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Cross Nation Active Travel Report

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Table of Contents

1.	Executive Summary	4
1.1.	Project Aims and Methods	4
1.2.	Key Findings	5
1.2.1.	Definitions	5
1.2.2.	Policy Landscape	5
1.2.3.	Data Collection and Monitoring	6
1.2.4.	Evidence from the Literature	6
1.3.	Gaps and Challenges	7
1.4.	Recommendations	7
2.	Background	9
3.	Approach	9
3.1.	Aims	9
3.2.	Methods	10
4.	AT definitions across the four national governments of the UK	10
5.	Overview of AT Context	12
5.1.	England	12
5.1.1.	Policy landscape	12
5.1.2.	Funding and Commitments	12
5.2.	Northern Ireland	13
5.2.1.	Policy landscape	13
5.2.2.	Funding and Commitments	14
5.3.	Scotland	14
5.3.1.	Policy landscape	14
5.3.2.	Funding and Commitments	17
5.4.	Wales	18
5.4.1.	Policy landscape	18
5.4.2.	Funding and Commitments	19
5.5.	Summary	19
6.	Monitoring and evaluation (M&E)	20
6.1.	England	20
6.1.1.	Data sources	20

6.1.2.	Future landscape	21
6.2.	Northern Ireland	21
6.2.1.	Data sources	21
6.2.2.	Future landscape	23
6.3.	Scotland	24
6.3.1.	Data sources	24
6.3.2.	Future landscape	26
6.4.	Wales	27
6.4.1.	Data sources	27
6.4.2.	Future landscape	29
6.5.	Data gaps	30
6.5.1.	National data on AT behaviours	30
6.5.2.	Data on AT behaviours following the introduction of an intervention or infrastructure change	31
6.5.3.	Data on outcomes associated with AT behaviours	32
6.6.	Discussion	33
7.	Comparison with literature	35
7.1.	Methods for literature search	35
7.2.	Results	36
7.2.1.	Target population	37
7.2.2.	Data collection methods	38
7.2.3.	Use of AT interventions	40
7.2.4.	Types of AT interventions	40
7.3.	Summary	42
7.3.1.	Gaps in the Literature	42
7.3.2.	Summary of objective tools used:	43
8.	Recommendations	44
9.	Reference List	46
10.	Appendix	61

1. Executive Summary

Active travel (AT) is increasingly recognised across all four UK nations as a critical lever for improving public health, tackling transport-related carbon emissions and addressing social inequalities. All governments have committed to expanding active travel as part of wider climate, health and transport strategies.

However, delivering on these ambitions requires a robust understanding of *who* is travelling actively, *where*, and *under what conditions*. Developing clear, consistent indicators and data collection practices is essential to guide evidence-informed policy, monitor progress toward Net Zero and ensure that interventions are equitable, effective and scalable.

The [PolicyWISE Cross Nation Cluster programme](#) fosters cross-national collaboration and knowledge exchange across key policy areas in the UK. In 2024, an Active Travel Cluster was convened, with participants identifying the need to map data and indicators used to monitor AT across the four UK national administrations.

This report was commissioned to fill this gap. It presents the findings of a cross-nation mapping exercise and rapid evidence review, offering a comparative overview of definitions, data collection practices, policy approaches and gaps in the monitoring and evaluation of AT across the four national governments of the UK.

1.1. Project Aims and Methods

The project aimed to:

- Identify and compare AT indicators across the four UK nations;
- Understand who collects what and how consistently;
- Highlight best practices in monitoring and evaluation (M&E);
- Conduct a rapid literature review to support comparative analysis.

Evidence was gathered via stakeholder meetings, organisational reviews and a targeted literature search.

1.2. Key Findings

1.2.1. Definitions

Definitions of AT vary across nations (see Table 1). While all include walking and cycling, inclusion of wheeling, scooting and mobility aids is inconsistent. Wales places particular emphasis on “purposeful journeys” (e.g., to school/work), while others include broader trip types. This finding may help policy makers harmonise inclusive definitions of AT, enabling more consistent data collection and policy development that better reflects the full spectrum of mobility needs, including those of disabled people.

1.2.2. Policy Landscape

All four national governments of the UK are committed to increasing walking, wheeling and cycling, recognising their role in addressing health inequalities, climate goals and sustainable mobility. However, their approaches vary:

- England centralised delivery through [Active Travel England \(ATE\)](#), underpinned by a national investment strategy (CWIS).
- Northern Ireland adopts a phased, place-based approach with strong local stakeholder engagement.
- Scotland integrates AT across multiple frameworks, including climate adaptation and 20-minute neighbourhoods.
- Wales legislates AT through the Active Travel (Wales) Act, supported by statutory mapping and national funding.

Understanding the varied policy approaches allows policy makers to identify effective strategies and structures, adapt best practices to their context and strengthen coordination across administrations and agencies.

1.2.3. Data Collection and Monitoring

AT definitions are different in each of the four national governments of the UK (see Table 1). Data collection also varies in method, frequency, granularity and coverage (see Table 2):

- Self-reported surveys dominate across all nations, with varying consistency in measures.
- Parent-reported and objective measures (e.g., global positioning system [GPS], accelerometry, counters) are used more selectively, especially in school-related metrics.
- Local authority data collection capacity is highly variable and often under-resourced.
- Scotland and Wales show more structured requirements for local monitoring linked to funding.

These findings can help policy makers improve the quality and comparability of AT data by investing in local monitoring capacity, increasing use of objective measures and embedding consistent data requirements in funding frameworks.

1.2.4. Evidence from the Literature

The literature review identified a predominance of studies focused on children and adults commuting patterns, with fewer studies addressing older adults and people with disabilities. Key findings include:

- Combined infrastructure and behavioural interventions are most effective in sustaining AT uptake.
- Objective data is more accurate but less widely used due to cost and complexity.
- There are significant data gaps regarding health outcomes, wheeling and impact on underserved populations.

This can help prioritise inclusive research funding, adopt evidence-based intervention design and address data blind spots, particularly around equity, health outcomes and less studied modes like wheeling.

1.3. Gaps and Challenges

- **Lack of standardised definitions hinders comparison across nations and studies.** Addressing this will support harmonised monitoring, joint learning and clearer benchmarking across the UK.
- Data inconsistencies and low evaluation capacity in local authorities **limit the ability to assess impact and value for money.** This highlights the need for targeted investment in local data infrastructure and skills to enable evidence-based policy and funding decisions.
- **Underrepresentation of key groups (e.g., older adults, disabled citizens) in research and monitoring reduces inclusivity.** Policymakers can use this insight to design more inclusive monitoring systems and ensure interventions benefit those who face the greatest mobility barriers.
- Health and environmental metrics are often absent in performance assessments. **Incorporating these metrics can help demonstrate the broader value of AT investments** and support cross-sector buy-in from health and environmental stakeholders.

1.4. Recommendations

1. **Develop and adopt harmonised definitions and measurement indicators** to enable consistent and meaningful cross-nation comparisons of active travel data. This will support a unified understanding of progress across then nations and enable benchmarking, policy alignment and shared learning.

2. Support local authorities by **fostering academic partnerships** and utilising tools such as the Active Travel Scheme Sketcher and the Sustrans Evaluation Toolkit to improve data collection and analysis. This will help build local capacity to evaluate interventions effectively and make evidence-based decisions investment.
3. Ensure **data collection frameworks explicitly capture walking, cycling and wheeling among diverse groups**, including disabled people, older adults and those with protected characteristics. This will enable more inclusive policy development and ensure that active travel interventions do not inadvertently reinforce existing inequalities.
4. Prioritise the collection of **objective and longitudinal data to accurately assess the health, environmental and economic impacts** of active travel initiatives. This will provide a robust evidence base to demonstrate long-term value, cost effectiveness and impact on population-level outcomes.
5. Promote **cross-nation sharing of effective practices and lessons learned** to support evidence-informed policy development and delivery. This will accelerate improvement by enabling decision makers to learn from successful models and avoid repeating known implementation challenges.
6. Enhance **collaboration between local authorities, third-sector organisations and other stakeholders to explore data sharing** and linkage opportunities, optimising the use of available data and resources. This will improve the completeness and utility of data sets, supporting more holistic and joined-up analyses of active travel behaviour and outcomes.
7. **Improve transparency and coherence by clearly mapping and linking related policy documents** to demonstrate how strategic objectives align and reinforce one another. This will help stakeholders identify synergies across policy areas and foster greater accountability in achieving active travel and net zero goals.

2. Background

The [PolicyWISE Cross Nation Cluster programme](#) is designed to foster collaborative communities of interest and support knowledge exchange across key policy areas within the four UK nations. These communities provide a platform for sharing ideas and addressing common policy challenges through evidence review, policy comparison and the co-production of reports and research. The cluster model was designed by Dr Eira Jepson, PolicyWISE Research Associate.

In 2024, PolicyWISE convened an Active Travel Cluster, which met twice. At the second workshop, participants were invited to co-develop research questions grounded in shared priorities, with the aim of shaping tangible project proposals. One proposal that emerged was to undertake a mapping exercise of the data and indicators currently used to monitor AT across the UK nations. It was felt that this work would support comparative analysis and enhance understanding of progress and impact. An initial output suggested by the group was a report offering an overview of the similarities and differences in national data and approaches. This work was undertaken by a team at Cardiff University.

3. Approach

Between March and June 2024, the project team met with representatives from the four national governments of the UK, Sustrans and Living Streets. In parallel, a rapid literature search was conducted to support the project's agreed aims by identifying relevant evidence and policy developments.

3.1. Aims

The aims of the project were:

- To identify the main AT indicators collected by governments across the four national governments of the UK, examining what they capture, what they miss and how they compare.

- To identify other impact measures related to AT, determine who collects them, compare them across nations and highlight examples of best practices in monitoring and impact assessment.
- To conduct a rapid review of the literature on AT across the four national governments of the UK to identify relevant datasets and indicators.

3.2. Methods

The following methods were used to conduct the work:

- Meetings with key stakeholders and searches of relevant organisation websites to determine what data / indicators are being collected.
- A comparison of the data / indicators being collected across the four national governments of the UK to identify synergies and differences.
- A rapid review of published literature on AT across the four UK nations from 2000 onwards.

The findings gathered through these methods have been synthesised and presented in this report. The structure includes a section detailing definitions, an overview of the AT context in each of the four national governments of the UK, data collection practices, identified gaps and a comparative analysis with the existing published literature.

4. AT definitions across the four national governments of the UK

Table 1 presents the definitions of AT used across the four UK nations, supplemented with insights gathered from stakeholder meetings. The table highlights both formal policy definitions and how AT is understood in practice, including variations in emphasis, such as whether definitions explicitly include walking, wheeling, cycling, or other non-motorised modes. The additional information provides context on how definitions have evolved or are applied in different settings, reflecting the influence of national strategies, legal frameworks and local priorities.

Table 1: Definitions of AT with additional information gathered from meetings

	England	Northern Ireland	Scotland	Wales
Formal definition	Everyday journeys made by walking, wheeling, or cycling. It includes trips that are made by foot, pedal-cycles, e-cycles, adapted cycles, wheelchairs, mobility scooters and push-scooters (National Audit Office 2023).	Walking, wheeling, or cycling primarily, but also includes running, or wheeling unaided, as well as using any kind of mobility aids such as electric wheelchairs, mobility scooters or walking frames. People pushing prams or buggies are also included in this definition, as well as other modes such as scooting, skateboarding, and rollerblading/roller skating. Cycling refers to users of pedal cycles, but not motorbikes. The definition includes e-cycles and non-standard cycles, such as adapted cycles (cycles or tricycles, specially adapted for use by disabled people), cargo cycles and recumbents (Department of Infrastructure 2024a).	Journeys made by modes of transport that are fully or partially people-powered, irrespective of the purpose of the journey. It includes walking, people using wheelchairs, cycling (including e-bikes). ‘Walking and wheeling’ represents the action of moving as a pedestrian, whether or not someone is walking or wheeling unaided or using any kind of wheeled mobility aid, including wheelchairs, mobility scooters, walking frames, prams or buggies (Transport Scotland, 2023).	Walking, wheeling, or cycling for purposeful journeys to destinations such as school or work, either alone or combined with public transport. These journeys prioritise utility over leisure, pleasure, or health benefits alone (Active Travel Board, 2024).
Additional information	Multimodal trips are included only if AT constitutes the major part. Electric scooters, mopeds and horse riding are excluded.		Considers short journeys by walking 2 miles or less and by cycling 5 miles or less as AT journeys.	A journey qualifies as AT if it includes at least 10 minutes of walking or wheeling, or any duration of cycling, including multimodal trips involving public transport.

5. Overview of AT Context

5.1. England

5.1.1. Policy landscape

The Department for Transport (DfT) established [Active Travel England \(ATE\)](#) in August 2022. ATE leads and coordinates the delivery of the government's ambition to increase levels of walking, wheeling and cycling.

The second [Cycling and Walking Investment Strategy \(CWIS2\)](#), launched in May 2022, outlines a range of targets and capital and revenue funding for AT between 2021 and 2025. ATE delivers it through a range of initiatives designed to make AT more inclusive and accessible. These included the expansion of the [National Cycle Network](#), an e-cycle support programme and the distribution of bike repair vouchers. These interventions specifically aimed to reduce access barriers for individuals with protected characteristics, enabling more people to walk, wheel, or cycle with confidence (Department for Transport, 2022).

Working in partnership with local authorities (LAs) and other stakeholders, ATE is overseeing the implementation of extensive walking and cycling infrastructure, safer crossings, widened pavements and traffic-calmed streets to support and encourage AT (Active Travel England, 2024).

5.1.2. Funding and Commitments

To tackle the key barriers limiting the uptake of AT, such as substandard infrastructure, inconsistent incorporation of AT in local planning, limited capacity and expertise within LAs and public concerns regarding safety and cycling confidence (National Audit Office, 2023), the previous government committed £2 billion over five years to transform how people move in towns and cities, with a goal for 50% of urban journeys to be walked or cycled by 2030.

5.2. Northern Ireland

5.2.1. Policy landscape

The [Active Travel Delivery Plan \(2024\)](#) outlines a comprehensive strategy to develop a network that connects people to key destinations for daily journeys, promoting a sustainable shift towards AT. The plan identifies opportunities for improvements, particularly at road junctions and adopts a holistic approach to street design, prioritising vulnerable road users. This includes enhancing areas around schools to support safer journeys to school, encouraging pupils and the wider school community to adopt AT. Key focus areas include education facilities, transport interchanges and town centres, while also considering broader trip origins and destinations (Department of Infrastructure 2024a).

Drawing on best practices from the UK and lessons from Ireland, the delivery plan avoids specifying infrastructure types, such as segregated routes, instead tailoring solutions on a scheme-by-scheme basis. Local community engagement and collaboration with stakeholders are integral to the design process. The plan aims to deliver high-quality, safe, accessible and interconnected AT infrastructure across urban and rural areas over the next decade, encouraging more people to integrate walking, wheeling, or cycling into their daily routines (Department of Infrastructure, 2024a).

The [Active Travel Delivery Plan](#) is being implemented in phases, starting with priority routes, delivering over 200 km of high-quality infrastructure within the first 10 years, followed by Future Routes, adding over 1,000 km to create an accessible and inclusive network. Route prioritisation will be periodically reviewed to reflect changes in local priorities, travel patterns and infrastructure needs (Department of Infrastructure, 2024a).

The plan complements other initiatives, such as the [Belfast Cycling Network Delivery Plan](#), the [Strategic Plan for Greenways](#) and other signature projects, providing a robust

foundation for delivering AT infrastructure across Northern Ireland over the next decade and beyond (Department of Infrastructure, 2024a).

The [Department of Infrastructure](#) collaborates with multiple partners to promote AT. Sustrans play a key role, alongside public health organisations, through initiatives like [Connect2](#). Local councils contribute to the construction and maintenance of greenways, while schools deliver cycle proficiency schemes. Other departments, including Transport, Agriculture, Rural Development, Communications, Education and Health, support AT projects. Central public health agencies lead efforts to promote active school travel.

5.2.2. Funding and Commitments

The [Department of Infrastructure](#) has recently allocated £1.9 million to fund seven AT projects across the 2024-25 and 2025-26 financial years. These initiatives, supported by local councils, include enhancements to pedestrian and cycle routes, upgraded route lighting, improved connective infrastructure, the introduction of e-bikes and support for better AT connections and enabling infrastructure, alongside other AT infrastructure improvements. (Department of Infrastructure, 2025)

5.3. Scotland

5.3.1. Policy landscape

The [Active Travel Framework](#) outlines Scotland's key policy strategies to boost walking and cycling participation. It aims to increase the number of individuals choosing walking, cycling and wheeling, while ensuring these activities are safer and accessible to everyone. The framework prioritises the development of high-quality infrastructure for walking, cycling and wheeling, making these options widely available. It also promotes collaboration with various partners to support the delivery of these initiatives (Transport Scotland, 2023).

The [Physical Activity for Health: Framework](#), part of the [Active Scotland Delivery Plan](#), sets national goals to encourage physical activity. These goals are framed around eight evidence based sub-systems that constitute the physical activity system as a whole: active systems; active places of learning; AT; active places and spaces; active health and social care; active communications; active sport and recreation and active workplaces (Scottish Government, 2024).

The [National Transport Strategy 2](#) is underpinned by four priorities: reducing inequalities; taking climate action; helping deliver inclusive economic growth; improving health and wellbeing. AT measures should be designed such that AT is prioritised over planning for the private car (Transport Scotland, 2023).

The [Cycling Framework for Active Travel – A plan for everyday cycling](#) describes six strategic themes: safe cycling infrastructure; effective resourcing; fair access; training and education; network planning and monitoring. The [Cycling Framework and Delivery Plan for Active Travel in Scotland](#) (2022-2030) seeks to develop evidence-based AT strategies and maps for each local authority, outlining plans to enhance AT networks and facilities by 2030. It focuses on creating a dense, cohesive network of traffic-separated cycling infrastructure in every town and city, integrated with public transport and linked to rural routes that connect to the trunk road network and the [National Cycle Network](#). The [National Walking and Cycling Network](#) oversees the development and upgrading of routes to form a comprehensive national network. The delivery plan prioritises investment in cycling infrastructure that integrates with public transport in urban areas and connects to inter-urban and rural routes, building on the [National Cycle Network](#) and proposals for active freeways in the [Strategic Transport Projects Review 2 \(STPR2\)](#) (Transport Scotland, 2023).

The [Let's get Scotland Walking - The National Walking Strategy](#) (2016-2026) is Scotland's national walking policy with an associated action plan that aligns with the [Active Travel](#)

[Strategy Guidance](#) content. It aims to create a walking culture, by developing and maintaining appealing, well-designed walking environments. The strategy aims to make walking easier, more convenient and accessible for people of all ages and abilities (Scottish Government, 2014).

Scotland's [Road Safety Framework](#) to 2030 aims to create a road traffic system free from deaths and serious injuries, with a focus on enhancing safety for pedestrians and cyclists. It includes a specific target to reduce cyclist casualties under the 'Safe Roads and Roadsides' outcome, alongside measures like speed limit reductions and promoting safer, positive behaviours in areas where further safety improvements are challenging (Transport Scotland, 2019).

The [Climate Change \(Scotland\) Act 2009](#) places a duty on Ministers to set out a new Adaptation Plan every five years. The latest [Climate change: Scottish National Adaptation Plan 2024-2029](#) outlines a list of actions for a climate resilient future, for the transport system this includes: embedding adaptation across transport; knowledge exchange; resilient AT routes and transport just transition plan. The update to the [Climate Change Plan 2018 –2032](#) (December 2020) predicts that a well-connected, innovative public transport system will encourage more people to prioritise sustainable travel options. Alongside this, [Achieving Car Use Reduction in Scotland: A Renewed Policy Statement](#) commits to reducing a reliance on cars by 6% by 2035 in order to reach net zero by 2045. A £500 million investment was allocated for AT projects to revolutionise the movement by improving access to bikes and e-bikes and delivering high-quality infrastructure for walking, wheeling and cycling (Scottish Government, 2020).

The [Fourth National Planning Framework](#) establishes a national [Planning Policy](#) to promote 20-minute neighbourhoods, where daily needs are accessible within a short walk, wheel, or cycle from home. These neighbourhoods depend on the strategic placement of housing and services, supported by environments that encourage AT and

provide strong public transport connections. Measures such as [low traffic neighbourhoods](#), new pathways and 20 mph speed limits will help foster the development of 20-minute neighbourhoods (Scottish Government, 2023).

Additionally, [Central Scotland Green Network](#) with the [Green Action Trust](#) are coordinating to create and connect the green infrastructure in central Scotland including AT path networks which will include, but be denser, than the [National Cycling Network](#) (Transport Scotland, 2023).

[Cleaner Air for Scotland 2](#) highlights that shifting from private car use to AT can reduce transport-related emissions that contribute to poor air quality. Key goals include creating a transport system that supports AT, improves public transport, adopts new technologies and limits private vehicle use, particularly in urban areas with high pollution and congestion. The introduction of [Low Emission Zones](#) in Scotland's four largest cities is also a critical measure (Scottish Government, 2021).

5.3.2. Funding and Commitments

The [Active Travel Infrastructure Fund \(ATIF\)](#) has replaced the [Cycling, Walking and Safer Routes \(CWSR\)](#) fund. Under its initial plan, Transport for Scotland will allocate £188.7 million to support high-quality AT and bus infrastructure, promote sustainable travel integration and encourage behaviour change to boost walking, wheeling and cycling for short daily trips. In 2025-26 the total funding provided directly to LAs through Tier 1 will be £37.5 million (an increase from £35 million provided in 2024-25) (Transport Scotland, 2025). A total of £26 million was confirmed in May 2025 for Tier 2 of the active travel infrastructure fund, which is available for LAs, [Regional Transport Partnerships](#) (RTPs) and National Park Authorities for construction-ready projects (Transport Scotland, 2025). The People and Place Programme supports behaviour change interventions, £23.4 million has been confirmed to support Scotland's [seven statutory RTPs](#) to commission and deliver programmes of active travel behaviour change interventions on a regional

basis (Transport Scotland, 2025). Additionally, £4.5 million is available to LAs to directly deliver and commission their own behaviour change interventions (Transport Scotland, 2025).

5.4. Wales

5.4.1. Policy landscape

The [Active Travel \(Wales\) Act 2013](#) promotes continuous improvement in AT infrastructure by requiring LAs to develop and enhance AT routes and facilities. LAs must create and update [Active Travel Network Maps](#) (ATNMs), which outline existing and proposed routes to support AT (Active Travel Board, 2024). ATNMs continue to be a vital resource for understanding existing infrastructure and provision.

The [Active Travel Delivery Plan 2024–2027](#) sets out measures to encourage a modal shift towards AT by making it more accessible, safer, appealing and inclusive (Welsh Government, 2024). This aligns with [Llwybr Newydd](#), the Welsh Government’s 2021 transport strategy, which aims for 39% of all journeys to be sustainable by 2030, rising to 45% by 2040 (Welsh Government, 2021).

The [Environment \(Air Quality and Soundscapes\) \(Wales\) Act 2024](#), enacted on February 14, 2024, mandates Welsh Ministers and LAs to promote AT to reduce or limit air pollution, with provisions allowing this duty to be extended to other public authorities through regulations (Welsh Government, 2024).

Additionally, on March 31, 2025, the Welsh Government introduced the [Bus Services \(Wales\) Bill](#), which aims to create a cohesive, safe, integrated, environmentally sustainable, efficient and economical public transport network that meets public transport needs (Welsh Government, 2025).

5.4.2. Funding and Commitments

The Welsh Government announced in 2023 over £72 million for new AT routes and detailed planning for 22 additional routes, £3 million to improve primary routes on the strategic road network and funding for 30 [Safe Routes in Communities](#) schemes across 17 LAs (Active Travel Board, 2024).

Key commitments also include:

- Developing high-quality infrastructure to enhance the [National Cycle Network](#) and strategic road network, while reducing physical barriers, particularly for people with protected characteristics.
- Maintaining current investment levels for LAs through the [Active Travel Fund](#) and Safe Routes in Communities funding. This is a changing picture in light of the regionalisation of transport grants where [Corporate Joint Committees](#) (CJCs) will now be responsible for deciding how transport allocations are spent in their regions.
- Strengthening the [Transport for Wales](#) AT hub by improving design expertise and programme management capacity.
- Improving access to procurement frameworks for AT projects.
- Enhancing AT facilities at public transport interchanges, integrating AT into journey planners and improving provisions for carrying cycles, mobility scooters and prams on public transport.

5.5. Summary

All four UK nations share a strategic commitment to promoting AT as a sustainable mode of transport, recognising its benefits for health, the environment and climate action. Common priorities include improving infrastructure, enhancing safety and embedding AT into local planning frameworks. Each nation also emphasises inclusivity, aiming to reduce barriers for groups with protected characteristics. However, their approaches differ in structure and emphasis. England has created a centralised agency (Active Travel England) to lead delivery, whereas Northern Ireland's strategy is more decentralised,

with phased route development and strong community engagement. Scotland adopts an integrated, multi-policy approach linking AT with climate adaptation, spatial planning (e.g. 20-minute neighbourhoods) and national frameworks, while Wales enforces a legislative approach via the Active Travel Act, supported by national network mapping and continued capital investment. The scale of financial commitments also varies, with England committing £2 billion over five years, while Wales allocated £72 million in 2023 for specific infrastructure schemes. Each nation is tailoring its approach to local contexts, governance structures and broader policy ambitions.

6. Monitoring and evaluation (M&E)

6.1. England

6.1.1. Data sources

Progress toward CWIS2 goals is tracked using the [National Travel Survey \(NTS\)](#), completed by approximately 15,000 respondents, for national and regional insights and the [Active Lives Survey](#), completed by approximately 200,000 respondents, for local data. These surveys monitor metrics like the proportion of trips under five miles, that are currently dominated by car travel, but which could shift to walking, wheeling or cycling, walking and cycling activity levels, walking to school activity levels and pedestrian and cyclist safety trends (Department for Transport, 2022).

ATE is working closely with LAs to map AT infrastructure and standardise data collection across project lifecycles. Tools like the [Active Travel Scheme Sketcher](#), developed with the Alan Turing Institute, help assess LAs capabilities, from planning to delivery, enabling targeted support for high-quality infrastructure. It aims to set high standards for AT infrastructure, new development design, engagement, training and behaviour change to make walking, wheeling and cycling the natural choices for shorter journeys, or as part of a longer journey by 2040. An inspectorate team assesses infrastructure from design through to completion, using pre-post scores that influence future funding. While LA

monitoring is currently limited, guidance is provided to improve evaluation, especially for schemes over £2 million, where 5–10% of the budget is advised for M&E.

The DfT also conducts independent evaluations of major funding programs, such as the [Active Travel Fund](#), which focuses on [low traffic neighbourhoods](#) and segregated cycle lanes. This includes increasing social research and evaluation expertise and capacity, providing guidance and frameworks for monitoring and evaluating schemes, improving the consistency of data collected and designing evaluation activity to provide timely access to robust and reliable evidence (National Audit Office, 2023).

6.1.2. Future landscape

Current definitions are framed within the Cycling and Walking Investment Strategy 3 (CWIS3), which is currently under development.

To address data gaps, ATE is collaborating with Sheffield Hallam University on a 2022–2027 [Active Travel Portfolio National Evaluation](#). This initiative aims to deepen understanding of how AT schemes are implemented, their impact on encouraging walking and cycling and their value for money (Sheffield Hallam University, 2022).

6.2. Northern Ireland

6.2.1. Data sources

The [Travel Survey for Northern Ireland](#) (TSNI) is an annual household survey that gathers data on travel behaviours, including distances travelled, modes of transport, commuting patterns and AT activities like walking and cycling. Data are collected from 1920 households in Northern Ireland, sampled in such a way as to be representative of all households. Due to small sample sizes, three years of data are typically combined for robust analysis, except for the 2020 survey, which was reported as a single year due to methodological changes caused by the COVID-19 pandemic. The 2021 report provides insights into distances, journey numbers, travel modes and variations by age, sex and disability, although data by Local Government District was not reported in 2021 due to

low sample sizes (last available from 2017–2019) (Northern Ireland Statistics and Research Agency, 2025).

Active and sustainable travel behaviours are also collected in the [Continuous Household Survey](#), last conducted in 2020-21. This includes information on the percentage of people who normally walk or cycle to or from work, people's propensity to walk or cycle for short journeys of less than 2 miles and their satisfaction with the current situation for walking or cycling and public transport in their area.

To prioritise investments, an assessment framework has been developed to evaluate potential AT routes. This framework incorporates user needs, informed by data on population density, local amenities and attractions, as well as insights from regional transport teams and stakeholders, including local councils, Sustrans, the [Inclusive Mobility Transport Advisory Committee](#) (IMTAC) and [Translink](#). The framework assesses how well routes connect to places of interest, such as schools, leisure facilities, employment areas and other amenities, while also considering barriers like land ownership or ecological issues. It prioritises connections that deliver significant benefits, such as links to schools, public transport and town centres (Department of Infrastructure, 2024a).

A detailed [AT network map](#) has been created for all towns and cities with populations exceeding 5,000, based on 2021 census data, with the exception of Belfast, where the [Belfast Cycling Network Delivery Plan](#) (2022) takes precedence.

The [Walking and Cycling Index](#), conducted by Sustrans, provides additional data on walking, wheeling and cycling in Belfast and across the UK. This survey includes local data, modelling and independent resident surveys for those aged 16 years and above (Sustrans, 2021). For active travel to school (ATS), the [Continuous Household Survey](#) (2023/24) collects parent-reported data on primary and post-primary pupils' main travel

methods, including the proportion who walk or cycle (Department of Infrastructure, 2024b).

AT infrastructure is monitored using counters on greenways, key routes and cycling paths, primarily around Belfast. However, these are not centrally managed by the government and are typically used by agencies for specific, time-limited projects.

6.2.2. Future landscape

The [Active Travel Delivery Plan](#) (2024) for Northern Ireland sets out a forward-looking strategy to make walking, wheeling and cycling safe and accessible for everyone over the next ten years and beyond and structured plans to measure AT related outcomes are currently being developed.

Key objectives include:

- Inclusive AT: Enabling people of all ages and abilities to confidently choose AT for short, everyday journeys.
- High-Quality Infrastructure: Delivering safe, accessible and consistently designed walking, wheeling and cycling infrastructure in urban and rural areas.
- Community Benefits: Creating safer streets, cleaner air and vibrant community spaces through AT networks.
- Seamless Connectivity: Developing an integrated AT network, supported by greenways, inter-urban routes and signature projects.
- Network Mapping: Providing detailed AT network maps, organised by council area, with proposed priority routes, future connections and enhancement opportunities, accessible via interactive online platforms.

Strategic Implementation

- Signature Projects: Introducing a rolling program of major AT projects to enhance network connectivity.

- **Complementary Plans:** Aligning with the Belfast Cycling Network Delivery Plan and Strategic Plan for Greenways to ensure cohesive infrastructure development.
- **Street Rebalancing:** Adjusting street spaces by narrowing carriageways, optimising parking, and reconfiguring bus stops to prioritise safe and equitable access.
- **Traffic Management:** Implementing measures like lower speed limits, one-way systems, and restricted vehicle access in people-focused areas to enhance safety for pedestrians and cyclists.

Public Engagement

- The plan invites public feedback on road space allocation and traffic management principles to ensure the AT network meets community needs, fostering a collaborative approach to building a connected, sustainable future for Northern Ireland.

6.3. Scotland

6.3.1. Data sources

The [Scottish Household Survey](#) is an annual survey with approximately 10,000 adult respondents, which asks about all the journeys which they made the previous day, as well as information about the mode, purpose, duration and length of these journeys. It provides high level indicators on walking and cycling.

The [Hands Up Scotland Survey](#) is funded by Transport Scotland and is a joint survey between Sustrans and all 32 Scottish LAs. It is conducted every September and provides an annual snapshot of school travel. It looks at how pupils across Scotland travel to primary and secondary school and nursery, providing an insight into journeys to school for more than a decade and is the largest national dataset on school travel.

The [Network Planning Tool for Scotland](#) (NPT) 2023, a planning support system, research project and web application to support strategic planning for AT, is focused on cycle

network planning and builds on the Department for Transport funded [Propensity to Cycle Tool](#) for England and Wales. The NPT uses data from the census and other reliable sources to estimate cycling uptake across Scotland. It estimates what journeys could be taken by cycling based on where people live, work, shop and socialise and the distances and hills between them. Routing algorithms optimised for cycling assigns journeys to the existing road and path network, resulting in cycling network flows for planning fast (direct), quiet (low traffic) and balanced (intermediate traffic) routes. This evidence on estimated baseline and future potential cycling levels is provided at the network level, down to individual streets and cycleways nationwide across Scotland, allowing it to be used for planning and prioritising investment in joined up and cost-effective cycle networks. It is designed to be used by local authorities, community groups and other organisations to help them plan for cycling, but is open access and can be used by anyone to support more evidence-based and data-driven discussions about and decisions on cycling infrastructure and investment.

[Cycling Scotland](#) currently uses three primary methods of data collection. They refer to the network of counters, located in every LA in Scotland and the temporary traffic surveys, conducted twice annually (May and September) across 100 different locations in Scotland as part of the national [Monitoring Framework](#). These complement existing monitoring schemes such as the [Scottish Household Survey](#), the [Hands Up Scotland Survey](#) (Sustrans Scotland), the [Walking and Cycling Index](#) (Sustrans) and the [WOW Travel Tracker](#) (Living Streets) to build a picture of cycling across the country. Cycling Scotland commissioned a longitudinal survey, funded by Transport for Scotland from 2017- 2023 to understand the perceptions of and barriers to cycling, and changes over time, in the Scottish population.

The [Walking and Cycling Index](#) (formerly Bike Life) is an assessment of walking, wheeling and cycling in urban areas in the UK conducted by Sustrans and reported every two years. The first report for Scotland, published in 2023 aggregates data from [Scottish Walking](#)

[and Cycling Index cities](#). It includes local walking, wheeling and cycling data, modelling and an independent survey of 9,688 residents aged 16 years or above in eight Scottish Index cities. The survey was conducted from March to June 2023. Social research organisation [NatCen](#) conducted the survey, which is representative of all residents, not just those who walk, wheel or cycle.

The [Walking and Wheeling Report 2023](#) details the findings from a national survey of attitudes, opinions and barriers to walking and wheeling in Scotland. It updates information last collected in 2019 and complements other sources such as the [Scottish Household Survey](#) and Scotland's [People and Nature](#) survey. In June 2025, Scotland rebranded its [Paths for All](#) Survey 2023 (National Walking and Wheeling Survey) as the Walking Scotland Survey to emphasise walking and wheeling data, recognising these as the most sustainable travel modes.

6.3.2. Future landscape

Scotland's 2030 Vision for AT seeks to transform communities by making walking and cycling the most popular choices for short, everyday journeys, fostering healthier, more inclusive, equitable and prosperous places. The following strategic objectives outline the future landscape, delivering sustainable, safe and economically vibrant communities:

- **Healthier and Safer Environments:** Safe, accessible spaces will make walking, cycling and wheeling natural choices, promoting healthy lifestyles, preventing disease, reducing health inequalities and enhancing well-being.
- **Reduced Inequalities:** Expanded AT networks will provide equitable access to jobs, services and leisure for all, including children, older adults, people with disabilities and low-income individuals.
- **Lower Carbon Emissions:** Greater adoption of walking and cycling will decrease motorised transport use, reducing pollution and emissions to address climate change and improve air quality, with added health benefits.

- **More Pleasant Communities:** Places designed for AT will enhance pedestrian and cyclist safety, creating practical, connected and vibrant spaces that improve community life.
- **Sustainable Economic Growth:** AT focused communities will attract investment and economic activity, becoming desirable places to live, work and enjoy, with walking, cycling and wheeling driving economic benefits.

6.4. Wales

6.4.1. Data sources

LAs are required to report to the Welsh Government on usage levels of the AT network. For schemes that receive funding, LAs must provide annual reports for three years following the allocation of funds. This monitoring activity is expected to be covered by the core financial allocations provided to LAs.

The primary source of AT data for residents aged 16 years and above is the [National Survey for Wales](#), conducted annually since 2013–2014. The AT data are collected from a sub-sample of 2000 survey respondents. In 2017–2018, the threshold for walking to qualify as AT was increased from 5 to 10 minutes. Data collection was disrupted in 2020–2021 due to the COVID-19 pandemic, with results not publicly released. The survey captures data on journey frequency, transport mode and demographics (e.g., sex, urban/rural classification and general health).

The [Wales National Travel Survey](#) (WNTS), commissioned by Transport for Wales (TfW) and re-launched in March 2025, gathers information on travel attitudes and behaviour. Its main target is adults aged 16 years and above, with a secondary interest in children to capture school trip data. A total of 15,000 households are invited to take part, with an anticipated response rate of around 33% (5000 responses). The WNTS aims to provide robust evidence for decision-makers to understand travel behaviour and trends over time, addressing gaps in current data sources (Transport for Wales, 2024). The [Census](#)

also provides commuting data but is known to underreport AT (Public Health Wales, 2024).

The [Travel to School Hands Up Survey](#), managed by Public Health Wales, collects data in classrooms, where teachers record pupils' modes of transport to school based on a show of hands. The data is intended for surveillance and to inform action at LA and school levels, though it lacks additional contextual details. NB: this has been paused for 2025.

The [School Health Research Network](#) (SHRN) administers a [Secondary School Environment Questionnaire](#) biennially that captures data on topics such as physical activity and AT in SHRN member schools. Their most recent report, published in 2023, included responses from 193 secondary schools across Wales. Work is also ongoing to include primary schools, with half of all primary schools registered for data collection in 2024.

Other sources of AT data among school children include the [Travel Tracker](#) conducted by Living Streets and Tali Teithio and self-report hands up surveys by Sustrans, both targeting primary and secondary school pupils in schools that have engaged with their AT behaviour change programmes. These aim to increase AT rates and inform policy at local and school levels.

For M&E, the Active Travel Advisory Group (ATAG) with Sustrans recommended four core tools for LAs to include in scheme M&E plans (pre-and post-implementation) (Sustrans 2024):

- User surveys
- Pedestrian and cycle counts
- Resident surveys (household or postal)
- School hands-up surveys

Additional methods, such as cycle parking counts, interviews, focus groups and mobile app data, are also encouraged. LAs are advised to collect data (compared against a 2016 baseline) on:

- Number of AT trips
- Percentage of children walking or cycling to school
- Percentage of work-related trips by walking or cycling
- Percentage of AT journeys.

Related data on behaviour, including climate change-related behaviours and attitudes, are gathered through periodic survey waves and offer complementary insights. For example, the latest [Climate Change perceptions and actions survey](#).

6.4.2. Future landscape

With the transition to regional funding, there is uncertainty about the continuity of these core allocations. Regional funding will be managed by four [Corporate Joint Committees](#) (CJCs), which will be responsible for prioritising, allocating and delivering their local transport delivery plans. This shift will necessitate the development of regional monitoring frameworks. However, the implications for the quality and consistency of data are not yet clear, particularly given the shift toward collecting multi-modal travel data rather than data solely focused on AT.

The [monitoring and evaluating AT schemes toolkit](#) developed by Sustrans for TfW, launched in 2025, aims to support LAs in collecting data, the intention is that the toolkit will enable a consistent number of sites across Wales to collect data over time, supporting more reliable local monitoring (Transport for Wales and Sustrans, 2025).

Monitoring of the 20mph policy will include a dedicated survey examining AT behaviours and broader behaviour change. The baseline data that informed the introduction of the policy also captured public perceptions of safety.

6.5. Data gaps

Key data gaps were identified during the stakeholder meetings and in the documents available in the four national governments of the UK, as summarised below.

6.5.1. *National data on AT behaviours*

These either come from general national surveys (all four national governments of the UK) or national travel surveys (England, Northern Ireland, Wales in 2025).

Limitations of these datasets include:

- Their reliance on self-reported data rather than objective measures.
- Small sample sizes, which limit detailed examination of AT behaviours by area or individual characteristics. This means that national data on important groups who might require additional support and intervention, such as older adults or disabled citizens, are lacking.
- A lack of targeting of data collection to areas of significant infrastructure investment.
- No longitudinal data collection with the same individuals to assess changes in behaviour over time.
- A lack of consistency in the approaches used by the four national governments of the UK to assess AT (see examples of latest data in Table 2), making comparisons between the nations difficult.
- Changes in the questions used to assess AT, making comparisons over time difficult.

Table 2: Examples of the AT measures presented in the latest national survey reports

Country	Data source	Data presented
England	National Travel Survey 2023 report, using annual data from 2022	Average cycling trips and miles travelled per person per year Percentage of cycling trips per person per year by trip purpose Average walking trips and miles travelled, including walking of a mile or more, per person per year Percentage of walking trips per person per year by trip purpose
Northern Ireland	Travel Survey for Northern Ireland 2021	Percentage of journeys made by different modes How often people walk Average distance travelled by mode Percentage of people walking or cycling to work
Scotland	Transport and Travel in Scotland 2022	Percentage of journeys under 2 miles that are made by the two main AT modes: walking and cycling
Wales	National Survey for Wales 2022-23, using annual data from 2018-19	Percentage of people who cycled once a week for AT purposes Percentage of people who walked once a week for AT purposes Percentage of people that travelled by cycling at least once a month Frequency of AT by walking

6.5.2. Data on AT behaviours following the introduction of an intervention or infrastructure change

Data are collected when behavioural and/or infrastructure schemes are implemented, to measure changes in AT during the implementation of behavioural interventions. However, both our interviewees and key reports (such as National Audit Office, 2023) identified several weaknesses in these data collection systems, resulting in datasets that differ in scope, format and reliability. It is therefore difficult to compare schemes across regions or draw meaningful conclusions about the effectiveness of interventions.

The identified weaknesses include:

- Inconsistent collection of baseline data, limiting the ability to assess whether there were changes in AT after implementation.
- Data collection being restricted to the period during and/or immediately after the implementation of an intervention, with no data collected in the long-term or on a longitudinal basis.
- Lack of data collection on safety issues (e.g., near misses or accidents) on AT routes.
- Less focus on data collection related to walking (other than school-based data) or wheeling interventions. In fact, data collection on wheeling is very limited, potentially limiting the inclusivity of AT schemes, as the needs of this group are not adequately understood or addressed.

Explanations for these weaknesses included:

- A lack of funding for long-term and/or longitudinal data collection.
- A lack of data collection and analysis expertise and/or the capacity to complete this work within LA teams.
- The fact that organisations collect data related to the schemes that they implement, but that there is no data sharing or linkage (for example, between third sector organisations and LAs) to create consistent or more comprehensive datasets.

6.5.3. *Data on outcomes associated with AT behaviours*

One of the most critical gaps identified by the NAO is the absence of a structured plan to measure the wider benefits of AT investments, such as contributions to health, environmental sustainability, economic gains and societal well-being (National Audit Office, 2023).

Information is urgently needed on:

- Whether and how increasing AT leads to improved physical and mental health outcomes.

- Whether and how increasing AT leads to wider benefits, such as such as associations with social interaction or loneliness, with household finances (e.g., examining how a modal shift from car journeys to cycling, walking or wheeling affects household expenditure), and with community benefits (e.g., community cohesion, or benefits to high-street footfall and spending as collected for the [Pedestrian Pound](#) report by Living Streets).
- The most impactful outcomes to study, given that potential changes in some outcomes may only become apparent in the long-term.
- Whether novel approaches to AT interventions (such as social prescribing) result in increased AT.
- In addition, the DfT's [Transport Decarbonisation Plan](#) sets ambitious targets to reduce carbon emissions from transport, but there is no mechanism to track how AT schemes contribute to these goals (National Audit Office, 2023).

Some work is being conducted to fill these gaps. For example, the DfT's [Active Mode Appraisal Toolkit](#) (AMAT) currently includes mortality benefits and is being expanded to cover morbidity. This work, delivered with DfT economists and Sheffield Hallam University, aims to model broader health outcomes.

6.6. Discussion

At the 2024 Active Travel Conference with Leicester City Council, Chris Whitty, England's Chief Medical Officer and UK Government Chief Medical Adviser since 2019, highlighted that AT yields greater health benefits for individuals with low to moderate exercise levels compared to those already highly active. He emphasised that focusing AT initiatives on children, older adults, people with disabilities and specific ethnic groups, particularly in deprived areas, would deliver more substantial health and economic benefits than the current focus on younger adults. Whitty also noted that AT supports the economy by reducing years spent in ill health, easing the burden on health care and social care

systems, extending working years by preventing early retirement due to ill health and enabling more adults to remain in the workforce by reducing caregiving responsibilities.

Current data collection on AT is variable and incomplete. This makes it difficult to understand changes within countries over time or after new infrastructure has been completed. Differences in definitions and national data collection methods between the four UK nations make it challenging to compare them with each other. The variability in data quality also stems from limited capacity and skills within LAs, as noted by the DfT. Many authorities lack the expertise or resources to implement sophisticated data collection methods, such as longitudinal studies or before-after or time-series analysis. This results in evaluations that are often superficial or based on incomplete data, reducing their usefulness for strategic planning (National Audit Office, 2023).

The NAO points out that the DfT's forecasting for achieving CWIS2 objectives is uncertain due to an incomplete understanding of how AT interventions work and the long-term impact of external factors, such as the COVID-19 pandemic. Without longitudinal data to track these shifts, it is difficult to predict whether current trends will persist or how interventions can sustain behaviour change (National Audit Office, 2023).

This has resulted in poorly informed investment decisions such as poor quality of funded schemes, offering only cosmetic improvements rather than safe, functional infrastructure (National Audit Office, 2023). This suggests that funding allocation is not always guided by robust evidence of what delivers the greatest impact. Also, without a centralised repository of comparable data, successful schemes cannot be easily identified or replicated and lessons from failures are not systematically documented. This slows the development of an evidence base on what works, for whom and in what circumstances, limiting the scalability of effective interventions.

In addition, without standardised metrics for health benefits (e.g., reduced healthcare costs from increased physical activity or improved air quality), wider benefits (e.g., financial or social outcomes), or environmental impacts (e.g., CO2 reductions from fewer car trips), policy makers cannot fully assess whether AT schemes deliver value for money. This also limits the ability to align AT with broader government priorities, such as net-zero commitments or public health strategies, potentially reducing political and public support for these initiatives (National Audit Office, 2023).

By improving data quality and evaluation frameworks, all four national governments of the UK seek to provide better guidance to LAs and ensure investments deliver lasting benefits. Ultimately, fostering a culture of AT requires not only better infrastructure but also a clearer understanding of what motivates people to choose walking, wheeling, or cycling for their daily journeys.

7. Comparison with literature

7.1. Methods for literature search

A literature search was conducted to identify articles published in peer-reviewed journals that described the results of primary research studies on AT, conducted in the UK or that included data from at least one of the four UK nations. We included quantitative studies that had examined AT as either an exposure (e.g., does AT lead to changes in overall physical activity?) or an outcome (e.g., which individual characteristics are associated with travelling actively?). To be included, studies also had to specify how they measured AT, which included a description of how the AT measure has been derived from the data used in the study. We excluded qualitative studies, modelling studies, editorials and opinion pieces because they did not quantify AT measures.

Literature searches were conducted in Medline and Embase, using the key words “active travel” combined with terms for each of the four national governments of the UK. In total 129 results were identified in Medline and 588 in Embase (total = 717). After removing

duplicates, 601 studies remained. A further 384 studies were excluded at the title and abstract screening stage. The full text papers of 217 papers were retrieved and 133 of these were deemed to include information that fulfilled our inclusion criteria. The characteristics of these studies, as well as a summary of the AT definitions and data sources used, are described below.

7.2. Results

Table 1 in the Appendix provides a summary of all included studies. Of the 133 studies included, the majority (69) were conducted in England, 17 in Scotland, one in Northern Ireland, five in Wales and 13 across all four national governments of the UK (including combinations such as England and Wales). Additionally, 28 studies were carried out in multiple or unspecified UK locations or as part of multinational European studies with UK-representative populations. All of the studies were published after 2007. Of the 133 studies, 46 investigated the effectiveness of interventions, of these, 22 focused on infrastructure interventions, 20 on behavioural interventions and four on a combination of both. In total, 84 studies targeted adult populations (aged over 16 years), of these, 61 used self-reported data to measure outcomes, three used only objective data and 20 used a combination of self-reported and objectively corroborated data. Among the 44 studies involving children (aged under 16 years), 11 used self-reported data to measure outcomes, one used parental report and the majority (32) used self-reported and/or parental-reported data corroborated with objective data. Only 14 studies focused on older adults (aged over 55 years). Of these, 11 used self-reported data, one used only objective data, and two used a combination of both. Definitions of AT varied substantially (see Table 1, Appendix 1). Measures typically included data on walking and cycling, with wheeling measured in only one study. Some studies also included public transport as a form of AT. AT was often framed in contrast to motorised travel rather than specifying the mode. As studies focused on specific outcomes, they generally specified the purpose of AT modes (e.g., commuting, travel to school, leisure, shopping).

7.2.1. Target population

Adults (16+ years) were the most frequently studied group, with research concentrating on commuting patterns, transport mode choices and the effects of AT interventions on these, as well as their implications for health, environmental sustainability and economic benefits. These studies often investigated shifts from motorised vehicles to active modes like walking or cycling. For instance, Aldred et al. (2021b, 2024) evaluated the Mini-Hollands programme in Outer London boroughs (Enfield, Kingston, Waltham Forest) through the People and Places longitudinal survey. They assessed weekly AT duration (in minutes) and the probability of achieving 150 minutes of AT per week, finding increased walking and cycling in areas with enhanced infrastructure, alongside health economic benefits in Wave 3 (Aldred et al., 2021b). Similarly, Brand et al. (2021) evaluated the Physical Activity through Sustainable Transport Approaches (PASTA) project across seven European cities, including London, using baseline questionnaires and bi-weekly travel diaries to quantify CO₂ emissions, cycling frequency and mode transitions. Their findings highlighted that AT uptake reduced emissions and supported sustainable urban mobility (Brand et al., 2021). Adult-focused research typically employed large-scale surveys or longitudinal approaches to explore commuting trends, emphasising environmental gains and improved health outcomes.

School-aged children (2–17 years) were another key focus, with studies examining ATS, such as walking, cycling, or scooting, to promote physical activity and reduce motorised transport dependency. For example, Bearman et al. (2014), in the Norfolk-based Sport, Physical activity and Eating behaviour: Environmental Determinants in Young people (SPEEDY) study, targeted students aged 6–16 years, using Global Positioning System (GPS) units and accelerometers to map school commute routes. They calculated “criterion distances” (the maximum distance pupils would actively travel) and the proportion of active versus passive journeys, identifying distance as a significant barrier to ATS (Bearman et al., 2014). Salway et al. (2024), in the Active-6 study, investigated post-lockdown ATS among 10–11-year-olds in England. Using questionnaires and

accelerometers, they linked school-level policies like cycle training to higher moderate-to-vigorous physical activity (MVPA), underscoring the importance of institutional support (Salway et al., 2024). Children's studies often prioritised school commutes, leveraging objective tools like accelerometers to measure MVPA and evaluate environmental or policy impacts on travel behaviour.

Older adults (55+ years) and people with disabilities were underrepresented, with limited research exploring transport-related walking or cycling and their effects on health and mobility in ageing populations. Portegijs et al. (2019) evaluated the European Project on Osteoarthritis (EPOSA) study spanning six European countries (including the UK), on adults aged 65–85 years. Using the Longitudinal Aging Study Amsterdam (LASA) Physical Activity Questionnaire, they measured daily AT time (in minutes) for activities like shopping, noting walking's significant contribution to physical activity despite low cycling rates (Portegijs et al., 2019). Brainard et al. (2020) using England's Active Lives Survey 2016/17, assessed moderate-intensity equivalent minutes (MIEMs) of AT among 55–74 year olds. They found walking was a popular leisure activity among retirees, highlighting its accessibility and health benefits in deprived areas (Brainard et al., 2020). Research on older adults typically emphasised walking rather than cycling, due to physical constraints, focusing on health improvements and social inclusion.

7.2.2. Data collection methods

Self-report was the predominant method of assessing AT, gathered through questionnaires, travel diaries, or interviews, as these methods can be used at scale and can capture attitudes, travel frequency and duration. For example, Fairnie et al. (2016) utilised the London Travel Demand Survey (LTDS) to collect data from residents aged 16+ years via household questionnaires and one-day trip sheets. They measured daily walking/cycling minutes and public transport-linked AT, finding higher rates among non-car owners, stratified by income and demographics (Fairnie et al., 2016). Sahlqvist et al. (2013) in the iConnect study across Cardiff, Kenilworth and Southampton, used postal

questionnaires to evaluate walking/cycling time for commuting and non-commuting purposes. Post-infrastructure improvements, they observed increased AT, with distinct patterns for commuting versus other trips (Sahlqvist et al., 2013). While self-reported data offer detailed insights, they are prone to recall bias, often requiring objective validation.

Parent-reported data were essential for younger children, documenting travel modes to school or other destinations, frequently complemented by child self-reports or objective measures. For example, Ginja et al. (2017), in the RIGHT TRACKS pilot trial in Northeast England, collected daily parental reports (via SMS or paper) alongside child self-reports on school travel among 9–10 year olds. Accelerometry data, MVPA recordings were used to validate parental and child reported data regarding distance travelled via ATS (Ginja et al., 2017). Oxford et al. (2015) surveyed parents of 2–4 year olds in South Gloucestershire, capturing pre-school travel modes and factors like distance and car access. They found greater AT in priority neighbourhoods with shorter distances (Oxford et al., 2015). Parent-reported data are vital for young children but may reflect parental perspectives, necessitating objective corroboration.

Objective data, including accelerometers, GPS devices, Geographic Information System (GIS) analysis, or traffic sensors, provided precise measurements of physical activity, routes and trip counts, often used to validate self-reports. For example, Audrey et al. (2019), in the Walk to Work feasibility study in South West England and South Wales, used accelerometers and GPS to measure daily MVPA during employee commutes. They observed significant MVPA increases with shifts from car to walking (Audrey et al., 2019). Procter et al. (2018) in London's ENABLE study, employed accelerometers and GPS with machine learning (XGBoost algorithm) to classify travel modes, accurately quantifying walking and cycling durations as a robust alternative to self-reports (Procter et al., 2018). Objective measures enhance precision but are resource-intensive, typically used in smaller studies or alongside self-reported data.

7.2.3. Use of AT interventions

Studies with interventions assessed initiatives like new infrastructure (e.g., cycle lanes, busways) or behavioural programmes (e.g., school campaigns, workplace incentives) to encourage AT. For example, Heinen et al. (2015a, 2015b, 2017) investigated the Cambridgeshire Guided Busway's impact in the Commuting and Health in Cambridge study. Using postal questionnaires and GIS data, they found increased walking, cycling and public transport use among those near the busway, indicating partial or full mode shifts (Heinen et al., 2015a, 2015b, 2017). Riches et al. (2024) evaluated the 'Park and Stride' initiative in Oxfordshire schools, using parent surveys, pupil hands-up surveys and vehicle counters. They reported higher AT frequency (days/week) and reduced vehicle counts near schools, demonstrating effective behaviour change (Riches et al., 2024).

Interventions often blend infrastructure and behavioural strategies, with urban areas showing stronger effects due to higher connectivity and population density. Studies without interventions were primarily observational or cross-sectional, examining baseline travel behaviours, environmental factors, or population trends. For example, Olsen et al. (2017b), using the Scottish Household Survey (2012–2013), analysed journey modes and distances via travel diaries and interviews. They identified the proportion and purpose of active journey stages, providing a foundation for policy development (Olsen et al., 2017b). Patterson et al. (2019), leveraging the English National Travel Survey (2010–14), measured daily walking/cycling minutes during public transport trips, highlighting walking segments linked to bus or train journeys and public transport's role in AT (Patterson et al., 2019). Non-intervention studies offer critical baseline data to inform future interventions, particularly through national surveys.

7.2.4. Types of AT interventions

Behavioural interventions promoted AT through education, gamification, or incentives, targeting groups like students or employees. For example, Connell et al. (2022) assessed the Cycle Nation project across six HSBC UK workplaces, using focus groups and

interviews to measure pre- and post-intervention cycling frequency (rides/week) and utility cycling (e.g., commuting, errands). The programme boosted commuter cycling (Connell et al., 2022). Harris et al. (2021) examined the 'Beat the Street' gamification initiative in Hounslow, London. Using questionnaires and Radio Frequency Identification (RFID) sensors, they found increased weekly moderate physical activity minutes and fewer vehicle counts, indicating a shift to AT (Harris et al., 2021). Behavioural interventions are effective for specific groups but require ongoing engagement to sustain changes.

Infrastructure interventions evaluated physical enhancements, such as cycle paths, pedestrianised zones, or public transport infrastructure, to facilitate AT. For example, Aldred et al. (2019) studied a London residential street closure to through motor traffic, using intercept surveys and count data to estimate new daily walk and cycle trips, with significant increases post-intervention (Aldred et al., 2019). Song et al. (2017), in the iConnect study, assessed new infrastructure (e.g., bridges, boardwalks) in Cardiff, Kenilworth and Southampton. Postal questionnaires showed higher walking/cycling time and distance shares near new infrastructure (Song et al., 2017). Infrastructural interventions are impactful in urban settings but require thoughtful design for accessibility and safety.

Combined behavioural and infrastructure interventions integrated physical upgrades with promotional campaigns, often in schools or communities, to maximise impact. For example, Coombes et al. (2016) evaluated Norfolk's 'Beat the Street' intervention, combining gamification with enhanced walking/cycling routes. Accelerometers and travel diaries showed increased active school commutes (percentage of trips) at mid- and post-intervention stages (Coombes et al., 2016). Norwood et al. (2014) assessed Scotland's Smarter Choices, Smarter Places programme, which included infrastructure improvements and behaviour change initiatives. House-to-house surveys indicated a higher likelihood of meeting physical activity guidelines (≥ 5 days/week) in intervention

areas (Norwood et al., 2014). Combined interventions capitalise on infrastructure accessibility and behavioural nudges to foster lasting AT adoption.

7.3. Summary

Research on AT predominantly focuses on adults (16+), examining commuting patterns and transitions from motorised to active modes like walking and cycling, often linking these shifts to health, environmental and economic benefits. School-aged children (2–17 years) are also a key focus, especially in studies promoting active school commutes. Older adults (55+) and people with disabilities are underrepresented, with limited studies highlighting the role of AT in physical activity and social inclusion.

Data collection methods were primarily self-reported (e.g., surveys, diaries), valued for scale but susceptible to recall bias. For children, parent-reported data were essential, while objective measures (e.g., accelerometers, GPS) provided accuracy, often used to validate self-reports, but are resource-intensive and require data science expertise to manage and analyse the data.

Studies employed various AT interventions, including infrastructure projects (e.g., cycle lanes, pedestrian zones), behavioural programmes (e.g., school campaigns, workplace incentives) and combined approaches. Evidence shows that combined behavioural and infrastructural interventions, especially in urban areas, are most effective in encouraging sustained shifts to AT.

7.3.1. Gaps in the Literature

Data challenges and inconsistencies identified from the published literature were similar to those identified in the earlier sections of this report and can be summarised as:

- **Definition Consistency:** Variations in AT definitions (e.g., including public transport or scooting) hinder comparisons. Standardising terminology could enhance research coherence.
- **Data Granularity:** Alattar et al. (2021c) emphasised the need for detailed, longitudinal data, particularly for underserved groups like deprived communities, to tailor interventions effectively.
- **Understudied Populations:** Older adults, disabled populations and pre-school children, as seen in Oxford et al. (2015), are underrepresented despite potential health and social benefits from AT.
- **Methodological Opportunities:** Combining self-reported and objective data, as in Procter et al. (2018), yields robust results, but objective measures are underutilised due to cost and complexity (Procter et al., 2018).

7.3.2. Summary of objective tools used:

The objective data measures used to assess AT across different studies include:

- **GPS Tracking:** Used to record routes, distances and durations of trips.
- **Accelerometers:** Measured physical activity levels, including moderate-to-vigorous physical activity (MVPA) during commutes.
- **ActiGraph Devices:** Worn by participants to quantify steps and activity intensity over time.
- **Traffic Counts/Sensors:** Monitored cycling and pedestrian flows.
- **GIS Mapping:** Analysed spatial data like route directness and environmental exposures.
- **Combined Heart Rate and Movement Sensors:** Provided detailed energy expenditure data.

Table 3 presents a comparison of the identified data that is collected across the four UK nations and the data collected in the literature.

Table 3: Comparison matrix of data collected by the four national governments of the UK and in the literature

	Government Measures		Literature Measures	
England	Self-report	✓	Self-report	✓
	Parent-report	-	Parent-report	✓
	Objective measures	✓	Objective measures	✓
Northern Ireland	Self-report	✓	Self-report	✓
	Parent-report	-	Parent-report	-
	Objective measures	✓	Objective measures	-
Scotland	Self-report	✓	Self-report	✓
	Parent-report	-	Parent-report	✓
	Objective measures	✓	Objective measures	✓
Wales	Self-report	✓	Self-report	✓
	Parent-report	-	Parent-report	-
	Objective measures	✓	Objective measures	✓

8. Recommendations

1. Develop and adopt harmonised definitions and measurement indicators to enable consistent and meaningful cross-nation comparisons of active travel data.
2. Support local authorities by fostering academic partnerships and utilising tools such as the Active Travel Scheme Sketcher and the Sustrans Evaluation Toolkit to improve data collection and analysis.
3. Ensure data collection frameworks explicitly capture walking, cycling and wheeling among diverse groups, including disabled people, older adults and those with protected characteristics.
4. Prioritise the collection of objective and longitudinal data to accurately assess the health, environmental and economic impacts of active travel initiatives.
5. Promote cross-nation sharing of effective practices and lessons learned to support evidence-informed policy development and delivery.
6. Enhance collaboration between local authorities, third-sector organisations and other stakeholders to explore data sharing and linkage opportunities, optimising the use of available data and resources.

7. Improve transparency and coherence by clearly mapping and linking related policy documents to demonstrate how strategic objectives align and reinforce one another.

9. Reference List

- Active Travel Board (2024) Active Travel in Wales Annual Report 2023-2024 [Online]. Cardiff: Welsh Government. Available at: activetravel@gov.wales (Accessed: 4 June 2025).
- Active Travel England. (2024) Annual Report and Accounts 2023/24. London: Active Travel England. Available at: <https://www.gov.uk/government/organisations/active-travel-england> [Accessed 26 May 2025].
- Alattar, M.A., Cottrill, C. and Beecroft, M. (2021) 'Public participation geographic information system (PPGIS) as a method for active travel data acquisition', *Journal of Transport Geography*, 96, article number: 103180. doi:10.1016/j.jtrangeo.2021.103180.
- Aldred, R. and Croft, J. (2019a) 'Evaluating active travel and health economic impacts of small streetscape schemes: an exploratory study in London', *Journal of Transport and Health*, 12, pp.86–96. doi:10.1016/j.jth.2018.11.009.
- Aldred, R., Croft, J. and Goodman, A. (2019b) 'Impacts of an active travel intervention with a cycling focus in a suburban context: one-year findings from an evaluation of London's in-progress mini-Hollands programme', *Transportation Research Part A: Policy and Practice*, 123, pp.147–169. doi:10.1016/j.tra.2018.05.018.
- Aldred, R., Woodcock, J. and Goodman, A. (2021) 'Major investment in active travel in Outer London: impacts on travel behaviour, physical activity, and health', *Journal of Transport and Health*, 20, article number: 100958. doi:10.1016/j.jth.2020.100958.
- Aldred, R., Goodman, A. and Woodcock, J. (2024) 'Impacts of active travel interventions on travel behaviour and health: results from a five-year longitudinal travel survey in Outer London', *Journal of Transport and Health*, 35, article number: 101771. doi:10.1016/j.jth.2024.101771.
- Audrey, S. et al. (2019) 'Evaluation of an intervention to promote walking during the commute to work: a cluster randomised controlled trial', *BMC Public Health*, 19(1), article number: 427. doi:10.1186/s12889-019-6791-4.
- Bearman, N. and Singleton, A.D. (2014) 'Modelling the potential impact on CO2 emissions of an increased uptake of active travel for the home to school commute using individual level data', *Journal of Transport and Health*, 1(4), pp.295–304. doi:10.1016/j.jth.2014.09.009.
- Betts, G. and Potoglou, D. (2025) 'Cycling infrastructure and deprivation: an empirical investigation', *Journal of Transport and Health*, 41, article number: 101974. doi:10.1016/j.jth.2024.101974.
- Bishop, D.T. et al. (2024) 'Barriers and enablers for cycling: a COM-B survey study of UK schoolchildren and their parents', *Journal of Transport and Health*, 35, article number: 101765. doi:10.1016/j.jth.2024.101765.

- Blake, H. et al. (2017) 'Active8! Technology-based intervention to promote physical activity in hospital employees', *American Journal of Health Promotion*, 31(2), pp.109–118. doi:10.4278/ajhp.140415-QUAN-143.
- Bösehans, G. and Walker, I. (2016) "Daily Drags" and "Wannabe Walkers" – identifying dissatisfied public transport users who might travel more actively and sustainably', *Journal of Transport and Health*, 3(3), pp.395–403. doi:10.1016/j.jth.2016.06.011.
- Brainard, J. et al. (2019) 'Age, sex and other correlates with active travel walking and cycling in England: analysis of responses to the Active Lives Survey 2016/17', *Preventive Medicine*, 123, pp.225–231. doi:10.1016/j.ypmed.2019.03.043.
- Brainard, J. et al. (2020) 'Physical activity and retirement: original analysis of responses to the English Adult Active Lives Survey', *International Journal of Public Health*, 65(6), pp.871–880. doi:10.1007/s00038-020-01438-8.
- Brand, C. et al. (2014) 'Evaluating the impacts of new walking and cycling infrastructure on carbon dioxide emissions from motorized travel: a controlled longitudinal study', *Applied Energy*, 128, pp.284–295. doi:10.1016/j.apenergy.2014.04.072.
- Brand, C., Dons, E. et al. (2021a) 'The climate change mitigation effects of daily active travel in cities', *Transportation Research Part D: Transport and Environment*, 93, article number: 102764. doi:10.1016/j.trd.2021.102764.
- Brand, C., Götschi, T. et al. (2021b) 'The climate change mitigation impacts of active travel: evidence from a longitudinal panel study in seven European cities', *Global Environmental Change*, 67, article number: 102224. doi:10.1016/j.gloenvcha.2021.102224.
- Carver, A. et al. (2014) 'Independent mobility on the journey to school: a joint cross-sectional and prospective exploration of social and physical environmental influences', *Journal of Transport and Health*, 1(1), pp.25–32. doi:10.1016/j.jth.2013.12.003.
- Cohen, D. et al. (2014) 'Association between habitual school travel and muscular fitness in youth', *Preventive Medicine*, 67, pp.216–220. doi:10.1016/j.ypmed.2014.07.036.
- Connell, H. et al. (2022) 'Development and optimisation of a multi-component workplace intervention to increase cycling for the Cycle Nation Project', *Frontiers in Sports and Active Living*, 4, article number: 857554. doi:10.3389/fspor.2022.857554.
- Coombes, E. et al. (2014) 'Is change in environmental supportiveness between primary and secondary school associated with a decline in children's physical activity levels?', *Health and Place*, 29, pp.171–178. doi:10.1016/j.healthplace.2014.07.009.
- Coombes, E. and Jones, A. (2016) 'Gamification of active travel to school: a pilot evaluation of the Beat the Street physical activity intervention', *Health and Place*, 39, pp.62–69. doi:10.1016/j.healthplace.2016.03.001.

- Cooper, A.R. et al. (2012) 'Active travel and physical activity across the school transition: the PEACH project', *Medicine and Science in Sports and Exercise*, 44(10), pp.1890–1897. doi:10.1249/MSS.0b013e31825a3a1e.
- Cooper, C.H.V. (2017) 'Using spatial network analysis to model pedal cycle flows, risk and mode choice', *Journal of Transport Geography*, 58, pp.157–165. doi:10.1016/j.jtrangeo.2016.12.003.
- Coronini-Cronberg, S. et al. (2012) 'The impact of a free older persons' bus pass on active travel and regular walking in England', *American Journal of Public Health*, 102(11), pp.2141–2148. doi:10.2105/AJPH.2012.300848.
- Dalton, A.M. et al. (2013) 'Neighbourhood, route and workplace-related environmental characteristics predict adults' mode of travel to work', *PLoS ONE*, 8(6), article number: e67575. doi:10.1371/journal.pone.0067575.
- Dalton, A.M. et al. (2015) 'Are GIS-modelled routes a useful proxy for the actual routes followed by commuters?', *Journal of Transport and Health*, 2(2), pp.219–229. doi:10.1016/j.jth.2014.10.001.
- Demiris, A. et al. (2025) 'Generation Z's travel behavior and climate change: a comparative study for Greece and the UK', *Big Data and Cognitive Computing*, 9(3), article number: 70. doi:10.3390/bdcc9030070.
- Department for Transport (2022) The second cycling and walking investment strategy (CWIS2). Available at: <https://www.gov.uk/government/publications/the-second-cycling-and-walking-investment-strategy/the-second-cycling-and-walking-investment-strategy-cwis2#foreword> [Accessed: 26 May 2025].
- Department of Infrastructure (2024a) Active Travel Delivery Plan-Consultation Document . Available at: <https://www.infrastructure-ni.gov.uk/consultations/active-travel-delivery-plan> [Accessed: 8 June 2025].
- Department of Infrastructure (2024b) Travel to/from school by pupils in NI, 2022/23. Available at: <https://www.infrastructure-ni.gov.uk/publications/travel-tofrom-school-pupils-ni-202223> [Accessed: 8 June 2025].
- Department of Infrastructure (2025) Kimmins announces £1.9m for greenways and active travel projects. Available at: <https://www.infrastructure-ni.gov.uk/news/kimmins-announces-ps19m-greenways-and-active-travel-projects> [Accessed: 13 June 2025].
- Downward, P. and Rasciute, S. (2015) 'Assessing the impact of the National Cycle Network and physical activity lifestyle on cycling behaviour in England', *Transportation Research Part A: Policy and Practice*, 78, pp.425–437. doi:10.1016/j.tra.2015.06.007.

- Fairnie, G.A., Wilby, D.J.R. and Saunders, L.E. (2016) 'Active travel in London: the role of travel survey data in describing population physical activity', *Journal of Transport and Health*, 3(2), pp.161–172. doi:10.1016/j.jth.2016.02.003.
- Flint, E. and Cummins, S. (2016a) 'Active commuting and obesity in mid-life: cross-sectional, observational evidence from UK Biobank', *The Lancet Diabetes and Endocrinology*, 4(5), pp.420–435. doi:10.1016/S2213-8587(16)00053-X.
- Flint, E., Webb, E. and Cummins, S. (2016b) 'Change in commute mode and body-mass index: prospective, longitudinal evidence from UK Biobank', *The Lancet Public Health*, 1(2), pp.e46–e55. doi:10.1016/S2468-2667(16)30006-8.
- Fluharty, M.E. et al. (2020) 'Educational differentials in key domains of physical activity by ethnicity, age and sex: a cross-sectional study of over 40 000 participants in the UK household longitudinal study (2013–2015)', *BMJ Open*, 10(1), article number: e033318. doi:10.1136/bmjopen-2019-033318.
- Foley, L. et al. (2015) 'Changes in active commuting and changes in physical activity in adults: a cohort study', *International Journal of Behavioral Nutrition and Physical Activity*, 12, article number: 161. doi:10.1186/s12966-015-0323-0.
- Foley, L. et al. (2018) 'Patterns of health behaviour associated with active travel: a compositional data analysis', *International Journal of Behavioral Nutrition and Physical Activity*, 15, article number: 26. doi:10.1186/s12966-018-0662-8.
- Fyhri, A. et al. (2011) 'Children's active travel and independent mobility in four countries: development, social contributing trends and measures', *Transport Policy*, 18(5), pp.703–710. doi:10.1016/j.tranpol.2011.01.005.
- Garrott, K. et al. (2023) 'Feasibility of a randomised controlled trial of financial incentives to promote alternative travel modes to the car', *Journal of Transport and Health*, 32, article number: 101673. doi:10.1016/j.jth.2023.101673.
- Ginja, S. et al. (2017) 'Feasibility of an incentive scheme to promote active travel to school: a pilot cluster randomised trial', *Pilot and Feasibility Studies*, 3, article number: 57. doi:10.1186/s40814-017-0197-9.
- Goodman, A., Mackett, R.L. and Paskins, J. (2011) 'Activity compensation and activity synergy in British 8-13 year olds', *Preventive Medicine*, 53(4-5), pp.293–298. doi:10.1016/j.ypmed.2011.07.019.
- Goodman, A., Paskins, J. and Mackett, R. (2012a) 'Day length and weather effects on children's physical activity and participation in play, sports, and active travel', *Journal of Physical Activity and Health*, 9(8), pp.1105–1116. <https://doi.org/10.1123/jpah.9.8.1105>
- Goodman, A., Brand, C. and Ogilvie, D. (2012b) 'Associations of health, physical activity and weight status with motorised travel and transport carbon dioxide emissions: a cross-

- sectional, observational study', *Environmental Health*, 11, article number: 52. doi:10.1186/1476-069X-11-52.
- Goodman, A. and Aldred, R. (2018) 'Inequalities in utility and leisure cycling in England, and variation by local cycling prevalence', *Transportation Research Part F: Traffic Psychology and Behaviour*, 56, pp.381–391. doi:10.1016/j.trf.2018.05.001.
- Goodman, A. et al. (2019) 'Scenarios of cycling to school in England, and associated health and carbon impacts: application of the "Propensity to Cycle Tool"', *Journal of Transport and Health*, 12, pp.263–278. doi:10.1016/j.jth.2019.01.008.
- Gorely, T. et al. (2009) 'Family circumstance, sedentary behaviour and physical activity in adolescents living in England: Project STIL', *International Journal of Behavioral Nutrition and Physical Activity*, 6, article number: 33. doi:10.1186/1479-5868-6-33.
- Götschi, T. et al. (2015) 'Contrasts in active transport behaviour across four countries: how do they translate into public health benefits?', *Preventive Medicine*, 74, pp.42–48. doi:10.1016/j.ypmed.2015.02.009.
- Götschi, T. et al. (2020) 'Integrated impact assessment of active travel: expanding the scope of the health economic assessment tool (HEAT)) for walking and cycling', *International Journal of Environmental Health and Public Health*, 17(20), article number: 7361, pp.1–21. doi:10.3390/ijerph17207361.
- Harris, M.A. and Crone, D. (2021) 'Using a gamification to encourage active travel commuting', *Journal of Transport and Health*, 23, article number: 101275. doi:10.1016/j.jth.2021.101275.
- Heinen, E., et al. (2014) 'Sociospatial patterning of the use of new transport infrastructure: walking, cycling and bus travel on the Cambridgeshire busway', *Journal of Transport and Health*, 2(2), pp.199–211. doi:10.1016/j.jth.2014.10.006.
- Heinen, E., et al. (2015) 'Changes in transport mode to work: a natural experimental study', *International Journal of Behavioral Nutrition and Physical Activity*, 12, article number: 81. doi:10.1186/s12966-015-0239-8.
- Heinen, E., et al. (2017) 'Does exposure to new transport infrastructure result in modal shifts? Patterns of change in commute mode choices in a four-year quasi-experimental cohort study', *Journal of Transport and Health*, 6(1), pp.396–410. doi:10.1016/j.jth.2017.07.009.
- Hong, J., Sila-Nowicka, K. and McArthur, D.P. (2018) 'Is the popularity of social networking services beneficial for public health? Focusing on active travel and BMI', *Journal of Transport and Health*, 11, pp.183–192. doi:10.1016/j.jth.2018.09.003.

- Hunter, R.F. et al. (2015) 'International inter-school competition to encourage children to walk to school: a mixed-methods feasibility study', *BMC Research Notes*, 8, article number: 19. doi:10.1186/s13104-014-0959-x.
- Hutchinson, J., White, P.C.L. and Graham, H. (2014) 'Differences in the social patterning of active travel between urban and rural populations: findings from a large UK household survey', *International Journal of Public Health*, 59(6), pp.993–998. doi:10.1007/s00038-014-0578-2.
- Ikeda, E., et al. (2022) 'Cross-sectional and longitudinal associations of active travel, organised sport and physical education with accelerometer-assessed moderate-to-vigorous physical activity in young people', *International Journal of Behavioral Nutrition and Physical Activity*, 19, article number: 41. doi:10.1186/s12966-022-01282-4.
- Jacob, N., et al. (2021) 'Does commuting mode choice impact health?', *Health Economics*, 30(2), pp.207–230. doi:10.1002/hec.4184.
- Jones, A., et al. (2012) 'Rethinking passive transport: bus fare exemptions and young people's wellbeing', *Health and Place*, 18(3), pp.605–612. doi:10.1016/j.healthplace.2012.01.003.
- Kelly, P., et al. (2011) 'Can we use digital life-log images to investigate active and sedentary travel behaviour? Results from a pilot study', *International Journal of Behavioral Nutrition and Physical Activity*, 8, article number: 44. doi:10.1186/1479-5868-8-44.
- Knott, C.S., et al. (2018) 'Changes in the mode of travel to work and the severity of depressive symptoms: a longitudinal analysis of UK Biobank', *Preventive Medicine*, 112, pp.61–69. doi:10.1016/j.ypmed.2018.03.018.
- Knott, C.S., et al. (2019) 'Changes in workplace car parking and commute mode: a natural experimental study', *Journal of Epidemiology and Community Health*, 73(1), pp.42–49. doi:10.1136/jech-2018-210983.
- Laverty, A.A., et al. (2021) 'Associations of active travel with adiposity among children and socioeconomic differentials: a longitudinal study', *BMJ Open*, 11(1), article number: e036041. doi:10.1136/bmjopen-2019-036041.
- Lawlor, E.R., et al. (2021) 'Individual characteristics associated with active travel in low and high income groups in the UK', *International Journal of Environmental Research and Public Health*, 18(19), article number: 10360. doi:10.3390/ijerph181910360.
- Lehtonen, E., et al. (2021) 'Are multimodal travellers going to abandon sustainable travel for L3 automated vehicles?', *Transportation Research Interdisciplinary Perspectives*, 10, article number: 100380. doi:10.1016/j.trip.2021.100380.
- Macdonald, L., et al. (2019) 'Active commute to school: does distance from school or walkability of the home neighbourhood matter? A national cross-sectional study of children aged 10–

- 11 years, Scotland, UK', *BMJ Open*, 9(12), article number: e033628. doi:10.1136/bmjopen-2019-033628.
- Martin, A., Goryakin, Y. and Suhrcke, M. (2014) 'Does active commuting improve psychological wellbeing? Longitudinal evidence from eighteen waves of the Household British Panel Survey', *Preventive Medicine*, 69, pp.296–303. doi:10.1016/j.ypmed.2014.08.023.
- Martin, A., Panter, J. and Suhrcke, M. (2015) 'Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey', *Journal of Epidemiology and Community Health*, 69(8), pp.753–761. doi:10.1136/jech-2014-205211.
- Martin, A., Morciano, M. and Suhrcke, M. (2020) 'Determinants of bicycle commuting and the effect of bicycle infrastructure investment in London: evidence from UK Census microdata', *Economics and Human Biology*, 41, article number: 100945. doi:10.1016/j.ehbh.2020.100945.
- Mason, P., Curl, A. and Kearns, A. (2016) 'Domains and levels of physical activity are linked to adult mental health and wellbeing in deprived neighbourhoods: a cross-sectional study', *Environment Research and Health*, 2016, article number: 20160083. <https://doi.org/10.1016/j.mhpa.2016.07.001>
- McCartney, G., et al. (2012) 'Building a bridge, transport infrastructure and population characteristics: explaining active travel into Glasgow', *Transport Policy*, 21, pp.119–125. doi:10.1016/j.tranpol.2012.03.003.
- McCreery-Phillips, S. and Heydari, S. (2023) 'Neighbourhood characteristics and bicycle commuting in the Greater London area', *Transport Policy*, 142, pp.152–161. doi:10.1016/j.tranpol.2023.08.007.
- McKee, R., et al. (2007) 'Promoting walking to school: results of a quasi-experimental trial', *Journal of Epidemiology and Community Health*, 61(9), pp.818–823. doi:10.1273/jech.2006.048181.
- McMinn, D., et al. (2011) 'The Strathclyde Evaluation of Children's Active Travel (SE-CAT): study rationale and methods', *BMC Public Health*, 11, article number: 958. doi:10.1186/1471-2458-11-958.
- McMinn, D., et al. (2012) 'The effect of a school-based active commuting intervention on children's commuting physical activity and daily physical activity', *Preventive Medicine*, 54(5), pp.316–318. doi:10.1016/j.ypmed.2012.02.013.
- Morgan, K., et al. (2016) 'Predictors of physical activity and sedentary behaviours among 11–16 year olds: multilevel analysis of the 2013 Health Behaviour in School-aged Children (HBSC) study in Wales', *BMC Public Health*, 16, article number: 1), article number: 669. doi:10.1186/s12889-016-3213-8.

- Mytton, O.T., et al. (2016a) 'Longitudinal associations of active commuting with body mass index', *Preventive Medicine*, 90, pp.1–7, pp. doi:10.1016/j.ypmed.2016.06.014.
- Mytton, O.T., et al. (2016b) 'Longitudinal associations of active commuting with wellbeing and sickness absence', *Preventive Medicine*, 84, pp.19–26, pp. doi:10.1016/j.ypmed.2015.12.010.
- Mytton, O.T., et al. (2018) 'Associations of active transport with body fat and visceral adipose tissue: a cross-sectional population based study in the UK', *Preventive Medicine*, 106, pp.86–93. doi:10.1016/j.ypmed.2017.10.017.
- National Audit Office. (2023). *Active Travel in England*. HC 1376, Session 2022-23. London: National Audit Office. Available at: www.nao.org.uk [Accessed 24 May 2025].
- Neves, A. and Brand, C. (2019) 'Assessing the potential for carbon emissions savings from replacing short car trips with walking and cycling using a mixed GPS-travel diary approach', *Transportation Research Part A: Policy and Practice*, 123, pp.130–146. doi:10.1016/j.tr.2018.08.022.
- Northern Ireland Statistics and Research Agency . 2025. *Travel Survey for Northern Ireland* | Northern Ireland Statistics and Research Agency. Available at: <https://www.nisra.gov.uk/statistics/find-your-survey/travel-survey-northern-ireland> [Accessed: 9 June 2025].
- Norwood, P., et al. (2014) 'Active travel intervention and physical activity behaviour: an evaluation', *Social Science and Medicine*, 113, pp.50–58. doi:10.1016/j.socscimed.2014.05.003.
- Ogilvie, D., et al. (2008) 'Personal and environmental correlates of active travel and physical activity in a deprived urban population', *International Journal of Behavioral Nutrition and Physical Activity*, 8, article number: 43. doi:10.1186/1479-5868-5-43.
- Ogilvie, D., et al. (2010) 'Commuting and health in Cambridge: a study of a 'natural experiment' in the provision of new transport infrastructure', *BMC Public Health*, 10, article number: 703. doi:10.1186/1471-2458-10-703.
- Olsen, J.R., et al. (2016) 'Effects of new motorway infrastructure on active transport in the local population: a retrospective repeat cross-sectional study in Glasgow, Scotland', *International Journal of Behavioral Nutrition and Physical Activity*, 13, article number: 77. doi:10.1186/s12966-016-0403-9.
- Olsen, J.R., et al. (2017a) 'Changes over time in population level transport satisfaction and mode of transport: a 13 year repeat cross-sectional study, UK', *Journal of Transport and Health*, 6, pp.366–378. doi:10.1016/j.jth.2017.03.012.

- Olsen, J.R., et al. (2017b) 'Population levels of, and inequalities in, in active transport: a national, cross-sectional study of adults in Scotland,' *Preventive Medicine Reports*, 8, pp.129–134. doi:10.1016/j.pmedr.2017.09.008.
- Olsen, J.R., et al. (2024) 'Association between local amenities, travel behaviours and urban planning: a spatial analysis of a nationwide UK household panel study,' *Journal of Transport and Health*, 36, article number: 101784. doi:10.1016/j.jth.2024.101784.
- Owen, C.G., et al. (2012) 'Travel to school and physical activity levels in 9–10 year-old UK children of different ethnic origin; child heart and health study in England (CHASE),' *PLoS ONE*, 7(2), article number: e30903. doi:10.1371/journal.pone.0030932.
- Oxford, L. and Pollock, J. (2015) 'How actively do children travel to their pre-school setting?,' *Journal of Transport and Health*, 2(2), pp.151–159. doi:10.1016/j.jth.2015.02.002.
- Page, A.S., et al. (2010) 'Independent mobility, perceptions of the built environment and children's participation in play, active travel and structured exercise and sport: the PEACH Project,' *International Journal of Behavioral Nutrition and Physical Activity*, 7, article number: 17. doi:10.1186/1479-5868-7-17.
- Pangbourne, K., Bennett, S. and Baker, A. (2020) 'Persuasion profiles to promote pedestrianism: effective targeting of active travel messages,' *Travel Behaviour and Society*, 20, pp.300–312. doi:10.1016/j.tbs.2020.04.004.
- Panther, J., Desousa, C. and Ogilvie, D. (2013b) 'Incorporating walking or cycling into car journeys to and from work: the role of individual, workplace and environmental characteristics,' *Preventive Medicine*, 56(3–4), pp.211–217. doi:10.1016/j.ypmed.2013.01.014.
- Panther, J., et al. (2011) 'Correlates of time spent walking and cycling to and from work: baseline results from the commuting and health in Cambridge study,' *International Journal of Behavioral Nutrition and Physical Activity*, 8, article number: 124. doi:10.1186/1479-5868-8-124.
- Panther, J., et al. (2013a) 'Individual, socio-cultural and environmental predictors of uptake and maintenance of active commuting in children: longitudinal results from the SPEEDY study,' *International Journal of Behavioral Nutrition and Physical Activity*, 10, article number: 83. doi:10.1186/1479-5868-10-83.
- Panther, J.R., et al. (2010) 'Attitudes, social support and environmental perceptions as predictors of active commuting behaviour in school children,' *Journal of Epidemiology and Community Health*, 64(1), pp.41–48. doi:10.1136/jech.2009.086918.
- Patterson, R., et al. (2019) 'Physical activity accrued as part of public transport use in England,' *Journal of Public Health*, 41(2), pp.222–230. doi:10.1093/pubmed/fdy099.

- Patterson, R., et al. (2020) 'The social and physical workplace environment and commute mode: a natural experimental study,' *Preventive Medicine Reports*, 20, article number: 101260. doi:10.1016/j.pmedr.2020.101260.
- Patterson, R., et al. (2023) 'Equity impacts of cycling investment in England: a natural experimental study using longitudinally linked individual-level Census data,' *SSM - Population Health*, 23, article number: 101438. doi:10.1016/j.ssmph.2023.101438.
- Patterson, R., Ogilvie, D. and Panter, J. (2018) 'Ethnic group differences in impacts of free bus passes in England: a national study,' *Public Health* [Preprint]. <https://doi.org/10.1016/j.jth.2018.09.005>
- Pistoll, C.T. and Cummins, S. (2019) 'Exploring changes in active travel uptake and cessation across the lifespan: longitudinal evidence from the UK Household Longitudinal Survey,' *Preventive Medicine Reports*, 13, pp.57–61. doi:10.1016/j.pmedr.2018.11.008.
- Portegijs, E. et al. (2020) 'Neighborhood resources associated with active travel in older adults: a cohort study in six European countries,' *Journal of Aging and Physical Activity*, 28(6), pp.920–933. doi:10.1123/japa.2019-0267.
- Potoglou, D. and Arslangulova, B. (2017) 'Factors influencing active travel to primary and secondary schools in Wales,' *Transportation Planning and Technology*, 40(1), pp.80–99. doi:10.1080/03081060.2016.1238573.
- Powers, E.F.J., et al. (2019) 'Local walking and cycling by residents living near urban motorways: cross-sectional analysis,' *BMC Public Health*, 19, article number: 1434. doi:10.1186/s12889-019-7621-4.
- Prins, R.G., et al. (2016) 'Causal pathways linking environmental change with health behaviour change: natural experimental study of new transport infrastructure and cycling to work,' *Preventive Medicine*, 87, pp.175–183. doi:10.1016/j.ypmed.2016.02.042.
- Procter, D.S., et al. (2018) 'An open-source tool to identify active transport from hip-worn accelerometer, GPS and GIS data,' *International Journal of Behavioral Nutrition and Physical Activity*, 15, article number: 91. doi:10.1186/s12966-018-0724-y.
- Public Health Wales (2024) *Travel to School Hands Up Survey*. Available at: <https://phw.nhs.wales/travel-to-school-hands-up-survey/> [Accessed: 4 June 2025].
- Rafferty, D., Dolan, C. and Granat, M. (2016) 'Attending a workplace: its contribution to volume and intensity of physical activity,' *Physiological Measurement*, 37(12), pp.2144–2147. doi:10.1088/0967-3334/37/12/2147.
- Raser, E., et al. (2018) 'European urban cyclists' travel behavior: differences and similarities between seven European (PASTA) cities,' *Journal of Transport and Health*, 9, pp.244–252. doi:10.1016/j.jth.2018.02.006.

- Riches, S.P. et al. (2024) 'Park and Stride for health and wellbeing: evaluation of a wayfinding intervention to promote active travel to school in Oxfordshire, UK', *Journal of Transport and Health*, 35, article number: 101769. doi:10.1016/j.jth.2024.101769.
- Rind, E., et al. (2015) 'Are income-related differences in active travel associated with physical environmental characteristics? A multi-level ecological approach,' *International Journal of Behavioral Nutrition and Physical Activity*, 12, article number: 73. doi:10.1186/s12966-015-0157-x.
- Roth, M.A., Millett, C.J. et al. (2012) 'The contribution of active transport (walking and cycling) in children to overall physical activity levels: a national cross-sectional study,' *Preventive Medicine*, 54(2), pp.134–135. doi:10.1016/j.ypmed.2011.12.004.
- Sahlqvist, S., et al. (2013b) 'The association of cycling with all-cause, cardiovascular and cancer mortality: findings from the population-based EPIC-Norfolk cohort,' *BMJ Open*, 3(11), article number: e003797. doi:10.1136/bmjopen-2013-003797.
- Sahlqvist, S., Goodman, A., Cooper, A.R., et al. (2013a) 'Change in active travel and changes in recreational and total physical activity in adults: longitudinal findings from the iConnect study,' *International Journal of Behavioral Nutrition and Physical Activity*, 10, article number: 28. doi:10.1186/1479-5868-10-28.
- Sahlqvist, S., Song, Y. and Ogilvie, D. (2012) 'Is active travel associated with a greater physical activity? The activity contribution of commuting and non-commuting active transport to total physical activity in adults,' *Preventive Medicine*, 55(3), pp.206–211. doi:10.1016/j.ypmed.2012.06.028.
- Salway, R., et al. (2019) 'The association of school-related travel and active transport after-school clubs with children's physical activity: a cross-sectional study in 11-year-old UK children,' *International Journal of Behavioral Nutrition and Physical Activity*, 16, article number: 72. doi:10.1186/s12966-019-0832-3.
- Salway, R., et al. (2024) 'School-level variation in children's-moderate to vigorous intensity physical activity before and after COVID-19: a multilevel model analysis,' *Public Health Research*, pp.147–168, pp.147–168. doi:10.3310/WQJK9893.
- Sandercock, G.R.H. and Ogunleye, A.A. (2012) 'Screen time and passive school transport as predictors of cardiorespiratory fitness in youth,' *Preventive Medicine*, 54(5), pp.319–322. doi:10.1016/j.ypmed.2012.03.007.
- Sarkar, C. (2017) 'Residential greenness and adiposity: findings from the UK Biobank,' *Environment International*, 106, pp.1–10. Available at: <https://www.sciencedirect.com/science/article/pii/S0160412017302416> [Accessed 21 April 2025].

- Scottish Government (2014) Let's get Scotland Walking - The National Walking Strategy. Available at: <https://www.gov.scot/publications/lets-scotland-walking-national-walking-strategy/pages/5/> [Accessed: 15 June 2025].
- Scottish Government (2019) Climate Ready Scotland: climate change adaptation programme 2019-2024. Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/1/> [Accessed: 15 June 2025].
- Scottish Government (2020) Climate Change Plan 2018-2032 - update: strategic environmental assessment - gov.scot. Available at: <https://www.gov.scot/publications/update-climate-change-plan-2018-2032-draft-strategic-environmental-assessment/> [Accessed: 15 June 2025].
- Scottish Government (2021) Cleaner Air for Scotland 2 - Towards a Better Place for Everyone. Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/pages/2/> [Accessed: 15 June 2025].
- Scottish Government (2023) National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed: 15 June 2025].
- Scottish Government (2024) Physical activity for health Scotland's National Framework. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2024/10/physical-activity-health-framework/documents/physical-activity-health-scotlands-national-framework/physical-activity-health-scotlands-national-framework/govscot%3Adocument/physical-activity-health-scotlands-national-framework.pdf> [Accessed: 2 July 2025].
- Scottish Government (2024) Scottish National Adaptation Plan 2024-2029. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2024/09/scottish-national-adaptation-plan-2024-2029-2/documents/scottish-national-adaptation-plan-2024-2029/scottish-national-adaptation-plan-2024-2029/govscot%3Adocument/scottish-national-adaptation-plan-2024-2029.pdf> [Accessed: 2 July 2025].
- Sheffield Hallam University (2022) Projects | Department for Transport (DfT) Active Travel Portfolio National Evaluation (2022-27). Available at: <https://www.shu.ac.uk/active-travel-research-group/projects> [Accessed: 28 May 2025].
- Sims, J., et al. (2022) 'A profile of children's physical activity data from the 2012 and 2015 health survey for England,' BMC Public Health, 22(1), article number: 1780. doi:10.1186/s12889-022-14150-4.

- Singh, A., et al. (2022) 'Impacts of COVID-19 lockdown on traffic flow, active transport and gaseous pollutant concentrations; implications for future emissions control measures in Oxford, UK,' *Sustainability*, 14(23), article number: 16182. doi:10.3390/su142316182.
- Smith, J.R., Sahlqvist, S., et al. (2012b) 'Is active transport to non-school destinations associated with physical activity in primary school children?', *Preventive Medicine*, 54(3–4), pp.224–228. doi:10.1016/j.ypmed.2012.01.006.
- Smith, L., Sahlqvist, S., Ogilvie, D., et al. (2012a) 'Is a change in mode of transport to school associated with a change in overall physical activity levels in children? Longitudinal results from the SPEEDY study,' *International Journal of Behavioral Nutrition and Physical Activity*, 9, article number: 134. <https://doi.org/10.1186/1479-5868-9-134>
- Smith, M.A., et al. (2019) 'Associations between active transport and diet: cross-sectional evidence on healthy, low-carbon behaviours from UK Biobank,' *BMJ Open*, 9(8), article number: e030741. doi:10.1136/bmjopen-2019-030741.
- Song, Y., Preston, J. and Ogilvie, D. (2017) 'New walking and cycling infrastructure and modal shift in the UK: a quasi-experimental panel study,' *Transportation Research Part A: Policy and Practice*, 95, pp.320–333. doi:10.1016/j.tra.2016.11.017.
- Southward, E.F., Et al., et al. (2012) 'Contribution of the school journey to daily physical activity in children aged 11–12 years,' *American Journal of Preventive Medicine*, 43(2), pp.201–204. doi:10.1016/j.amepre.2012.04.015.
- Steinbach, R., Green, J. and Edwards, P. (2012) 'Look who's walking: social and environmental correlates of children's walking in London,' *Health and Place*, 18(4), pp.917–927. <https://doi.org/10.1016/j.healthplace.2012.02.005>
- Sulikova, S. and Brand, C. (2021) 'Investigating what makes people walk or cycle using a socio-ecological approach in seven European cities,' *Transportation Research Part F: Transport Psychology and Traffic Behaviour*, 83, pp.351–360. doi:10.1016/j.trf.2021.10.008.
- Sun, Y., Moshfeghi, Y. and Liu, Z. (2017) 'Providing crowdsourced geographic information and GIS for assessment of air pollution exposure during a study of active transport,' *Journal of Transport and Health*, 6, pp.93–104. doi:10.1016/j.jth.2017.06.004.
- Susilo, Y.O. and Liu, C. (2016) 'The influence of parents' transport patterns, perceptions and perceptions and self-selectivity to their children's transport mode shares,' *Transportation*, 43*(2), pp.357–378. doi:10.1007/s11116-015-9579-0.
- Sustrans (2021) Belfast Walking and Cycling Index. Available at: <https://www.sustrans.org.uk/the-walking-and-cycling-index/belfast-walking-and-cycling-index/> [Accessed: 9 June 2025].
- Sustrans (2024) Monitoring and evaluating active travel schemes: a toolkit for local authorities in Wales. Cardiff: Transport for Wales. (Accessed: 6 June 2025).

- Teyhan, A., et al. (2016) 'The impact of cycle proficiency training on cycle-related behaviours and accidents in adolescence: findings from ALSPAC, a UK longitudinal cohort,' *BMC Public Health*, 16, article number: 1, article number: 469. doi:10.1186/s12889-016-3138-2.
- Thomas, G.O. and Walker, I. (2015) 'Users of different travel modes differ in journey satisfaction and habit strength but not environmental worldviews: a large-scale survey of drivers, walkers, bicyclists and bus users commuting to a UK university', *Transportation Research Part F: Traffic Psychology and Behaviour*, 34, pp.86–93. doi:10.1016/j.trf.2015.07.016.
- Transport for Wales (2024) *Wales National Transport Strategy: Initial Scoping Review Report* [Online]. Available at: https://tfw.wales/sites/default/files/2024-10/WNTS-Initial-Scoping-Review-Report_Final-Accessible.odt (Accessed: 4 June 2025).
- Transport Scotland (2019). *Scotland's Road Safety Framework to 2030*. Available at: <https://www.transport.gov.scot/publication/scotland-s-road-safety-framework-to-2030/> [Accessed: 15 June 2025].
- Transport Scotland (2023). *Active Travel Strategy Guidance*. Available at: <https://www.transport.gov.scot/active-travel/active-travel-strategy-guidance/> [Accessed: 15 June 2025].
- Transport Scotland (2023). *Cycling Framework for Active Travel – A Plan for Everyday Cycling*. Available at: <https://www.transport.gov.scot/media/53417/cycling-framework-for-active-travel-a-plan-for-everyday-cycling.pdf> [Accessed: 2 July 2025].
- Transport Scotland (2025). *Achieving Car Use Reduction in Scotland: A Renewed Policy Statement*. Available at: <https://www.transport.gov.scot/publication/achieving-car-use-reduction-in-scotland-a-renewed-policy-statement/> [Accessed: 2 July 2025].
- Transport Scotland (2025). *Bulletin – June 2025 – Active Travel Transformation*. Available at: <https://www.transport.gov.scot/progress-update/bulletin-june-2025-active-travel-transformation/> [Accessed: 2 July 2025].
- Van Sluijs, E.M.F., et al. (2009) 'The contribution of active travel to children's activity levels: cross-sectional results from the ALSPAC study,' *Preventive Medicine*, 48(6), pp.519–524. doi:10.1016/j.ypmed.2009.03.002.
- Walker, I. and Gamble, T. (2023) 'Active transport to school: a longitudinal millennium cohort study of schooling outcomes,' *BMJ Open*, 13,2(3), article number: e068388. doi:10.1136/bmjopen-2022-068388.
- Welsh Government (2021) *Llwybr Newydd - The Wales Transport Strategy 2021* [Online]. Cardiff: Welsh Government. Available at: <https://www.gov.wales/llwybr-newydd-wales-transport-strategy-2021> (Accessed: 4 June 2025).

- Welsh Government (2024) Active travel delivery plan 2024 to 2027 [Online]. Cardiff: Welsh Government. Available at: <https://www.gov.wales/active-travel-delivery-plan-2024-2027> (Accessed: 3 June 2025).
- Welsh Government (2024) Environment (Air Quality and Soundscapes) (Wales) Act 2024 | Law Wales. Available at: <https://law.gov.wales/environment-air-quality-and-soundscapes-wales-act-2024> [Accessed: 15 June 2025].
- Welsh Government (2025) Bus Services (Wales) Bill | Senedd. Available at: <https://business.senedd.wales/mgIssueHistoryHome.aspx?Ild=45442> [Accessed: 15 June 2025].
- Werneck, A.O., et al. (2021) 'Association of change in the school transport mode with changes in different physical activity intensities and activity time: an International Children's Accelerometry Database Study,' *Preventive Medicine*, 153, article number: 106862. doi:10.1016/j.jpmed.2021.106862.
- Whelan, I., Luiu, C. and Pope, F.D. (2024) 'Assessing the polarising social impacts of low-traffic neighbourhoods: a community perspective from Birmingham, UK,' *International Journal of Environmental Health and Public Health*, 21(12), article number: 1638. doi:10.3390/ijerph21121638.
- Woodcock, J., et al. (2021) 'Health, environmental sustainability and distributional impacts of cycling uptake: the mode underlying the Propensity to 'Propensity for Cycle tool for England and Wales,' *Journal of Transport and Health*, 22, article number: 101066. doi:10.1016/j.jth.2021.101066.
- Xiao, C., et al. (2024) 'Children's Health in London and Luton (CHILL) cohort: a 12-month natural experimental study of the effects of the Ultra Low Emission Zone on children's transport to school,' *International Journal of Behavioral Nutrition and Physical Activity*, 21(1), article number: 98. doi:10.1186/s12966-024-01621-7.
- Zhang, X., et al. (2020) 'Active transport to school is not associated with increased total daily physical activity levels, or reduced obesity and cardiovascular/pulmonary health parameters in 10–12-year-olds: a cross-sectional cohort study,' *International Journal of Obesity*, 44(7), pp.1452–1466. doi:10.1038/s41366-020-0571-1.

10. Appendix

Table 1: Summary of Included Studies

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Alattar et al. (2021b)	Glasgow, Scotland	Maptionnaire (online, map-based survey tool) and non-spatial data.	Residents aged 18+ years	Travel modes that incorporate physical activity for all or part of a journey (e.g. walking and cycling).	STRAVA & Public Participation Geographic Information System (PPGIS) with a particular focus on cycling data.	Route length (Kms) with cycling trip purpose (Commute/Non-commute)
Aldred et al. (2019)	London, England	Routinely collected count data	Pedestrians and Cyclists in the intervention area.	Walking and cycling in the context of a travel mode shift from car use.	Intercept survey data (Primary data collection) Before-and-after counts (Routinely collected govt. data) Intervention: A residential street closed to through motor traffic	Estimate of number of new daily walk and cycle trips.
Aldred et al. (2019c)	Outer London boroughs, England	People and Places Longitudinal survey	Residents in the 3 targeted boroughs and control area boroughs	Not defined but suggests walking and cycling.	Online Survey with past-week travel diary (Data collected at baseline and after 1 year) (the 'mini-Hollands programme')	1. % who cycled past week 2. Minutes cycled past week 3. % who walked past week 4. Minutes walked past week 5. % who did active travel past week 6. Minutes of active travel past week
Aldred et al. (2021b)	Outer London boroughs, England	People and Places longitudinal survey	Residents in the 3 targeted boroughs	Not defined but suggests walking and cycling.	Online Survey with past-week travel diary (the 'mini-Hollands programme')	1. Duration of past-week active travel in minutes. 2. Likelihood of participants achieving 140 minutes of active travel per week. 3. Likelihood of participants being physically active for 5 days in the past week.

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Audrey et al. (2019) Aldred et al. (2024)	Southwest Outer London boroughs and South Wales England	Workplace Walk to People and Places Work feasibility study longitudinal survey	Eligible Employees at Residents in the 3 randomly selected targeted boroughs workplaces	Not defined but suggests walking and cycling.	Accelerometers (ActiGraph GT4M) and GPS receivers (QStarz BT 1000X) set to record positional data every 10s. Travel diaries at baseline and at 1 year follow up	1. Daily minutes of Moderate to Vigorous Physical Activity (MVPA) during commute (primary outcome) 2. Past-week cycling a. % cycled b. Minutes spent cycling 3. Past-week walking: a. % walked b. Minutes spent walking 4. Past-week car travel: a. % travelled by car b. Minutes spent traveling by car 5. Modal shift for commute (private car to walking) cycling
Bearman et al. (2014)	Norfolk, England	1.The SPEEDY study 2.School census data	Primary (6-11/12 years) & secondary school (11/12 -16 years) students	Not defined but suggests walking and cycling.	School commute routes were collected using GPS units and accelerometers for a subset of the sample	1. Criterion distances: the maximum distance that pupils are prepared to travel by active travel 2. Past-week active travel: a. % did any active travel b. % did 140+ minutes of active travel c. Proportion of journeys walked, cycled and passive journeys (not AT) 3. Minutes spent on active travel 4. Past-week public transport: a. % used public transport
Betts et al. (2025)	Cardiff, Wales	1.National Survey for Wales (NSW) 2. StatsWales.	Adults residing in Cardiff	Walking, running or cycling	Face-to-face survey interviews	Frequency of walking, running or cycling for commute across the deprivation index.
Bishop et al. (2024)	West London Boroughs, England	Primary data collection	Children aged 9–15 years and one of their parents/carers.	Not defined but suggests walking and cycling especially for school commutes.	Online surveys distributed via Bikeability training providers using Qualtrics online platform following identity verification via video call.	1. Cycling frequency for ≤2-mile trips (4-point scale: Never, Occasionally, Frequently, Very Frequently) 2. Monthly cycling hours in spring/summer and autumn/winter 3. Frequency of recreational vs. commuter cycling 4. Composite measure from cycling frequency, seasonal hours, and cycling type for analysis 5. COM-B analysis of barriers and motivators to cycling for students and parents/carers
Blake et al. (2017)	UK	Primary data collection	Hospital employees (from diverse occupation groups)	Walking or cycling to and from places, including commuting to work.	Baseline and follow-up surveys were conducted at 6, 12, and 16 weeks to assess changes in physical activity behaviour between the two intervention groups (RCT with SMS vs Email messaging to promote physical activity)	Active travel was measured using the Global Physical Activity Questionnaire (GPAQ), to capture: 1. Frequency (days/week) of walking or cycling for transport. 2. Duration (hours/day) spent in active travel.
Bösehans et al. (2016)	Bath, England	Primary data collection	Staff members and students (UG/PG) from the University of Bath, UK	Not defined but suggests walking and cycling.	Online survey	1. Self-reported travel modes (e.g. Walking, bus, car, etc) 2. Attitude towards walking

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Brainard et al. (2020)	England	The Active Lives Survey 2016/17	Older adults stratified into two age bands 55–64 years and 65–74 years.	Walking and cycling for transport	Self-reported data from web survey forms and paper questionnaires with questions related to specific physical activities people did in the preceding 28 days.	1. Moderate-Intensity Equivalent Minutes (MIEMs) for Active Travel: number of MIEMs per week. Further stratified acc. to age groups and work status: (full-time, part-time, or retired) 2. Participation in Active Travel: Yes/No 3. Walking as a Popular Leisure Activity: mentioned in leisure-based PA, specific measure not used
Brand et al. (2014)	Cardiff/Penarth (Wales), Kenilworth and Southampton (England)	Connect2 project (Led by Sustrans)	Adults living within a 5 km road network distance of the core Connect2 projects.	Walking and cycling for transport.	Baseline Questionnaires (2010) and one-year follow-up (2011) before and after new high-quality routes were built under the Sustrans Connect2 programme in three UK municipalities. A second cohort completed surveys at baseline and two-year follow-up (2012).	1. Modal shift from motorised to active travel 2. Increase in Active travel (walking/cycling) 3. Change in CO ₂ emissions from motorised travel
Brand et al. (2021)	7 European cities (including London, UK)	Physical Activity through Sustainable Transport Approaches (PASTA) project	Adults 18+ years of age (16+ years in Zurich)	Walking or cycling for transport.	Baseline Questionnaire with one-day travel diary. Follow-up surveys were issued biweekly, with every third including a one-day travel diary; the last of these served as the final questionnaire.	1. Mobility-related lifecycle CO ₂ emissions (Impact of active travel on reduction in CO ₂ emissions) 2. Changes in active travel (increase in cycling/walking i.e. mode shift) 3. 'Main mode' of daily travel 4. Cycling frequency 5. Journey purpose (Business/Commute/Recreational)
Brand et al. (2021)	7 European cities (including London, UK)	'Physical Activity through Sustainable Transport Approaches' (PASTA) project	Adults 18+ years of age (16+ years in Zurich)	Walking or cycling for transport.	Baseline Questionnaire with one-day travel diary. Follow-up surveys were issued biweekly, with every third including a one-day travel diary; the last of these served as the final questionnaire.	1. All modes CO ₂ emissions(kg/day) 2. Transport mode usage (trips/day) 3. Average distance travelled (by car/bike/walking/public transport) in kms/day 4. All modes average travel time (min/day)

Carver et al. (2014)	Norfolk, England	SPEEDY study	Children aged 9–10 years, residing within 1600 meters of their school.	Not defined but suggests walking or cycling to school.	Children completed questionnaires at school (Baseline (T1) and after one year (T2)). Participants wore an accelerometer for 7 days at baseline, mid-intervention and post-intervention (+20 weeks), and completed a travel diary.	1. Usual mode of travel (car, bus/train, bicycle, on foot).
Coombes et al. (2016)	Norfolk, England	A pilot non-randomised controlled evaluation of a 9-week intervention (Beat the Street)	School children in the control and intervention groups.	Walking or cycling for transport	Parents completed a questionnaire at T1 and T2.	1. Travel mode to school: % of school commutes at baseline, mid-intervention/ post-intervention that were reported using active travel. 2. Change in travel mode to school: a. Did not walk/cycle independently (used a motorized mode or was accompanied by an adult). b. Change in % of school commutes reported using active travel between baseline and mid-intervention. c. Walked/cycled independently (without adult accompaniment). d. Change in % of school commutes reported using active travel between baseline and post-intervention.
Cohen et al. (2014)	England	East of England Healthy Hearts Study	Students of 10-16 years of age.	Not defined but suggests walking or cycling to school	Data collected via questionnaires during regularly scheduled physical education classes	1. Travel to school: distance travelled (km) using active travel between baseline and post-intervention. 2. Passive transport: Distance travelled (km)
Cooper et al. (2012)	One UK city (name undisclosed)	The PEACH project	Year 6 children (aged 10–11 years) attending primary schools	Not defined but suggests walking and cycling to and from school.	1. Physical activity was measured over 7 days using a waist-worn accelerometer, excluding swimming, bathing, and sleep. 2. Focus groups and interview audio recordings	3. Active transport: Distance travelled (km) 4. Change in moderate-to-vigorous physical activity (MVPA) associated with change in travel mode between primary and secondary school.
Connell et al. (2022)	Six HSBC UK workplaces (England and Scotland)	Cycle Nation project with a pilot intervention to increase cycling habits in the workplace population.	Staff members (18+ years) who were able to ride a bicycle.	Not defined	1. Travel mode to and from school was self-reported via a computerised questionnaire. 2. Street network distances (km) between home and school were calculated using GIS, with locations based on postcode derived grid references. 3. An accelerometer (ActiGraph) worn at the waist for 7 days, set to record level of physical activity at 10 s intervals. 4. Choice data from the UK Census (2011) at the output area level. 5. A questionnaire administered at both baseline and follow-up (one year) (2005–2012), informs the safety model. 6. The residential postcode of each child.	1. Total cycling (rides/week) & (min/week) 2. Utility cycling* (days/week Commuting cycling (rides/week) 3. Leisure cycling (rides/week) 4. Motorised transport use (min/week) {*Utility cycling includes shopping, running errands, school run, etc.}
Coombes et al. (2014)	Bristol, England	Phases 1 and 2 of the PEACH project	Year 6 children (aged 10–11 years) attending primary schools	Walking and cycling to school	1. Cycle flow data comes from DfT and Cardiff Council, with mode choice data from the UK Census (2011) at the output area level. 2. Road traffic incident data (2005–2012), informs the safety model. 3. Data from Open Street Map (2015) for cycle infrastructure (e.g., off-road paths) and the exclusion of on-road bike lanes.	Change in travel mode to school between primary and secondary compared with change in school commute environment supportiveness in % (stays same: active, changes from active to passive, changes from active to passive, stays same: passive) 1. Observed Cycle Flows (Annual Average Daily Traffic (AADT)): average number of cyclists per day on specific road segments 2. Predicted Cycle Flows: modelled using parameters for distance, slope, traffic, and angular distance 3. Mode Choice (Proportion of People Choosing to Cycle): correlated with urban density (indirect measurement) 4. Route Choice (Perceived Effort for Cycling): proxy measure modelled using relative attractiveness of routes
Cooper et al. (2017)	Cardiff, Wales	1. 2011 UK census, project 2. Department for Transport (DfT) and 3. Cardiff Council	Nationally representative sample	Not defined		

					4. No direct measure for Walking used	
Coronini-Cronberg et al. (2012b)	UK	UK National Travel Survey (NTS)	Participants with/without a free bus pass of ages >60 years	Walking, cycling, and use of public transport	An interview, and a 1-week travel diary over a 4-year study period	1. Walking frequency (binary): <3times/week and >3times/week 2. Access to a car: No/Yes 3. Proportion of journey stages by active transport for Pass holders/ Non-pass holders 3. Proportion of journey stages by bus for Pass holders/Non-pass holders
Dalton et al. (2013)	Cambridge, England	Commuting and Health in Cambridge study	Participants aged 16 and over, working in Cambridge and living within 30 kms of the city.	Walking and cycling to work.	Postal questionnaires which included the Recent Physical Activity Questionnaire (RPAQ).	1.Usual mode of travel to work (car/public transport/walk/cycling) 2. Environmental characteristics to predict active travel to work: a. Distance to work (strong predictor, particularly affecting walking). b. Street connectivity (junction density). c. Proximity and quality of public transport (bus service frequency, railway station distance). d. Availability of free car parking at work. e. Number of destinations (shops, leisure, schools) near home and work. f. Building density and road types along commuting routes
Dalton et al. (2015)	Cambridge, England	Commuting and Health in Cambridge study.	Participants aged 16 and over, working in Cambridge and living within 30 km of the city but not in the immediate vicinity of their workplace.	Walking and cycling to and from work.	1. Postal questionnaires, with a group of participants completing a 7-day retrospective travel diary. 2. GPS devices recorded the actual travel routes every 5 seconds. 3. GIS software (ArcGIS 9.3) generated the modelled shortest-distance routes based on available pedestrian and cycle networks.	1.Mode of travel to work (% journeys) Bicycle, Bus, Car/motorcycle, Car/bicycle, Car/Walk, Walk 2.Difference in route length (%) (between actual GPS-tracked and GIS-modelled routes), 3.%spatial overlap (actual vs. modelled), 4. Environmental exposures along the route (particularly healthy/unhealthy destinations encountered), 5. Route directness.
Demiris et al. (2025)	England	The National Travel Attitudes Survey (NTAS) conducted annually by the Department for Transport (DfT)	Residents aged 16+ years in England.	Not defined.	Questionnaire on travel behaviour, climate attitudes, and socio-demographics targeted towards people born in mid-1990s to mid-2000s.	1. Flexibility in Travel Habits (switch from car use to walking, cycling, or public transport for short trips (<3 km or 2 miles) 2. Current Travel Behaviour (walking/cycling or car use)

						3. Willingness to Reduce Car Use (in response to climate change) 4. Actual Use of Walking/Cycling for travel.
Downward et al. (2015)	Local authorities in England with NCN routes.	1. Sport England's Active People Survey (APS) 2. Miles of National Cycling Network (NCN) routes (Sustrans data), 3. Census 2011	Adults in the UK	Walking and cycling	1. APS data: Random sampling on a rolling monthly basis, representative of each local authority 2. NCN route data from Sustrans: (miles of cycle routes per local authority)	1. Total minutes of cycling of any sort or any duration in the past 4 weeks. 2. Days cycled for ≥30 minutes by purpose (recreational or utilitarian). 3. Intensity of cycling: Moderate/ Vigorous Effects of Population density, Miles of cycling routes in local authority, Ethnicity and Annual income were analysed on cycling behaviour
Fairnie et al. (2016)	London, England	Transport for London's London Travel Demand Survey (LTDS)	Residents of London aged 16+ years	Any travel made predominantly by walking, cycling, using a scooter or running, includes walking stages linked to public transport use.	Household questionnaire, Individual questionnaire and Trip sheets of a single travel day. Followed by household interviews.	1. Any active travel (≥1 minute): yes/no 2. Total minutes spent walking/cycling per day. 3. Average length of active stages (e.g., 4 minutes for bus-linked walks, 6 minutes for rail-linked walks). 5. Public transport-related: Active travel stages tied to public transport trips (e.g., walking to a train station). 6. Pure active trips: Trips where walking/cycling was the main mode (e.g., walking to a shop). Active travel rates stratified by Car ownership, Bicycle access/use, Income, Ethnicity, Age, gender, employment status, and day of the week (weekday vs. weekend).
Flint et al. (2016a)	UK	Longitudinal data from UK Biobank.	Participants aged 40–69 years who visited 22 assessment centres across the UK between 2006 and 2010	Walking, cycling (in relation with travel to work)	Self-reported commuting data collected between 2006 and 2010	1. Commuting method: Car only, Car and public transport, Public transport only, Car and public transport or active transport, public transport and active transport, walking only & cycling only or cycling and walking 2. Non-work active travel: No/ Yes 3. Walking for pleasure: Once a month, 2–3 times a month, Once a week, 2–3 times a week, 4–5 times a week, and every day
Flint et al. (2016b)	UK	Longitudinal data from UK Biobank.	Participants were aged 40–69 years and commuted from home	Walking, cycling (in relation with travel to work)	Baseline data: collected between 2006–2010 from 22 assessment centres.	Travel used as exposure for change in BMI 1. Primary mode of travel to work 2. Transition from car to active/public transport 3. Transition from active/public transport to car

			to a workplace on a regular basis		Follow-up data: Collected between 2012–2013 at a single centre (Stockport) for a subset of participants.	4. Stable car users. 5. Stable active/public transport users.
Fluharty et al. (2019)	UK	UK household longitudinal study	Employed adults aged 20 years and over	Walking and cycling	National cross-sectional survey via face-to-face computer-assisted personal interview	Mode of travel to work (Active: walking/cycle, Non-active: Car/public transport)
Foley et al. (2015)	Cambridge, England	Commuting and Health in Cambridge Study	Participants aged 16 or over, lived within a radius of 30 km of Cambridge city centre, and worked in Cambridge	Walking or cycling to get to or from work	Questionnaires and objective physical activity monitoring (Actiheart sensor). Commuting was assessed using a validated seven-day travel to work record. Moderate-to-vigorous physical activity (MVPA) was assessed using the Recent Physical Activity Questionnaire and combined heart rate and movement sensing.	Exposures divided based on Self-reported and objectively measured data: 1. Time spent in (a) active commuting (walking plus cycling; minutes/week), (b) cycle commuting (minutes/week) and (c) walking commuting (minutes/week). 2. Change in active commuting (min/week; no change, increase or decrease)
Foley et al. (2018)	UK	2014/15 United Kingdom Harmonised European Time Use Survey	Participants aged 18 or above	Walking or cycling for transport	Individual demographic questionnaire and recorded two diary days of activity, and one day was randomly selected. Each diary started at 4 am and covered a full 24 h, in 10-min timeslots	1. Mode of Travel: Active travel coded as Travel by foot/Travel by cycle 2. Travel including both active and motorised modes (minutes/day) 3. Leisure MVPA including walking or cycling for recreation (minutes/day)
Fyhri et al. (2011)	UK	National Travel Surveys (NTS) of 4 countries (Denmark, Finland, UK, Italy)	All household members in UK	Not defined but suggested as walking/cycling or use of public transport for commute to school.	Longitudinal cross-sectional surveys with large, nationally representative samples, include travel diaries. Inclusion of local survey data on travel to school.	1. Mode of transport to school: Walk/Bicycle/Public transport/Private car/Other 2. Mode Share (%): proportion of trips made by different modes 3. Distance to school (in kms) 4. Change in travel trends over time: Car use, walking to school, cycling etc
Garrott et al. (2023)	Northstowe Cambridgeshire, England	A mixed-methods, three-arm Randomised Controlled Trial.	Northstowe residents over 16 years old from households that had not previously claimed financial incentives.	Not defined but suggested walking, cycling and use of public transport to travel.	Baseline questionnaire assessing socio-demographic characteristics and travel behaviour, followed by randomisation into three groups (control/intervention/intervention plus) based on financial incentives claimed online/via	1. Self-reported travel modes: walking, cycling, public transport, or cars. 2. Incentive use (quantitative): whether participants used travel-related financial incentives (e.g., bus passes, sports vouchers). 3. Qualitative travel behaviour descriptions: Walking, cycling, public transport behaviour changes prompted by incentives.

					email/or greater value claimed via email. Data then collected after 3 months, and 6 months follow up.	
Ginja et al. (2017)	Northeast England	A parallel cluster randomised pilot trial (RIGHT TRACKS) conducted over 9 weeks in two schools from a low-income area.	Year 5 school children (aged 9–10 years) and their parents.	Walking or cycling to and from school.	1. Daily parental AST reports (optionally by SMS) and child AST reports, as well as accelerometry (ActiGraph GT3X+). Intervention: Randomised lottery based monetary incentive scheme	1. Mode of travel each school day (walk/cycle): by parental reports 2. Self-reported travel mode for each past day 3. Objective MVPA during travel times and pre-school hour (using accelerometer) 4. Comparison of MVPA levels for active and non-active travel trips.
Goodman et al. (2011)	Hertfordshire, South-East England	Two observational studies conducted in Hertfordshire between 2002 and 2006.	The first study recruited students Years 6-8 (ages 10–11 years and 12-13 years) The second study recruited students of Years 4, 5 and 6 (ages 8–11 years)	Walking and/or cycling to travel to and from school.	1. Physical activity measured using RT3 tri-axial accelerometers worn by students. 2. Travel and activity diaries recorded for four days, adapted from National Travel Survey diaries. 3. Global Positioning Systems (GPS) monitors worn by a subsample of participants for behaviours involving spatial changes.	1. Travel mode: AT to school or for other purposes 2. Time allocation: % of the day spent in each behavior (minutes in active travel ÷ total waking hours) 3. Moderate-to-vigorous physical activity (MVPA): % of day in MVPA 4. Secondary analysis: a. If AT increased total MVPA without reducing activity at other times → no compensation (supporting activity synergy). b. If AT increased MVPA but led to less activity later → compensation
Goodman et al. (2012)	Hertfordshire, South-East England	Two observational studies conducted in Hertfordshire between 2002 and 2006.	The first study recruited students Years 6-8 (ages 10–11 years and 12-13 years) The second study recruited students of Years 4, 5 and 6 (ages 8–11 years))	Walking and/or cycling to travel to and from school.	1. Physical activity measured using RT3 tri-axial accelerometers worn by students. 2. Travel and activity diaries recorded for four days, adapted from National Travel Survey diaries. 3. Global Positioning Systems (GPS) monitors worn by a subsample of participants for behaviours involving spatial changes. 4. Day length in hours calculated using sunrise and sunset times for London (borders Hertfordshire).	1. For each behaviour, its duration (minutes in behaviour/total minutes), activity intensity (MVPA minutes in behaviour/total minutes in behaviour), and activity contribution (duration × intensity, or MVPA minutes in behaviour/total minutes) were calculated. 2. % of the day spent in active travel. 3. % of active travel time spent in moderate-to-vigorous physical activity (MVPA). 4. Activity contribution: Combined effect of duration × intensity (MVPA minutes from active travel ÷ total daily minutes)

Goodman et al. (2012b)	Cardiff (Wales), Kenilworth and Southampton (England)	iConnect study	UK adults	Walking and/or cycling	Postal Questionnaires including travel diaries.	1. Walking/Cycling for recreation in past week (in min) 2. Walking/cycling for transport in past week (in min) 3. Active travel distance (median distance kms/week)
Goodman et al. (2018)	England	Active People Survey data with comparisons made with National Travel Survey (NTS)	Adults aged 16+ years.	Not defined, only measures cycling	Telephonic surveys	1. Local Cycling Prevalence: Proportion of adults cycling in a local authority (in % classified as low, medium and high) 2. Purpose of Cycling for utility (transport) or recreational
Goodman et al. (2019)	England	2011 National School Census (NSC) data & National Travel Survey (NTS) data	Children attending state-funded schools in England	Walking or cycling to and from school	NSC: Provided origin-destination (OD) pairs for home-to-school travel, including mode of transport. NTS: Validated seasonal variation in cycling rates and trip distances. Propensity to Cycle tool (PCT) applied to collected data.	1. Observed cycling rates (%) 2. Distance from Home to School (Kms) 3. Modal shift/ cycling uptake
Gorely et al. (2009)	UK	Project STIL – Sedentary Teenagers and Inactive Lifestyles	School students from year 9, 10, and 11 (13–16 years old)	Not defined but suggested as walking and cycling	Ecological momentary assessment diaries every 15 minutes for 3 weekdays outside of school hours and 1 weekend day	1. Self-reported: Time spent in active travel (min/day)
Götschi et al. (2015)	England and Wales	1. National Travel Survey 2. Integrated Transport and Health Impact Modelling tool (ITHIM)	Participants aged 15+ years	Walking and cycling for travel	Routinely collected survey data on travel patterns	1. Active Travel Modes: walking/cycling 2. Converted to marginal MET-hours/week 3. Daily minutes spent walking/cycling (absolute and relative)
Götschi et al. (2020)	Not specified (European region)	Health Economic Assessment Tool (HEAT)	Adults (age not specified)	Walking and cycling	The tool used multiple data sources (self-reported, population survey data, app-based data)	HEAT accepts diverse units for active travel: 1. Time-based: Minutes/hours per day. 2. Distance-based: Kilometres/miles per day. 3. Frequency-based: Trips per day, mode share (%), or categorical frequency 4. Counts: (e.g., daily cyclist counts). 5. Total steps: For walking only.
Harris et al. (2021)	Hounslow, London, England	'Beat the Street': community-wide	Adults aged 19-79 years	Walking, cycling, scooting, or	1. Self-report questionnaire with a validated physical activity measure (Short active lives survey	1. Changes in physical activity: Weekly minutes of moderate physical activity (inactive: <30 min/week or active: > or =150 min/week)

		gamification-based intervention study.		wheeling to/from school or work	or SALS): At baseline (pre-intervention) and follow-up post-intervention (6 weeks) 2. Objective measure: Data collected through Gameplay (RFID sensors to generate time stamps) 3. Traffic count data: using Traffic monitoring cameras	2. Participation activity (Gameplay frequency): to distinguish leisure time physical activity or active travel (commute to school/work) 3. Reduction in vehicle counts on the road (used as proxy for increased active travel)
Heinen et al. (2015a)	Cambridgeshire, England	Commuting and Health in Cambridge cohort study	Participants aged ≥16 years, living within 30 km of Cambridge, and working near the busway.	Walking and cycling for commute to work	1. Annual postal surveys over four waves (this study utilised data from the last wave– 2012) 2. Seven-Day Travel-to-Work Diary (Self-Reported) 3. Proximity to Busway (intervention) calculated using GIS.	1. Trip modes: Walking or cycling – further classified into full active travel trips or combination trips (walk + bus or walk + train etc) 2. Changes in mode of travel: none/partial/complete
Heinen et al. (2015b)	Cambridge, England	Commuting and Health in Cambridge cohort study	Participants aged ≥16 years, living within 30 km of Cambridge, and working near the busway.	Commute involving walking and or cycling to work.	1. Postal Questionnaire data collected annually between 2009 and 2012 including a seven-day travel-to-work record (pre and post intervention) i.e. 2009 and 2012. 2. Self-reported home and workplace post codes calculated using GIS. 3. Intervention: the Cambridgeshire Guided Busway	1. Changes in commute mode share (%): a. involving any active travel, b. involving any public transport, and c. made entirely by car 2. Number of commute trips(n) 3. Change in objective commute distance(kms)
Heinen et al. (2017)	Cambridge, England	Commuting and Health in Cambridge cohort study	Participants aged ≥16 years, living within 30 km of Cambridge, and working near the busway.	Commute involving walking and or cycling to work.	1. Postal Questionnaire data collected annually between 2009 and 2012 including a seven-day travel-to-work record (pre and post intervention) i.e. 2009 and 2012. 2. Self-reported home and workplace post codes calculated using GIS. 3. Intervention: the Cambridgeshire Guided Busway	1. Modal shift change: (a) no change, (b) a full modal shift, (c) a partial modal shift, (d) non-stable but patterned behaviour, and (e) complicated or apparently random patterns 2. Patterns of change: change in travel mode by car/active travel/public transport 3. Individual mode shift: no significant change in individual travel behaviour

Hong et al. (2018)	Glasgow and Clyde Valley Planning area, Scotland	The integrated Multimedia City Data (iMCD) survey conducted by the Urban Big Data Centre (UBDC) in Glasgow	Residents in Glasgow with mean age of 49.9 years	Walking and cycling	1. Face-to-face household surveys for a self-reported measure, including a one-day travel diary. 2. 1-week wearable GPS device: objective measure of average walking hours.	1. Self-reported: Frequency of active travel trips (min walked/day) 2. Objectively measured: Average walking hours per person per day 3. Measurement of association between social media use and active travel
Hunter et al. (2015)	London and Reading, England	An uncontrolled mixed-methods feasibility evaluation of a 4-week international "Beat the Street" walk-to-school competition.	Children aged 11–13 years old	Travel to school via walking and/or cycling	1. School Travel Tracking: Swipe card technology and a custom website recorded walks to/from school over a 4-week intervention. 2. Travel Diary: A 5-day log captured travel mode and journey duration (minutes). 3. Baseline & Post-Intervention Surveys: Paper questionnaires 4. An online follow-up survey gathered parent/teacher feedback on the intervention's impact and perceived changes in children's activity levels.	1. Number of walks to/from school objectively recorded using the swipe card tracking system. 2. Attitudes towards walking collected at baseline and week 4 (post-intervention) 3. Mode of travel (walking, cycling, car, bus) and journey duration (minutes) to/from school. 4. Participation Rates: Proportion of children walking (objectively via swipe cards vs. self-reported). 5. Behavioral Trends: Weekly decline in walking rates
Hutchinson et al. (2014)	UK	UK Household Longitudinal Study	Nationally representative UK population	Walking and cycling for transport.	Computer-assisted personal interview (CAPI): self-reported	1. Frequency of active travel (self-reported) : (Always/Very often/Quite often/Not very often/Never/Not applicable/can't do this) associated with socio-demographic factors and urban/rural settings
Ikeda et al. (2022)	England	Three longitudinal studies within the International Children's Accelerometry Database (ICAD)	Participants aged 11.3 ± 1.2 years at baseline	Travel to school via walking and/or cycling	1. Physical activity levels measured via ActiGraph accelerometers in Average daily minutes of moderate-to-vigorous physical activity (MVPA) 2. Survey questionnaire: Child- or parent-reported mode of travel to school The three studies used: 1. Avon Longitudinal Study of Parents and Children (ALSPAC; England)	1. Data from accelerometer: a. average minutes of MVPA per valid day at baseline for cross-sectional analyses, and b. change in the average minutes of MVPA per valid day from baseline to follow-up c. Average daily minutes of MPA and VPA 2. Self-reported data: Travel mode to school: Active i.e. walk or cycle and Other i.e. public transport or car 3. Compared MVPA levels between active and non-active travellers and baseline active travel's association with changes in MVPA over time.

					2.Children Living in Active Neighbourhoods (CLAN; Australia) 3.Sport, Physical activity and Eating behaviour: Environmental Determinants in Young people (SPEEDY; England)	
Jacob et al. (2021)	UK	The UK Household Longitudinal Study	Nationally representative UK population	Walking or cycling	Data collected from panel surveys from 2009-2016, regarding: 1. Mode of travel to work: Car/Public Transport/ Active Travel/ Other 2. Physical and Mental Health score (SF-12 questionnaire) 3. Socio-economic and demographic characteristics	1. Mode of travel to work (active/non-active) 2. Changes in Commuting Mode: individuals who switched modes between waves (car to active or vice-versa) 3. Commute time: Duration of one-way commute (in minutes) {also analysed by mode}
Jones et al. (2012)	London, England	Primary qualitative data collection	Participants were 12–18-year-olds living in London	Walking, cycling, and bus travel	Qualitative data collected by using young people's accounts of bus travel generated in interviews, focus groups and observational notes	1.Including bus travel as active travel as it involves: a. Physical activity: Walking to/from bus stops, switching buses, standing on buses. b. Social activity: Interaction with peers and strangers, fostering independence and social capital. 2.Walking: Displaced as well as generated due to bus travel (free bus pass): further differentiated based on geographical location 3.Cycling: Leisure time active/ not a spontaneous replacement to walking or bus travel.
Kelly et al. (2011)	UK	A pilot study (primary data collection)	Non-random convenience sample of participants (n=20) aged 24-60 years.	Not defined but suggested as walking and cycling,	1. Participants were required to wear the 'Sense Cam device' for one full day of travel. 2. A self-reported travel diary over the same period for comparison and 3. Interviews to assess user burden and experience.	1. Journey mode (walk/cycle/car/bus), 2. frequency (n), 3. average self-reported duration (sec) and 4. average Sense Cam recorded duration (sec)
Knott et al. (2018)	England	UK Biobank Cohort (population-level longitudinal cohort study)	Participants aged 40–75 at baseline with a mean follow-up of 4.65 years who reported to be	Not defined but suggested as walking and cycling	1. Travel data generated from the UK Biobank (self-reported data) 2. Health-related data: Two-item Patient Health Questionnaire	1. Commute mode: Active/Inactive 2. Mode change/Transition: a. Stable inactive: Consistently car-only. b. Stable active: Consistently used active modes.

			employed/ self-employed and commuted for work.		(PHQ-2), validated for depressive symptom severity.	c. Inactive → active: Switched from car-only to active modes. d. Active → inactive: Switched from active modes to car-only 3. Commute distance (miles) and Commute frequency (trips/week)
Knott et al. (2019)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults aged ≥16 years at enrolment, worked in Cambridge, UK, and lived within 30 km of the city.	Walking and Cycling	Participants completed postal questionnaires about their lifestyle, commute (using 7-day travel diary), workplace, environment, and health	Proportion of trips (%) and %difference in trips made exclusively by motor vehicle, walking and/or cycling and involving public transport, associated with change in workplace car parking policies.
Laverty et al. (2021)	UK	UK Millennium Cohort Study.	Children at ages 7, 11 and 14 years	The use of non-motorised modes of travel such as walking or cycling	Self-reported questionnaires (baseline and follow up (8 years))	1. Transport mode to school was categorised as private motorised transport, public transport and active transport 2. Distance to school (kms) 3. Switching of mode of travel to school in association with adiposity.
Lawlor et al. (2021)	Connswater, Belfast, Northern Ireland	The Physical Activity and the Rejuvenation of Connswater (PARC) study	Adults aged 16 and above	Walking or cycling as an alternative to motorised transport for the purpose of making every day journeys	Postal questionnaires (self-reported)	Time spent in AT (minutes/week): categorised into none (0min/week), some (≥10 min/week) and sufficient (≥150min/week) in association with income
Lehtonen et al. (2021)	UK	EU H2020-funded L3Pilot project	Adults (car-drivers) aged 18+ from 8 European countries including UK	Walking and/or cycling	1. Online survey questionnaire 2. Intervention: Automated Car availability Transport modes categorised as: Personal car as a driver, Walking more than 500m, Car as a passenger, Shared car as a driver, Personal bicycle, Public transport <50km, Public transport >50km, Motorcycle, and Shared bicycle	1. Current travel behaviour: frequency of using 9 transport modes in a week based on Low/medium/High use of alternative modes. 2. An alternative mode use score was calculated (average frequency of non-car modes) 3. Change in use of Public transport or active travel based on L3Avs (<i>Large decrease, Decrease, No change, Increase, Large increase</i>)
Macdonald et al. (2019)	Scotland	Studying Physical Activity in Children's Environments across Scotland study (SPACES).	Children aged 10-11 years recruited from the Growing Up in Scotland (GUS) Study	Travel to school by walking and/or cycling	1. Interviews of children and parents. 2. A travel diary (how they travel to and from school each day during two school weeks (10 days/20 trips))	1. Children who actively travelled to/from school categorised as active all (100% of AST) and active 60 %+ (at least 60% of AST). 2. Home-to-school road/path network distance (<0.5 km, 0.5 to <1 km, 1 to <1.5 km, 1.5 to <2 km, 2 km+).

						<p>3. Home neighbourhood walkability (i.e., composite measure of road/path intersection density and dwelling density) (in quintiles).</p> <p>4. Likelihood of school journeys using active travel by home- to- school distance and walkability of home neighbourhood (weighted) : ORs and P-values</p>
Martin et al. (2014)	UK	British Household Panel Survey	Adults aged 18–65 years who commuted to work.	Cycling and or walking to work	Questionnaires (Self-reported)	<p>Study tested the association of mode of travel with psychological well-being:</p> <p>1. Mode of travel to work: Active travel, Public transport or Car travel</p> <p>2. Commuting Time: Time Spent Walking/Cycling in minutes</p> <p>3. Mode switch: Switching to Active Travel or Switching to Walking vs. Cycling</p>
Martin et al. (2015)	UK	British Household Panel Survey	Adults aged over 18 years	Walking and cycling to work	Annual survey (baseline and follow up after 2 years) Data from 2004/2005, 2005/2006 and 2006/2007 surveys	<p>1. Mode of travel to work</p> <p>2. Change/switch in mode of travel to work:</p> <p>a. Switching from private motor transport to active travel or public transport</p> <p>b. Switching from active travel or public transport to private motor transport</p>
Martin et al. (2020)	London, England	UK Census microdata (2001-2011)	Adults ages 16 and above who commute to work via bicycle	Not defined	Census data	<p>1. Borough-level prevalence and trends in cycling (%) over time</p> <p>2. Individual level prevalence and trends in cycling (%) over time</p> <p>3. Relationship between change in cycling infrastructure and change in the proportion of commuters who cycle</p>
Mason et al. (2016)	Glasgow, Scotland	GoWell Research and Learning Programme	Residents (householder or partner), aged 18 years or more	Walking or cycling to work or school	Survey via questionnaire (self-reported data)	<p>1. Domains of physical activity: Household chores, Occupational, Active travel, Leisure and Family activities</p> <p>2. Relative contribution of different types of physical activity (based on IPAQ): Low/moderate/High</p>
McCartney et al. (2012)	Glasgow, Scotland	Data from the 2001 Census and data from a ‘cordon count’ survey over two days in four consecutive years (2007–2010)	Glasgow adults (aged 16–74 years) whose commuting destination was within the city centre area	Walking and or cycling for commute	Census data: to calculate modes of travel to work or study from different geographical sectors in Glasgow to the City centre.	<p>1. Mode of Travel to Work/Study</p> <p>2. Distance of Commute</p> <p>3. Active Travel Prevalence: Proportions of commuters walking/cycling</p> <p>4. Per Capita Rates: Cordon counts expressed as journeys per 1,000 residents</p>

					Cordon count data: to calculate the patterns of active transport into and out of the city centre	5.Trends: Yearly changes in counts of pedestrians/cyclists
McCreery-Phillips et al. (2023)	Greater London, England	1.Office for National Statistics (2013) based on UK census (2011) 2.Greater London Authority (GLA) Datasets 3.Department for Transport data (London)	People aged 16–74 who travel to work by bicycle	Not defined but suggests walking and cycling	1. 2011 UK Census: Ward level proportion of commuters who cycle 2. Greater London Authority (GLA) Datasets: a) Ward profiles and borough profiles: Provided land-use data, population density, and economic indicators. b) Public Transport Accessibility Level (PTAL) scores: Measured public transport access at the ward level. 3. Transport for London (TfL): a) Cycle network density b) Santander Cycles docking stations 4. Department for Transport (DfT): Annual vehicle miles travelled	1. Bicycle commuting rates 2. Cycle network density (length of cycle network per unit area (km/m2)) 3. Total annual vehicle miles travelled (millions)
McKee et al. (2007)	Scotland	A quasi-experimental trial (primary data collection)	Primary school grade-5 (aged 9 yrs) children and their families and teachers for an intervention and control school.	Walking and cycling to school.	1. A computerised mapping programme to record school travel behaviour at baseline and follow-up (10 weeks). 2. An online computerised questionnaire to ascertain “stage of behaviour change” and the benefits of motivations for and barriers to making an active journey to school. 3. Results based on baseline journey measurements and travel questionnaires 4. Intervention: Travelling Green, a school-based active travel project	1. Mean difference between intervention and control schools for: a) Mean distance travelled from home to school; Mean distance travelled to school by walking and Mean distance travelled to school by car b) Mean difference in the distance travelled to school by walking between baseline and follow-up and Mean difference in the distance travelled to school by car between baseline and follow-up 2. Stage of behaviour change for active commuting (action or maintenance)
McMinn et al. (2011)	Scotland	1. A quasi-experimental trial (primary data collection)	Participants were from primary 5 (ages 8-9 years) from 5 Scottish schools.	Walking or cycling to and from school.	1.Parent and child questionnaires, travel diary, and ActiGraph GT1M accelerometers	1. Time (seconds) spent in MVPA (≥ 4 METs) during commutes via accelerometer. 2. Minutes spent in MVPA (threshold: ≥ 3.6 METs) via Pedometer

		2. Strathclyde Evaluation of Children's Active Travel (SE-CAT)			and the NL-1000 pedometer recordings) were taken during 5 consecutive school days prior to starting the intervention and during 5 consecutive school days post-intervention (after 5 and 12 months) 2. Intervention: Travelling Green, a school-based active travel project	3. Usual travel mode: Self-reported walking, cycling, car, or bus 4. Travel mode: How the child travelled home and Trip details: Time arrived home, stops enroute
McMinn et al. (2012)	Scotland	Strathclyde Evaluation of Children's Active Travel (SE-CAT)	Participants were children from 5 elementary schools in Scotland. 2 schools received the intervention, and 3 schools acted as controls.	Not defined but suggests walking to schools	Pre and post intervention (6 weeks) data collection using: 1. ActiGraph GT1M recordings 2. Travel questionnaire 3. Travel diary GT1M data were processed so that steps and MVPA time were calculated for the morning commute, afternoon commute, total commute (morning + afternoon commute), and the full day	1. Mean steps (daily, a.m., p.m., and total commute) from pre- to post-intervention 2. MVPA time(s) for morning, afternoon and total commute. 3. Mode of travel to school (self-reported)
Morgan et al. (2016)	Wales	2013 Health Behaviour in School-aged Children (HBSC) study	Young people aged 11-16 years across 67 schools in Wales	Walking or cycling for travelling to/from school	HBSC School Environment Questionnaire	1. Mode of travel: Other mode/Actively(walk/bike) 2. Levels of MVPA via various modes (physical activity, active travel, etc)
Mytton et al. (2016a)	Cambridge, England	Commuting and Health in Cambridge cohort study	Not mentioned	Walking and cycling to work	Annual questionnaires (2009–2012)- self-reported	1. Travel mode maintenance: Walking or cycling to work for a week 2. Weekly duration of cycle/walk commuting at baseline and follow-up: 0 min, 1–149 min, and >150 min 3. Change in duration of active commuting weekly (increase, no change, decrease)
Mytton et al. (2016b)	Cambridge, England	Commuting and Health in Cambridge cohort study	Commuters working in Cambridge	Walking and cycling to work	Annual questionnaires (2009–2012)- self-reported	1. Maintenance of cycling (or walking) to work over a one-year period 2. Associations between change in cycling (or walking) to work and change in indices of wellbeing 3. Change in weekly time spent cycling to work and change in weekly time spent walking to work

Mytton et al. (2018)	Cambridgeshire, England	Fenland study (a population-based cohort study: 2005-15)	Commuters (aged 29-65 years) who were employed and reported regular travel to work	Walking and cycling to work	1. Self-reported: a general questionnaire, a food frequency questionnaire and the Recent Physical Activity Questionnaire (RPAQ) 2. Body composition assessed by dual-energy X-ray absorptiometry (DEXA scan) 3. Six days of objective physical activity monitoring by combined heart rate and movement sensing (measured by Actiheart)	1. Modes of travel (car/motor vehicle, works or public transport, bicycle, and walking) and frequency of each mode use (always, usually, occasionally or never) 2. Distance to work (> or < 5 miles) 3. Objective physical activity energy expenditure (PAEE) associated with various modes of travel
Neves et al. (2019)	Cardiff, Wales	iConnect baseline survey	Cardiff city residents	Walking and cycling	Personal Global Position System (GPS) devices, 7-day travel diaries and contextual interviews over two seasonally matching 7-day time periods in 2011 and 2012	1. GPS data: objectively record spatial and temporal details of trips, including route choices and activity locations. 2. Travel Diary: Participants recorded trip modes (e.g., walking, cycling, car) and purposes (e.g., commuting, shopping) in diaries (further cross-checked via GPS data) 3. Interviews: participants' perceptions of walking/cycling infrastructure, barriers to active travel, and reasons for mode choices 4. Trip Chain Analysis: Trips were analysed as part of "chains" (sequences starting/ending at home) to assess feasibility of substituting car trips with active travel.
Norwood et al. (2014)	Scotland	Scottish Government Smarter Choices, Smarter Places programme (SCSP)	Adult residents aged 16+ years	Walking, cycling and public transport	House to house surveys were conducted before and after the programme intervention, in May/June 2009 and 2012	1. Number of days per week engaged in at least 30 minutes of moderate-intensity exercise (e.g., brisk walking, cycling) outside of work/school. 2. Based on areas with intervention and without: a) Likelihood of physical activity participation. b) Likelihood of meeting recommended activity levels (≥ 5 days/week)
Ogilvie et al. (2008b)	Glasgow, Scotland	An observational intervention pilot study.	Local residents aged 16 or over in Scotland	Walking and cycling for transport	1. Random postal survey (at baseline) 2. A travel diary, the short form of the International Physical Activity Questionnaire (IPAQ) and the SF-8 3. Intervention: Construction and opening of a new freeway	1. Reported travel time for each mode of transport, 2. Total travel time by active modes (walking plus cycling) and by all modes combined 3. The proportion of total travel time contributed by each mode of transport.

					4. Correlates to active travel: Age, Housing tenure, Distance to place of work/study, Access to bicycle, Composite variable : access to car and difficulty walking, Proximity to shops, Road safety for cyclists, Day of travel diary (weekday)	4. Average time spent walking and total physical activity: Walking (min/week) and Total activity (MET-min/week)
Oglivie et al, (2010)	Cambridgeshire, England	Commuting and health in Cambridge cohort Study	Adults aged 16 and over who work in areas of Cambridge and live within a radius of 30 kms of the city centre.	Walking and cycling	1. Repeated postal questionnaires (Seven-day retrospective travel record) 2. Objective measurement of physical activity using accelerometers 3. Household travel diaries, 4. Combined heart rate and movement sensors and GPS receivers 5. A longitudinal qualitative and Photo-Elicitation interview study 6. Intervention: the opening of the Cambridgeshire Guided Busway.	1. Change in daily active commuting time: Net difference in minutes/day spent walking/cycling to work, comparing intervention and control groups 2. Total active travel time: Includes all walking/cycling trips (not just commutes)
Olsen et al. (2016)	Scotland	Scottish Household Survey (SHS) with	A Scottish representative population aged 16 and over	Walking and cycling	1.Travel diaries (2009 to 2013), 2. Face to face interviews. 3. Pre-post intervention period defined to measure changes in Active travel (2009/10 and 2012/13) 4. Intervention: M74 extension	1. Changes in active travel over time 2. Comparing changes in active travel over time between areas (also represented intervention effect) 3. Likelihood of journey stage using active travel methods
Olsen et al. (2017)	Scotland	Transport, Health and Well-being Study conducted in 1997 and 2010	Glasgow residents aged 17 to 95 years old	Walking and cycling	A detailed postal questionnaire in 1997 and then in 2010 (self-reported)	1. Satisfaction with current transport mode 2. Journey mode and destination 3. Change in transport satisfaction over time 4. Likelihood of transport mode satisfaction 5. Changes in the likelihood of transport satisfaction over time (1997–2010)
Olsen et al. (2017b)	Scotland	Scottish Household Survey (2012-2013)	Sampled individuals aged 16+ living within Scotland	A journey stage that was either walked or cycled	1. Survey travel diaries recorded all journeys made on the previous day 2. Face-to-face interviews	1. Journey mode and distance travelled 2. Likelihood of an active journey stage 3. Number and proportion of active stages of a journey 4. Journey purpose by active or non-active travel

						5. Mean distances of active and non-active journey stages
Olsen et al. (2024)	UK	Understanding Society, the UK Household Longitudinal Study (UKHLS)	Adults aged 16+ years	Walking and cycling	Interviews and panel survey data from Waves 9 and 10 (2017–2019) to avoid pandemic-related biases	1. Travel Behaviours: a. Daily/Weekly Walking: Frequency of walking >10 minutes (from Wave 9). b. Daily/Weekly Cycling, Car Use, Bus Use: Frequency of use (from Wave 10) 2. A. Walking: Daily: a. Walking >10 minutes on ≥1 day/week (dichotomised). b. Weekly: Walking >10 minutes on ≥1 day/week (dichotomised). B. Cycling: a. Daily: Cycling ≥1 day/week. b. Weekly: Cycling ≥1 day/week. 3. Visualised likelihood of daily/weekly travel behaviours by amenity diversity using Shannon's Diversity Index (SDI)
Owen et al. (2012)	London, Birmingham and Leicester (England)	Child Heart and Health Study in England (CHASE)	Children (aged 9–10 years in 2006–7)	Travelling to school using walking or cycling, in combination with public transport where necessary	1. Children were asked to wear an ActiGraph GT1M activity monitor during waking hours for 7 whole days 2. Child questionnaires to ascertain mode of travel to school on a. weekdays, b. between 8-9 am and 3-5 pm on weekdays, c. weekdays excluding periods of active travel 3. Parental questionnaires	1. Mode of transport to school by gender, ethnic group, and distance from home to school (miles) 2. Adjusted mean weekday levels of physical activity by mode of transport to school. 3. Mean (95% CI) weekday physical activity levels (steps) by median distance to school on weekdays in walkers only 4. Median weekday physical activity levels (CPM) from 7 am to midnight by mode of travel to school 5. Adjusted activity levels in children who walk/cycle to school by distance to school
Oxford et al. (2015)	South Gloucestershire, England	A cross-sectional travel survey focussed on active travel amongst pre-school aged children	Parents/carers bringing to and/or collecting children aged 2–4 years old from the pre-schools on the survey days	Walking or cycling for transport	1. A travel questionnaire including questions about child and parent travel to and from the pre-school 'today' and 'usually' at this time of year', factors affecting the pattern of travel, journey length, access to a car and home postcode	1. Proportion of Active travel: children's arrival and collection 'usually in priority (PN) and non-priority neighbourhoods (NPN) 2. Factors affecting the pattern of travel to pre-school 3. Distance travelled to each pre-school and proportion of children living less than 800m from the pre-school 4. Duration of total journey to pre-school 'usually' and access to a car to travel to pre-school
Page et al. (2010)	UK	Baseline data from the PEACH project (Personal and Environmental	10–11-year-old boys and girls from 23 schools	Walking or cycling to school	1. A computerised questionnaire (self-reported) to ask questions about: Outdoor play, Exercise, Mode of travel to school, perceptions of the environment,	Factors associated with likelihood of walking/ cycling home from school.

		Associations with Children's Health)			independent mobility and distance from home to school. 2. Accelerometer worn for 7 days	
Pangbourne et al. (2020)	UK	Experimental study evaluating the persuasiveness of pro-walking messages tailored to individual characteristics	Adults (aged 18+ years)	Not defined but suggests walking.	Qualtrics online survey: a. Travel Behaviour: Self-reported frequency of journeys under 2 miles in past week and primary transport modes used. b. Travel attitudes: Drivers, Potential Non-Drivers, Non-Drivers	Frequency of walking for short trips (<2 miles) in the past week
Panter et al. (2010)	Norfolk, England	SPEEDY study	Children aged 9-10 years and their parents and guardians	Walking or cycling to school	Questionnaires completed by the children and their parents: usual travel mode to school (travel behaviour) Distance to school was estimated using a Geographic Information System	1. % children travelling to school on foot/bicycle/motorised vehicle 2. Associations between child and parental perceptions and child's travel mode to school, stratified by distance from school (Distance <1km, 1-2km and >2km)
Panter et al. (2011)	Cambridge, England	Commuting and health in Cambridge cohort study	Adults who travel to work in Cambridge	Walking and cycling for transport	1. Postal surveys: travel modes and time spent travelling to and from work in the last week, perceptions of the route, psychological measures regarding car use and socio-demographic characteristics 2. Objective measures of urban-rural status were estimated within a Geographical Information System (GIS)	1. Mode of travel to and from work 2. Individual and household characteristics of the sample according to time spent walking and cycling to work 3. Odds of spending any time walking to work 4. Odds of engaging in any walking to work stratified according to car availability within the household (car/no car) 5. Odds of spending 1-149 minutes and ≥ 150 minutes of cycling to and from work, further stratified based on car availability
Panter et al. (2013a)	Norfolk, England	SPEEDY study	Children aged 9-10 years and their parents and guardians	Walking and cycling to school	Child and parent questionnaire (baseline and follow up after 1 year)	1. Travel mode: (i) used active modes at both time points (maintained active travel), (ii) used passive modes at both time points (maintained passive travel), (iii) switched from passive to active modes of travel (took up active travel) and (iv) switched from active to passive modes of travel (took up passive travel). 2. Odds of taking up active travel/ remaining an active traveller

Panter et al. (2013b)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults over the age of 16 years working in Cambridge and living within 30 km of the city	Walking or cycling to work	Postal questionnaires	1. Mean minutes/day spent walking or cycling on the commute 2. Travel modes used on the journey to and from work 3. Odds of incorporating walking or cycling into car journeys
Patterson et al. (2018)	England	National Travel Survey	Participants eligible for a free bus pass (aged 60-99 years) in England in 2006-2014	Walking, cycling and public transportation such as bus or train	Interview and One week travel diary	1. Bus Use: Number of bus journey stages per week. 2. Active Travel as Part of Bus Journeys: Walking segments linked to bus trips (e.g., walking to/from stops) 3. Total Active Travel Stages: Sum of all walking, cycling, and public transport stages per week. 4. Walking Frequency: Self-reported walking frequency (dichotomized as <3 times/ week or ≥3 times/ week).
Patterson et al. (2019)	England	National Travel Survey 2010-14	Nationally representative sample of adults (17+ years)	Walking and cycling for transport, including stages of public transport journeys that involve walking or cycling (e.g., walking to/from bus stops or train stations)	Self-reported travel, personal and household characteristics and a diary of all journeys made in 1 week including mode of transport, distance and duration.	1. Minutes/day of walking/cycling accrued during public transport journeys 2. Mode-Specific Active Travel: Bus: Walking to/from stops, Train/Light-rail: Walking to/from stations (often longer distances), Multimode: Combined walking/cycling across multiple public transport types
Patterson et al. (2020)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults aged 16 years and over who worked in Cambridge, UK	Walking, cycling and combinations of walking or cycling with other modes, such as public transport	A postal questionnaire about commuting practices, individual characteristics and workplace characteristics in 2011 and 2012	1. Commute Mode Categories: a. Exclusively Active Modes: Trips made entirely by walking and/or cycling. b. Including Active Modes: Trips that incorporate walking or cycling as part of a longer journey, such as combining them with public transport (e.g., walking to a bus stop). c. Exclusively Private Motor Vehicle: Trips made solely by car, taxi, van, motorcycle, or moped. 2. Proportion of all commute trips made by each of the above categories
Patterson et al. (2023)	England and Wales	The Office for National Statistics-Longitudinal Study	Aged at 16 and above years, employed and who lived in the same	Walking and cycling to work	Longitudinally linked 2001 and 2011 census data	1. Commute mode: a) cycling to work b) walking to work c) cycling or walking to work (groups a and b combined)

		(ONS-LS)- data from 2001-2011	local authority area in 2001 and 2011		* Did not include data of residents working from home	2. Uptake vs. Maintenance: further stratified by demographics: a. Uptake: Switching to cycling/walking by 2011 among non-active commuters in 2001. b. Maintenance: Continuing to cycle/walk in both 2001 and 2011
Pistoll et al. (2019)	UK	UK Household Longitudinal Survey (UKHLS) (2010-12 and 2014-16)	UK adults aged 16+ years	Walking, cycling and public transport use for travel	Self-reported survey data	1 Travel modes: a. Walking/Cycling: Combined due to low cycling rates. b. Public Transport. 2. Change Variables: a. Initiation: Switched to walking/cycling or public transport between waves. b. Cessation: Stopped using these modes between waves. 3. Odds ratios (ORs) for initiation/cessation by age group
Portegijs et al. (2019)	European Countries including UK	European Project on Osteoarthritis (EPOSA), a multi-country cohort study.	Older adults aged 65–85 years (71–79 years in the UK)	Transport-related walking and cycling for purposes like shopping or running errands (excluding sports or recreational activities)	1. Standardised questionnaires and clinical exams 2. Self-reported data on active travel (frequency and duration of walking/cycling over the previous two weeks). 3. Data collection at baseline, with follow up after 12 and 18 months	1. Active Travel Time (min/day): the total minutes of walking and cycling for transportation, then dividing by 14 days to estimate daily duration 2. Cycling not measured separately due to low prevalence. 3. Walking and Cycling: Assessed separately using the Longitudinal Aging Study Amsterdam (LASA) Physical Activity Questionnaire, validated for older adults
Potoglou et al. (2016)	Wales	National Survey for Wales (2013/14 and 2014/15)	School children (4-12 years of age) and adolescents (12-19 years of age)	Walking and cycling to school	Face-to-face interviews	1. Frequency of Walking and Cycling by Parents ("every day," "several times a week," "1–2 times a week," or "no active travel by walking/cycling") : to assess the association between parents' active travel habits and their children's mode of travel to school 2. Distance to school: Less than 0.5 miles, 0.5 to 1 mile and More than 1 mile
Powers et al. (2019)	Glasgow, Scotland	Follow-up data from a larger longitudinal natural experimental study	Adults aged 16 or over	Walking or cycling for transport (utility purposes) or recreation within	1. Self-reported postal surveys with 7-day recall of walking/cycling for transport and recreation, combined with GIS-measured motorway proximity	1. Walking and Cycling for Transport (Utility Purposes) in the past 7 days 2. Walking and Cycling for Recreation in past 7 days 3. Outcomes: Any local walking/cycling (transport

				the local neighbourhood	2. Intervention: M74 motorway construction 3. Data collected pre-intervention (2005) and post intervention (2013)	or recreation), Walking/cycling for transport only, Walking/cycling for recreation only
Prins et al. (2016)	Cambridge, England	Commuting and Health in Cambridge natural experimental study	Adults (≥16 years), who lived within 30 km of the city centre and travelled to workplaces in Cambridge	Walking and cycling for commute	Intervention: Cambridgeshire Guided Busway Timeline: Baseline (2009) and 3-year follow-up (2012) data Data: Postal questionnaires with self-reported all commuting journeys and the modes of transport used over the past 7 days	1. Weekly cycle commuting time (average cycling time/trip) 2. Change in cycling time: increase, decrease, or no change in weekly cycling time between baseline and follow-up. 3. Causal pathways linking busway proximity to changes in cycling (direct pathway/indirect pathway)
Procter et al. (2018)	London, England	Examining Neighbourhood Activities in Built Living Environments (ENABLE) in London study	Adult residents in London	Walking and cycling	Participants wore accelerometers and GPS receivers on the hip for 7 days along with a questionnaire to describe their travel patterns to work/place of study	The study uses supervised machine learning (XGBoost algorithm) to classify travel modes based on: Accelerometer, GPS metrics and 4-min rolling window Each 10s epoch was classified into modes of travel based on the above metrics to measure all activities involving walking, cycling or active travel objectively.
Rafferty et al. (2016)	Glasgow, Scotland	A descriptive observational study (primary data collection)	Twenty-six office workers (age 23–65 years) employed at Glasgow Caledonian University	Not defined but suggests walking as part of the commute	1. A global position system (GPS) was to identify the geographical domain of the participant. 2. An activity monitor to measure the number of steps taken and the cadence of those steps. Both devices were worn for seven consecutive days and 5 workdays extracted post data collection. 3. Cycling data was not analysed.	1. Total steps taken during the commute domain (defined as leaving home to arriving at work or vice versa). 2. Time spent in moderate-to-vigorous physical activity (MVPA) during the commute 3. Distance to Workplace: to calculate steps/MVPA
Raser et al. (2018)	7 European cities including London, England, UK	PASTA project	Adult population in 6 European countries including UK	Walking and cycling	Web-based survey (2014–2017) with information on sociodemographic characteristics, travel behaviour (frequency of use for different transport modes), physical activity level (global physical activity questionnaire- GPAQ),	1. Total time spent walking or cycling during trips, aggregated per day 2. Mode Share and Trip Characteristics: Cycling Share: %of trips made by bicycle. a. Trip Rates: Average number of trips per day by mode.

					geolocations (home, work, education), commute route and attitudinal and behavioural aspects with 1-day travel diary	b. Trip Distance/Duration: Average length and time of walking/cycling trips, with city-specific comparisons.
Riches et al. (2024)	Oxfordshire, England	A non-randomised, controlled, before and after design in four intervention and two control schools	Primary school children and their parents	Walking, cycling, scootering, and "park and stride" (where parents parked nearby and walked the last part of the journey)	1. Parent Surveys: Online questionnaires captured travel mode, frequency, and perceptions. 2. Pupil "Hands-Up" Surveys: Classroom teachers recorded daily travel modes (though this method had low consistency). 3. Vehicle and Air Quality Monitoring: Objective measures of traffic and pollution changes. 4. Qualitative Interviews/Focus Groups: Provided insights into the intervention's acceptability and impact 5. Intervention: 'Park and Stride', to increase active travel to or from school.	1. Frequency of Active Travel: the number of days per week children used active travel to or from school (0 to 5 days). 2. Awareness and Use of Wayfinding Routes: awareness of the intervention and how often parents used the designated routes. 3. Reasons for Mode Choice and Barriers: Parents provided reasons for choosing active or non-active travel modes (e.g., convenience, health benefits, distance, safety concerns). 4. Vehicle Counts: Pneumatic tube counters measured changes in vehicle traffic near schools during drop-off and pick-up times.
Rind et al. (2015)	UK	UK National Travel Survey (NTS) for 2002 and 2003	Urban adults aged 16+ years	Walking or cycling for commuting, business, education, shopping, and other personal activities (non-recreational)	Cross-sectional survey data: face-to-face interviewing was used to collect key socio-economic, demographic and travel-related characteristics of participants and a travel diary recording trips undertaken over the course of a week	1. Mode of travel for each trip associated with income levels 2. Trip length set as 0.1-5 miles, shorter and longer trips excluded from analysis
Roth et al. (2012)	England.	Nationally representative Health Survey for England 2008	Children aged 5-15 years	Walking, cycling and public transport	1. Household interviews, and measurement of height and weight. 2. Participants were asked to wear the ActiGraph accelerometer during their waking hours for seven consecutive days.	Self- reported: 1. Active Travel to School: further classified by a. Number of days walked or cycled in the past week. b. Duration of the journey (time spent walking or cycling to/from school). 2. Time spent in: a. Other walking (leisure or non-commute walking). b. Other cycling (leisure or non-commute cycling).

						<p>c. Sports and exercise (both formal and informal activities)</p> <p>Objective measures: Time spent in MVPA</p> <p>a. Duration and intensity of physical activity</p> <p>b. Wear time (at least 600 minutes/day for a valid day)</p>
Sahlqvist et al. (2012)	Cardiff (Wales), Kenilworth and Southampton (England)	Baseline survey for the iConnect study in the UK	Representative sample of adults	Any walking or cycling for transport, including the walking or cycling stages of public transport journeys (e.g., walking to a bus stop)	<p>1. Travel and recreational physical activity were assessed using detailed seven-day recall instruments (postal questionnaire)</p> <p>2. Mode of travel: Motorised: Only motorised modes (car, bus, train), Combination: Both active and motorised modes, Active: Only active modes (walking or cycling)</p>	<p>1. Time spent walking or cycling for commuting or non-commuting purposes (minutes/week)</p> <p>2. Mode of travel</p> <p>3. Active travel was analysed in relation to:</p> <p>a. Recreational Physical Activity: Assessed using modified IPAQ items (walking/cycling for recreation, moderate/vigorous activity).</p> <p>b. Total Physical Activity: Sum of active travel and recreational physical activity</p>
Sahlqvist et al. (2013)	Cardiff (Wales), Kenilworth and Southampton (England)	UK-based iConnect study	Adults aged over 18 years	Walking or cycling for commuting	A survey questionnaire which asked about travel and physical activity behaviour and included standard sociodemographic questions (baseline and 1 year follow up)	<p>1. Trip purpose: Commuting travel: Journeys to/from work or study. Non-commuting travel: Journeys for shopping, personal business, visiting friends/relatives, or other social activities.</p> <p>2. Mode of transport: Walking, cycling, bus, train, car, or "other."</p> <p>3. Total time spent (minutes/week) and distance travelled (miles/week) for each mode.</p> <p>4. Active travel time (minutes/week): Time spent walking and cycling for commuting and non-commuting purposes</p> <p>5. Change in Active Travel: Calculated by subtracting baseline active travel time from follow-up time. (increase/ decrease/ maintained)</p> <p>6. a. Change in commuting active travel (walking + cycling for work/study)</p> <p>b. Change in non-commuting active travel (walking + cycling for other purposes).</p> <p>c. Change in walking for all purposes.</p> <p>d. Change in cycling for all purposes.</p>
Sahlqvist et al. (2013b)	England	European Prospective Investigation into	Adults aged 40–79 years at the first health assessment.	Not defined, suggested as walking and cycling	Two stages of health examinations:	1. Average weekly time (in hours) spent cycling for all purposes (e.g., commuting, leisure) separately for winter and summer

		Cancer and Nutrition study-Norfolk (EPIC-Norfolk)			<p>Stage 1: between 1993 and 1997 (average weekly duration of cycling for all purposes using a simple measure of physical activity)</p> <p>Stage 2: between 1998 and 2000 (a more detailed breakdown of their weekly cycling behaviour using the EPAQ2 physical activity questionnaire)</p>	<p>a. Total cycling time (minutes/week)</p> <p>2. Commuter Cycling: usual mode of travel to work (car, public transport, bike, or foot) and frequency ("always," "usually," "occasionally," "never/rarely"). Distance cycled (miles/week) then min/week</p> <p>3. Non-Commuting Utility Cycling: the number of non-work trips made by bicycle across different distance categories (e.g., <0.5 miles, 0.5–1.5 miles, etc.)</p> <p>4. All Utility Cycling: Sum of commuter and non-commuting utility cycling (miles/week)</p> <p>5. Recreational Cycling: time spent "cycling for pleasure" per session and frequency, converted to min/week</p> <p>6. Total Cycling: Combined time spent in commuter, non-commuting utility, and recreational cycling (minutes/week).</p>
Salway et al. (2019)	England	B-PROACT1V study, a longitudinal study that examined the physical activity and sedentary behaviours of primary school children and their parents.	Primary school children aged 5–11 years, and their parents	Walking, cycling, or scooting	<p>1. Self-reported travel mode (daily).</p> <p>2. Accelerometer-derived MVPA (objective physical activity tracking).</p> <p>3. Club attendance logs (to assess additional activity opportunities).</p> <p>4. Children wore waist-worn ActiGraph accelerometers for three weekdays and two weekend days</p>	<p>1. Mode of Travel to/from School: Active travel modes: Walking, bicycling, or scooter. Non-active travel modes: Car or public transport.</p> <p>2. Active Travel Frequency (days/week): None (0 days), 1–2 days, 3–4 days, All 5 days</p> <p>3. Daily Active Travel: whether the child used active travel for: The journey to school or the journey from school.</p> <p>4. Daily minutes of moderate-to-vigorous physical activity (MVPA): to assess the association between active travel/ club attendance and physical activity levels</p>
Salway et al. (2024)	England	Active-6 study compared post-lockdown accelerometer-estimated physical activity to a pre-COVID-19 comparator group (B-Proact1v study).	Children aged 10–11 years (in Year 6 of primary school)	The use of walking, cycling, or using a scooter, to travel to and from school	<p>1. Pre-COVID-19 (2017-2018): Children reported their mode of travel to school for each day of the week (Monday to Friday) via a questionnaire along with Accelerometer data.</p> <p>2. Post-Lockdown (Wave 1: 2021, Wave 2: 2022): Children were directly asked to report their typical mode of travel to school via a questionnaire,</p>	<p>1. Individual Active Travel: indicator of whether a child typically walks, cycles, or scoots to school, showing a significant association with higher MVPA.</p> <p>2. School-Aggregated Active Travel: The %of pupils using active travel</p> <p>3. Cycle Training Policy: A school-level policy measure associated with increased MVPA, with growing importance post-lockdown.</p>

					accelerometer, individual and school data.	4. Written Active Travel Policy: A school-level policy measure with no significant association with MVPA, limited by missing data.
Sandercock et al (2012)	England	East of England Healthy Hearts Study	English youth aged 10–16 years	The use of walking or cycling to travel to and from school	Self-reported questionnaire with physical activity (7-day recall), school travel and screen time habits. Travel was classified as active (walking, cycling) or passive.	1. Active Travel: based on a single self-reported question asking participants how they usually travel to school, with responses categorised as active (walking or cycling) or passive (car, bus, or other motorised transport) 2. Walking and Cycling combined in methodology due to low prevalence of cycling among UK students.
Sarkar et al. (2017)	UK	The UK Biobank cohort	Participants aged 38–73 years	Non-work travel by walking, cycling, or using public transport	Self-reported questionnaire: individual-level data on residential greenness, built environment exposures and travel behaviour. *Cycling: Included as a component of the active travel measure but not separately measured or analysed due to its aggregation with walking and public transport.	1. Active Travel: non-work travel modes in the past 4 weeks, categorised as active (walking, cycling, or public transport) vs. motorised (car/motor vehicle). 2. Walking: whether participants walked more than 30 minutes per day on a typical day, (proxy for physical activity)
Sims et al. (2022)	England	Health Survey for England (HSE) 2012–15	Children aged 2 to 15 years	Walking or cycling to and from school	Household interview: the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ)- self reported or reported by parents.	1. Active Travel: MET minutes per week for walking or cycling to school. Episodes ≥ 10 minutes were recorded and converted to METs. Further stratified based on a. Sex: Boys/Girls b. Age Group: 2–4 years, 5–7 years, 8–10 years, 11–12 years, 13–15 years c. Weight Status: Normal, Overweight, Obese
Singh et al. (2022)	Oxford, England	Primary quantitative analysis (time-series analysis)	Oxford residents	Walking and cycling for transport	Transport Mode and Traffic Flow Data: Vivacity Labs roadside vehicle detection sensors at Oxford High Street. The sensors recorded hourly counts of bicycles, classified as a distinct transport mode alongside motorised vehicles	1. Cycle flow: daily and hourly cycle counts (number of bicycles detected) stratified by: Pre-lockdown (1 January–22 March), Lockdown 1 (23 March–15 June), Inter-lockdown (16 June–4 November) and Lockdown 2 (5 November–2 December)
Smith et al. (2012)	Norfolk, England	SPEEDY study (2007–08)	9-10-year-old British children	Walking or cycling to school	1. Self-reported data from a questionnaire completed by	1. Mode of travel to school: Active/Passive

					pupils at baseline (2007) and follow-up (2008) 2. Objective measurement using ActiGraph accelerometer worn for seven consecutive days	2. Further categorised into: Consistent active travel (active at both baseline and follow-up), Consistent passive travel (passive at both baseline and follow-up), Change from passive to active travel, Change from active to passive travel 3. Change in MVPA associated with change in mode of travel: Change in total daily MVPA (weekdays and weekends, min/day) and change in weekday MVPA (Monday–Friday, min/day)
Smith et al. (2012b)	Norfolk, England	SPEEDY study (2007-08)	9-10-year-old British children	Walking or cycling to school	1. Self-reported data from a questionnaire (2007 and 2008) 2. Accelerometer: MVPA required at least three valid days (wear time ≥ 600 min/day) for daily and after-school analyses, and at least three days including one weekend day for weekend and out-of-school analyses	1. Mode of travel to four specific non-school destinations (other family members, friends in the neighbourhood, parks, and shops): Active/Passive/Combination then further stratified by sex (boys/girls) 2. MVPA generated: Daily MVPA (weekdays, 0600–2300), After-school MVPA (weekdays, 1500–2300), Weekend MVPA (weekends, 0600–2300), Out-of-school MVPA (weekends plus weekdays 1500–2300)
Smith et al. (2019)	UK	UK Biobank	Participants aged 40-69 years were recruited between 2006 and 2010.	Walking or cycling	Travel behaviour data were collected via a touchscreen questionnaire	1. Mode of travel for commuting and non-work-related journeys: Active (walking or cycling) /No active travel 2. Travel Mode Combinations: Car only, Car + public transport only, Car + public and active transport, Car + active transport only, Public transport only, Public + active transport, Walking only, Cycling only or cycling + walking 3. Differences by Journey Type: Preferred mode for commute and non-work-related travel.
Song et al. (2017)	Cardiff (Wales), Kenilworth and Southampton (England)	iConnect study	Adults living within 5 km of the intervention sites	Walking and cycling for utility purposes, such as commuting, business, shopping, healthcare, or social activities (non-recreational)	1. Participants reported their travel behaviour over the previous seven days using a postal questionnaire distributed in 2010 (baseline), 2011, and 2012. 2. Intervention: New or upgraded infrastructure (the People's Bridge in Cardiff, the boardwalk in Southampton, or the bridge in Kenilworth)	1. Time Share: The proportion of an individual's total weekly travel time accounted for by walking and cycling (i.e., [walking time + cycling time] / total travel time). 2. Distance Share: The proportion of an individual's total weekly travel distance accounted for by walking and cycling (i.e., [walking distance + cycling distance] / total travel distance). 3. Modal Shift: Shift to Active Travel (increased active travel and reduced car travel), No shift or

						Inverse shift (increased car driving share or decreased active travel share) 4. Use of Infrastructure: to assess its impact on active travel. 5. Distance to infrastructure: physical distance (in kilometres) from a participant's home to the infrastructure.
Southward et al. (2012)	Bristol, England	PEACH (Personal and Environmental Associations with Children's Health) study 2008–2009	Children aged 11–12 years, in first year of secondary school.	Walking (primarily) or cycling to and from school.	1. The study combines accelerometer and GPS data within a Geographic Information System (GIS) to quantify physical activity during school journeys. 2. Travel diary used for self-reported mode of travel.	1. Mode of travel to school: Walking, cycling, car or bus. 2. Time window: Journey to/from School 3. Total Daily MVPA: minutes of MVPA per day. 4. Journey MVPA: minutes of MVPA accumulated during the school journey (to and from school). 5. Proportion of Daily MVPA: The contribution of journey MVPA to total daily MVPA, expressed as a percentage. 6. Trip distance: The study assessed the relationship between journey distance and MVPA
Steinbach et al. (2012)	London, England	London Travel Demand Survey (LTDS) from 2006–2008	Children aged 5–17 years	Not defined but suggests walking and cycling for transport	1. Travel Diary: One-day travel diaries completed via 2. Face-to-face interviews, recording trip starts, interchanges, and ends for all household members aged >5 years 2. Environmental Variables (Derived using GIS analysis): such as Road network, traffic data, land use, street connectivity and deprivation *No specific measure for cycling used	1. %of Children Walking: proportion of children who do "some walking" (walk >100 meters) or walk "all the way" to their destination (for school journeys specifically) stratified by school commute, non-school journeys during term times and summer and weekend journeys 2. Mean Walking Distance: average distance walked per day (in kilometres), including children who do not walk (assigned a distance of 0 km) 3. Mean Walking Time: average time spent walking per day (in minutes), also including non-walkers. 4. Multimodal trips: Primarily walking to destination or walking with use of public transport
Sulikova et al. (2021)	7 European cities including London, England, UK	PASTA Study (2014–17)	Urban residents	Walking and cycling	Transport and health behaviour surveys (Baseline questionnaires), travel diaries, GPS, and accessibility data	1. Mode of travel: Active (walking/cycling) or Others (car, public transport) 2. Trip Purpose: work/study trips, leisure trips, and service trips
Sun et al. (2017)	Glasgow, Scotland	Strava Metro data (Urban Big Data Centre, 2016) and GIS technologies	App users tracking cycling or walking activity	Walking and cycling	1. Crowdsourced data from Strava users 2. Trip counts represent the total number of recorded trips, regardless of unique users,	1. Trip Counts: Trips including cycling and pedestrian activities (including walks, runs, and hikes). 2. Trip characteristics: Average Time, average distance and demographics

					aggregated to street level (edges) and intersection level (nodes). 3. The dataset captured the time of activities (year, day, hour, minute), to calculate median time spent moving on edges or waiting at nodes	3. Spatial Granularity: It records the count of cycling or pedestrian activities at a specific time (minute-level granularity). 4. Temporal Granularity: Median Moving Time & Median Waiting time
Susilo et al. (2016)	UK	UK National Travel Survey (NTS) from 2002 to 2006	Households having two adults (parents) and at least one child	Walking and cycling	1. Travel Diaries: 7-day diaries record trip counts, modes (walking, cycling, car, public transport), and travel time. 2. Questionnaires- self reported	1. Proportion of Non-Motorised (Active travel) Trips: daily trips made by walking and cycling for each household member (father, mother, and child) 2. Trip Counts and Total Trips: total number of daily trips is recorded for each household member 3. Total travel time: min/week 4. Household members' %of mode share by regional locations: Travel On foot, Cycle, Car, Public transport, Total trips
Teyhan et al. (2016)	Bristol, England	Avon Longitudinal Study of Parents and Children (ALSPAC)	Adolescents at ages 14-16 years (Year 6 school students)	Not defined	1. Self-reported questionnaires: used to evaluate the effectiveness of National Cycle Proficiency Scheme (NCPS) or Bikeability training in promoting cycling (e.g., cycling to school), encouraging safety behaviours (e.g., helmet and high-visibility clothing use), and reducing accidents 2. Hospital episode statistics (HES) data for hospital admissions 3. Maternal-reported SEP and family variables 4. School data from linkage to the National Pupil Database for Year 6 school identification	1. Cycling to School: whether the adolescent currently cycles as part of their school commute (yes/no) 2. Bike ownership: yes/no 3. When last cycled: in the last week, in the last month, or more than 1 month ago 4. Distance of last cycle: <1miles, 1-3 miles, 3-5miles, >5miles. 5. Safety behaviours (helmet ownership, helmet use, and high-visibility clothing use) * Walking data not measured
Thomas et al. (2015)	Bath, England	Primary data collection	Staff and students at University of Bath, UK	Walking and cycling	1. Online survey for all staff and students. 2. Optional Psychology Section: Included environmental worldview (NEP), affective	1. Travel mode for commuting: walking, cycling, car, bus, or other (e.g., motorcycle, train) 2. Affective Appraisal of Commute: Based on mode of travel- (Exciting, Pleasant, Relaxing,

					appraisal (six terms), and habit strength (SRHI)	Depressing, Boring, Stressful) using a 7-point Likert scale 3. Habit strength: Measured using the 12-item Self-Report Habit Index (SRHI) on a 7-point Likert scale
Van Sluijs et al. (2009)	Bristol, England	Avon Longitudinal Study of Parents and Children (ALSPAC) data from 2002-2004	Children aged 11-12 years old and their carers/parents	Walking or cycling to school	1. A parent-proxy questionnaire completed by the child's main carer. 2. Physical activity data from MTI ActiGraph AM7164 accelerometers worn for seven days.	1. Travel Mode to School: car, walking, cycling, public transport, school bus, wheelchair/other) stratified with frequency (as either "every or most days" or "some days") 2. Distance to School: <0.5-mile, 0.5-1 mile, 1-5 miles and >5 miles 3. Total Physical Activity: Measured as average accelerometer counts per minute (counts/min) over the whole week, weekdays, and weekend days 4. Moderate-to-Vigorous Physical Activity (MVPA): Measured as average minutes of MVPA per day 5. Hourly Weekday Patterns: Average counts/min per hour on weekdays, showing differences between walkers and car users during school commute times for distances of 0.5–5 miles.
Walker et al. (2023)	England, Wales and Northern Ireland	1. UK Millennium Cohort Study (MCS)	School children, surveyed at ages 7, 11, 14 and 17 years.	Walking or cycling to school	1. Self-reported travel mode data * Data from Scotland excluded due to different exam system 2. MCS data from ALSPAC, SPEEDY and PEACH studies	1. Travel Mode to School: Public transport, School bus or coach, Private motorised, Bike, and Walk
Werneck et al. (2021)	UK, Australia, Denmark and Switzerland	UK cohort of International Children's Accelerometry Database (ICAD)	Adolescents aged 10–13 years at baseline, with 1.9±0.7 years of follow-up and their parents.	Walking or cycling to school	1. Self-reported or parent-reported travel mode data and accelerometer data for physical activity (MVPA) and sedentary time (SED) 2. "active" (walking or cycling) or "passive" (car, bus, public transport)	1. Travel Mode to School over time: a. Active/Active (consistent active travel), b. Passive/Active (taking up active travel), c. Active/Passive (taking up passive travel), and d. Passive/Passive (consistent passive travel)
Whelan et al. (2024)	Kings Heath, Birmingham, England	Primary data collection: mixed methods study	Kings Heath residents aged 18-65 years	Non-motorised modes of transportation such as walking and cycling	1. Online survey questionnaires in 2023 (self-reported travel modes) 2. Air-quality-monitoring sensors	1. Travel Mode Changes: Participants reported their primary mode of transportation into Kings Heath before and after Low-Traffic Neighbourhood (LTN) implementation, with response options

						including walking, cycling, car, public transport, and taxi
Woodcock et al. (2021)	England and Wales	1. 2011 Census, 2. CycleStreets.net, 3. National Travel Survey (NTS), 4. Index of Multiple Deprivation, Mortality and Sickness Data 2016, and 5. 2017 Global Burden of Disease data	Nationally representative sample (individual-level synthetic population)	Walking and cycling for commute	1. 2011 Census for baseline walking mode share by origin-destination (OD) pair and demographic group. 2. NTS data for average walking trips per week and speed (4.6–4.8 km/h) 3. CycleStreets.net for route distance and gradient, used to estimate walking duration and mMETs. 4. All measures quantified by physical activity calculations (average walking/ cycle commute trips per week (from NTS, stratified by age/sex) × trip duration (distance ÷ speed) × mMET rate 5. Propensity to cycle tool (PCT) used	1. Primary Mode of Commute: Baseline mode shares are calculated for cycling, walking, driving, and other modes, disaggregated by demographic groups (sex, age, ethnicity, car ownership, income deprivation, urban/rural status) 2. Mode Shift: walking as a baseline mode displaced by new cyclists 3. Cycling Uptake in Scenarios: based on (distance, hilliness, demographics in Near Market) and uptake (new cyclists, mode share
Xiao et al. (2024)	Central London and Luton, England	Children's Health in London and Luton (CHILL) cohort	Children aged 6-9 years in London	Modes of transport to school that involve physical activity, specifically walking, cycling, or scootering during any part of the journey, or modes that include public transport (bus or train/tube), as these often involve walking or cycling to access them.	1. Annual health assessments with child self-reports at baseline (June 2018–April 2019) and one-year follow-up (June 2019–March 2020). 2. Intervention group: living within or near the Ultra Low emission zones (ULEZ)) with those in Luton (control group) with parents/carers 3. Parental Questionnaires 4. Geographic Data: Residential and school addresses used to calculate walking distance 5. Deprivation/Crime Data: 2019 English Indices of Deprivation	1. Self-Reported Travel Mode: Active modes: Any trip involving walking, cycling, scootering, or public transport (bus, train/tube), and Inactive modes: Exclusively using a private vehicle or taxi for the entire journey 2. Modal Shift: a. Switching from inactive to active modes (e.g., from car to walking). b. Switching from active to inactive modes (e.g., from walking to car). c. Maintaining active or inactive modes

					(IDACI) and crime quintiles from postcodes	
Zhang et al. (2020)	Scotland	Scottish Lifestyle Organised Sports and Health (SLOSH) project	Children aged 10–12 years (primary 6 and 7) and their parents/carers	Modes of transport to school that involve physical activity, specifically walking or cycling	1. Parents completed a questionnaire detailing the transport modes used for each journey to and from school over the previous week 2. ActiGraph Accelerometers: Used to objectively measure physical activity levels, validating the impact of active travel during commuting times 3. Distance to School: Calculated using home and school postcodes	1. Children categorised as active travellers if they used active modes (walking or cycling) for >70% of their journeys to and from school over a week, or passive travellers if they used active modes for <30% of their journeys. 2. Children with 30–70% active journeys were excluded to ensure clear group distinctions. 3. Factors associated with passive or active method of school transport: Distance to school and Council tax bands.

Study name	Settings	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Bösehans et al. (2016)	Bath, England	Primary data collection	Staff members and students (UG/PG) from the University of Bath, UK	Not defined but suggests modes of transportation that involve physical activity, such as walking and cycling.	Online survey	1. Self-reported travel modes (e.g. Walking, bus, car, etc) 2. Attitude towards walking
Brainard et al. (2019)	England	Adult Active Lives Survey 2016/17	Adults (16+ years) living in England	Physical activity undertaken while travelling for other purposes (such as to work, school or shops)	Cross-sectional survey combining online and paper questionnaires.	1. Moderate Intensity Equivalent Minutes (MIEMs) per week: Calculated from self-reported activity over the past 28 days, averaged to weekly values, further categorised in moderate/vigorous and Walking AT and Cycling AT.
Brainard et al. (2020)	England	The Active Lives Survey 2016/17	Older adults stratified into two age bands 55–64 years and 65–74 years.	Walking and cycling for transport	Self-reported data from web survey forms and paper questionnaires with questions related to specific physical activities people did in the preceding 28 days.	1. Moderate-Intensity Equivalent Minutes (MIEMs) for Active Travel: number of MIEMs per week. Further stratified acc. to age groups and work status: (full-time, part-time, or retired) 2. Participation in Active Travel: Yes/No 3. Walking as a Popular Leisure Activity: mentioned in leisure-based PA, specific measure not used
Brand et al. (2014)	Cardiff/Penarth (Wales), Kenilworth and	Connect2 project (Led by Sustrans)	Adults living within a 5 km road network	Walking and Cycling for transport.	Baseline Questionnaires (2010) and one-year follow-up (2011) before and after new high-quality	1. Modal shift from motorised to active travel 2. Increase in Active travel (walking/cycling) 3. Change in CO ₂ emissions from motorised travel

	Southampton (England)		distance of the core Connect2 projects.		routes were built under the Sustrans Connect2 programme in three UK municipalities. A second cohort completed surveys at baseline and two-year follow-up (2012).	
Brand et al. (2021)	7 European cities (including London, UK)	Physical Activity through Sustainable Transport Approaches (PASTA) project	Adults 18+ years of age (16+ years in Zurich)	Walking or cycling for transport.	Baseline Questionnaire with one- day travel diary. Follow-up surveys were issued biweekly, with every third including a one-day travel diary; the last of these served as the final questionnaire.	1.Mobility-related lifecycle CO2 emissions (Impact of active travel on reduction in CO2 emissions) 2.Changes in active travel (increase in cycling/walking i.e. mode shift) 1.Mobility-related lifecycle CO2 emissions (Impact of active travel on reduction in CO2 emissions) 2.Changes in active travel (increase in cycling/walking i.e. mode shift)3.'Main mode' of daily travel 4.Cycling frequency 5.Journey purpose (Business/Commute/Recreational)

Brand et al. (2021)	7 European cities (including London, UK)	Physical Activity through Sustainable Transport Approaches (PASTA) project	Adults 18+ years of age (16+ years in Zurich)	Walking or cycling for transport.	Baseline Questionnaire with one-day travel diary. Follow-up surveys were issued biweekly, with every third including a one-day travel diary; the last of these served as the final questionnaire.	1. All modes CO2 emissions(kg/day) 2. Transport mode usage (trips/day) 3. Average distance travelled (by car/bike/walking/public transport) in kms/day 4. All modes average travel time (min/day)
Carver et al. (2014)	Norfolk, England	SPEEDY study	Children aged 9–10 years, residing within 1600 meters of their school.	Not defined but suggests walking or cycling to school.	Children completed questionnaires at school (Baseline (T1) and after one year (T2)) Parents completed a questionnaire at T1	1. Usual mode of travel (car, bus/train, bicycle, on foot). 2. Was travel accompanied (alone, sibling, parent/adult, friend). a. Did not walk/cycle independently (used a motorized mode or was accompanied by an adult). b. Walked/cycled independently (without adult accompaniment).
Cohen et al. (2014)	England	East of England Healthy Hearts Study	Students of 10-16 years of age.	Not defined but suggests walking or cycling to school	Data collected via questionnaires during regularly scheduled physical education classes	1. Travel to school: distance travelled (km) 2. Passive transport: Distance travelled (km) 3. Active transport: Distance travelled (km) a. Of which walk: Distance travelled (km) b. Of which cycle Distance travelled (km)
Connell et al. (2022)	Six HSBC UK workplaces (England and Scotland)	Cycle Nation project with a pilot intervention to increase cycling habits in the workplace population.	Staff members (18+ years) who were able to ride a bicycle.	Not defined	Focus groups and interview audio recordings	Pre- and post-intervention measures of : 1. Total cycling(rides/week) & (min/week) 2. Utility cycling*(days/week Commuting cycling(rides/week) 3. Leisure cycling(rides/week 4. Motorised transport use(min/week) {*Utility cycling includes shopping, running errands, school run, etc.}
Coombes et al. (2014)	Bristol, England	Phases 1 and 2 of the PEACH project	Year 6 children (aged 10–11 years) attending primary schools	Walking and cycling to school	An accelerometer (ActiGraph) worn at the waist for 7 days, set to record level of physical activity at 10 s intervals. A questionnaire administered at both baseline and follow-up (one year). The residential postcode of each child.	Change in travel mode to school between primary and secondary compared with change in school commute environment supportiveness in % (stays same: active, changes from passive to active, changes from active to passive, stays same: passive)

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Coombes et al. (2016)	Norfolk, England	A pilot non-randomised controlled evaluation of a 9-week intervention (Beat the Street)	School children in the control and intervention groups.	Walking or cycling for transport	Participants wore an accelerometer for 7 days at baseline, mid-intervention and post-intervention (+20 weeks), and completed a travel diary.	1. Travel mode to school: % of school commutes at baseline/ mid-intervention/ post-intervention that were reported using active travel 2. Change in travel mode to school: a. Change in % of school commutes reported using active travel between baseline and mid-intervention b. Change in % of school commutes reported using active travel between baseline and post-intervention
Cooper et al. (2012)	One UK city (name undisclosed)	The PEACH project	Year 6 children (aged 10–11 years) attending primary schools	Not defined but suggests walking and cycling to and from school.	1. Physical activity was measured over 7 days using a waist-worn accelerometer, excluding swimming, bathing, and sleep. 2. Travel mode to and from school was self-reported via a computerised questionnaire. 3. Street network distances (km) between home and school were calculated using GIS, with locations based on postcode-derived grid references.	Change in moderate-to-vigorous physical activity (MVPA) associated with change in travel mode between primary and secondary school
Cooper et al. (2017)	Cardiff, Wales	1. 2011 UK census, 2. Department for Transport (DfT) and 3. Cardiff Council	Nationally representative sample	Not defined	1. Cycle flow data comes from DfT and Cardiff Council, with mode choice data from the UK Census (2011) at the output area level. 2. Road traffic incident data (2005–2012) informs the safety model. 3. Data from Open Street Map (2015) for cycle infrastructure (e.g., off-road paths) and the exclusion of on-road bike lanes. 4. No direct measure for Walking used	1. Observed Cycle Flows {Annual Average Daily Traffic (AADT)}: average number of cyclists per day on specific road segments 2. Predicted Cycle Flows: modelled using parameters for distance, slope, traffic, and angular distance 3. Mode Choice (Proportion of People Choosing to Cycle): correlated with urban density (indirect measurement) 4. Route Choice (Perceived Effort for Cycling): proxy measure modelled using relative attractiveness of routes

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Coronini-Cronberg et al. (2012b)	UK	UK National Travel Survey (NTS)	Participants with/without a free bus pass of ages >60 years	Walking, cycling, and use of public transport	An interview, and a 1-week travel diary over a 4-year study period	1. Walking frequency (binary): <3times/week and >3times/week 2. Access to a car: No/Yes 3. Proportion of journey stages by active transport for Pass holders/ Non-pass holders 3. Proportion of journey stages by bus for Pass holders/Non-pass holders
Dalton et al. (2013)	Cambridge, England	Commuting and Health in Cambridge study	Participants aged 16 and over, working in Cambridge and living within 30 kms of the city.	Walking and Cycling to work.	Postal questionnaires which included the Recent Physical Activity Questionnaire (RPAQ).	1.Usual mode of travel to work (car/public transport/walk/cycling) 2. Environmental characteristics to predict active travel to work: a. Distance to work (strong predictor, particularly affecting walking). b. Street connectivity (junction density). c. Proximity and quality of public transport (bus service frequency, railway station distance). d. Availability of free car parking at work. e. Number of destinations (shops, leisure, schools) near home and work. f. Building density and road types along commuting routes
Dalton et al. (2015)	Cambridge, England	Commuting and Health in Cambridge study.	Participants aged 16 and over, working in Cambridge and living within 30 km of the city but not in the immediate vicinity of their workplace.	Walking and cycling to and from work.	1. Postal questionnaires, with a group of participants completing a 7-day retrospective travel diary. 2. GPS devices recorded the actual travel routes every 5 seconds. 3. GIS software (ArcGIS 9.3) generated the modelled shortest-distance routes based on available pedestrian and cycle networks.	1.Mode of travel to work (% journeys) Bicycle, Bus, Car/motorcycle, Car/bicycle, Car/Walk, Walk 2.Difference in route length (%) (between actual GPS-tracked and GIS-modelled routes), 3.%spatial overlap (actual vs. modelled), 4. Environmental exposures along the route (particularly healthy/unhealthy destinations encountered), 5. Route directness.
Demiris et al. (2025)	England	The National Travel Attitudes Survey (NTAS) conducted annually by the Department for Transport (DfT)	Residents aged 16+ years in England.	Not defined.	Questionnaire on travel behaviour, climate attitudes, and socio-demographics targeted towards people born in mid-1990s to mid-2000s.	1. Flexibility in Travel Habits (switch from car use to walking, cycling, or public transport for short trips (<3 km or 2 miles) 2. Current Travel Behaviour3. Willingness to Reduce Car Use (in response to climate change) 4. Actual Use of Walking/Cycling for travel.

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Downward et al. (2015)	Local authorities in England with NCN routes.	1. Sport England's Active People Survey (APS) 2. Miles of National Cycling Network (NCN) routes (Sustrans data), 3. Census 2011	Adults in the UK	Walking and cycling	1. APS data: Random sampling on a rolling monthly basis, representative of each local authority 2. NCN route data from Sustrans: (miles of cycle routes per local authority)	1. Total minutes of cycling of any sort or any duration in the past 4 weeks. 2. Days cycled for ≥30 minutes by purpose (recreational or utilitarian). 3. Intensity of cycling: Moderate/ Vigorous Effects of Population density, Miles of cycling routes in local authority, Ethnicity and Annual income were analysed on cycling behaviour
Fairnie et al. (2016)	London, England	Transport for London's London Travel Demand Survey (LTDS)	Residents of London aged 16+ years	Any travel made predominantly by walking, cycling, using a scooter or running, includes walking stages linked to public transport use.	Household questionnaire, Individual questionnaire and Trip sheets of a single travel day. Followed by household interviews.	1. Any active travel (≥ 1 minute): yes/no 2. Total minutes spent walking/cycling per day. 3. Average length of active stages (e.g., 4 minutes for bus-linked walks, 6 minutes for rail-linked walks). 5. Public transport-related: Active travel stages tied to public transport trips (e.g., walking to a train station). 6. Pure active trips: Trips where walking/cycling was the main mode (e.g., walking to a shop). Active travel rates stratified by Car ownership, Bicycle access/use, Income, Ethnicity, Age, gender, employment status, and day of the week (weekday vs. weekend).
Flint et al. (2016a)	UK	Longitudinal data from UK Biobank.	Participants aged 40–69 years who visited 22 assessment centres across the UK between 2006 and 2010	Walking, cycling (in relation with travel to work)	Self-reported commuting data collected between 2006 and 2010	1. Commuting method: Car only, Car and public transport, Public transport only, Car and public transport or active transport, Public transport and active transport, Walking only & Cycling only or cycling and walking 2. Non-work active travel: No/ Yes 3. Walking for pleasure: Once a month, 2–3 times a month, Once a week, 2–3 times a week, 4–5 times a week, and every day
Flint et al. (2016b)	UK	Longitudinal data from UK Biobank.	Participants were aged 40–69 years and commuted from home to a workplace on a regular basis	Walking, cycling (in relation with travel to work)	Baseline data: collected between 2006–2010 from 22 assessment centres. Follow-up data: Collected between 2012–2013 at a single centre	Travel used as exposure for change in BMI 1. Primary mode of travel to work 2. Transition from car to active/public transport 3. Transition from active/public transport to car 4. Stable car users. 5. Stable active/public transport users.

					(Stockport) for a subset of participants.	
Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Fluharty et al. (2019)	UK	UK household longitudinal study	Employed adults aged 20 years and over	Walking and cycling	National cross-sectional survey via face-to-face computer-assisted personal interview	Mode of travel to work (Active : walking/cycle, Non-active: Car/public transport)
Foley et al. (2015)	Cambridge, England	Commuting and Health in Cambridge Study	Participants aged 16 or over, lived within a radius of 30 km of Cambridge city centre, and worked in Cambridge	Walking or cycling to get to or from work	Questionnaires and objective physical activity monitoring (Actiheart sensor). Commuting was assessed using a validated seven-day travel to work record. Moderate-to-vigorous physical activity (MVPA) was assessed using the Recent Physical Activity Questionnaire and combined heart rate and movement sensing.	Exposures divided based on Self-reported and objectively measured data: 1. Time spent in (a) active commuting (walking plus cycling; minutes/week), (b) cycle commuting (minutes/week) and (c) walking commuting (minutes/week). 2. Change in active commuting (min/week; no change, increase or decrease)
Foley et al. (2018)	UK	2014/15 United Kingdom Harmonised European Time Use Survey	Participants aged 18 or above	Walking or cycling for transport	Individual demographic questionnaire and recorded two diary days of activity, and one day was randomly selected. Each diary started at 4 am and covered a full 24 h, in 10-min timeslots	1. Mode of Travel: Active travel coded as Travel by foot/Travel by cycle 2. Travel including both active and motorised modes (minutes/day) 3. Leisure MVPA including walking or cycling for recreation (minutes/day)
Fyhri et al. (2011)	UK	National Travel Surveys (NTS) of 4 countries (Denmark, Finland, UK, Italy)	All household members in UK	Not defined but suggested as walking/cycling or use of public transport for commute to school.	Longitudinal cross-sectional surveys with large, nationally representative samples, include travel diaries. Inclusion of local survey data on travel to school.	1. Mode of transport to school: Walk/Bicycle/Public transport/Private car/Other 2. Mode Share (%): proportion of trips made by different modes 3. Distance to school (in kms) 4. Change in travel trends over time: Car use, walking to school, cycling etc
Garrott et al. (2023)	Northstowe Cambridgeshire, England	A mixed-methods, three-arm Randomised Controlled Trial.	Northstowe residents over 16 years old from households that had not previously claimed financial incentives.	Not defined but suggested walking, cycling and use of public transport to travel.	Baseline questionnaire assessing socio-demographic characteristics and travel behaviour, followed by randomisation into three groups (control/intervention/intervention plus) based on financial incentives claimed online/via email/or greater value claimed via email.	1. Self-reported travel modes: walking, cycling, public transport, or cars. 2. Incentive use (quantitative): whether participants used travel-related financial incentives (e.g., bus passes, sports vouchers). 3. Qualitative travel behaviour descriptions: Walking, cycling, public transport behaviour changes prompted by incentives.

					Data then collected after 3 months and 6 months follow up.	
Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Ginja et al. (2017)	Northeast England	A parallel cluster randomised pilot trial (RIGHT TRACKS) conducted over 9 weeks in two schools from a low-income area.	Year 5 school children (aged 9–10 years) and their parents.	Walking or cycling to and from school.	1. Daily parental AST reports (optionally by SMS) and child AST reports, as well as accelerometry (ActiGraph GT3X+). Intervention: Randomised lottery based monetary incentive scheme	1. Mode of travel each school day (walk/cycle): by parental reports 2. Self-reported travel mode for each past day 3. Objective MVPA during travel times and pre-school hour (using accelerometer) 4. Comparison of MVPA levels for active and non-active travel trips.
Goodman et al. (2011)	Hertfordshire, South-East England	Two observational studies conducted in Hertfordshire between 2002 and 2006.	The first study recruited students Years 6-8 (ages 10–11 years) and 12-13 years) The second study recruited students of Years 4, 5 and 6 (ages 8–11 years)	Walking and/or cycling to travel to and from school.	1. Physical activity measured using RT3 tri-axial accelerometers worn by students. 2. Travel and activity diaries recorded for four days, adapted from National Travel Survey diaries. 3. Global Positioning Systems (GPS) monitors worn by a subsample of participants for behaviours involving spatial changes.	1. Travel mode : AT to school or for other purposes 2. Time allocation: % of the day spent in each behavior (minutes in active travel ÷ total waking hours) 3. Moderate-to-vigorous physical activity (MVPA): % of day in MVPA 4. Secondary analysis : a. If AT increased total MVPA without reducing activity at other times → no compensation (supporting activity synergy). b. If AT increased MVPA but led to less activity later → compensation
Goodman et al. (2012)	Hertfordshire, South-East England	Two observational studies conducted in Hertfordshire between 2002 and 2006.	The first study recruited students Years 6-8 (ages 10–11 years) and 12-13 years) The second study recruited students of Years 4, 5 and 6 (ages 8–11 years))	Walking and/or cycling to travel to and from school.	1. Physical activity measured using RT3 tri-axial accelerometers worn by students. 2. Travel and activity diaries recorded for four days, adapted from National Travel Survey diaries. 3. Global Positioning Systems (GPS) monitors worn by a subsample of participants for behaviours involving spatial changes. 4. Day length in hours calculated using sunrise and sunset times for London (borders Hertfordshire).	1. For each behaviour, its duration (minutes in behaviour/total minutes), activity intensity (MVPA minutes in behaviour/total minutes in behaviour), and activity contribution (duration × intensity, or MVPA minutes in behaviour/total minutes) were calculated. 2. % of the day spent in active travel. 3. % of active travel time spent in moderate-to-vigorous physical activity (MVPA). 4. Activity contribution: Combined effect of duration × intensity (MVPA minutes from active travel ÷ total daily minutes)

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Goodman et al. (2012b)	Cardiff (Wales), Kenilworth and Southampton (England)	iConnect study	UK adults	Walking and/or cycling	Postal Questionnaires including travel diaries.	1. Walking/Cycling for recreation in past week (in min) 2. Walking/cycling for transport in past week (in min) 3. Active travel distance (median distance kms/week)
Goodman et al. (2018)	England	Active People Survey data with comparisons made with National Travel Survey (NTS)	Adults aged 16+ years.	Not defined, only measures cycling	Telephonic surveys	1. Local Cycling Prevalence: Proportion of adults cycling in a local authority (in % classified as low, medium and high) 2. Purpose of Cycling for utility (transport) or recreational
Goodman et al. (2019)	England	2011 National School Census (NSC) data & National Travel Survey (NTS) data	Children attending state-funded schools in England	Walking or cycling to and from school	NSC: Provided origin-destination (OD) pairs for home-to-school travel, including mode of transport. NTS: Validated seasonal variation in cycling rates and trip distances. Propensity to Cycle tool (PCT) applied to collected data.	1. Observed cycling rates (%) 2. Distance from Home to School (Kms) 3. Modal shift/ cycling uptake
Gorely et al. (2009)	UK	Project STIL – Sedentary Teenagers and Inactive Lifestyles	School students from year 9, 10, and 11 (13–16 years old)	Not defined but suggested as walking and cycling	Ecological momentary assessment diaries every 15 minutes for 3 weekdays outside of school hours and 1 weekend day	1. Self-reported: Time spent in active travel (min/day)
Götschi et al. (2015)	England and Wales	1. National Travel Survey 2. Integrated Transport and Health Impact Modelling tool (ITHIM)	Participants aged 15+ years	Walking and cycling for travel	Routinely collected survey data on travel patterns	1. Active Travel Modes: walking/cycling 2. Converted to marginal MET-hours/week 3. Daily minutes spent walking/cycling (absolute and relative)

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Götschi et al. (2020)	Not specified (European region)	Health Economic Assessment Tool (HEAT)	Adults (age not specified)	Walking and cycling	The tool used multiple data sources (self-reported, population survey data, app-based data)	HEAT accepts diverse units for active travel : 1. Time-based: Minutes/hours per day. 2. Distance-based: Kilometres/miles per day. 3. Frequency-based: Trips per day, mode share (%), or categorical frequency 4. Counts: (e.g., daily cyclist counts). 5. Total steps: For walking only.
Harris et al. (2021)	Hounslow, London, England	'Beat the Street': community-wide gamification-based intervention study.	Adults aged 19-79 years	Walking, cycling, scooting, or wheeling to/from school or work	1. Self-report questionnaire with a validated physical activity measure (Short active lives survey or SALS): At baseline (pre-intervention) and follow-up post-intervention (6 weeks) 2. Objective measure: Data collected through Gameplay (RFID sensors to generate time stamps) 3. Traffic count data: using Traffic monitoring cameras	1. Changes in physical activity: Weekly minutes of moderate physical activity (inactive: <30 min/week or active: > or =150 min/week) 2. Participation activity (Gameplay frequency): to distinguish leisure time physical activity or active travel (commute to school/work) 3. Reduction in vehicle counts on the road (used as proxy for increased active travel)
Heinen et al. (2015a)	Cambridgeshire, England	Commuting and Health in Cambridge cohort study	Participants aged ≥16 years, living within 30 km of Cambridge, and working near the busway.	Walking and cycling for commute to work	1. Annual postal surveys over four waves (this study utilised data from the last wave– 2012) 2. Seven-Day Travel-to-Work Diary (Self-Reported) 3. Proximity to Busway (intervention) calculated using GIS.	1. Trip modes: Walking or cycling – further classified into full active travel trips or combination trips (walk + bus or walk + train etc) 2. Changes in mode of travel : none/partial/complete
Heinen et al. (2015b)	Cambridge, England	Commuting and Health in Cambridge cohort study	Participants aged ≥16 years, living within 30 km of Cambridge, and working near the busway.	Commute involving walking and or cycling to work.	1. Postal Questionnaire data collected annually between 2009 and 2012 including a seven-day travel-to-work record (pre and post intervention) i.e. 2009 and 2012. 2. Self-reported home and workplace post codes calculated using GIS. 3. Intervention: the Cambridgeshire Guided Busway	1. Changes in commute mode share (%): a. involving any active travel, b. involving any public transport, and c. made entirely by car 2. Number of commute trips(n) 3. Change in objective commute distance(kms)

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Heinen et al. (2017)	Cambridge, England	Commuting and Health in Cambridge cohort study	Participants aged ≥ 16 years, living within 30 km of Cambridge, and working near the busway.	Commute involving walking and or cycling to work.	1. Postal Questionnaire data collected annually between 2009 and 2012 including a seven-day travel-to-work record (pre and post intervention) i.e. 2009 and 2012. 2. Self-reported home and workplace post codes calculated using GIS. 3. Intervention: the Cambridgeshire Guided Busway	1. Modal shift change: (a) no change, (b) a full modal shift, (c) a partial modal shift, (d) non-stable but patterned behaviour, and (e) complicated or apparently random patterns 2. Patterns of change : change in travel mode by car/active travel/public transport 3. Individual mode shift: no significant change in individual travel behaviour
Hong et al. (2018)	Glasgow and Clyde Valley Planning area, Scotland	The integrated Multimedia City Data (iMCD) survey conducted by the Urban Big Data Centre (UBDC) in Glasgow	Residents in Glasgow with mean age of 49.9 years	Walking and cycling	1. Face-to-face household surveys for a self-reported measure, including a one-day travel diary. 2.1-week wearable GPS device: objective measure of average walking hours.	1. Self-reported: Frequency of active travel trips (min walked/day) 2. Objectively measured: Average walking hours per person per day 3. Measurement of association between social media use and active travel
Hunter et al. (2015)	London and Reading, England	An uncontrolled mixed-methods feasibility evaluation of a 4-week international "Beat the Street" walk-to-school competition.	Children aged 11–13 years old	Travel to school via walking and/or cycling	1. School Travel Tracking: Swipe card technology and a custom website recorded walks to/from school over a 4-week intervention. 2. Travel Diary: A 5-day log captured travel mode and journey duration (minutes). 3. Baseline & Post-Intervention Surveys: Paper questionnaires 4. An online follow-up survey gathered parent/teacher feedback on the intervention's impact and perceived changes in children's activity levels.	1. Number of walks to/from school objectively recorded using the swipe card tracking system. 2. Attitudes towards walking collected at baseline and week 4 (post-intervention) 3. Mode of travel (walking, cycling, car, bus) and journey duration (minutes) to/from school. 4. Participation Rates: Proportion of children walking (objectively via swipe cards vs. self-reported). 5. Behavioral Trends: Weekly decline in walking rates
Hutchinson et al. (2014)	UK	UK Household Longitudinal Study	Nationally representative UK population	Walking and cycling for transport.	Computer-assisted personal interview (CAPI): self-reported	Frequency of active travel (self-reported) : (Always/Very often/Quite often/Not very often/Never/Not applicable/can't do this) associated with socio-demographic factors and urban/rural settings

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Ikeda et al. (2022)	England	Three longitudinal studies (ALSPAC, England; CLAN, Australia; SPEEDY, England) within the International Children's Accelerometry Database (ICAD)	Participants aged 11.3 ± 1.2 years at baseline	Travel to school via walking and/or cycling	1. Physical activity levels measured via ActiGraph accelerometers in Average daily minutes of moderate-to-vigorous physical activity (MVPA) 2. Survey questionnaire: Child- or parent-reported mode of travel to school	1. Data from accelerometer: a. average minutes of MVPA per valid day at baseline for cross-sectional analyses, and b. change in the average minutes of MVPA per valid day from baseline to follow-up c. Average daily minutes of MPA and VPA 2. Self-reported data: Travel mode to school: Active i.e. walk or cycle and Other i.e. public transport or car 3. Compared MVPA levels between active and non-active travellers and baseline active travel's association with changes in MVPA over time.
Jacob et al. (2021)	UK	The UK Household Longitudinal Study	Nationally representative UK population	Walking or cycling	Data collected from panel surveys from 2009-2016, regarding: 1. Mode of travel to work: Car/Public Transport/ Active Travel/ Other 2. Physical and Mental Health score (SF-12 questionnaire) 3. Socio-economic and demographic characteristics	1. Mode of travel to work (active/non-active) 2. Changes in Commuting Mode: individuals who switched modes between waves (car to active or vice-versa) 3. Commute time: Duration of one-way commute (in minutes) {also analysed by mode}
Jones et al. (2012)	London, England	Primary qualitative data collection	Participants were 12–18-year-olds living in London	Walking, cycling, and bus travel	Qualitative data collected by using young people's accounts of bus travel generated in interviews, focus groups and observational notes	1. Bus Travel as Active Travel: a. Includes walking to/from stops, transfers, and standing on board (physical activity). b. Promotes social interaction, independence, and social capital. 2. Walking: Both displaced and induced by bus use (e.g., free pass), varies by geography. 3. Cycling: Primarily leisure-based; not a direct substitute for walking or bus travel.
Kelly et al. (2011)	UK	A pilot study (primary data collection)	Non-random convenience sample of participants (n=20) aged 24-60 years.	Not defined but suggested as walking and cycling,	1. Participants were required to wear the 'Sense Cam device' for one full day of travel. 2. A self-reported travel diary over the same period for comparison and 3. Interviews to assess user burden and experience.	1. Journey mode (walk/cycle/car/bus), 2. frequency (n), 3. average self-reported duration (sec) and 4. average Sense Cam recorded duration (sec)

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Knott et al. (2018)	England	UK Biobank Cohort (population-level longitudinal cohort study)	Participants aged 40–75 at baseline with a mean follow-up of 4.65 years who reported to be employed/ self-employed and commuted for work.	Not defined but suggested as walking and cycling	1. Travel data generated from the UK Biobank (self-reported data) 2. Health-related data: Two-item Patient Health Questionnaire (PHQ-2), validated for depressive symptom severity.	1. Commute mode: Active/Inactive 2. Mode change/Transition: a. Stable inactive: Consistently car-only. b. Stable active: Consistently used active modes. c. Inactive → active: Switched from car-only to active modes. d. Active → inactive: Switched from active modes to car-only 3. Commute distance (miles) and Commute frequency (trips/week)
Knott et al. (2019)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults aged ≥16 years at enrolment, worked in Cambridge, UK, and lived within 30 km of the city.	Walking and Cycling	Participants completed postal questionnaires about their lifestyle, commute (using 7-day travel diary), workplace, environment, and health	Proportion of trips (%) and %difference in trips made exclusively by motor vehicle, walking and/or cycling and involving public transport, associated with change in workplace car parking policies.
Laverty et al. (2021)	UK	UK Millennium Cohort Study.	Children at ages 7, 11 and 14 years	The use of non-motorised modes of travel such as walking or cycling	Self-reported questionnaires (baseline and follow up (8 years))	1. Transport mode to school was categorised as private motorised transport, public transport and active transport 2. Distance to school (kms) 3. Switching of mode of travel to school in association with adiposity.
Lawlor et al. (2021)	Connswater, Belfast, Northern Ireland	The Physical Activity and the Rejuvenation of Connswater (PARC) study	Adults aged 16 and above	Walking or cycling as an alternative to motorised transport for the purpose of making everyday journeys	Postal questionnaires (self-reported)	Time spent in AT (minutes/week): categorised into none (0min/week), some (≥10 min/week) and sufficient (≥150min/week) in association with income
Lehtonen et al. (2021)	UK	EU H2020-funded L3Pilot project	Adults (car-drivers) aged 18+ from 8 European countries including UK	Walking and/or cycling	1. Online survey questionnaire 2. Intervention: Automated Car availability Transport modes categorised as: Personal car as a driver, Walking more than 500m, Car as a passenger, Shared car as a driver, Personal bicycle, Public transport <50km, Public transport >50km, Motorcycle, and Shared bicycle	1. Current travel behaviour: frequency of using 9 transport modes in a week based on Low/medium/High use of alternative modes. 2. An alternative mode use score was calculated (average frequency of non-car modes) 3. Change in use of Public transport or active travel based on L3Avs (<i>Large decrease, Decrease, No change, Increase, Large increase</i>)

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Macdonald et al. (2019)	Scotland	Studying Physical Activity in Children's Environments across Scotland study (SPACES).	Children aged 10-11 years recruited from the Growing Up in Scotland (GUS) Study	Travel to school by walking and or cycling	1. Interviews of children and parents. 2. A travel diary (how they travel to and from school each day during two school weeks (10 days/20 trips))	1. Children who actively travelled to/from school categorised as active all (100% of AST) and active 60 %+ (at least 60% of AST). 2. Home-to-school road/path network distance (<0.5 km, 0.5 to <1 km, 1 to <1.5 km, 1.5 to <2 km, 2 km+). 3. Home neighbourhood walkability (i.e., composite measure of road/path intersection density and dwelling density) (in quintiles). 4. Likelihood of school journeys using active travel by home- to- school distance and walkability of home neighbourhood (weighted) : ORs and P-values
Martin et al. (2014)	UK	British Household Panel Survey	Adults aged 18–65 years who commuted to work.	Cycling and or walking to work	Questionnaires (Self-reported)	Study tested the association of mode of travel with psychological well-being: 1. Mode of travel to work: Active travel, Public transport or Car travel 2. Commuting Time: Time Spent Walking/Cycling in minutes 3. Mode switch: Switching to Active Travel or Switching to Walking vs. Cycling
Martin et al. (2015)	UK	British Household Panel Survey	Adults aged over 18 years	Walking and Cycling to work	Annual survey (baseline and follow up after 2 years) Data from 2004/2005, 2005/2006 and 2006/2007 surveys	1. Mode of travel to work 2. Change/switch in mode of travel to work : a. Switching from private motor transport to active travel or public transport b. Switching from active travel or public transport to private motor transport
Martin et al. (2020)	London, England	UK Census microdata (2001-2011)	Adults ages 16 and above who commute to work via bicycle	Not defined	Census data	1. Borough-level prevalence and trends in cycling (%) over time 2. Individual level prevalence and trends in cycling (%) over time 3. Relationship between change in cycling infrastructure and change in the proportion of commuters who cycle

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Mason et al. (2016)	Glasgow, Scotland	GoWell Research and Learning Programme	Residents (householder or partner), aged 18 years or more	Walking or cycling to work or school	Survey via questionnaire (self-reported data)	1.Domains of physical activity: Household chores, Occupational, Active travel, Leisure and Family activities 2. Relative contribution of different types of physical activity (based on IPAQ): Low/moderate/High
McCartney et al. (2012)	Glasgow, Scotland	Data from the 2001 Census and data from a 'cordon count' survey over two days in four consecutive years (2007–2010)	Glasgow adults (aged 16–74 years) whose commuting destination was within the City centre area	Walking and or cycling for commute	Census data: to calculate modes of travel to work or study from different geographical sectors in Glasgow to the City centre. Cordon count data: to calculate the patterns of active transport into and out of the City centre	1.Mode of Travel to Work/Study 2.Distance of Commute 3.Active Travel Prevalence: Proportions of commuters walking/cycling 4.Per Capita Rates: Cordon counts expressed as journeys per 1,000 residents 5.Trends: Yearly changes in counts of pedestrians/cyclists
McCreery-Phillips et al. (2023)	Greater London, England	1.Office for National Statistics (2013) based on UK census (2011) 2.Greater London Authority (GLA) Datasets 3.Department for Transport (DfT) data (London) 4. Transport for London (TfL) data	People aged 16–74 who travel to work by bicycle	Not defined but suggests walking and cycling	1. 2011 UK Census : Ward-level cycling commute rates. 2. GLA Datasets: a) Ward and borough profiles: Land use, population density, economic indicators. b) PTAL scores: Public transport accessibility by ward. 3. TfL: a) Cycle network density. b) Santander Cycles docking station locations. 4. DfT: Annual vehicle miles travelled.	1. Bicycle commuting rates 2. Cycle network density (length of cycle network per unit area (km/m2)) 3. Total annual vehicle miles travelled (millions)
McKee et al. (2007)	Scotland	A quasi-experimental trial (primary data collection)	Primary school grade-5 (aged 9 yrs) children and their families and teachers for an intervention and control school.	Walking and cycling to school.	1. A computerised mapping programme to record school travel behaviour at baseline and follow-up (10 weeks). 2. An online computerised questionnaire for behaviour change 3. Results based on baseline journey measurements and travel questionnaires 4. Intervention: Travelling Green, a school-based active travel project	1. Mean difference between intervention and control schools for: a) Mean distance travelled from home to school: by walking and by car b) Mean difference in the distance travelled to school by walking/car between baseline and follow-up 2. Stage of behaviour change for active commuting (action or maintenance)

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McMinn et al. (2011)	Scotland	1. A quasi-experimental trial (primary data collection) 2. Strathclyde Evaluation of Children's Active Travel (SE-CAT)	Participants were from primary 5 (ages 8-9 years) from 5 Scottish schools.	Walking or cycling to and from school.	1. Parent and child questionnaires, travel diary, and ActiGraph GT1M accelerometers and the NL-1000 pedometer recordings) were taken during 5 consecutive school days prior to starting the intervention and during 5 consecutive school days post-intervention (after 5 and 12 months) 2. Intervention: Travelling Green, a school-based active travel project	1. Time (seconds) spent in MVPA (≥ 4 METs) during commutes via accelerometer. 2. Minutes spent in MVPA (threshold: ≥ 3.6 METs) via Pedometer 3. Usual travel mode: Self-reported walking, cycling, car, or bus 4. Travel mode: How the child travelled home and Trip details: Time arrived home, stops enroute
McMinn et al. (2012)	Scotland	Strathclyde Evaluation of Children's Active Travel (SE-CAT)	Participants were children from 5 elementary schools in Scotland. 2 schools received the intervention and 3 schools acted as controls.	Not defined but suggests walking to schools	Pre and post intervention (6 weeks) data collection using: 1. ActiGraph GT1M recordings 2. Travel questionnaire 3. Travel diary GT1M data were processed so that steps and MVPA time were calculated for the morning commute, afternoon commute, total commute (morning + afternoon commute), and the full day	1. Mean steps (daily, a.m., p.m., and total commute) from pre- to post-intervention 2. MVPA time(s) for morning, afternoon and total commute. 3. Mode of travel to school (self-reported)
Morgan et al. (2016)	Wales	2013 Health Behaviour in School-aged Children (HBSC) study	Young people aged 11-16 years across 67 schools in Wales	Walking or cycling for travelling to/from school	HBSC School Environment Questionnaire	1. Mode of travel: Other mode/Actively(walk/bike) 2. Levels of MVPA via various modes (physical activity, active travel, etc)
Mytton et al. (2016a)	Cambridge, England	Commuting and Health in Cambridge cohort study	Not mentioned	Walking and cycling to work	Annual questionnaires (2009–2012)-self-reported	1. Travel mode maintenance: Walking or cycling to work for a week 2. Weekly duration of cycle/walk commuting at baseline and follow-up: 0 min, 1–149 min, and >150 min 3. Change in duration of active commuting weekly (increase, no change, decrease)

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Mytton et al. (2018)	Cambridgeshire, England	Fenland study (a population-based cohort study: 2005-15)	Commuters (aged 29-65 years) who were employed and reported regular travel to work	Walking and cycling to work	1. Self-reported: a general questionnaire, a food frequency questionnaire and the Recent Physical Activity Questionnaire (RPAQ) 2. Body composition assessed by dual-energy X-ray absorptiometry (DEXA scan) 3. Six days of objective physical activity monitoring by combined heart rate and movement sensing (measured by Actiheart)	1. Modes of travel (car/motor vehicle, works or public transport, bicycle, and walking) and frequency of each mode use (always, usually, occasionally or never) 2. Distance to work (> or < 5miles) 3. Objective physical activity energy expenditure (PAEE) associated with various modes of travel
Neves et al. (2019)	Cardiff, Wales	iConnect baseline survey	Cardiff city residents	Walking and cycling	Personal Global Position System (GPS) devices, 7-day travel diaries and contextual interviews over two seasonally matching 7-day time periods in 2011 and 2012	1. GPS data: objectively record spatial and temporal details of trips, including route choices and activity locations. 2. Travel Diary: Participants recorded trip modes (e.g., walking, cycling, car) and purposes (e.g., commuting, shopping) in diaries (further cross-checked via GPS data) 3. Interviews: participants' perceptions of walking/cycling infrastructure, barriers to active travel, and reasons for mode choices 4. Trip Chain Analysis: Trips were analysed as part of "chains" (sequences starting/ending at home) to assess feasibility of substituting car trips with active travel.
Norwood et al. (2014)	Scotland	Scottish Government Smarter Choices, Smarter Places programme (SCSP)	Adult residents aged 16+ years	Walking ,cycling and public transport	House to house surveys were conducted before and after the programme intervention, in May/June 2009 and 2012	1.Number of days per week engaged in at least 30 minutes of moderate-intensity exercise (e.g., brisk walking, cycling) outside of work/school. 2. Based on areas with intervention and without: a) Likelihood of physical activity participation. b)Likelihood of meeting recommended activity levels (≥5 days/week

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Ogilvie et al. (2008b)	Glasgow, Scotland	An observational intervention pilot study.	Local residents aged 16 or over in Scotland	Walking and cycling for transport	1. Random postal survey (at baseline) 2. A travel diary, the short form of the International Physical Activity Questionnaire (IPAQ) and the SF-8 3. Intervention: Construction and opening of a new freeway 4. Correlates to active travel: Age, Housing tenure, Distance to place of work/study, Access to bicycle, Composite variable : access to car and difficulty walking, Proximity to shops, Road safety for cyclists, Day of travel diary (weekday)	1. Reported travel time for each mode of transport, 2. Total travel time by active modes (walking plus cycling) and by all modes combined 3. The proportion of total travel time contributed by each mode of transport. 4. Average time spent walking and total physical activity: Walking (min/week) and Total activity (MET-min/week)
Ogilvie et al. (2010)	Cambridgeshire, England	Commuting and health in Cambridge cohort Study	Adults aged 16 and over who work in areas of Cambridge and live within a radius of 30 kms of the city centre.	Walking and cycling	1. Repeated postal questionnaires (Seven-day retrospective travel record) 2. Accelerometers 3. Household travel diaries, 4. Combined heart rate and movement sensors and GPS receivers 5. A longitudinal qualitative and Photo-Elicitation interview study 6. Intervention: the opening of the Cambridgeshire Guided Busway.	1. Change in daily active commuting time: Net difference in minutes/day spent walking/cycling to work, comparing intervention and control groups 2. Total active travel time: Includes all walking/cycling trips (not just commutes)
Olsen et al. (2016)	Scotland	Scottish Household Survey (SHS) with	A Scottish representative population aged 16 and over	Walking and cycling	1. Travel diaries (2009 to 2013), 2. Face to face interviews. 3. Pre-post intervention period defined to measure changes in Active travel (2009/10 and 2012/13) 4. Intervention: M74 extension	1. Changes in active travel over time 2. Comparing changes in active travel over time between areas (also represented intervention effect) 3. Likelihood of journey stage using active travel methods
Olsen et al. (2017)	Scotland	Transport, Health and Well-being Study conducted in 1997 and 2010	Glasgow residents aged 17 to 95 years old	Walking and cycling	A detailed postal questionnaire in 1997 and then in 2010 (self-reported)	1. Satisfaction with current transport mode 2. Journey mode and destination 3. Change in transport satisfaction over time 4. Likelihood of transport mode satisfaction 5. Changes in the likelihood of transport satisfaction over time (1997–2010)

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Olsen et al. (2017b)	Scotland	Scottish Household Survey (2012-2013)	Sampled individuals aged 16+ living within Scotland	A journey stage that was either walked or cycled	1. Survey travel diaries recorded all journeys made on the previous day 2. Face-to-face interviews	1. Journey mode and distance travelled 2. Likelihood of an active journey stage 3. Number and proportion of active stages of a journey 4. Journey purpose by active or non-active travel 5. Mean distances of active and non-active journey stages
Olsen et al. (2024)	UK	Understanding Society, the UK Household Longitudinal Study (UKHLS)	Adults aged 16+ years	Walking and cycling	Interviews and panel survey data from Waves 9 and 10 (2017–2019) to avoid pandemic-related biases	1. Travel Behaviours: a. Daily/Weekly Walking: Frequency of walking >10 minutes (from Wave 9).b. Daily/Weekly Cycling, Car Use, Bus Use: Frequency of use (from Wave 10) 2. A. Walking: Daily: a. Walking >10 minutes on ≥1 day/week (dichotomised). b. Weekly: Walking >10 minutes on ≥1 day/week (dichotomised). B. Cycling: a. Daily: Cycling ≥1 day/week. b. Weekly: Cycling ≥1 day/week. 3. Visualised likelihood of daily/weekly travel behaviours by amenity diversity using Shannon's Diversity Index (SDI)
Owen et al. (2012)	London, Birmingham and Leicester (England)	Child Heart and Health Study in England (CHASE)	Children (aged 9–10 years in 2006–7)	Travelling to school using walking or cycling, in combination with public transport where necessary	1. Children were asked to wear an ActiGraph GT1M activity monitor during waking hours for 7 whole days 2. Child questionnaires to ascertain mode of travel to school on a. weekdays, b. between 8-9 am and 3-5 pm on weekdays, c. weekdays excluding periods of active travel 3. Parental questionnaires	1. Mode of transport to school by gender, ethnic group, and distance from home to school (miles) 2. Adjusted mean weekday levels of physical activity by mode of transport to school. 3. Mean (95% CI) weekday physical activity levels (steps) by median distance to school on weekdays in walkers only 4. Median weekday physical activity levels (CPM) from 7 am to midnight by mode of travel to school 5. Adjusted activity levels in children who walk/cycle to school by distance to school

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Oxford et al. (2015)	South Gloucestershire, England	A cross-sectional travel survey focussed on active travel amongst pre-school aged children	Parents/carers bringing to and/or collecting children aged 2–4 years old from the pre-schools on the survey days	Walking or cycling for transport	1. A travel questionnaire including questions about child and parent travel to and from the pre-school 'today' and 'usually' at this time of year', factors affecting the pattern of travel, journey length, access to a car and home postcode	1. Proportion of Active travel: children's arrival and collection 'usually in priority (PN) and non-priority neighbourhoods(NPN) 2. Factors affecting the pattern of travel to pre-school 3. Distance travelled to each pre-school and proportion of children living less than 800m from the pre-school 4. Duration of total journey to pre-school 'usually' and access to a car to travel to pre-school
Page et al. (2010)	UK	Baseline data from the PEACH project (Personal and Environmental Associations with Children's Health)	10–11-year-old boys and girls from 23 schools	Walking or cycling to school	1. A computerised questionnaire (self-reported) to ask questions about : Outdoor play, Exercise, Mode of travel to school, perceptions of the environment, independent mobility and distance from home to school. 2. Accelerometer worn for 7 days	Factors associated with likelihood of walking/ cycling home from school.
Pangbourne et al. (2020)	UK	Experimental study evaluating the persuasiveness of pro-walking messages tailored to individual characteristics	Adults (aged 18+ years)	Not defined but suggests walking.	Qualtrics online survey : a. Travel Behavior: Self-reported frequency of journeys under 2 miles in past week and primary transport modes used. b. Travel attitudes: Drivers, Potential Non-Drivers, Non-Drivers	Frequency of walking for short trips (<2 miles) in the past week
Panter et al. (2010)	Norfolk, England	SPEEDY study	Children aged 9-10 years and their parents and guardians	Walking or cycling to school	Questionnaires completed by the children and their parents: usual travel mode to school (travel behaviour) Distance to school was estimated using GIS	1. % children travelling to school on foot/bicycle/motorised vehicle 2. Associations between child and parental perceptions and child's travel mode to school, stratified by distance from school (Distance <1km, 1-2km and >2km)

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Panter et al. (2011)	Cambridge, England	Commuting and health in Cambridge cohort study	Adults who travel to work in Cambridge	Walking and cycling for transport	1. Postal surveys : travel modes and time spent travelling to and from work in the last week, perceptions of the route, psychological measures regarding car use and socio-demographic characteristics 2. Objective measures of urban-rural status were estimated within GIS.	1. Mode of travel to and from work 2. Individual and household characteristics of the sample according to time spent walking and cycling to work 3. Odds of spending any time walking to work 4. Odds of engaging in any walking to work stratified according to car availability within the household (car/no car) 5. Odds of spending 1-149 minutes and ≥ 150 minutes of cycling to and from work , further stratified based on car availability
Panter et al. (2013a)	Norfolk, England	SPEEDY study	Children aged 9-10 years and their parents and guardians	Walking and cycling to school	Child and parent questionnaire (baseline and follow up after 1 year)	1. Travel mode: (i) used active modes at both time points (maintained active travel), (ii) used passive modes at both time points (maintained passive travel), (iii) switched from passive to active modes of travel (took up active travel) and (iv) switched from active to passive modes of travel (took up passive travel). 2. Odds of taking up active travel/ remaining an active traveller
Panter et al. (2013b)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults over the age of 16 years working in Cambridge and living within 30 km of the city	Walking or cycling to work	Postal questionnaires	1. Mean minutes/day spent walking or cycling on the commute 2. Travel modes used on the journey to and from work 3. Odds of incorporating walking or cycling into car journeys
Patterson et al. (2018)	England	National Travel Survey	Participants eligible for a free bus pass (aged 60-99 years) in England in 2006-2014	Walking, cycling and public transportation such as bus or train	Interview and One week travel diary	1. Bus Use: Number of bus journey stages per week. 2. Active Travel as Part of Bus Journeys: Walking segments linked to bus trips (e.g., walking to/from stops) 3. Total Active Travel Stages: Sum of all walking, cycling, and public transport stages per week. 4. Walking Frequency: Self-reported walking frequency (dichotomized as <3 times/ week or ≥ 3 times/ week).

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Patterson et al. (2019)	England	National Travel Survey 2010–14	Nationally representative sample of adults (17+ years)	Walking and cycling for transport, including stages of public transport journeys that involve walking or cycling (e.g., walking to/from bus stops or train stations)	Self-reported travel, personal and household characteristics and a diary of all journeys made in 1 week including mode of transport, distance and duration.	1. Minutes/day of walking/cycling accrued during public transport journeys 2. Mode-Specific Active Travel: Bus: Walking to/from stops, Train/Light-rail: Walking to/from stations (often longer distances), Multimode: Combined walking/cycling across multiple public transport types
Patterson et al. (2020)	Cambridge, England	Commuting and Health in Cambridge cohort study	Adults aged 16 years and over who worked in Cambridge, UK	Walking, cycling and combinations of walking or cycling with other modes, such as public transport	A postal questionnaire about commuting practices, individual characteristics and workplace characteristics in 2011 and 2012	1. Commute Mode Categories: a. Exclusively Active Modes: Trips made entirely by walking and/or cycling. b. Including Active Modes: Trips that incorporate walking or cycling as part of a longer journey, such as combining them with public transport (e.g., walking to a bus stop). c. Exclusively Private Motor Vehicle: Trips made solely by car, taxi, van, motorcycle, or moped. 2. Proportion of all commute trips made by each of the above categories
Patterson et al. (2023)	England and Wales	The Office for National Statistics- Longitudinal Study (ONS-LS)- data from 2001-2011	Aged at 16 and above years, employed and who lived in the same local authority area in 2001 and 2011	Walking and cycling to work	Longitudinally linked 2001 and 2011 census data * Did not include data of residents working from home	1. Commute mode: a) cycling to work b) walking to work c) cycling or walking to work (groups a and b combined) 2. Uptake vs. Maintenance: further stratified by demographics: a. Uptake: Switching to cycling/walking by 2011 among non-active commuters in 2001. b. Maintenance: Continuing to cycle/walk in both 2001 and 2011
Pistoll et al. (2019)	UK	UK Household Longitudinal Survey (UKHLS) (2010-12 and 2014-16)	UK adults aged 16+ years	Walking, cycling and public transport use for travel	Self-reported survey data	1 Travel modes: a. Walking/Cycling: Combined due to low cycling rates.b. Public Transport. 2. Change Variables: a. Initiation: Switched to walking/cycling or public transport between waves. b. Cessation: Stopped using these modes between waves. 3. Odds ratios (ORs) for initiation/cessation by age group

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Portegijs et al. (2019)	European Countries including UK	European Project on Osteoarthritis (EPOSA), a multi-country cohort study.	Older adults aged 65–85 years (71–79 years in the UK)	Transport-related walking and cycling for purposes like shopping or running errands (excluding sports or recreational activities)	1. Standardised questionnaires and clinical exams 2. Self-reported data on active travel (frequency and duration of walking/cycling over the previous two weeks). 3. Data collection at baseline, with follow up after 12 and 18 months	1. Active Travel Time (min/day): the total minutes of walking and cycling for transportation, then dividing by 14 days to estimate daily duration 2. Cycling not measured separately due to low prevalence. 3. Walking and Cycling: Assessed separately using the Longitudinal Aging Study Amsterdam (LASA) Physical Activity Questionnaire, validated for older adults
Potoglou et al. (2016)	Wales	National Survey for Wales (2013/14 and 2014/15)	School children (4–12 years of age) and adolescents (12–19 years of age)	Walking and cycling to school	Face-to-face interviews	1. Frequency of Walking and Cycling by Parents ("every day," "several times a week," "1–2 times a week," or "no active travel by walking/cycling") : to assess the association between parents' active travel habits and their children's mode of travel to school 2. Distance to school: Less than 0.5 miles, 0.5 to 1 mile and More than 1 mile
Powers et al. (2019)	Glasgow, Scotland	Follow-up data from a larger longitudinal natural experimental study	Adults aged 16 or over	Walking or cycling for transport (utility purposes) or recreation within the local neighborhood	1. Self-reported postal surveys with 7-day recall of walking/cycling for transport and recreation, combined with GIS-measured motorway proximity 2. Intervention: M74 motorway construction 3. Data collected pre-intervention (2005) and post intervention (2013)	1. Walking and Cycling for Transport (Utility Purposes) in the past 7 days 2. Walking and Cycling for Recreation in past 7 days 3. Outcomes: Any local walking/cycling (transport or recreation), Walking/cycling for transport only, Walking/cycling for recreation only
Prins et al. (2016)	Cambridge, England	Commuting and Health in Cambridge natural experimental study	Adults (≥16 years), who lived within 30 km of the city centre and travelled to workplaces in Cambridge	Walking and cycling for commute	Intervention: Cambridgeshire Guided Busway Timeline: Baseline (2009) and 3-year follow-up (2012) data Data: Postal questionnaires with self-reported all commuting journeys and the modes of transport used over the past 7 days	1. Weekly cycle commuting time (average cycling time/trip) 2. Change in cycling time: increase, decrease, or no change in weekly cycling time between baseline and follow-up. 3. Causal pathways linking busway proximity to changes in cycling (direct pathway/indirect pathway)

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Procter et al. (2018)	London, England	Examining Neighbourhood Activities in Built Living Environments (ENABLE) in London study	Adult residents in London	Walking and cycling	Participants wore accelerometers and GPS receivers on the hip for 7 days along with a questionnaire to describe their travel patterns to work/place of study	The study uses supervised machine learning (XGBoost algorithm) to classify travel modes based on: Accelerometer, GPS metrics and 4-min rolling window Each 10s epoch was classified into modes of travel based on the above metrics to measure all activities involving walking, cycling or active travel objectively.
Rafferty et al. (2016)	Glasgow, Scotland	A descriptive observational study (primary data collection)	Twenty-six office workers (age 23–65 years) employed at Glasgow Caledonian University	Not defined but suggests walking as part of the commute	1. A global position system (GPS) was to identify the geographical domain of the participant. 2. An activity monitor Both devices were worn for seven consecutive days and 5 workdays extracted post data collection. 3. Cycling data was not analysed.	1. Total steps taken during the commute domain (defined as leaving home to arriving at work or vice versa). 2. Time spent in moderate-to-vigorous physical activity (MVPA) during the commute 3. Distance to Workplace: to calculate steps/MVPA
Raser et al. (2018)	7 European cities including London, England, UK	PASTA project	Adult population in 6 European countries including UK	Walking and cycling	Web-based survey (2014-2017) with physical activity level measurement (global physical activity questionnaire- GPAQ), geolocations (home, work, education), commute route and attitudinal and behavioral aspects with 1-day travel diary	1. Total time spent walking or cycling during trips, aggregated per day 2. Mode Share and Trip Characteristics: Cycling Share: %of trips made by bicycle. a. Trip Rates: Average number of trips per day by mode. b. Trip Distance/Duration: Average length and time of walking/cycling trips, with city-specific comparisons.
Riches et al. (2024)	Oxfordshire, England	A non-randomised, controlled, before and after design in four intervention and two control schools	Primary school children and their parents	Walking, cycling, scootering, and "park and stride" (where parents parked nearby and walked the last part of the journey)	1. Parent Survey. 2. Pupil "Hands-Up" Surveys: Classroom teachers recorded daily travel modes (though this method had low consistency). 3. Vehicle and Air Quality Monitoring 4. Qualitative Interviews/Focus Group 5. Intervention: 'Park and Stride', to increase active travel to or from school.	1. Frequency of Active Travel: the number of days per week children used active travel to or from school (0 to 5 days). 2. Awareness and Use of Wayfinding Routes: awareness of the intervention and how often parents used the designated routes. 3. Reasons for Mode Choice and Barriers: Parents provided reasons for choosing active or non-active travel modes (e.g., convenience, health benefits, distance, safety concerns). 4. Vehicle Counts: Pneumatic tube counters measured changes in vehicle traffic near schools during drop-off and pick-up times.

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Rind et al. (2015)	UK	UK National Travel Survey (NTS) for 2002 and 2003	Urban adults aged 16+ years	Walking or cycling for commuting, business, education, shopping, and other personal activities (non-recreational)	Cross-sectional survey data: face-to-face interviewing was used to collect key socio-economic, demographic and travel-related characteristics of participants and a travel diary recording trips undertaken over the course of a week	1. Mode of travel for each trip associated with income levels 2. Trip length set as 0.1-5 miles, shorter and longer trips excluded from analysis
Roth et al. (2012)	England.	Nationally representative Health Survey for England 2008	Children aged 5-15 years	Walking, cycling and public transport	1. Household interviews, and measurement of height and weight. 2. Participants were asked to wear the ActiGraph accelerometer during their waking hours for seven consecutive days.	Self-reported: 1. Active Travel to School: further classified by a. Number of days walked or cycled in the past week. b. Duration of the journey (time spent walking or cycling to/from school). 2. Time spent in: a. Other walking (leisure or non-commute walking). b. Other cycling (leisure or non-commute cycling). c. Sports and exercise (both formal and informal activities) Objective measures: 1. Time spent in MVPA a. Duration and intensity of physical activity b. Wear time (at least 600 minutes/day for a valid day)
Sahlqvist et al. (2012)	Cardiff (Wales), Kenilworth and Southampton (England)	Baseline survey for the iConnect study in the UK	Representative sample of adults	Any walking or cycling for transport, including the walking or cycling stages of public transport journeys (e.g., walking to a bus stop)	1. Travel and recreational physical activity were assessed using detailed seven-day recall instruments (postal questionnaire) 2. Mode of travel: Motorised: Only motorised modes (car, bus, train), Combination: Both active and motorised modes, Active: Only active modes (walking or cycling)	1. Time spent walking or cycling for commuting or non-commuting purposes (minutes/week) 2. Mode of travel 3. Active travel was analysed in relation to: a. Recreational Physical Activity: Assessed using modified IPAQ items (walking/cycling for recreation, moderate/vigorous activity). b. Total Physical Activity: Sum of active travel and recreational physical activity

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Sahlqvist et al. (2013)	Cardiff (Wales), Kenilworth and Southampton (England)	UK-based iConnect study	Adults aged over 18 years	Walking or cycling for commuting	A survey questionnaire which asked about travel and physical activity behaviour and included standard sociodemographic questions (baseline and 1 year follow up) Subcategories of Change: a. Commuting active travel b. Non-commuting active travel c. Walking (all purposes) d. Cycling (all purposes)	1. Trip Purpose: Commuting (work/study) vs. Non-commuting (shopping, personal, social). 2. Transport Mode: Walking, cycling, bus, train, car, or other. 3. Travel Volume: Weekly minutes and miles by mode. 4. Active Travel Time: Weekly minutes walking and cycling (all purposes). 5. Change in Active Travel: Follow-up minus baseline (increase/decrease/maintained).
Sahlqvist et al. (2013b)	England	European Prospective Investigation into Cancer and Nutrition study- Norfolk (EPIC-Norfolk)	Adults aged 40–79 years at the first health assessment.	Not defined, suggested as walking and cycling	Two stages of health examinations: Stage 1: between 1993 and 1997 (average weekly duration of cycling for all purposes using a simple measure of physical activity) Stage 2: between 1998 and 2000 (a more detailed breakdown of their weekly cycling behaviour using the EPAQ2 physical activity questionnaire)	1. Average Weekly Cycling Time (hours/week) – separately for winter and summer a. Total Cycling Time (minutes/week) 2. Commuter Cycling: Usual travel mode to work (car, public transport, bike, foot); Frequency of cycling (always, usually, occasionally, rarely/never); Distance cycled (miles/week); Time cycled (minutes/week) 3. Non-Commuting Utility Cycling: Number of trips by bike across distance bands (e.g., <0.5, 0.5–1.5 miles, etc.) 4. All Utility Cycling: Total distance cycled for commuting and non-commuting purposes (miles/week) 5. Recreational Cycling : Time per session and frequency; Converted to minutes/week 6. Total Cycling Time: Combined minutes/week from commuter, utility, and recreational cycling
Salway et al. (2019)	England	B-PROACT1V study, a longitudinal study that examined the physical activity and sedentary behaviours of primary school children and their parents.	Primary school children aged 5–11 years, and their parents	Walking, cycling, or scooting	1. Self-reported travel mode (daily). 2. Accelerometer-derived MVPA (objective physical activity tracking). 3. Club attendance logs (to assess additional activity opportunities). 4. Children wore waist-worn ActiGraph accelerometers for three weekdays and two weekend days	1. Travel Mode: Active (walk, bike, scooter) vs. Non-active (car, public transport) 2. Active Travel Frequency: 0, 1–2, 3–4, or 5 days/week 3. Daily Active Travel: Active mode used for school arrival and/or departure 4. Daily MVPA Minutes: Total minutes of moderate-to-vigorous physical activity per day

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Salway et al. (2024)	England	Active-6 study compared post-lockdown accelerometer-estimated physical activity to a pre-COVID-19 comparator group (B-Proact1v study).	Children aged 10–11 years (in Year 6 of primary school)	The use of walking, cycling, or using a scooter, to travel to and from school	1. Pre-COVID-19 (2017-2018): Children reported their mode of travel to school for each day of the week (Monday to Friday) via a questionnaire along with Accelerometer data. 2. Post-Lockdown (Wave 1: 2021, Wave 2: 2022): Children were directly asked to report their typical mode of travel to school via a questionnaire, accelerometer, individual and school data.	1. Individual Active Travel: indicator of whether a child typically walks, cycles, or scoots to school, showing a significant association with higher MVPA. 2. School-Aggregated Active Travel: The %of pupils using active travel 3. Cycle Training Policy: A school-level policy measure associated with increased MVPA, with growing importance post-lockdown. 4. Written Active Travel Policy: A school-level policy measure with no significant association with MVPA, limited by missing data.
Sandercock et al (2012)	England	East of England Healthy Hearts Study	English youth aged 10–16 years	The use of walking or cycling to travel to and from school	Self-reported questionnaire with physical activity (7-day recall), school travel and screen time habits. Travel was classified as active (walking, cycling) or passive.	1. Active Travel: based on a single self-reported question asking participants how they usually travel to school, with responses categorised as active (walking or cycling) or passive (car, bus, or other motorised transport) 2. Walking and Cycling combined in methodology due to low prevalence of cycling among UK students.
Sarkar et al. (2017)	UK	The UK Biobank cohort	Participants aged 38–73 years	Non-work travel by walking, cycling, or using public transport	Self-reported questionnaire: individual-level data on residential greenness, built environment exposures and travel behaviour. *Cycling: Included as a component of the active travel measure but not separately measured or analysed due to its aggregation with walking and public transport.	1. Active Travel: non-work travel modes in the past 4 weeks, categorised as active (walking, cycling, or public transport) vs. motorised (car/motor vehicle). 2. Walking: whether participants walked more than 30 minutes per day on a typical day, (proxy for physical activity)
Sims et al. (2022)	England	Health Survey for England (HSE) 2012-15	Children aged 2 to 15 years	Walking or cycling to and from school	Household interview: the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ)- self reported or reported by parents.	1. Active Travel: MET minutes per week for walking or cycling to school. Episodes ≥ 10 minutes were recorded and converted to METs. Further stratified based on a. Sex: Boys/Girls b. Age Group: 2–4 years, 5–7 years, 8–10 years, 11–12 years, 13–15 years c. Weight Status: Normal, Overweight, Obese

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Singh et al. (2022)	Oxford, England	Primary quantitative analysis (time-series analysis)	Oxford residents	Walking and cycling for transport	Transport Mode and Traffic Flow Data: Vivacity Labs roadside vehicle detection sensors at Oxford High Street. The sensors recorded hourly counts of bicycles, classified as a distinct transport mode alongside motorised vehicles	1. Cycle flow: daily and hourly cycle counts (number of bicycles detected) stratified by : Pre-lockdown (1 January–22 March), Lockdown 1 (23 March–15 June), Inter-lockdown (16 June–4 November) and Lockdown 2 (5 November–2 December)
Smith et al. (2012)	Norfolk, England	SPEEDY study (2007-08)	9-10-year-old British children	Walking or cycling to school	1. Self-reported data from a questionnaire completed by pupils at baseline (2007) and follow-up (2008) 2. Objective measurement using ActiGraph accelerometer worn for seven consecutive days	1. Mode of travel to school: Active/Passive 2. Further categorised into: Consistent active travel (active at both baseline and follow-up), Consistent passive travel (passive at both baseline and follow-up), Change from passive to active travel, Change from active to passive travel 3. Change in MVPA associated with change in mode of travel: Change in total daily MVPA (weekdays and weekends, min/day) and Change in weekday MVPA (Monday–Friday, min/day)
Smith et al. (2012b)	Norfolk, England	SPEEDY study (2007-08)	9-10-year-old British children	Walking or cycling to school	1. Self-reported data from a questionnaire (2007 and 2008) 2. Accelerometer: MVPA required at least three valid days (wear time ≥ 600 min/day) for daily and after-school analyses, and at least three days including one weekend day for weekend and out-of-school analyses	1. Travel Mode to Non-School Destinations: Active, Passive, or Mixed travel to four destinations (family, neighborhood friends, parks, shops), stratified by sex (boys/girls). 2. MVPA Levels: Daily MVPA (weekdays, 06:00–23:00); After-school MVPA (weekdays, 15:00–23:00); Weekend MVPA (weekends, 06:00–23:00); Out-of-school MVPA (weekends + weekdays, 15:00–23:00)
Smith et al. (2019)	UK	UK Biobank	Participants aged 40–69 years were recruited between 2006 and 2010.	Walking or cycling	Travel behavior data were collected via a touchscreen questionnaire	1. Mode of travel for commuting and non-work-related journeys: Active (walking or cycling) /No active travel 2. Travel Mode Combinations: Car only, Car + public transport only, Car + public and active transport, Car + active transport only, Public transport only, Public + active transport, Walking only, Cycling only or cycling + walking 3. Differences by Journey Type: Preferred mode for commute and non-work-related travel.

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Song et al. (2017)	Cardiff (Wales), Kenilworth and Southampton (England)	iConnect study	Adults living within 5 km of the intervention sites	Walking and cycling for utility purposes, such as commuting, business, shopping, healthcare, or social activities (non-recreational)	1. Participants reported their travel behavior over the previous seven days using a postal questionnaire distributed in 2010 (baseline), 2011, and 2012. 2. Intervention: New or upgraded infrastructure (the People's Bridge in Cardiff, the boardwalk in Southampton, or the bridge in Kenilworth)	1. Time Share: Proportion of weekly travel time spent walking or cycling. 2. Distance Share: Proportion of weekly travel distance covered by walking or cycling. 3. Modal Shift: Change in travel mode—toward active travel, no change, or shift toward car use. 4. Infrastructure Use: Frequency or extent of active travel on new infrastructure. 5. Distance to Infrastructure: Kilometres from home to active travel infrastructure.
Southward et al. (2012)	Bristol, England	PEACH (Personal and Environmental Associations with Children's Health) study 2008–2009	Children aged 11–12 years, in first year of secondary school.	Walking (primarily) or cycling to and from school.	1. The study combines accelerometer and GPS data within a Geographic Information System (GIS) to quantify physical activity during school journeys. 2. Travel diary used for self-reported mode of travel.	1. Travel Mode: Walking, cycling, car, or bus to school. 2. Travel Time Window: School commute (to/from). 3. Daily MVPA: Minutes of moderate-to-vigorous physical activity per day. 4. Commute MVPA: MVPA minutes during school travel. 5. MVPA Contribution: Percentage of daily MVPA from commute. 6. Trip Distance: Distance of school journey and its relation to MVPA.
Steinbach et al. (2012)	London, England	London Travel Demand Survey (LTDS) from 2006–2008	Children aged 5–17 years	Not defined but suggests walking and cycling for transport	1. Travel Diary: One-day travel diaries completed via 2. Face-to-face interviews, recording trip starts, interchanges, and ends for all household members aged >5 years 2. Environmental Variables (Derived using GIS analysis): such as Road network, traffic data, land use, street connectivity and deprivation *No specific measure for cycling used	1. % Children Walking: Proportion of children walking >100m or walking all the way, stratified by journey type (school commute, non-school term-time, summer/weekend). 2. Mean Walking Distance: Average daily walking distance (km), including non-walkers (0 km). 3. Mean Walking Time: Average daily walking time (minutes), including non-walkers (0 minutes). 4. Multimodal Trips: Trips primarily involving walking, alone or combined with public transport.

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Sulikova et al. (2021)	7 European cities including London, England, UK	PASTA Study (2014-17)	Urban residents	Walking and cycling	Transport and health behavior surveys (Baseline questionnaires), travel diaries, GPS, and accessibility data	1. Mode of travel: Active (walking/cycling) or Others (car, public transport) 2. Trip Purpose: work/study trips, leisure trips, and service trips
Sun et al. (2017)	Glasgow, Scotland	Strava Metro data (Urban Big Data Centre, 2016) and GIS technologies	App users tracking cycling or walking activity	Walking and cycling	1. Crowdsourced data from Strava users 2. Trip counts represent the total number of recorded trips, regardless of unique users, aggregated to street level (edges) and intersection level (nodes). 3. The dataset captured the time of activities (year, day, hour, minute), to calculate median time spent moving on edges or waiting at nodes	1. Trip Counts: Trips including cycling and pedestrian activities (including walks, runs, and hikes). 2. Trip characteristics: Average Time, average distance and demographics 3. Spatial Granularity: It records the count of cycling or pedestrian activities at a specific time (minute-level granularity). 4. Temporal Granularity: Median Moving Time & Median Waiting time
Susilo et al. (2016)	UK	UK National Travel Survey (NTS) from 2002 to 2006	Households having two adults (parents) and at least one child	Walking and cycling	1. Travel Diaries: 7-day diaries record trip counts, modes (walking, cycling, car, public transport), and travel time. 2. Questionnaires- self reported	1. Proportion of active travel trips (walking, cycling) per household member (father, mother, child) 2. Daily trip count per household member 3. Total weekly travel time (minutes) 4. Household members' mode share (%) by region: walking, cycling, car, public transport, total trips
Teyhan et al. (2016)	Bristol, England	Avon Longitudinal Study of Parents and Children (ALSPAC)	Adolescents at ages 14-16 years (Year 6 school students)	Not defined	1. Self-reported questionnaires assessing NCPS/Bikeability training impact on cycling habits, safety behaviours, and accident reduction. 2. Hospital Episode Statistics (HES) for admission records. 3. Maternal reports on socioeconomic position (SEP) and family factors. 4. School data linked via National Pupil Database for Year 6 identification.	1. Cycling to School: whether the adolescent currently cycles as part of their school commute (yes/no) 2. Bike ownership : yes/no 3. When last cycled: in the last week, in the last month, or more than 1 month ago 4. Distance of last cycle: <1miles, 1-3 miles, 3-5miles, >5miles. 5. Safety behaviours (helmet ownership, helmet use, and high-visibility clothing use) * Walking data not measured

Author(s)	Setting(s)	Data sources	Target population	Definition of active travel	Methods of data collection	Active Travel measures used
Thomas et al. (2015)	Bath, England	Primary data collection	Staff and students at University of Bath, UK	Walking and cycling	1. Online survey for all staff and students. 2. Optional Psychology Section: Included environmental worldview (NEP), affective appraisal (six terms), and habit strength (SRHI)	1. Travel mode for commuting: walking, cycling, car, bus, or other (e.g., motorcycle, train) 2. Affective Appraisal of Commute: Based on mode of travel- (Exciting, Pleasant, Relaxing, Depressing, Boring, Stressful) using a 7-point Likert scale 3. Habit strength: Measured using the 12-item Self-Report Habit Index (SRHI) on a 7-point Likert scale
Van Sluijs et al. (2009)	Bristol, England	Avon Longitudinal Study of Parents and Children (ALSPAC) data from 2002-2004	Children aged 11-12 years old and their carers/parents	Walking or cycling to school	1. A parent-proxy questionnaire completed by the child's main carer. 2. Physical activity data from MTI ActiGraph AM7164 accelerometers worn for seven days.	1. Travel Mode to school: Car, walking, cycling, public transport, school bus, wheelchair/other; frequency as "every/most days" or "some days." 2. Distance to School: <0.5, 0.5–1, 1–5, >5 miles. 3. Total Physical Activity: Average accelerometer counts/min over week, weekdays, and weekends. 4. MVPA: Average daily minutes of moderate-to-vigorous physical activity. 5. Hourly Weekday Activity: Average counts/min per hour on weekdays; comparison of walkers vs. car users for 0.5–5 mile commutes.
Walker et al. (2023)	England, Wales and Northern Ireland	1. UK Millennium Cohort Study (MCS)	School children, surveyed at ages 7, 11, 14 and 17 years.	Walking or cycling to school	1. Self-reported travel mode data * Data from Scotland excluded due to different exam system 2. MCS data from ALSPAC, SPEEDY and PEACH studies	1. Travel Mode to School: Public transport, School bus or coach, Private motorised, Bike, and Walk
Werneck et al. (2021)	UK, Australia, Denmark and Switzerland	UK cohort of International Children's Accelerometry Database (ICAD)	Adolescents aged 10–13 years at baseline, with 1.9±0.7 years of follow-up and their parents.	Walking or cycling to school	1. Self-reported or parent-reported travel mode data and accelerometer data for physical activity (MVPA) and sedentary time (SED) 2. "active" (walking or cycling) or "passive" (car, bus, public transport)	1. Travel Mode to School over time: a. Active/Active (consistent active travel), b. Passive/Active (taking up active travel), c. Active/Passive (taking up passive travel), and d. Passive/Passive (consistent passive travel)

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Whelan et al. (2024)	Kings Heath, Birmingham, England	Primary data collection : mixed methods study	Kings Heath residents aged 18-65 years	Non-motorised modes of transportation such as walking and cycling	1. Online survey questionnaires in 2023 (self-reported travel modes) 2. Air-quality-monitoring sensors	Travel Mode Changes: primary mode of transportation before and after Low-Traffic Neighbourhood (LTN) implementation, with response options including walking, cycling, car, public transport, and taxi
Woodcock et al. (2021)	England and Wales	1. 2011 Census, 2. CycleStreets.net, 3. National Travel Survey (NTS), 4. Index of Multiple Deprivation, Mortality and Sickness Data 2016, and 5. 2017 Global Burden of Disease data	Nationally representative sample (individual-level synthetic population)	Walking and cycling for commute	1. 2011 Census for baseline walking mode share by origin-destination pairs and demographics. 2. NTS data for average weekly walking trips and walking speed (4.6–4.8 km/h). 3. CycleStreets.net for route distance and gradient to estimate walking duration and mMETs. 4. Physical activity calculated as (average weekly walking/cycling trips by age/sex from NTS) × (trip duration = distance ÷ speed) × mMET rate. 5. Propensity to Cycle Tool (PCT) applied.	1. Primary Mode of Commute: Baseline mode shares are calculated for cycling, walking, driving, and other modes, disaggregated by demographic groups (sex, age, ethnicity, car ownership, income deprivation, urban/rural status) 2. Mode Shift: walking as a baseline mode displaced by new cyclists 3. Cycling Uptake in Scenarios: based on (distance, hilliness, demographics in Near Market) and uptake (new cyclists, mode share)
Xiao et al. (2024)	Central London and Luton, England	Children's Health in London and Luton (CHILL) cohort	Children aged 6-9 years in London	Modes of transport to school that involve physical activity, specifically walking, cycling, or scootering during any part of the journey, or modes that include public transport (bus or train/tube), as these often involve walking or cycling to access them.	1. Annual health assessments with child self-reports at baseline (June 2018–April 2019) and one-year follow-up (June 2019–March 2020). 2. Intervention group: residing within/near Ultra Low Emission Zones (ULEZ); control group in Luton, involving parents/carers. 3. Parental questionnaires. 4. Geographic data: residential and school addresses to calculate walking distances. 5. Deprivation and crime data: 2019 English Indices of Deprivation (IDACI) and crime quintiles by postcode.	1. Self-Reported Travel Mode: Active modes: Any trip involving walking, cycling, scootering, or public transport (bus, train/tube), and Inactive modes: Exclusively using a private vehicle or taxi for the entire journey 2. Modal Shift: a. Switching from inactive to active modes (e.g., from car to walking). b. Switching from active to inactive modes (e.g., from walking to car). c. Maintaining active or inactive modes

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Zhang et al. (2020)	Scotland	Scottish Lifestyle Organised Sports and Health (SLOSH) project	Children aged 10–12 years (primary 6 and 7) and their parents/carers	Modes of transport to school that involve physical activity, specifically walking or cycling	1. Parents completed a questionnaire detailing the transport modes used for each journey to and from school over the previous week 2. ActiGraph Accelerometers: Used to objectively measure physical activity levels, validating the impact of active travel during commuting times 3. Distance to School: Calculated using home and school postcodes	1. Children categorised as active travellers if they used active modes (walking or cycling) for >70% of their journeys to and from school over a week, or passive travellers if they used active modes for <30% of their journeys. 2. Children with 30–70% active journeys were excluded to ensure clear group distinctions. 3. Factors associated with passive or active method of school transport: Distance to school and Council tax bands.



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