Full title: HEaLth iMpact of E-bikes and e-scooTers (HELMET): Data collection for the evaluation of e-bike and e-scooter hire schemes

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Contents

1.1 KEY STUDY CONTACTS

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Funders	NIHR Public Health Research Rapid Funding Scheme

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Key collaborators

- Bristol City Council
- Leeds City Council
- Sheffield City Council
- Bradford Metropolitan District Council
- Plymouth City Council
- Bath and North East Somerset Council
- West of England Combined Authority
- West Yorkshire Combined Authority
- Beryl, commercial partner
- Tier, commercial partner

1.2 STUDY SUMMARY

Study Title	HEaLth iMpact of E-bikes and e-scooTers (HELMET): Data collection for the evaluation of e-bike and e-scooter hire schemes

Internal ref. no (or short title)	HELMET: Data collection
Study Design	Cross-sectional surveys and interviews
Intervention	Introduction of e-bike hire schemes in Bristol and Leeds
Study Participants	Residents of Bristol, Leeds (intervention sites), Plymouth, Bath (intervention sites, data only collected at follow-up), Sheffield and Bradford (control sites) over 16 years of age
Planned Size of Sample	At least n=540 per site; N=2160
Planned Study Period	August 1st 2023 – October 31st 2024

1.3 STUDY MANAGEMENT

Funder

This research is supported by the National Institute for Health Research Public Health Research Rapid Funding Scheme (NIHR159622).

Project Management and governance

Dr Armstrong will manage the project and line-manage project staff based in Bristol. Dr Jones will manage Dr Spencer. The co-applicants on the NIHR bid will form the Project Management Team and they will meet four times during this grant, in months one, three, five and eleven. We will also establish a Study Steering Committee (SSC) during this baseline data collection period which will meet twice during this project: during month two to provide input into data collection and suggestions for a subsequent NIHR full evaluation bid application, and during month five to provide input into the project results, dissemination, and further thoughts for an NIHR stage 2 full evaluation bid application (if invited by the NIHR to apply). Finally, they will meet in month eleven to provide any further feedback before the resurvey data collection period. Dr Paul Kelly, an expert in active travel from the University of Edinburgh, is the chair of the SSC. Dr Anthony Laverty, an expert in transport and physical activity from Imperial College London is an SSC member. Ian Achurch from North Northamptonshire Council, and Kate Dickins from Sustrans are SSC members. We have two Patient and Public

Involvement (PPI) members on the SSC, Josephine Gyasi and Ben Foley. We aim for the SSC to continue if a full evaluation were to be funded.

1.4 PLAIN ENGLISH SUMMARY

Aims of the research: During the autumn of 2023, Bristol will be adding e-bikes to their government approved e-scooter hire scheme, and Leeds will be introducing an e-bike only hire scheme. To understand the pros and cons of these schemes, we need to collect information before and after they are implemented. This project aims to collect information on physical activity levels, how people get between places, and their quality of life, before the start of these schemes and at one year post introduction. As part of a larger project which we hope to run in the future we would compare the information collected before and after scheme implementation, to see if there are any differences.

Background of the research: Physical activity is important for physical and mental health. Walking or cycling between places is one way to be physically active. E-bikes are pedal bikes which have a battery to help make cycling a bit easier, especially on hills. Using e-bikes could be a good option to increase physical activity but we are not sure. E-scooters run on batteries meaning you don't have to push them. E-scooters may decrease physical activity if people use them instead of walking.

The government is currently unsure about whether to legalise the private use of e-scooters. The government has been testing e-scooters in some parts of the UK since 2020. People can pay to use them for trips within each area. While certain types of e-bikes are currently legal in the UK, they can be expensive to buy and tricky to store at home. Being able to pay to use them only when they are needed may encourage more use.

Design and methods used: We will conduct a survey in four UK cities during the summer and early autumn of 2023. Two of the cities (Leeds and Bristol) will be introducing schemes in the autumn that allow the public to pay to use e-bikes and/or e-scooters. Two will not have these types of schemes (Bradford and Sheffield). This initial project will ask survey questions. We will send a link to the survey to at least 40,000 people across the different cities. We will ask about how much physical activity people do and their quality of life. We will also ask questions that will help us understand how people get between places. For example, cycling, walking, scooting, driving, or using public transport. We plan to ask the same questions about a year later, when the e-bike and e-scooter hire schemes have started. This will be done at the same sites, but also two new sites, Bath and Plymouth. We can then later look to see if physical activity levels have changed. We can also check if use of e-bikes and e-scooters has changed.

We will interview people to understand how they feel about these types of e-bike and e-scooter hire schemes and if they have changed how they travel. We also want to ask how easy the survey is to read and if it could be improved.

Patient and public involvement: The project has been developed in consultation with council partners and has received input from an NIHR Applied Research Collaboration West (NIHR ARC-West) PPI panel who have shaped the overall project design. Further, a member of the public (PPI co-applicant) recruited through a community organisation in Bristol (LifeCycle) reviewed the funding application and wrote lay summaries. She will attend project management meetings to provide a lay user perspective, and contribute to study and survey design, and results publication. The researchers will also consult a group of members of the public to help with understanding the study findings and to get suggestions for the next phase of the project.

Publication of results: We will provide a report of our findings to the councils included in the research. For the research funder we will provide an NIHR Open Research article. We will also write a publication for a journal including summary information from the surveys and interviews. We expect the main study results in a second full evaluation study.

1.5 BACKGROUND AND RATIONALE

Historically, the car was favoured over other modes of transport, but policy now focuses on replacing short car journeys in urban areas with more sustainable modes. E-bikes and e-scooters have the potential to offer sustainable ways of getting from A to B [1] and could have potential health impacts for the user [2]. However, the health impacts of e-bikes and e-scooters is an under-researched area [2-4]. While e-bike usage is legal in UK, for e-scooters, the UK government is yet to make a decision about legalising their use outside of currently approved trial areas and has extended trials multiple times to 'continue to fill research gaps' [5]. Therefore, understanding the health, social, economic, and environmental impact of e-bikes and e-scooters is important to inform future investment in these types of hire schemes.

Regular physical activity has been shown to contribute to the prevention of a range of chronic diseases [6] and reductions in all-cause mortality [7]. The UK Chief Medical Officer recommends that adults engage in 150 minutes of moderate-to-vigorous intensity physical activity per week [8]. In the UK, 37% of adults do not meet these guidelines [9]. With respect to active commuting, meta-analysis evidence shows 11% and 10% reductions in all-cause mortality risk through walking and cycling respectively when meeting physical activity guidelines [10]. Further, increased active travel has been associated

with an increase in overall physical activity levels, without compensatory reductions in recreational physical activity [11]. This implies the potential of active travel for increasing overall physical activity levels [11]. While e-bikes are considered active travel, e-scooters are not but may influence active travel behaviour, with the possibility of both substitution and complementary effects on active travel suggested [12, 13]. Our primary health outcome in this project will thus be overall physical activity.

When referring to e-bikes, we mean cycles for which the user has to pedal for assistance to be provided; also known as pedelecs [14]. In contrast, some studies refer by e-bikes to throttle powered electric bicycles, which are not of interest in the current project [14]. In the UK, the maximum power for an e-bike is 250W with a top speed of 25km/hr [15]. E-bikes, as referred to in the UK context, are considered bicycles in the eyes of the law [15]. E-scooters are a more recent addition to the transport 'family'. Currently in the UK privately owned e-scooters are illegal to ride on the road [16]. Rather, the Department for Transport began an e-scooter pilot scheme starting in 2020 involving 32 UK regions [12]. In the UK, e-scooters are classed as motor vehicles [16].

E-cycling provides at least moderate intensity activity and as such, engagement in this activity has the potential to positively improve health [2]. Further, data suggest that individuals ride an e-bike further and for longer than a conventional bicycle and therefore experience similar physical activity gains to conventional cyclists from active travel [17]. Improved mental health has also been reported with e-cycling [18]. While limited, there is some evidence to suggest that e-cycling improves cardiorespiratory fitness [2]. On the other hand, e-scooting has been identified as providing none up to light activity [19]. Furthermore, individuals reported disproportionately replacing walking and bike journeys with e-scooters [19].

Research suggests that e-scooter and e-bike hire schemes could connect people with public transport [20]. This is important as there is often a lack of options for transport to and from public transport (end-to-end solutions). Few studies have explored how access to an e-bike or e-scooter impacts access to employment, education, or other societal opportunities which could have a significant impact on the lives of individuals and wider society [21]. This may provide a potential opportunity for reducing inequalities, as it has been found that ethnic minority and low income users were more likely to report being regular e-scooter users than their counterparts in UK e-scooter trials [12].

E-bikes and e-scooters are more environmentally friendly than motor cars [1, 12], with rural areas likely to have the greatest potential for individual carbon savings [1]. There is debate as to the degree to which this applies to e-scooter hire schemes [12, 22]. For both, charging related emissions make them less environmentally friendly compared to conventional scooting or cycling [3]. It has been

suggested that hire schemes have greater life cycle emissions due to having to manage and move the fleet [23]. However, the degree to which hire schemes versus loan schemes impact substitution of car trips is unclear. Chang et al. [24] reported that e-scooter trips replace walking and bicycling trips as often as driving and public transport trips. As such, in the UK, where the primary mode of transport is the car, there may be potential to get individuals out of motor cars and onto e-bikes and/or e-scooters.

A Danish study found that 29% of e-bike users had experienced a safety incident that would have been unlikely to happen had they been riding a conventional bike. These incidents were most commonly attributed to other road users underestimating e-bike speed [25]. E-scooters are an emerging transport mode which limits the ability to make accurate comparison on traffic collision levels with other more established transport modes [12]. However, early data suggests five percent of survey respondents experienced a collision over the preceding year, with less experienced users reporting the majority of collisions [12]. A recent study reported severe injuries were more common in e-scooter users than in cyclists [26].

It is evident therefore, that e-bike and/or e-scooter hire schemes could have an impact on public health, social, economic, and environmental factors, yet numerous research gaps remain, highlighting the need for this study.

1.6 RESEARCH AIMS AND OBJECTIVES

The proposed research aims to collect baseline (i.e. prior to e-bike and/or e-scooter hire scheme roll-out in September 2023) data (see sections 1.7.3 and 1.7.4) in two 'intervention' sites (Bristol and Leeds), and two comparable control sites with similar levels of health and income deprivation (Sheffield and Bradford; where no plans are in place for an e-bike and/or e-scooter hire scheme being implemented in the next 1.5 years). It also aims to collect follow-up survey data about a year later. This provides three levels of exposure for exploring health, social, economic, and environmental impacts in a subsequent full e-bike and/or e-scooter hire scheme evaluation:

1) No change in exposure - control areas without e-bike and/or e-scooter hire schemes;

2) Mode choice A, an e-bike hire scheme (Leeds);

3) Mode choice B, an e-bike and (an already implemented) e-scooter hire scheme (Bristol).

1.6.1 RESEARCH OBJECTIVES

To collect information on:

1. Self-reported baseline and follow-up survey physical activity level of residents in each study area (Bradford, Bristol, Leeds, and Sheffield). Bath and Plymouth data collected at follow-up survey only.
2. Self-reported baseline and follow-up survey modes of travel used by residents in each area (Bradford, Bristol, Leeds, and Sheffield). Bath and Plymouth data collected at follow-up survey only.
3. Determine what should be included in a qualitative interview for a full evaluation.
4. Determine what adjustments, if any, should be made to the survey questionnaire prior to follow-up survey.
5. Determine which methods are the most cost-effective, and most effective overall, for boosting the sample from seldom heard groups.

1.7 STUDY DESIGN & SETTING

1.7.1 STUDY DESIGN

We will use a natural experiment [27] to evaluate the introduction and impact of e-bike and/or e-scooter hire schemes into Leeds and Bristol. The current proposal aims to collect cross-sectional baseline data, prior to the implementation of the hire schemes in Leeds and Bristol and the control sites, Sheffield and Bradford. We will collect follow-up survey data about one year later in all baseline sites. At this follow-up survey timepoint, we will also collect data in two other intervention sites, Bath and Plymouth, for triangulation purposes. This will allow for a future, full evaluation to use a controlled before-after repeated cross-sectional design, potentially informing future local and national policy decisions.

1.7.2 STUDY SETTING

Baseline and follow-up survey data collection will take place in two intervention sites (Leeds and Bristol) and two control sites (Bradford and Sheffield). We are interested in evaluating different levels of exposure to strengthen causal inference and include Bristol as this already has an e-scooter hire scheme in place. This makes it distinctively different from Leeds, which will implement an e-bike only scheme at the same time (autumn 2023). Therefore, we define our 'mode choice A' and 'mode choice

B' exposures as those populations living in Leeds and Bristol respectively. The intervention and control sites are similar with respect to the proportion reporting very good health (49.5%, 50.8%, 46.7% 46.1%) and income deprivation (14.3%, 14.1%, 15.6%, 18.9%), in Leeds, Bristol, Sheffield and Bradford respectively [28]. For the purposes of triangulation, additional data will be collected in two other intervention sites, Bath and Plymouth, at the follow-up survey timepoint. Recruitment will target those that reside in the remit of the intervention and control site local authorities and define them based on their residency in these areas. We will also include a question in the survey around possible contamination effects to ensure we are able to identify people who might, for example, live in Bradford but commute into Leeds and therefore be exposed to the e-bike hire scheme intervention.

Leveraging channels already in place through local authorities, we will distribute an advert with a link to our survey to the populations local to each site using council administered mailing lists or newsletters as our primary mode of distribution. In Bristol, it will be included in the 'AskBristol' newsletter, which has a reach of about 7,000 Bristol residents. In Leeds, it will be distributed through various mailing lists such as 'Connecting Leeds', and other council owned lists and social assets surrounding each mailing list, with an estimated reach of at least 20,000. In Sheffield, primary distribution will be through the local authority email newsletter via Gov delivery, with a reach of about 12,000. In Bradford, Bath, and Plymouth the survey will be distributed via local authority owned mailing lists. To boost responses, a paid for Facebook advertisement campaign will be run to target the study areas.

We will also identify and contact relevant local stakeholder groups and gatekeepers of relevant social media groups in each study area to facilitate distribution to their members. Organisations will be identified during the first month of the project, whereby two temporary staff members will consider demographic data from previously conducted publicly available micro-mobility surveys (e.g. [12]) and will use this to identify demographic characteristics of seldom heard voices. They will then consult local authority provided lists of local charities, groups, and organisations, as well as searching online to locate potential suitable gatekeepers that can be approached to help circulate our survey to improve reach to seldom heard voices.

1.7.3 SURVEY DATA COLLECTION

Participants will be required to provide online informed consent prior to being able to begin the survey. The survey, developed in consultation with council communication and transport teams from the four baseline local authorities, contains 32 questions (see Appendix 1) enquiring about demographics (age, gender, ethnicity, employment, income, postcode); physical activity volume (self-

reported minutes of moderate-to-vigorous physical activity (MVPA)); transport ownership; use of e-bikes or e-scooters; active travel and other travel; distance travelled by different transport modes; substitution of travel modes; quality of life; and access to venues and services. Those completing the survey will be asked if they are interested in being contacted for interview, as a means of recruiting interview participants. If interested, they will be asked to provide a contact method (email or telephone). Email addresses/ phone numbers will be stored separately from survey data, with linkage only possible through a separate key, stored separately from the data on the University of Bristol secure server. The age range for participation in the survey will be 16 years and over as this is the minimum age from which e-scooters can be driven [29].

Incentives will be offered to encourage participation from seldom heard groups. Participants will be offered the opportunity to be entered into a prize draw, with eight £100 Love2Shop vouchers available for each data collection site. Participants wanting to take part will be asked to provide a contact method (email or telephone) so that they can be contacted after the draw. This identifying data will also be dealt with as described above.

1.7.4 QUALITATIVE DATA COLLECTION

Following the baseline survey, we will conduct interviews with local residents to discuss views about the introduction of e-bike and/or e-scooter hire schemes and their experience of them. We will request interviews with a sample of eight respondents to the survey questionnaire, split equally between Leeds and Bristol. The interviews will seek a more in-depth understanding of e-bike and e-scooter scheme use (and non-use). We will aim to select two people who have used an e-scooter scheme and two people who have used an e-bike (either scheme, owned or borrowed). We will select 4 people who have not used e-scooters or e-bikes before, with an aim to include both those with a propensity to use either an e-bike or e-scooter scheme and those who have no intention of doing so.

The semi-structured interviews will aim to investigate 'ABCD': Awareness of and attitudes to e-bike/e-scooter schemes in the local context; Behaviour in relation to using the schemes or not and why; Characteristics in terms of previous and current travel behaviour and prospects for change (incorporating e-bike and/or e-scooter use and under what conditions); and Difficulties they may have had when completing the survey instrument and what they think could be improved. The baseline interviews are thus primarily an opportunity to test the interview schedule provided in Appendix 2, understand participants' experiences of completing the questionnaire survey, and also as a way of potentially identifying a snowball sample of seldom heard voices. To this end, we will aim to ensure that our initial baseline sample of eight participants represents people of different gender, age, and

ethnicity. Interviews will be approximately one-hour duration each. Those completing the interview will be given a £40 Love2Shop voucher as a thanks for their time.

1.7.5 PROJECT OUTLINE AND TIMETABLE

The proposed project has seven Deliverables.

1. A list of amenable relevant local stakeholder and social media groups for further survey distribution, to be used in baseline and potential follow-up survey distribution.
2. A clean dataset containing baseline and follow-up data from surveys and descriptive analyses.
3. A list of effective survey distribution methods.
4. Transcribed interviews and analysis.
5. A draft mixed methods manuscript including quantitative data and interviews.
6. A brief final report for local authorities.
7. A final NIHR Open Research article for the funder.

The proposed project will be conducted over a 15-month period:

Project Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Calendar Month	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24
Research Ethical approval																	
Collate & contact stakeholder groups (Del. 1)																	
Baseline survey distribution - intervention sites																	
Baseline survey distribution - control sites																	
Survey data management & descriptive analysis, (Del. 2-3)																	
Structured Interviews																	
Transcription & interview analysis (Del. 4)																	
Draft mixed-methods manuscript (Del. 5)																	
Revisions to survey following feedback																	
Follow-up survey distribution - intervention sites																	
Follow-up survey distribution - control sites																	
Final report for local authorities (Del. 6)																	
Final NIHR Open Research article (Del. 7)																	
Project Management Team meetings		x		x		x						x					
Study Steering Group meetings			x			x						x					
PPI Focus Group					x												

1.8 STATISTICS AND DATA ANALYSIS

1.8.1 SAMPLE SIZE CALCULATIONS

Prior to baseline, we estimated the mean and standard deviation of the self-reported MVPA to be 258 and 214 min/week respectively [30]. For 80% power and a significance level of 5%, we would require a minimum of 540 responses per site, across two intervention sites and two control sites, to detect a change of 10% (equivalent to approximately 26 min/week) in the primary outcome of self-reported MVPA. Assuming a minimum reach of 7000 in each site, this corresponds to a response rate of 8%, which is a conservative estimate based on similar studies in the area. The final numbers from the baseline collection will inform the recruitment strategies and samples size calculations for the follow-up survey.

A convenience sample of those who have volunteered to be contacted for interview at baseline data collection, will be recruited for the interview component. We will aim to recruit a diverse sample, given factors such as gender identity, ethnic group, mobility impairments, and age.

At baseline we achieved a sample size of n= 1777 in control sites and n=2353 in intervention sites. The self-reported MVPA data were heavily skewed with median 210 min/week and interquartile range 300 min/week. Therefore, in a future full evaluation the data would be analysed on the log scale and back-transformed to give estimates of percentage increase in MVPA. If we obtain the same sample sizes at follow-up, we would be able to detect a minimum increase of 9% in MVPA at 80% power and significance level of 5%. If response for the follow-up data collection is poorer, with follow-up sample sizes at 70% of baseline, then we would still be able to detect an increase of 10%; with improved follow-up response rates of 20% higher, we would be able to detect an increase of 8%. These calculations suggest that the study will be able to detect an increase of at least 10% in MVPA.

1.8.2 STATISTICAL ANALYSIS PLAN

As this study is aimed at collecting time-sensitive baseline and follow-up data it is not resourced to do exposure-response statistical analyses. Resource to allow time for exposure-response analyses will be sought in a future full evaluation project. In this project we will assess the demographic characteristics

of participants recruited through the various recruitment channels against demographic characteristics of each local authority. Basic descriptive analyses will be performed to gain an understanding of baseline and follow-up survey e-bike and e-scooter use in each local authority. This will be considered overall, and according to different population groups to understand possible health inequalities.

1.9 DATA MANAGEMENT

Data will be collected and retained in accordance with the General Data Protection Regulation 2018 (GDPR) and subsequent data protection laws that supersedes the Data Protection Act, and stored as per the University of Bristol Privacy policy: http://www.bristol.ac.uk/secretary/data-protection/policy/research-participant-fair-processing-notice/ .

Survey data: We will use the 'Online Surveys' (https://www.onlinesurveys.ac.uk) platform (GDPR compliant and certified to ISO 27001 standard) to host the online surveys. The same survey content but different survey links will be used for each local authority site. We will store anonymised data on a secure University of Bristol server. Data will be cleaned, and relevant new variables created to produce a dataset of baseline and follow-up survey data ready to be used in a future, full evaluation. Key data for any possible linkage between baseline and re-survey data will be stored in a separate area of the secure University of Bristol server. A master matching file will be created in which each name/contact details are assigned a participant ID (e.g. P1, P2, P3).

Interviews: Qualitative interviews will be audio recorded using an encrypted recording device. Interview recordings will be deleted following transcription and analysis and interview transcripts will be edited to remove identifying details. As interviews will be conducted by a qualitative researcher at Oxford Brookes University, interview data will be stored securely in a password protected file at Oxford Brookes University. Once analysis has been completed, anonymised interview transcripts will be securely transferred to the researchers at the University of Bristol and stored securely in a password protected file on the University of Bristol Server. Interviews will be transcribed and all identifying information anonymised within two weeks of the interview. The interview data will be linked to the original survey data and anonymised using the master matching file.

Data.bris will be used to store the anonymised data for reuse. Before sharing on Data.bris, all interview transcripts will have any possible identifying data redacted. Further, all possible fields that could identify participants will not be shared in the dataset archived on Data.bris. Reuse will be permissible

under a Creative Common Share Alike 2.0 licence. Anonymised analysed data and summaries of data will be held for 10 years after the study is finished.

1.10 ETHICAL AND REGULATORY CONSIDERATIONS

1.10.1 ETHICAL APPROVAL

The baseline data collection for the study has been approved by the School for Policy Studies Research Ethics Committee at the University of Bristol (SPSREC/2223/362). Any subsequent protocol amendments will be submitted to the Research Ethics Committee for approval. We will apply to the same committee for ethics to conduct the follow-up survey.

1.10.2 PATIENT AND PUBLIC INVOLVEMENT

The overall project has been developed in consultation with council partners and has received input from the NIHR ARC-West PPI panel who have shaped the overall project design. We have additionally worked with Ms Lesley Welch, a current e-bike user recruited through a community organisation in Bristol (LifeCycle), who reviewed the application, wrote lay summaries and is a co-applicant for PPI in this study. Ms Welch will attend project management meetings to provide a lay user perspective on aspects relating to design, implementation, and interpretation. The project will also be guided by a project steering committee which will include a combination of academics, a local authority member, and two PPI reps. This will help to provide independent guidance from a variety of viewpoints. Dr Paul Kelly, an expert in active travel from the University of Edinburgh, has agreed to chair the SSC. Finally, A PPI focus group meeting will take place to help inform our interpretation of findings and make any further suggestions for a future full evaluation. The PI, Dr Armstrong, will keep a record of changes and added value to the project that have come about because of PPI inputs.

The cross-sectional survey was developed in consultation with communications and transport teams from the four local authorities (Bradford, Bristol, Leeds, and Sheffield). These council partners will also be asked to provide input into developing appropriate advertising materials for distributing through their channels to eligible study participants.

1.10.3 INVESTIGATORS RESPONSIBILITY

The PI, Dr Armstrong, will ensure that local research approvals have been obtained and that any necessary contractual agreements required have been signed off by all parties. All investigators will comply with this protocol. Investigators will allow access to study documentation or source data on request for monitoring visits and audits performed by the NIHR or any regulatory authorities.

1.10.4 CONFIDENTIALITY

The Principal Investigator and the research team will preserve the confidentiality of participants in accordance with the Data Protection Act (DPA) 2018 and subsequent data protection laws that supersedes the DPA. All research data will be handled according to the principles of the DPA and University of Bristol data protection policies.

1.10.5 STUDY SPONSORSHIP

The University of Bristol is the sponsor of this study.

1.11 DISSEMINATION

We will draft one scientific mixed-methods paper for submission to a peer-reviewed journal, and also provide reports to local authorities and the funder. The data collected within this study will primarily be used to inform a full evaluation of the intervention in the near future.

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Appendix 1 – Survey Content

General Questions

The survey will take approximately 10 to 15 minutes of your time to complete.

1. How old are you (in years)? _____

2. Please tick the appropriate box
   □ Female
   □ Male
   □ Transgender female
   □ Transgender male
   □ Non-binary
   □ Prefer not to say
   □ Other
   2a. If you selected Other, please specify:_____

3. What is the full post code of your home address (e.g. BS13 9BC)? We are asking this to understand if people have different views in different areas and to be sure we have heard from people in all parts of the research area. : _____
   □ Prefer not to say

4. What is your ethnic group?
   □ White
      English, Welsh, Scottish, Northern Irish or British
      Irish
      Gypsy or Irish Traveller
      Any other White background
   □ Mixed or Multiple ethnic groups
      White and Black Caribbean
      White and Black African
      White and Asian
      Any other Mixed or Multiple ethnic background
   □ Asian or Asian British
      Indian
      Pakistani
      Bangladeshi
      Chinese
      Any other Asian background
   □ Black, African, Caribbean or Black British
      African
      Caribbean
      Any other Black, African or Caribbean background
   □ Other ethnic group
      Arab
      Any other ethnic group
   □ Prefer not to say

5. What is your occupational status?

□ Currently not employed
□ Full-time employed
□ Part-time employed
□ Self-employed
□ Retired
□ Student
□ Prefer not to say
□ Other

5a. If you selected Other, please specify: _____
5b. If you are employed, what is your current occupation? _____

6. Which of the following represents the total ANNUAL income of your household from all sources, before tax, national insurance and any other deductions (if you receive any benefits include them as income)?
□ Less than £7000
□ £7000 to £19,999
□ £20,000 to £29,999
□ £30, 000 to £39, 999
□ £40, 000 to £59, 999
□ £60,000 or more
□ Prefer not to say

7. What is your highest level of education or technical qualification?
□ None
□ GCSE, O-level, NVQ level 1 or equivalent
□ AS-level, A-level, NVQ level 2 or equivalent
□ Degree level or equivalent
□ Prefer not to say

8. Do you live in Bradford/Bristol/Leeds/Sheffield? [adjust for each city specific link]
□ Yes
□ Prefer not to say
□ No, I live in another City

8a If you selected 'No, I live in another City', please specify which city:_____
8b. If you do NOT live in [Bradford/Bristol/Leeds/Sheffield] itself, how often do you go into [Bradford/Bristol/Leeds/Sheffield] during a typical week?
□ Every day
□ 5-6 times a week
□ 3-4 times a week
□ 1-2 times a week
□ Less than once per week
□ Never
□ Prefer not to say

9. How can your household be best described?
□ Just myself
□ A couple
□ Family with children under 18
□ Single parent family with children under 18

□ Multi-generational household
□ Multiple people in shared accommodation
□ Prefer not to say
□ Other: …….

10. In a TYPICAL WEEK, how much time do you spend IN TOTAL on MODERATE AND VIGOROUS PHYSICAL ACTIVITIES where your heartbeat increases and you breathe faster (for example, brisk walking, cycling as a means of transport or as exercise, heavy gardening, running or recreational sports)? For example, for 1.5 hours per week, you would write '1' for Hours and '30' for 'Minutes'.
    Hours:_____
    Minutes:_____

11. Do you have any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more?
    □ No
    □ Prefer not to say
    □ Yes

    11a. If yes, please give details: _____
    11b. If yes, do any of your conditions or illnesses reduce your ability to carry out day-to-day activities?
    □ Yes, a lot
    □ Yes, a little
    □ Not at all
    □ Prefer not to say

12. How much do you weigh without clothes and shoes in kilograms OR stones and pounds?
    Kilograms (kg) : _____
    OR

    Stones: _____
    Pounds (lbs): _____

13. How tall are you without shoes in centimetres OR feet and inches?
    Centimetres (cm): _____
    OR

    Feet: _____
    Inches: _____

Questions about how you travel in a typical week

14.

	During a TYPICAL WEEK, how frequently do you use any of the following?						
	Every day	5-6 times a week	3-4 times a week	1-2 times a week	Less than once per week	Never	Prefer not to say
Car/Taxi	○	○	○	○	○	○	○
Van	○	○	○	○	○	○	○
Motorbike/Moped	○	○	○	○	○	○	○
Standard bike	○	○	○	○	○	○	○
E-bike	○	○	○	○	○	○	○
Standard kick scooter	○	○	○	○	○	○	○
E-Scooter (e.g. Voi, Tier)	○	○	○	○	○	○	○
Bus	○	○	○	○	○	○	○
Train	○	○	○	○	○	○	○
Underground	○	○	○	○	○	○	○
Tram	○	○	○	○	○	○	○
Walking	○	○	○	○	○	○	○

15.

	During a TYPICAL WEEK, how many MILES **OR** KILOMETRES, ON AVERAGE, do you travel by each of the following modes of transport? Type '0' if you do not use a given mode of transport. *You can select if you used miles or kilometres at the end of this question.*
Car/Taxi	
Van	
Motorbike/Moped	
Standard bike	
E-bike	
Standard kick scooter	
E-Scooter (e.g. Voi, Tier)	
Bus	
Train	
Underground	
Tram	
Walking	

Questions about your use of e-bikes

16. Have you previously ridden an e-bike? An e-bike is one that is assisted by an electric motor only when you pedal.
    □ Yes
    □ No
    □ Prefer not to say
    Route to question 20 if they choose 'No'

17. If you have previously ridden an e-bike please choose all that apply
    □ Yes, through an e-bike share scheme (for example Beryl, Voi etc)
    □ Yes, through an e-bike loan scheme (for example loaned for a period of a few weeks or months)
    □ Yes, hired on a day-to-day basis
    □ Yes, personal e-bike (my own)
    □ Yes, personal e-bike (borrowed)
    □ Prefer not to say

18.

	In a TYPICAL WEEK, do you use an E-BIKE for one or more trips to replace the following modes of transport?			
	Yes	No	**IF YES**, how many of these trips are replaced in a TYPICAL WEEK?	**IF YES**, what is the AVERAGE E-BIKE DISTANCE traveled in MILES **OR** KILOMETRES to replace each mode of transport? *You can select if you used miles or kilometres at the end of this question.*
Car/Taxi	○	○		
Van	○	○		
Motorbike/Moped	○	○		
Standard bike	○	○		
Standard kick scooter	○	○		
E-Scooter (e.g. Voi, Tier)	○	○		
Bus	○	○		
Train	○	○		
Underground	○	○		
Tram	○	○		
Walking	○	○		

18.a. Please tell us if you answered the above in miles or kilometres
    □ Miles
    □ Kilometres

19. During a typical week do you use an **e-bike** to access any of the following venues or services? (tick all that apply)
    □ Education (including taking children to school)
    □ Work
    □ Job interview
    □ Job centre
    □ Doctor
    □ Hospital or clinic
    □ Between home and public transport
    □ Shops
    □ Visit friends at their home
    □ Parks, green space and nature
    □ Venues for personal business (for example errands)
    □ Leisure related venue (for example theatre, cinema, sports facility)
    □ None of these
    □ Other
    □ prefer not to say

    19a. If you selected Other, please specify:

Questions about your use of e-scooters

20. Have you previously ridden an e-scooter?
    □ Yes
    □ No
    □ prefer not to say
    Route to question 24 if they choose No

21. If you have previously ridden an e-scooter please choose all that apply
    □ Yes, through an e-scooter share scheme (for example Beryl, Voi)
    □ Yes, through an e-scooter loan scheme (for example loaned for a period of a few weeks or months)
    □ Yes, hired on a day-to-day basis
    □ Yes, personal e-scooter (my own)
    □ Yes, personal e-scooter (borrowed)
    □ prefer not to say

22.

	In a TYPICAL WEEK, do you use an E-SCOOTER to replace 1 or more trips for the following modes of transport?			
	Yes	No	**IF YES**, how many of these trips are replaced in a TYPICAL WEEK?	**IF YES**, what is the AVERAGE E-SCOOTER DISTANCE traveled in MILES **OR** KILOMETRES to replace each mode of transport? *You can select if you used miles or kilometres at the end of this question.*
Car/Taxi	○	○		
Van	○	○		
Motorbike/Moped	○	○		
Standard bike	○	○		
E-bike	○	○		
Standard kick scooter	○	○		
Bus	○	○		
Train	○	○		
Underground	○	○		
Tram	○	○		
Walking	○	○		

22.a. Please tell us if you answered the above in miles or kilometres

□ Miles

□ Kilometres

23. During a **TYPICAL WEEK** do you use an **e-scooter** to access any of the following venues or services?

□ Education (including taking children to school)

□ Work

□ Job interview

□ Job centre

□ Doctor

□ Hospital or clinic

□ Between home and public transport

□ Shops

□ Visit friends at their home

□ Parks, green space and nature

□ Venues for personal business (for example errands)

□ Leisure related venue (for example theatre, cinema, sports facility)

□ None of these

□ Other

□ prefer not to say

23a. If you selected Other, please specify: _____

Questions about your quality of life

We are hoping to understand how your transport use may link with your quality of life. Therefore, please indicate which statements best describe your overall quality of life at the moment by selecting ONE box for each of the five questions below:

24. Feeling settled and secure
    □ I am able to feel settled and secure in **all** areas of my life
    □ I am able to feel settled and secure in **many** areas of my life
    □ I am able to feel settled and secure in **a few** areas of my life
    □ I am **unable** to feel settled and secure in **any** areas of my life
    □ prefer not to say

25. Love, friendship and support
    □ I can have **a lot** of love, friendship and support
    □ I can have **quite a lot** of love, friendship and support
    □ I can have **a little** love, friendship and support
    □ I **cannot** have **any** love, friendship and support
    □ prefer not to say

26. Being independent
    □ I am able to be **completely** independent
    □ I am able to be independent in **many** things
    □ I am able to be independent in **a few** things
    □ I am **unable** to be at all independent
    □ prefer not to say

27. Achievement and progress
    □ I can achieve and progress in **all** aspects of my life
    □ I can achieve and progress in **many** aspects of my life
    □ I can achieve and progress in **a few** aspects of my life
    □ I **cannot** achieve and progress in **any** aspects of my life
    □ prefer not to say

28. Enjoyment and pleasure
    □ I can have **a lot** of enjoyment and pleasure
    □ I can have **quite a lot** of enjoyment and pleasure
    □ I can have **a little** enjoyment and pleasure
    □ I **cannot** have **any** enjoyment and pleasure
    □ prefer not to say

Questions about your interest in a more in-depth conversation and/or a repeat questionnaire

29. Are you willing to be contacted to have a chat with us (either in person or by video call) for about an hour about your views on e-bikes, e-scooters and how you travel? Those selected will be given a £40 Love2Shop voucher on completion of the chat as a thanks for their time. We are interested in all views, so it doesn't matter whether you use these forms of transport or not.

If you are interested, please answer 'Yes' and enter your name, and email address or telephone number below. Your contact details will be stored securely and separately from your main survey data within GDPR regulations. Your contact details will only be used for the purpose of contacting you about a possible chat and linking your survey data to your responses. If you are selected for a chat with us, we will be in touch with you within the next 6 weeks to make arrangements for this.

□ Yes
□ No

30. We plan to repeat this survey in about a year. It would be useful to be able to link your answers from this survey to the future repeat survey to understand if there have been any changes in your behaviours. We would also like to contact you to tell you when the repeat survey is ready to complete.
    If you are willing for us to do this, please answer 'Yes' to this question and please provide your name and email address or telephone number below. We will only use these contact details to contact you about the repeat survey. We will only use your name for linking the survey data collected today to the repeat survey. This information will be stored securely and separately from your main survey data within UK GDPR regulations.
    □ Yes
    □ No

31. I you answered 'Yes' to either of the two previous questions, please enter your name, and e-mail address or telephone number:
    Name: _____

    31a. Email address: _____
    31b. Telephone number: _____

32. How did you hear about this survey?
    □ A communication from my council/local authority
    □ A Facebook advertisement
    □ A communication from a Facebook group
    □ A communication from a charity, community group or other organisation
    □ prefer not to say
    □ Other
    32a. If you selected Other, please specify: _____

Thank you for your time and effort in responding to this questionnaire and assisting us with our research.

Appendix 2 – HELMET Interview Topic Guide

HELMET Interview Topic Guide

1. Can you tell me a little about your household - who lives with you?

2. Can you tell me about how you and your household generally travel during a typical week?

3. Has your travel changed in the last couple of years?

<probe> If so, how, and why?

4. Can you tell me what you know about electric bike / electric scooter public hire schemes in your city?

5. Do you think they are a good idea?

<probe> Why do you say that?

6. Can you tell me about your experience of using the schemes?

[If not used] Can you tell me about your experience of interacting with (users of) the schemes?

<probe> Would you change anything about them?

7. Thinking ahead to the next 6-12 months, do you think the way you or your household travels during a typical week is likely to change?

<probe> How? Why?

8. Is there anything else you want to say about electric bike / electric scooter public hire schemes?

9. Thinking back to the survey questionnaire you kindly completed, how did you find it?

<probe> Was there anything that wasn't clear/that could be improved?

10. Finally, we are trying to include a diverse range of people in our study. Do you have any suggestions of how we could do this?

<probe> Any suggested organisations or contacts?