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Public preferences and willingness to pay for a net zero NHS: a protocol for a discrete choice experiment in England and Scotland

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ABSTRACT

Introduction Climate change poses a major threat to our health, livelihoods and the planet. In 2020, the UK National Health Service (NHS) committed to reducing its Scope 1, 2 and 3 emissions to reach net zero by 2045. Although a net zero NHS would help to limit the consequences of climate change, little is known about the UK general public's values and preferences for the proposed service changes needed to reach net zero.

Methods This study will elicit the public's preferences for actions to help achieve net zero NHS in England and Scotland using a discrete choice experiment (DCE). The DCE attributes and levels describe actions that can be taken by the NHS across key areas: buildings and estates, outdoor space, travel and transport, provision of care, goods and services and food and catering. The survey was designed using online think-aloud interviews with 17 members of the public. Two versions of the survey will be administered to a sample of up to 2200 respondents. One will include a payment vehicle as income tax increases. We will estimate the relative importance of each attribute and, for the former survey, the monetary trade-offs which individuals are willing to make between attributes. Where possible, we will match both samples to gauge preference robustness with the inclusion of the monetary payment. We will test whether respondents' preferences differ based on their socioeconomic circumstances and attitudes toward the NHS and climate change.

Ethics and dissemination The University of Aberdeen's School of Medicine, Medical Sciences and Nutrition Ethics Research Board has approved the study (reference: SERB/690090). All participants will provide informed consent. Results will be submitted to peer-reviewed publications and presented at relevant conferences and seminars. A lay summary of the research will be published on the Health Economics Research Unit website.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ We will explore preferences from two samples: the general public and income tax-paying public to assess how including a monetary vehicle affects preferences and willingness to support National Health Service (NHS) net zero actions.
⇒ We will explore preference heterogeneity based on respondents' sociodemographic characteristics, NHS use experience and attitudinal statements towards climate change.
⇒ It is not feasible to incorporate all possible actions that may be needed to achieve a net zero NHS.
⇒ We focus on emissions and actions from the secondary sector only as this is more amenable to organisational changes.
⇒ Findings related to observed preference heterogeneity do not necessarily translate to causality in choice.

INTRODUCTION

Climate change poses a major threat to our health as well as our planet.[1–3] Impacts of climate change such as increased risk of cardiovascular and respiratory illnesses will put further pressures on the demand for healthcare services.[4] At the same time, the provision of healthcare itself is a major contributor to anthropogenic climate change.[5] Globally, health services account for approximately 4% of total greenhouse gas net emissions.[6] In the UK, the National Health Services (NHS) currently account for between 2% and 4% of total emissions.[7 8] In common with many large organisations, the NHS in England and Scotland have adopted policies and are committed to achieving 'net zero' from Scope 1 (eg, emissions from and directly controlled by the NHS), 2 (eg, emissions caused indirectly by energy use) and 3 (eg, emissions created by the wider value chain) by 2045.[9] Net zero can be achieved through a combination of *direct* measures to reduce emissions (for example, by improving energy efficiency) or by *offsetting* emissions (for example, by planting trees which absorb carbon).[8 10] Achieving net zero will require simultaneous organisational and service provision changes which will affect the care and experiences of patients, visitors and staff when using the NHS. Furthermore, the

actions needed to achieve net zero will require the NHS to make funding decisions which may preclude investment in other areas of public concern, such as capacity constraints, waiting times and staff retention.[11]

There is widespread evidence that the majority of the UK general public is concerned about climate change[12] and supportive of doing more to achieve net zero targets sooner.[13] In a recent Health Foundation study, which measured public perceptions of climate change and health, approximately 60% of UK respondents indicated that they would support NHS actions to reach net zero even if taxes would have to increase to fund them.[14] The study also found that while there was general support for a range of measures to reduce NHS emissions, support decreased when measures were perceived to impact on patient-level treatment decisions and care.[15] However, to our knowledge, there is no existing quantitative evidence on which net zero measures to prioritise and how much the UK public are willing to pay for a net zero NHS. Furthermore, there is a paucity of evidence on the trade-offs individuals are willing to make, financially or otherwise, in pursuit of a net zero NHS.

This protocol describes a study that intends to provide empirical evidence to inform a better understanding of public preferences and the trade-offs people are willing to make, and help policymakers design and implement emission reduction policies that have public support. The publication of protocols for survey and economics-driven research, beyond clinical trials, has been advocated for in the literature.[16 17] Protocols allow a critical assessment of whether the subsequent results and conclusions follow the study's initial objectives.[18] Protocols also avoid unnecessary duplication of work and minimise publication bias. This protocol is produced at a key stage of the study and aims to provide transparency and accountability of the intended methods and analyses.

AIM

This study aims to build on existing evidence of public attitudes by eliciting quantitative public preferences and trade-offs for environmental policies which could be implemented to achieve a net zero NHS using a discrete choice experiment (DCE) in England and Scotland. Specifically, we explore:

- Relative importance of alternative measures to reduce emissions in the NHS.
- Trade-offs the public make between these measures, including willingness to pay (WTP) (eg, via an increase in income tax) for NHS net zero policies, and non-monetary trade-offs between alternative measures to achieve net zero.
- Impact on preferences when actions to reduce emissions and achieve net zero involve a monetary cost to the respondent.
- Preference heterogeneity based on individuals' characteristics.

METHODS

We will use an online DCE survey to elicit preferences from two representative samples of respondents in England and Scotland: a sample from the general population and a sample of income tax-paying individuals. DCEs are a commonly used choice-based economic instrument that produce quantifiable measures of preference for individual features describing a good/service/policy.[19] It assumes a policy (eg, NHS net zero plan) can be described by individual attributes (eg, areas where NHS emissions could be reduced) which take different levels (eg, specific actions and policies to reduce emissions). Respondents are faced with a series of choice tasks, which describe two or more mutually exclusive alternatives, each described by attributes and levels. In each choice task, the respondent is asked to choose their preferred option. DCEs assume individuals choose the alternatives that yield the highest utility and thus, using consumer theory, the repeated pattern of choices allows the estimation of quantifiable measures of preference for each individual attribute and relevant trade-offs.[20 21] We motivate the DCE tasks as a choice between which bundle of actions (described as net zero plans), if any, the NHS should focus on to achieve net zero. The study started in December 2022, with planned data collection in March 2024 and end date in December 2024.

Development of attributes and levels for the DCE

In this study, attributes and levels describe different possible actions the NHS could take to help achieve net zero. Given the diversity of organisations in the primary care sector, we focus on the emissions from the secondary care sector which are more amenable to change through NHS-wide policy. We based the attributes and levels on a literature search of the environmental impact of the NHS. We focused on the strategy documents published by both NHS England and NHS Scotland and further grey literature that reports sources of emissions in the NHS. These documents describe key areas (eg, estates and facilities, travel and transport, medicines and the supply chain), within Scopes 1, 2 and 3, that account for the majority of NHS emissions and outline specific interventions (eg, actions) that have or can be taken to reduce emissions.[8 10]

Reflecting on the commonalities in these documents and seeking to create a survey instrument that allows for comparability across the different samples, the DCE task is defined as a choice of net zero plans each described by an action (levels) within six areas (attributes) and a monetary payment vehicle (see table 1). While recognising the NHS will have to undertake all actions within each area to reach net zero, we motivate the choice frame by the policy need of making priority setting decisions when implementing and funding different actions. We describe below how the actions reflect the policy documents and outline potential impacts on care and experience of NHS users and staff as described in the survey.

Building and estates

NHS buildings and estates account for up to 15% of overall NHS emissions.[10] Most of these emissions are

Table 1 List of attributes and levels included in the discrete choice experiment

Attributes	Levels
Building and estates	1. Build more efficient new hospitals. 2. Retrofit existing hospitals.
Outdoor spaces	1. Improve outdoor spaces with more plants and trees. 2. Improve outdoor space so it can be used.
Travel and transport	1. Replace fleet to zero-emission vehicles. 2. Promote walking, cycling and public transport.
Medicine	1. Prioritise medicines that generate fewer emissions. 2. Reduce the number of medicines prescribed.
Food and catering	1. Provide more plant-based meals. 2. Provide more seasonal and local-based meals. 3. Provide same meals as now with less single-use plastic.
Supply chain	1. Ask patients to return devices and equipment. 2. Ask suppliers to be accredited. 3. Fund research to develop environmental innovations.
Cost (presented as nominal value based on percentage increase of stated average gross income)	1. 2.5% 2. 5% 3. 10% 4. 15%

caused by energy use for heating and lighting in buildings. Both NHS England and NHS Scotland describe a strategy of renewing, restating and replacing health facilities to address these emissions. In summary, there are two possible actions. First, all new hospitals and facilities should be built and maintained to net zero standards. Second, existing estates should be improved (retrofitted) to net zero standards (net zero standards are described in the policy documents for NHS England and NHS Scotland, respectively, where the latter refers to them as sustainable NHS buildings).

The attribute has two levels: (1) building all new hospitals to net zero standards, and (2) retrofitting existing hospitals to net zero standards. New hospitals would be built and maintained using innovative low-carbon materials which reduce emissions. However, these new hospitals may be in different locations, such as outside towns and cities. Retrofitting existing hospitals would involve installing energy-efficient lighting, heating, air conditioning and ventilation. However, the process of retrofitting may cause some disruption to existing services.

Travel and transport

Transportation is a major source of emissions, accounting for up to 14% of the total emissions in NHS England.[10] In Scotland, transport also made up a quarter of the total emissions in 2019.[8] The top sources include business travel and fleet transport, patient travel and staff commutes. The NHS aims to accelerate the electrification of their transport fleet and facilitate green travel by building more cycling and walking paths, promoting public and shared transport, and providing storage and charging spaces for electric bikes.

The attribute has two levels: (1) replace fleet to zero-emission vehicles and (2) promote walking, cycling and public transport. Intuitively, less fuel-powered vehicles used by the NHS (eg, ambulance and first response vehicles) leads to less emissions. However, accessibility to remote areas can also be limited for electric vehicles with limited battery range. Furthermore, active travel can be promoted by incentivising NHS staff (eg, cycle-to-work reward scheme) and facilitating lower emission transport modes for patients and visitors (eg, building cycling and walking paths and increasing the number of electric public buses). However, this could mean reprioritising the use of land and thereby reducing the availability of parking spaces for private cars.

Outdoor spaces

NHS England's Greener NHS strategy discusses offsetting and other mechanisms to reduce overall emissions.[10] One strategy is to increase carbon sequestration by increasing the quantity of green space and trees on NHS sites. Similarly, NHS Scotland has committed to the restoration of natural habitats and increasing the value of biodiversity on NHS sites. Both countries identify that improved NHS sites also offer opportunities to improve public, patient and staff health and well-being through recreation, relaxation and social prescribing.

The attribute has two levels: (1) improve outdoor spaces with more plants and trees, and (2) improve outdoor space so it can be used. Both offer an improvement in quality of green space. The former focuses on improving the outdoor spaces with woods and increasing biodiversity such that there is more potential to offset negative emissions and mitigate the adverse effects of air pollution, excessive noise, heat and flooding. However, this would limit its use as a recreational area. The latter focuses on improving the outdoor space use such that it encourages active travel and provide health-enhancing opportunities for patients, staff and communities. However, this focus would mean less biodiversity and reduced sequestration.

Food and catering

It is estimated that food and catering services in the NHS account for up to 6% of NHS emissions.[10] These emissions are generated from agriculture, transport, storage and waste across the supply chain and on the NHS estate. New standards are being developed by the NHS, focusing on procuring and producing sustainable and healthy food

for patients, visitors and staff. This may include sourcing local supplies of food, the use of seasonal produce, reducing waste and offering healthier, more sustainable menu choices.

The attribute has three levels: (1) provide more plant-based meals, (2) provide more seasonal and local-based meals and (3) provide the same meals as now with less single-use plastic. A plant-based diet includes foods that use less land and water, but this means fewer meat-based meals would be available. Seasonal and local-based food does not have to travel as far and seasonal food requires less energy for artificial heating and lighting. However, this means that, at certain times of the year, there might be limited food options. Finally, offering the same meals but using less single-use plastic would lower waste and emissions, although replacing plastic packaging and utensils with other materials such as glass, paper or alternative methods might be more difficult to handle and clean.

Supply chain

While the NHS cannot directly control the emissions generated by suppliers (eg, Scope 3 emissions), it can use its purchasing power to influence change.[22] The NHS has identified three ways to decarbonise its supply chain.[8 10] First, more efficient use of supplies, such as device reuse and refurbishment. Second, encourage adoption of low-carbon technologies by, for example, actively encouraging environmental innovations. Third, ensuring NHS suppliers are decarbonising their own processes by using accreditation scoring as part of the NHS procurement process (eg, Carbon Reduction Plans and Evergreen Sustainable Supplier Assessment).

Reflecting these actions, the supply chain attribute has three levels: first, setting up a return scheme so that patients can return devices and equipment for the NHS to refurbish and reuse. While this would reduce waste, it means some patients might receive refurbished equipment, and may cause burden on users and staff in setting up and using a return scheme. Second, asking suppliers to be accredited so as to ensure they align with NHS policy and are committed to finding ways to reduce emissions. However, this could mean there are less suppliers for the NHS to choose from. Third, funding research to develop environmental innovations. However, this would mean less funding is available for other areas of the NHS.

Medicine

Medicines account for up to 25% of NHS emissions, with anaesthetic gases and inhalers accounting for 5% of these emissions at 'point of use'.[10] Up to 20% of these emissions result from medicines production, transportation and disposal. The NHS Greener strategy documents present ways to reduce these emissions. Possible interventions that reduce anaesthetic gases and inhaler emissions are as follows: optimise prescribing, substitute high-carbon medicines for low-carbon alternatives, and improve production, transportation and waste processes.[10] NHS Scotland also describes its commitment to support healthcare professionals to consider environmental impacts when prescribing medicines.[8]

NHS Greener strategies in both countries also discuss how to achieve a net zero health service by adopting sustainable models of care. This includes promoting preventive measures, addressing health inequalities by encouraging changes in behaviour and lifestyle factors and widening the range of support available to patients with social prescribing.[23] This attribute has two levels: (1) prioritise medicines that generate fewer emissions, for example, by moving to lower carbon inhalers where clinically appropriate, such as dry powder inhalers; and (2) reduce the number of medicines prescribed by reviewing prescriptions more often and considering alternatives such as lifestyle changes and activities, for example, nature-based exercise or art-based activities. However, prioritising medicines that generate fewer emissions might decrease the range of available medicines for a given condition. Reducing the number of prescribed medicines means that some patients will have their prescriptions reviewed more often and changed and might be referred to activities outside the hospital.

Cost

A cost attribute is often included in DCEs to estimate individuals' WTP.[24] In this DCE, the inclusion of a cost attribute will allow us to estimate the monetary value to individuals of different NHS net zero plans. The cost attribute will be an increase in income tax required to fund the net zero plans. An increase in income tax is a realistic payment vehicle for similar government-funded interventions given most of the current NHS funding comes from a similar payment vehicle (eg, National Insurance).[25] However, not everyone pays income tax, and the non-tax-paying population may be among those most impacted by changes in NHS service delivery. Therefore, the DCE will elicit preferences from two samples: (1) the general public, excluding the cost attribute (sample 1), and (2) public income tax payer, including the cost attribute (sample 2).

In sample 2, the monetary cost of alternative net zero NHS plans is presented as a percentage increase in the nominal amount of income tax paid, with four levels: 2.5%, 5%, 10% and 15% increase. These levels were selected based on realistic increases given the socioeconomic conditions at the time of the study. To reduce cognitive burden, percentage increases in income tax are automatically converted into nominal monetary values in the survey for each respondent based on the midpoint of their income band. These levels of tax increase were tested using think-aloud interviews with people from across a range of income bands using a contingent valuation exercise and by probing choice task deliberation strategies (see below and online supplemental material 1). The range of the income tax increases is crucial to estimate WTP accurately. Incorrectly specified increases could lead to decision heuristic use and overshooting in the estimation of WTP. Given the lack of a priori evidence

to inform the cost attribute levels, we will further test these levels in the quantitative pilot and conduct further developmental work if needed.[26]

Experimental design

The actions within each of the six areas of the NHS where emissions could be reduced were combined to create hypothetical 'net zero NHS plans'. In each choice task, participants will be asked to choose between three alternative plans: two unlabelled net zero plans (eg, 'net zero plan A' and 'net zero plan B,') and a 'no NHS net zero plan'. The third alternative describes a situation in which the NHS does not actively focus on implementing actions to reduce emissions. For sample 2, this alternative has no increase in income tax. This opt-out alternative is included to ensure respondents who have strong preference for not implementing any net zero actions and/or have a maximum WTP lower than the minimum cost level have an alternative to choose from in each choice task. Omitting this alternative might cause random responses, which could result in unreliable preference means and, in sample 2, upwardly biased WTP estimates.[27 28]

A D-efficient unconstrained main effects design, using null priors, was used to generate 24 distinct choice tasks to estimate the non-linear effect of each attribute level on the likelihood of choosing a net zero plan using Ngene software.[29] The design was informed based on minimal marginal improvements to the multinomial logit model D-error, with final design selection assessed on minimum attribute overlap, level balance and minimal within attribute correlation. It was not possible to assess utility balance as no prior information about the attributes was known.

The 24 choice tasks are blocked into 3 sets of 8 choice tasks to ensure participants are presented with a manageable number of choice tasks.[30 31] Figures 1 and 2 show the choice card for both samples 1 and 2. Choice tasks include visual icons for each attribute level to ease comprehension and facilitate user interface using different devices. The order of the choice tasks within each block is randomised to minimise ordering effects.[32]

Questionnaire design

The survey will be administered online, thus enabling the use of visuals to explain attributes and convey key information throughout the survey (see online supplemental materials 2 and 3). Crucially, the online platform also allows us, for sample 2, to embed within the choice card what the approximate nominal tax increase would be for each participant based on their own personal income and tax residency (see figure 2). This avoids having the respondent having to calculate what different percentage increases would mean to them while completing the survey. We also include a contingent valuation exercise, after the DCE tasks, to gauge the overall monetary valuation of the respondent's ideal net zero plan. The nominal values in the payment card are informed by the respondent's stated income.

We will debrief respondents who chose to opt out at least once to gauge possible reasons not to choose a net zero plan. We will collect information about respondents' sociodemographic characteristics such as occupation, qualifications and household composition. We also include questions to describe participants' current use of and experience with the NHS, as well as attitudinal questions to gauge their views about the environment and climate change. These data will be used to explore preference heterogeneity across different groups of individuals. Where applicable, questions are based on underlying existing national statistics (eg, census, Labour Force Survey) to ensure comparability of our sample with the general population.

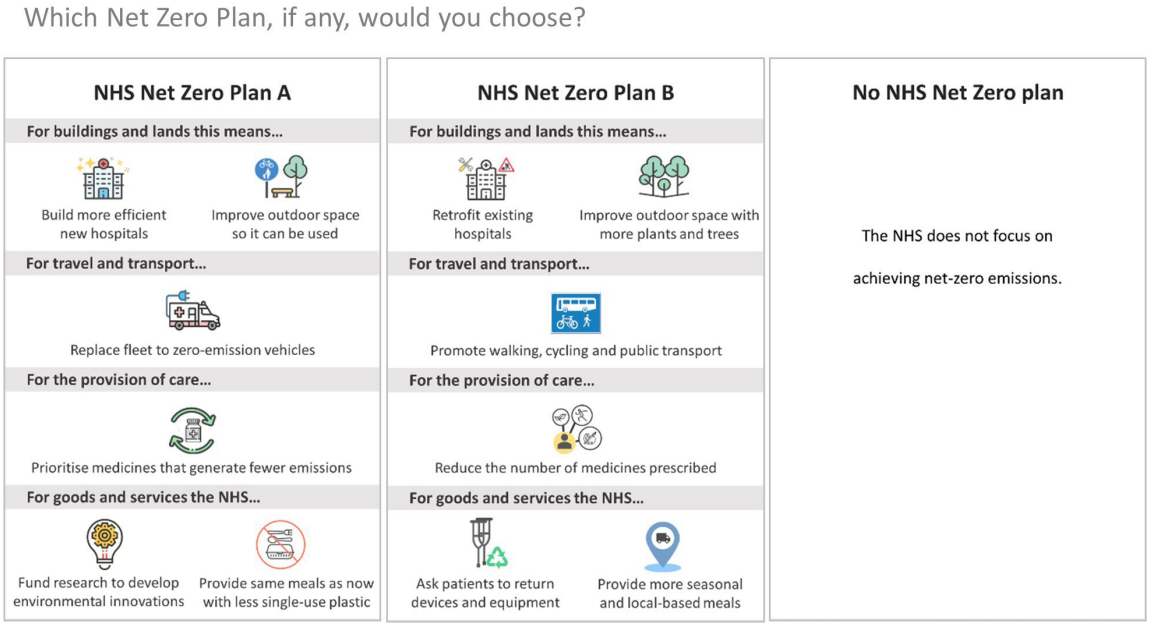

Figure 1 Example choice card for sample 1. NHS, National Health Service.

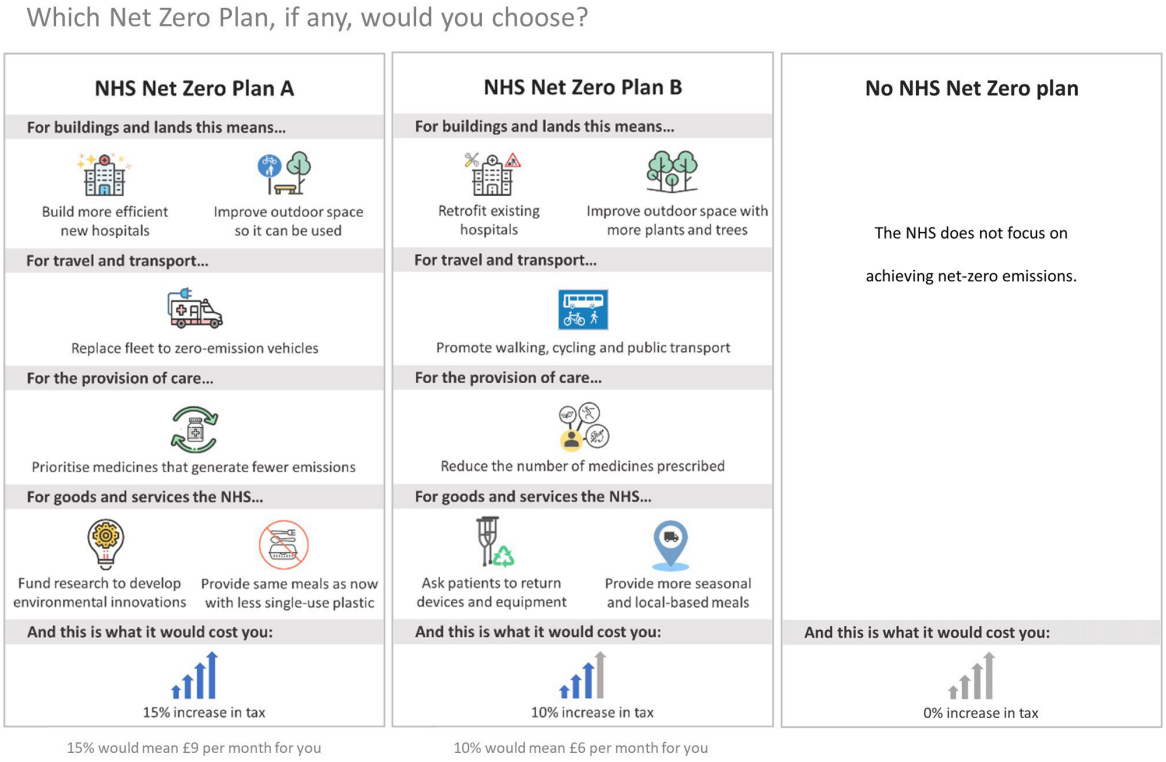

Figure 2 Example choice card for sample 2 (including cost attribute). Nominal increases shown in the figure are illustrative. NHS, National Health Service.

Survey developmental work

We involved members of the public, using online think-aloud video interviews, in the design of the survey.[33] Participants were recruited using social media adverts on Facebook, targeting prospective respondents for samples 1 and 2. We conducted 17 interviews: 5 for sample 1 and 12 for sample 2. Participants were compensated with a £20 shopping voucher. More information about the interviews' findings and how these shaped the survey and DCE tasks is described in the online supplemental material 1.

During the interviews, participants were asked to verbalise their thoughts as they completed the survey together with two researchers. Participants were encouraged to share their thoughts on the content, structure and length of the survey. The interviews were also used to ensure the actions and plans were clear, easily interpretable and plausible. The interview data were used to iteratively make edits to the survey until saturation was reached.

Respondent recruitment

The survey will be administered online. Participants will be recruited using a managed access panel (eg, Qualtrics) with quotas based on age and sex to ensure a representative sample across samples and nations. The panel will arrange compensation to participants. The survey will be piloted with 10% of the target sample to gauge data quality and assess the face validity of parameter estimates. Should data suggest quality issues, we will make further amendments to the survey and, if necessary, conduct further developmental work (see above).

Sample size

Think-aloud interviews were held until saturation was reached, that is, when two consecutive interviews yielded no new information (eg, issues that merited changes to the survey).[34 35] Based on experience with similar studies, an initial ethical approval of 30 interviews was sought with the expectation of seeking an extension if needed. Sample size for the main survey is calculated using Louviere's formula for choice proportions to approximate the minimum sample size, such that, given a baseline choice probability of 33%, an accuracy level of 90%, a CI of 95% and eight choice tasks per respondent, we require 78 respondents per block.[36] We will recruit at least 110 individuals from each sample to pilot the survey and statistical model. Given that we aim to explore preference heterogeneity using flexible logit models, we aim to recruit 550 for each nation per sample (total n=2200).

Data analysis

Choice data will be analysed using variants of the multinomial logit (MNL) model.[37] This model is underpinned by Random Utility Maximisation (RUM) framework. Under RUM, we assume respondents choose the alternative that yields the highest utility (benefit), such that:

$$U_{njt} = V_{njt} + \varepsilon_{njt}$$

$$V_{njt} = \sum_{k} \beta_k X_{kjt}$$

where n, j, t, k are subscripts for the individuals (n=1,…,N), the alternatives or net zero plans (j=1,…,J), the choice tasks (t=1,…,T) and the attributes (k=1,…,K).

The deterministic component (V) is typically described as an additive function consisting of the product of the preference estimates (β) and corresponding attribute levels (X). The random component (ε) is assumed identically and independently and extreme value type 1 distribution. This allows the estimation of the preference estimates from the choice data using logit models.

The mean coefficients provide information of whether the presence of the corresponding action (ie, level) makes it more likely for the respondent to choose the alternative, which can be interpreted as a measure of the marginal benefit (ie, utility) this provides to the respondent. Given the RUM framework, it is possible to use the coefficients to estimate the probability of choosing (ie, uptake of) a net zero plan based on different combinations of net zero actions (and associated cost).

Initially, the cost attribute will be modelled as percentage changes in income tax. This considers the disproportional nature of percentage increases to different income levels. Where possible, income tax changes will also be modelled in absolute values in subgroup analysis based on different income levels. These estimates provide a quantitative measure of the willingness to buy in to different net zero plans, based on the actions they involve and the likely impact on patient care and experience.

The ratio of two coefficients, known as the marginal rates of substitution, describes the trade-off respondents make between two attribute levels. For the tax-paying population, this ratio shows the WTP for specific actions, for example, how much extra income tax are individuals willing to pay to have all electric vehicles. It is also possible to estimate WTP for bundles of actions.

Initially, we will estimate MNL models. However, given the limitations of the MNL model, namely the assumptions of uncorrelated and independent errors and preference homogeneity, we will employ mixtures of the logit model.[38–40] For example, we will explore random parameter logit models which employ assumptions of continuous distribution in preference parameters that allow for the characterisation of unobserved preference heterogeneity, and introduction of heteroscedasticity and/or correlations across alternatives.[41 42] We will also explore discrete distribution models to estimate probabilistic class allocation models, also known as latent class models. Where possible, we will use observed respondents' sociodemographic characteristics information to predict class membership.[43]

Given the potential policy relevance, we will explore observed preference heterogeneity with the characteristics collected in the survey across subgroups of individuals using interaction terms and/or estimating unrestricted random parameter logit models.[19] For example, we will explore the effect of paying income on preferences for different actions. Additionally, we will explore heuristic-driven behaviour in the form of attribute aggregation or non-attendance using confirmatory class analysis models.[44 45] For example, to account for individuals who consider similar actions together or focus solely on one attribute (eg, cost). We will also explore the use of matching algorithms to assess preference robustness from the addition of a cost vector (eg, payment via income tax) to net zero plans.[46] Where possible, we will explore the use of hybrid choice models to include the effect of attitudinal responses as indicators of latent variables.[47]

The choice of the final model will be determined based on a combination of robustness tests, measures of fit (eg, log-likelihood and Akaike and Bayesian Information Criteria) and conversations with the Stakeholder Advisory Group (see below) on which best conveys potential policy implications.

Ensuring impact

We have established a Stakeholder Advisory Group, consisting of academic and non-academic collaborators with expertise in the NHS, climate change and sustainability, to provide critical feedback and validation for practical and theoretical aspects of the project. The group will be consulted throughout the project. Virtual sessions will be organised to ensure main findings can be communicated to ensure policy relevance and impact.

Patient and public involvement

Members of the public have been involved in the development of the survey, providing feedback and input of the survey's content and, crucially, informing the DCE attributes and levels and choice frame (see online supplemental material 1). We will work with the Public Engagement in Research Unit at the University of Aberdeen to disseminate preliminary results to the public, such that final reports and dissemination material will contain input from members of the public.

ETHICS AND DISSEMINATION

Ethics approval was obtained from the University of Aberdeen's School of Medicine, Medical Sciences and Nutrition Ethics Review Board. As part of the approval process, this protocol underwent internal scientific peer review. Results will be disseminated via webinars and seminars aimed specifically to the relevant policy community and to the wider academic community. Project information will be reported on the publicly available Health Economics Research Unit (HERU) website, and we will use HERU's blog and social media accounts to disseminate key findings. Findings from the study will be presented at national/international conferences and peer-reviewed journals. Authorship policy will follow the recommendations of International Committee of Medical Journal Editors.

CONSENT

Eligibility and consent for the think-aloud sessions were sought and taken by the researcher prior to the start of the interview. Qualtrics will confirm eligibility for the main study. Consent from respondents will be sought as part of the survey prior to the data collection questions.

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Contributors LEL-R, MiA, MeA, PN, MR, VW and HW were involved in the conception and design of the study. MiA led the ethical review submission for this study. MiA, MeA, PN, LEL-R and HW conducted the think-aloud interviews. MiA, MeA and LEL-R led the think-aloud data analysis. LEL-R, MiA, MeA, PN, MR, VW and HW interpreted the think-aloud data and agreed on final edits to the survey. LEL-R wrote the initial draft of the manuscript. LEL-R, MiA, MeA, PN, MR, VW and HW critically revised, edited and approved the final version of this manuscript.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

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