A MULTICOMPONENT EVALUATION OF NEW RESTRICTIONS ON MARKETING OF LESS HEALTHY FOODS: PROTOCOL

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Ethics and research governance are covered in protocol section. No project-specific ethics approval has been obtained as of 24 October 2025.

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TABLE OF CONTENTS

1 PROTOCOL CONTACTS AND AUTHORISATION

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1.3 Study steering committee

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1.4 Protocol sign off

Chief investigator signature

2 RESPONSIBILITIES

2.1 Chief investigator

Jean Adams will provide overall leadership for the project, lead WP0, 1c and 2, and supervise the two post-doctoral researcher associates (PDRA) contributing to these WP and the project study co-ordinator. She brings expertise in evaluation of dietary public health interventions, inequalities in dietary public health, and differential effects of interventions.

2.2 Co-investigators

Lauren Bandy will lead WP1a and supervise the WP1a PDRA. She brings expertise in using commercial data on food products to monitor and evaluate how the food industry responds to government policy.

Emma Boyland will lead WP1b and supervise the WP1b PDRA. She brings expertise in food marketing and as PI on the NIHR PRP project providing baseline data for evaluation of the impact of advertising restrictions on children's exposure to food advertising will ensure synergies with that project.

Nathan Critchlow will co-lead WP5 and co-supervise the WP5 PDRA. He brings expertise in commercial determinants of health and quantitative methods to analyse marketing activity and the association with health-related knowledge, attitudes, and behaviours in consumers.

Allison Ford will co-lead WP5 and co-supervise the WP5 PDRA. She brings expertise in qualitative methods for evaluation of public health interventions.

Hannah Forde will co-lead WP6 and co-supervise the WP6 PDRA. She brings expertise in commercial determinants of health and food marketing.

David Hammond will contribute to WP5. He leads the International Food Policy Study used in WP5 and brings expertise in population-level interventions to reduce chronic disease, including marketing restrictions and obesity prevention policies.

Henning Jensen will co-lead WP4. He brings expertise in the application of Computable General Equilibrium (CGE) models, and the construction of fully integrated macroeconomic and epidemiological-demographic simulation models.

Marcus Keogh-Brown will co-lead WP4. He brings expertise in the macro-economic models and the health-related applications of CGE Modelling with GAMS.

Peter Scarborough will lead WP3 supervise the two PDRAs contributing to these WP. He brings expertise in evaluating population approaches to diet, interrupted time series analyses using food retail datasets, and health modelling projects which will be used in WP1a and 3 respectively.

Richard Smith will co-lead WP4. He brings expertise in a wide range of economic methods, including micro, macro, behavioural, and political-economic techniques as applied to health.

Martin White will co-lead WP6 and supervise the WP6 PDRA. He co-leads the Population Health Interventions programme at the MRC Epidemiology Unit and is a visiting fellow at the Bennett Institute for Public Policy at Cambridge University. He has expertise in commercial food systems and evaluation of food policy interventions, with a particular focus on policy processes.

2.3 Project staff

To be appointed

3 SCIENTIFIC ABSTRACT

3.1 Background

The World Health Organization recommends limiting children's exposure to less healthy food marketing to improve diets. New restrictions on marketing of food and drinks high in fat, salt and sugar (HFSS) are due to be implemented, comprising bans on:

- adverts for HFSS products on live broadcast TV and UK on-demand services (eg ITV hub, All4) from 0530-2100h from Jan 2026;
- paid-for online adverts of HFSS products by UK operating businesses from Jan 2026;
- multibuy (eg 3 for 2) and volume based (eg 50% extra free) price promotions on pre-packaged HFSS products in England from Oct 2025.

These will be some of the strictest food marketing restrictions globally. As such, their effects are unknown. We will conduct a multi-component evaluation taking a theory guided, systems perspective to understand whether and how they impact on health and society. We will integrate our findings with those of others to provide a comprehensive analysis of the impact of the interventions.

3.2 Research questions

1. Were there pre-post intervention changes in:

    a. prevalence of HFSS price promotions in UK supermarkets?
    b. prevalence of HFSS TV and online advertising (both product and brand)?
    c. exposure of UK adults to HFSS TV adverts?
    d. availability and price of HFSS products in UK supermarkets and chain restaurants?
    e. purchasing of HFSS products by English households?

2. What are the modelled impacts of any changes in purchasing on:

    a. prevalence of overweight, obesity and other relevant health outcomes in England?
    b. economic performance of relevant food, media & advertising industries & wider society in the UK?

3. What proportion of people living in England were aware of and supported the interventions? What were their experiences of the interventions?

4. Who were the key actors and what were the key actions involved in development, prioritisation, delay and implementation of the interventions?

5. Were any changes in outcomes identified in RQ1-3 due to the intervention?

3.3 Methods

To answer each research question (RQ), we will:

RQ1: use interrupted time series analysis of supermarket, broadcast, social media, restaurant and household purchasing data collected by us or purchased from commercial suppliers.

RQ2: use health impact and Computable General Equilibrium modelling, with data generated from RQ1 and elsewhere as inputs.

RQ3: use data from international repeat cross-sectional surveys and focus group interviews.

RQ4: expand our pre-intervention stakeholder interviews to a longitudinal qualitative study and conduct documentary analysis of consultation responses.

RQ5: draw on process tracing to update our programme theory in response to emergent findings.

3.4 Timeline

36 months

4 PLAIN ENGLISH SUMMARY

4.1 Background

In the uk, many people do not eat in ways that best supports their health. One reason for this is food marketing. Food marketing includes adverts on tv and online as well as special offers. Food marketing mostly focuses on less healthy things like fast food and sweets.

In october 2025, new rules will ban special offers on less healthy food and drinks (eg 3-for-2 offers), tv adverts for these items from 5.30am to 9pm and some online ads . A standard definition of ‘less healthy’ will be used.

The effects of these bans could extend beyond what food and drinks are marketed. For example, companies may start making healthier food to avoid the bans. Or peoples’ buying habits may change, with an impact on the health of the population and economy.

4.2 Aims

We aim to understand the impacts of the bans on health, the economy and society. This will inform future government policy.

4.3 Methods

We will first study impacts on food marketing. We will use data collected by market research companies and by us and compare the year before the bans to the year after. We will study whether special offers on less healthy items become less common, whether healthier items become more available, and how TV and online advertising changes. We will use data on grocery purchases from 30,000 households to study changes in buying habits.

We have already developed a method to predict changes in chronic diseases from changes in food purchasing. We will use this to predict changes in weight, diabetes, heart disease and cancer over 10 years. We will also study any changes in costs to the NHS of treating these conditions.

The bans could lead to loss of employment in food, media and advertising. We will track the economic performance of relevant companies in the year before the bans compared to the year after.

We will then combine results from all our work to estimate the impacts of the bans on society. We will balance impacts on health and the NHS with those on the economy.

The bans might not work as intended. We will run focus groups and surveys to understand how parents and youth experience the bans. Interviews with people from government and the private sector will help us understand what did and didn't go well.

5 BACKGROUND & RATIONALE

In 2019-21, 28% of 4-5 year olds, 41% of 10-11 year olds and 64% of adults in England were living with overweight or obesity.[1, 2] Overweight and obesity are associated with adverse psychological and physical outcomes,[3, 4] are more common in those living in more deprived circumstances,[1, 2] and cost UK society more than £27bn per year.[5]

Poor diet is a major driver of obesity.[6] The World Health Organization recommends limiting children's exposure to less healthy food marketing as an overarching and enabling action to improve diets.[7, 8] Marketing occurs across the 4 Ps of: product, place, price and promotion. Systematic reviews, including by us, confirm that food advertising (a type of promotion) focuses on less healthy products and influences children's food preferences and consumption;[9-14] and that price promotions increase purchasing of less healthy products.[15, 16] More recent work confirms these findings.[17, 18]

New restrictions on advertising of food and drinks high in fat, salt or sugar (HFSS) on TV before 9pm and online will be implemented in the UK in October 2025.[19] Restrictions on price-based promotions of HFSS products in England will also be implemented in October 2025.[20] Full details are provided elsewhere.[19, 20] In brief, these restrictions comprise bans on:

- adverts for HFSS products on live broadcast TV and UK on-demand services (e.g. ITV hub, All4) from 0530-2100h;
- paid-for online adverts of HFSS products by UK operating businesses;
- multi-buy (e.g. 3 for 2) and volume based (e.g. 50% extra free) price promotions on pre-packaged HFSS products in England.

Throughout, HFSS are products identified as 'less healthy' by the 2004/05 UK Nutrient Profiling Model[21] within specified food categories (e.g. including confectionary, but excluding meat).[22] The Nutrient Profiling Model assigns 'points' based on energy, saturated fat, sugar and sodium content per 100g. Points are then subtracted based on fruit, vegetable and nuts, fibre and protein content per 100g. Foods with an overall score of 4 or more and drinks with a score of 1 or more are considered HFSS and 'less healthy'.

We refer to the restrictions described above as 'the interventions'. The interventions are written into legislation that has received royal assent. Although originally planned for implementation in 2023 a number of delays were imposed by the previous Conservative government amidst concern around the Cost of Living crises.[23] The option for this delay was written into relevant legislation. Implementation of the interventions was a manifesto commitment of the new Labour government and implementation guidance has now been published.[24] As such, there is now greater certainty of implementation. A ban on placement of pre-packaged HFSS products in checkouts, queuing areas, end of aisles, store entrances and online equivalents was introduced in October 2022 in England.

We recently estimated that 6.4% of UK childhood obesity is attributable to HFSS TV advertising and that a pre-2100h ban on HFSS TV food advertising would result in a 4.6% reduction in childhood obesity.[25] Effects were two-fold greater in the most vs least deprived groups. Near-simultaneous restrictions on different types of marketing have the potential to lead to synergistic and system-wide effects not just on health, but also wider social outcomes.

Our 2022 systematic review found few evaluations of food marketing restrictions worldwide, and that many evaluations take place years after implementation, relying on cross-sectional data.[26] The interventions will be some of the most restrictive internationally and are a rare example of co-ordinated effort across different aspects of the marketing mix.[27] Given they have not yet been implemented, we are confident that their effects are unknown. However, we are aware of ongoing related research. Co-applicant Boyland led (with Adams) a baseline analysis of children's 'holistic' exposure to food marketing across multiple media that will serve as the 'before' data in an intended 'before-after' analysis of the advertising

restrictions. The NIHR Policy Research Unit (Adams chairs the Scientific Advisory Board) is conducting work on closely related restrictions on location-based promotions (i.e. placement of HFSS products in 'high value' areas such as checkouts, end of aisles and store entrances) implemented in October 2022. Co-applicant Scarborough is collaborating on further work on the location-based promotions commissioned by NIHR Policy Research Programme. Furthermore, Adams and co-applicant White are collaborating on project NIHR167794 on voluntary implementation of restrictions of price-promotions in two UK supermarkets prior to implementation of mandatory restrictions. As detailed in application NIHR167794, we have made substantial efforts to ensure synergy rather than overlap between it and the current work.

We will conduct a multi-component evaluation of the interventions, taking a theory guided, systems perspective to understand whether and how they impact on health and society. We will integrate the findings of our evaluation with those of others, including those cited above, to provide a comprehensive analysis of the impact of the interventions.

Our results will fill a number of knowledge gaps on the effects of the interventions in particular, and food marketing restrictions more generally. Poor diets and obesity are key public health concerns in the UK[28] and globally.[7, 8] The Department of Health & Social Care (DHSC) has committed to reviewing the interventions and discussions with DHSC colleagues indicate our evaluation will form a core input to that review, enabling policy refinement. Internationally, our findings will guide efforts to develop effective public health responses to food marketing.

Given the number of components in the interventions and how they may interact with each other and contextual factors, the interventions can be considered 'complex'.[29] The revised MRC guidance on evaluating complex interventions emphasises using programme theory, involving diverse stakeholder perspectives, and identifying and focusing evaluations on key uncertainties.[29] Supported by NIHR Public Health Programme Rapid Funding we co-developed a 'concept map' (Fig 1) with relevant academic, civil society, government and industry stakeholders of the most important potential mechanisms through which the interventions could impact on health, commercial food companies and society.[30, 31] This will serve as our initial programme theory. Fig 1 focuses on the advertising restrictions and reflects our initial intention to focus only on these. However, the decision to implement the price restrictions to the same timeline will make it impossible to disentangle the distinct effects of these different intervention components. The price restrictions are likely to have similar mechanisms of effect as those shown in Figure 1.

The system-wide impacts of policy changes delivered to whole populations can rarely be discerned from randomised controlled trials (RCTs).[32] Although RCTs have been used to confirm that food marketing impacts on consumption,[9, 14] it is impractical to randomise the interventions considered here for extended periods at a population level. Instead, we will use natural experimental designs.[33] To maximise value for money, we will make best use of retrospectively accessible extant data and co-ordinate with other focused evaluative work to create synergies and avoid overlap.

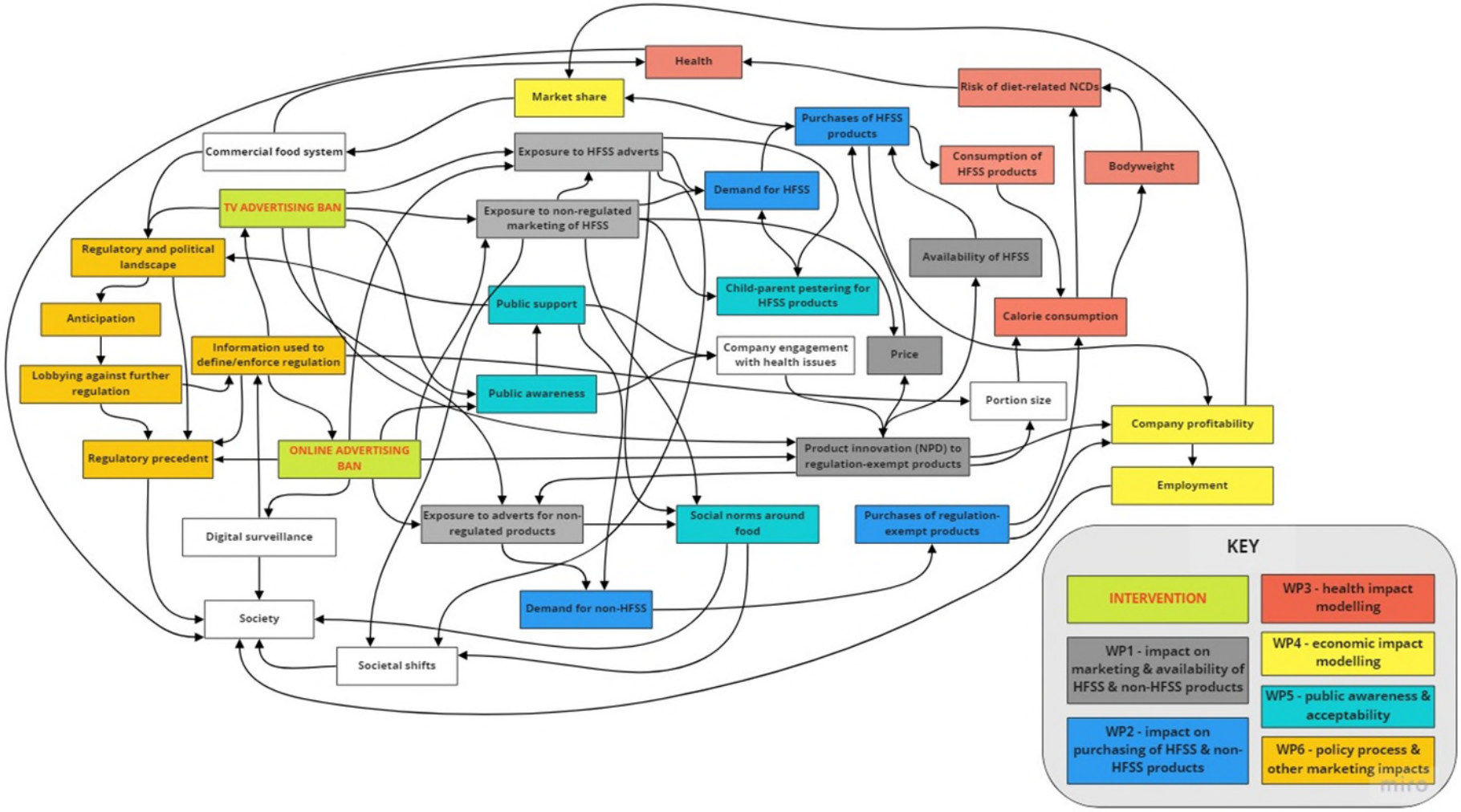

Figure 1. 'Concept map' of the potential mechanisms through which the advertising interventions may impact on health and society. This map was co-developed with public, private and third sector stakeholders using NIHR Public Health Programme Rapid Funding. It focuses on the advertising bans as they were more certain during data collection. The price and location bans may have similar mechanisms of effect. The map will serve as our initial programme theory. WP: work package; HFSS: food and drink products high in fat, salt or sugar

6 RESEARCH QUESTIONS

1. Were there pre-post intervention changes in:
    a. prevalence of HFSS price promotions in UK supermarkets?
    b. prevalence of HFSS TV and online advertising (both product and brand)?
    c. exposure of UK adults to HFSS TV adverts?
    d. availability of HFSS products in UK supermarkets and chain restaurants?
    e. purchasing of HFSS products by English households?
2. What are the modelled impacts of any changes in purchasing on:
    a. prevalence of overweight, obesity and other relevant health outcomes in England?
    b. economic performance of relevant food, media & advertising industries & wider society in the UK?
3. What proportion of people living in England were aware of and supported the interventions? What were their experiences of the interventions?
4. Who were the key actors and what were the key actions involved in development, prioritisation, delay and implementation of the interventions?
5. Were any changes in outcomes identified in RQ1-4 due to the intervention?

We will address these research questions in a multi-component intervention comprising 7 inter-linked Work Packages (WP). Our findings will be supplemented by results from other NIHR work on intervention impacts on children's exposure to intervention-restricted advertising (led by Boyland; funded by Policy Research Programme). Colour coding in Figure 1 shows how our WP relate to our programme theory. Figure 2 provides an overview of the research, showing links between WP and other work.

Throughout we define HFSS products, price promotions and eligible adverts as in the interventions. The interventions varyingly apply to the whole of the UK (restrictions on TV and online advertisements) and England only (restrictions on price promotions). Scotland is considering implementing similar restrictions on price promotions. However, the data we have access to varyingly represents the UK, Great Britain or England. In some cases this means there is a mismatch between data (available for the UK or GB as a whole) and interventions (applied to England only). Whilst this may introduce some error, if anything it is likely to dilute any true effect. England represents 86% of the UK population.

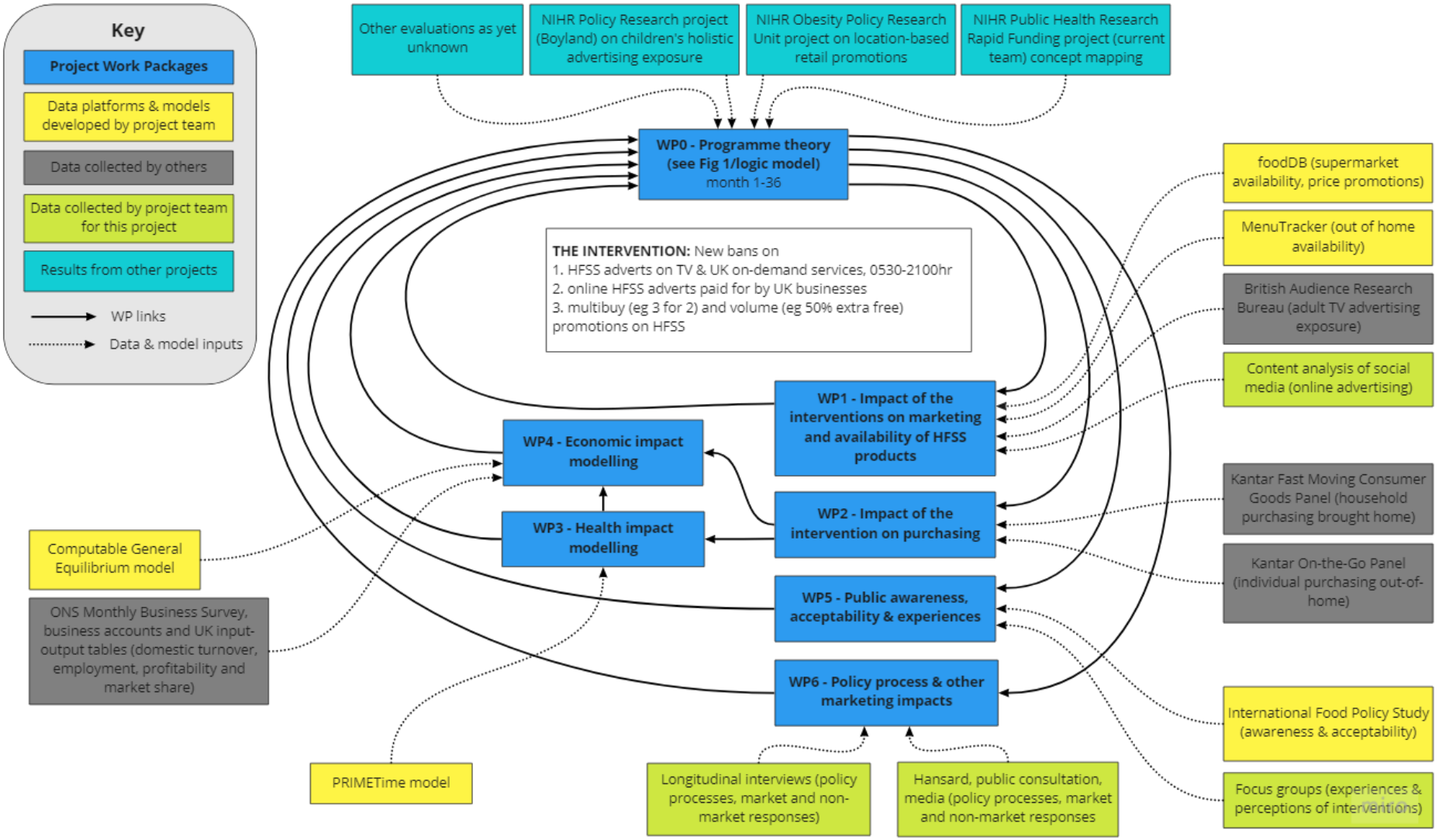

Figure 2. Visual summary of research design. This figure summarises the study design, the sequence of different work packages, and data and model inputs into each work package. WP: work package; HFSS: food and drink products high in fat, salt or sugar; ONS: Office for National Statistics

7 RESEARCH PLAN & METHODS

7.1 WP0 Integration

Leadership Adams

RQ addressed RQ5: Were any changes in outcomes identified in RQ1-4 due to the intervention?

Given the interventions will be implemented nation-wide, RCTs will be impossible to conduct. Instead, we will use observational methods to generate probabilistic evidence. This is sometimes considered less able to support 'causal' claims than RCTs. The concept of 'Evidence Based Medicine plus' (EBM+) recognises the value of multiple forms of evidence and proposes that mechanistic evidence from a variety of sources can provide a causal scaffolding to increase our confidence that probabilistic evidence is causal. Our programme theory (Fig 1) sets out proposed mechanisms of impact of the interventions. We will use the concept of 'integration' to test whether there is evidence that hypothesised mechanisms have been triggered and support (or contest) the interpretation of any findings that the interventions are associated with changes in outcomes as causal. For example, a finding from WP1a that the intervention was associated with a decrease in availability of HFSS foods would support the conclusion that any decrease in purchasing found in WP2 are due to the interventions rather than e.g. altered preferences for HFSS foods. This requires a process of 'integration'.

Integration has been described as bringing together multiple research components in a way that produces "findings that are greater than the sum of parts".[34] Thus, integration is a way to gain additional insight from multiple analyses on related, but different, questions which may have individually used a variety of different data sources and methods.

When integration of the findings from multi-component evaluations is proposed, the intention is often to do so at the end of a project in a final 'bringing together'. This is an approach we have also used.[35] However, this can mean that integration gets lost in project wrap up and that additional 'bridging' analyses addressing emerging questions that could enable a greater depth of integration are identified too late to conduct them. As an alternative, we recently proposed that conceptualising integration as 'Work Package Zero' should help embed the integrative process and provide more holistic insights.[36]

Rather than as a final process completed when all other WP have delivered findings, we see integration as a tool to inform decisions throughout the project. We will operationalise it as WP0.[36] WP0 will be guided by our programme theory (Fig 1) and will use our and others' results to test our hypothesis that "any changes in outcomes are due to the intervention".

Inclusion criteria We will include findings from our evaluation as well as those of others to provide a comprehensive assessment of the impact of the interventions. Any evaluations of the interventions will be included.

Searching We will identify relevant findings from our evaluation in project meetings and the findings of others via our networks and regular systematic searches in relevant scientific databases. As new relevant papers are published, we will add citation alerts to these papers.

Data analysis Our analysis will draw on Process Tracing[37] – a structured approach to considering how evidence changes confidence in hypothesised causal pathways. We will conduct 'living synthesis' of relevant findings. As new relevant data emerges, we will revise our programme theory (Fig 1) indicating where confidence in pathways changes in light of new evidence. We will be open to emerging clues to new potential pathways and unintended consequences. Where appropriate and feasible, we will collect targeted new data to test these and provide 'bridging' analyses. Given that the specifics of this work will depend on emergent findings, whilst we can pre-specify the general approach we will take, it is difficult to pre-specify its exact nature until findings begin to emerge.

For example, findings from WP1c may indicate that implementation of the interventions is associated with reductions in purchasing of HFSS products. However, findings from WP1b may simultaneously indicate that implementation of the interventions was not associated with reductions in adults' exposure to HFSS advertising. This may undermine any conclusion that the changes in purchasing can be causally attributed to the interventions. However, in this scenario, additional evidence from elsewhere may help us establish that there were reductions in children's exposure to HFSS advertising and so start to increase our confidence of a causal effect of the interventions on purchasing again. This case would be strengthened by a finding in WP1c that reductions in purchasing were specific to households with children. In this case we might hypothesise that a causal effect is more likely if the interventions also decreased child purchasing requests for HFSS products ('pester power'). Here, additional 'bridging' analyses could involve a specific focus on pester power in WP5.

Participants and ethics The main synthesis aspect of WP0 will not recruit participants and will not require ethical approval. If additional bridging analyses are conducted that require additional participant recruitment, we will seek ethical approval as required.

Timescale WP0 will be live throughout the project with dedicated staff time available in study months 10-36. We will review (and revise as necessary) our programme theory at least bi-annually.

7.2 WP1 Impact of the interventions on marketing and availability of HFSS products

7.2.1 WP1a Price promotions on, and availability of, HFSS products in supermarkets

Leadership Bandy

RQ addressed RQ1a and 1d: Were there pre-post intervention changes in: prevalence of HFSS price promotions in UK supermarkets? And availability and price of HFSS products in UK supermarkets?

The interventions should eliminate price promotions on HFSS products in UK supermarkets. Restricting marketing based on nutritional content can trigger changes in price, package size and formulation so reducing availability of HFSS products.[38-40]

Research design We will conduct an uncontrolled interrupted time series analyses (ITSA)[41, 42] of weekly supermarket data from at least 1yr before the start of implementation (i.e. Sept 2024 to Sept 2025) to 1yr after (i.e. Jan 2026 to Dec 2026), with the three months between as the 'interruption' (i.e. Oct 2025 to Dec 2025).

Data source We will use data from a commercial provider (Acuity) who collect product data available from UK supermarkets on a weekly basis. Acuity data includes information on product name, price, nutritional content, package size and price promotions.

Population & setting We will include data from five supermarkets (Tesco, Sainsbury's, Ocado, Asda, Aldi) that cover more than 60% of the UK grocery market and includes both the largest supermarket (Tesco) and the largest discounter (Aldi) by market share.[43]

Food categories of interest The interventions only apply to specific food categories – for example, confectionary is included, but meat is excluded. Assigning products to food categories, and so clarifying which are in categories that are intervention eligible is highly resource intensive. Instead, we will focus our analysis on four purposively selected categories.

We hypothesise that reformulation will be more likely in intervention eligible categories which currently include 25-75% non-HFSS products (indicating that market-acceptable non-HFSS can be developed). Similarly, we hypothesise that changes in price and package size are more likely in categories which currently include more than 95% HFSS products (indicating non-HFSS alternatives are harder to develop). We will, therefore, focus on indicative food categories in four groups:

- intervention-eligible category with *(intervention series)*:

    - 25-75% of products currently HFSS: e.g. breakfast cereal (45% HFSS);[44]
    - >95% of products currently HFSS: e.g. chocolate confectionary (100% HFSS);
- non-intervention-eligible category with *(comparator series)*:
    - 25-75% of products currently HFSS: e.g. instant hot drinks (34% HFSS);
    - >95% of products currently HFSS: e.g. pastry (100% HFSS)

Outcome measures The outcome measures will be, within each of the four study categories: the proportion of products that are HFSS; the proportion of HFSS and non-HFSS products on volume-based promotion; and mean price and package size of HFSS and non-HFSS products.

Sample size We will include 52 weekly pre-intervention data points and 52 weekly post-intervention data points = 104 data points in total, substantially exceeding the minimum suggested requirements for ITSA.[45]

Analysis As non-intervention eligible categories are not direct analogues of intervention-eligible categories, we will not conduct controlled ITSA. Instead, we will replicate uncontrolled ITSA in all categories (intervention and comparator series) to determine specificity of intervention effects.[46] Sainsbury's stopped price promotions on HFSS products voluntarily in 2016 before our data collection period. Therefore, for this intervention component the Sainsbury's data will act as a further comparator series.

Given the delay in intervention implementation, it is possible that some changes occurred prior to implementation in an anticipatory fashion. We will explore possible anticipatory changes by varying the point of interruption in sensitivity analysis and extending the pre-intervention data series if necessary.

Ethics WP1a will not recruit participants and will not require ethical approval.

Timescale Study months 10-21

7.2.2 WP1b Adult exposure to HFSS TV advertising and prevalence of online social media advertising by prominent food brands

Leadership Boyland

RQ addressed RQ 1b and 1c: Were there pre-post intervention changes in: prevalence of HFSS TV and online advertising (both product and brand)?; and exposure of UK adults to HFSS TV adverts?

The interventions should reduce exposure to HFSS food advertising. Boyland recently led an NIHR Policy Research Programme-funded project capturing pre-implementation rates of children's exposure to food advertising across multiple media as part of planned evaluation of the new advertising restrictions. Results will feed into WP0.

Although the advertising restrictions have been framed as focusing on children's exposure, their scope means they are also likely to change adults' exposure. Food advertising includes both 'product' adverts where specifically identifiable products are shown (e.g. a McDonald's Big Mac), and 'brand' adverts where brand identifiers are shown without specific products (e.g. the McDonald's 'golden arches'). As the advertising restrictions focus on product adverts, one potential impact is a decrease in product advertising but a compensatory increase in brand advertising.

Due to the personalised nature of online advertising and the substantial costs of direct measurements of exposure (e.g. using screen capture),[47] the online component of this WP will focus on response of companies to the interventions (i.e. prevalence and nature of online food advertising) rather than changes in exposure to online advertising per se.

Research design We will conduct uncontrolled ITSA of weekly broadcast television and selected social media brand channel data from 1yr before the start of implementation (i.e.

Sept 2024 to Sept 2025) to 1yr after (i.e. Jan 2026 to Dec 2026), with the three months between as the 'interruption' (i.e. Oct 2025 to Dec 2025).

Population & setting We will include UK TV channels with adult viewers and the brand channels of prominent brands of appeal to adults in WP1a categories on the four social media platforms most popular with UK adults. This reflects standardised monitoring approaches and pragmatic considerations.[48]

There are around 560 UK TV channels with any adult viewers. Currently the four most popular social media platforms with UK adults are YouTube, Facebook, Instagram and TikTok.[49] We will use the most up to date OfCom media use data at the time of data collection to make a final selection. We will use Euromonitor data (via Cambridge Judge Business School licence) to identify the top three UK operating brands by market share within each of the four WP1a categories giving n=12 brands in total across four social media channels.

Outcome measures For adult exposure to TV advertising, the outcomes will be adult person-minute-views (PMVs) of TV advertising for: all food products, HFSS food products, and brands associated with these products – all aggregated to the week level. We will disaggregate exposure pre vs post 2100 hrs to explore the potential for displacement.

For prevalence of social media food advertising by prominent brands, the outcomes will be total social media posts per brand, the proportion that are for HFSS food products, the proportion that are for brands associated with these products, and the proportion that are brand only (no food product is shown) – again aggregated to the week level. Calculation of HFSS status for food products will be as per WP1c.

Data source & collection We will purchase broadcast data on adult exposure to TV food advertising collected by the British Audience Research Bureau, from Attentional Ltd as previously[50, 51] and in Boyland's parallel NIHR PRP project. We will retrospectively collect social media food advertising content directly from social media channels using WHO protocols designed by Boyland.[52]

Sample size We will include 52 weekly pre-intervention data points and 52 weekly post-intervention data points = 104 data points in total for each of TV and social media, substantially exceeding the minimum suggested requirements for ITSA.[45]

Analysis As an obvious comparator is not available, we will use uncontrolled ITSA of adult PMVs for TV advertising. As non-intervention eligible categories are not direct analogues of intervention-eligible categories, we will not conduct controlled ITSA of social media data. Instead we will replicate uncontrolled ITSA of social media posts in each WP1a category to determine specificity of effects.

As above, anticipatory effects may occur. We will explore possible anticipatory changes by varying the point of interruption in sensitivity analysis.

Ethics WP1b will not recruit participants and will not require ethical approval.

Timescale Study months 13-30

7.2.3 WP1c Availability of HFSS products in chain restaurants

Leadership Adams

RQ addressed RQ 1d: Were there pre-post intervention changes in: availability of HFSS products in UK chain restaurants?

We found that two-thirds of UK adults reported purchasing at least one meal prepared away from home in the last week in 2018.[53] Food prepared out-of-home accounts for 31% of UK household food spend.[54] Restricting food marketing based on nutritional content may trigger reformulation and reduced availability of HFSS options both in the grocery and out-of-

home sectors.[38-40] We will supplement analysis of supermarket data (WP1a) with analysis of the nutritional content of food items available in the out-of-home sector.

Research design We will conduct an uncontrolled ITSA of quarterly data from 19 quarters before the start of implementation (i.e. Jan 2021 to July 2025) to 10 quarters after (i.e. Jan 2026 to April 2028), with the quarter between as the 'interruption' (i.e. October 2025). Quarterly data is used here, rather than weekly data as in WP1a and WP1b, to reflect the frequency with which our data source is updated.

Data source We will use MenuTracker.[55] Developed by Adams' team, this is our quarterly updated database of the nutritional content of food and drink items served by out-of-home chains. Out-of-home chains are included in MenuTracker if they have 250+ employees (i.e. are considered 'large' businesses and thus subject to current menu calorie labelling requirements in England) and provide publicly available online nutritional data. Nutritional data is sourced from chains' websites on all menu items for which it is available using automated web-scraping techniques. In 2021, 79-85 chains and 18-20k items were included per quarter. Total energy content information was available for 100% of items; fat, saturated fat, carbohydrate, sugar, protein and salt content for 95-98% of items, fibre content for 49-52% of items and serving weight for 40-43% of items.[55]

Food categories of interest Within the out-of-home sector, the interventions apply to out-of-home main meals, starters and sides, children's items, and sandwiches. We will include these as intervention eligible categories. We will use other food groups (e.g. baked goods, desserts) as comparators. We will allocate food items to food groups based on the menu section they appear in. Where menu sections are not present or ambiguous, we will develop machine learning algorithms to allocate items to categories based on item descriptions.[56]

Outcome measure The outcome measure will be the proportion of products available in intervention and comparator categories that are HFSS according to the Pan-American Health Organization's Nutrient Profiling Model (PAHO NPM).[57]

Calculation of HFSS status as defined by the interventions requires nutritional information per 100g. However, in most cases, nutritional information in MenuTracker is provided per serving, rather than per 100g. Information on serving weight (in order to convert information from per serving to per 100g) is only available for 40-43% of items. Previous work has found that the outcome of HFSS calculated according to the PAHO NPM represents an adequate proxy of HFSS status calculated according to the interventions.[58]

Analysis As non-intervention eligible categories are not direct analogues of intervention-eligible categories, we will not conduct controlled ITSA. Instead, we will replicate uncontrolled ITSA in intervention eligible and non-intervention eligible categories separately to determine specificity of intervention effects.[46] We will explore interactions by chain type (i.e. 'fast-casual', 'fast-food restaurant' or 'full-service').[59]

We will explore possible anticipatory changes by varying the point of interruption in sensitivity analysis.

Sample size We will include 11 quarterly pre-intervention data points and 10 quarterly post-intervention data points = 21 data points in total, exceeding the minimum suggested requirements for ITSA.[45]

Participants and ethics WP1c will not recruit participants and will not require ethical approval.

Timescale Study months 25-33.

7.3 WP2 Impact of the intervention on household food purchasing

Leadership Adams

RQ addressed RQ1e: Were there pre-post intervention changes in: purchasing of HFSS products by English households?

For changes in food marketing to impact on diet and health, they must change food purchasing. Household food purchasing adequately reflects consumption.[60] We have previously used purchasing data to evaluate the impact of the Soft Drinks Industry Levy and the Transport for London HFSS advertising ban on relevant household purchases.[61, 62]

Research design We will conduct an uncontrolled ITSA of weekly 'take home' household grocery purchasing using weekly data from 1yr before the start of implementation (i.e. Sept 2024 to Sept 2025) to 1yr after (i.e. Jan 2026 to Dec 2026), with the three months between as the 'interruption' (i.e. Oct 2025 to Dec 2025).

Data source We will use Kantar's Fast Moving Consumer Goods (KFMCG) Panel of ~30,000 households. Panel households are given a handheld scanner to record the barcodes of packaged items purchased and brought into the home and a book of barcodes to record unpackaged items. Purchase data (including online sales and deliveries) is uploaded daily and sent to Kantar who link it to nutritional data. Nutritional data are collected by Kantar from product packaging at least twice a year in order to capture reformulation or, for unpackaged goods, from standard food composition tables. Households record and update their demographic characteristics annually and receive gift vouchers equivalent to £100 annually. KFMCG excludes households that record fewer than six purchases weekly along with those whose adjusted weekly spend is lower than an undisclosed minimum. The panel is representative of GB households as a whole.

Food categories of interest To enable comparison, we will use the same four categories as WP1a, i.e. breakfast cereals, chocolate confectionary, instant hot drinks and pastry.

Outcome measures The primary outcome will be units of HFSS products purchased in each category per household per week. The secondary outcomes will be purchased energy, saturated fat, salt and sugar overall and in each category separately per household per week. The KFMCG data set includes nutritional content per 100g to enable calculation of HFSS status as defined in the interventions. Alongside standard nutrients, percentage fruit, nuts and vegetables is required to calculate HFSS status. As previously, we will estimate % fruit, nuts and vegetables from Kantar's qualitative assessment: high (scored as >80% fruit, nuts and vegetables), mixed (>40% and ≤80%) or low (≤40%).[61]

Analysis As non-intervention eligible categories are not direct analogues of intervention-eligible categories, we will not conduct controlled ITSA. Instead, we will replicate uncontrolled ITSA in all categories to determine specificity of intervention effects.[46] Similar analyses will be conducted for the primary and secondary outcomes. Analysis will be replicated for households with and without children and by tertiles of household income to explore differential effects across those particularly targeted by the intervention (with children) and socio-economic position (SEP; household income).

We will explore possible anticipatory changes by varying the point of interruption in sensitivity analysis.

Sample size The KFMCG panel includes ~30,000 households. We will include 52 weekly pre-intervention data points and 52 weekly post-intervention data points = 104 data points in total, substantially exceeding the minimum suggested requirements for ITSA.[45]

Ethics WP2 will not recruit participants and will not require ethical approval.

Timescale Study months 10-27.

7.4 WP3 Health impact modelling

Leadership Scarborough

RQ addressed RQ2a: What are the modelled impacts of any changes in purchasing on prevalence of overweight, obesity and other relevant health outcomes in England?

The interventions will have high population reach and do not require substantial engagement from individuals in order for them to benefit. This type of population intervention is expected

to have equitable effects across socio-economic groups.[63] We will estimate the impact of any changes in purchasing on population health outcomes in terms of body weight and incidence of related health outcomes. We will use these estimates to further estimate the impact of the interventions on healthcare costs and BMI-related social care costs. We will produce comparable results for subgroups of the population defined by area-level deprivation.

Research design As previously,[25] we will conduct scenario modelling using PRIMEtime[64] - a proportional multi state life table model.

Comparator group We will compare scenario results with a counterfactual projection of trends in obesity and diet-related disease where no interventions were implemented.

Population & setting The PRIMEtime model is representative of the English population, including both children and adults, divided into deprivation quintiles.

Outcome measures We will estimate the impact of the interventions on prevalence of overweight and obesity; and incidence of diabetes, cardiovascular diseases and cancers - all over 10 years. Over the life course of the population, we will estimate the impact of the interventions on quality-adjusted life years, life expectancy and NHS costs for each subgroup. Results will be discounted using UK Treasury rates.

Analysis Analysis of each scenario will be accompanied by assessments of parametric and structural uncertainty. Parametric uncertainty will be assessed by Monte Carlo analyses, allowing key model parameters (e.g. intervention effect sizes, relative risks, disease-specific healthcare costs) to vary according to their estimated uncertainty range. Tornado plots will be used to demonstrate which parameters are the major contributors to this uncertainty. Structural uncertainty will be assessed by sensitivity analyses varying key model assumptions (e.g. time lag between intervention and effect, duration of effect, discount rates).

Governance and ethics WP3 will not recruit participants and will not require ethical approval.

Timescale Study months 19-30.

7.5 WP4 Economic modelling

Leadership Smith, Keogh-Brown & Jensen

RQ addressed RQ2b: What are the modelled impacts of any changes in purchasing on economic performance of relevant food, media and advertising industries and wider society in the UK?

One common concern about restrictive public health policies, captured in Fig 1, is that they will have negative impacts on society and that these could offset any direct health benefits. In WP3 we will calculate any direct costs savings to the NHS as a result of the intervention. In WP4 we will explore wider economic impacts. The interventions could impact negatively on the UK commercial food, media and advertising sectors[65] with knock-on impacts for employment and, by extension, UK health. However, substitution across food categories and any health-related impacts from changes in purchasing and consumption could potentially out-weigh any negative commercial impacts. We will estimate a holistic set of indicators to assess the microeconomic, macroeconomic, health and demographic impacts of the interventions in the UK context.

Research design For impacts on the commercial sector we will conduct uncontrolled ITSA of monthly domestic turnover, employment, profitability and market share of the largest UK manufacturers and retailers of HFSS products, UK-based advertisers, digital platforms and broadcasters. We have previously conducted similar evaluations of the Soft Drinks Industry Levy.[66] In all cases, we will use data from 1yr before the start of implementation (i.e. Sept 2024 to Sept 2025) to 1yr after (i.e. Jan 2026 to Dec 2026), with the three months between as the ‘interruption’ (i.e. Oct 2025 to Dec 2025).

For impacts on the whole-economy, the Computable General Equilibrium model developed for the NIHR funded evaluation of the Soft Drinks Industry Levy[67] and further developed in project NIHR133887, which is linked to the PRIMEtime model in WP3, will be further enhanced to account for the very different interventions studied here.

Data source ONS Monthly Business Survey, business accounts, ONS Living Costs and Food Survey data, Global Trade Analysis Project (GTAP10) data and UK input-output tables

Population & setting UK

Outcome measures Sectoral turnover, employment, profitability and market share; and macro-economic indicators of Gross Domestic Product, tax revenue, production, consumption and labour impacts by sector, including agriculture, food and drink processing and retail and also population-wide demographic indicators.

Sample size For impacts on commercial sector: we will include 12 monthly pre-intervention and 12 monthly post-intervention time points = 24 data points in total, exceeding the minimum suggested requirements for ITSA.[45]

Analysis For impacts on commercial sector: uncontrolled ITSA for each outcome of interest. We will explore possible anticipatory changes by varying the point of interruption in sensitivity analysis.

For impacts on the whole economy: annual (10 year) macroeconomic simulations including impacts on GDP, sector-specific outputs, labour supplies, employment and household welfare distribution will be conducted.

Ethics WP4 will not recruit participants and will not require ethics approval.

Timescale Study months 12-36

7.6 WP5 Public awareness, support & experiences

Leadership Critchlow & Ford

RQ addressed RQ3: What proportion of people living in England were aware of and supported the interventions? What were their experiences of the interventions?

Mixed-method consumer ‘process’ evaluation can help ‘make sense’ of how and why interventions do or do not achieve effects on health and other outcomes.[68] For example, public awareness of, and support for, the interventions may be important mediators of any health effects of the interventions (Fig 1). Similarly, the interventions would be expected to reduce self-reported recall of marketing exposure, and the effects, of marketing (e.g. pester power) and these would, in turn, be expected to reduce purchasing of HFSS products. Exploring how the public perceive and respond to the interventions will provide contextual information to help interpret data on outcomes measured in WP1-4 and may be important in influencing intervention longevity and the implementation of future public health policy.[69] Consumer data also provides an opportunity to examine other direct and indirect effects of the interventions (e.g., policy support, changes in self-reported recall of marketing exposure, changed pester power) and how these interact with wider societal factors, including cost of living.

7.6.1 WP5a Quantification of changes in self-reported recall of marketing exposure and support for the intervention

Research design We will conduct between and within-country analyses of relevant questions from the International Food Policy Survey (IFPS). Data will come from the 2024 wave (pre-implementation), the 2025 wave (during intervention implementation) and the 2026 wave (post-implementation).

Setting, population & data collection IFPS is an annual, repeat cross-sectional survey conducted in Australia, Canada, Mexico, the UK, and the United States.[70] Data are collected via web-based surveys with adults (aged 18y+) and youth (aged 10-17y).[71]

Recruitment is through Nielsen Consumer Insights Global Panel and their partners. Core funding for IFPS to 2026 has been provided by Canadian Institutes of Health Research. Hammond leads IFPS and Adams & White are UK collaborators.

Comparator groups Australia, Canada, Mexico, United States.

Outcome measures We will measure past-month self-reported recall of HFSS marketing among adults and youth, including newly-restricted and unrestricted marketing. Among adults, we will also measure intervention support.

As previously,[72] self-reported recall of HFSS marketing will be measured using the question: "Think about the last 30 days: have you seen or heard advertisements for 'unhealthy' foods or drinks in any of these places?" with 14 locations listed including TV, online and via price promotions. As previously,[73] policy support will be measured using the question: "Would you support or oppose a government policy that would require a ban on…?":

- price discounts for unhealthy food and drinks (e.g., 30% off, or 'buy 1 get 1 free')
- marketing of unhealthy food and beverages online/on the internet
- advertising of unhealthy food and beverages on TV before 9pm
- unhealthy foods (e.g., sugary drinks, crisps, chocolate) at grocery store checkouts

Sample size IFPS recruits 4000 adult and 1500 youth per year per country.

Analysis Descriptive statistics will be used to examine changes in past-month self-reported recall of HFSS marketing (in adults and youth separately) and intervention support (in adults). Multivariate regression models, controlling for demographics (e.g. gender, age, SEP) will examine how self-reported recall of HFSS marketing (in adults and youth separately) and intervention support (in adults) varies by wave, testing for country*wave interactions. We will narratively compare results from the adult and youth surveys on self-reported recall of marketing.

Ethics The IFPS is reviewed by the University of Waterloo Research Ethics Committee and, where relevant, ethics boards in participating countries – including the UK. Adult participants provide informed consent. Informed consent is provided by both parents and participants in the youth survey.

Timescale Study months 16-27.

7.6.2 WP5b – In-depth understanding of awareness, acceptability, and experiences of the interventions

Research design We will conduct focus groups (FG) with adults and youth to explore awareness, acceptability, experiences, and perceptions of the interventions. FG are a valuable means of exploring, in-depth, the public's reactions to interventions and policies, and how reactions interact with wider societal and demographic factors.

Setting and Population. Focus groups will be conducted with adults (aged 18y+) and youth (aged 13-18y) living in England. Adult participants will be recruited from the general population through a GDPR-compliant market research agency operating an adult research panel. Participants aged 13-15y will be recruited via parents on the panel.

Data collection FG will be conducted online and last 60-90 minutes. Two experienced researchers will moderate the groups. The moderators will use broad and open questioning techniques to encourage participants to speak freely, using their own language.

A semi-structured topic guide will be developed to assist the moderators. The topic guide will be informed by four online PPI consultation groups (one each of people aged 13-15y, 16-18y, adults who are parents or carers, and adults who are not parents or carers) to provide preliminary understanding of the main issues from their perspective. These PPI groups will be recruited in the same way as FG participants. For this element, we want a fresh and

sample specific group of people to inform the topic guide rather than those who are already advising on the study. Thus we will not make use of the main PAG described elsewhere.

Sample size and composition We will conduct six FG with youth. Youth FG will be evenly split by age (13-14y, 15-16y and 17-18y) and gender. Four of these six groups will comprise youth whose parents are in receipt of relevant welfare benefits. We will conduct eight FG with adults. Adult FG will be split by parental status (whether participants are parents or carers or not) and receipt of relevant welfare benefits. Those who are parents or carers and those on lower incomes may be disproportionately impacted by the interventions. As such, these groups will be over-represented in FG. We will also seek to recruit diverse samples with respect to ethnicity and other PROGRESS+ characteristics.[74]

Conducting single gender FGs with participants of similar age and social background (for youth) and those of similar parental status and social background (for adults) will facilitate group dynamics and cohesion. Each group will comprise 5-6 participants giving a total sample of ~70-84 (plus an additional ~20-24 in the PPI groups). All participants will be offered a financial 'thank you' for taking part.

Analysis With participant consent, interviews will be digitally audio-recorded, transcribed verbatim, and identifiable information removed for analysis. Data will be managed using NVivo to facilitate robust, structured, deductive, and inductive thematic analysis.[75] Findings will be compared between groups to explore any demographic differences, and in particular, any indications of inequalities in experiences of the interventions.

Governance and ethics The study will be subject to full approval from Stirling University's research ethics committee. All participants will provide informed consent prior to FG commencing. Additionally, parental consent will be provided for youth participation.

Timescale Study months 1-18

7.7 WP6 Policy processes and intervention design and implementation

Leadership White & Forde

RQ addressed RQ4: Who were the key actors and what were the key actions involved in development, prioritisation, delay and implementation of the interventions?

The effects of the current interventions are dependent on the details of their design and implementation. Many organisations and stakeholders may have influenced the nature of the interventions and their pathways to impact, including the various delays to implementation. We previously found evidence that industry stakeholders achieved substantial watering down of current restrictions on TV food advertising.[65] This may explain their limited impact on children's exposure to less healthy TV food advertising.[51] Recent analysis of political lobbying suggests that the media and advertising industries made greater efforts to impact the current interventions than the food and beverage industries.[76] To understand how the interventions came to be as they were (including delays in implementation), we will qualitatively explore stakeholders' perceptions of the relevant policy processes as well as their documented responses to relevant consultations. We will interpret findings in the light of findings of other WP to determine how these policy processes may have impacted on intervention effects.

Research design With the support of Rapid Funding, we completed baseline, semi-structured interviews on the policy process in summer 2021 (n=9). We will first complete preliminary analysis of these interviews to inform the remainder of the WP. We will conduct follow up and additional interviews to explore how the policy processes evolved over time. We will supplement these with documentary analysis of responses to relevant consultations. Expert interviews will allow us to explore issues relating to the policies that may not be available in the public domain. Supplementing these with consultation responses will be useful for capturing information directed at policymakers and to capture the views of those we are unable to include by interview.

Participants and recruitment We will purposefully sample individuals who meet our interview inclusion criteria: those with self-described professional knowledge and experience of UK food marketing regulations who are currently (or until recently were) working in academia, civil society, industry or government. First, we will invite those individuals who took part in baseline interviews (n=2 from academia, 6 from civil society and 1 from government) in summer 2021. Second, we will invite additional, relevant individuals from our networks and via snowball sampling to reach a total sample size of 15-20 participants. We will send invitations with participant information sheets by email, and individuals will be invited to ask any questions before deciding to participate.

Data collection As for the baseline interviews, we will conduct follow-up interviews via videoconference. Interviews will be guided by an updated version of the interview topic guide from the baseline interviews, which reflects the Multiple Streams Framework[77] and explores aspects of problem (e.g. what problem participants think the interventions seek to address), policy (e.g. how the interventions developed) and politics (e.g. who or what helped or hindered implementation). Preliminary analysis of baseline interviews will be used to help update the topic guide. Given the amount of time that has passed since the initial proposal of the interventions it is possible that participants will have forgotten what they previously thought. To help them remember their evolving thoughts we will share our concept map developed prior to intervention implementation (Fig 1) and preliminary findings from baseline interviews to indicate what some people previously thought. We will also use 'landmarks' to remind them of specific events in the process from policy proposal, through consultation, delay and finally implementation and hence place themselves back at these events.

To access consultation responses, we will contact policy colleagues at DHSC who have previously helped us gain access to similar documents. If they are unable to assist we will issue a Freedom of Information request. Either way, we will only seek access to responses that respondents agreed could be further shared. We anticipate obtaining a maximum of 506 responses to three consultations:

- The 2019 consultation on TV and online advertising restrictions (29 responses from businesses including from broadcasters, food manufacturers and retailers, 111 from organisations including academia, health NGOs and trade organisations)[78]
- The 2020 consultation for TV and online advertising restrictions (80 from businesses, 169 from other organisations)
- The 2019 consultation on restricting promotions by location and by price (42 from businesses, 75 from other organisations).[79]

We will also consider including responses to any further relevant consultations as they become available. For example, a 2024 consultation on TV and online advertising restrictions.[80]

Analysis Audio recordings of baseline and follow-up interviews will be transcribed verbatim and analysed using thematic analysis.[75] Analysis will apply a blend of deductive and inductive reasoning: we will search for codes relevant to the Multiple Streams Framework but also allow for insights that deviate from the Framework. We will explore whether the nature of codes changes over time, and how the interventions interact with the wider policy landscape (e.g., the Cost of Living crisis). Around 3-4 transcripts will be independently coded by a second coder. The research team will meet for data clinics to discuss emerging findings before finalising themes.

Consultation responses will also be analysed using thematic analysis,[75] drawing on principles of the Framework Method.[81] We will use the codes developed in the interview analysis, amending themes and adding to them where appropriate. We will seek to understand the responses of key stakeholders to the proposed interventions as they developed through the consultation period and how this influenced the final interventions implemented. Given the potential volume of responses, we will organise responses by

stakeholder group, as the Framework Method allows, and whether they are conceptually rich or not. Analysis will focus on the richest responses in each group in the first instance.

We will interpret findings in the light of findings of other WP to determine how these policy processes may have impacted on intervention effects. Analysis of consultation responses will be used to enhance interpretation of the interview analysis and contribute to the review of programme theory in WP0.

Governance & ethics We obtained approval for baseline interviews from the University of Cambridge Humanities and Social Sciences Research Ethics Committee (reference 21.276). Further interviews will be subject to similar approval and informed consent. Data will be held on secure servers in accordance with MRC Epidemiology Unit data management policies. Respondents to consultations indicate if their responses can be shared. Ethical approval for analysis of those responses where sharing has been agreed is not required.

Timescale Study months 7-21

8 SOCIO-ECONOMIC POSITION & INEQUALITIES; EQUALITY, DIVERSITY & INCLUSION

When using quantitative data on individuals, we will use representative samples as far as possible and apply weights to maximise the generalisability of conclusions. We have not included a specific WP on inequalities to avoid it becoming 'siloed'. Instead, we see inequalities as fundamental to, and embedded throughout, the project. We conceptualise 'inequalities' broadly across diverse domains guided by PROGRESS+[74] and data availability. As far as possible and as data allow, we will explore differential effects of the interventions according to SEP (at either the individual or area level as appropriate), age, gender, ethnicity, and household structure (children in the household or not).This approach will allow us to include an assessment of differential effects of the intervention in every quantitative work package.

In qualitative work (WP5b), where representativeness is less important, we will purposively sample to ensure that a wide variety of experiences and perspectives are captured. Techniques such as member checking and deviant case analysis will be used to ensure analytical rigour.

Our approach to representativeness, EDI and differential effects in each WP is as follows:

- **WP1a**; We have included supermarkets that cater for different sections of the marketplace including the leading discount retailer (Aldi); differences by supermarket price point will be explored
- **WP1b**; broadcast data on advertising exposure; includes all UK TV channels with adult viewers; differences by gender, SEP and household structure will be explored
- **WP1c**; MenuTracker data on out-of-home availability; >85 large out-of-home chains; differences by chain type will be explored
- **WP2**; Kantar household purchasing data; ~30,000 households; weights used to maximise generalisability; differences by SEP and household structure will be explored
- **WP3**; Health Impact Modelling; based on WP2 findings; differences by area-level deprivation will be explored
- **WP4**; Economic Modelling; households in the CGE model will be disaggregated to enable analysis by SEP
- **WP5a**; IFPS data on awareness & acceptability; ~4000 adults, ~1500 youth per year per country, census-based recruitment quotas; design weights used to maximise generalisability; differences by age, gender, SEP and ethnicity will be explored
- **WP5b**; Focus groups stratified by SEP and age to ensure diversity of perspectives and increase group cohesion; differences by age and SEP will be explored

- **WP6**; Stakeholder interviews & documentary analysis; diverse sampling frame to ensure wide variety of stakeholder perspectives; differences by stakeholder group will be explored

9 STUDY REPORTING AND PUBLICATION

We will focus our dissemination activities on four stakeholder groups: international and UK national-level policymakers, international and UK civil society groups, the public, and other researchers. Given the interventions we will study are globally unique, we anticipate that our research will impact: refinement and development of dietary public health policy in the UK and internationally; and development of scientific understanding on food marketing and its restriction. Both are likely to improve population health.

We will disseminate findings to policymakers and civil society via short written and video summaries of findings, making use of infographics and other design approaches as relevant, shared directly with relevant individuals and organisations and more broadly through our networks. We will conduct online 'briefings' on key papers as they are published, inviting relevant representatives from policy and civil society to 30-60min webinars describing key findings and allowing time for discussion and comment. We will arrange a final dissemination workshop bringing all of our findings together. We will conduct this hybrid to enable a wide range of people to attend and for a recording to be made and shared even more widely. We will share invitations to briefings and the dissemination workshop widely and ask those in our networks to onward share them with others in their networks.

We will also present findings at relevant conferences and networks that policymakers and representatives of civil society organisations attend in the UK and internationally. We will maintain informal discussions with relevant teams in DHSC, World Health Organization and advocacy groups and use these as opportunities for formal and informal dissemination. We have included representatives from policy and advocacy groups on our Study Steering Committee to help inform our research as well as our dissemination strategy.

We will disseminate findings to the public via events at festivals of science and knowledge, short videos shared via social media and press-releases of peer-reviewed publications. All participants recruited specifically for this research will be asked if they would like findings shared with them. Public-facing dissemination will be guided by our Public Advisory Group.

We will disseminate findings to other researchers via presentations at conferences and publications in peer-reviewed journals. Planned publications are shown in the timeline.

We will follow best practice with data sharing, posting anonymised data on freely accessible repositories where we can. In other cases we will make clear who data sharing requests should be sent to. In some cases (e.g. data is subject to data sharing agreements, ethical restrictions), we will be unable to share data. As appropriate, we will also share analytical code on freely accessible repositories and publish pre-prints when we submit to peer-reviewed journals. As with data, it may not be possible to share all analytical code, particularly that subject to intellectual property restrictions. In some cases where we cannot make data freely available, code will be shared, but other researchers will only be able to replicate analyses if they are able to independently access e.g. proprietary data.

The main barriers to achieving our anticipated impacts are likely to be political i.e. the political landscape is not best aligned to make change in response to our findings. We will take a long view on impact beyond the life of the project, identify policy windows as they open, and ensure evidence products are ready to be delivered when policy windows open.

10 DATA MONITORING, QUALITY CONTROL AND QUALITY ASSURANCE

Adams will provide overall leadership of the project. WP leads will provide day-to-day management, oversight and leadership of individual WP, meeting regularly with project researchers and providing ad-hoc support between meetings. Approximately monthly project

meetings of all applicants and project staff will be used to monitor progress and ensure interaction between WP. A Study Steering Committee comprising independent academics, policy representatives, advocacy groups and members of the Public Advisory Group will meet at least annually to provide independent oversight.

11 ETHICS AND REGULATORY ISSUES

In most cases, we will not recruit participants directly for this research. Data obtained from elsewhere will be entirely anonymised prior to sharing with us. We will recruit participants for WP5b (focus groups) and for WP6 (stakeholder interviews). This will be subject to ethical approval from relevant ethics committees at the Universities of Stirling and Cambridge respectively. All participants recruited directly for the research will provide fully informed consent and will be offered financial tokens of appreciation. Data will be fully anonymised before analysis. All data will be stored on secure servers with access restricted to project members.

12 PUBLIC INVOLVEMENT

We will evaluate a government-led intervention. As such, it is appropriate to involve diverse publics. We will involve the public in our research for three purposes – to comment on public facing documents (e.g. recruitment materials and focus group topic guides) to ensure they are best designed to achieve our aims, to help us interpret emerging findings to ensure we bring a wide variety of perspectives to making sense of our results, and to guide public facing dissemination activities to ensure that they are accessible and meaningful.

We have recruited 5 members of the Cambridge University Hospital PPI Panel to join a Public Advisory Group (PAG). These will be supplemented with input from young people (e.g. via BiteBack 2030), a broader range of parents (e.g. via the Children's Food Campaign Food Ambassador's Programme) and the public involvement functions of the ARC North West and Cumbria and Health Determinants Research Collaboration in Liverpool.

We will seek feedback on public facing documents from the PAG via ad-hoc electronic communications. We will share public facing documents for comment with a structured background and feedback form explaining the purpose of the document and the feedback sought. We will provide a brief written summary of changes made based on feedback.

In an additional strand of PPI in WP5b, we will recruit consultation groups to inform the focus group topic guides to be used. Four online PPI consultation groups (one each of people aged 13-15y, 16-18y, adults who are parents or carers, and adults who are not parents or carers) will be convened. These will be recruited through market research companies with access to diverse participants.

To help us interpret emerging findings and guide public facing dissemination activities we will host quarterly meetings of the PAG. These will take the form of discussions held by video-conference of up to 90 minutes. Specific discussion topics will vary across the project. We will always provide an update on how previous discussions have influenced the research and include time for general discussion on the wider issues raised by the research. In the first meeting, we will agree terms of reference.

Each PAG meeting will be preceded by circulation of an electronic newsletter to maintain engagement and provide a holistic view of the research. These newsletters will report on progress, share news from the research team (e.g. brief researcher profiles) and provide links to other relevant materials related to food marketing that PAG members might find interesting.

We will invite two PAG members to join our Scientific Advisory Group. They will be given the opportunity for a brief pre-meet with the Principal Investigator (Adams) before each meeting of the Scientific Advisory Group to review the agenda and likely content of the meeting.

Our PPI activities will be managed and co-ordinated by the Study Co-ordinator (to be recruited).

All individuals contributing to PPI activities will be reimbursed for their time at standard INVOLVE rates.

13 PROJECT TIMELINE

<table>
<tr><td></td><td></td><td></td><td></td><td colspan="36">Study month (1 = January 2026)</td></tr>
<tr><td></td><td></td><td></td><td>Setp-up</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td></tr>
<tr><td>WP</td><td>Lead</td><td>Content</td><td></td><td colspan="36"></td></tr>
<tr><td>WP0</td><td>Adams</td><td>Integration</td><td rowspan="10">Contracting, recruitment of PDRA7, establish study steering committee etc</td><td colspan="9"></td><td colspan="12">Living synthesis, additional WP0 work as required, WP6 extends pro rata</td><td colspan="15">Updating programme theory, targetted additional data collection, analysis, final reporting</td></tr>
<tr><td>WP1a</td><td>Bandy</td><td>Supermarket promotions & HFSS availability</td><td colspan="5"></td><td colspan="4">Recruitment</td><td colspan="6">Protocol & data prep</td><td colspan="3">Analysis</td><td colspan="3">Reporting</td><td colspan="15"></td></tr>
<tr><td>WP1b</td><td>Boyland</td><td>Adults' exposure to TV & online advertising</td><td colspan="8"></td><td colspan="4">Recuitment</td><td colspan="7">Social Media protocol, collection & analysis</td><td colspan="7">TV data protocol, access & analysis</td><td colspan="4">Reporting</td><td colspan="6"></td></tr>
<tr><td>WP1c</td><td>Adams</td><td>Out of home HFSS availability</td><td colspan="8"></td><td colspan="4" rowspan="2">Recruitment</td><td colspan="12"></td><td colspan="3">Protocol</td><td colspan="3">Analysis</td><td colspan="3">Reporting</td><td colspan="3"></td></tr>
<tr><td>WP2</td><td>Adams</td><td>Household grocery purchasing</td><td colspan="8"></td><td colspan="3">Protocol</td><td colspan="3">Data access</td><td colspan="6">Analysis</td><td colspan="3">Reporting</td><td colspan="9"></td></tr>
<tr><td>WP3</td><td>Scarborough</td><td>Health impact modelling</td><td colspan="14"></td><td colspan="4">Recruitment</td><td colspan="6">Update PRIMEtime & protocol</td><td colspan="3">Analysis</td><td colspan="3">Reporting</td><td colspan="6"></td></tr>
<tr><td>WP4</td><td>Keogh-Brown, Jensen & Smith</td><td>Economic modelling</td><td colspan="12"></td><td colspan="3">Protocol</td><td colspan="3">ITS analysis</td><td colspan="3">ITS reporting</td><td colspan="9">Update CGE</td><td colspan="3">CGE analysis</td><td colspan="3">CGE reporting</td></tr>
<tr><td rowspan="2">WP5</td><td rowspan="2">Critchlow & Ford</td><td rowspan="2">Public awareness, support & experience</td><td colspan="3">5b protocol & ethics</td><td colspan="5">5b data collection</td><td colspan="6">5b analysis</td><td colspan="4">5b reporting</td><td colspan="18"></td></tr>
<tr><td colspan="15"></td><td colspan="3">5a protocol</td><td colspan="6">5a analysis</td><td colspan="3">5a reporting</td><td colspan="9"></td></tr>
<tr><td>WP6</td><td>White & Forde</td><td>Policy processes</td><td colspan="2"></td><td colspan="4">Recruitment</td><td colspan="3">Protocol & ethics</td><td colspan="6">Interviews & data access</td><td colspan="3">Analysis</td><td colspan="3">Reporting</td><td colspan="15"></td></tr>
</table>

Note. Study month 1 = January 2026; colour coding shows where researchers contribute to more than one WP in order to provide longer positions that provide more employment stability; milestones are as implied by the timeline e.g. milestone 1 = WP5 ethics by end of study month 3.

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