Evaluating the impact of the placement regulations on the CONvenience store sector and co-creating solutions for a healthier system: ECON study

Protocol

Short title: ECON

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SPONSOR

City St George's, University of London is the research sponsor for this project. For further information regarding sponsorship conditions, please contact Christina Vogel (contact details above).

COLLABORATORS

Impact on Urban Health
The Food Foundation
Southampton City Council
Surrey County Council

Gateshead Council
Southwark Council
Royal Borough of Greenwich
Nottingham County Council
NewTrade Media
TWC
Asian Media Group
Chartered Trading Standards Institute
Chartered Institute of Environmental Health

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GENERAL INFORMATION
This protocol describes the ECON study and provides information and the procedures for recruiting participants and running the study. Every care has been taken in drafting this protocol; however, corrections or amendments may be necessary. These will be circulated to the known co-applicants, collaborators and funders of the study as necessary. Problems relating to the study should be referred, in the first instance, to the study manager.

COMPLIANCE
This study will adhere to the conditions and principles outlined in the EU Directive 2001/20/EC, EU Directive 2005/28/EC and the ICH Harmonised Tripartite Guideline for Good Clinical Practice (CPMP/ICH/135/95). It will be conducted in compliance with the protocol, the Research Governance Framework for Health and Social Care (Department of Health 2nd July 2005), the General Data Protection Regulations 2018, Mental Capacity Act (2005), and other regulatory requirements as appropriate.

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1. SUMMARY

In October 2022 the government implemented a new law to restrict the placement of foods high in fat, salt and sugar (HFSS) at prominent places in stores in England including entrances, aisle-ends and checkouts.(1) In October 2025, further restrictions will ban the use of volume-based HFSS promotions (e.g. multi-buy offers).(2) The rules do not apply to smaller stores <2,000 square feet or <50 employees. But, unlike supermarkets, larger in-scope convenience stores have few legal and financial resources to implement reform.

Our recent reports indicate the disruptive impact this law could have on the convenience store sector, (3,4) with uncertain implications for sectoral competition, customer experience and public health. Our in-depth evaluation of the convenience store sector will provide insight into the law's benefits but also disentangle unintended consequences for profits and dietary inequalities. We couple this evaluation with identification of strategies to improve the sale, marketing and profitability of healthy foods in all convenience stores to enhance public health.

2. INTRODUCTION

Obesity and poor diet constitute two of the greatest threats to population health. They are key priorities of government policies(5,6,7,8) because they directly contribute to morbidity, mortality and health inequalities, and cost the NHS >£6 billion annually.(9-12) Across England, two-thirds of adults live with overweight; in the most deprived areas the prevalence is 75%.(13) There are widening inequalities in diet and weight status between socioeconomically disadvantaged and affluent families (13,14) and a life expectancy gap of ~10 years between the most and least deprived areas.(15)

The food industry and customers are trapped in a 'junk food cycle', where unhealthy foods are cheap to make, profitable to market, appealing to eat and affordable to buy.(16) Healthy food is three times more expensive per calorie than HFSS foods, and <1% of placement promotions are fruit and vegetables.(17,18) Previous interventions which rely on individual action are unjust, ineffective and increase inequalities.(19,20) To give everyone an equal chance of achieving and sustaining good health, policies must focus on changing food environments and systems. Recognising the need for action, the Government recently implemented the first component of the Food (Promotion and Placement) regulations in England.(1) This new law is world-leading and supports the creation of store layouts that promote healthier food purchasing. It is, however, complex, as our pre-implementation rapid qualitative evaluation with 108 stakeholders showed that there may be unintended economic and health consequences for convenience store owners and their customers especially as government authorities are often too under-resourced to offer local business support.(3,4)

Increased exposure to prominent displays and price promotions on HFSS products is associated with less healthy choices, increased BMI and dietary inequalities.(21-24) Our own and others' research shows that replacing HFSS products with healthier or non-food items in prominent areas in supermarkets helps people across socioeconomic groups make healthier choices.(21,25,26) But supermarkets operate different business models than convenience stores,(27) having greater opportunity to offer more, better quality, healthy foods.(28-30)

There are over 48,590 convenience stores in the UK that contribute £45.2 billion pounds to the British economy, 405,000 jobs and a key food supply in local communities.(30,31) Populations known to have poorer diets (i.e. young people, older adults and socioeconomically disadvantaged families) often rely on convenience stores for their groceries. Transport limits access to large supermarkets(28) and increases dependence on local, less healthy convenience stores and takeaways.(32,33) The new law may increase inequalities and cause commercial disruption to the sector because small out-of-scope stores are permitted to continue marketing unhealthy foods. Additionally, in-scope convenience stores have limited resources to comply, and local authorities, tasked with supporting retailers with this new law, are overstretched.(34) Patchy implementation and ineffective law enforcement are highly likely.(3)

Our research will generate robust data to provide a thorough, independent evaluation of the new Food (Promotions and Placement) regulation's effects on convenience stores, their customers and local authorities. The mixed-methods, complex systems design builds on existing evidence and discussions with customers, convenience store staff, project partners and other stakeholders. We will co-produce mutually beneficial solutions across the food system that will take into account the heterogeneity of the sector in terms of store type, core sales purpose and customer base. Our project focuses on the need to maintain or increase profit margins, establish trusting relationships, strengthen bonds between retailers and their communities, and engage suppliers.(27,28)

3. AIMS AND OBJECTIVES

3.1 Aim

To evaluate how the Food (Placement and Promotions) regulations influence food-related behaviours of customers, commercial outcomes in the convenience store sector and the load on local authority enforcers in England, and co-create multiple systemic strategies that enable convenience stores to support health and wellbeing.

3.2 Objectives

a) To assess the influence and effectiveness of the new law on the food purchasing and dietary behaviours of convenience store customers (WPs2&3)

b) To investigate the impact of the new law on commercial outcomes for convenience 3 stores (WPs2&3)

c) To examine the enforcement strategies used by local authorities to enable convenience stores to comply with the law (WPs2&3)

d) To co-create and prioritise strategies for reforming local and national systems surrounding convenience stores to optimise the marketing and profitability of offering healthier foods (WPs3&4)

4. METHODS AND ANALYSES

4.1 Study design

This project has four interlinked data work packages (WPs) carried out over 30-months (Figure 1). WP1 incorporates project governance, patient and public involvement (PPI) and disseminations activities. WPs2-4 are the interlinked data WPs. Ethical approval for all primary data collection will be gained from City St George's, University of London, School of Health and Medical Sciences Ethics Committee.

WP2 quantitatively examines the national context of the legislation drawing upon an existing national dataset of household food purchasing in convenience stores using Kantar World Panel data and national surveys with i) local authorities and ii) convenience store owners.

WP3 uses a mixed method case study approach to examine the local impact of the regulations in six diverse communities in England. This approach enables a deep-dive exploration into the local systems that impact the implementation and enforcement of the legislation whilst providing insight into further opportunities to support health in the sector. Quantitative datasets will include novel commercial (ePOS) sales data at the store level in the case study areas which will be enhanced by store audit data relating to placement of products in each store and a survey of the diets and shopping habits of customers from these stores. Qualitative ethnographic data will be collected from stores, citizens, local authorities and suppliers in each region to gain in-depth understanding of the systems, environments and practices used in each sector.

WP4 will utilise deliberative workshop methods to build upon findings from earlier WPs to identify strategies to optimise engagement with, and structural supports for, improving the healthfulness of food and drink products offered across convenience stores.

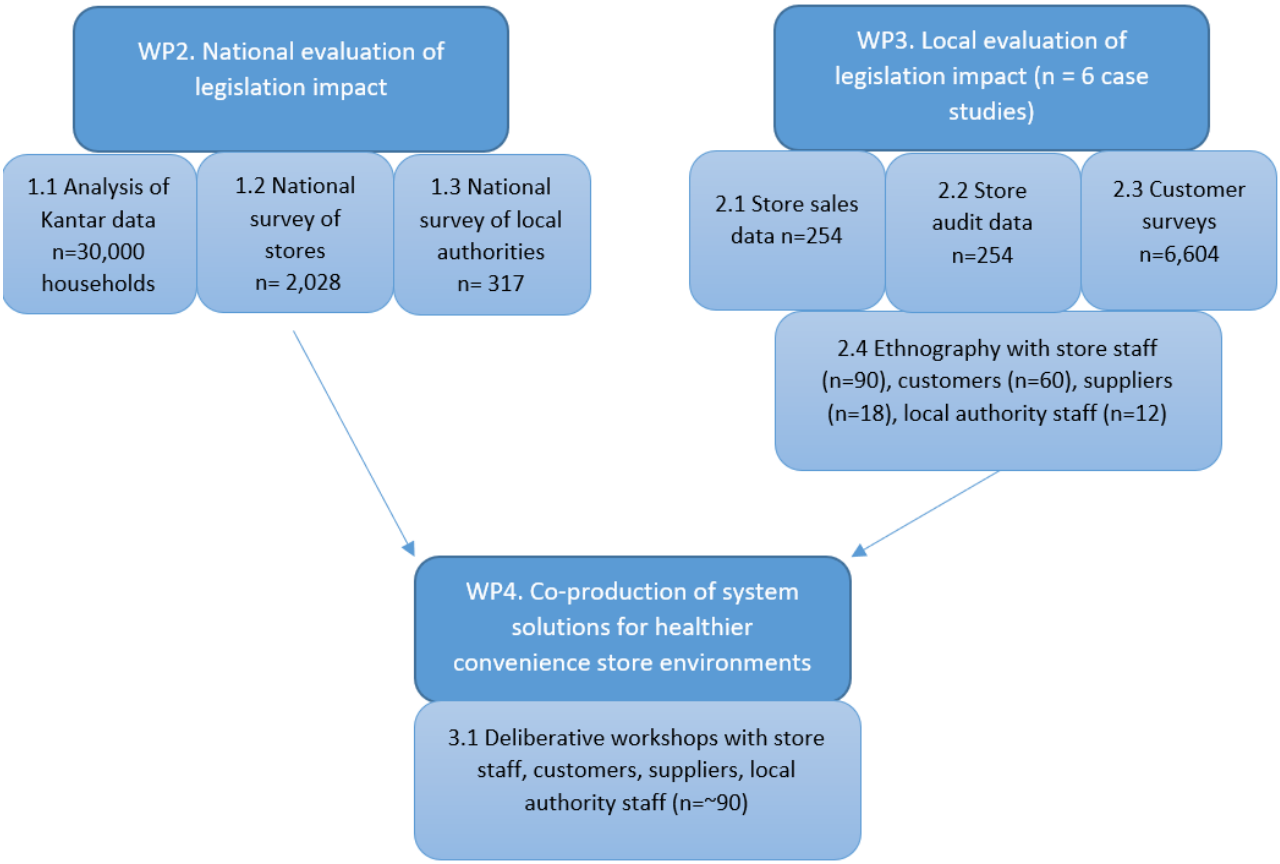

Figure 1. Three work packages in ECON

4.2 Study Setting

The study evaluates the impact of the Food (Placement and Promotions) (England) 2021 regulations (henceforth 'regulations') in the convenience store sector in England.

The regulations were implemented in October 2022 and restrict qualifying businesses from promoting less healthy foods (high in fat, sugar and salt; HFSS) in prominent locations such as the store entrance, aisle ends and checkouts in stores. HFSS foods are products from one of thirteen specified categories (soft drinks, savoury snacks, confectionary, sweet biscuits and bars, cakes and cupcakes, desserts and puddings, sugar-sweetened yoghurts, ice creams, meal centres, cereals, morning goods, pizzas and potato products) that has a nutrient profile score of ≥4 for food or ≥1 for drink using the FSA nutrient profile model.

Large businesses (with premises whose sales space is ≥2,000 square feet and have ≥50 employees) must abide to these regulations. This study focuses on small-medium retail businesses whose size just about qualifies them for the regulations or who may be considered out-of-scope. This includes i) independent corner shop stores who may be affiliated with a symbol group company (e.g. Londis, Nisa) and are therefore contracted to stock or promote a percentage of specific products or ii) independent stores who have full autonomy on the products they stock and how these might be displayed. This study does not include small format stores of supermarkets (e.g. Tesco Express, Little Waitrose) as these operate a different business model.

Work package 2 focuses on a national picture of the convenience store sector whilst work package 3 takes a focused case study approach. Case study areas include Surrey and Southampton in the South, Gateshead in the North, Nottinghamshire in the Midlands and Southwark and Greenwich as two London Boroughs. These communities have been selected because they:

i. represent culturally and ethnically diverse communities, located in different regions of England;
ii. provide insight into variations between urban (Gateshead, Southampton, Southwark, Greenwich) and rural communities (Nottinghamshire, Surrey);
iii. include a mix of moderate to high levels of child overweight and obesity rates compared to the national average of 37.8 (Southampton and Reigate & Banstead area of Surrey 34.0, Bassetlaw district of Nottinghamshire 37.8, Greenwich and Southwark 40.5, Gateshead 40.9);
iv. represent a range of levels of deprivation for comparative purposes (Surrey least deprived, Southampton, Bassetlaw and Greenwich high levels of deprivation, Gateshead and Southwark highest deprivation);
v. Surrey County Council is the primary authority for Association of Convenience Stores and will provide important information about support provided to one of the sector's representative bodies.

5. WP2: NATIONAL EVALUATION OF LEGISLATION IMPACT

5.1 Analysis of Kantar Data

5.1.1 Research Questions

1. Which population groups make regular HFSS purchases from convenience stores and how do these differ by type of store?
2. What impact does the new law have on HFSS purchases and the nutrient profile in the convenience sector, and which population groups are affected?

5.1.2 Eligibility Criteria

Kantar World Panel (KWP) is a large, nationally representative dataset of ~30,000 English households per year followed over time that will allow investigation of *changes* in household food choices before and after legislation implementation. KWP data from households in England will be used. This will include households who used independent-unaffiliated, independent-affiliated (symbol group or fascia), or franchised convenience stores (note we are not including convenience formats of national supermarket chains). Both qualifying stores (with a relevant floor area of ≥2,000 square feet) and out-of-scope stores will be included. Store details will be cross-referenced with property records from EG Radius, a data platform by Estates Gazette that provides comprehensive commercial real estate data and market analysis. In addition to store location details like postcode and full address, EG radius provides property square footage. These data will enable classification of stores as either being in-scope or out-of-scope of the regulation. An assumption will be made that ~80% of a store is used for product sales (with 20% used for storage, staff rooms, and non-food services such as post office space), thus stores ≥2,400 square feet will be considered a qualifying business for the regulations.

5.1.3 Sample size calculation

Kantar Worldpanel, a large, nationally representative dataset of 30,000 English households per year who report all food purchases they bring home.

5.1.4 Outcome measures

Primary outcome: The difference in purchases of HFSS products in the 13 in-scope categories from in-scope and out of scope convenience stores pre- and post- implementation of regulation.

<u>Secondary outcomes</u>:

i) Differences in overall nutrient profile model score and overall calories from purchases made between in-scope and out-of-scope convenience stores pre and post regulation implementation
ii) Differences in the nutritional outcomes according to consumer group characteristics (age, income, households with/without children and BMI status of main shopper)

iii) Differences in HFSS, nutrient profile model score and calorie purchases between customers who frequently make purchases in convenience stores, those who do their top up or on-the-go shopping in such outlets, and those who rarely purchase from convenience stores

iv) Differences in the above according to consumer characteristics

5.1.5 Analysis

KWP data is high-frequency purchasing information including product nutrients and the food outlet where products were purchased. KWP data will be analysed to:

i) Identify consumer groups who: i) frequently make purchases in convenience stores, ii) do their top up or on-the-go shopping in such outlets, and iii) rarely purchase from convenience stores.

Our analysis will focus on identifying these groups based on characteristics of age, income, households with and without children and adolescents, and by self-reported BMI status (obesity) of the main shopper in the household. We will focus on producing these analyses for the period before the introduction of the new legislation - October 2021 to October 2022 - to provide novel insights about shopping patterns and profiles for the convenience store sector. The definitions of store types will rely on previous literature (29) as well as differentiating large and small convenience stores based on shop floor square footage.

ii) Aggregate KWP purchasing data across the same period by food outlet to analyse the average product composition of foods and drinks sold and determine how healthy the foods sold in different types of convenience stores were before the introduction of the legislation. The sample covers purchases in around 6,700 shops. For a subsample of 4,410 we have information on the size of their sales area and whether they classify as convenience stores. Dimensions of nutrient quality will include a breakdown into high and low HFSS products, average nutrient profile scores as well as sugar, fat and salt content of outlet-specific purchases.

iii) Examine data covering the period January 2022 to March 2023 to analyse whether there is discontinuity in the purchase of HFSS products from October 2022, when the regulations were introduced (RQ2). We will exploit the fact that the Food (Promotions and Placement) regulation is only being introduced in convenience stores with a sales floor area exceeding 2,000 square feet (according to our currently available data around 87% of KWP convenience stores), and combine a regression discontinuity with a difference-in-difference approach (35) to compare HFSS product sales in larger intervention stores with those in smaller control convenience stores. If we detect a change in the sales outcomes, we will further estimate the impact of the regulation on the aggregated nutrient profiles scores, as well as on key nutrient outcomes such as calories, salt, fat and sugar using the nutrient profiling model. This approach helps investigate the extent to which the legislation changes overall purchases of HFSS foods. Since the legislation came into effect in the midst of a cost-of-living crisis, we will control for overall inflation by including the consumer price index as well as location-specific food prices in our estimation. As we are using a difference-in-difference estimates, which compare HFSS purchases made in large (intervention) versus small (control) convenience stores, inflation indices will only affect our estimates if they alter the stores from which households purchase foods, or change purchasing patterns by shoppers in large versus small convenience stores.

iv) While our approach to answering RQ2 for this WP will rely on aggregating the individual shopping trip data to outlet-area level, we will also: i) characterise consumers by whether they shop in small and/or large convenience stores prior to the legislation and ii) estimate the differential impact of the legislation on shoppers who frequently or regularly buy from treated stores relative to those who do not. We will apply the same statistical approach – a Regression

discontinuity design combined with a Difference-in-difference approach - to households' purchasing data to determine changes in the amount/frequency of HFSS purchases among those who frequently shop in intervention versus control stores. This approach allows characterisation of how particular consumer groups are affected by the legislation. We will focus on differential policy impacts based on characteristics of age, income, households with and without children and adolescents, and by self-reported BMI status (obesity) of the main shopper in the household.

v) We will also identify the impact of the new legislation on the overall nutrient composition and food baskets of population groups who predominantly or regularly buy from large convenience stores, compared to those only using small stores that do not have to comply with the legislation. In addition, we will analyse substitution patterns, such as whether people switch to healthier snacks or unhealthy alternatives such as alcohol which are on prominent display following introduction of the new regulation.

5.2 National survey of convenience stores

5.2.1 Research Question

What perceived impact does the new law have on commercial outcomes across the convenience store sector?

5.2.2 Eligibility Criteria

Surveys will be completed by store owners or managers (those who have financial oversight of the business and have responsibility for decision-making around stock supply and placement) of businesses located in England that are defined as an independent-unaffiliated, independent-affiliated (symbol group or fascia), or franchise convenience store. This will include stores that qualify for the regulations (i.e. with relevant floor area of ≥2,000 square feet) and those who do not (≤2,000 square feet). Store size will be determined through data linkage to the EG Radius dataset. Other store staff will not be eligible.

5.2.3 Sample size calculation

The sample size is estimated in terms of non-inferiority (37), since it is important to determine that the revenue of in-scope stores is not inferior to that out-of-scope stores following legislation implementation. Revenue is considered not inferior if the change is within 0.13SD. Therefore, the total sample size required at 90% power and a 5% significance level is 2,028 (1,014 in- scope and 1,014 out of scope stores).

5.2.4 Participant Recruitment

We have partnered with two media companies who have a combined membership of over 45,000 convenience store retailers. Membership lists will be classified as in-scope or out-of-scope by IFS based on the size of store. Stratified randomised sampling will establish a list of qualifying and out of scope stores to be contacted for participation, with each media company recruiting 1,014 stores.

5.2.5 Method

A random sample of equal numbers of in- and out-of-scope stores from each media companies' membership lists will be emailed an invitation to take part in the study and then followed up with a phone call from research and insight staff at each media company. The survey will be completed over the telephone with media company staff and captured on Qualtrics, a survey online platform. The fifteen-minute survey has been co-designed with public contributors and expert stakeholders and covers questions about services and products offered and noticeable changes in sales, customer footfall and products available from suppliers and wholesalers since the legislation, as well as costs of implementing change (e.g., layout, staffing) in response to the legislation.

The convenience sector is diverse and may serve a number of purposes in the local community (e.g. to provide travel cards and snacks to local commuters, to provide essential groceries to local families, or to provide cultural produce to ethnic communities) and it is important to capture details of this heterogeneity so that

any proposed solutions can be tailored for businesses. Asking about products offered also allows us to identify the types of HFSS and alternatives to HFSS that stores stock. Store managers who complete the survey will be given a £20 Amazon voucher.

5.2.6 Outcome measures

Primary outcome: Perceived percentage change in revenue per store since the regulation's implementation in 2022 (in the last 2-3 years).

Secondary outcomes:

i) Perceived changes in customer footfall since the regulation's implementation in in 2022 (in the last 2-3 years).
ii) Perceived changes in wholesale lines (i.e., healthiness of products available from suppliers) since the regulation's implementation in 2022 (in the last 2-3 years).
iii) Changes in store's infrastructure, staffing, suppliers and product offerings in response to the regulations, and estimated costs.

5.2.7 Data analysis

Primary survey data analysis will use Stata (36) and address the research questions (RQs). Descriptive statistics will use mean (SD) for continuous, normally-distributed variables and median (IQR) for continuous non-normally-distributed variables. Categorical variables will be summarised using frequencies and percentages. Linear regression models will be used to compare percentage change in revenue between in-scope and out-of-scope stores controlling for confounders. Ordinal or logistic regression models will be used to compare perceived changes to numbers of customers visiting stores and healthiness of products available from suppliers, depending on distributions of the outcomes. If binary outcomes are not rare log-binomial (39), Poission regression models (40) will be used to calculate relative risks. Confounders will be adjusted for, identified using Directed Acyclic Graphs.(41)

5.3 National survey of local authorities

5.3.1 Research Questions

What enforcement and business support activities are local authorities undertaking and how does this vary by region and type of authority?

5.3.2 Eligibility Criteria

Responsibility for enforcing the legislation falls to either trading standards or environmental health staff depending on the individual structure of each local authority. Furthermore, staff enforcing food policy need to have received appropriate training as a food qualified officer. Senior, food qualified officers in all (n=317) in local authorities in England will be invited to participate in the study. Supporting colleagues to enforce and businesses to comply with the regulation is within the remit of public health teams. Therefore all (n=156) local authorities with a public health lead will also be invited to participate in the study.

5.3.3 Sample size calculation

The target sample is to hear form trading standard or environmental health teams in all n=317 local authorities in England and all public health teams in local authorities in England (n=156). Therefore the total target sample is n=473.

5.3.4 Participant Recruitment

The chief executive or lead manager of each local authority in England and all public health directors in England will be invited to participate via personalised email. All email addresses are available on publicly available

council websites. Furthermore, study adverts will also be placed in professional communication channels hosted by the Chartered Trading Standards Institute and the Chartered Institute of Environmental Health.

5.3.5 Method

Email invitations and adverts will include information about the study and a link to an online survey hosted by Qualtrics. The online survey has been co-designed with representatives from our six local partners. It consists of a consent form followed by specific questions filtered for either enforcement (trading standards and environmental health; ~30-minute survey) staff or public health staff (~15-minute survey). The enforcement survey asks about whose responsibility it is to enforce the regulations in each specific local authority, the proactive (site visits, notices and penalties issues) and reactive (complaints) activities, business support activities and confidence in enforcing the regulations. The public health route of the survey asks about local population data, public health priorities, and activities to support local enforcement.

5.3.6 Outcome measures

Primary outcome: Enforcement activity in terms of total number of proactive visits, complaints by citizens and businesses, improvement notices,fixed penalty notices issued, and appeals received by local authorities in England.

Secondary outcomes

i) Differences in enforcement activity (number of proactive visits, complaints, improvement notices, fixed penalty notices and appeals) by **region**(North East, North West, Yorkshire and The Humber, East Midlands, West Midlands, East of England, London, South East, South West).
ii) Differences in enforcement activity by **type** of local authority (Single-Tier Authorities: Unitary Authorities, London Boroughs, Metropolitan Boroughs; Two-Tier Authorities: County councils and district/borough councils; Combined Authorities)
iii) Differences in enforcement activity by **enforcement type** (i.e., trading standards vs environmental health).
iv) Differences in enforcement activity by **number of environmental health/trading standards officers** in local authority.
v) Differences in enforcement activity by current and required **resource allocation to enforcement** activity (FTE's to food controls and % time dedicated to enforcement activities)
vi) Differences in enforcement activity by **perceived confidence in knowledge of regulation** details and ability to enforce.

Other exposures of interest

Other exposures of interest to explore differences in enforcement activity include level of deprivation by local authority, population size, level of childhood obesity priority, number of retail business in LA, percentage of retail food businesses that qualify for the regulation.

5.3.7 Data analysis

Primary survey data analysis will use Stata (36) and address the RQs. Descriptive statistics will use mean (SD) for continuous, normally-distributed variables and median (IQR) for continuous non-normally-distributed variables. Categorical variables will be summarised using frequencies and percentages. Count outcome variables will be analysed using Poisson regression models to compare outcomes such as number of improvement notices issued by exposures such as geographic region or local authority type. Descriptive statistics will be used to describe the impact of regulations on workload (i.e., proportion of LA's providing support to businesses to help them implement the regulations before, and after incidents of non-compliance, proportion of Local Authorities that provide primary authority support) and the capacity available, allocated and desired for enforcement. . Analyses will be conducted separately for enforcement (environmental health

and trading standards) and public health staff so that each local authority is only represented once in each analysis.

6. WP3: LOCAL EVALUATION OF LEGISLATION IMPACT

6.1 Store sales data

6.1.1 Research Question

What impact does the new legislation have on store sales and how does this impact differ between in-scope and out-of-scope stores?

6.1.2 Eligibility Criteria

Independent unaffiliated, independent-affiliated and symbol group convenience stores residing in postcode areas included in the six case study regions in England will be eligible for the study. We aim to achieve a split of ~50/50 in-scope and out-of-scope businesses in this sample (or as close to this as pragmatically possible given the natural mix of stores in the regions). Similar to methods used in WP2, in-scope stores will be determined through data linkage to the EG Radius dataset which contains information on store size.

6.1.3 Sample size calculation

In a previous product placement intervention study of six discount supermarkets (25) we observed that confectionery sales rose over the study period by 411 items per week in three control stores, compared with only 297 items per week in three intervention stores (pooled SD = 255 items per week). We anticipate that 70% of transaction data will come from in-scope stores and 30% from out-of-scope stores. The total sample size required to detect a difference in change of 114 items per week with a standard deviation of 255 items per week at 90% power and a 5% significance level is 254 stores (77 in-scope stores and 177 out-of-scope stores).

6.1.4 Participant Recruitment

We have partnered with TWC, a technology company who provide insight solutions to wholesalers in the convenience store sector. TWC will identify 254 stores across our six case study areas and provide their sales data for 12 product categories including: 6 HFSS categories - soft drinks, confectionary, savoury snacks, biscuits, ice cream, cereals; 4 categories which represent core everyday sales for convenience stores including ‘alcohol’ and ‘household’ which we have been informed are likely to be promoted in place of HFSS by some stores and ‘milk’ and ‘bread’ as two staple grocery products; and 2 healthy food categories – fruit & vegetables and bottled water. Weekly sales data will be obtained for the period April 2022 – March 2024 for all categories to enable comparisons to be made from before the Food (Promotions and Placement) legislation implementation in October 2022.

6.1.5 Method

TWC will create a bespoke database to securely share total and category weekly sales data with the research team for analysis.

6.1.6 Outcome measures

Primary outcome: The difference in changes in weekly sales data of HFSS products from in-scope categories pre and post regulations between in-scope and out-of-scope convenience stores

Secondary outcomes:

i) Changes in weekly sales data in alternative products/categories (including water, alcohol, household, milk, bread, fruit and veg) between store types, pre and post regulations implementation

ii) Proportion of HFSS, non-HFSS (healthier versions of HFSS categories) and non-food items in prominent locations in stores

6.1.7 Data analysis

Store sales data will be analysed using Interrupted Time Series models (25,44). Models will examine differences between in-scope and out-of-scope stores in % change in weekly sales of product categories at implementation (Oct 2022) and 6, 12 and 18 months after.

6.2 Ethnographic exploration of the systems, decisions and practices in convenience stores

6.2.1 Research Questions

What products are promoted in prominent locations following legislation implementation?
What support do different types of stores need to successfully and sustainably offer healthier options to their community?
What are stakeholders' experiences of the new law?
What factors prompt retailer to stock and promote their product offer/range?

6.2.2 Eligibility Criteria

Stores identified by TWC will be approached for collection of in-depth ethnographic data. Due to the in-depth nature of the ethnographies ~10-15 stores per region (~60-90 total) will provide sufficient data for analysis. Purposive sampling will be employed to ensure a mix of store types (in-scope/out-of-scope, independent affiliated/independent unaffiliated/symbol groups, urban/rural, cultural/traditional, customer profile (e.g. professional/family/older adult) will be included in the sample.

6.2.3 Participant Recruitment

Members of the research team will visit stores to build rapport. The team will provide an information pack about the study. The researcher will arrange a follow-up to commence recruitment and data collection following consent being obtained.

6.2.4 Method

Ethnographic observations will provide deep-dive understandings of the systems, players and processes involved in store across the convenience store sector. For each store a mix of quantitative and qualitative observational data will be collected during an in-person interview. Data will be collected on a) the products placed in prominent locations, b) the availability of healthy products and c) the local environment (e.g. distance from competitor businesses and other food businesses (e.g. out of home). Photographs will be taken to answer the research questions with store staff consent. Question about how decisions about product offer are made, and to explore store staff perceptions of their community's well being and health, and their businesses commercial viability will be asked. A £25/per hour voucher incentive will be provided to participating store staff.

6.2.5 Data analysis

Quantitative data regarding to store offer and promotional activities will be analysed using descriptive statistics. Qualitative data will be analysed using thematic analysis informed by a grounded theory approach. Grounded theory is particularly suited for studies looking at processes and decision making especially in heterogeneous groups and is well-suited for the analysis of observational and interview data. It employs methods such as theoretical sampling and constant comparison to find new cases to test emerging theory. This analysis approach will support the development of a taxonomy of convenience stores, theoretical maps explaining the processes, players and decisions involved in stocking and promoting products in stores and key themes detailing how best to provide healthy options for customers in different store types.

6.3 Customer surveys

6.3.1 Research Question
How do food purchasing and dietary patterns of convenience store customers differ between in-scope and out-of-scope stores, and by customer demographics?

6.3.2 Eligibility Criteria
Customers aged 16+ who shop at the 254 stores where sales data will be collected.

6.3.3 Sample size calculation
A total of n=6604 customers will be recruited. As per our previous placement intervention study, we assume a rho of 0.1 (46). The total sample size required to detect a difference in frequency of purchase of HFSS items between in-scope and out-of-scope stores of 0.15 SDs at 90% power and a 5% significance level is 26 customers per store (therefore 6604 customers in total over the 254 stores).

6.3.4 Participant Recruitment
Each participating store will be asked to place flyers at checkouts and encourage their customers to complete a short ~10 minute online survey.

6.3.5 Method
Interested customers will access the survey through adverts in the participating stores and access the online survey via QR code, web address or supported by calling a researcher to complete the survey over the phone. These methods have been determined from our PPI discussions with adults that are young, older and living in low-income households. The survey has been co-created with public contributors and includes questions relating to: i) frequency of food purchasing from different types of food outlets; ii) products purchased from their study convenience store; iii) dietary quality; iv) perceptions of local food environment; and v) demographic characteristics. Store owners will receive £1 for each customer recruited and store customers will receive £10 for completing the survey.

6.3.6 Outcome measures
Primary: The primary outcome will be difference in weekly HFSS purchases between in-scope and out-of-scope stores

Secondary:

i) Difference in dietary patterns of convenience store customers differ between in-scope and out-of-scope stores
ii) Customer use of and attitudes towards their local convenience stores.

6.3.7 Data analysis
Statistical analysis will use multilevel regression models with customers clustered within stores. The distribution of the outcome will determine whether we are able to use linear regression models with continuous, normally-distributed outcomes or logistic regression models with binary outcomes. Confounders will identified using Directed Acyclic Graphs.(41)

7. WP4: CO-PRODUCTION OF SYSTEM SOLUTIONS FOR HEALTHIER CONVENIENCE STORE ENVIRONMENTS

7.1 Research Question
What are the systemic strategies that could sustainably enable convenience stores to sustain health and wellbeing in their local communities?

7.2 Eligibility Criteria

A mix of ~15 stakeholders with personal or professional links to one of the six case study areas. Stakeholders will include, but are not limited to, convenience store customers, convenience store owners/staff, suppliers and wholesalers, local authority staff, local business groups, local councillors, non-government or civil society organisations etc.

7.3 Participant Recruitment

Participants will be identified and recruited during the case study phase of the project.

7.4 Method

Three workshops will be held in each of the six areas by researchers trained in deliberative techniques to enable the elicitation of diverse stakeholder voices and aid policy reformulation that takes account of, and resolves, complex issues that may hinder policy implementation (52-55). Public stakeholders identified in the ethnographic study will be supported to work with the researchers to run the workshops and ensure system-based solutions are identified collaboratively without any potential power imbalances that may be present in traditional research techniques. Workshop 1 involves convenience store staff and customers and leads to the development of participatory systems-maps detailing the complex factors that both inhibit and enable avoidance of HFSS purchases. These maps will become the focal point of workshops 2 and 3 which will involve a mix of suppliers, local authority staff and other key stakeholders alongside the customers and store staff involved in workshop 1. During workshops 2 and 3 stakeholders will work collaboratively to identify and prioritise local workable solutions to better support the health and wellbeing contexts of convenience stores in the local community.

7.5 Outcome measures

The key deliverable is a local action plan for each case study area to improve the healthfulness of the offer in convenience stores.

8. PATIENT AND PUBLIC INVOLVEMENT (WP1)

Prior to study commencement and to aid study design, our research team visited 31 convenience stores across Southampton (n=13) and Southwark (n=18) and spoke to shop staff. This work highlighted the rich heterogeneity of the convenience store sector especially in terms of stores' primary purpose, local customer base, core product sales and use of suppliers which need to be considered when creating new policy recommendations. Our PPI discussions highlighted staff willingness to discuss decisions about stock, product placement, what sells well and what doesn't, suppliers, impact of the cost-of living crisis and views on healthy and HFSS products. They were willing to allow researchers to perform in-store surveys and advertise the customer survey in their stores. PPI discussions demonstrated the hands-on nature in which store owners discussed their products, pointing to products and areas in the store or pointing down the road at local competitors which informed our decisions to include ethnographic data and researcher field notes to better understand the contextual factors pertaining to store decision-making. PPI discussions also determined the use of incentives that would benefit business rather than a personal payment.

We also discussed our research with 14 convenience store customers. Young people described frequent purchases of impulse products (soft drinks, confectionary and savoury snacks) and convenient/eat now meal foods (e.g. sandwiches, pasta) from convenience stores. Older adults described purchasing staple or top-up food items from convenience stores but were also tempted by impulse buy products at checkouts and store entrances. PPI discussions informed the consumer facing activities in this proposal including choice of incentive, length of survey and how best to engage customers with the flier and the use of various methods of participation (young people suggested using a QR code and online survey to access the survey while older adults wanted a freephone number to complete the survey over the phone with a researcher).

Two PPI panels will be formed: i) convenience store staff panel (n~6) and ii) convenience store customer panel (n~6). These panel members will be recruited from across England from our partner local authorities. They will

feed into methodological decisions and development of data collection materials, interpretation of results and dissemination activities. Panel members will also be influential in the final aspect of the study: the co-creation of workable policy strategies.

9. ETHICS AND DISSEMINATION

Ethics approval will be obtained from City St George's, University of London and/or University of Southampton. The study will be conducted in accordance with the Declaration of Helsinki, Good Clinical Practice guidance, Research Governance Framework for Health and Social Care and Data Protection regulations. ECON is registered with Research Registry (researchregistry10927). An independent advisory group will provide strategic guidance, monitor progress and assess professional conduct throughout the study duration and tri-annual committee meetings will be held with collaborators including regional partners, industry and NGO experts.

We anticipate this project will deliver impact on public policy at local and national levels. At the local level, engagement with convenience store and community members in our six case study communities and completion of deliberative workshops. Local action plans will be developed in collaboration with local stakeholders for local communities, including local public health teams and businesses, to commit to. Impact beyond the six case study communities is possible through dissemination of the case reports using various media such as webinars/seminars, infographics and animations/videos developed to highlight exemplar practices to other local authorities, small and medium businesses, convenience sector organisations and/or community organisations. Dissemination plans, activities and materials will be co-created with our PPI researchers and project partners to ensure that are relevant and tailored to specific audiences and widely distributed through existing networks to achieve largest possible reach. Our partners Asian Media Group, NewTrade Media, Chartered Trading Standards Institute, Chartered Institute for Environmental Health and the Food Foundation will facilitate access to a broad range of business, local authority, food policy and community networks where we can communicate our findings via webinars, reports, leaflets and infographics. Our own, and our partners' connections within the food retail sector provide unique avenues to disseminate pertinent findings to these stakeholders through advertorials, newsletter articles and sector specific conferences. Our project partners also connect with the general public nationally through their social media and on-the-ground activities and can assist with dissemination of project findings to the public through blogs, social media posts using infographics or animations/videos and general press releases.

Reporting to national policymakers (e.g. DHSC, BEIS, DEFRA) on key project findings, through briefing notes and short reports, will be achieved on a regular basis and could help to enhance implementation and possibly refinement of the Food (Promotions and Placement) regulation. Our PPI discussions also highlighted the importance of reporting back to participants who actively engaged with the project, thus we will include feedback on top-level findings to participants (e.g. via email or letters) as part of our dissemination plan. We will also reach the research community through publications in scientific peer-reviewed journals, conferences and seminars.

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