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in England on consumer behaviour: a natural experimental study

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Abstract

Background Out-of-home (OOH) food tends to be energy-dense and nutrient-poor. In response, England implemented a mandatory calorie labelling policy in the OOH sector. We evaluated changes in consumer behaviours after the policy was implemented in April 2022.

Methods We employed a natural experimental design to assess pre-post changes in noticing and using nutrition information, and behaviours associated with menu labelling. We compared changes in England to comparator jurisdictions without similar policies. Data included four consecutive years (2019–2022) from the International Food Policy Study; participants were adults aged 18 years or older. M. labelling policy in out-of-home food outlets

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Introduction

e out-of-home (OOH) food sector includes physical and online locations where food and beverages are sold for immediate consumption including, restaurants, cafés, pubs and bars, takeaways, fast food, street-food and other sites [1]. OOH eating has become common in many countries and is increasing globally [1, 2], typically involving energy-dense, nutrient-poor foods that contribute to elevated energy intake and increased risk of obesity [3–5]. ere is also evidence that individuals underestimate the calorie content of foods when eating OOH [6, 7], and a recent study in England found that customers of OOH food outlets underestimated calories purchased by an average of 253 kcal [8]. In response to the public health challenge posed by the OOH food environment, some governments have adopted policies requiring mandatory calorie labels in the OOH sector to help the public make informed food choices in these settings [9].

A mandatory calorie labelling policy for the OOH food sector was signed into law in July 2021, and came into force the following year in England [10]. As of the 6th April 2022, large food businesses with more than 250 employees, including cafes, restaurants and takeaways, were required to display calorie information on menus for non-prepackaged food sold for immediate consumption [11]. Some outlets have voluntarily used calorie labelling for a number of years and a mandatory policy was rst proposed in 2018 – which may have prompted others to take pre-emptive action [12]. ere is evidence that some out-of-home food outlets in England began implementing calorie labelling ahead of the mandatory compliance date in April 2022. Observational research conducted between August and December 2021 found that a minority (21%) of assessed outlets had implemented some form of calorie labelling, although adherence to best practice recommendations was inconsistent and incomplete [8]. It is possible that this limited pre-implementation labelling could have in uenced customer behaviour before the mandatory policy came into e ect.

According to the legislation, calorie labels must display the energy content (kcal) of food for the given portion size and must be accompanied by the reference statement ‘adults need around 2000 kcal a day’ [11]. Labels must be easily visible and clearly legible for both online and in-store purchases at all points of choice, de ned as any place where customers choose what food to buy [11]. Exempt establishments include education institutions for pupils < 18 years, workplace canteens solely used by employees, and health and social care settings where food is solely provided for patients or residents. Speci c item exemptions include menu items available for less than 30 days, beverages with greater than 1.2% alcohol content by volume, unpackaged and unprepared fruit and vegetables, and condiments added by consumers (i.e. not pre-prepared) [11]. Limited formal public health campaigns or advocacy e orts to support or explain the policy were made in the year between when the policy was announced and came into force.

e evidence for the impact of calorie labelling on consumer choices is mixed. A meta-analysis of non-experimental eld data found calorie labelling interventions were associated with 21 fewer kcal selected by customers [13]. Another meta-analysis of randomised controlled trials found a reduction of 47 kcal purchased after energy labelling was implemented on menus in restaurants [14]. Studies in the United States of America (USA) have found small-to-moderate decreases in energy purchased from supermarkets and fast-food restaurants [15, 16]. However, many studies in real world settings on the e ects of calorie labelling policies lack a comparison group [15–17], and those that do are small-scale [18–20]. A study in Canada found that mandatory calorie information on

comparator group and study year. To estimate the potential di erences in pre-post changes between England and the comparator, two-way interactions between policy group and study year were included. e marginal probability of each outcome was calculated by year and policy status [27]. Di erence-in-di erences were calculated for the changes from each consecutive year (2019 to 2020, 2020 to 2021, 2021 to 2022) in England compared to the changes in those years in the comparator. To explore the

Table 2 Categorisation of jurisdictions according to presence or absence of mandatory menu labelling policies before 2019 data collection [9]

Country and Policy Status	Jurisdiction	Description	Unweighted *n* for this analysis
Intervention group			
England	National policy (2022)	In April 2022, England introduced mandatory calorie menu labelling for large out-of-home food businesses with more than 250 employees.	*n* = 11,732
Comparator group – no policy present			
Australia– jurisdictions without a policy	Western Australia, Tasmania, Northern Territory	The three states/territories included in the analysis do not have a mandatory menu labelling policy. Other states/territories with policies were excluded from the analysis.	*n* = 1,719
Canada– jurisdictions without a policy	All provinces other than Ontario	Provinces other than Ontario do not have a mandatory menu labelling policy. Ontario implemented a mandatory menu labelling policy in 2017, and was excluded from the analysis.	*n* = 9,752
Mexico– no policy	Whole country	No mandatory menu labelling policy.	*n* = 14,494
United ingdom – jurisdictions without a policy	Scotland, Wales, and Northern Ireland	No mandatory menu labelling policy.	*n* = 1,928

Table 3 Sample characteristics (data are unweighted N, weighted %; or weighted mean (SD)

	2019 (pre-implementation)		2020 (pre-implementation)		2021 (pre-implementation)		2022 (post-implementation)	
	England	Comparator	England	Comparator	England	Comparator	England	Comparator
Variable	***n*** **= 3194 n, %**	***n*** **= 7543 n, %**	***n*** **= 2489 n, %**	***n*** **= 6120 n, %**	***n*** **= 2906 n, %**	***n*** **= 7061 n, %**	***n*** **= 3143 n, %**	***n*** **= 7169 n, %**
Sex								
Male	1574, 49.0	3761, 48.6	1249, 49.7	3130, 50.0	1446, 48.5	3534, 49.4	1528, 48.2	3520, 48.8
Female	1620, 51.0	3782, 51.4	1240, 50.3	2990, 50.0	1460, 51.5	3527, 50.6	1615, 51.8	3649, 51.2
Ethnicity								
Majority	2865, 87.4	6360, 81.5	2167, 85.2	5133, 81.5	2528, 86.6	5892, 82.0	2706, 83.2	5952, 81.4
Minority	329, 12.6	1183, 18.5	322, 14.8	987, 18.5	378, 13.4	1169, 18.0	437, 16.8	1217, 18.6
Income Adequacy								
Not easy	1739, 59.5	5518, 75.4	1456, 60.0	4436, 74.1	1527, 56.8	4807, 70.7	2015, 66.8	5291, 75.3
Easy	1455, 40.5	2025, 24.6	1033, 40.0	1684, 25.9	1379, 43.2	2254, 29.3	1128, 33.2	1878, 24.7
Education								
Low	914, 49.8	1875, 31.9	933, 48.6	1630, 32.6	838, 47.1	1595, 31.0	836, 37.7	1562, 29.5
Medium	821, 20.9	1846, 21.9	742, 20.3	1627, 23.1	798, 22.6	1805, 22.9	798, 25.6	1828, 22.0
High	1459, 29.4	3822, 46.2	814, 31.1	2863, 44.4	1270, 30.3	3661, 46.1	1509, 36.7	3779, 48.5

Results

A total of 67,960 adults completed the IFPS surveys in 2019–2022 across the four countries. A total of 46,809 people met the inclusion criteria described in Table 2 of being either from England or a jurisdiction without a comparable menu labelling policy. Among those, 40,209 (85.9%) participants reported visiting a restaurant within the last 6 months and answered the questions for the outcomes used for this analysis. Of this sample size that met all inclusion criteria, 467 observations (1.2%) were removed due to missing data on ethnicity, and a further 117 observations (0.3%) were removed due to missing data on education. e nal sample included 39,625 respondents (2019 = 10,737; 2020 = 8,609; 2021 = 9,967; 2022 = 10,312).

Table 3 describes the sample characteristics, strati ed by policy status and year. ere was a greater proportion of high education participants in the comparator group compared to England. Participants in the comparator were slightly older than in England. Both groups reported a higher proportion of low income adequacy (i.e. not easy to make ends meet).

Noticed nutrition information

ere were no signi cant di erences in noticing nutrition information between years in the comparator. In

England, the probability of noticing nutrition information increased from 16.0% (95% CI 15.6 to 16.4) in 2020 to 19.7% (95% CI 19.1 to 20.2) in 2021 with a further increase to 25.8% (95% CI 25.5 to 26.1) in 2022 (Fig. 1a).

ere was no evidence of a di erence in changes between England and the comparator in 2020 vs. 2019. For 2021 vs. 2020, the di erence in the probability of noticing was 2.9% points (95% CI 1.7 to 4.1) higher in England compared to the comparator. For 2022 vs. 2021, the di erence was 4.8% points (95% CI 2.5 to 7.1) higher in England compared to the comparator (Fig. 3).

Used nutrition information

In England, the probability of using nutrition information increased from 8.0% (95% CI 7.5 to 8.4) in 2020 to 11.8% (95% CI 10.9 to 12.6) in 2021 and further increased to 13.5% (95% CI 13.1 to 13.9) in 2022 (Fig. 1b). ere was no evidence of a di erence in changes between England and the comparator in 2020 vs. 2019. For 2021 vs. 2020, the di erence in the probability of using nutrition information was 2.7% points (95% CI 2.0 to 3.4) higher in England compared to the comparator. For 2022 vs. 2021, the di erence was smaller and not statistically signi cant (Fig. 3).

Ordered something di erent

ere were no signi cant di erences in ordering something di erent because of nutrition information in restaurants between years in the comparator. ere was a slight reduction in ordering something di erent in 2020 vs. 2019 in England, after which there were signi cant increases in England in 2021 and 2022 (Fig. 2a). In England, the probability of ordering something di erent increased from 12.6% (95% CI 12.4 to 12.7) in 2020 to 15.2% (95% CI 14.7 to 15.6) in 2021 and a further increase to 17.7% (95% CI 17.6 to 17.8) in 2022 (Fig. 2a). For 2022 vs. 2021, the di erence in the probability of ordering something di erent was 2.8% points (95% CI 1.8 to 3.9) greater in England compared to the comparator (Fig. 3).

Ate less of food ordered

ere were no signi cant di erences in eating less of the food ordered because of nutrition information between years in the comparator. In England, the probability of eating less of the food ordered increased from 12.3% (95% CI 12.1 to 12.5) in 2020 to 14.4% (95% CI 14.2 to 14.7) in 2021 and reduced to 12.8% (95% CI 12.6 to 13.0) in 2022 (Fig. 2b). ere was no evidence of a di erence in changes between England and the comparator in 2020 vs. 2019. For 2021 vs. 2020, the di erence in the probability of eating less of the food ordered was 2.3% points (95% CI 1.7 to 2.9) greater in England compared to the comparator (Fig. 3). For 2022 vs. 2021, the di erence in the probability of eating less of the food ordered was 1.6% points (95% CI 0.3 to 2.9) lower in England compared to the comparator.

Changed restaurants visited

ere were no signi cant di erences in changing restaurants visited because of nutrition information between years in the comparator. In England, the probability of changing restaurants visited increased from 8.3% (95% CI 8.2 to 8.4) in 2020 to 11.3% (95% CI 11.0 to 11.6) in 2021 and reduced to 9.0% (95% CI 8.8 to 9.2) in 2022 (Fig. 2c). For 2020 vs. 2019, the change in the probability of changing restaurants visited was 0.5% points (95% CI 0.2 to 0.8)

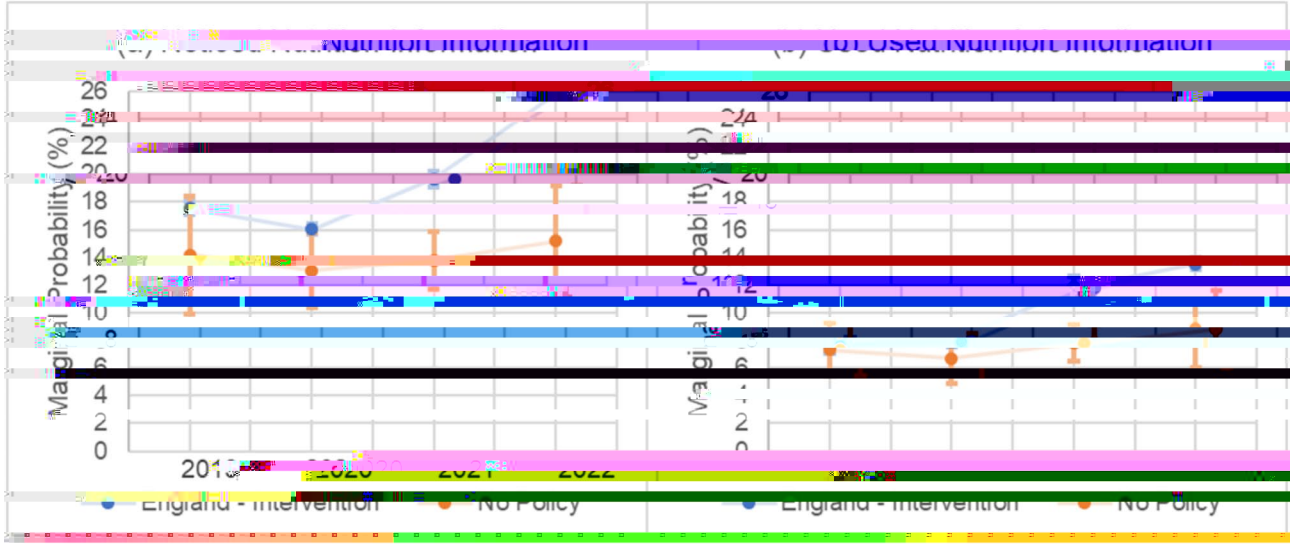

Fig. 1 a-b. Marginal probability of (**a**) noticing and (**b**) using nutrition information from 2019–2022 for England and the comparator estimated from mixed e ects logistic regression model adjusted for age, sex, education, perceived income adequacy, and ethnicity. Error bars represent 95% con dence intervals and are presented for both England and the comparator. The con dence intervals for England are narrow, at ± 0.6% or less for the outcomes

greater in England compared to the comparator (Fig. 3). In 2021 vs. 2020, the di erence in the probability of changing restaurants visited was 2.6% points (95% CI 1.4 to 3.8) greater in England compared to the (r)6(e)-9(a)9(t)6.1(er in E899.880.202514648 241.700805664 Tm (3)Tj ET5)]TJ ET

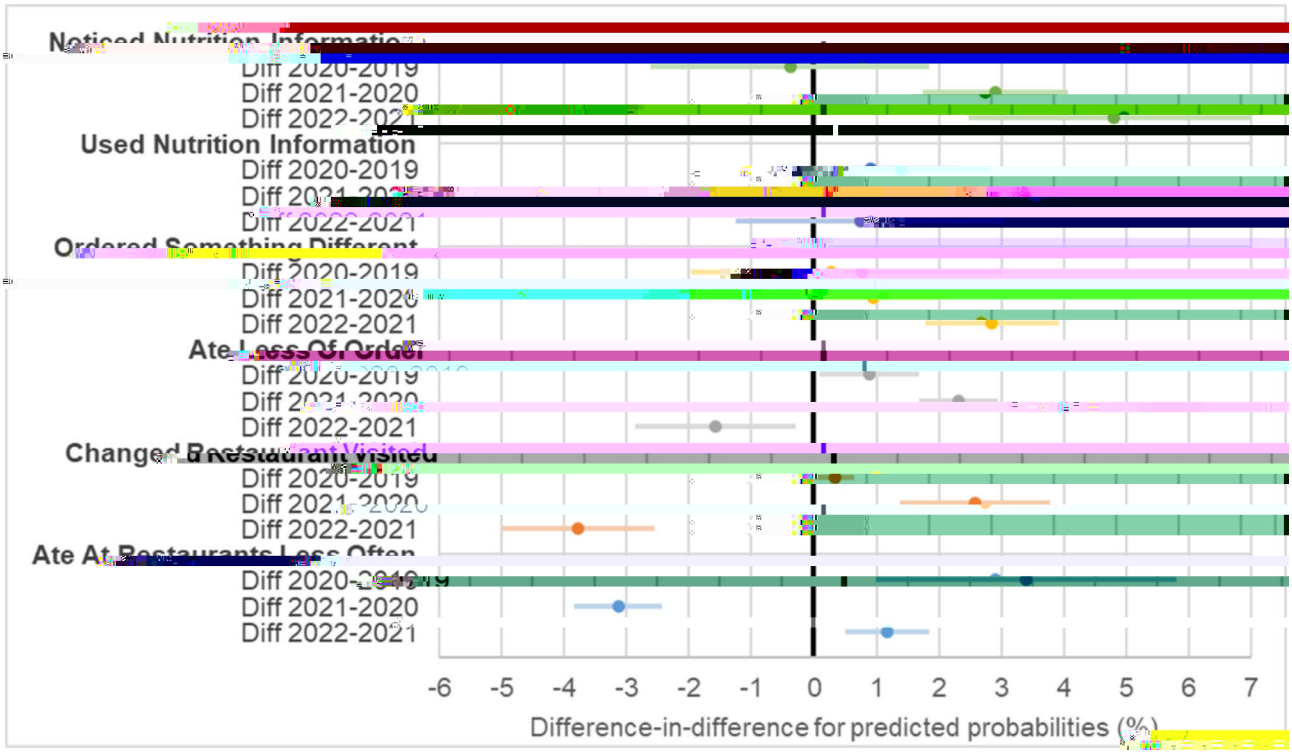

Fig. 3

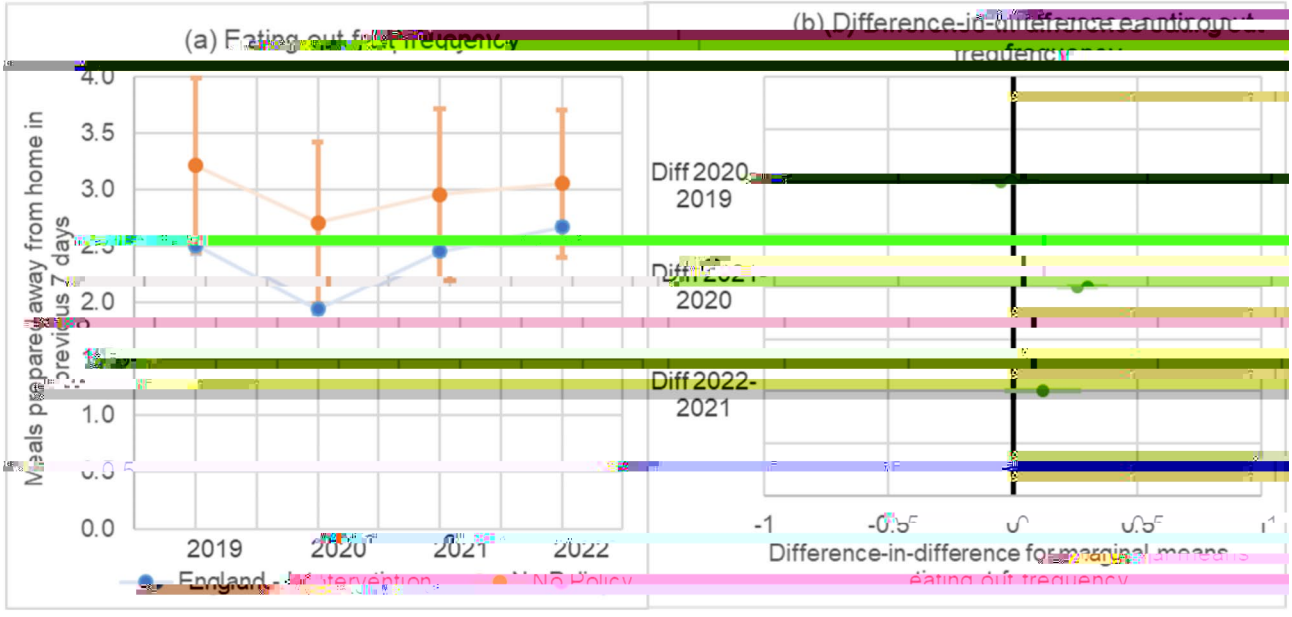

Fig. 4 a-b. (**a**) Frequency of eating out of home from 2019–2022 for England and the comparator, (**b**) Di□erence-in-di□erences between years for frequency eating out of home

changes between England and the comparator in 2020 vs. 2019. For 2021 vs. 2020, the change in frequency of eating out was 0.3 occasions per week (95% CI 0.2 to 0.3) higher in England compared to the comparator. For 2022 vs. 2021, there was no signi cant di erence in changes between years (Fig. 4b).

Sensitivity analysis

e sensitivity analysis found substantial evidence of

pandemic. While this may have reduced statistical power to detect small di erences, the sample sizes remained su ciently large for robust analyses. Furthermore, by