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Introduction: We are researchers at the University of Oxford who study
10 the relationship between what we eat and its effect on public health and the environment. We assess drivers and patterns in population health nutrition, develop and evaluate diet-related health interventions, and use this research to help shape public policymaking. Here, we focus on
15 evidence produced by researchers at the University of Oxford and in other closely related academic literature.

Summary:

- Ample evidence demonstrates the role of less healthy diets as the major determinant of overweight and obesity, and diet-related health inequalities, in the UK.
- 20 • Less healthy diets and excess weight are associated with numerous other non-communicable diseases that have substantial related treatment costs; overweight and obesity are associated with around 12% of all adult healthcare expenditure in the UK.
- There are several systems to classify foods based on the presumed
25 levels of processing. The Nova system originally defined “ultra-processed foods” and is the most widely adopted.
- Some countries have based policy recommendations on ultra-processed foods, but these countries have much lower levels of consumption of UPF than the UK. In the UK, the “high fat, salt and
30 sugar” classification or nutrient profiling model is usually used for public health policy.
- Healthier diets tend to be more expensive than less healthy diets, and this could be a barrier to improving diet-related health inequalities.
- 35 • The UK food system is dominated by multinational food and drinks companies, and 7 of the 10 largest food manufacturers generate at least two-thirds of their sales from foods that are high in fat, sugar and salt.
- 40 • Implementing and evaluating a range of integrated, coherent, and synergistic policies is required to achieve a food system in which healthy foods are accessible to all.

- Mandatory regulation, rather than voluntary or industry-led action, tends to be more effective.
- When designing and implementing these policies, government should assess and mitigate (i) the potential for conflicts of interest through industry involvement in policy development, and (ii) the risk of compensatory actions by the food industry, as these could undermine the intended effect of the regulation.

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1. Key trends in food, diet and obesity, and the evidential base for identifying these trends.

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In the UK, we are fortunate to have detailed information on food consumption, nutrient intake and nutritional status (including height and body weight) regularly collected through the National Diet and Nutrition Survey. This continuous cross-sectional survey has been used to collect information in a nationally representative sample since 2008, thereby providing key information on trends in dietary intakes and measures of adiposity in the UK population.¹ Recent analysis of the National Diet and Nutrition Survey published by the Food Foundation shows that the majority of adults and children in the UK are not currently meeting the dietary requirements for a nutritious diet, and there are substantial dietary inequalities: the most deprived fifth of adults consume less fruit and veg (37% less), oily fish (54% less) and dietary fibre (17% less) than the least deprived fifth.² A secondary analysis of multiple observation studies in the UK found that only 0.078% of the National Diet and Nutrition Survey sample adhered to all nine national dietary recommendations outlined in the Eatwell Guide.^{3,4}

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2. The primary drivers of obesity both amongst the general population and amongst distinct population and demographic groups.

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Randomised controlled trials indicate that higher sugary beverage consumption in children and adolescents leads to greater weight gain and increased body mass index, and that consuming a higher proportion of sugar in the diet increases energy intake in adults.⁵ Evidence published by Nuffield Department of Primary Care Health Sciences (NDPCHS) researchers has shown that diets that are high in chocolate, confectionery, butter, refined bread, table sugar and preserves, and low in fresh fruit, vegetables, and wholegrain foods, are associated with a higher risk of cardiovascular disease and all-cause mortality, in part through a link to excess weight.⁶

Evidence also shows that the food and drinks industry uses a range of strategies to shape the food system at every level of the supply chain, from ingredients (and their nutritional quality), processing, distribution,

price, pack size, promotions, and advertising. Consequently, these
85 strategies influence food consumption. For example, research shows that
food marketing is associated with increased intake, choice, preference
and purchase requests in children and adolescents.⁷ In the UK, more
money is spent on advertising less healthy than healthy foods: in 2022 a
90 third (33%) of food and soft drink advertising spending went towards
confectionery, snacks, desserts and soft drinks, compared to just 1% for
fruit and vegetables.²

3. The impacts of obesity on health, including on children and adolescent health outcomes.

Evidence shows that obesity is associated with several causes of death.^{8,9}
95 It is also a well-established risk factor for various health conditions,
including type 2 diabetes¹⁰ and several types of cancer.^{11,12} In a cohort
study of British adults, the effects of a poor diet on risk of developing type
2 diabetes were especially pronounced in younger people and those living
with obesity.¹³ In the UK, it has been estimated that around 6.3% of all
100 cancer cases were caused by overweight and obesity.¹⁴ In addition to
affecting health, overweight and obesity are associated with higher
healthcare costs. Based on a very large study conducted in middle-aged
UK women, it was estimated that excess weight accounted for an
estimated 11% (or £229 million) of primary care consultation costs, and
105 approximately 20% (£384 million) of prescription medication costs in all
women aged between 55-79 years in England.¹⁵ Further, a systematic
review of individual participant data studies found that overweight and
obesity are associated with around 12% of all adult healthcare
expenditure in the UK,¹⁶ and analysis of cohort study data found that
110 £662 million (14.6%) of the estimated £4.5 billion of total annual hospital
costs has been attributed to excess weight (BMI ≥ 25 kg/m²).¹⁷

~~**4. The influence of pre- and post-natal nutrition on the risk of
subsequent obesity, and the specific influences on the diet of
children and adolescents that contribute to the risk of
becoming obese.**~~

5. The definition of a) ultra-processed food (UPF) and b) foods high in fat, sugar and salt (HFSS) and their usefulness as terminologies for describing and assessing such products.

There are several systems that attempt to classify foods based on the
120 presumed levels of processing, rather than their nutritional composition;
and the criteria used to classify the foods based on processing varies
widely between systems.¹⁸ The Nova system is the most widely adopted
and is the origin of the term "ultra-processed food" (UPF).¹⁹ Ultra-
processed foods are generally defined as industrially manufactured
125 products made up of several ingredients (formulations) including sugar,

oils, fat, and salt (often in higher amounts than in processed foods) and food substances that are rarely used in culinary preparations.²⁰ There are questions regarding whether UPFs are being classified based on formulation (i.e. the product recipe) or processing (e.g. using equipment and energy to transform an agricultural product into a finished food item).

²¹ In the UK, foods and drinks that are high in fat, sugar, and salt (HFSS) are classified according to their UK Nutrient Profiling Model (NPM) score,²² though the NPM model adopts a broader view of the 'healthiness' of an individual food than just these nutrients of concern. The UK NPM scores foods based on the levels of energy, saturated fat, total sugars and sodium present in a food.²² This score is then subtracted from a score derived from the levels of fruit, vegetable and nuts, fibre, and protein present. Foods scoring more than 3 points, and drinks scoring more than 0 points are classified as "less healthy".²²

The UPF and HFSS classifications overlap for some foods (notably non-core/discretionary foods e.g., cake, confectionery), but there are considerable differences. For example, some foods such as grain-based products that are categorised as UPF would be categorised more favourably by the UK NPM,²³ and some foods that would be classified as HFSS would not be classified as UPFs. Some foods in the UK have been specifically reformulated to meet the NPM, yet would still be classified as UPF.

In the UK, more than half of all energy intake comes from UPFs,²⁴ and this includes some foods which have been traditionally considered as part of a healthy diet e.g., bread and breakfast cereals.²⁵ This is in contrast to countries like Brazil, where only around 20% of total energy intake is from UPFs and the majority of the UPFs consumed are discretionary food items (e.g. fast food dishes, cookies).²⁶ If a large proportion of the available foods are classified as UPF it may be difficult for some subgroups of the population to access this definition of a 'healthy' diet.

NPMs are algorithms used to score or rank foods based on their nutritional composition for the purposes of health promotion and/or disease prevention.²² The UK NPM that defines HFSS is already used to support existing policies (e.g. the TV advertising policy, the promotion and placement policy). The choice of what specific NPM is used to underpin regulations is important as models vary in their strictness (how many foods pass/fail the model) and in the types of foods that pass the model,²⁷ and an NPM model can be made stricter if needed to include more foods. Diets containing greater consumption of foods that are evaluated favourably by NPMs are associated with better health outcomes.²⁸

It is our view that basing recommendations on UPFs in a country like Brazil may be reasonable, this might not be the case in the UK, where

foods in the UPF category are broad and varied. Currently, HFSS may provide a more suitable basis for public health recommendations in the UK, while also capturing UPF items that would be deemed as discretionary items in the UK dietary guidelines.

6. How consumers can recognise UPF and HFSS foods, including the role of labelling, packaging and advertising

In the 2020 obesity strategy²⁹ the government discussed two labelling-related initiatives; calorie labelling on menus (implemented in 2022³⁰) and a consultation on traffic light labelling (closed in late 2020³¹). Labelling may improve diets through two mechanisms: allowing consumers to make informed, “healthier” dietary choices, and encouraging manufacturers to reformulate foods so that products have a more favourable nutritional profile. The former is considered a “high agency” approach requiring greater degrees of engagement and action in order for the individual to benefit whereas the latter is considered a “low agency” intervention. High agency interventions tend to be less equitable and effective than low agency interventions.³²

Findings from a review of 28 studies showed that nutritional labelling comprising energy information on menus may reduce energy purchased in restaurants.³³ However, the body of evidence was small and of low-quality, and further high-quality research is needed to draw conclusions about their potential impact in grocery stores and vending machines, and to assess potential moderators (e.g., socioeconomic status).³³ Menu labelling has been associated with serving items with less fat and salt in a study of 100 most popular UK chain restaurants,^{34,35} suggesting that menu labelling could encourage reformulation.

The implementation of the calorie menu labelling policy is a positive step, but further action is required,³⁶ particularly as reformulation strategies alone may not be the most effective way to develop longer term, sustainable changes that cultivate a healthier commercial food system.³⁷ This could include consideration of labelling systems that go beyond a single nutrient and use colours to convey the nutritional quality of a food, such as the traffic light labelling or the Nutri-score systems.³⁸

More generally, it is our view that policies to support a healthier diet and prevent obesity will need to go further than merely empowering individuals to make informed choices, and instead work towards a system overhaul. A food system that prioritises making healthy, sustainable foods accessible to all could be achieved by implementing range of integrated, coherent, and synergistic policies (e.g. that regulate a suite of food and drinks companies’ activities across the food system).³⁷

7. The cost and availability of a) UPF and b) HFSS foods and their impact on health outcomes.

210 Food prices are an important factor affecting food choices. There is
evidence from both real-world and simulated studies of the effectiveness
of price increases of unhealthy foods and/or price decreases for healthier
foods to change food purchasing. Healthier diets tend to be more
expensive than less healthy diets. In 2016, we found that there was no
215 significant difference in the cost of the current, average diet and a diet
that meets the UK dietary recommendations.³⁹ However, more recent
analyses suggests this is no longer the case.⁴⁰ Based on data collected in
May 2022 for 18,441 food items, we found the cost of the population
average diet is £6.82 per person, per day, whereas the cost of achieving a
220 healthy diet (the Eatwell Guide diet³) is £7.48 per person, per day.⁴⁰

In 2020 the government said it intended to remove volume-based price
promotions on HFSS foods. This policy has been delayed multiple times
and is now expected to come into effect in October 2025.⁴¹ Evidence from
an online experiment found that when price promotions are removed from
225 HFSS foods, the energy content of chosen foods reduces by
approximately 10%: mean energy in food selected without promotions
was 5,156 kcal per basket, compared to 5536 kcal with promotions, a
difference of -552kcal (95%CI: -866, -238).⁴² The same study
reported that 55.5% of participants expressed some degree of support for
230 the legislation.⁴²

8. The role of the food and drink industry in driving food and diet trends and on the policymaking process.

The UK food system is dominated by multinational food and beverage
companies. Of the 10 largest food manufacturers in the UK (Coca-Cola,
235 Danone, Ferrero, Kellogg's, Kraft-Heinz, Mars, Mondelez, Nestle, PepsiCo
and Unilever), seven of them saw at least two-thirds of their sales come
from HFSS foods.⁴³ These companies' revenue generation is mainly reliant
on selling foods that contribute to dietary ill health and are not included in
the government's Eatwell Guide.³

240 A rise in corporate social responsibility commitments has seen many
companies pledge to reduce the sugar, fat and salt content of their
products and not advertise unhealthy foods to children, for example.
However, in 2022, seven of the ten largest food manufacturers spent
£50m on advertising just four food categories – biscuits, chocolate, crisps
245 and ice cream – representing 91% of total advertising spend for these
categories.⁴³

In general, problematic outcomes arise when individuals or organisations
have conflicts of interests with work they are supposedly undertaking

independently.⁴⁴ There are well documented tactics used by some
250 members of the commercial food and drinks industry to influence
research outcomes and related public health policy.⁴⁵ Though the food
industry must contribute towards efforts to improve the healthiness of the
food system, it is important to ensure that potential conflicts of interests
between such efforts and commercial gain are mitigated.⁴⁶

255 ~~**9. Lessons learned from international policy and practice, and
from the devolved administrations, on diet-related obesity
prevention.**~~

260 **10. The effectiveness of Government planning and
policymaking processes in relation to food and drink policy
and tackling obesity.**

With some notable policy exceptions (e.g., the UK Soft Drinks Industry
Levy), government obesity strategies have lacked effective
implementation and evaluation over the last 30 years, in turn limiting
opportunity to learn or develop new policy ideas.⁴⁷ Failing to design
265 evidence-informed health policies capable of sustaining changes has been
attributed to incentive structures for politicians that support setting
ambitious policy goals without the effective policies needed to achieve
them, and conflicting political ideologies and interests.⁴⁸ Involving citizens
in policymaking (e.g., through surveys, citizen assemblies, focus groups)
270 could help ensure their interests are prioritised and in turn, achieve more
effective public health policies.⁴⁸ Reinforcing this by introducing legally
binding systems for reporting policy progress is also proposed as a way of
keeping progress on track.⁴⁸

275 **11. The impact of recent policy tools and legislative
measures intended to prevent obesity.**

To date, the Government has taken two approaches to improving the
nutritional quality of the food supply by working with the food industry.
The first is to set voluntary reformulation targets – the most recent
iteration of these are for calories, sugar and salt.⁴⁹ The second is to set
280 mandatory policy, for example in the form of the Soft Drink Industry
Levy,⁵⁰ which aims to encourage manufacturers to reduce the sugar
content of their soft drinks in order to avoid paying a higher rate of tax.

We have seen much greater reductions in the sugar content of soft drinks
compared to the food groups covered by the sugar reduction targets; the
285 sugar content of soft drinks fell by 30% between 2015 and 2018,^{51,52}
compared to just 5% for foods over the same time period,⁵³ a long way
off the 20% target. Progress towards the latest salt reduction targets has
largely stalled,⁵⁴ with the population's salt intake beginning to rise again.
⁵⁵ The effectiveness of mandatory rather than voluntary, or industry-led

290 action corresponds with evidence elsewhere – for example, for food industry advertising regulation.⁵⁶

12. Policy tools that could prove effective in preventing obesity amongst the general population, including those focussed on the role of the food and drink industry in tackling obesity.

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Evidence clearly shows the food and drinks industry significantly influences what we eat, and that this influence tends to undermine healthy diets.⁵⁷ Accordingly, implementing policies to incentivise the production and sale of healthier foods could help address diet-related ill-
300 health. Various existing reports and publications propose an array of potential policy options e.g., obesity strategy,²⁹ the National Food Strategy.⁵⁸

There is currently a lack of transparency when it comes to what actions the food industry is taking to improve the healthiness of their products
305 and practices. For example, companies do not have to report their progress towards the voluntary reformulation targets, the proportion of their sales that are derived from healthy foods, or the amount that they spend on advertising. Research to assess the overall healthiness of a company's product portfolio has shown this type of monitoring can track
310 companies' progress over time, and the transparency enables benchmarking.^{59,60} If company and brand metrics such as these were mandatorily reported on an annual basis, then it would allow policymakers, researchers and the public to better scrutinise their progress, hold them to account, and encourage them to take more
315 responsibility for improving the nutritional quality of the foods that they produce.

Policies and regulation implemented in the food system can have unanticipated consequences depending on how stakeholders respond.⁴⁶ For example, banning TV food advertising may lead to compensatory
320 increases in promotion via other, less regulated platforms or for foods outside of those defined in the restrictions.⁶¹ Understanding and regulating food and drinks industry activities as an integrated whole, rather than as individual components (such as advertising alone), has the potential to be more effective.⁶²

325 When designing and implementing policy, it is our view that government should review the potential for any compensatory actions by the food and drinks industry that could undermine the intended effect of the policy, and adapt accordingly. Similar recommendations have been made in response to other policy consultations.⁶³ For example, in qualitative research about
330 the UK Soft Drinks Industry Levy,⁶⁴ and about the proposed UK TV and

online food advertising regulations,⁶¹ it was demonstrated that the food and drinks industry responses could be pre-empted – in part based on each company’s characteristics and context – and used to design regulations that maximise the potential for health-promoting adaptation and minimise the potential for undermining adaptations. In practice, this is likely to include ensuring that regulations cover a sufficiently wide range of food products and activities to encourage meaningful change.⁶¹

References

1. Bates B, Clifford R, Collins D, et al. *National Diet and Nutrition Survey (NDNS RP)*.; 2019.
340
2. The Food Foundation. *The Broken Plate 2023: The State of the Nation's Food System*.; 2023. www.nuffieldfoundation.org
3. UK Government. *The Eatwell Guide*.; 2016. Accessed April 4, 2024. https://assets.publishing.service.gov.uk/media/5bbb790de5274a22415d7fee/Eatwell_guide_colour_edition.pdf
345
4. Scheelbeek P, Green R, Papier K, et al. Health impacts and environmental footprints of diets that meet the Eatwell Guide recommendations: analyses of multiple UK studies. *BMJ Open*. 2020;10(8):e037554. doi:10.1136/bmjopen-2020-037554
5. Scientific Advisory Committee on Nutrition. *Carbohydrates and Health*.; 2015.
350
6. Gao M, Jebb SA, Aveyard P, et al. Associations between dietary patterns and the incidence of total and fatal cardiovascular disease and all-cause mortality in 116,806 individuals from the UK Biobank: a prospective cohort study. *BMC Med*. 2021;19(1). doi:10.1186/s12916-021-01958-x
355
7. Boyland E, McGale L, Maden M, et al. Association of Food and Nonalcoholic Beverage Marketing with Children and Adolescents' Eating Behaviors and Health: A Systematic Review and Meta-analysis. *JAMA Pediatr*. 2022;176(7). doi:10.1001/jamapediatrics.2022.1037
360
8. Prospective Studies Collaboration. Body-mass index and cause-specific mortality in 900,000 adults: collaborative analyses of 57 prospective studies. *The Lancet*. 2009;373(9669):1083-1096. doi:10.1016/S0140
365
9. Di Angelantonio E, Bhupathiraju SN, Wormser D, et al. Body-mass index and all-cause mortality: individual-participant-data meta-analysis of 239 prospective studies in four continents. *The Lancet*. 2016;388(10046):776-786. doi:10.1016/S0140-6736(16)30175-1
10. Manning AK, Hivert MF, Scott RA, et al. A genome-wide approach accounting for body mass index identifies genetic variants influencing fasting glycemic traits and insulin resistance. *Nat Genet*. 2012;44(6):659-669. doi:10.1038/ng.2274
370
11. Reeves GK, Pirie K, Beral V, Green J, Spencer E, Bull D. Cancer incidence and mortality in relation to body mass index in the Million
375

Women Study: Cohort study. *Br Med J*. 2007;335(7630):1134-1139. doi:10.1136/bmj.39367.495995.AE

12. World Cancer Research Fund, American Institute for Cancer Research Diet Nutrition Physical Activity and the Prevention of Colorectal Cancer. *Continuous Update Project Report.*; 2018.
13. Gao M, Jebb SA, Aveyard P, et al. Associations Between Dietary Patterns and Incident Type 2 Diabetes: Prospective Cohort Study of 120,343 UK Biobank Participants. *Diabetes Care*. 2022;45(6):1315-1325. doi:10.2337/dc21-2258
14. Brown KF, Runggay H, Dunlop C, et al. The fraction of cancer attributable to modifiable risk factors in England, Wales, Scotland, Northern Ireland, and the United Kingdom in 2015. *Br J Cancer*. 2018;118(8):1130-1141. doi:10.1038/s41416-018-0029-6
15. Kent S, Jebb SA, Gray A, et al. Body mass index and use and costs of primary care services among women aged 55–79 years in England: a cohort and linked data study. *Int J Obes*. 2019;43(9):1839-1848. doi:10.1038/s41366-018-0288-6
16. Kent S, Fusco F, Gray A, Jebb SA, Cairns BJ, Mihaylova B. Body mass index and healthcare costs: a systematic literature review of individual participant data studies. *Obesity Reviews*. 2017;18(8):869-879. doi:10.1111/obr.12560
17. Kent S, Green J, Reeves G, et al. Hospital costs in relation to body-mass index in 1.1 million women in England: a prospective cohort study. *Lancet Public Health*. 2017;2(5):e214-e222. doi:10.1016/S2468-2667(17)30062-2
18. De Araújo TP, De Moraes MM, Afonso C, Santos C, Rodrigues SSP. Food Processing: Comparison of Different Food Classification Systems. *Nutrients*. 2022;14(4). doi:10.3390/nu14040729
19. Monteiro CA, Cannon G, Levy RB, et al. Ultra-processed foods: What they are and how to identify them. *Public Health Nutr*. 2019;22(5):936-941. doi:10.1017/S1368980018003762
20. Martinez-Steele E, Khandpur N, Batis C, et al. Best practices for applying the Nova food classification system. *Nat Food*. 2023;4(6):445-448. doi:10.1038/s43016-023-00779-w
21. O'Connor LE, Higgins KA, Smiljanec K, et al. Perspective: A Research Roadmap about Ultra-Processed Foods and Human Health for the United States Food System: Proceedings from an Interdisciplinary, Multi-Stakeholder Workshop. In: *Advances in Nutrition*. Vol 14. Elsevier B.V.; 2023:1255-1269. doi:10.1016/j.advnut.2023.09.005

- 415 22. UK Government. The nutrient profiling model. Accessed April 4, 2024. <https://www.gov.uk/government/publications/the-nutrient-profiling-model>
23. Barrett EM, Gaines A, Coyle DH, et al. Comparing product healthiness according to the Health Star Rating and the NOVA classification system and implications for food labelling systems: An analysis of 25 486 products in Australia. *Nutr Bull.* 2023;48(4):523-534. doi:10.1111/nbu.12640
- 420
24. UK Government Office for Health Improvements and Disparities. *SACN Statement on Processed Foods and Health - Summary Report.*; 2023. Accessed April 4, 2024. <https://www.gov.uk/government/publications/sacn-statement-on-processed-foods-and-health/sacn-statement-on-processed-foods-and-health-summary-report>
- 425
25. Madruga M, Martínez Steele E, Reynolds C, Levy RB, Rauber F. Trends in food consumption according to the degree of food processing among the UK population over 11 years. *British Journal of Nutrition.* 2023;130(3):476-483. doi:10.1017/S0007114522003361
- 430
26. Louzada ML da C, Martins APB, Canella DS, et al. Ultra-processed foods and the nutritional dietary profile in Brazil. *Rev Saude Publica.* 2015;49. doi:10.1590/S0034-8910.2015049006132
- 435
27. Rayner M, Scarborough P, Kaur A. Nutrient profiling and the regulation of marketing to children. Possibilities and pitfalls. *Appetite.* 2013;62:232-235. doi:10.1016/j.appet.2012.06.021
- 440
28. Barrett EM, Afrin H, Rayner M, et al. Criterion validation of nutrient profiling systems: a systematic review and meta-analysis. *American Journal of Clinical Nutrition.* 2024;119(1):145-163. doi:10.1016/j.ajcnut.2023.10.013
- 445
29. Department of Health and Social Care. *Tackling Obesity: Empowering Adults and Children to Live Healthier Lives.*; 2020. Accessed April 5, 2024. <https://www.gov.uk/government/publications/tackling-obesity-government-strategy/tackling-obesity-empowering-adults-and-children-to-live-healthier-lives>
- 450
30. UK Government. *The Calorie Labelling (Out of Home Sector) (England) Regulations 2021.*; 2021.
31. UK Government. Front-of-pack nutrition labelling in the UK: building on success. Published 2020. Accessed April 5, 2024.

455 <https://www.gov.uk/government/consultations/front-of-pack-nutrition-labelling-in-the-uk-building-on-success>

32. Adams J, Mytton O, White M, Monsivais P. Why Are Some Population Interventions for Diet and Obesity More Equitable and Effective Than Others? The Role of Individual Agency. *PLoS Med*. 2016;13(4):e1001990-e1001990. doi:10.1371/journal.pmed.1001990
33. Crockett RA, King SE, Marteau TM, et al. Nutritional labelling for healthier food or non-alcoholic drink purchasing and consumption. *Cochrane Database of Systematic Reviews*. 2018;2018(2). doi:10.1002/14651858.CD009315.pub2
- 465 34. Theis DRZ, Adams J. Correction: Differences in energy and nutritional content of menu items served by popular UK chain restaurants with versus without voluntary menu labelling: A cross-sectional study (PLoS ONE (2019) 14:10 (e0222773) DOI: 10.1371/journal.pone.0222773). *PLoS One*. 2019;14(12). doi:10.1371/journal.pone.0226704
- 470 35. Theis DRZ, Adams J. Differences in energy and nutritional content of menu items served by popular UK chain restaurants with versus without voluntary menu labelling: A cross-sectional study. *PLoS One*. 2019;14(10). doi:10.1371/journal.pone.0222773
- 475 36. Kaur A, Briggs ADM. Calorie labelling to reduce obesity. *BMJ*. 2019;367(I6119). doi:10.1136/bmj
37. Forde H, Penney TL, White M, Adams J. Is Reformulation Still a Suitable Goal for Sugary Beverage Taxes? A Response to Recent Commentaries. *Int J Health Policy Manag*. 2023;12(1). doi:10.34172/ijhpm.2023.8366
- 480 38. Kaur A, Briggs A, Adams J, Rayner M. New calorie labelling regulations in England. *BMJ*. 2022;377. doi:10.1136/bmj.o1079
39. Scarborough P, Kaur A, Cobiac L, et al. Eatwell Guide: modelling the dietary and cost implications of incorporating new sugar and fibre guidelines. doi:10.1136/bmjopen-2016
- 485 40. Kaur A, Scarborough P. *The Cost of Achieving the Eatwell Guide Diet: 2023 Update.*; 2023.
41. UK Government. Press release: PM backs public's right to choose with delay to BOGOF restrictions. Published 2023. Accessed April 5, 2024. <https://www.gov.uk/government/news/pm-backs-publics-right-to-choose-with-delay-to-bogof-restrictions>
- 490

42. Luick M, Pechey R, Harmer G, Bandy L, Jebb SA, Piernas C. The impact of price promotions on confectionery and snacks on the energy content of shopping baskets: A randomised controlled trial in an experimental online supermarket. *Appetite*. 2023;186. doi:10.1016/j.appet.2023.106539
43. Bite Back. "Fuel Us, Don't Fool Us" Report.; 2024. Accessed April 4, 2024. https://biteback.contentfiles.net/media/documents/WEBSITE__Bite_Back_Manufacturers___high_res.pdf
44. Cullerton K, Adams J, Francis O, Forouhi N, White M. Building consensus on interactions between population health researchers and the food industry: two stage, online, international Delphi study and stakeholder survey. *PLoS One*. 2019;14(8):e0221250-e0221250. doi:10.1371/journal.pone.0221250
45. Cullerton K, Adams J, Forouhi NG, Francis O, White M. Avoiding conflicts of interest and reputational risks associated with population research on food and nutrition: the Food Research risk (FoRK) guidance and toolkit for researchers. *BMJ*. Published online January 29, 2024:e077908. doi:10.1136/bmj-2023-077908
46. White M, Aguirre E, Finegood DT, Holmes C, Sacks G, Smith R. What role should the commercial food system play in promoting health through better diet? *BMJ*. 2020;368:m545-m545. doi:10.1136/bmj.m545
47. Theis DRZ, White M. Is Obesity Policy in England Fit for Purpose? Analysis of Government Strategies for Policies, 1992-2020. *Milbank Q*. 2021;00(0):1-45. doi:10.1111/1468-0009.12498
48. Marteau TM. Evidence-neglect: addressing a barrier to UK health and climate policy ambitions. *Sci Public Policy*. Published online 2023:scad021. doi:10.1093/scipol/scad021/7202063
49. UK Government. *Collection on Sugar, Salt and Calorie Reduction Reformulation.*; 2024. Accessed April 4, 2024. <https://www.gov.uk/government/collections/sugar-reduction>
50. UK Government. *Collection on the Soft Drinks Industry Levy (SDIL): Detailed Information.*; 2024. Accessed April 4, 2024. <https://www.gov.uk/government/publications/soft-drinks-industry-levy/soft-drinks-industry-levy>
51. Bandy LK, Scarborough P, Harrington RA, Rayner M, Jebb SA. Reductions in sugar sales from soft drinks in the UK from 2015 to 2018. *BMC Med*. 2020;18(1):20. doi:10.1186/s12916-019-1477-4

52. Scarborough P, Adhikari V, Harrington R, et al. Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis. *PLoS Med.* 2020;17(2):e1003025-e1003025. doi:10.5287/bodleian
53. Bandy LK, Scarborough P, Harrington RA, Rayner M, Jebb SA. The sugar content of foods in the UK by category and company: A repeated cross-sectional study, 2015-2018. *PLoS Med.* 2021;18(5). doi:10.1371/journal.pmed.1003647
54. Bandy LK, Hollowell S, Jebb SA, Scarborough P. Changes in the salt content of packaged foods sold in supermarkets between 2015–2020 in the United Kingdom: A repeated cross-sectional study. *PLoS Med.* 2022;19(10). doi:10.1371/journal.pmed.1004114
55. UK Government. National Diet and Nutrition Survey—Assessment of salt intake from urinary sodium in adults (aged 19 to 64 years) in England, 2018 to 2019. Published 2020. Accessed April 4, 2024. <https://www.gov.uk/government/statistics/national-diet-and-nutrition-survey-assessment-of-salt-intake-from-urinary-sodium-in-adults-aged-19-to-64-years-in-england-2018-to-2019>
56. Galbraith-Emami S, Lobstein T. The impact of initiatives to limit the advertising of food and beverage products to children: A systematic review. *Obesity Reviews.* 2013;14(12):960-974. doi:10.1111/obr.12060
57. Baker P. Ultra - processed foods and the nutrition transition : Global , regional and national trends , food systems transformations and political economy drivers. *Obesity Reviews.* 2020;(August). doi:10.1111/obr.13126
58. Department for Environment Food & Rural Affairs. *The National Food Strategy: The Plan.*; 2021.
59. Bandy LK, Hollowell S, Harrington R, Scarborough P, Jebb S, Rayner M. Assessing the healthiness of UK food companies' product portfolios using food sales and nutrient composition data. *PLoS One.* 2021;16(8 August):1-12. doi:10.1371/journal.pone.0254833
60. Bandy L, Jewell J, Luick M, et al. The development of a method for the global health community to assess the proportion of food and beverage companies' sales that are derived from unhealthy foods. *Global Health.* 2023;19(1). doi:10.1186/s12992-023-00992-z

- 570 61. Forde H, Boyland EJ, Scarborough P, Smith R, White M, Adams J.
Exploring the potential impact of the proposed UK TV and online
food advertising regulations: a concept mapping study. *BMJ Open*.
2022;12(6):e060302-e060302. doi:10.1136/bmjopen-2021-060302
- 575 62. Forde H, Chavez-Ugalde Y, Jones RA, et al. The conceptualisation
and operationalisation of 'marketing' in public health research: a
review of reviews focused on food marketing using principles from
critical interpretive synthesis. *BMC Public Health*. 2023;23(1).
doi:10.1186/s12889-023-16293-4
- 580 63. Forde H, Adams J, White M. *Introducing a Total Online Advertising
Restriction for Products High in Fat, Sugar and Salt (HFSS):
Consultation Response Submitted by the Centre for Diet and Activity
Research (CEDAR), MRC Epidemiology Unit, University of
Cambridge.*; 2020. Accessed April 6, 2024. <https://www.mrc-epid.cam.ac.uk/wp-content/uploads/2023/08/Online-advertising-restrictions-HFSS-consultation-response-Dec2020.pdf>
- 585 64. Forde H, Penney TL, White M, Levy L, Greaves F, Adams J.
Understanding Marketing Responses to a Tax on Sugary Drinks: A
Qualitative Interview Study in the United Kingdom, 2019. *Int J
Health Policy Manag*. Published online 2022.
doi:10.34172/ijhpm.2022.5465

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