recommendations (versus 22% in most deprived). Preliminary model validation appears to suggest estimates are suitable for use.

Conclusion Our study presents a novel framework for estimating fruit and vegetable consumption for small areas and within cities. We find low levels of fruit and vegetable consumption in Liverpool, with wide geographical inequalities in consumption by level of deprivation. These results were largely supported by internal/external validation. Producing small area statistics can support better nuanced decision-making including geographical targeting of interventions, especially for local authorities, as well as provide robust inputs for other modelling methods (e.g. agent-based modelling).

OP40

'THERE IS NO SILVER BULLET' HOW PARLIAMENTARY DEBATE ON THE UK SOFT DRINKS INDUSTRY LEVY CHANGED OVER TIME (2014–2020): AN APPLIED THEMATIC ANALYSIS

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10.1136/jech-2021-SSMabstracts.40

Background Announced in March 2016 and implemented in April 2018, the UK Soft Drinks Industry Levy (SDIL) aims to incentivise the reformulation of soft drinks. The SDIL has successfully decreased the amount of sugar in UK soft drinks, and purchased in soft drinks. Consequently, the SDIL has been widely applauded as a policy success. SSB taxation in other countries, however, has not been as successful and in some cases the policy was retracted. We aimed to develop an understanding of why the SDIL was deemed successful by analysing parliamentary debate two years before its announcement until two years post-implementation (2014–2020).

Methods Searches of Hansard were conducted for parliamentary debate transcripts discussing the SDIL across three key time periods: Pre-Announcement (01/01/14–15/03/16), Announcement – Implementation (16/03/16–5/04/18), and Post-Implementation (6/04/18–16/03/20). 218 transcripts containing eligible search terms were identified, and 179 included in the analysis after screening for relevance. Applied thematic analysis was conducted in 5 stages: familiarisation and creation of initial codebooks, independent second coding, codebook finalisation through team consensus, final coding of the dataset to the complete codebook and theme finalisation through team consensus.

Results Common issues raised in discussions across the timeline were: the ring-fencing of SDIL funds for pro-social causes, the scale of the health problems associated with excess sugar consumption, and the role of celebrities in making the SDIL a high profile issue. MPs acknowledged that the SDIL is not a 'silver bullet' for obesity prevention: it was positioned as either a 'good start' with other interventions required or that other interventions were needed instead. Distinct themes were that, due to early reformulation, the SDIL was discussed as 'having worked' one year prior to implementation. This notion persisted until the end of the timeline. These themes will be further refined to identify temporal patterns and trends. Additional results will be submitted before the June 28th deadline.

Population Health Relevance The SDIL is unique: it is a flagship policy for the UK Childhood Obesity Strategy and has cross-party support. Understanding why and how the SDIL made it onto the statutes, and why it was politically successful is vital for using policy instruments to improve population health in future. This work will aid understanding of the parliamentary process surrounding the SDIL, and could provide insight for those wishing to extend the SDIL to other products or implement SSB taxes elsewhere.

OP41

EVALUATION OF A NATURAL EXPERIMENT TO INCREASE AVAILABILITY OF HEALTHIER SNACK FOODS IN VENDING MACHINES USING INTERRUPTED TIME SERIES ANALYSIS

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10.1136/jech-2021-SSMabstracts.41

Background The food environment plays a key role in access and availability of healthier food and drink choices. Community based vending machines are one source of energy dense snack foods high in saturated fats, sugars and salts, particularly for young people. The aim of this research was to evaluate the increased availability of healthier options of different types of snack products sold in vending machines situated in English leisure centres. The natural experiment was managed by Leeds city council with vending provision by Wilkes vending company and support from Public Health England (PHE).

Methods The intervention sought to increase the availability of healthier food items within 18 vending machines in Leeds leisure centres over three iterative phases during 39 weeks between September 2018 and May 2019. Products were altered to meet agreed nutrition criteria at each phase based on the Government Buying Standards for Food and Catering Services (GBSF) and taking into consideration calorie guidelines within PHE's sugar reduction programme, and product availability. A quasi experimental trial design was used with interrupted time series analysis and segmented regression techniques adjusting for underlying trends, correlation between data points and holiday weeks when footfall is generally lower. The primary outcomes were the changes in level and trend of weekly purchased energy in phase 1 and phase 2. Secondary outcomes included phase changes in levels and trends for saturated fats, sugars, salt and purchased units.

Results Total energy, saturated fats, sugars and salt from products purchased all significantly reduced in phase 1 compared with baseline and although did not reduce further at phase 2 when more stringent standards were implemented, nutrients purchased continued to be lower compared with baseline. Trend changes during phase 1 were non-significant for all nutrients; however, during phase 2 there were upward trends for energy, saturated fats and salt. The total weekly amount of energy purchased by all machines reduced by 244,256kcal (95% CI -399,456 to -89,057 kcal), between baseline and phase 1. The reductions for saturated fats, sugars and salt were 4,917g (95%CI -8884 to -950g), 23,868g (95%CI -38,369 to -9,366g) and 425g (95%CI -644 to -207g) respectively. Weekly sales varied over time and were lower in phase 1 but recovered in phase 2.

Conclusion It is feasible to introduce standards to increase the availability of healthier snack products in vending machines and assess changes in purchased snacks without substantially affecting sales.

OP42

ASSOCIATIONS BETWEEN GLOBALISATION AND THE DOUBLE BURDEN OF MALNUTRITION: A MULTI-LEVEL ANALYSIS OF REPEATED CROSS-SECTIONAL DATA FROM 55 LOW- AND MIDDLE-INCOME COUNTRIES 1992–2018

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10.1136/jech-2021-SSMabstracts.42

Background Globalisation can transform food systems and contribute to a nutrition transition from local diets to westernised diets high in ultra-processed foods. This is likely to influence malnutrition in all its forms, however there is no evidence on its association with the double burden of malnutrition (DBM), i.e. the co-existence of overnutrition and undernutrition within the same individual, household, or population. This analysis investigates the association between DBM, expressed as a stunted child and overweight mother in the same household, and economic, social, and political globalisation, and how these differ by country income and household wealth.

Methods We pooled anthropometric and demographic data for 1,131,069 children aged under 5 years and their mothers, aged 15–49 years, from 189 Demographic and Healthy Surveys (DHS) conducted between 1992 and 2018 in 55 low- and middle-income countries (LMICs). These were combined with country-level data on globalisation, using the KOF Globalisation Index de jure, and gross national income (GNI) from the World Bank. Multi-variate associations between the DBM and globalisation were tested using logistic regression with country and time fixed-effects and robust standard errors clustered by country. Interactions between globalisation, household wealth index and GNI were also included in the model.

Results The DBM was distributed unequally across groups of affluence in our sample, with higher probability of DBM among rich households of LMICs at low GNI levels, and among poor households of LMICs at high GNI levels. We identified that economic globalisation was associated with higher odds of children being stunted and having an overweight mother among the poorest but not the richest wealth quintiles (OR; 95% CI: 1.52; 1.18–1.97 for poorest quintile). These associations were attenuated as country income increased. Social globalisation was also associated with higher odds of children being stunted and having an overweight mother, although this did not vary significantly by household wealth or country income (OR; 95% CI: 1.43; 1.18–1.74). No associations were identified between political globalisation and the DBM.

Conclusion This analysis suggests that the DBM is affecting rich households of poorer LMICs and poor households of richer LMICs the most. It also indicates that economic and social globalisation are associated with higher DBM, although the impacts of economic globalisation are mostly realised by the world's poorest.

Friday 17 September

Womens Health, 09.00 – 11.30

OP43

MEDIATORS OF SOCIOECONOMIC DIFFERENCES IN PRETERM BIRTH: A SYSTEMATIC REVIEW OF THE EVIDENCE

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10.1136/jech-2021-SSMabstracts.43

Background Approximately 8% of births in the UK are pre-term, and rates have been increasing for the past decade. There are significant inequalities in the prevalence of preterm birth, with some estimates showing 50% higher prevalence in mothers with low socioeconomic status (SES). Understanding and explaining how low SES increases the risk of preterm birth, will be important to reduce these inequalities.

Methods Systematic review of quantitative observational studies of mediation of the relationship between maternal SES and preterm birth. Searches were conducted from five databases covering January 2000 to June 2020, and all were identified for dual screening based on title and abstract review. Inclusion criteria was comparison across SES, preterm birth or gestational age as outcome, and study of mediation of non-genetic variables. All included studies were citation searched. All studies were narratively synthesised and quality assessed.

Results Initial searches identified 58 studies for full-text screening, of which 13 met inclusion criteria, and citation searching identified four more studies. A final sample of 17 studies from 11 countries (five from North America, 11 from Europe, and one each from Africa, the Middle East and South America; one study covered three European countries) were identified for analysis, covering study periods between 1980 and 2013. The majority (10/17) used the difference-of-coefficients approach and estimated proportion mediated. Other methods included multiplication of coefficients and counterfactual approaches. Forty-eight mediators (or groups of mediators) were examined. SES was measured most frequently by maternal education (7/17). All studies used a categorisation of preterm birth. The most frequently examined mediator was smoking (8/17), with the proportion estimated ranging from 2% to 43%. A residual direct effect of SES on preterm birth not via mediating exposures studied remained in over half of these studies. Four studies examined mediation via maternal health (range 6% to 39%), BMI (range 2% to 17%), and depression and anxiety (range from no effect to 44%).

Discussion Our review suggests that inequalities in preterm birth are in part explained by unequal exposure to risk factors across socioeconomic strata. However, limitations in the methods to assess mediation, reporting of mediation results, and measures of SES used mean it is difficult to meaningfully combine findings. A major limitation is the lack of consideration for the theoretical basis for mediation in the data, such as the underlying assumptions. Despite these limitations, these findings highlight potential intervention points for reducing preterm birth inequalities.