and expanding urbanisation has had deleterious effects on the diet and health of city dwellers; yet urban planning offers a potential mechanism for public health strategies. To inform such policy efforts in the Caribbean, we conducted a cross-disciplinary study to understand historical and epidemiological transformations in Kingston, Jamaica. With this case study, we aimed to develop methods and conceptual tools for investigating the historical social, political and economic contexts that have shaped contemporary foodscapes and can inform future nutrition strategies.

Methods Caribbean historians analysed principally online Jamaican newspaper archives to examine changes in food availability, affordability and consumption, and public discourses around eating, particularly fast food and other types of unhealthy food, from 1945 to present. Public health researchers undertook a scoping review to map available regional health survey databases for local nutrition and related health data, to examine major epidemiological trends in nutrition for the same time frame and assess its impact on noncommunicable diseases. Geographical information scientists mapped the health and historical data to produce an interactive map of the evolution of Kingston's foodscape.

Results

Preliminary historical findings include the increasing popularisation of commercial, more quickly prepared meals between the 1950s and 1970s; a national campaign to promote locally produced food crops in the diet to address food scarcity in the late 1970s; and the proliferation of United States fast food chains in Kingston in the 1980s. The health data review found thirteen relevant health or nutrition surveys on malnutrition including childhood stunting rates, nutrient deficiency and obesity rates. Few predate the 1980s and many only offer national (versus city level) data. Annual health and demographic reports pre- and post-independence in 1962 might be able to fill data gaps. For the geographical information systems map, we had to identify relevant historical address points, as well as identify and digitalise historical maps from 1945 onwards onto which data can be layered.

Conclusion Structural approaches to public health require us to expand the scope of transdisciplinary research and build the methodological capacity to make 'non-traditional' connections. In this case study of the health history of a major Caribbean urban space, while not claiming causal relationships between historic and health trends, we suggest the important role that natural events, international and local policies, and advertising driven economies play in the production of 'unhealthy' foodscapes over time.

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| P17 | **DIETARY INFLAMMATORY POTENTIAL AND RISK OF BREAST CANCER: RESULTS FROM A CASE-CONTROL STUDY IN FRANCE** |

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Background Diet is known as one of the major modifiable risk factors for the regulation of chronic inflammation. Epidemiologic studies that have examined the association between dietary inflammatory potential and breast cancer risk have been inconsistent. The aim of this study was to assess the association between the Adapted Dietary Inflammatory Index (ADII) and breast cancer risk.

Methods The study was conducted using data from the CECILE study, a population-based case-control study in 2 French departments (Ille-et-Vilaine and Côte d'Or). The group of cases included women aged 25–75 years with a cancer of the breast diagnosed between 2005 and 2007. Controls were selected at random from the telephone directories and were frequency-matched to the cases by age and department.

Information on socio-demographic characteristics, lifestyle-related factors, hormonal and reproductive history, previous medical conditions, and family history of breast cancer were obtained from a structured questionnaire during in-person interviews. Information on dietary habits the year prior to inclusion was self-reported by the study subjects using a 150-items food frequency questionnaire.

The ADII for each subject was calculated as the sum of the standardized energy-adjusted intake of each dietary component weighted by its dietary inflammatory score, as described by (van-Woudenbergh et al, Am J Clin Nutr, 2013).

Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated from multivariable logistic regression after controlling for potential confounders selected among breast cancer risk factors.

Results The analysis was based on 840 cases and 908 controls who completed the food frequency questionnaire. The OR for breast cancer in women in the highest quartile of ADII as compared to women in the lowest quartile, was 1.43 (95% CI: 1.07–1.90) and there was a significant trend of increasing risk with increasing ADII. The corresponding OR in menopausal women was 1.58, 95% CI: 1.08–2.31, while no statistically significant association was observed in premenopausal women

Conclusion Our results suggest that a pro-inflammatory diet increases the risk of developing breast cancer among postmenopausal women.

| P18 | **MULTILEVEL LATENT CLASS MODELLING OF SIMULATED HEALTHCARE PROVIDER-LEVEL CAUSAL EFFECTS IN OBSERVATIONAL DATA** |

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Background Healthcare provider performance is commonly assessed using patient outcomes, e.g. survival rates. Patient characteristics that may affect outcomes in the absence of genuine provider-level differences must therefore be balanced across providers to ensure a fair comparison. There are many methods that can accommodate this patient 'casemix' but none that also allow the assessment of provider-level covariate effects, i.e. the potential causes of performance differences. We aim to demonstrate the utility of multilevel latent class (MLC) modelling to identify causal provider-level covariate effects after accommodating patient differences.

Methods We simulated data for patients and providers, based on a previously utilised real-world dataset of patients diagnosed with colorectal cancer. Age at diagnosis, sex and

socioeconomic status were included at the patient level, and we explored a continuous outcome. We included both binary and continuous effects at the provider level, to reflect organisational features such as surgeon speciality or available beds, although these were analysed separately to demonstrate proof-of-principle. We simulated unique sets of 100 datasets using a range of coefficient effect values and error variances. Interest lies in the ability of the MLC model to recover these simulated provider-level coefficient effects.

Results Models contained one patient-level latent class and up to five provider-level latent classes. For the binary provider-level covariate, median recovered values were almost identical to simulated effects throughout, e.g. for the simulated coefficient value 0.500 at 33% error variance, the median recovered value was 0.499 (95% CI 0.489–0.509) across all models. For the continuous provider-level covariate, median recovered values improved as the number of provider-level latent classes were increased, e.g. for the simulated coefficient value 0.200 at 33% error variance, the median recovered value was 0.153 (95% CI 0.113–0.184) for two provider-level classes and 0.191 (95% CI 0.168–0.210) for five provider-level classes.

Discussion The MLC modelling approach achieved successful recovery of simulated coefficient values, within credible intervals for at least three provider-level latent classes. Very small simulated coefficient values were not recovered as well as higher values, which may be due to the variability introduced during simulation dominating the coefficient effect. There is also some attenuation of effect seen for the continuous provider-level covariate. We have demonstrated the utility of this approach to separate modelling for prediction (to accommodate patient casemix) and for causal inference (to explore provider-level effects) across a data hierarchy. There is much scope to extend the assessment of upper-level causal effects by consideration of a multivariable DAG.

P19 | BIRTH, CHILD AND MATERNAL OUTCOMES FOR YOUNG AND VULNERABLE MOTHERS IN ENGLAND: A POPULATION-BASED DATA LINKAGE COHORT STUDY

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Background Increased support during pregnancy and early childhood is targeted at first time teenage mothers and is recommended for other vulnerable mothers in England. We used population-level healthcare data to assess which mothers and children are most at risk of adverse health outcomes.

Methods We used Hospital Episode Statistics for births to mothers aged 15–44 years in NHS hospitals in England between 2011–2014. We evaluated a number of birth, child and maternal outcomes within 24 months following birth (including birthweight, emergency hospital contacts for children, and subsequent deliveries), according to a range of maternal risk factors: age, parity, neighbourhood deprivation, history of adversity (drug/alcohol abuse, violence, self-harm), or chronic mental or physical illness identified from ICD-10 diagnosis codes in the 5 years prior to delivery.

Results Of the 1,174,688 births in the study population, 61,370 (8·7%) were to first time teenage mothers, 16,675 (1·0%) were to multiparous teenage mothers, 76,245 (4·4%) were to mothers with a history of adversity, and 394,388 (23·0%) were to mothers with a mental health/behavioural chronic condition. The prevalence of risk factors generally decreased with maternal age, but the relationship between risk factors and outcomes varied according to maternal age. Compared with infants born to multiparous mothers aged 25–35 with no risk factors ('low risk' mothers), babies born to primiparous teenage mothers were 206 g lighter (95% CI 202–211 g) and babies born to multiparous teenage mothers were 206 g lighter (95% CI 198–215 g). Compared with children born to 'low risk' mothers, an additional 11·9% (95% CI 11·5–12·3%) of babies born to primiparous teenage mothers and 15·6% (95% CI 15·0–16·2%) born to mothers aged 20–24 with a history of adversity had an emergency hospital contact. Subsequent deliveries were most common in multiparous teenage mothers (21·9% for primiparous and 23·3% for multiparous teenage mothers, compared with 11·1% for 'low risk' mothers). When adjusting for all maternal risk factors together, mental health conditions were a strong driver of adverse outcomes.

Discussion In addition to primiparous teenage mothers, multiparous teenage mothers and mothers across a range of ages with a history of adversity or mental health condition could benefit from increased support before, during and after birth. Appropriate delivery and targeting of effective interventions for these groups could help improve birth, child and maternal outcomes.

P20 | ANALYSIS OF IRISH INQUIRY REPORTS RELATING TO PREGNANCY LOSS SERVICES (2005–2018)

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Background External inquiries related to maternity services are sometimes carried out after negative media reporting of adverse events that have occurred. External inquiries aim to identify issues in the maternity care provided to pregnant women and to make recommendations to improve the standard of care; however, these recommendations are not always implemented. Published literature comparing external reports and assessing their impact on maternity services is limited. Hence, this is the focus of this study.

Methods Ten publically-available national health-service-commissioned inquiry reports published between 2005–2018 relating to perinatal deaths and pregnancy loss services, were identified from national inquiries into the maternity services in Ireland. These were assessed by 2 clinicians, separately, to compare and examine the content and recommendations made in each report.

Quantitative and qualitative data was collected using a specifically designed review tool (based on the Health Service Executive's (HSE) Systems Analysis Review Report Checklist (SARRC)). The findings and recommendations from each report were studied by descriptive thematic analysis outlining emerging themes and issues.