

disadvantage. A limitation of this study is that SEC measures are not directly comparable across countries.

OP104 **DISTINCT PATTERNS OF SOCIO-ECONOMIC DISPARITIES IN CHILD-TO-ADOLESCENT BMI TRAJECTORIES ACROSS UK ETHNIC GROUPS: A PROSPECTIVE LONGITUDINAL STUDY**

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Background In many high-income countries, BMI and levels of overweight and obesity are inversely associated with socio-economic status. Recent evidence suggests that socio-economic disparities in BMI are emerging at a young age. Little is known whether patterns of these disparities vary by ethnicity, especially in the UK. This is the first UK study to our knowledge to examine the pattern of socio-economic disparities in child-to-adolescent BMI trajectories across ethnic groups.

Methods We used data from the UK Millennium Cohort Study, which oversampled children living in the disadvantaged circumstances and in England those from minority ethnic backgrounds. A total of 15,996 children with 62,051 BMI measurements between 3 and 14 years were included in this analysis. Mixed-effects fractional polynomial models were applied to estimate mean BMI trajectories for each socio-economic group (as defined by poverty and maternal education) and differences in BMI between groups at each age. Models were subsequently stratified by ethnicity and adjusted for maternal pre-pregnancy BMI, maternal smoking during pregnancy, birthweight and infant feeding.

Results Overall, the poverty group had a higher mean BMI than non-poverty group from 6 years with a small difference of 0.06 kg/m² [95% CI 0.01–0.12], which increased to 0.67 kg/m² [0.52–0.82] by 14 years. The income-BMI associations differed by ethnicity. In Whites and South Asians, the BMI difference by income was established at 3 years and widened with age. Among Black African-Caribbeans, there was a reverse socio-economic gradient in BMI, in that the poverty group had a lower BMI (-0.37 kg/m² [-0.04, -0.71] at 5 years; -0.95 kg/m² [-0.11, -1.79] at 14 years). Differences remained after adjustment for early-life factors. These distinct patterns persisted when using maternal education as the socio-economic indicator.

Conclusion These findings imply that socio-economic advantage may not necessarily be universally associated with lower BMI. The effect of socio-economic circumstances on BMI potentially differs by ethnic group. Given the increasing ethnic diversity in the UK, public health approaches to promote healthy weight need to consider the varying needs of target populations. The positive income-BMI association found in Black African-Caribbean children requires replication in other samples and further investigation into the underpinning cultural and biological mechanisms that may explain these differences.

OP105 **ASSOCIATIONS BETWEEN NEIGHBOURHOOD ENVIRONMENTS AND HOSPITAL ADMISSIONS FOR CVD ARE MODIFIED BY SOCIOECONOMIC FACTORS: A PROSPECTIVE STUDY USING UK BIOBANK**

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Background Neighbourhood environments may influence risk of cardiovascular disease (CVD), via diet and physical activity (PA) behaviours. However, if the effects of CVD-related neighbourhood risks vary by socioeconomic position, efforts to improve population health by improving neighbourhood built environments may widen health inequalities. We examined whether associations between two neighbourhood characteristics – availability of PA facilities and fast-food store proximity – and CVD-related hospital admissions, were modified by income and area deprivation.

Methods 336,156 UK Biobank participants aged 40–70 years, linked to the UK Biobank Urban Morphometric Platform, were followed up through linked Hospital Episodes Statistics (mean follow-up=6.8 years). We examined whether associations between neighbourhood density of formal PA facilities and proximity of home address to a fast-food/takeaway store (at baseline), and hospital admissions with a primary diagnosis of CVD, were modified by household income or area deprivation (Townsend). We used Cox proportional hazards models, adjusted for likely confounding, and calculated relative excess risks due to interaction (RERI) to assess effect modification on the additive scale. We also examined the combined modifying role of income and deprivation.

Results Household income and area deprivation modified associations between neighbourhood exposures and CVD-related hospital admissions. Greater density of PA facilities may have a larger public health impact in more deprived areas (RERI=0.088), but high-income households benefit more than low-income households (RERI=-0.075). The estimated benefit was restricted to high-income households in deprived areas, where we observed 21% lower hazard of being admitted to hospital with CVD for people living <1km from at least four PA facilities than among people with no local PA facilities (HR=0.79, 95%CI:0.65–0.95). For fast-food proximity, reduced access to fast-food stores might have the biggest impact for low-income households (RERI=0.075), but mostly in less deprived areas (RERI=-0.104). A beneficial association was only observed among low-income households in affluent areas, where the hazard of CVD-related admission was 12% lower among people living ≥2km from a fast-food store than among people living <500m from one (HR=0.88, 95% CI:0.80–0.97).

Conclusion Among mid-life adults in the UK, associations between neighbourhood food and PA environments and hospital admissions for CVD varied according to household income and area deprivation. Results suggest that formal PA facilities may reduce CVD risk in deprived areas, but not among low-income households, raising important implications for health

inequalities. Reducing access to fast-food stores may have greatest impact for low-income households but mostly in affluent areas. This may imply a greater range of alternatives to fast food in those areas.

OP106

THE CONTRIBUTION OF MATERNAL PSYCHOLOGICAL DISTRESS TO INEQUALITIES IN CHILD MENTAL HEALTH PROBLEMS: DIFFERENTIAL EXPOSURE AND DIFFERENTIAL SUSCEPTIBILITY IN THE UK MILLENNIUM COHORT STUDY

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Background Reducing prevalence and inequalities in child mental health problems (CMHP) will improve life chances and prevent the perpetuation of social inequalities. Research seeking to identify options for reducing health inequalities often aims to identify amenable risk factors on the pathway between socio-economic circumstance (SECs) and health. Such risk factors may create health inequalities via two mechanisms: differential exposure (risk factor is more prevalent in disadvantaged groups) and differential susceptibility (health impacts of the risk factor are worse in disadvantaged groups). Most research focusses on differential exposure, using mediation analysis. However, most mediation methods produce inaccurate estimates if differential susceptibility (i.e. an interaction) is present. Furthermore, differential exposure and differential susceptibility may reveal alternative or complementary policy actions. We used a novel effect decomposition method to examine the contribution of maternal psychological distress (MPD) to inequalities in CMHP in the nationally-representative UK Millennium Cohort Study (born 2000–2002, $n \sim 18,000$).

Methods SECs (exposure) were represented by maternal education (GCSE grades A*–C, yes/no, age 9 months), MPD (risk factor) by the Kessler scale (continuous, 3y), and CMHP (outcome) by the Strengths and Difficulties Questionnaire (borderline-abnormal, yes/no, 5y). The total effect (TE) of SECs on CMHP was estimated using risk ratios (RR) and decomposed, using Stata's 'Med4way', into: the direct effect and effects via MPD due to: mediation (differential exposure), interaction (differential susceptibility), and mediated interaction (when SECs affect MPD and its impact on CMHP). Confidence intervals were estimated using non-parametric bootstrapping (1000 replications). We adjusted for baseline confounders (ethnicity, maternal age at first live birth) in a complete case sample ($n=9,777$). Sensitivity analyses examined bias from unmeasured intermediate confounding and attrition.

Results 10% children had borderline-abnormal CMH. The RR for the TE of SECs on CMHP was 1.79(1.58–2.04). Two thirds (66% [0.50–0.81]) of this was direct, i.e. not acting through MPD. Four percent (1.2–6.8%) was mediated (differential exposure), 28% (12.1–42.2%) was due to interaction (differential susceptibility), and 2% (0.6–4.3%) was from mediated interaction. Bias from unmeasured intermediate confounding and attrition appeared minimal.

Conclusion The direct effect of SECs on CMHP was large. Maternal psychological distress is also potentially important in the development of inequalities, predominantly due to

differential susceptibility (and not differential exposure). Thus analyses which only consider mediating pathways may underestimate its role. Policies to improve MPD have the potential to reduce inequalities in CMHP. Future research to understand the factors that buffer advantaged mothers from the consequences of MPD may inform policy content and delivery.

OP107

HOW CAN WE MEASURE COMMUNITY RESILIENCE FOR POPULATION HEALTH? AN EVIDENCE SYNTHESIS FOR WHO EUROPE HEATH EQUITY NETWORK

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Background Resilience is a dynamic process of coping, adaptation and growth in response to threats and can be an attribute of individuals, communities or systems. 'Creating resilient communities' is a Health 2020 priority, reflecting the importance of the social environment as a determinant of population health. This is an emergent field for research, with questions of how best to define and measure this complex concept at a community level. This presentation reports on a rapid review and synthesis of measurement strategies conducted for WHO Europe Health Evidence Network (HEN). The review question was: 'What quantitative and qualitative methods can be used to measure health-related community resilience at a national level?'

Methods The rapid review used HEN Evidence Synthesis guidance. A systematic search of academic and grey literature databases and 73 websites combined key terms for community resilience and measurement. Included languages were English, French and German, and Russian (via an independent search). Study selection was in 2 phases, with an initial focus on Europe. Inclusion criteria were articles that reported outcomes involving measurement of health-related community resilience in all population groups, study designs and settings. Studies on individual/system resilience and those not specifying health and wellbeing measurement were excluded. Data extraction fields included theoretical framework, methods and indicators. Findings were summarised in tables and a narrative synthesis.

Results In total, 3,753 publications were identified and following screening, 33 studies were included; 27 from WHO European Region. The map of literature showed various measurement frameworks in use, however most related to community disaster resilience. We grouped measurement strategies into:

- Frameworks providing population profiles of resilience factors, using quantitative data
- Mixed method assessments incorporating stakeholder views, used mostly for local planning & evaluation
- Qualitative and participatory approaches, which involved marginalised communities.

There was a dearth of validated measures and insufficient evidence on national-level indicators, but socioeconomic measurement domains were categorised. Key methodological challenges were highlighted, including definitional issues, data aggregation and lack of attention to equity. Notwithstanding these challenges, the review identified some common principles for measuring community resilience.