Conclusion This study showed a reduced risk of dementia for individuals with a higher level of engagement in cognitively stimulating activities such as reading, playing computer games, visiting art and museums contributing to a multifaceted level of leisure activities, that may preserve cognitive reserve until later in life and hinting to the psychosocial paradigm.

Thursday 10 September
Diet and Obesity

OP55   **CHILDHOOD OVERWEIGHT AND OBESITY AT THE START OF PRIMARY SCHOOL: EXTERNAL VALIDATION OF PREGNANCY AND EARLY-LIFE PREDICTION MODELS**

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Background Tackling the childhood obesity epidemic can potentially be facilitated by risk-stratifying families at an early-stage to receive prevention interventions and extra support. As part of the Studying Lifecourse Obesity Predictors (SLOPE) study, we developed prediction models for childhood overweight and obesity using routinely-collected antenatal and early-life healthcare data in Hampshire, South of England.[1] As a model usually performs better in the data used for its development, external validation is needed to check its performance in similar but new target population. This analysis aimed to externally validate these models using data from the Born in Bradford (BiB) cohort in the North of England.

Methods BiB is a longitudinal multi-ethnic birth cohort study which recruited 12,453 women (13,776 pregnancies) at around 28 weeks gestation between 2007 and 2010 in Bradford. Data from the routine National Child Measurement Programme measurement at 4–5 years in school was linked to the maternal and early-life BiB cohort data. The outcome was defined as body mass index (BMI) ≥91st centile at 4–5 years based on the UK clinical cut-off used to develop the SLOPE models. Maternal predictors included BMI, highest educational attainment, partnership and smoking status at booking, ethnicity and intake of folic acid supplements. Early life predictors included birthweight, gestational age, sex and weight at 1 or 2 years. Discrimination was assessed using the area under the receiver operating curve (AUC) and calibration using calibration slope (equal to one in well-calibrated model).

Results Data were available for 6292 women for the early pregnancy models and 3801 women and children for the early-life models. The AUC was comparable to the development model at all stages (early pregnancy, birth, ~1 year and ~2 years). The AUC at development was 0.66 (95% confidence intervals (CI) 0.65 to 0.67) compared to 0.64 (95% CI 0.62 to 0.66) on external validation. Similarly, the AUC was 0.83 (95% CI 0.82 to 0.84) at ~2 years at development and 0.81 (95% CI 0.79 to 0.83) on external validation. Models were less well-calibrated on external validation ranging from 0.87 (standard error (SE) 0.04) to 0.91 (SE 0.06) across the stages compared to 0.98 (SE 0.03) to 0.99 (SE 0.01) at development.

Conclusion The SLOPE models developed for predicting childhood overweight and obesity risk performed reasonably well on external validation in a birth cohort with a different geographical location and ethnic composition. However, recalibration by updating the model intercept may be required to improve calibration in other populations.

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OP56   **WHAT IS THE LIKELIHOOD OF OVERWEIGHT OR OBESITY IN YOUNGER CHILDREN SHARING A HOUSEHOLD WITH AN OLDER CHILD WHO IS OBESE OR SEVERELY OBESE? CROSS-SECTIONAL ANALYSIS OF LINKED NATIONAL CHILD MEASUREMENT PROGRAMME DATA**

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Background The National Child Measurement Programme (NCMP) assesses the weight status of 4–5 and 10–11 year-old children attending state schools. We linked pseudonymised NCMP records to pseudonymised unique household identifiers derived from general practice electronic health records to investigate the likelihood of overweight or obesity in a younger household child member based on the oldest child's weight status, sex and ethnic background.

Methods We assigned an encrypted Unique Property Reference Number using a validated address-matching algorithm to addresses of patients registered in mid-2018 with all 159 GP practices in four inner east London boroughs. We identified 36,789 children (18,714 five-year-olds [9,326 girls] and 18,075 11-year-olds [8,989 girls]) with NCMP records living in 16,434 households, representing 33.8% of 48,602 registered households with two or more children who would have been eligible for NCMP measurements in the preceding five school years. We identified the oldest child in the household with a NCMP record as the reference child.

We used binary logistic regression to estimate the likelihood (Odds Ratio [OR]; 95% confidence intervals [CI]) of at least one younger household member with NCMP-recorded overweight or obesity (BMI centile ≥91st) according to the reference child's weight status (reference category: healthy weight), sex (male), and ethnic background (White) after adjustment for household size and composition, and borough of residence (Stata/MP 15).

Results The number of children with a NCMP record per household ranged from 2–8 (median 2, IQR 2–2) with 13,170 (80.1%) including only two. 50.0% of 16,434 reference children were girls, with 18.2%, 33.5% 18.6% from White, South Asian or Black ethnic backgrounds respectively. 5.4% (n=890) of reference children were severely obese (≥120% of the 95th centile) and 24.0% (n=3,936) had a younger household member with NCMP-recorded overweight or obesity.

After mutual adjustment, reference children who were obese (OR 3.50; 95% CI: 3.08,3.96), severely obese (4.29; 3.69,4.99) or from Black ethnic backgrounds (1.52;