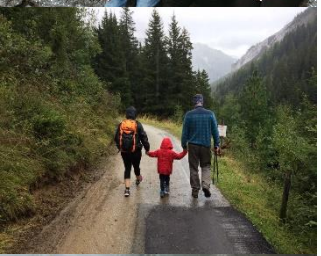
Growing Up in Ireland
National Longitudinal Study of Children



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Decomposing maternal education differentials in BMI trajectories between ages 9 and 17/8: Findings from the Growing Up in Ireland study

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Background: Prevalence of obesity

- Worldwide, adult obesity has tripled since the 1970s and is now a leading cause of preventable morbidity and mortality (WHO, 2020).
- Obesity is in the top three global social burdens, second only to smoking (Dobbs et al. 2014).
- In 2019, UNICEF estimated that 340 million children globally between 5 and 19 years of age, and 40 million children below age 5, are overweight or obese (OWO) (UNICEF, 2019).

Health Consequences

- Treating OWO and its consequences is costly at both societal and individual levels (Dai et al. 2020; Cuschieri and Mamo 2016).
- In Ireland approximately two-thirds of the adult population are overweight or obese
- Obesity rates increased from 10% in 1990 to 24% in 2018 for those aged 18 to 64
- OWO costs approx. €1.13 billion per year for Ireland and €0.51 billion for NI

Child Overweight and Obesity

- A child's risk of OWO is the outcome of the interaction of a number of complex factors operating at genetic, familial, environmental, community and societal levels (Ross & Desai, 2014; Dobbs et. al., 2014; Abarca-Gomez et. al., 2017)

- Obesity risk tracks from childhood to adulthood:
  - 88% of obese 19-year-olds are predicted to be obese at age 35 (Ward et. al., 2017)

Socioeconomic Gradients in OWO

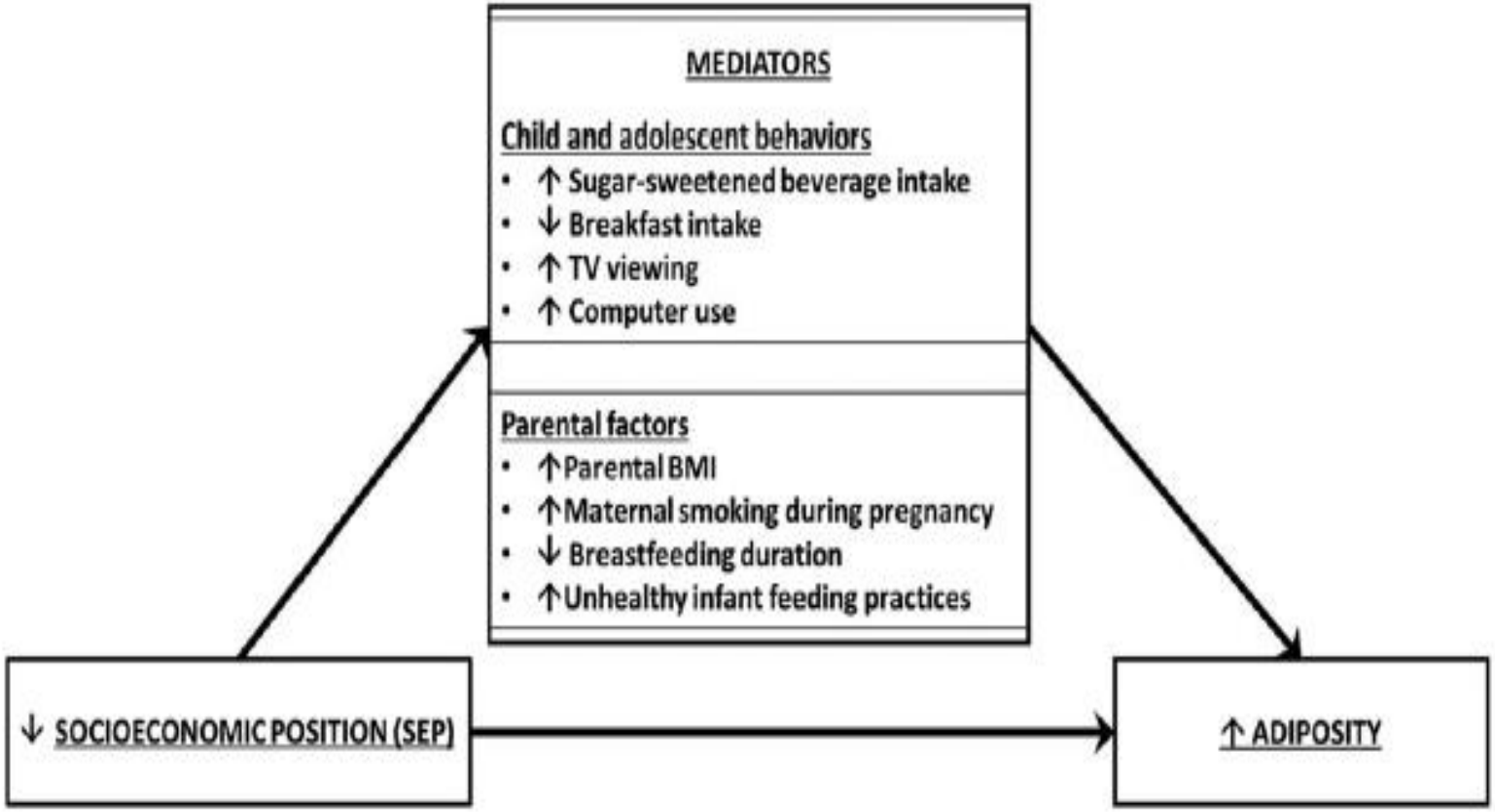
- Historically low BMI has been associated with low SEP. More recently, low SEP is more commonly associated with high BMI, and in particular OWO (Bann et al. 2018).
- Evidence suggests child obesity rates are plateauing
- However, rates continue to increase for lower SEP families (Chung et al. 2016; Abarca-Gómez et al. 2017; Dai et al. 2020; Bann et al. 2018)
- SEP gradients in OWO contribute to adult health inequalities

Research question

What are the relative contributions of different factors to SEP differentials in BMI from middle childhood (age 9) to late adolescence (age 17/8)?

SEP is measured as maternal education

Mediators of association SEP and OB



A conceptual model summarizing the consistent mediators of the association between SEP and adiposity among youth

Source: Gebremariam et. al. (2017)

Growing Up in Ireland (GUI) dataset

- GUI is a nationally representative, longitudinal study commenced in 2007-2008.
- It comprises two cohorts (Infant and Child) followed every four years from baseline.
- These analyses use data from the first three sweeps of the Child cohort (cohort98)
  - 8,568 9-year-olds (and families) included in the first sweep
  - 7,525 families (88%) were followed up at age 13
  - 6,216 (73%) at age 17/18 years.
- Data on a range of topics were collected including information on the child's daily life, dietary and exercise habits and included anthropomorphic measurements of both carer and child

Socio-Economic Position

- Independent variable: Socio economic position – identified by maternal education and categorized into 4 groups/levels of education:
  - Lower Secondary or Less
  - Leaving
  - Diploma/Certificate
  - Degree or Higher
- Maternal education accounts for more variation in child health than family income or occupational class

- Maternal education is a good predictor of child health behaviours

Outcome variable – child BMI

- Child BMI was calculated using the child's measured height and weight at each wave. (BMI = kg/m^2 - where kg is a person's weight in kilograms and m^2 is their height in metres squared).

- Childhood BMI was then categorised into overweight and obesity (OWO) using standard sex- and age-specific International Obesity Task Force (IOFT) cut-off points (Cole, 2000).

Mediating factors (1 of 2)

Perinatal factors

- Prenatal smoking

  'Never', 'Occasionally' and 'Weekly or more often'
- Prenatal drinking

  'Never', 'Occasionally' and 'Weekly or more often'
- Breastfeeding duration

  'Never', '<=5 weeks', '6-10 weeks', '11-15 weeks',

  '16-25 weeks' and '26+ weeks'
- Mother's age at birth

Mediating factors (2 of 2)

Exercise & Diet

- Godin-Shephard Leisure-Time Physical Activity Questionnaire

  Exercise: 'Light' and 'Hard' over a two week period:

  'None', '1-2 days', '3-5 days', '6-8 days', 9+ days' activity.

- Diet Quality Score (DQS)

  How often food type eaten in previous 24 hours

  'Never', 'Once', 'More than once'

  'Healthy' (e.g. raw vegetables, fruit) scored 0, 1, 2.

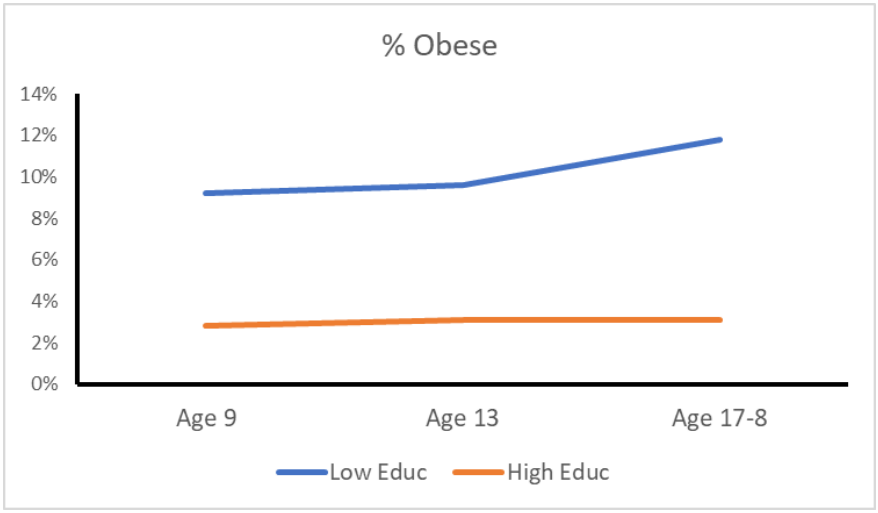
  'Unhealthy' (e.g. sausage, chips) score 0, -1, -2.

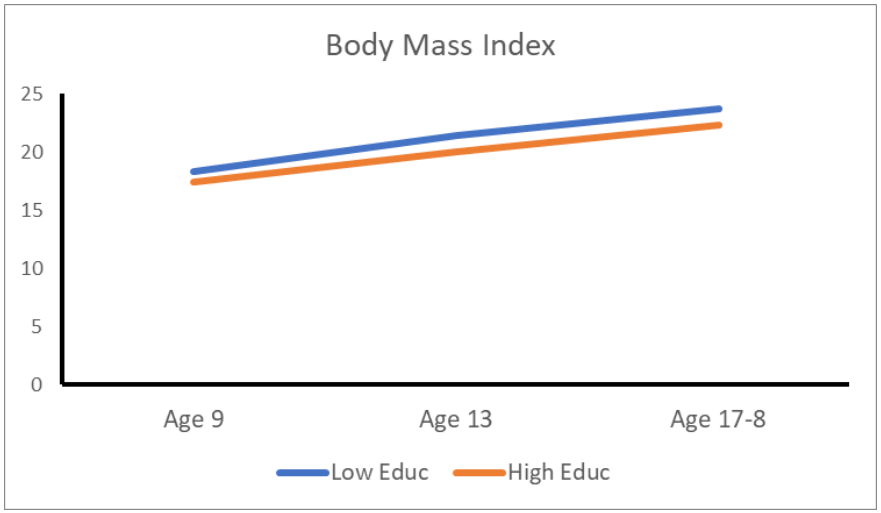
  Sum both for total Diet Quality Score

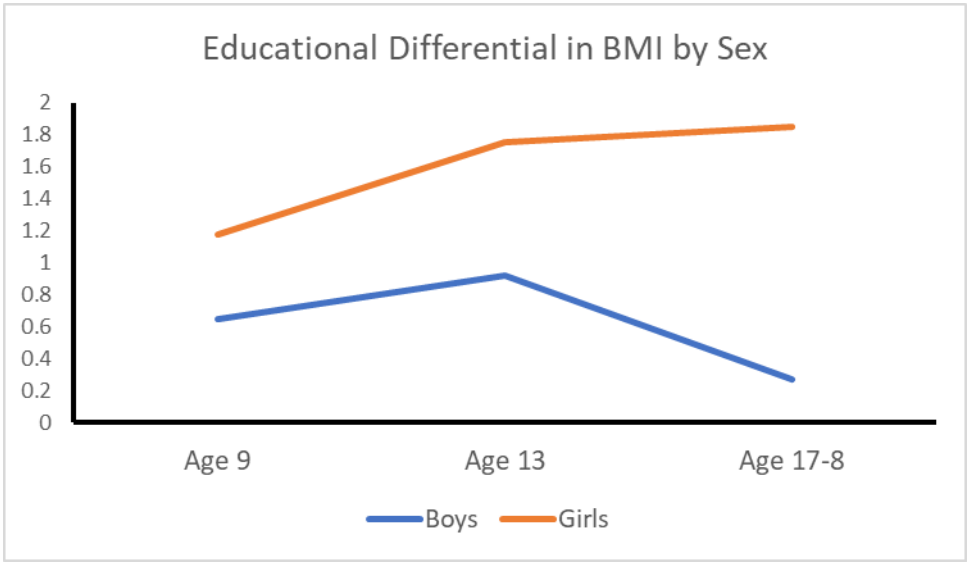
Analysis

- Linear spline multi-level models were estimated to examine the factors associated with BMI trajectory.
- Both time-varying (e.g. child exercise) and time-invariant (e.g. perinatal) factors were used to examine the pattern and magnitude of differentials.
- Multi-level modelling assessed the differential effects of levels of maternal education (or SEP) on BMI outcome at each age

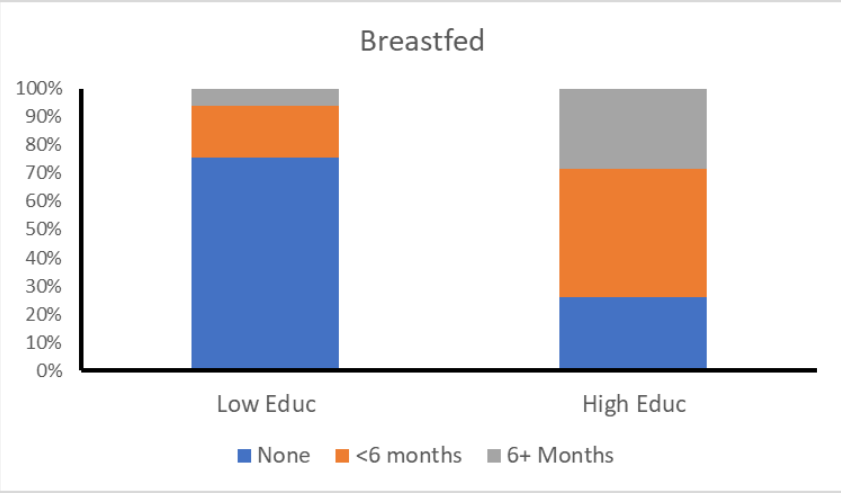
Results: BMI and Obesity

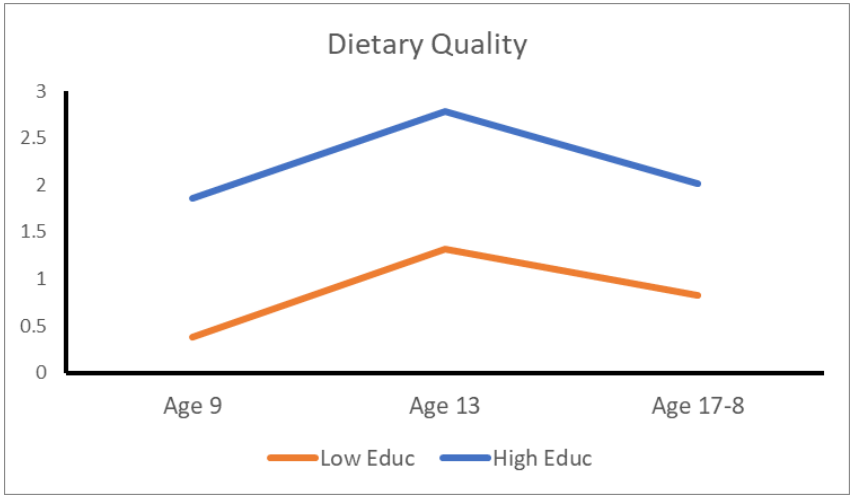


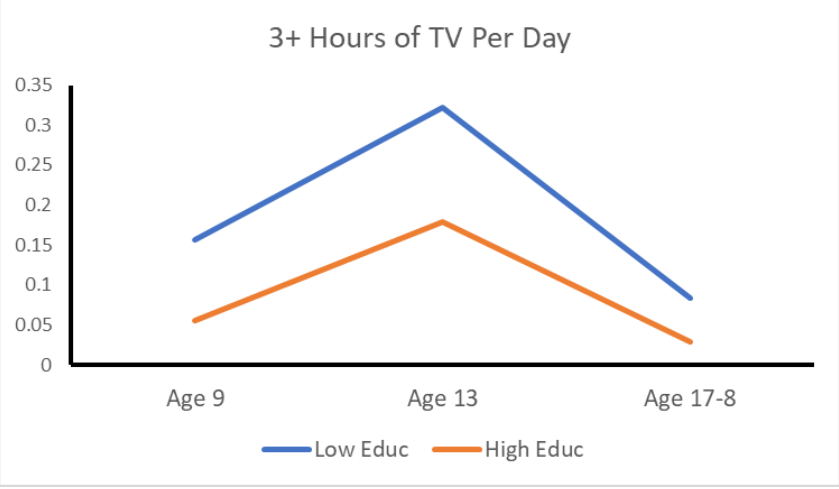


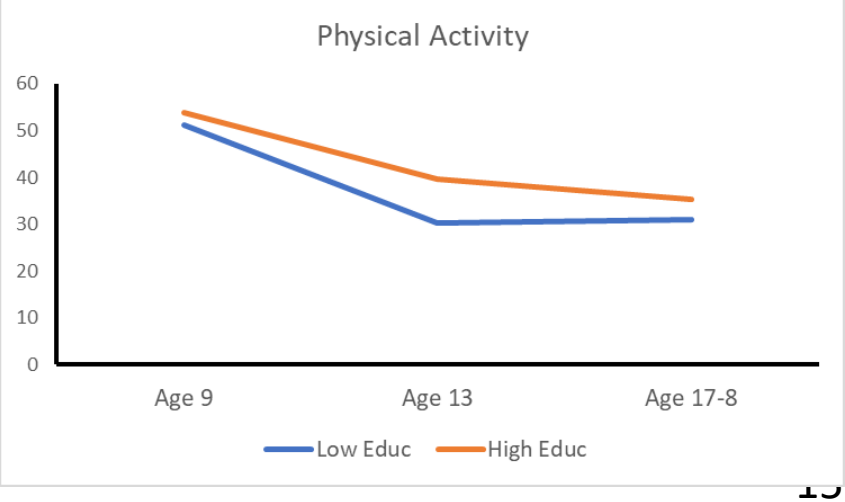


Results: Health Behaviours

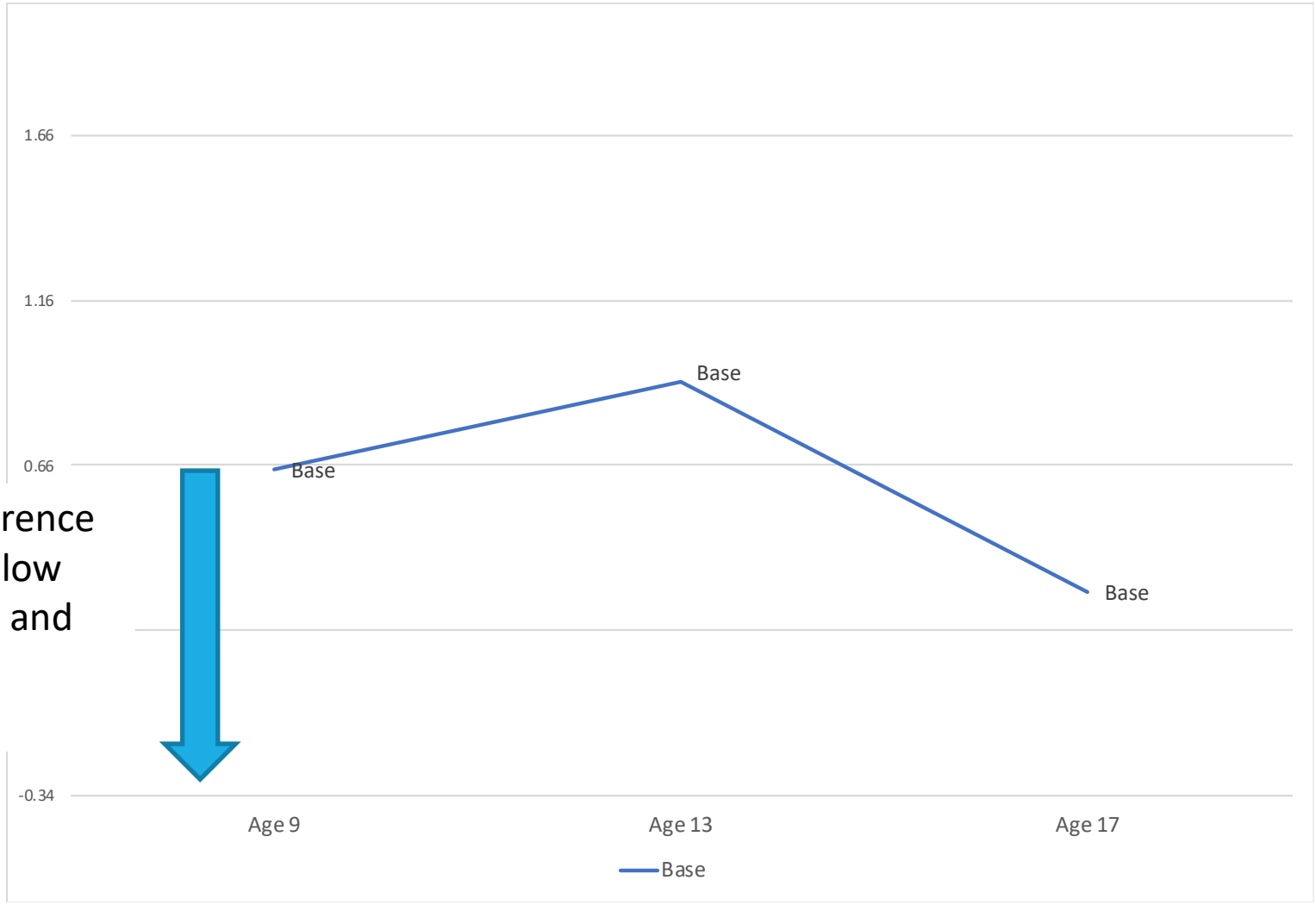






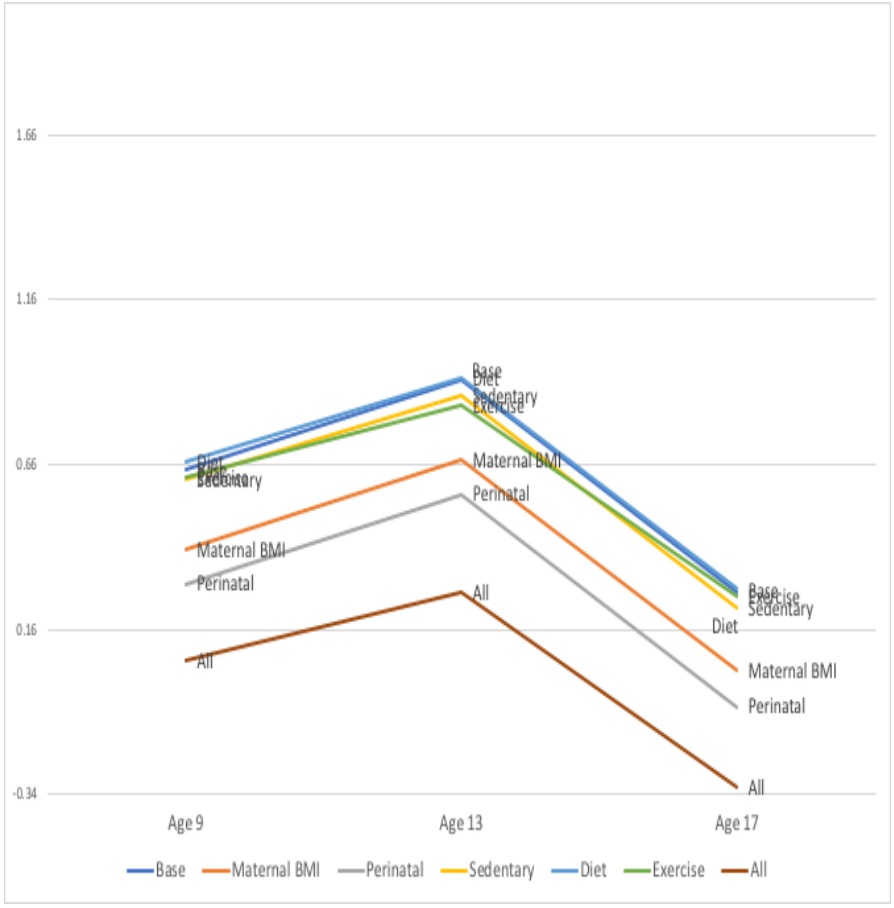


Unadjusted BMI Educ. Differential - boys

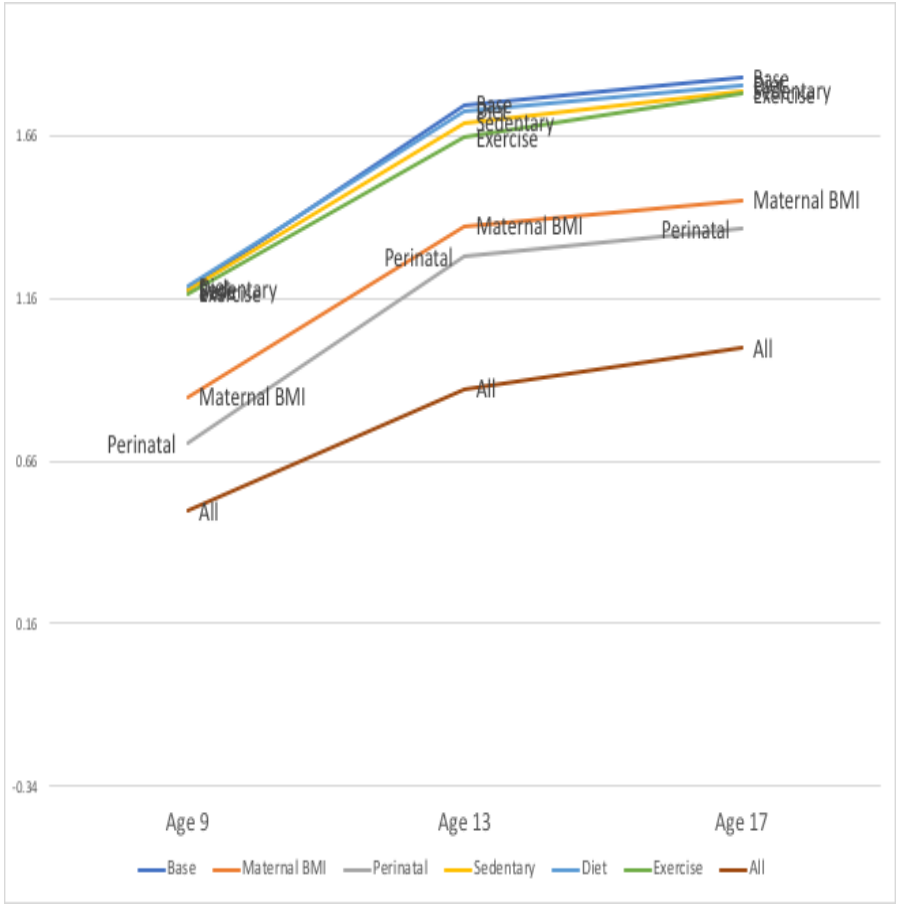


BMI Difference between low educated and highest educated

Results: Absolute differentials by model by sex



Boys



Girls

Findings

- The fully adjusted model reduced educational differentials by 100% for males and 50% for females
- Early life exposures explain 57% of the educational differential for males, 29% for females
- Combined, diet, sedentary and physical activity explain 15% for males, 6% for females

Conclusion

- Low SEP children have 3 times the risk of obesity to high SEP children growing to 4 times at 17/8
- Absolute inequalities are larger in females and increase with age; smaller and decreasing for males
- Early life & prenatal factors account for more of the SEP differential than health behaviours in childhood and adolescence
- Policies focused on improving conditions for families and infant children will have a larger impact on obesity than policies targeted at health behaviours in adolesence

Acknowledgements

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