

## 2. Association between use of new walking and cycling infrastructure and meeting physical activity guidelines.

Models were adjusted for demographic variables. Cohort data were additionally adjusted for baseline physical activity and scheme.

**Results** The new routes were associated with increased use (median increase in cyclists=52%, pedestrians=38% ( $p<0.001$ )). Large relative increases in users were found where baseline levels were low (e.g. double cycling OR=0.47, 95% CI=0.26, 0.74 for each 10,000 baseline cyclists). Use of the new routes was associated with meeting physical activity guidelines in both the cross-sectional pre-post and longitudinal evaluations (compared to non-users, 1-yr follow-up users OR=2.09, 95%CI=1.38–3.25; 2-yr follow-up users OR=2.04, 95%CI=1.40, 3.03)).

**Conclusion** Creating new walking and cycling infrastructure may help to increase levels of population physical activity and places with existing low levels of walking and cycling could see the largest relative increases. ‘Routine’ and academic research evaluations involve trade-offs between scale, representativeness of sample and ability to capture within-participant change. Combining findings across data sources can help to understand the impacts of complex interventions on health.

OP90

### AN EVALUATION OF THE IMPACT OF THE 20MPH SPEED LIMITS IN THE CITY OF EDINBURGH ON ROAD TRAFFIC CASUALTY AND COLLISION RATES

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**Background** The City of Edinburgh implemented 20mph speed limits on most of the streets (an increase from 50% to 80%) in the city between April 2016 and March 2018. This paper is part of the research undertaken by the ‘Is Twenty Plenty for Health?’ project team which examines the impact of the 20mph speed limit policy in the City of Edinburgh. This paper assesses, specifically, the impact of the speed limits on the average vehicular speed and volume in the City, and the road traffic collision and casualty rates. Police recorded data (road traffic collisions and casualties), and the City of Edinburgh’s street survey data are used in this study.

**Methods** In this paper we calculate vehicular speed and volume summaries, and the average annual rate for collisions and casualties for selected subgroups. In addition, we calculate the percentage difference in annual rates before and after the 20mph speed limits (un-adjusted and adjusted for secular trend) for various street categories. The observed reduction in collisions (overall) is compared with that predicted from Elvik’s power model.

Finally, we construct a regression model with key explanatory variables treatment (implementation zone vs control zone), time (adhering to the stepped wedge nature of the implementation), and an interaction term constructed from the two latter variables. The dependent variable is the number of collisions (and separately, casualties) and the model coefficient

of the interaction term is the ‘difference in differences’ estimator.

**Results** Our results show that there was a statistically significant reduction of in average speed in the City (1.34mph) since the speed limit implementation and that there was no significant change in vehicular volume. We identified a reduction in road traffic collisions post speed limit implementation and a reduction in road traffic casualties in key vulnerable groups such as children (a provisional, un-adjusted 39% reduction in casualty rate).

**Conclusion** In this paper, we reveal the changes in vehicular speed and volume post 20mph speed limits and also present changes in road traffic collisions and casualties. In addition we apply statistical methods to evaluate the impact of the speed limits in a natural experiment context. This study is important not only to public health and city planning officials, but to academics involved in natural experiment evaluations.

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## Pregnancy II

OP91

### DID ENGLAND’S TEENAGE PREGNANCY STRATEGY REDUCE PREGNANCY RATES IN ENGLAND? EVALUATING A POLICY USING TWO NATURAL EXPERIMENTAL METHODS

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**Background** The Teenage Pregnancy Strategy was published in July 1999 with the aim halving under-18 pregnancy rates in ten years. The strategy came to an end in 2010 with the UK’s change of government. Overall costs of implementation are estimated around £280m. From 1999–2014 rates of pregnancy to women aged under 18 fell by more than 50%. Hailed as a unique, nation-wide, comprehensive, evidence-based intervention, the strategy has been promoted as a reproducible model for other countries with high teenage pregnancy rates. In evaluating policy impact, observational studies alone may not be able to account for background trends and other events. We aimed to evaluate the impact of England’s Teenage Pregnancy Strategy on pregnancy and birth rates using natural experimental methods.

**Methods** Women aged under-20 and living in England during the intervention period were the target population. UK pregnancy rates were taken from Office of National Statistics and Information Services Division Scotland reports for years 1992–2016. We compared under-18 pregnancy rates in England with Scotland and Wales as controls using interrupted time series methods. Observed level and trend changes in controls at 1999 were used to predict a ‘No Strategy’ England. We compared under-18 birth rates and under-20 pregnancy rates of England with European and English-speaking high-income countries using synthetic control methods. Estimates of births were taken from the Human Fertility Database, estimates of population from the Human Mortality Database and abortions from the European Health Information Gateway, supplemented from national statistics bodies, for years 1990–2013.

Background trends were estimated using a weighted mean of control countries' rates.

**Results** Although pregnancies and births in England fell during the Strategy period, we found no difference compared with control. In interrupted time series analyses, trends in rates of teenage pregnancy beginning in 1999 in England were similar to Scotland (0.08 fewer pregnancies per 1,000 women per year; -0.74 to 0.60) and Wales (0.14 more pregnancies per 1,000 women per year; -0.48 to 0.76). In synthetic control analyses, yearly under-18 birth rates in England were very similar to synthetic control predictions post intervention, and under-20 pregnancy rates were marginally higher than control across the post intervention time period. Placebo testing and other sensitivity analyses supported the finding of no effect.

**Conclusion** Our analyses cast doubt on the effectiveness of England's teenage pregnancy strategy. These results should be factored into decision making if other countries, or England in the future, were to contemplate similar costly strategies.

OP92

#### DOES MATERNAL FOLIC ACID SUPPLEMENTS IN PREGNANCY INFLUENCE AUTISM SPECTRUM DISORDER IN CHILDREN? A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Background** Folic acid supplements during pregnancy may be causally associated with reduced risk of Autism Spectrum Disorder (ASD). This relationship is potentially socially patterned as folic acid intakes are lower in deprived groups. The main limitations of previous systematic reviews and meta-analysis are multiple counts of the same unit of analysis and use of DerSimonian and Laird estimator which underestimates uncertainty and increases type I error rate. We aimed to evaluate evidence of a causal association between prenatal folic acid intake and offspring ASD, and outline evidence of health inequalities.

#### Methods

**Results** A total of 1,001,424 children (4646 cases) were pooled from five cohort and four case-control studies. No association was observed between maternal folic acid supplement intakes and offspring ASD (RR 0.77, 95% CI: 0.53 – 1.11,  $I^2=92.8\%$ ). However, when restricting to high quality studies, there was some evidence of a reduced risk of ASD (RR 0.76, 95% CI: 0.56–1.03,  $I^2=77\%$ ) or with removal of the outlier (RR 0.69, 95% CI: 0.51–0.94,  $I^2=93.2\%$ ). A study was considered an outlier if the studies 95% CI did not overlap the 95% CI of the summary effect estimate. Evidence of health inequalities was not reported in any study, but all considered socioeconomic position or an indicator of socioeconomic position to be an important confounder.

**Conclusion** High quality studies demonstrated a reduced risk of ASD in relation to folic acid supplements in pregnancy, yet residual confounding was likely. Nonconventional approaches to estimate causality were applied in only a few studies but they suggest the relationship is potentially causal. Future research should apply causally informed methods and investigate evidence of health inequalities.

OP93

#### THE ASSOCIATION BETWEEN GESTATIONAL AGE AT BIRTH AND SPECIAL EDUCATION NEEDS AT AGE 11 – EVIDENCE FROM THE UK MILLENNIUM COHORT STUDY

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**Background** Being born at an earlier gestational age is a risk factor for having neurodevelopmental impairment and special educational needs (SEN) at school. Most prior studies focused on children born preterm (<37 weeks) rather than across the entire gestational age continuum and have not examined specific types of SEN. Our aim was to examine the association between gestational age across the entire gestation spectrum and SEN at the age of 11 years.

**Methods** We analysed parent reported survey data from the UK Millennium Cohort Study, a nationally representative cohort of children born during the years 2000–2002. Information about the child's birth, health and sociodemographic factors was collected from mothers when children were 9 months old. Information about presence of SEN, whether the child has a statement of SEN which indicates more complex needs, and the reasons for SEN was collected from parents at age 11. Adjusted risk ratios (aRR) were estimated using modified Poisson regression while accounting for confounding.

**Results** The sample included 12,081 children with data at both time points. The proportion of children with SEN in the cohort was 11.2% and this proportion increased markedly as gestation decreased. The risk of having SEN was highest in children born before 32 weeks gestation who had a 3-fold higher risk than those born at 40 weeks (aRR=2.89; 95% CI 2.02, 4.13). The risk was also elevated in children born early term (37–38 weeks) (aRR=1.33; 95% CI 1.11, 1.59). The proportion of children with a statement of SEN was 4.9% in the overall cohort. There was a clear inverse association between gestational age and having a statement of SEN, which peaked at 15.3% in children born <32 weeks (aRR=3.96; 95% CI 2.24, 7.06). Gestational age was also inversely associated with having multiple reasons for SEN, reaching aRR=3.32 (95% CI 1.61, 6.84) at <32 weeks.

**Conclusion** Children born at earlier gestational age are more likely to experience SEN, have more complex SEN and require support in multiple facets of learning at age 11. This increased likelihood of SEN was observed even among children born at early term gestation.

OP94

#### 'I NEEDED SOMEBODY LIKE HER IN MY LIFE': MIGRANT WOMEN'S EXPERIENCES AND PERCEPTIONS OF HEALTH NAVIGATION SERVICES TO INCREASE ACCESS TO MATERNITY CARE IN THE UK

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**Background** Migrant women in the UK are at increased risk of maternal morbidity and mortality compared to UK-born women, in part due to inequalities in healthcare access. Health