APPENDIX

We performed several sensitivity analyses. Here we describe these analyses and the results for each exposure variable.

Cohort study

Considering the complex relationship between birthweight and birthweight for gestational age with GA, we repeated the birthweight for gestational age models restricting the analysis to children with gestational age of ≥37 weeks and then more than ≥39 weeks. Similarly, we repeated the GA models excluding SGA and LGA children. Between 1973 and 1981 we were able to classify mode of delivery into unassisted vaginal delivery (VD), instrumental vaginal delivery (IVD) and Caesarean section (CS) while from 1982 data on elective and emergency CS were available and were used to classify CS. Data on maternal BMI were available from 1981 onwards. However, more than 20% of the women who delivered their children from 1981 onwards had missing BMI data. Therefore, we repeated the models from 1982 onwards (to coincide with the more detailed data on mode of delivery) as well as models excluding all women with missing BMI. Considering that data coverage was complete at the national level from 1987 we repeated the statistical models including births from 1987 onwards. Further analyses were performed excluding 1) IVD and CS; 2) children of mothers who had pre-eclampsia; 3) children of mothers who had pre-gestation diabetes; 4) children of women who had gestational diabetes; 5) children of women who were classified as obese (BMI≥30kg/m²). We also repeated the Poisson models excluding
children of birthorder ≥ 3. To examine the distributional assumption of the Poisson regression regarding over-dispersion, we performed negative binomial regression models. There was no evidence to suggest the distributional assumption was violated therefore the Poisson models results are presented throughout the manuscript.

Sibling study

In post-hoc analyses, we repeated the sibling-control models excluding children of women who had pre-gestational or gestational diabetes.

RESULTS

Gestational age

Restricting the analysis to unassisted vaginal delivery, children who were AGA and children of women without pre-eclampsia did not change the results materially.

Birthweight for gestational age

The following sensitivity cohort analyses did not change the results of SGA or LGA materially: restricting the analysis to 1) early term and term babies; 2) offspring of mothers who had no pre-eclampsia; and 3) unassisted vaginal births.
Birthweight

Further sensitivity analyses restricted the statistical models to unassisted vaginal birth and excluding children of mothers with pre-eclampsia did not change the results materially.

Sensitivity analyses

When the models were repeated for births from 1987 onwards at the cohort level the findings were not materially changed compared to the full cohort models (data not shown). When we repeated the cohort analyses for all the exposure variables excluding birth before 1981 and then excluding all births with missing BMI data, no material change was observed. Additional analyses on the three exposure variables were performed excluding children of; 1) mothers classified as obese; 2) mothers with pre-pregnancy diabetes and 3) mothers with gestational diabetes. None of these exclusions had any material effect on the overall findings. Restricting the Poisson models to the first two children per mother did not change the results materially. Excluding diabetes and gestational diabetes from the sibling models did not explain any of the observed associations.