Background
Cerebral small vessel disease (cSVD) is a major cause of stroke and dementia. Mildlife vascular disease and adult socioeconomic status (SES) are established risk factors. Less is known about the effect of factors earlier in life. A recent meta-analysis found that lower levels of childhood IQ, childhood SES and education increased the risk of cSVD in later life but was unclear if these relationships persist after adjustment for vascular risk factors or adult SES.

Methods
We analysed birth parameters including birth and placental weight (grams), measures of childhood SES such as father’s occupation (manual/non-manual), toilet (outdoors; number of people sharing), childhood IQ and premorbid adult IQ using the National Adult Reading Test (NART) and education (years) from participants from 3 cohort studies: the Dutch famine birth cohort (n=118), the Lothian Birth Cohort 1936 (LBC1936, n=685) and the Simpson cohort (n=110).

We analysed cSVD features individually, then summed into a total “cSVD score” (range 1–4) and imaging evidence of infarcts. Data were adjusted for vascular risk factors and adult SES, analysed separately for each cohort and meta-analysed, adjusted for vascular risk factors and adult SES.

Results
Across the 3 cohorts increasing birth weight was associated with lower cSVD score (OR 0.999 95% CI 0.998–0.999, p=0.02). In the Simpson cohort increasing placental weight was associated lower cSVD score (OR 0.995 95% CI 0.991–0.999, p=0.01), fewer white matter hyperintensities (WMH) (OR 0.995 95% CI 0.99–0.999), cerebral microbleeds (CMBs) (OR 0.995 95% CI 0.991–0.999, p=0.01) and infarcts (OR 0.99 95% CI 0.98–0.998, p=0.02). Higher childhood IQ was associated with fewer lacunes (all studies; OR 0.98 95% CI 0.97–0.99, p=0.04) and infarcts (LBC36; OR 0.99 95% CI 0.97–0.99, p=0.04). Higher NART score was associated with fewer lacunes (all studies; OR 0.995 95% CI 0.99–0.999, p=0.01), fewer white matter hyperintensities (WMH) (OR 0.995 95% CI 0.99–0.999), cerebral microbleeds (CMBs) and infarcts (OR 0.999 95% CI 0.998–0.999, p=0.01)

Discussion
Birth parameters including birth and placental weight may influence risk of cSVD in later life. Childhood factors such as IQ, education and SES may influence some cSVD features and risk of infarcts but it was not possible in these data to determine whether they contribute independently to WMH or total cSVD or not. The effects sizes and potential impact of these findings suggest that larger samples are needed to robustly test these associations.