Background Child unintentional injuries (UIs) are common with stark health inequalities. Understanding the pathways to inequalities in childhood UIs is essential in tackling this public health challenge. Using a national birth cohort, the aim of this study was to assess the role of early-life risk factors in explaining excess UIs in children from lower income households.

Methods Analysis of the United Kingdom (UK) Millennium Cohort Study (~18 000 children born 2000–2002), based on 14 333 who participated in three sweeps, at ages 9 months, 3 and 5 years. Our main exposure measure of socio-economic circumstances (SEC) was household income quintile at birth. Our binary outcome was derived from parent-reported ever had an accident and was taken to the doctor, health centre or hospital at 5 years old since the last sweep. Relative risk (RRs) and 95% confidence intervals (95% CI) for UIs were estimated using Poisson regression, by household income quintile. Potential early-life risk factors were explored to assess if they attenuated the associations between family income and UI in models adjusting for factors within three domains: environmental safety, supervision and child behaviours and abilities. Analyses were conducted using Stata/SE with svy commands to account for the sampling design and attrition using survey weights. We repeated the analysis using an alternative outcome (UI admissions), SEC exposure (maternal education) and using multiple imputations to address missingness.

Results 28% of children had a UI from 3 to 5 years old. Children in the lowest income quintile had a 20% greater risk of UIs compared to those in the highest (aRR 1.20 95% CI 1.05,1.37). Sequentially adjusting for factors that may influence: environmental safety (aRR 1.18, 95% CI 1.01,1.37), supervision (aRR 1.17, 95% CI 1.00,1.36) and child behaviours and abilities (aRR 1.14 95% CI 0.98,1.33) reduced the relative risk by 10%, 15% and 30% respectively, rendering the association between income and UI non-significant in our final model. Our sensitivity analyses support our main findings.

Conclusion Using a nationally representative sample, we found one in four UK children had a UI from 3 to 5 years old, with significant inequalities. These were partly explained by factors that may influence: environmental safety, supervision and child behaviour and abilities. Interventions to address these potentially modifiable risk factors may also reduce inequalities in childhood injury. Our use of ‘proxy’ measures is a limitation of this study. Future research needs to further understand how these factors may influence UI.