To identify the effect of the reduction of the age threshold from seven to five, which is the primary focus of the study, we shall conduct a series of DiD analyses. Using the UnS data, we shall compare changes in health outcomes in families who first become exposed to LPO between their period 3 and period 4 interviews (see Table 1), with changes in families who remain unexposed, and with families who were exposed at both waves. To identify the effect of the reduction in the age cut-off from 10 to seven, we shall conduct a similar analysis of changes between period 2 and period 3 interviews and to identify the effect of the reduction in the age cut-off from 12 to 10, we shall conduct a similar analysis of changes between period 1 and period 2 interviews.

In all the analyses we shall classify families as exposed or unexposed according to the age of their youngest child and the age cut-off at the time of their interview. The DiD approach controls for time-invariant characteristics of individuals, but we will adjust for differences in baseline measures to better account for time-variable effects of the following confounders: parental age and gender, ethnicity, presence of older children in the family and social position (income, employment history, occupation, education and neighbourhood deprivation). If we find substantial health effects, we shall explore the pathways by which the LPO affect health by repeating the analyses, including in the models the following potential mediators: changes in employment status, income and financial stress between the relevant survey waves. We shall use multiple linear regression models for the continuous outcomes (SF12 scores) and logistic regression models for the categorical outcomes (self assessed fair/poor general health). We shall undertake a range of robustness checks and sensitivity analyses. We shall repeat the analyses excluding families who are interviewed shortly after a change in the cut-off date, to allow for a wash-in period in case there are lags in the implementation of the requirements. Lone parents who would become exposed between survey interviews, but who have a younger child, or some other change exempting them from the jobseeking requirement, will initially be classified as unexposed, but we shall repeat the analyses, reassigning them to the exposed group as a further sensitivity analysis. We shall compare changes in health among lone parent families with changes amongst couple families, to determine whether any effects we observe are specific to lone parents or common to all families with dependent children. We shall also conduct ‘placebo’ or ‘falsification’ tests’ using age cut-offs other than those actually in force at the time.

We anticipate item non-response for some outcomes and explanatory variables. We will use multiple imputation by chained equations to complete the missing observations in the dataset. It is difficult to identify in advance the number of imputed datasets we will need to construct but we expect it to be between 10 and 20. We will analyse the imputed datasets identically and combine the results to obtain estimates and standard errors for the multiple imputed data. These results will be reported alongside those of the complete case analyses. Our analysis strategy follows the recommendations of the MRC guidelines on the evaluation of natural experiments, which emphasise the value of multiple testing to address the range of possible biases that might affect causal inferences drawn from observational data. We do not propose to adjust p values or confidence intervals to allow for multiple testing. Instead, we shall report all the analyses comprehensively, explore the reasons for discordant findings by detailed comparison of the relevant models, and qualify our conclusions about positive, negative or null impacts of the LPO based on the primary outcome according to the pattern of findings across all of the outcomes and additional tests, rather than highlighting only those findings that reach statistical significance.