

# Life Study: a UK-wide birth cohort study of environment, development, health, and wellbeing

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## Abstract

**Background** Health and social policies relevant to improving the lives of children draw on understanding of early life developmental trajectories and the social and material environments in which children are born and grow up. These policies draw on information from the UK's unique birth cohorts (comprising cohorts from 1946, 1958, 1970, and 2000 that have been assessed repeatedly to the present day) and other longitudinal studies. The importance of intergenerational and intragenerational effects on child health and development in the UK is increasingly recognised. A cross-disciplinary approach to the lifecourse is needed to meet this pressing scientific public health and policy challenge, which is sensitive to social, gender, and ethnic inequalities and incorporates biomedical, clinical, and social sciences from the outset. We will create a longitudinal data resource to address questions and hypotheses relevant to improving the lives of children, both now and in their futures. Five major research themes will be explored: inequalities, diversity, and social mobility; early life antecedents of school readiness and later educational performance; developmental origins of health and ill-health in childhood; social, emotional, and behavioural development: the interplay between infant and parent; and neighbourhoods and environment: effects on child and family.

**Methods** A multidisciplinary scientific leadership team is responsible for the detailed scientific design and protocol. Methods used to support protocol development and delivery include systematic review; process models; consultation with academics, policy makers, and parents; development of an ethics and governance framework; data simulations; and power calculations. The study has been designed to provide sufficient statistical power to address key scientific hypotheses and to provide nationally representative statistical information. It consists of two components: mothers and partners recruited during pregnancy through selected maternity units and those recruited after birth through probability-based sampling of the birth register. These sampling methods allow the larger component of pregnant mothers to be geographically clustered and ethnically diverse while increasing the precision of estimates for nationally representative measures. Mothers will be invited to attend a Life Study centre local to their maternity unit once during pregnancy and twice during the first year of life; fathers or partners will also be seen antenatally. Biological samples will be taken at the visits and at birth. Parents and babies in the probability sample will be contacted twice in the first year. Up to 90 000 children will be recruited with whom contact will be maintained through childhood and into adult life. An achieved sample size of 50 000 by 12 months would provide adequate power to detect moderately strong causal effects of risk factors (environmental, psychosocial, genetic) that are moderately common (eg, prevalence  $\geq 10\%$ ) on outcomes of public health importance (eg, prevalence  $\geq 2\%$ , including asthma, obesity, autism spectrum disorders, and learning difficulties). Ethics and information governance approvals have been obtained and an ethics framework developed. Data enhancements that are under development address infection and immunity, the role of fathers or partners, and home-based environmental exposures.

**Interpretation** Life Study offers an opportunity to develop and test our understanding of social and biological mechanisms operating through the lifecourse and to identify translational opportunities for policy and practice relevant to children's lives.

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## Contributors

All authors contributed equally to the design, undertaking, and development of the study protocol and its component parts.

## Conflicts of interest

We declare that we have no conflicts of interest.

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