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COHORT PROFILES

Cohort profile: 1958 British birth cohort (National Child Development Study)

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How did the study come about?

The 1958 birth cohort or the National Child Development Study (NCDS) began as a study of Perinatal Mortality focussing on just over 17 000 births in a single week in 1958. To address concerns regarding the stillbirth rate not falling, the original study aimed to identify social and obstetric factors linked to stillbirth and neonatal death. The findings contributed to the improvement of maternity services in Britain and to a reduction in perinatal mortality.[1] The initial survey was not planned as a longitudinal study, but subsequently the National Children's Bureau was commissioned by the Central Advisory Council for Education (The Plowden Committee) to retrace the cohort at age 7 and monitor their educational, physical, and social development.[2] Further surveys took place when children were aged 11 and 16.[3,4] This cohort was educated during a period when there was considerable debate about the nature of primary schooling, the selection for secondary school (the 'eleven-plus') was being abolished, and the comprehensive sector of secondary schooling was expanding. The school leaving age was raised to 16 yr in 1973 making cohort members part of the first year group required to stay on at school for an extra year. Divorce rates, though rising during the 1960s, were still relatively low and most of this cohort lived with both parents throughout their childhood. In other respects, the cohort grew up in an environment which differed from that experienced by children today, with proportionately more children living in houses that lacked basic amenities, although access to welfare provision, such as free school meals, was available. Breast-feeding was relatively common, and so too was maternal smoking in pregnancy. This generation was not exposed to the levels of childhood obesity seen nowadays and rates of teenage drug taking were low.

Followed into adult life, the cohort had reached a life stage marked by major transitions—for example from school or full-time further education to employment (although unemployment was very high), and from dependent status in their family of origin to independent status as heads of new households. A survey at age 23 (1981) was designed to trace these transitions, and in so doing it differed from earlier follow-ups in obtaining information directly from the cohort member (instead of their parents, usually the mother). In 1985, responsibility for the cohort was transferred to the Social Statistics Research Unit (SSRU) at City University, London, who undertook a survey of the cohort at age 33 (1991). The survey covered a wide range of substantive topics, and included a random one in three sample of children of the cohort. In 1998, the SSRU moved to the Institute of Education, London, and became the Centre for Longitudinal Studies (CLS). CLS houses the 1970 birth cohort study (BCS70), and in 1999/2000 an integrated contact of both cohorts was undertaken to facilitate comparisons between these generations. Such comparisons allow assessments, for example, of changes in equality of opportunity, which appear to have lessened between these generations.[5] A biomedical survey of the cohort (when they were aged 44–45 yr) has been conducted, with several collaborating partners, under the Medical Research Council's 'Health of the Public' initiative (Table 1). The primary objective was to examine how developmental, lifestyle, and environmental factors act throughout the lifespan to influence current ill health, and physiological and psychological function in early middle age.

Funding sources are shown in Table 1. The ESRC are committed to funding the next phase of follow-up, in 2008, when cohort members will be aged 50 yr.

What does it cover?

From its original focus on the circumstances and outcomes of birth, the 1958 study has broadened in scope to chart many aspects of the health, educational, and social development of cohort members as they passed through childhood and adolescence. In later sweeps, the information collected covered inter-generational relationships in health, stabilities and discontinuities and the development of health inequalities, as well as transitions to adult life, such as leaving full-time education, entering the labour market, establishing independent homes, forming partnerships, and becoming parents. Research on health and development has tackled similar issues to those identified within other disciplines, for example, in determining later life outcomes of childhood characteristics, or in identifying the precursors of adult states.

Who is in the sample, how often have they been followed-up, and what is attrition like?

Participants are survivors from an original sample of over 17 000 births, all born in England, Wales, and Scotland, during 1 week in 1958, and followed-up by parental interview and examination at

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Table 1 The 1958 birth cohort study, dates of contact, sample size, and funding sources

Survey	Year[a]	Age (yr)	Data collected from	Cross-sectional target sample[b]	Cross-sectional achieved sample[c]	Funders
PMS	1958	Birth	Mother and medical records	17 634	17 416	National Birthday Trust Fund
Sweep 1	1965	7	Parents; school; tests; medical exam; cohort member	16 727	15 425	Department of Education and Science
Sweep 2	1969	11	Parents; school; tests; medical exam; cohort member	16 754	15 337	Social Science Research Council
Sweep 3	1974	16	Parents; school; tests; medical exam; cohort member; census	16 901	14 647	Department of Education and Science; Department of Health and Social Security
Exams	1978	20	Schools attended when cohort member was aged 16 yr	14 647	14 331	Department of Education and Science
Sweep 4	1981	23	Cohort member; census	16 482	12 537	Department of Health and Social Security; Department of Education and Science; Department of Employment; Manpower Services Commission; Department of the Environment
Sweep 5	1991	33	Cohort member; spouse/partner; children[d]; children's mother[e]	16 240	11 407	Economic and Social Research Council; Department of Health; Department of Social Security; Employment Department; Department of Education and Science; Department of the Environment; Transport and Road Research Laboratory; Health and Safety Executive; US National Institute of Child Health and Development
Sweep 6	2000	42	Cohort member	16 240	11 419	Economic and Social Research Council; Government Departments and Agencies (Office of National Statistics, Department Education and Employment, Department of Social Security, Department of Health, Scottish Executive, Basic Skills Agency); International Centre for Child Studies
Biomedical[f]	2003	45	Cohort member	16 078	9426	Medical Research Council; Wellcome Trust
Sweep 7	2004	46	Cohort member	Not available	Not yet completed	Economic and Social Research Council; Department Education and Skills

PMS = Perinatal Mortality Survey.

[a] Fieldwork often extended over more than 1 yr.

[b] All those born in the particular week in March 1958, living in Britain at that sweep, and those included from outside Britain during the childhood surveys.

[c] Achieved sample is all those members of the cross-sectional target sample who participate in a particular sweep (at least one survey instrument partially completed).

[d] For a random sample of 1 in 3 cohort members. Information was collected directly from 3008 children of cohort members.

[e] This could be the cohort member, their spouse, or partner (same 1 in 3 random sample). 2588 mothers completed the 'mother' questionnaire, giving information on 4278 children.

[f] The Biomedical study is a collaboration between C Power (Institute of Child Health, London); D Strachan (St George's Hospital Medical School); Centre for Longitudinal Studies, National Centre for Social Research.

ages 7, 11, and 16 yr and by cohort member interview at 23, 33, and 42 yr (Table 1). The first biomedical assessment in adulthood was conducted by a research nurse visiting the home at 44–45 yr. During childhood, cohort members were traced through schools and immigrants born in the reference week were added to the sample. This was no longer possible once cohort members became adults. It can be seen that the sample reached at age 23 yr is considerably smaller than at age 16 yr. The main reasons for sample loss over time are individuals moving to a new address and not responding to efforts to trace them. Refusal rates are relatively low but also contribute to sample loss over time. At age 23 yr refusal was 7.1%; at 33 yr, 11.1%; and at 42 yr, 13.2%.[6]

What has been measured?

Table 2 shows the main health and medical data, from birth to 45 yr. There are repeat measures for several topics, such as for emotional health, while others are restricted to a particular life stage. During the childhood sweeps, health data was mostly obtained from the school doctor's examination or parental report; during adulthood, information was mostly reported by

Table 2 1958 birth cohort summary of health and medical data, 1958–2005

Perinatal Mortality Survey (birth)
- Maternal smoking before and during pregnancy
- Maternal hypertension during pregnancy
- Albuminuria during pregnancy
- Obstetric complications
- Induction and progress of labour
- Medications given during labour
- Mode of delivery
- Birth-weight and gestational age
- Illnesses in the neonatal period
- Multiple birth identifier

7 year follow-up (1964)
- Infant feeding
- Immunizations (DPT, polio, smallpox)
- Measles, rubella, pertussis, chickenpox, mumps
- Scarlet fever, recurrent throat/ear infections
- Tonsillectomy or adenoidectomy
- Hospital admissions for surgery or accident
- Asthma, wheezy bronchitis, pneumonia
- Eczematous rashes, hay fever
- Abdominal pain, periodic vomiting, migraine
- Epileptic fits in first year and after, petit mal
- Enuresis, urinary infection, proteinuria
- Skin examination for eczema, warts, birth marks
- Height and weight
- Visual acuity and screening audiometry
- Physical coordination
- Behaviour (Rutter home/Bristol Social Adjustment Guide) scores

11 year follow-up (1969)
- Parental heights and weights
- Childhood illnesses (as at 7) plus
- Rheumatic fever, hepatitis, meningitis, tuberculosis
- Hospital admissions and operations (including T&A)
- Recurrent throat/ear infections, discharging ears
- Asthma/wheezy bronchitis, hay fever, eczema
- Abdominal pain, periodic vomiting, migraine
- Epileptic fits, tics, habit spasms
- Enuresis, night terrors, school refusal
- Behaviour (Rutter home/Bristol Social Adjustment Guide)
- Undescended testes
- Skin examination for eczema, psoriasis, warts, acne
- Height and weight
- Visual acuity and screening audiometry
- Physical co-ordination

16 year follow-up (1974)
- Immunizations (BCG, rubella, smallpox)
- Hospital admissions and operations, specifically:
- Tonsillectomy, appendicectomy, orchidopexy
- Recurrent throat/ear infections, discharging ears
- Asthma/wheezy bronchitis, hay fever, eczema
- Abdominal pain, periodic vomiting, migraine
- Epileptic fits, tics, habit spasms
- Behaviour (Rutter home and school) score
- Skin examination for eczema, psoriasis, warts, acne
- Height and weight
- Visual acuity and screening audiometry
- Puberty measures: age at menarche/age voice broke
- Undescended testes
- Physical and mental handicap
- Physical co-ordination

23 year follow-up (1981)
- Hospital admissions and accidents since 16
- Disability and consequences
- Asthma/wheezy bronchitis, hay fever, eczema
- Cough and phlegm (MRC bronchitis questions)
- Abdominal pain, periodic vomiting, migraine
- Epileptic fits, tics, habit spasms
- Use of spectacles/contact lenses
- Psychological distress (Malaise inventory)
- Height and weight
- Smoking history, smoking by others in household
- Alcohol consumption

33 year follow-up (1991)
- As at 23 yr plus
- Reproductive history
- Checklist of common complaints
- Emotional problems and health care for these
- Food frequency questionnaire, exercise habits

42 year follow-up (2000)
- As at 33 yr

45 year follow-up (2003)
- Blood pressure, pulse
- Standing and sitting height
- Weight, waist and hip circumferences
- Respiratory symptoms, ventilatory function (FEV1 and FVC)
- Visual acuity (near and distant), refractive error
- Hearing thresholds
- Depression and anxiety disorder (CIS-R)
- Blood samples for lipids, clotting factors, inflammatory markers, total/specific serum IgE
- Salivary cortisol
- DNA (and immortalized cell lines)
- Chronic widespread pain
- Use of medications
- Alcohol use (AUDIT)
- Food frequency questionnaire, exercise habits

the participant, except at age 45 yr when measurements were collected. The cohort is flagged for mortality and cancer registration.

Table 3 identifies the sociodemographic information collected at each age. Broadly, topics include family background, socioeconomic circumstances, cognitive development, educational achievement, employment, psychosocial work characteristics, partnership histories, and health-related behaviour. For the 23 yr survey information was obtained from the 1971 and 1981 Censuses as well as directly from the study participant.

What has it found? Key findings and publications

The cohort has been extremely influential in its impact on policy and practice and in extending our understanding of human development, social inequalities, and health inequalities. Over 900 publications, mostly in health and social science journals, document the life of the cohort to date. Early findings from the study have been summarized elsewhere, on health[7] and other outcomes.[1–3] Initially, key findings emerged from the Perinatal Mortality Study (PMS) on the adverse effects of smoking in pregnancy. The PMS demonstrated that reductions in birthweight were mainly due to smoking in the second and third trimesters[8] and that they were not accounted for by factors such as maternal age, weight and height, and socioeconomic position (SEP).[9] Higher rates of spontaneous abortion in smokers were also reported.[8] Since the PMS, data from the cohort has filled important gaps in knowledge, for example, by providing information on prevalence or on levels of function across the population, such as for hearing and visual acuity.[7] We do not include these contributions in order to focus on findings from longitudinal analyses. Several major research themes can be identified, including natural history, relationships between health and social factors over time (life-course epidemiology), social inequalities in health and health-related behaviour.

Natural history

Progress has been made in understanding the extent to which childhood illness and deficits in development persist into adult life. Continuities in socioemotional development within childhood have been observed, with correlations of 0.31–0.48 for measures of behaviour at 7, 11, and 16 yr.[3] Mild mental retardation in childhood was found to have consequences for later life, with continuing impairment for many individuals, including elevated rates of adult psychological distress.[10] For schizophrenia, abnormalities of social adjustment were detected in childhood in some people who developed psychotic illness in adulthood.[11] Some of the observed changes in emotional status may be due to differences in the measures of mental health over time. Nonetheless, comparisons of the same instruments suggest that children's behaviour has a modest level of stability, but cannot be assumed to be constant.[3]

For growth and obesity, the study provides population-based evidence on the prognosis for those at the extremes of the distribution. Fatter children (above the 91st body mass index (BMI) centile at 7 yr) had increased risks of becoming an obese adult (relative risk = 4.0 for males and 3.2 for females),[12] particularly if they had manual social backgrounds[13] or overweight parents.[14] Yet across the full range of BMI, child to adult correlations were modest.

Levels of function for vision and hearing also persisted (or tracked) over the childhood years; but, even for those with severe defects, recovery of normal function was reported for some children.[3] Particularly notable are the studies of asthma and wheezing symptoms, showing that for children with symptoms before age 7, 50% had attacks during the previous year, 35% had complete remission of symptoms by early adulthood (33 yr), 5% had persistent symptoms, with the remainder having intermittent symptoms.[15] From the long period of symptom recording it has been possible to demonstrate how children who 'outgrow' their early asthma or wheezy illness have no impairment of lung function at age 34–35, but those with persistent asthma through adolescence, even though symptom-free, had reduced airflow.[16] Incidence and prognosis of asthma were strongly influenced by atopy and by smoking.[15] Effects of early chest illness have also been reported, such that participants with a history of pneumonia in early childhood had lower FEV1 and FVC levels at 34–35 yr, not reversed by salbutomol.[17] Based on evidence from the cohort, it has been argued that the link between childhood chest illness and adult lung disease is due to an asthmatic tendency rather than to impaired prenatal lung development.[18]

Relationships between health and social factors over time (life-course epidemiology)

As the cohort has aged it has contributed to the development of life-course epidemiology, providing empirical evidence on outcomes associated with conditions in pregnancy or in childhood, inter-generational relationships, and predictors of adult health.

Building on knowledge gained in the earliest phases of the study, key findings have emerged on long-term outcome of exposures in pregnancy. Children of women who smoked in pregnancy were shorter at age 7,[19] more likely to have wheezing illness after age 16 yr and, by early adulthood, they were fatter[20] and had fewer educational qualifications.[21] Inter-generational associations are also seen, such that the birth-weight of offspring increases in relation to increases in the mother's birth-weight.[22] However, associations depend upon the particular factors influencing birth-weight; notably, deficits in maternal birth-weight attributable to grand-maternal smoking in pregnancy were not transmitted to the next generation.[23] Results from the study also suggest that mothers with poor nutrition during childhood (indicated by height) subsequently had offspring with lower weight at birth.[24]

Growth and obesity are major research themes. Studying the entire growth trajectory using repeat height measures throughout childhood has revealed three distinct patterns of influence on growth: (i) some factors (maternal smoking in pregnancy and parental separation) were associated with height deficits in childhood, but then after rapid catch-up had negligible effects on adult height; (ii) socioeconomic disadvantage in early life also resulted in delayed growth in childhood, and in this case adult height was reduced; and (iii) parental height and birth-weight had persistent, possibly strengthening, effects throughout the entire period of growth.[25] Such studies suggest that adult measures of height fail to detect the full effect of adversity in

Table 3 Summary of social and educational data collected on the British 1958 birth cohort, 1958–2005

Perinatal Mortality Survey (birth)
- Mother's age, parity, marital status
- Mother's education and employment
- Father's social class
- Maternal grandfather's social class
- Place of birth (county boroughs and admin counties)
- Household structure and amenities

7 year follow-up (1964)
- Mother's work
- Maternal separation and periods in care
- Parental social class
- Household structure
- Household tenure and amenities
- Place of residence (county boroughs, counties)
- Pre-school nursery experience
- School attendance
- Type and size of school
- School's social composition and academic record
- Ability ratings
- Special provisions for the child
- Prediction of future educational/occupational progress
- Ratings of parental interest
- Cognitive tests (reading, arithmetic, drawing, copying)

11 year follow-up (1969)
- Ethnic group
- Father's occupation and education
- Mother's work
- Type of accommodation and tenure
- Place of residence (county boroughs, counties)
- Family size
- Parental situation
- Periods 'In Care'
- Separation from mother
- Financial situation
- Housing and neighbourhood satisfaction
- School size and organization
- Teachers assessment of child's abilities
- Cognitive (reading and maths, general ability, copying) tests
- Interests out of school and educational aspiration
- Essay describing their life at age 25

16 year follow-up (1974)
- Father's occupation and education
- Mother's work
- Type of accommodation and tenure
- Ever been 'in care' (local authority or voluntary)
- Country of birth, year of immigration
- Place of residence (county boroughs, counties)
- Parental situation
- Household amenities
- Financial situation
- Separation from mother
- Financial situation
- Cognitive (reading and maths) tests
- School size and organization
- Child's future education/employment (teacher assessed)
- Child's aspirations (future education, employment, relationships, marriage and family)
- Child's smoking and drinking alcohol
- Parental smoking

23 year follow-up (1981)
- Employment, periods out of the labour force
- Apprenticeship and training
- Education and qualifications since school
- Literacy and numeracy
- Attitudes to school and work
- Number, age and sex of all natural children
- Children's health
- Marriage and cohabitation
- Characteristics of partners
- Marriage/family plans
- Housing
- Income and savings
- Leisure and voluntary activities
- Economic status of parents
- Experience of 'Care' as a child
- Place of residence (post-1974 counties)
- Characteristics of ward of residence based on 1981 census data

33 year follow-up (1991)
- As at 23 yr plus:
- Housing (mortgage arrears, and homelessness)
- Income, savings, state benefits, other sources
- Inheritance and debt
- Citizenship (voting behaviour, religiosity, ethnicity)
- Psychosocial work characteristics

42 year follow-up (2000)
- As at 33 yr plus
- Contact with information technology
- Quality of marital relationship
- Skills
- Contact with the police and crime
- Use of illegal drugs

45 year follow-up (2003)
- Marital status, children
- Life events
- Household tenure and access to cars
- Social support
- Psychosocial work characteristics

childhood. Similarly for obesity, trajectories over time appear to have been influenced by conditions in early life. One study of this cohort was amongst the first to highlight the importance of early life conditions (indicated by manual social class) in the development of obesity.[13] The link between manual class in early life and adult obesity, now replicated in other populations, is important partly because it may explain much of the observed association between early social position and adult blood pressure, and other adult outcomes. The cohort was also one of the first to demonstrate that the previously documented relationship between early maturation and increased adiposity in adults originates at an earlier life stage, with the implication that there may be common early life influences on timing of maturation and adiposity.[12] This research contributes to understanding the early life origins of adult disease. Increasingly, patterns of prenatal and post-natal growth and weight gain are seen to relate to adult disease risk in this population. In one example, all individuals who were born small and who subsequently developed diabetes had shown an excessive gain in BMI, although large size at birth was also associated with a high rate of BMI gain and increased risk of diabetes in adulthood.[26] Excessive weight gain is highlighted as a determinant of diabetes risk in this cohort.

Key findings are also evident from studies of emotional development, primarily, in relation to parental separation and divorce, where increased risks of psychological distress and problem drinking in adulthood have been identified. But, whereas the increased risk for psychological distress had become apparent by early adulthood (age 23 and also age 33) that for problem drinking only emerged at the later age.[27,28] Psychological distress and alcohol consumption have also been found to relate to the participants' own marital status as well as that of their parents, with lower levels of both outcomes among married men and women. However, these relationships appear to develop through different processes. Elevated psychological symptoms among the divorced appeared to be due to both selective and causal processes, while the heavy drinking levels of the divorced did not arise from selection, but accompanied the transition to divorce, implying a causal relationship.[29,30] Individuals who had never married were particularly at risk of chronic heavy drinking. Other adult risk factors, including unemployment, have also been shown to have selection and possible causal effects on mental health: men with poorer behavioural adjustment in childhood were more likely to experience unemployment in adulthood,[31] although an association operating in the opposite direction was suggested by further work showing an increased risk of psychological problems needing medical attention for unemployed men.[32]

Co-evolution of different aspects of child development and co-morbidity of outcomes is a further key theme, showing for example, relationships between birth-weight and cognitive trajectories.[33] Limitations of space preclude a more-detailed description of this topic, although, it is important to mention studies that recognize how different aspects of child development combine to affect adult health. One noteworthy study found that markers of child development (height, emotional development, and cognition) had effects on adult (poor-rated) health even after taking account of later influences, such as qualification level or adult factors, such as job insecurity.[34] This research offers important perspectives in life-course epidemiology and suggests that the influences on some adult outcomes accumulate over long periods. Further work demonstrates cumulative effects of unskilled manual SEP across different life stages on poor-rated health in adulthood, thereby highlighting the role of social factors, while also suggesting that effects of early exposures are compounded by those experienced subsequently in adulthood.[35]

Social inequalities in health

Work on this cohort has shown inequalities from the early stages of life and across a range of health indicators. This research has focussed largely on explanation, particularly from a life-course perspective, rather than description. Research on health selection and social causation, exploring the direction of association, has been prominent.[36] Socioeconomic differences in adverse growth trajectories involving retarded fetal growth, slow linear growth, and accelerated weight gain are evident in this cohort,[37] which may have implications for later inequalities in cardiovascular and respiratory disease. For self-reported health, inequalities were found to be due to conditions in the past as well as the present,[38] and while health selection (reverse causation) has been observed, thus far it does not appear to have played a major role in the development of inequalities.[36] A general conclusion from research on this population is that inequalities are due to multiple exposures, accumulating over different life stages.

Health-related behaviours

Physical activity, smoking, dietary habits, and alcohol consumption have been studied, as also their stability over time and the influences upon them. Changes in behaviour have been reported over the period of early adulthood: smoking habit appears to have been relatively stable[39] and frequency of physical activity less so.[40] Influences during childhood, including social class background and parental separation, have affected both the uptake and maintenance of adult behaviour.[28,37,39] Effects of adult experiences have also emerged, for example, with men who had accumulated more unemployment being less likely than others to quit smoking in early adulthood.[41] SEP and education level have emerged as key influences on health behaviours, in some instances over the long term.[39,40] Thus, it is not only the social pattern of uptake of hazardous behaviour, but also the pattern of quitting that is likely to reinforce social inequalities in health over time.

What are the main strengths and weaknesses?

Although all births were included, the cohort does not have the ethnic diversity of today's population. In the past, *ad hoc* funding has inhibited the development of strategies for the timing and sometimes the content of each follow-up. Strengths include the large study sample, extensive data coverage, eight ages studied, use of objective measures, and standardized tests or scales, especially in the earliest phases of follow-up (e.g. for height and cognition). Simultaneous coverage of physical, cognitive, emotional, and behavioural development is a great strength of the childhood data. Disease and functional measures in mid-life now provide outcomes to assess determinants of health gain, and also establish a baseline from which to monitor future disease and

health decline. The combination of genetic and phenotypic information is likely, increasingly, to be regarded as a major strength, with the potential to establish whether genetic susceptibilities can be offset or exacerbated by particular life-course and socioeconomic trajectories.

Can I get hold of the data? Where can I find out more?

The 1958 cohort is conducted by the CLS at the Institute of Education, University of London. CLS offers support and advice to data users. The CLS website with documentation for the cohort and detailed information about research and publications is: http://www.cls.ioe.ac.uk/. Data from the cohort is held and distributed by the UK Data Archive, a service provider of the Economic and Social Data Service. Non-commercial users can download data free of charge. Further information can be obtained from ESDS at: http://www.esds.ac.uk/longitudinal/ Requests for information from the biomedical survey, including genetic data, are currently dealt with by an oversight committee, including representatives of major funding bodies (MRC, Wellcome Trust, and ESRC). At the time of writing, access arrangements to the biomedical data are not yet finalized.

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References

[1] Butler NR, Bonham DG. *Perinatal Mortality*. Edinburgh: Livingstone, 1963.

[2] Davie R, Butler NR, Goldstein H. *From Birth to Seven. A Report of the National Child Development Study*. London: Longman, 1972.

[3] Fogelman K. (Ed.) *Growing up in Great Britain. Papers from the National Child Development Study*. London: The Macmillan Press Ltd, 1983.

[4] Wedge P. *The Second Follow-up of the National Child Development Study*. Concern 1969;**3:**34–39.

[5] Blanden J, Gregg P, Machin S. Intergenerational Mobility in Europe and North America. Centre for Economic Performance. London School of Economics, London, 2005.

[6] Plewis I, Calderwood L, Hawkes D, Nathan G. *Changes in the NCDS and BCS70 populations and samples over time. CLS Technical Report*. London: CLS, Institute of Education, 2004.

[7] Power C. A review of child health in the 1958 birth cohort: National Child Development Study. *Paediatr Perinat Epidemiol* 1992;**6:**81–110.

[8] Butler NR, Goldstein H, Ross EM. Cigarette smoking in pregnancy: its influence on birth weight and perinatal mortality. *BMJ* 1972;**2:**127–30.

[9] Butler NR, Alberman E. *Perinatal Problems. The Second Report of the British Perinatal Mortality Survey*. Edinburgh and London: E & S Livingstone Ltd, 1969.

[10] Maughan B, Collishaw S, Pickles A. Mild mental retardation: psychosocial functioning in adulthood. *Psychol Med* 1999;**29:**351–66.

[11] Done DJ, Crow TJ, Johnstone EC, Sacker A. Childhood antecedents of schizophrenia and affective illness: social adjustment at ages 7 and 11. *BMJ* 1994;**309:**699–703.

[12] Power C, Lake JK, Cole TJ. Body mass index and height from childhood to adulthood in the 1958 British birth cohort. *Am J Clin Nutr* 1997;**66:**1094–101.

[13] Power C, Moynihan C. Social class and changes in weight-for-height between childhood and early adulthood. *Int J Obes* 1988;**12:**445–53.

[14] Lake JK, Power C, Cole TJ. Child to adult body mass index in the 1958 British birth cohort: associations with parental obesity. *Arch Dis Child* 1997;**77:**376–81.

[15] Strachan DP, Butland BK, Anderson HR. Incidence and prognosis of asthma and wheezing illness from early childhood to age 33 in a national British cohort. *BMJ* 1996;**312:**1195–99.

[16] Strachan DP, Griffiths JM, Johnston ID, Anderson HR. Ventilatory function in British adults after asthma or wheezing illness at ages 0–35. *Am J Respir Crit Care Med* 1996;**154:**1629–35.

[17] Johnston ID, Strachan DP, Anderson HR. Effect of pneumonia and whooping cough in childhood on adult lung function. *N Engl J Med* 1998;**338:**581–87.

[18] Strachan DP, Sheikh A. A lifecourse approach to respiratory and allergic diseases. In: Kuh D, Ben-Shlomo Y, (eds). *A Life Course Approach to Chronic Disease Epidemiology*. Oxford: Oxford University Press, 2004, pp 240–59.

[19] Goldstein H. Factors influencing the height of seven year old children—results from the National Child Development Study. *Hum Biol* 1971;**43:**92–111.

[20] Power C, Jefferis BJ. Fetal environment and subsequent obesity: a study of maternal smoking. *Int J Epidemiol* 2002;**31:**413–19.

[21] Fogelman KR, Manor O. Smoking in pregnancy and development into early adulthood. *BMJ* 1988;**297:**1233–36.

[22] Emanuel I, Filakti H, Alberman E, Evans SJ. Intergenerational studies of human birthweight from the 1958 birth cohort. 1. Evidence for a multigenerational effect. *Br J Obstet Gynaecol* 1992;**99:**67–74.

[23] Hypponen E, Davey Smith G, Power C. Effects of grandmothers' smoking in pregnancy on birth weight: intergenerational cohort study. *BMJ* 2003;**327:**898.

[24] Hypponen E, Power C, Davey Smith G. Parental growth at different life stages and offspring birthweight: an intergenerational cohort study. *Paediatr Perinat Epidemiol* 2004;**18:**168–77.

[25] Li L, Manor O, Power C. Early environment and child-to-adult growth trajectories in the 1958 British birth cohort. *Am J Clin Nutr* 2004;**80:**185–92.

[26] Hypponen E, Power C, Davey Smith G. Prenatal growth, BMI, and risk of type 2 diabetes by early midlife. *Diabetes Care* 2003;**26:**2512–17.

[27] Rodgers B, Power C, Hope S. Parental divorce and adult psychological distress: evidence from a national birth cohort: a research note. *J Child Psychol Psychiatry* 1997;**38:**867–72.

[28] Hope S, Power C, Rodgers B. The relationship between parental separation in childhood and problem drinking in adulthood. *Addiction* 1998;**93:**505–14.

[29] Power C, Rodgers B, Hope S. Heavy alcohol consumption and marital status: disentangling the relationship in a national study of young adults. *Addiction* 1999;**94:**1477–87.

[30] Hope S, Rodgers B, Power C. Marital status transitions and psychological distress: longitudinal evidence from a national population sample. *Psychol Med* 1999;**29:**381–89.

[31] Montgomery SM, Bartley MJ, Cook DG, Wadsworth ME. Health and social precursors of unemployment in young men in Great Britain. *J Epidemiol Community Health* 1996;**50:**415–22.

[32] Montgomery SM, Cook DG, Bartley MJ, Wadsworth MEJ. Unemployment pre-dates symptoms of depression and anxiety resulting in medical consultation in young men. *Int J Epidem* 1999;**28:**95–100.

[33] Jefferis BJ, Power C, Hertzman C. Birth weight, childhood socioeconomic environment, and cognitive development in the 1958 British birth cohort study. *BMJ* 2002;**325:**305.

[34] Hertzman C, Power C, Matthews S, Manor O. Using an interactive framework of society and lifecourse to explain self-rated health in early adulthood. *Soc Sci Med* 2001;**53:**1575–85.

[35] Power C, Manor O, Matthews S. The duration and timing of exposure: effects of socioeconomic environment on adult health. *Am J Public Health* 1999;**89:**1059–65.

[36] Manor O, Matthews S, Power C. Health selection: the role of inter- and intra-generational mobility on social inequalities in health. *Soc Sci Med* 2003;**57:**2217–27.

[37] Power C,.Matthews S. Origins of health inequalities in a national population sample. *Lancet* 1997;**350:**1584–89.

[38] Power C, Matthews S, Manor O. Inequalities in self-rated health: explanations from different stages of life. *Lancet* 1998;**351:**1009–14.

[39] Jefferis BJMH, Power C, Graham H, Manor O. Changing social gradients in cigarette smoking and cessation over two decades of adult follow up in a British birth cohort. *J Public Health Med* 2004;**26:**13–18.

[40] Parsons TJ, Manor O, Power C. Changes in diet and physical activity in the 1990s in a large British sample (1958 birth cohort). *Eur J Clin Nutr* 2005;**59:**49–56.

[41] Montgomery SM, Cook DG, Bartley MJ, Wadsworth M. Unemployment, cigarette smoking, alcohol consumption and body weight in young men. *Eur J Public Health* 1998;**8:**21–27.