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Childhood Poverty and Adult Health

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By Professor Nick Spencer published by End Child Poverty with the support of GMB

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Introduction

As part of an upsurge in interest in so-called 'life course epidemiology' (the study of early life factors that affect health in later life)[1], it is now clear that poverty and low socio-economic status in early life adversely affect health in ways that transmit across time and contribute to poor adult health. In other words, poor social circumstances in childhood are associated with poor health both in childhood itself and in adult life.

Poor circumstances in childhood can affect adult health in a number of ways. Poverty and low socio-economic status may inflict damage on the developing fetus or infant that does not manifest itself until adulthood. This latent effect is best illustrated by the 'fetal programming hypothesis'[2] that postulates programming of the cells in fetal and early infant life by adverse uterine and early infancy environmental influences. Poor adult health may also result from the accumulation of health problems in childhood combining to precipitate chronic health outcomes later in the life course. Adult lung disease, for instance, partly reflects the cumulative effects of early life exposure to risk factors such asair pollution and cigarette smoke and frequent childhood respiratory infections.[3] A further mechanism is the precipitation of a negative trajectory or pathway in childhood that has a 'domino' effect on adult health. For example,early school failure and poor reading ability is likely to lead to truanting and educational under-achievement leading to poor job prospects, increased experience of unemployment and associated poor adult health outcomes.[4]

The body of work on the effects of poverty and low socio-economic status during fetal life, infancy and childhood on adult health is reviewed here, drawing on the expanding life course literature to identify latent, cumulative and pathway mechanisms by which these effects are mediated. I will consider first the impact of intergenerational factors that are determined both by social and biological influences, such as maternal health in childhood, on fetal growth that, through birthweight and growth in early childhood, exert a latent effect on adult health. Cumulative and pathway effects of early socio-economic status on adult health will be discussed followed by evidence for the role of low socio-economic status and poverty in the early establishment of adverse health behaviours, such as poor diet, smoking and lack of exercise, that profoundly influence future health outcomes.

I bring together powerful evidence to show that socio-economic circumstances in fetal life and in childhood have an influence on health stretching beyond childhood and into adult life. The evidence presented here adds further weight to the arguments in favour of reducing childhood exposure to poor social circumstances: not only is such a reduction likely to lead to health gains among children themselves but it is likely to be associated with future gains in adult health.

Maternal Health, Fetal Growth, Birthweight and Adult Health

Barker[5] argues that fetal cells are programmed by an adverse fetal environment leading to impaired fetal growth and that latent effects of programming manifest themselves in adult life in increased illness and premature death. Although the fetal programming hypothesis is not universally accepted, there is very good evidence that birthweight is associated with a range of adult health outcomes. Through its effects on birthweight, this is a powerful mechanism by which poverty in early life impacts on adult health.

Birthweight and Cardio-vascular Disease in Adulthood

Cardio-vascular disease is among the commonest causes of death and ill health in the UK and death and illness rates from cardio-vascular disease increase with decreasing socio-economic status. Barker's fetal programming hypothesis was developed in an attempt to explain the relationship he noted in a series of studies (summarised below) between birthweight and cardio-vascular death and illness and the risk factors for cardiac disease in adult life.

Based on a cohort of men and women born in Hertfordshire, England between 1911 and 1930, the risk of death from coronary heart disease declined with increasing birthweight in men and women, with a slight increase in risk in the heaviest birthweight group (see Table 1).[6]

The Hertfordshire findings were initially replicated in a study of singleton (excluding twins, triplets etc.) men born in Sheffield between 1907 and 1924.[7] Subsequently there have been many studies confirming this relationship from a range of different countries.[8] Deaths from cerebro-vascular disease (strokes etc) has also been shown to have the same relationship with birthweight.[9]

Non-fatal cardio-vascular disease has been shown to have the same relationship with self-reported birthweight among women aged 46-71 in 1992 enrolled in the US Nurses' Health Study.[10] Among middle-aged men from Caerphilly in South Wales, higher rates of non-fatal heart attacks were associated with lower birth weight.[11]

Raised blood pressure and obesity are important markers of cardio-vascular risk. However, their relationship with birthweight is not so clear. Among children aged 9-11 years an inverse relationship of blood pressure with low birthweight was noted after adjustment for age, sex, height and body mass index.[12] An inverse association of blood pressure with birthweight was also noted in a study of Jamaican school children aged 6-16 years.[13] Although studies have also shown the same relationship in adulthood[14] and high blood pressure in childhood has been shown to continue into adult life,[15] two studies in adolescence fail to show the expected inverse relationship with blood pressure.[16]

Summary

- Cardio-vascular mortality rates decrease with increasing birthweight up to an optimum level between 3500-4500 g. There is a slight increase in rates in birthweight groups above 4500g.
- The same relationship has been noted between non-fatal cardio-vascular disease and birthweight.
- Known risk factors for cardio-vascular disease such as high blood pressure and obesity show some relationship with birthweight, although the relationship is not as clear as that for death and illness.

Table 1: Risk of death from coronary health disease and birth weight

Birthweight group (lbs)	Ratios for coronary heart disease mortality compared with lowest birthweight group (<5 lbs) :Men (born 1911-1930)	Ratios for coronary heart disease mortality compared with lowest birthweight group (<5 lbs): Women (born 1923-1930)
≤5.5	1.00 (reference)	1.00 (reference)
6-7	0.81:1	0.87:1
7-8	0.80:1	0.81:1
8-9	0.74:1	0.71:1
9-10	0.55:1	0.52:1
≥10	0.65:1	0.59:1

Source: C Osmond, D J P Barker and P D Winter, 'Early Growth and Death from Cardio-vascular Disease in Women', *British Medical Journal* 307, 1993, pp1519-24

Maternal Health, Fetal Growth, Birthweight and Adult Health

Birthweight and Non-Insulin Dependent Diabetes Mellitus (NIDDM) and Impaired Glucose Tolerance (IGT)

Diabetes, particularly non-insulin dependent form associated with obesity and otherwise known as Type 2 diabetes mellitus (NIDDM), is, along with cardio-vascular disease, one of the chronic diseases that has increased in prevalence and importance over the last 50 years. Impaired glucose tolerance (IGT) is an abnormal response to tests of the ability of the body to cope with high levels of sugar and is found in people in the early stages of NIDDM, or in women with reduced ability to deal with sugar during pregnancy. The impairment of glucose metabolism associated with NIDDM and IGT has important health consequences.

In a sub-sample of the Hertfordshire cohort (see above) still resident in the county, a clear linear relationship was demonstrated between NIDDM and IGT and birthweight and those in the lowest birthweight group (less than 5.5 lbs.) were over 6 times as likely to have impaired glucose metabolism.[17]

Subsequent reports confirm the relationship of birthweight with diabetes and impaired glucose tolerance although not all show the same linear relationship. Among 266 men and women born in a hospital in Preston and studied at a mean age of 50 years, a linear relationship of birthweight to new NIDDM or IGT was demonstrated.[18] Among US male health professionals studied at a mean age of 61 years, with the birthweight group 3.2-3.8 kgs as reference, the odds ratio for NIDDM was 1.9 in those in the lowest birthweight group (under 2.5 kgs) and 1.4 in the birthweight group 2.5-3.1 kgs.[19] No trend in NIDDM prevalence was found at the higher levels of birthweight. A stepwise increase in NIDDM prevalence among 60-year-old men living in Uppsala (Sweden) was noted in those in the lowest birthweight category (under 3.25 kgs).[20]

Summary

- There is good evidence that risk of NIDDM and IGT in adult life is higher in those with low birthweights (more common among poorer children).
- Evidence of risk of NIDDM and IGT at higher birthweights is less clear.

Maternal Health, Fetal Growth, Birthweight and Adult Health

Birthweight and Respiratory Illness and Cancer in Adulthood

Lung disease and poor lung function are important causes of death and ill health in adult life. Cancers play an increasing part in morbidity and mortality in adulthood. Evidence of an association with birthweight raises issues related to the prevention of these major threats to adult health.

Results from the British 1946 national cohort study (the MRC National Survey of Health and Development) showed that low birthweight, along with living in crowded home circumstances at two years of age and a parental history of bronchitis, was independently associated with reduced peak expiratory flow rate (a measure, commonly used in asthma and chronic bronchitis, that indicates how much constriction there is in the large airways) at age 36 years. This is even after adjustment for smoking, education and adult socio-economic circumstances.[21] Forced expiratory volume in one second (FEV1) (a measure of the amount of air that can be blown out of the lungs in one second) measured at 35 years age in the British 1958 national cohort study was positively related to birthweight (after excluding those born pre-term) after adjustment for adult height, smoking and socio-economic status in childhood and adult life.[22]

In the Hertfordshire cohort, there was a weak trend of falling standardised mortality ratios (SMR) (death rates adjusted for the age structure of the population) for chronic obstructive airways disease (usually due to chronic bronchitis and resulting in obstruction to the flow of air out of the lings on breathing out) with increasing birthweight.[23] The number of deaths was small making interpretation difficult but there was a striking difference between the SMR for men with birthweights of 5.5 lb or less (SMR 131) and those with birthweights of 9.5 lb or over (SMR 28). This paper also reported a linear relationship between FEV1 and birthweight (Table 2). This relationship persisted after adjustment for current height, age, smoking and social class.

The results of this study failed to show any trend in SMRs for lung cancer by birthweight. Other studies show an inconsistent relationship of birthweight with cancer in adult life. Stomach cancer is likely to be linked with birthweight through the association of both with lower socio-economic status.[24] A Swedish case-control study failed to show any gradient of breast cancer with birthweight[25] but another study suggests a positive relationship between birthweight and breast cancer.[26]

Summary

- Risk of death from chronic lung disease and impaired lung function in adult life is associated with birthweight.
- The relationship between birthweight and the risk of cancer is less clear.

Table 2

Birthweight (lb)	Number of men	Mean forced expiratory volume at one second adjusted for height and age
≤5.5	33	2.28
5.6-6.5	103	2.41
6.6-7.5	258	2.44
7.6-8.5	242	2.52
8.6-9.5	132	2.55
≥9.5	57	2.57

Source: D J P Barker, K M Godfrey, C H D Fall, C Osmond, P D Winter and S O Shaheen, 'Relation of Birthweight and Childhood Respiratory Infection to Adult Lung Function and Death from Chronic Obstructive Airways Disease' in D J P Barker (ed), *Fetal and Infant Origins of Adult Disease*, BMJ Publications, 1992, p154

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Maternal Health, Fetal Growth, Birthweight and Adult Health

Birthweight and Height and Cognitive Function in Adulthood

Height is associated with the risk of subsequent adult health outcomes. Short stature increases the risk of an adverse pregnancy outcome,[27] death from coronary heart disease[28] and obstructive lung disease.[29] Counties of England and Wales with taller populations have been shown to have lower death rates from chronic bronchitis, rheumatic heart disease, ischaemic heart disease and strokes, and higher mortality from breast, prostate and ovarian cancer.[30]

In a large study from Israel (30,083 subjects born in Jerusalem between 1964 and 1971), a significant increase in standing height at age 17 by birthweight of 3.33cm/1,000 g was reported for males and 2.85cm/1,000g for females.[31] This relationship persisted after adjustment for social class and ethnic origin. Birthweight was associated with adult height in the British 1946 cohort, independent of other confounding variables such as social class, sex and parental height.[32] A similar association was noted in the British 1958 national cohort.[33]A French study demonstrated that men who had been born with birthweights lower than expected for their gestational age (so-called small for gestational age) were 4.5cm shorter at age 20 years compared with those with normal birthweights for gestational age. The height difference for women born small for gestational age compared with normal for gestational age subjects was 3.9cm.[34] Another study reported a seven-fold higher risk of short stature among young adults who were small for gestational age compared with normal for gestational age subjects.[35]

Another factor that has been shown to have an impact on adult health is education which in turn is affected by cognitive function (usually measured as IQ). Although there is reasonable evidence for a link between cognitive function and birthweight in childhood, results of studies extending into adulthood are conflicting. A study of Danish conscripts reports a relationship of IQ with birthweight such that IQ increased in association with birthweight up to 4500g but fell slightly in birthweight groups over 4500g.[36] Members of the British 1946 cohort studied at age 43 continued to demonstrate a weak association between birthweight and cognitive function after adjustment for sex, father's social class, mother's education and birth order.[37] These findings suggest that the association with birthweight may dissipate with increasing age. This would be consistent with the findings among older men and women who had been born in Hertfordshire, Preston and Sheffield between 1920 and 1943 that failed to show any consistent association between impaired fetal growth and cognitive function.[38] Small for gestational age subjects who were part of the British 1970 national cohort showed significant differences in academic achievement and professional attainment at age 26 years compared with normal birthweight subjects.[39] However, the author reports no long-term social or emotional consequences of being small for gestational age.

Summary

- Cognitive function up to early adulthood has been shown to be related to birthweight; however, there is some evidence that the effect is attenuated in later life.
- Attained height, important for health, increases with increasing birthweight.

Birthweight and Future Socio-Economic Status

Sub-optimal birthweight not only has negative implications for adult health but has also been shown to influence future social class. By age 33 years, birthweight was still strongly associated with social class for both men and women of the 1958 British birth cohort suggesting that birthweight exerts its effect despite the tendency in early adulthood for individuals to embark on their own socio-economic trajectories.[40]

Summary

- Birthweight appears to be associated with cardio-vascular mortality and morbidity in adulthood.
- The increased risk of cardio-vascular mortality and morbidity is not confined to low birthweight infants but continues into the 'normal' birthweight range.
- There is evidence of a relationship of birthweight with some adult health outcomes such that the risk decreases up to a birthweight of around 4500g and increases slightly in higher birthweight groups.

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Childhood Poverty and Health in Adulthood

Following the suggestion by a Norwegian researcher that childhood socio-economic conditions might impact on coronary heart disease mortality in later life,[41] poverty in childhood has been shown to have profound effects on adult health.[42] These effects result from a combination of the latent, pathway and cumulative processes discussed above. These findings, summarised below, mean that poor social circumstances in childhood not only make children ill but carry into adult life to affect their later health.

Childhood Socio-Economic Conditions and Adult Mortality

Based on a study in the west of Scotland, all-cause mortality among men aged 35-64 years followed over a 21-year period increased in a finely graded stepwise fashion from those men whose social class of origin, social class at labour market entry and social class at entry into the study were all non-manual to those who had been in manual social classes at all three points (see Table 3).[43]

This relationship with cumulative social class held good even when risk factors such as smoking and blood pressure were taken into account. Social class of origin was associated with mortality risk independent of social class at labour market entry and at entry into the study. A Norwegian study confirms the influence of social class of origin on some causes of death, notably stomach cancer and cardiovascular disease, among men and women.[44]

Table 3: Relative death rates by cumulative social class adjusted for age and risk factors for men in the West of Scotland Collaborative Study

Cumulative social class	Ratio of death rates adjusted for age with all three non-manual as reference	Ratio death rates adjusted for age and risk factors* with all three non-manual as reference
All three non-manual	1.00 (reference)	1.00 (reference)
Two non-manual, one manual	1.29 :1	1.30 :1
Two manual, one non-manual	1.45 :1	1.33 :1
All three manual	1.71:1	1.57 :1

* Adjusted for age, smoking, diastolic blood pressure, cholesterol concentration, body mass index, adjusted FEV1, angina, bronchitis and ECG ischaemia

Source: G Davey Smith, D Gunnell and Y Ben-Shlomo, 'Life-course Approaches to Socio-economic Differentials in Cause-specific Adult Mortality' in D Leon and G Walt (eds), *Poverty, Inequality and Health: an international perspective, Oxford University Press*, 2001, p93

Childhood Poverty and Health in Adulthood

Birthweight and Future Socio-Economic Status

The Scottish study[45] showed a more marked gradient for cardio-vascular mortality in men associated with cumulative social class: even when age and risk factors were taken into account, men who were in manual social classes on all three occasions had a 92 per cent higher risk of death from cardio-vascular disease than those in non-manual classes on all three occasions. Manual social class of origin was associated with a 41 per cent increase in risk when social class at labour market entry and study entry were taken into account. This association of childhood socio-economic status with cardio-vascular mortality has been confirmed in other studies.[46]

Stroke mortality shows a social gradient similar to that of coronary heart disease. The relationship with poor childhood socio-economic circumstances is strong and remains virtually unaltered when current social class is taken into account in the analysis.[47] There may be a pathway through raised blood pressure in early adult life (see below) associated with poor social circumstances linking poor childhood socio-economic status to stroke mortality.

The relationship of cancer mortality with childhood socio-economic circumstances varies with the site of the cancer.[48] Cancer of the stomach shows a strong relationship with childhood socio-economic conditions with the risk among men in the west of Scotland study whose fathers were in social class IV and V being nearly three times that of men whose fathers were in social class I and II.[49] Cancer of the stomach seems to be related to infection with *Helicobacter pylori*[50] and adult infection with this organism is related to poor socio-economic circumstances in childhood.[51] Cancers related to smoke exposure have an association with poor socio-economic circumstances in childhood but this is likely to be mediated through the influence of poverty on later adult smoking (see below). By contrast, breast cancer has a reverse social gradient and seems to be more closely related to better childhood social conditions.[52]

Summary

- Risk of death from many major causes in adulthood is increased by poor social circumstances in childhood.
- Mortality from some cancers, such as breast cancer, shows a relationship in the opposite direction with better social conditions in childhood.

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Childhood Poverty and Health in Adulthood

Childhood Socio-Economic Conditions and Physical Ill Health in Adulthood

In addition to the effect on premature mortality in adult life of poor socio-economic conditions in childhood, the same conditions are also likely to impose an increased burden on the physical health of adults.

Physiological risk factors for cardio-vascular disease among men in the west of Scotland study were related to their social circumstances in childhood as well as to their social class at the time of the study.[53] Blood pressure, serum cholesterol concentration, and FEV 1 (a measure of respiratory function) were all related to both social class of origin and own social class. Body mass index (weight/height^2) was associated only with social class of origin. This latter finding is consistent with the findings of a systematic review of cohort studies which reports that childhood obesity is not consistently associated with social class but adult obesity is associated with lower social class in childhood.[54]

Respiratory function in adult life is more likely to be impaired in poor children.[55] Evidence from the 1946 national birth cohort showed that respiratory illness affecting the lungs in the first two years of life, more common among poor children, was a significant risk for adult chronic obstructive lung disease (most commonly chronic bronchitis).[56] From the same study, living in crowded home circumstances at two years of age was independently associated with reduced peak expiratory flow rate (another measure of respiratory function) at 36 years of age and there was evidence for a cumulative effect of adverse respiratory factors throughout childhood and into early adulthood.[57]

As discussed above, adult height is influenced by birthweight but social class and living conditions during childhood have an effect independent of birthweight.[58] Short stature is associated with an increased risk of cardio-vascular and respiratory morbidity and mortality.[59] A recent study analysing follow-up data from the Boyd-Orr cohort, originally recruited in 1937 and 1939 to survey diet and health in childhood, enables the association between adult height and inadequate childhood nutrition to be examined.[60] Higher childhood inadequate nutrition scores were significantly associated with shorter adult height for men and women. Reduced adult leg length, a particularly sensitive indicator of childhood growth, was associated with poor childhood nutrition for both sexes.

Childhood socio-economic disadvantage increases the risk of disability in adulthood, partly through the association of disability with a history of serious illness in childhood.[61] Self-reported limiting longstanding illness (illness that interferes with normal daily activity) at age 33 years has also been shown to be associated with poor social conditions in childhood. Adults at 33 years of age in the 1958 British national cohort were 50 per cent more likely to report limiting illness if they had experienced disadvantage at seven and 11 years of age.[62]

Childhood disadvantage increases the risk of self-reported poor health in adulthood.[63] Low socio-economic status at birth and in early childhood contributes to a cumulative effect of socio-economic status from birth to 33 years of age on poor self-reported health such that those who originated in and remained in unskilled manual social classes had a three-fold greater risk of poor self-reported health than those who had been in non-manual classes throughout their lives.[64]

Using a definition of good health at 36 years based on no disability and no health problems, normal blood pressure, normal weight, lung function in the top 80 per cent of the population distribution and no admission to hospital in the previous three years, Kuh and Wadsworth reported that good health was associated with better socio-economic conditions in childhood and higher educational qualifications.[65] Associations between childhood and poor adult health were the products of continuing social disadvantage, of the effects of illness in childhood, adolescence and early adulthood, and the effects in adult life of gaining no educational qualifications. Both cumulative and pathway effects were demonstrated.

Summary

- Many of the risk factors for cardio-vascular disease, such as high blood pressure and high serum cholesterol, are associated with childhood poverty.
- Living in crowded circumstances in childhood is associated with an increased risk of impaired respiratory function at 36 years of age.
- Childhood disadvantage is associated with increased levels of disability and limiting longstanding illness in adulthood.

Childhood Poverty and Health in Adulthood

Childhood Socio-Economic Circumstances and Adult Mental Health

There is increasing awareness of the importance of mental ill health as a cause of disability and reduced wellbeing in childhood and adult life. The evidence presented below suggests that a significant proportion of the experience of mental health problems in adult life has its origins in poor socio-economic circumstances in childhood.

Childhood adversity including economic hardship and loss of a parent through death or divorce has been shown to affect adversely adult mental health.[66] Social class IV and V at birth was associated with an odds ratio of 3.03 for women and 1.86 for men of psychological distress at 33 years of age in the 1958 British national cohort.[67] In a study of middle-aged Finnish men, poor childhood socio-economic conditions and low educational achievement were associated with higher levels of hopelessness, depression and cynical hostility (defined as a general hostility to others) and a lower sense of coherence (see Table 4).[68]

Evidence from a US study confirms the relationship of low socioeconomic position in childhood with major depression in adulthood.[69] Adults who had lower socioeconomic status backgrounds had a twofold increase in risk for major depression compared to those from the highest socioeconomic status background independent of family history of mental illness and adult socioeconomic status.

Behaviour problems and conduct disorders in childhood and adolescence are strongly socially patterned[70] and are associated with reading difficulties and educational failure.[71] The anti-social behaviour tends to persist into late childhood and early adolescence with increased levels of crime,[72] drug and alcohol abuse[73] and unemployment.[74] Although no evidence directly relates suicide to early childhood socio-economic circumstances, poorer mental health in early adulthood increases the risk of suicide.[75]

Under-nutrition in pregnancy and birth complications, both of which are socially patterned, have been shown to increase the risk of later schizophrenia and subsequently the risk of suicide.[76]

Summary

- Adult mental health is likely to be worse in those who have experienced adverse social conditions in childhood.
- Behaviour problems and conduct disorders in childhood and adolescence that are strongly associated with poor socio-economic conditions in childhood are likely to set up a pathway effect leading to educational failure and subsequent poor employment prospects in adulthood.

Table 4: Childhood socio-economic conditions and psychological problems in middle aged men

Socio-economic conditions in	% in the highest third for hopelessness	% in the highest quartile for depression	% in the highest quartile for cynical hostility	% in the lowest quintile for sense of coherence
Childhood:				
Poor	10.7	20.2	24.7	19.2
Middle	10.1	22.4	25.1	19.5
High	6.0	18.6	19.1	16.6
Education:				
Primary or less	12.0	24.0	28.4	21.7
Some high school	7.3	19.6	20.0	15.4
Finished high school or better	1.3	16.4	11.2	16.4

Source: J W Lynch, G A Kaplan and J T Salonen, 'Why Do Poor People Behave Poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socio-economic lifecourse', *Social Science and Medicine* 44, 1997, p815

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Childhood Poverty and Health in Adulthood

Childhood Poverty and Health-Related Behaviours in Adult Life

Health-related behaviours such as smoking, alcohol consumption, diet and exercise are frequently portrayed as individual decisions reflecting a process of free choice. As a consequence, stress has been laid on individual responsibility for health in UK and US government strategies for health.[77]

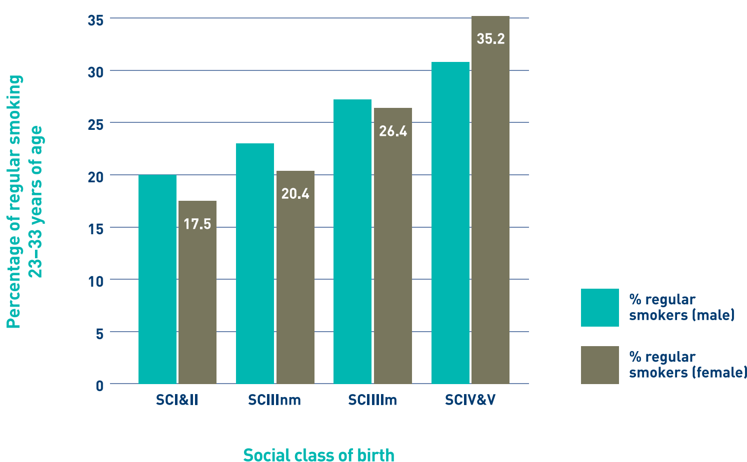
However, all these behaviours are themselves strongly socially patterned and, although individuals make choices, these choices are made within economic, historical, cultural and political contexts.[78] As Lynch et al state *'evidence that health behaviours are differentially distributed by SES should be viewed in a lifecourse perspective as the cumulative responses of different classes of people to conditions imposed by the social structure'*.[79]

In the same way as blood pressure and serum cholesterol (see above) are associated with childhood disadvantage, health-related behaviours in adult life such as smoking, alcohol consumption, diet and exercise show a similar relationship. Educational attainment, experience of parental separation or divorce before 15 years of age and behaviour in adolescence, all of which are strongly related to early childhood disadvantage, were shown to influence health-related behaviours at the age of 36 years in members of the 1946 British national birth cohort.[80] Cohort members with higher levels of education and training were inclined to take more exercise, to drink less alcohol if they were men and more if they were women, to eat a diet closer to recommended intakes and to smoke less than those with lower educational attainment.

Evidence from the 1958 British national birth cohort shows a direct relationship of social class at birth with the chances of regular smoking between ages 23-33 years in both men and women. The gradient is clear among both men and women but is greatest among women with double the percentage of women born into social classes IV and V being regular smokers in early adulthood compared with those born into social classes I and II (see Figure 1).[81]

Among middle-aged Finnish men cigarette consumption was higher in those who experienced poor childhood social circumstances.[82] There was evidence for a cumulative effect of socio-economic status across the lifecourse on smoking with differences related to childhood socio-economic status increasing by early adulthood as measured by educational attainment. Of men who had finished high school or better, 32.1 per cent were lifetime non-smokers compared with 22.2 per cent of men with only a primary education. Similar patterns were shown for drunkeness (but not alcohol consumption), physical activity and obesity. Marked differences in dietary consumption of fruit, non-root vegetables, salt, vitamin C, and carotene by socio-economic status in childhood was also noted among these men. This study also demonstrated the lifecourse pathways from childhood socio -economic status to education and from education to occupation. Seventy per cent of those born into low socio-economic status families achieved an educational level of primary or less and only 21 per cent of those with this level of education were in 'white-collar' occupations.

Figure 1: Risk of regular smoking between 23-33 years of age by social class of birth among 1958 national cohort members



Source: C Power and C Hertzman, 'Health, Wellbeing and Coping Skills in D P Keating and C Hertzman (eds), *Developmental Health and the Wealth of Nations*, The Guilford Press, 1999, p45

Summary

- Health-related behaviours in adulthood are influenced by early childhood socio-economic status and socio-economic lifecourse pathways.
- Regular smoking in early adulthood shows a stepwise gradient by social class at birth and the effect is greater in women than men.
- The influence of early poor childhood circumstances on adult health-related behaviours seems to be mediated primarily through educational attainment.

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Conclusion

The evidence presented in this paper demonstrates that the influence of childhood poverty on health is not confined to childhood. Adult health is adversely affected by poor fetal growth, itself strongly socially patterned, with those infants born at sub-optimal birthweights having an increased risk of a range of adverse health outcomes in adult life.

Infants born into poor families are more likely to have a sub-optimal birthweight, to experience early growth failure associated with birthweight and poor nutrition, to experience more childhood ill health, both acute and chronic, to develop early educational and behavioural difficulties, to under-achieve educationally in adolescence and to adopt less healthy behaviours. These infants are also more likely to experience family breakdown and lone parenthood and come to parenthood earlier. Their risks of unemployment and low-income jobs are far higher. These latent, cumulative and pathway effects combine to ensure that poverty in childhood has a profound effect on adult health.

Summary

- Birthweight tends to be lower in poorer infants and it has been shown to be associated with a range of adverse adult health outcomes.
- Risk of death from major causes in adult life increases with poorer socio-economic conditions in childhood.
- Children who have experienced poor childhood socio-economic conditions tend to have increased physical health problems in adulthood.
- Mental ill health in adulthood is more likely in those who have experienced poor childhood socio-economic conditions.
- Poor social circumstances in childhood also increase the risk of adoption of adverse health-related behaviours in adult life.

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