



Health Development Agency

Childhood disadvantage and adult health: a lifecourse framework

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About the Health Development Agency

The Health Development Agency (www.hda.nhs.uk) is the national authority and information resource on what works to improve people's health and reduce health inequalities in England. It gathers evidence and produces advice for policy makers, professionals and practitioners, working alongside them to get evidence into practice.

Contents

Acknowledgements	iv
Preface	v
Summary	1
1 Introduction	2
Aim	2
Background	2
Sources of research evidence	3
Structure of the report	3
2 Researching the links between childhood circumstances and adult health	5
Defining childhood	5
Measuring child health	5
Measuring childhood circumstances	6
Studies of lifecourse influences	8
3 Childhood disadvantage and adult health – building up our understanding	10
Introduction	10
Links between childhood disadvantage and poor health	10
How might childhood circumstances influence adult health?	11
Influence of childhood circumstances on adult circumstances	11
Influence of childhood circumstances on developmental health and health behaviour	15
Influence of childhood circumstances on developmental health and adolescent trajectories	17
4 Childhood disadvantage and adult health: a lifecourse framework	19
The framework	19
Features of the framework	19
Mapping policies and policy impacts	20
5 Conclusions and implications for improving the evidence base for policy	22
Implications for improving the evidence base for policy	22
Two specific gaps	22
Conclusions	23
References	25

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Preface

Two apparently contradictory features characterise the health of the population of modern Britain. First, over many years there has been an overall improvement in the health of the population. Second, at the same time as health has improved, inequalities in health have not only stubbornly resisted the overall trend, they have got worse. Consequently people in higher socio-economic groups enjoy better health and live longer than poorer members of society. These differences in health and life expectancy exist at all levels in society, and get steadily worse as income and social circumstances get worse. The Health Development Agency (HDA) has a remit to develop the evidence base on the reduction of inequalities in health. In a series of briefings the HDA has shown that, in general terms, while the relationship between health inequalities and the wider determinants of health is clear at an aggregate level, the empirical and theoretical understanding of the causal pathways is not very well developed (www.hda.nhs.uk/evidence).

In this important report, Hilary Graham and Chris Power develop a model of these causal pathways. The report shows that a principal explanation for the persistence and worsening of inequalities is the ways in which health (both good and bad) is transmitted from generation to generation through economic, social and developmental processes, and that the advantages and disadvantages are reinforced in adult life. A 'lifecourse approach' focuses on the different elements of the experience of health, from the moment of conception through childhood and adolescence to adulthood and old age.

The model draws on important new reviews as well as longitudinal studies of child development. This report describes the causal pathways of health inequalities and links these to broad social and economic factors as well as studies of child development. It shows that there are critical points in

the transitions from infancy through childhood into adult life, where an individual may move in the direction of advantages or disadvantages in health. It indicates that mainstream policies in health, education and social welfare do not always provide enough protection for people at these crucial turning points. These patterns are not uniform, varying not only by social class but also, very importantly, by ethnicity.

The report shows how, throughout life, a poor start makes health worse. Social circumstances, as measured by social class, influence one's chance of staying alive. It also shows that social circumstances influence health at all ages, but have particularly strong effects *in utero*, in infancy and in childhood. This is true whether we measure health developmentally (by physical, emotional, social and cognitive capacities) or by rates of disease.

The report illustrates how the earlier the point of transition from childhood to adult roles (defined as leaving full-time education, being available to enter the labour market, and becoming a parent), the worse health tends to be. It also demonstrates how social circumstances subsequently reinforce the disadvantages of early years. With every step up the social hierarchy, social circumstances improve and so, too, does health. And at every step up the hierarchy the reinforcing negative effects diminish.

Childhood is important because it is when physical, emotional and cognitive development patterns are established. These include the kinds of things people value about themselves and others, and are linked to ways of behaving such as smoking, eating and exercise. Obviously these are not set in stone in childhood, and may change as a young person moves into adulthood – but for many these aspects of life do become effectively fixed, with beneficial or harmful effects on subsequent health.

There are three main routes for the transmission of

advantage and disadvantage: poor childhood social circumstances predict poor adult circumstances; poor childhood circumstances cause poor childhood health; and poor adult circumstances determine poor adult health.

Poor childhood social circumstances relate to poor adult circumstances in a number of ways. For example, education is still the major route out of disadvantage, but poorer children perform educationally less well than better-off children. Children not staying on in education, or not entering employment or training at 18, are a particularly high-risk group. Children from poorer backgrounds are much more likely to get into trouble with the police, to be excluded from school, or to become a teenage parent, all of which make moving up the social hierarchy more difficult.

Disadvantaged childhood conditions have a direct impact on child health. So children from poorer circumstances tend to be affected in a number of ways: slower foetal growth, lower birth weight, shorter height and leg length, and more disease. Adolescence is critical in determining behaviour such as cigarette consumption, dietary behaviour, exercise and alcohol use, and while there is much evidence to show that children from all social groups tend to experiment with smoking and alcohol as well as drugs, the potentially damaging long-term use of drugs and alcohol, as well as consumption of fat, sugar and salt, are established in adolescence.

Adult circumstances will also have significant impacts on health, although in adult life the stresses may come from work (or lack of it), poverty, housing and leisure, as well as from the more general environment.

There are many policies and initiatives that aim to ameliorate these aspects of life in contemporary society. However, an important question posed by this report is whether mainstream policies on education, social welfare, employment, training, criminal policy, youth unemployment and health, when taken in the round, are actually part of the causal mechanisms rather than part of the solution. As a first step to answering this, it is important to obtain a much better understanding of the impact of these mainstream policies on the lives of the population as a whole. Undoubtedly, in many ways the overall effect of these policies for the population as a whole has been to improve the health of the total population. However, those benefits and advantages become less effective the further down the social hierarchy we go. This paper highlights some of the

underlying reasons for this, and points towards an upstream policy programme to deal with some of these basic iniquities and disadvantages.

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Summary

This report is designed as a resource to support the development of policies to tackle socio-economic inequalities in health. It focuses on the link between childhood disadvantage and poor health in adulthood, drawing on evidence from epidemiological studies and social surveys to develop a framework which maps the pathways through which a disadvantaged start in life can compromise adult health.

Our framework highlights how disadvantage in childhood adversely affects both socio-economic circumstances and health in adulthood through a set of interlocking processes. Key among these are children's developmental health (their physical, cognitive and emotional development) and health behaviours, together with the associated educational and social trajectories. The framework makes clear that disadvantage is not an event that strikes at a single point in childhood, but is the context in which the child is conceived, is born, and grows up. The origins of childhood disadvantage lie in the disadvantages experienced by parents; its effects endure into adulthood.

Our framework breaks down the link between childhood disadvantage and adult health into its constituent elements: parental disadvantage and poor childhood circumstances, a set of interlocking child-to-adult pathways, and poor circumstances and poor health in adulthood. In so doing, it offers a way of thinking about policy. It provides a framework for mapping and reviewing policies which tackle inequalities in the current and future generations of parents; in the social conditions and development of children; in their developmental health (physical, emotional and cognitive) and health behaviour; in their educational and social trajectories; and, as they grow up, in their health and social circumstances in adulthood. We also note gaps in the evidence base for policies to improve the life chances and health prospects of children growing up in disadvantaged circumstances.

While focusing on childhood circumstances, the framework makes clear that adult circumstances also have a powerful effect on adult health. Tackling inequalities in adult health therefore requires policies that address inequalities in socio-economic circumstances in adulthood, as well as throughout childhood.

1 Introduction

Aim

This short piece of work has been commissioned by the Health Development Agency (HDA) to contribute to the evidence base of England's public health policy. Central goals of the policy are:

- Improving the health of the worst off
- Tackling the wider socio-economic inequalities in health.

This report provides a framework to assist those developing and monitoring policies that aim to achieve these two goals. The framework focuses on how childhood disadvantage contributes to poor health in adulthood. It is informed by epidemiological and social research, and particularly by longitudinal studies that have followed children from birth. The report does not provide a detailed review of this body of research – its purpose is to interpret and translate this research for the policy community. We describe the pathways through which a poor start in life can compromise health in adult life. At the end of the report, we briefly discuss gaps in the evidence base that were highlighted in the process of undertaking this work for the HDA.

Although our report focuses on childhood influences, it is noted that adult circumstances are also very important, and have a powerful effect on adult health. Tackling the link between poverty and poor health requires policies that address inequalities between socio-economic groups at all stages of the lifecourse.

Background

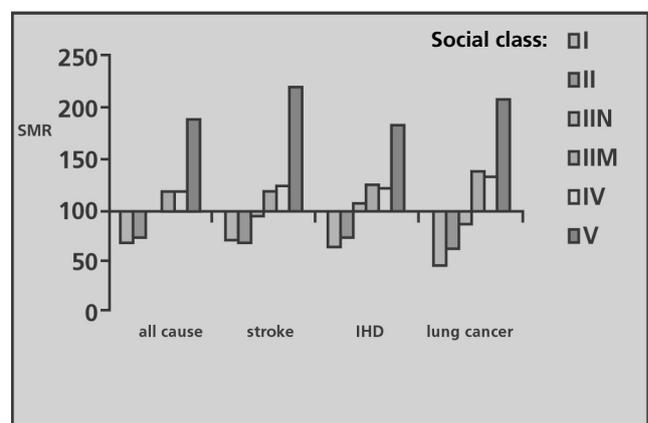
There are unequal opportunities for health in the UK, with those in higher socio-economic groups enjoying better health and longer lives than those lower down the socio-economic ladder. Tackling these socio-economic inequalities in health is now at the top of the UK's public health agenda.

Behind the socio-economic gradients in deaths from all causes lie the socio-economic gradients in the 'big killers', which include ischaemic heart disease, stroke and lung cancer (Figure 1). These are diseases which take their toll in adulthood, through both poor health and early death. Public health research and policy have therefore focused on adulthood, directing attention at adult risk factors, such as smoking and obesity, which increase the risks of poor health.

But there is increasing evidence that the roots of some adult health problems may lie in experiences earlier in life. Childhood, in particular, has been singled out as a period of life which has enduring effects on health and longevity. By middle age, women and men from more disadvantaged backgrounds have death rates double those of women and men with advantaged family backgrounds (Kuh *et al.*, 2002). This effect is also apparent for specific causes of premature death, including the 'big killers' such as heart disease, respiratory disease and stroke – poor childhood

Figure 1 Standardised mortality ratios from selected causes by social class (based on occupation), men aged 20–64, England and Wales, 1991–93.

Source: Drever *et al.*, 1996 (Crown Copyright).



circumstances increase the risk of death from these diseases (Davey Smith *et al.*, 1998).

Such evidence provides an important perspective on health inequalities. It suggests that the socio-economic inequalities in the health of adults – in disease, disability and premature mortality, for example – may reflect inequalities in the circumstances in which they were conceived, born and grew up. In particular, disadvantage in early life may make an important contribution to poor health in adulthood. If this is so, then inequalities in the resources and opportunities available to today's children will roll forward into inequalities in their health in the decades to come – and into inequalities in the health of their children.

Our report turns the spotlight on the link between childhood circumstances and health in adult life, summarising and interpreting research for a policy audience. It is concerned in particular with how childhood disadvantage may jeopardise future health.

Sources of research evidence

There are a range of potentially important sources of information on how childhood circumstances may affect adult health. Among these are intervention studies (where recruitment to the study is set up in such a way that the outcomes for children in receipt of particular interventions can be compared with those of other children); and observational studies (where specific interventions are not the focus, and information is collected from families drawn from the wider population). There is very little evidence from intervention studies on the long-term health impact of childhood conditions; for example, from studies that map the effects on adult health of policies and interventions which improved circumstances in childhood. Considerably more information on the links between early life and adult health is available from observational studies, in particular from longitudinal studies. These include the UK's birth cohort studies which have been following children from birth and through their lives. But, even here, important gaps remain.

Mapping the links between childhood circumstances and adult health is therefore about piecing together evidence of different kinds, and from different sources. This has been done in a number of authoritative reviews of the evidence, both from the UK and internationally (Hertzman and Wiens, 1996; Kuh *et al.*, 1997, 2004; Power and Hertzman, 1997, 2003). Other important reviews of lifecourse influences on health inequalities have been undertaken (eg Blane, 1999; Graham, 2002; Davey Smith, 2003).

These reviews, and the models they contain, provide a major resource for this report. The reviews focusing on how adult health is influenced by the socio-economic circumstances into which children are born have been particularly helpful. We have relied especially on the recent reviews by Kuh *et al.* and by Power and Hertzman (Kuh *et al.*, 2004; Power and Hertzman, 2004), supplementing these reviews with additional evidence on social and health inequalities. This report does not provide a summary or synthesis of these international reviews, nor does it detail the studies on which they draw. Instead, evidence from them is included to highlight the mechanisms through which childhood circumstances may affect adult health. Analyses from the UK's birth cohort studies are used in the Figures and Tables to illustrate these mechanisms. Where specific findings are cited, sources are provided in the References.

Structure of the report

Our framework for mapping the links between childhood circumstances and adult health is developed in three stages.

- The first stage is to clarify the key constituents of the framework. Section 2 looks at how our understanding of childhood, child health and childhood circumstances is being advanced by recent research. It also notes aspects of childhood experience that are not adequately captured by longitudinal studies.
- The second stage is to focus on the links between childhood disadvantage and adult health, and to highlight mechanisms that may underlie these links. This is done in section 3.
- The third stage is to provide a lifecourse framework for understanding how poor circumstances in childhood take a toll on health in adulthood. This framework highlights the continuities in disadvantage across childhood and adulthood. Adopting a broad understanding of child health, it identifies the development of children's health resources as playing a central part in these lifecourse continuities. The framework highlights how childhood disadvantage constrains the development of the resources which children need to secure decent socio-economic circumstances and good health in adulthood. A number of interlocking dimensions are identified – physical and emotional health, cognition and education, together with health behaviours and the social identities through which young people negotiate the transition to adulthood.

The framework, like the report as a whole, focuses specifically on the links between childhood disadvantage and

adult health. But the research on which we draw highlights some broader, more general issues. Three issues, in particular, should be borne in mind.

- It is not only among poor families that social circumstances influence health. As Figure 1 indicates, social circumstances shape health across the socio-economic hierarchy. This means that there is not a health divide in which the poor endure poor health while the rest of the population enjoy a uniform standard of good health. Instead, the poor circumstances/poor health link captures one end of a health gradient, a gradient in which each step up the socio-economic ladder brings a parallel improvement in health. Tackling the extreme end is important. But, as emphasised by both the *Independent Inquiry into Inequalities in Health* (Acheson, 1998) and the recent cross-cutting review of tackling health inequalities (Department of Health, 2002), policies to address the wider relationship between social position and health are needed to reduce health inequalities.
- Our health is shaped by experiences not only in childhood, but across our lives. While circumstances in early life may be particularly important for some diseases and some dimensions of health, adult circumstances may play the major role in others (Davey Smith *et al.*, 2001). But there are particular reasons why policies to equalise opportunities for children are important. Ensuring that children have an equal start in life is recognised by many to be the basis of a just and fair society. Childhood is also the key stage for development of the resources that underpin adult social position and adult health, including physical and emotional health, cognitive/educational capabilities, social identities and health behaviours. To some extent, at least, deficits can be remedied later in life. But second chances are often second best in terms of laying the foundations for decent life chances and good health in adulthood.
- Evidence for the lifelong effects of childhood experience comes from studies that provide information on people's experiences from early in their lives. These studies highlight the complexity of the links between childhood circumstances and adult health, and suggest that the influence of childhood may vary for different health outcomes, and change as societies change. Unravelling these links is complicated by the fact that dimensions of disadvantage (such as poor education and low income) cluster together, and the diseases with which they are associated (such as coronary heart disease) have multiple causes and develop over long periods. This means that many factors, often acting at different times of life, are

likely to contribute to the development of these diseases. It is therefore difficult to estimate exactly how much childhood experiences contribute to health in adult life. Nonetheless, it is possible to establish whether and how childhood circumstances play a role in adult health. These questions are the focus of this report.

2 Researching the links between childhood circumstances and adult health

Defining childhood

Childhood is commonly understood to span the years from birth to adulthood. However, important influences on health are set during gestation. This means that the foetal period – and therefore the conditions in which future mothers live – should also be included in policies to improve child and adult health, and in policies to tackle health inequalities (Acheson, 1998).

The end of childhood can be measured by chronological age, through such fixed time points as the minimum school-leaving age (16 years) or the age of majority (18 years). Alternatively, childhood can be seen in social terms, with its end point defined by the transitions that mark entry into adulthood. These include leaving full-time education and taking up employment, leaving the family home, and becoming a parent. Until the late 1970s the majority of young people left school at 16 and went straight into employment, with marriage and parenthood following by their early 20s. This transition from child to adult varied little by socio-economic background. Today, these social transitions occur at older ages, and are strongly affected by family background. Over the past few decades children of better-off parents have been increasingly deferring the transition to adulthood, lengthening the time they spend in full-time education and entering later into cohabitation and parenthood. Children from poorer families are more likely to follow the pattern that predominated in the 1950s and 1960s – to leave school at the minimum leaving age and to become parents by their early 20s.

This differential extension of childhood makes chronological age a less reliable guide for policy. It also suggests that the window for tackling childhood disadvantage is widening, and should now be seen to extend across the first two decades of life. By this point, a proportion

of young people will also be parents: around five in 100 women are mothers by the age of 20.

Measuring child health

In adulthood, health status has traditionally been measured through serious illness, disability and death. In childhood these are now rare events, and researchers therefore look to alternative measures to capture children's health. These include indicators of physical health such as birth weight and post-natal growth, and rate of growth in childhood. Other physical measures include leg length, a more sensitive measure of factors affecting growth (such as inadequate diet) than adult height. These are sometimes referred to as indicators of 'health capital' or 'health potential' or, using an older term, a person's 'constitution'. What these concepts capture is the stock of biological reserves which children accumulate as they grow up, and which underwrite their health in adulthood.

The search for appropriate indicators of child health has been extended to include the non-physical constituents of health. Here the focus has been on cognition (eg readiness to learn, verbal ability, numeracy and literacy skills) and emotional wellbeing (self-esteem, self-efficacy). It can also include health behaviours (cigarette smoking, alcohol consumption) and other behaviours expressive of identity such as sexual behaviour. Some researchers use 'personal capital' to describe these cognitive, emotional and behavioural dimensions of health.

There are three important features of these alternative measures.

- First, they emphasise child development – how rapidly and fully children realise their potential in key areas of growth and maturation. The term 'developmental health' has been suggested by Keating and Hertzman (1999) to

describe a range of developmental outcomes that mark a child's journey from birth, through infancy and later childhood, and into adolescence. It can be seen as a concept which embraces physical health (health capital, health potential, constitution) and cognitive, emotional and social capabilities (personal capital). We found this concept of developmental health particularly helpful in developing a lifecourse framework that captures the links between childhood disadvantage and poor adult health.

- Second, like the disease-and-death measures of adult health, the developmental measures of child health reveal marked socio-economic gradients. Gradients are evident in physical health: for birth weight, growth, leg length and height, as well as body mass index and fitness. Socio-economic inequalities in cognition are evident from the earliest age at which it can be reliably measured; they are also evident in emotional and behavioural problems (such as anxiety and unhappiness, or difficulty in getting along with other children). There are also socio-economic differentials in health behaviours, including diet and smoking, and in the social identities that shape the transition to adulthood (such as early entry into sexual relationships and parenthood).
- Third, there is evidence that the alternative developmental markers of child health predict health in later life. Birth weight, for example, is a marker of foetal growth and, powerfully influenced by the mother's socio-economic background, is associated with health in adulthood – with illness and disability, physical and psychological functioning, and mortality risk. The socio-economic gradients evident in growth through childhood continue into adulthood, with shortness in childhood and adulthood predicting important adult health outcomes such as coronary heart disease. Growth in childhood influences many other adult outcomes – for example, childhood growth is linked to lung function in adulthood, through its effect on lung size and capacity. A similar pattern is evident in measures of cognitive development, with childhood socio-economic circumstances having a strong influence on childhood cognition, and childhood cognition having an enduring influence on cognition in middle age.

Measuring childhood circumstances

The circumstances in which children grow up are largely determined by the resources available to their parents – by the homes and neighbourhoods in which they can afford to live, and by the living standards their income secures. Childhood circumstances are therefore more accurately

described as parental and family circumstances: parental and household resources are used to measure the conditions in which children grow up.

Childhood/parental circumstances are measured through a range of indicators, including parental education and occupation, housing tenure, and household income. Education (eg age of leaving full-time education, or highest qualification) is commonly used in European and US research to measure the socio-economic position of adults and their children. UK research has relied primarily on occupation, using current or most recent occupation of the main earner to allocate families to a social class/socio-economic group. Since its development nearly a century ago, the major occupational classification has been the Registrar General's social class schema. This places occupations within a class-based hierarchy which ranges from professional and managerial social classes at the top to semi-skilled and unskilled manual groups at the bottom (see box below). Children in households headed by a parent in an unskilled manual occupation (social class V) or a semi-skilled manual occupation (social class IV) are often defined as growing up in disadvantaged circumstances. Around one in five children are disadvantaged on this criterion. A new classification, the National Statistics Socio-Economic Classification (NS-SEC), is now being introduced into official statistics and social surveys. However, most of what is known about the impact of childhood disadvantage on adult health derives from the older Registrar General's classification (see box below).

Household income provides another indicator of the social and material conditions of childhood. Unlike education or occupation, it captures family living standards directly: it measures the income available to secure basic necessities including food, housing and heating, and to provide children with experiences such as sports activities, school outings

<i>Registrar General's social class schema</i>		
Social class		Examples of occupations
I	Professional etc	Doctor, lawyer
II	Intermediate	Teacher, manager
IIINM	Skilled non-manual	Secretary, sales representative
IIIM	Skilled manual	Bus driver, miner
IV	Semi-skilled manual	Machine sewer, packer
V	Unskilled manual	Office cleaner, labourer

Table 1 Number of children in the UK below various poverty lines, after housing costs, 1994–2002

Year	Income after housing costs			
	50% mean		60% median	
	millions	%	millions	%
1994–95	4.0	32	4.0	32
1995–96	4.2	33	4.0	32
1996–97	4.4	34	4.3	34
1997–98	4.3	34	4.2	33
1998–99	4.5	35	4.2	33
1999–2000	4.3	34	4.1	32
2000–01	4.1	32	3.9	31
2001–02	4.0	32	3.8	30

Source: Department of Work and Pensions, 2003.

and family holidays, which most people agree children should not be denied. One measure of poor income is provided by dividing households into quintiles on the basis of their income. On this measure, children are poorer than the population as a whole: in 2002 nearly half (48%) of the UK's children were in the lowest two income quintiles (Department of Work and Pensions, 2003). Among children, further inequalities are apparent. The proportion of children in the lowest income quintiles is appreciably higher for those living in one-parent households (77%) than in two-parent households (43%). It is markedly higher for children in black Caribbean and black non-Caribbean families (62 and 74%) than for children in white families (48%). Among children in Pakistani and Bangladeshi families, nearly 90% are in the bottom two quintiles (Department of Work and Pensions, 2003).

A second, more widely used measure of poor childhood circumstances is provided by identifying a low-income threshold or 'poverty line'. Until recently a household income of less than 50% mean household income was taken by the government to represent its low-income threshold. In line with EU practice, this poverty line has recently been changed to 60% of median household income, a measure which is seen to better capture the gap in living standards of poor families and those of the 'typical' family. The two measures paint a similar picture of the scale of poverty among children in the UK (Table 1). They confirm that through the 1990s the proportion of children in households below the low-income threshold continued to rise. Since 1999 the trend has been downward. Nonetheless, the latest data suggest that nearly one child in three is living in poverty.

These nationally published statistics also reveal that those

in poverty are not equally poor: as in the wider population, there are income gradients among the poor. Children in lone-parent households, and in African-Caribbean, Bangladeshi and Pakistani households, are not only more likely to be poor than children in white, two-parent households, they are also much more likely to experience extreme levels of poverty. These extreme levels are captured in national data on the proportion of children living in households with incomes below 40% of mean household incomes and below 50% of median household income (Table 2).

National poverty statistics rely on cross-sectional data that capture the number of children in poverty at any one point in time. Longitudinal surveys suggest that a significant proportion of children live in households which are 'persistently poor', with incomes below the low-income threshold (60% median income) for three out of four years.

Table 2 Children's risk of extreme poverty

Group	Income threshold	
	Below 40% mean	Below 50% median
Family type		
Lone-parent	31	34
Two-parent	14	14
Ethnic group		
White	16	17
Black Caribbean	26	26
Black non-Caribbean	30	35
Indian	24	26
Pakistani/Bangladeshi	53	54

Source: Department of Work and Pensions, 2003.

Three years represents a large proportion of a young child's life; in 2002, 16% of children were experiencing persistent poverty (Department of Work and Pensions, 2003).

As this suggests, measures of childhood circumstances such as household income can capture enduring dimensions of disadvantage. Similarly, parental occupation (current/most recent) and housing tenure often represent relatively long-term features of a child's social circumstances (although parents may lose and change jobs, and families move house). Parental education is typically fixed by early adulthood, with few parents improving their level of attainment later in life. While measures taken across childhood are the best indicators of the circumstances in which children are growing up, measures taken at one point in time, eg at birth, can provide a useful guide to conditions across longer periods of childhood.

The different measures of childhood circumstances are also closely correlated. Children whose parents left school without qualifications struggle in a labour market where qualifications are increasingly the passport to employment; in consequence they find themselves restricted to poverty line incomes – in low-paid work and on welfare benefits – and to the social housing sector. Among children in households below the poverty line, nearly 50% live in households on income support; over 60% live in households with no earner; and 75% live in rented housing (Bradshaw, 2002).

Different dimensions of children's circumstances, such as material conditions and parental education, may influence their future health in different ways. Understanding how these dimensions act on adult health is clearly important. But disentangling their separate and cumulative effects is a complex process. Because poor children experience multiple forms of deprivation, the impact of one component – eg financial poverty – will be mediated through, and compounded by, other disadvantages. It is therefore hard to isolate the specific effects of financial poverty (or parental education and occupation), particularly when other health determinants may have been overlooked or inadequately measured.

For this reason, health researchers tend to avoid terms like 'child poverty', which imply that this dimension is primary. Unless their findings relate specifically to the impact of household income, researchers often prefer more general terms such as 'socio-economic circumstances', 'social (dis)advantage' and 'social conditions' when describing the social and material environment in which children are growing up. Our report follows this convention.

Studies of lifecourse influences

Studying the links between childhood conditions and adult health requires information across people's lives. Researchers have collected this information in a variety of (often ingenious) ways. Studies of adults have collected retrospective data on socio-economic circumstances earlier in life; records on children's weight, size and health at birth have been linked to disease and death records in adulthood; and children recruited to health surveys in the 1930s have been traced and followed up in adulthood.

But a major source of information on the links between childhood disadvantage and adult health is the birth cohort studies. These studies collect information on the social conditions and health experiences of children born around the same time, from (before) birth and at regular intervals across their lives. Internationally, there are an increasing number of these studies. Within the UK, key examples include the national studies of children born in 1946, 1958 and 1970. The Avon Longitudinal Study of Parents and Children (ALSPAC) study, which is following children born in 1991/92; and the national millennium cohort, following children born in 2000, are set to further enhance our understanding of how circumstances in early life shape health in adulthood.

While the birth cohort studies stand out for the quality of the information they provide on childhood health and conditions, they share a number of features with other studies. Three are particularly relevant to understanding the links between childhood disadvantage and adult health.

First, the UK studies with information on childhood circumstances and adult health are predominantly studies of the white population. The 1946, 1958 and 1970 birth cohort studies were established when Asian and African-Caribbean families made up a small proportion of the population. Like other longitudinal data, they provide important insights into how childhood disadvantage patterns social position and health in adulthood among white children. What they do not capture, however, are the circumstances and experiences of Asian and black children. This means that the studies cannot shed light on how childhood poverty affects – in similar and different ways – the health and life chances of children with different cultural backgrounds and ethnic identities. Nor can they track how exposure to, or protection from, racism mediates the effects of childhood poverty on health in adult life.

Second, the birth cohort studies, like other surveys, collect information on individuals and the families they live in. This

information enables researchers to identify the individual and family factors related to health in adulthood. But this focus gives less of a handle on the role of the broader social environment in determining the conditions in which children grow up. As a result, surveys may underestimate the role of the peer group, the mass media, the school, and other welfare agencies involved in children's care and development. Parents' socio-economic position predicts the cognitive development and school performance of their children, and cognition and education are seen as important mechanisms linking family background to health in adulthood – but the poorer cognitive and school performance of poor children may reflect, at least in part, the fact that poor parents are constrained to live in neighbourhoods that offer few resources for child development, and to send their children to schools that offer a poor-quality education. In other words, the learning environment of the area and school, as well as learning experiences at home, may be important links in the chain running between family background and health in adulthood. We return to this point when discussing gaps in the evidence base for policy (section 5).

Third, almost all the evidence for the effects of childhood conditions on adult health comes from quantitative studies. In these studies the emphasis is on 'risk factors' which 'predict' and 'increase the odds of' poor health, an emphasis which can cast the individual as passive and powerless in the face of the processes that shape their lives. Outcomes that are statistically predicted are, of course, not copper-bottomed certainties; high odds do not mean an outcome is inevitable, but only that individuals in one group are more likely to experience that outcome than those in another group.

Further, the information provided by quantitative studies, while very detailed, is necessarily restricted to 'indicator' variables: measures of exposures and outcomes designed by researchers, rather than accounts provided by children and their parents. Qualitative studies that record children's and parent's experiences directly can provide deeper and richer understanding of how privilege and disadvantage affect people's lives. Qualitative studies can also highlight how parents and children, on their own and as part of the communities in which they live, are actively engaged in mediating the impact of factors that compromise their health – in countering discrimination, in resisting their disadvantaged social positions, in buffering the effects of adverse social and material environments, and in developing lifestyles that express and affirm positive identities.

3 Childhood disadvantage and adult health – building up our understanding

Introduction

This section surveys the evidence that informs the lifecourse framework presented in section 4. It draws on, rather than duplicates, the research reviews that have already been undertaken. Here we introduce only some of the evidence, to provide an indication of how research is shedding light on the links between circumstances in early life and health in adulthood. The section begins by noting these links, before turning to consider the mechanisms that may underlie them.

Links between childhood disadvantage and poor health

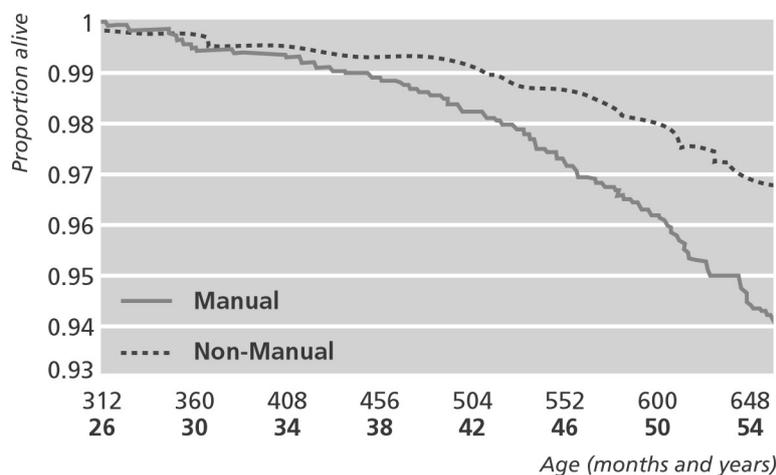
There is considerable evidence that poor circumstances in early life ‘cast long shadows forward’ over future health. Before birth, poverty can take its toll through poor foetal nutrition, affecting foetal development in ways that leave an inbuilt vulnerability to a range of diseases in later life (Barker, 1998). The circumstances into which children are conceived and born also affect their chances of dying in the first year of life, with marked socio-economic gradients in

infant mortality. The children of parents in manual groups are more likely to experience serious childhood illness and disability than children in non-manual families – and children who experience illness and disability in childhood face higher rates of ill health and disability in adulthood. There are also socio-economic gradients in childhood mortality (ages 1–15), with deaths from injuries revealing particularly sharp socio-economic differentials.

The association between early circumstances and subsequent health is not confined to infancy and childhood. Early circumstances are also associated with health in adulthood. Figure 2 plots the survival of children in the 1946 birth cohort study, from the age of 26 (when almost all children from manual and non-manual backgrounds were still alive) to age 54. It captures the marked socio-economic differentials in survival, with death rates among women and men born into manual households double those of women and men growing up in non-manual households. This increased risk of death remains after taking account of their adult socio-economic position (Kuh *et al.*, 2002).

The same pattern is apparent for specific causes of death,

Figure 2 Cumulative death rates age 26–54, by father’s social class at birth, among men and women in the 1946 birth cohort study. Source: Kuh *et al.*, 2002.



with poor childhood circumstances increasing the risk of early death from diseases such as coronary heart disease and respiratory disease (Davey Smith *et al.*, 1998). The impact of childhood disadvantage is particularly marked in the case of death from stroke and stomach cancer (Davey Smith *et al.*, 2001). Looking beyond adult mortality, there is evidence that socio-economic conditions in childhood are also related to some dimensions of adult health. This has been found for some physical health outcomes (eg body mass index, obesity, periodontal disease and tooth decay); for cognitive function; and for some dimensions of mental health (Poulton *et al.*, 2002; Kuh *et al.*, 2004). In all these examples, the association between childhood circumstances and adult health remains after account is taken of adult socio-economic position.

Taken together, the evidence points to a link between childhood circumstances and adult health. Evidence of this link does not mean that adult socio-economic circumstances are not also very important – particularly so for some health outcomes and some causes of death, such as lung and other cancers, and for deaths from accidents and violence. Further, evidence of an association does not explain how childhood circumstances might exert their influence – it does not reveal the mechanisms through which childhood disadvantage might take its toll on adult health.

How might childhood circumstances influence adult health?

Figure 3 provides a first-stage framework for understanding how conditions early in life may exert their influence on health in adulthood. The cornerstones of the framework are childhood circumstances and adult health, with childhood interpreted broadly to include conditions acting on a child from the point of conception. Health during childhood and social circumstances in adulthood are added to these cornerstones. There is a range of mechanisms which could potentially run between childhood circumstances, childhood health and adult circumstances, and adult health. There is evidence for most of these mechanisms, at least for some dimensions of adult health. But there is particularly consistent evidence for two sets of pathways.

First, there is evidence that socio-economic circumstances across childhood influence adult health through their effect on circumstances in adulthood (Figure 4A). Second, children's circumstances shape the development of health and other personal resources in childhood, with these resources laying the foundation for socio-economic position and for health in adulthood (Figure 4B). The pathways mapped out in Figure 4A and B are likely to overlap and work through each other. But separating them can be helpful in highlighting the

Figure 3 A first-stage framework

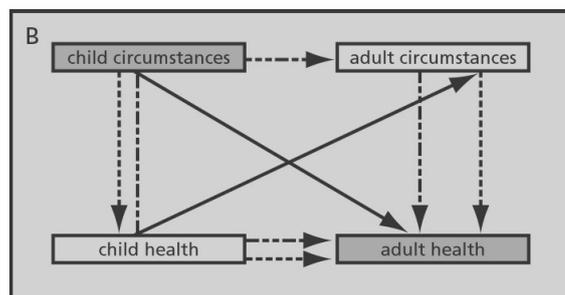
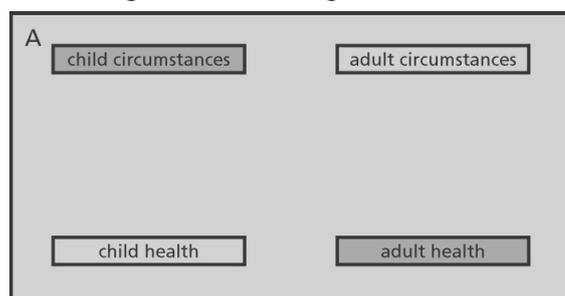
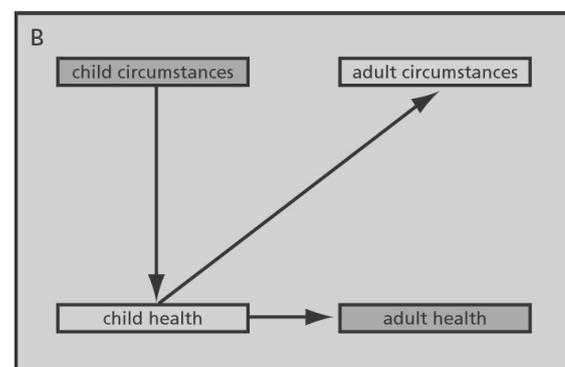
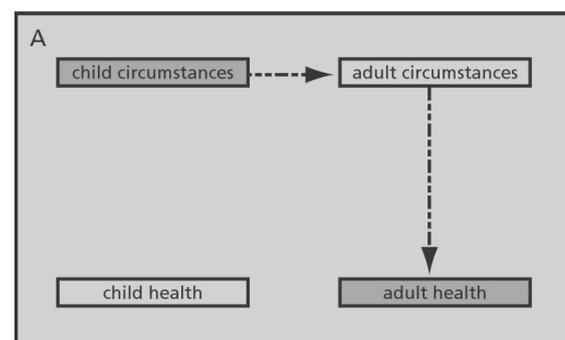


Figure 4 How poor circumstances may compromise adult health



processes involved. The following subsections look at the two sets of pathways in turn (pages 11–15, 15–17), and then together (pages 17–18).

Influence of childhood circumstances on adult circumstances

Childhood origins shape adult destinations. As a result, there are marked continuities in socio-economic circumstances across the lifecourse, with some people experiencing disadvantage (or advantage) both through their childhood and across their adult lives.

Table 3 Socio-economic circumstances in childhood and adulthood by social class at birth: children born in 1958

	Percentage by social class at birth							
	Male				Female			
	I/II	III _{nm}	III _m	IV/V	I/II	III _{nm}	III _m	IV/V
Age 11								
Household overcrowding*	15.4	28.5	41.8	55.6	14.6	29.8	41.9	55.1
Lacking/sharing amenities†	4.7	8.3	11.9	16.6	4.9	7.0	12.5	18.6
Free school meals (any child in family)	3.3	6.9	8.4	19.7	3.4	5.2	9.8	17.9
Adulthood								
Below average income at 23	11.6	10.4	13.9	20.9	15.0	15.0	20.5	24.0
Rented housing at 33	12.6	16.0	18.4	28.8	9.7	13.2	23.6	30.5
Redundancy between 23 and 33	14.1	16.8	22.2	25.5	8.5	9.6	10.9	12.9

*≥ one person per room.

† Bathroom, indoor toilet, hot water supply.

Source: Power and Matthews, 1997.

A privileged start in life increases one’s chances of achieving an advantaged socio-economic position in adult life. As illustrated in the 1958 cohort study, a boy whose father was in social class I or II was three times more likely to be social class I or II as an adult than a boy whose father had been a skilled manual worker. Conversely, a disadvantaged start in life increases the risk of continuing disadvantage. (See the Box on page 6 for an explanation of the social class schema.) Thus, in the 1958 study, children born into social classes IV and V were much more likely to grow up in overcrowded homes lacking household amenities than children born into families higher up the social class ladder (Table 3). Class-differentiated childhood circumstances were followed by class-differentiated adult circumstances: by the age of 33 there were steep gradients by social class at birth in employment status, housing tenure and income.

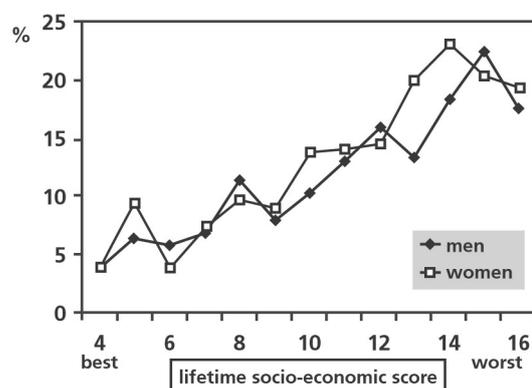
These continuities in socio-economic position – from parent to child, and from childhood to adulthood – are evident in more recent cohorts. These indicate that family background has become a more, not less, important influence on adult socio-economic position. New research from Britain also shows that there has been less intergenerational mobility in earnings in the 1970 birth cohort than in the 1958 cohort (Blanden *et al.*, 2003).

The continuities in disadvantage across the lifecourse have been identified as an important part of the relationship

between poor childhood circumstances and poor adult health (Figure 4A). A series of studies have found that ‘lifetime’ socio-economic position – socio-economic position across childhood and adulthood – is a stronger predictor of adult health than socio-economic position at any one point in time.

Findings from the 1958 birth cohort study illustrate this important finding. Information on socio-economic circumstances at four ages (birth, 16, 23 and 33) was used to produce a lifetime socio-economic score. The score ranged from 4 (in social class I or II at all four ages) to 16 (in social class IV or V at all four ages). As Figure 5 indicates, the proportion of the cohort in poor health at age 33 rose in line

Figure 5 Poor health at age 33 by socio-economic circumstances (0–33 years). Source: Power *et al.*, 1999



with duration of exposure to poor circumstances. Only 4% of women and men with the best lifetime circumstances had poor health at age 33, compared with 19% (women) and 18% (men) with the worst circumstances.

Both childhood and adult socio-economic circumstances are associated with other health outcomes, including all causes of mortality, and cardiovascular morbidity and mortality. Studies with measures of household income across the lifecourse have found that rates of physical disability, clinical depression and premature mortality increase in line with duration of exposure to poverty. Being born into poverty, and remaining in poverty into adulthood, confers the highest health risk (Brooks-Gunn and Duncan, 1997).

As these findings suggest, continuities in disadvantage are part of the reason why childhood disadvantage anticipates poor health in adulthood. Research is also shedding light on why disadvantage runs across life and between generations. It suggests that an important part is played by the trajectories children follow as they grow up – the educational trajectories and associated social trajectories along which children steer their way to adulthood. These educational and social routes into adulthood are experienced together, one providing the context for the other.

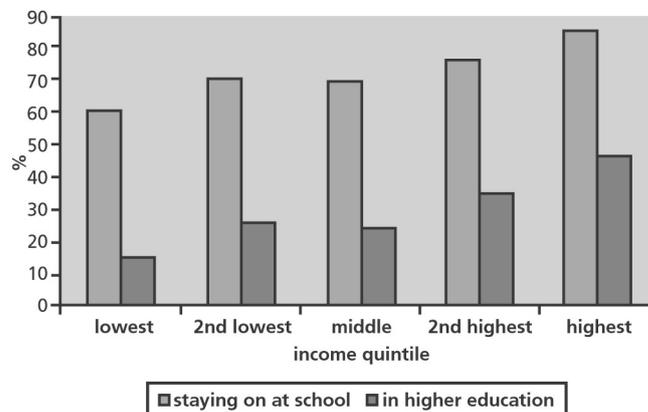
Educational trajectories

Experiences at school are important in the transmission of advantage and disadvantage across the generations. This is because how well children do at school affects their chances of employment, and of employment in an occupation which offers the prospect of a fulfilling and well paid career. Changes in the labour market are increasing the 'education premium'. Both skilled manual jobs secured through apprenticeships, and unskilled manual jobs that require few pre-entry skills, are in decline, and the growing service sectors of the economy are generating skilled, non-manual jobs which are hard to access for those without educational qualifications.

The influence of parental background on a child's school performance and educational attainment was evident in the 1950s and 1960s. It has endured, despite changes to the education system designed to support the upward social mobility of children from poorer backgrounds. In the 1970 birth cohort, 90% of children born to fathers in professional occupations stayed on at school beyond 16, and two-thirds went on to attain a university degree. Among children born into unskilled manual families, less than half stayed on at school and, 10 years later, only 4% had gained a degree (Bynner and Parsons, 1997).

Figure 6 Educational profiles of children by income quintile: proportion at school at age 17–18, and in higher education at age 19, Britain, 1999.

Source: Machin, 2003.



There is evidence that recent educational reforms, in particular the introduction of GCSEs in 1988, have had a major, positive effect on the proportion of poorer children staying on at school, with the proportion among children in the lowest income quintile rising from under 30% in 1979 to over 60% in 1999 (Machin, 2003). The rise in numbers staying on has narrowed the gap between children from poorer and richer families. But the improvement in the proportion of poorer children staying on has yet to be matched by a similar increase in their participation in higher education. The proportion of children of higher-income parents going on to college and university increased steadily between the late 1970s and the late 1990s, from 27 to 46% of 19 year olds. Across the same period, the proportion of children of poor parents (in the lowest-income quintile) in higher education rose from under 10 to 15% (Machin, 2003). The educational profile of children from richer and poorer families is given in Figure 6.

It is not only the home environment that influences children's educational trajectory – schools are also important. Children who go to schools with poor attendance records and low educational standards have poorer attendance records, and are more likely to leave school without qualifications. The evidence from educational interventions suggests that teachers' expectations of disadvantaged children, and their support for, and investment in, their education, is critical to breaking the transmission process (Rutter, 1989; Schweinhart *et al.*, 1993; Duncan and Brooks-Gunn, 1997).

But, while education is part of the link between childhood disadvantage and adult disadvantage, growing up in poverty is an important transmission mechanism, over and above the difficulties it places in the way of a child doing well at school (Gregg *et al.*, 1999). This finding has important

policy implications. It suggests that interventions which seek to improve the educational progress of children in poverty are, on their own, unlikely to break the link between poor childhood and adult circumstances – they need to be embedded in policies that tackle childhood poverty head-on.

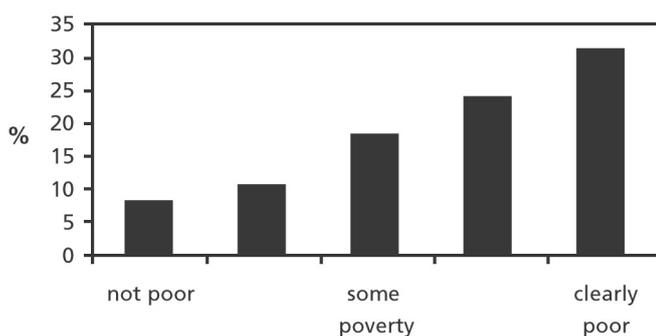
Other structures of inequality also mediate the influence of education on adult circumstances. Within ethnic groups, adults with a degree are less likely to be poor than those without. But education confers greater economic benefits to some ethnic groups than others, with white people advantaged relative to African-Caribbean and south Asian groups. The contrast between white, and Pakistani and Bangladeshi, adults is particularly stark. A Bangladeshi with a degree has the same risk of poverty as a white person with no qualifications (Berthoud, 1998).

Social trajectories

Growing up without the social and educational opportunities that children from better-off families can take for granted, children from poorer families are more likely to invest in identities which do not depend on doing well at school. Identities validated by friends and family offer alternative sources of self-affirmation, including sexual relationships, which lead to early cohabitation and parenthood (young women), and engagement in law-breaking and criminal activity (young men). These experiences place additional obstacles in the way of securing the educational qualifications and employment record on which adult socio-economic position is built.

Figure 7 provides one illustration of how childhood disadvantage influences the transition to adulthood, charting the relationship between childhood poverty and early motherhood. Based on the 1958 birth cohort study, it groups women according to their experience of poverty

Figure 7 Proportion of women having their first baby by the age of 20, according to level of poverty in childhood. Source: Hobcraft and Kiernan, 1999.



in childhood, on a scale ranging from 'not poor' to 'clearly poor'. As the figure indicates, the greater the level of poverty experienced during childhood, the more likely a woman was to make an early transition into motherhood.

Building on these analyses, recent research on the 1958 cohort study suggests that the effects of childhood disadvantage are stronger for women than men. While poor educational performance plays a key role in the continuity of disadvantage for both young men and young women, the link between childhood disadvantage and early motherhood leaves women from poorer backgrounds additionally vulnerable (Hobcraft, 2003). As this suggests, gender influences the pathways from childhood disadvantage to adult disadvantage.

Educational and associated social trajectories

Making a distinction between educational and social trajectories is somewhat artificial, as each describes different dimensions of young people's experiences as they make the journey from childhood to adulthood. A focus on one point in this journey can help to bring the two dimensions together.

The years between 16 and 18 mark a crucial staging post on the road to adulthood. Young people who are outside the education system and the labour market for extended periods during this time are particularly vulnerable to continuing disadvantage in adulthood. 'Not in education, employment or training' (NEET) has been coined as the term to describe this vulnerable position. Analyses of the 1970 birth cohort study indicate that NEET status is the result of childhood disadvantage (measured by material circumstances, parental education and parental attitudes to education) and negative school experiences (no qualifications). By the age of 21, young NEET men and women are much more likely to be on pathways to continuing disadvantage than their peers who were in continuous education, employment or training between 16 and 18 (Bynner and Parsons, 2002).

As Table 4 indicates, NEET young people are much more likely to have become parents in their teenage years than their contemporaries who are in education, training or employment. Among the women, over one-third have two or more children by the age of 21. Employment trajectories also diverge, with the NEET group much less likely to be in the labour market – women working full time as home carers and men being at risk of unemployment. Among men, the NEET group were also much more likely to report that a criminal record was limiting their chances of education/employment.

Table 4 Outcomes at age 21 of education, employment and training (EET) status at ages 16–18

Outcome	Men (%)		Women (%)	
	NEET	EET	NEET	EET
Employment				
Unemployed at age 21	44	11	8	4
Full-time home care at age 21	–	–	57	11
Believe criminal record affects education/employment opportunities	13	2	3	–
Family situation				
Teenage parent	16	9	60	5
Two or more children at age 21	3	2	37	5
Health				
Poor/fair health	16	11	26	14
Long-term illness	3	15	27	16

Source: taken from *Young People not in Employment, Education or Training and Social Exclusion*, Report to Social Exclusion Unit (1999). Figures published in Social Exclusion Unit (1999). For more advanced analysis of these results, see Bynner and Parsons (2002).

Influence of childhood circumstances on developmental health and health behaviour

Figure 4A suggests that childhood circumstances influence adult circumstances, and that continuities in socio-economic circumstances underlie the link between childhood conditions and adult health.

Figure 4B presents an alternative pathway. It rests on a multi-dimensional understanding of child health as a developmental process that embraces physical, emotional and cognitive development. It highlights the role that developmental health plays in influencing both adult socio-economic position and adult health. In essence, Figure 4B suggests that a child's social background shapes the development of health and other personal resources which underpin adult social position and also adult health. Childhood advantage gives children more chances to maximise opportunities for physical, emotional and cognitive development, and to develop health-promoting behaviours, building blocks on which they can construct rewarding careers and enjoy health and wellbeing in adulthood. Growing up in poor circumstances constrains the development of a child's resources – emotional as well as physical, cognitive as well as behavioural – needed for high living standards and good health in later life.

Evidence comes from a wide range of research fields, including foetal epidemiology and child psychology and development. Together, the evidence highlights how, in the UK's rapidly changing labour market, children need to be

equipped with a spectrum of capacities and competences. Examples of the evidence emerging from this body of research are given below.

Physical health

Research on pre- and post-natal growth is deepening our understanding of how childhood disadvantage takes its toll on adult health by compromising physical health early in life. This research suggests that social disadvantage becomes – literally – embodied in the growing child. An influential set of studies suggests that the process starts from the moment of conception, and maybe before conception, in the mother's earlier life. The suggested pathway runs through the mother's nutritional status before and during pregnancy, with poor maternal nutrition resulting in undernutrition of the developing foetus. Adaptations to undernutrition are thought to induce permanent changes in the structure, physiology and metabolism of the child *in utero*. These changes help survival in the short term, but leave the infant undernourished and underweight at birth, and vulnerable to a range of diseases in adult life (Barker, 1998). Supporting this hypothesis, low birth weight, the key indicator of a child's health status at birth, has been found to increase the risk of cardiovascular disease in middle age, a risk that remains after taking account of childhood circumstances. Recent studies have found that the combination of poor foetal growth and high body mass index in childhood is particularly important in increasing the risk of coronary death in adult life.

Research on childhood height and obesity adds further evidence that childhood circumstances may affect adult health through their impact on children's physical development. Children from less advantaged backgrounds grow more slowly and are shorter, on average, than children born to parents in advantaged circumstances. Childhood height, in turn, is associated with adult cardiovascular mortality and pulse pressure, independent of later socio-economic circumstances and adult risk factors. The relationship with adult cardiovascular mortality is stronger when leg length, rather than height, is used. Leg length is known to reflect early nutritional intake, and possibly infection, especially in the first two years of life. Longitudinal studies also show that poor childhood circumstances increase the risk of fatness in adulthood, which in turn is associated with an increased health burden in adult life.

Emotional health

Children growing up in disadvantaged circumstances face a range of stresses and challenges, both material and social, that children from more affluent backgrounds can avoid. They are more likely to grow up in families with major financial worries, and to experience major family change (eg parental separation and divorce). These stresses and challenges can take a toll on their emotional wellbeing, children from poorer families often having elevated rates of emotional and behavioural problems (eg finding it hard to be self-confident, to concentrate, and to contain anxiety and aggression) (Hertzman *et al.*, 2002).

Figure 8 captures the gradient in social and emotional adjustment in childhood in the 1958 cohort study, as

Figure 8 Rates of poor social/emotional adjustment, by father's social class at birth.

Source: Power and Matthews, 1997.

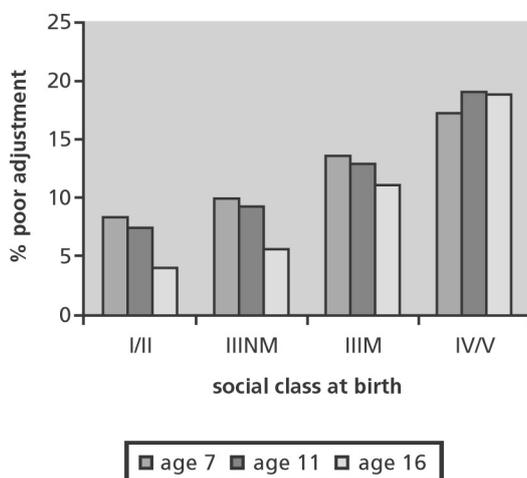
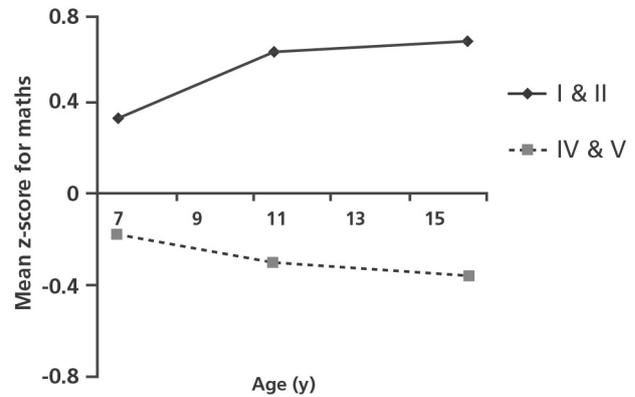


Figure 9 Mean z scores* for maths from ages 7–16 by social class at birth. Source: Jefferis *et al.*, 2002.



Class IV & V includes children with no male head. Analysis excludes low birth weight children.

*z scores allow comparisons across the three ages (7, 11, 16 years).

For each age a z score of 0 is the average for that age. So a child with a score of 0 on each occasion is about average relative to other children. An increasing z score with age signals improvement in relative achievement.

assessed by standard measures (Bristol social adjustment scale at ages 7 and 11; Rutter behavioural scale at age 16). It points to marked socio-economic gradients in social and emotional adjustment across childhood, with no evidence that the gradients narrow as children get older.

Cognition

Family background has a strong influence on cognitive development, with children from non-manual families achieving higher scores on cognitive tests than those from manual families. These socio-economic differentials in cognition, evident from when measures can first be reliably taken at around age 2, increase as children grow older. Figure 9 maps these differentials from ages 7–16 in children in the 1958 birth cohort. It points to ways in which the cognitive trajectories of children from more and less advantaged backgrounds diverge as children move through primary and secondary education.

Health behaviours

Research highlighting the developmental character of child health has focused primarily on physical, cognitive and socio-emotional development. This developmental perspective also sheds light on childhood health behaviours.

Childhood is a formative stage for the development of health behaviours which play an important role in adult health. Adolescence, in particular, is a period when social identities are in a process of experimentation and change, particularly with respect to behaviours such as cigarette smoking, alcohol

use, dietary habits and physical activity. For the majority white population there is evidence that poor childhood circumstances are linked to higher rates of childhood smoking. The Health Survey for England (Prescott-Clarke and Primatesta, 1999) found evidence of a socio-economic gradient in cotinine among children aged 4–15 (a saliva cotinine level of 15 ng/ml and above is taken as indicative of smoking). As Figure 10 indicates, the gradient is more marked among young people aged 16–24.

Children from poorer backgrounds also have poorer diets, as measured by the consumption of less health-promoting food (higher consumption of confectionery, soft drinks and crisps; lower intake of fruit, vegetables and fibre) (Batty and Leon, 2002). However, parental socio-economic position has not been found to be consistently related to either exercise or alcohol consumption.

Longitudinal studies provide the opportunity to examine how far health behaviours ‘track’ (remain stable) over time. The evidence is clear for cigarette smoking: children who are not smoking regularly in their teens are unlikely to smoke in adult life, while those who take up smoking when they are young, and smoke more heavily, are likely to continue into middle age. Alcohol use and diet in adolescence do not track as strongly into adulthood as cigarette smoking.

Influence of childhood circumstances on developmental health and adolescent trajectories

Viewing child health in developmental terms makes it clear that the two pathways identified in Figure 4 run in tandem. Important to the links between childhood circumstances,

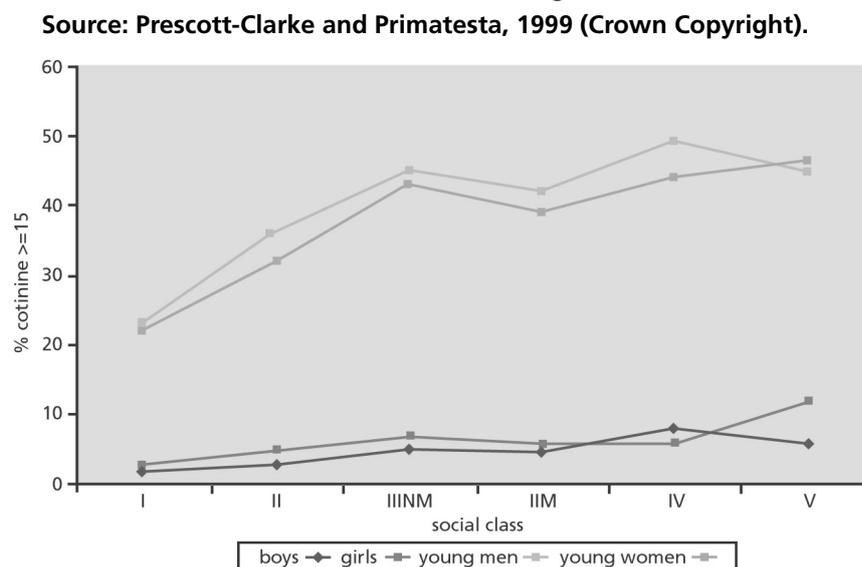
adult circumstances and adult health (Figure 4A) are children’s educational and associated social trajectories. Underlying the links between children’s circumstances and children’s health, and their future circumstances and health (Figure 4B), are children’s developmental trajectories.

As societies change, the key trajectories and the blend of developmental resources that determine adult position are also likely to change. In the 19th and early 20th centuries manual work was the major source of income, and the development of physical health (‘a good constitution’) was a prerequisite for young men and women from working class backgrounds if they were to avoid destitution in their adult lives. Today, education holds the key to employment, and cognitive development has an important role in the pathway from early circumstances to adult health status.

The contemporary pathway has been characterised as follows (Power and Hertzman, 2004).

- Circumstances in the early years of life influence readiness for school (the cognitive, social and behavioural skills children need to ‘hit the ground running’ when they first go to school). Having these skills is important because children who are not ready for school are more likely to experience low expectations of teachers, to lose confidence and find it hard to make friends, and to face repeated academic failure.
- Readiness for school has consequences for success at school, for school attendance, and for educational performance. There is evidence that inequalities in educational and psychological resources emerge very early in life, and do not reduce in adolescence.

Figure 10 Proportion of children (aged 4–15) and young people (aged 16–24) with cotinine levels ≥ 15 ng/ml by social class of head of household, England, 1995–97.

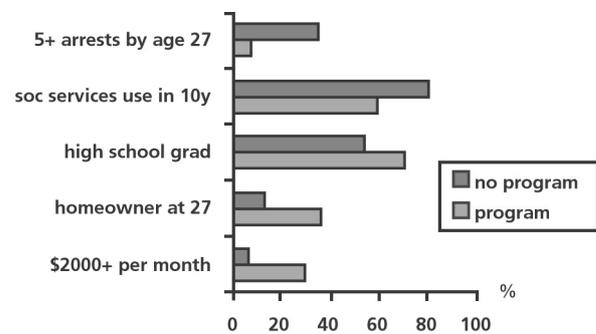


- School attendance and performance influence educational achievement. Both home characteristics (material circumstances, parental involvement with and aspirations for their children) and school characteristics are important, but their relative importance change as a child grows up. In adolescence, family influences become less important, and social contexts beyond the family become more so.
- Feeling disengaged with and unsupported by school plays a role in the development of health-damaging behaviours such as cigarette smoking, and the development of sources of identity based around peer relationships and youth culture. While important psychologically, these identities can result in behaviours such as non-attendance and law-breaking, which further damage educational prospects. Early parenthood, too, can be an important source of identity, but one that makes it harder to stay on at school and gain qualifications.
- Leaving school and not going onto either education, training or employment leaves young people vulnerable to unemployment, with paid work restricted to unskilled and semi-skilled jobs. These jobs are characterised by low pay and job insecurity, which may bring further health costs in terms of higher rates of sickness absence, disability and coronary heart disease. The environment of home and neighbourhood can place further strains on physical and mental health.
- In consequence, poor adult circumstances take an additional toll on health, in part because they are implicated in the maintenance of health behaviours linked to chronic diseases, such as coronary heart disease and cancer, which underlie inequalities in health in adult life. Adult social circumstances have been found to be more important than childhood conditions in predicting adult health behaviours like diet, exercise and smoking.

It is important to note that this sequence is not inevitable, enveloping all children who face social and material disadvantage in their early lives. As the evidence from intervention studies indicates, chains of risk can be broken. The High/Scope Perry Preschool project (Schweinhart *et al.*, 1993), which began in the USA in the 1960s and enrolled black children living in poverty, provides an example.

The High/Scope Perry Preschool project was based on an active-learning programme of classroom and home-visit activities, which engendered 'dispositions in children which enabled them to achieve greater success as they begin school' (Schweinhart *et al.*, 1993). Figure 11 captures its effects on educational trajectories (graduation from high school); on criminal careers (five or more arrests by the age of 27); and on adult social circumstances (monthly earnings of

Figure 11 High/Scope Perry Preschool Project – major findings at age 27. Source: Schweinhart *et al.*, 1993.



US\$2000 or more at age 27, a home-owner at age 27, and receipt of social services in the past 10 years). However, it is important to bear in mind that, although the achievements of the children on the programme are impressive, they do not match those of children from better-off homes with no preschool intervention programme. As this suggests, a more comprehensive policy programme is needed to reduce socio-economic inequalities in children's life chances.

4 Childhood disadvantage and adult health: a lifecourse framework

The framework

It is clear that conditions early in life have long-term effects on adult health. Because of this, inequalities in children's socio-economic circumstances make an important contribution to inequalities in health in adulthood. Exactly how much of the socio-economic gradient in adult health is explained by inequalities in childhood circumstances is not known.

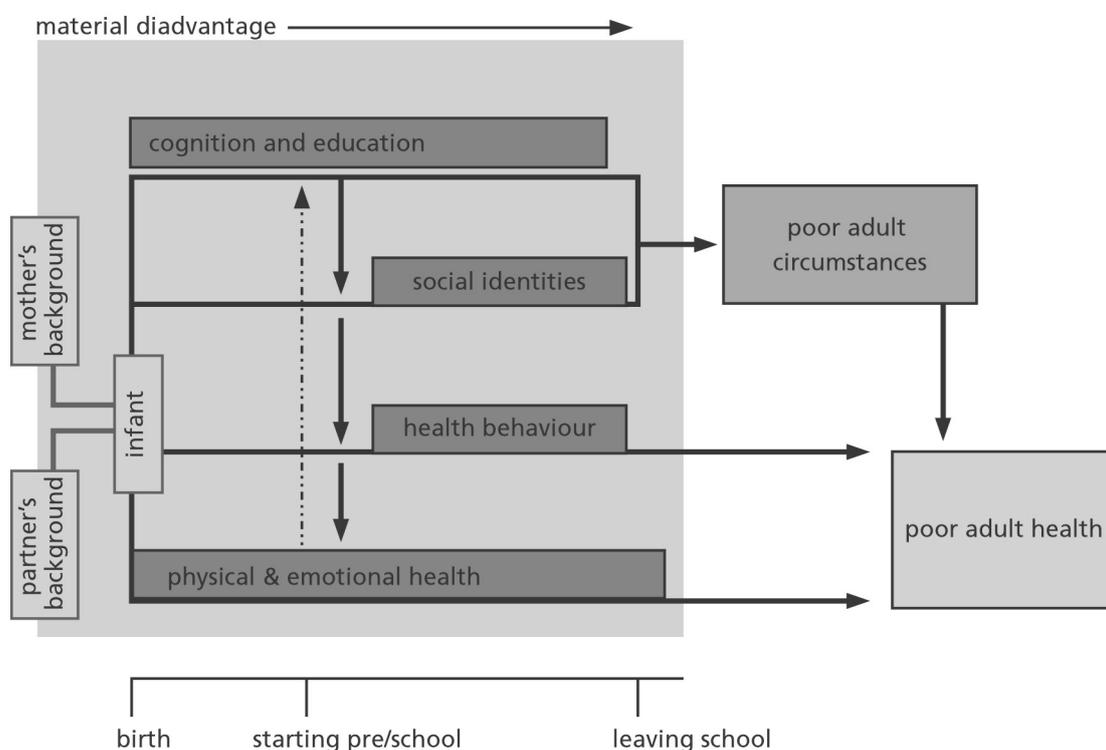
Figure 12 draws on the evidence set out in section 3 to build a framework that links childhood disadvantage to adult health. It is similar to – but less elaborate than – the models

developed by other researchers. This point needs to be emphasised: the framework is a simplified version of models which are already schematic representations of much more complex processes. But our framework both includes the core constituents of these more complex models, and signals the underlying relations between them.

Features of the framework

The lifecourse framework puts the focus on childhood disadvantage, from before birth and throughout childhood (large box). The pathways running from childhood circumstances to adult circumstances and adult health are set

Figure 12 Lifecourse framework linking childhood disadvantage to poor adult health



in this context. Four pathways are highlighted. They include the development of physical and emotional health, and the development of health behaviours. But they also range across cognitive development and educational progress, and investment in social identities such as becoming a parent in adolescence/early adulthood. The framework identifies these four dimensions as central to the link between childhood disadvantage and poor adult health.

Other points about the framework:

- Childhood disadvantage is represented as stemming from parental disadvantage (from the disadvantages experienced by the mother and her partner) – inter-generational disadvantage is therefore an inherent part of childhood disadvantage
- Childhood disadvantage is represented not as an input or event operating at one point in childhood, but as the enduring context in which the child is conceived, is born and grows up
- Physical and emotional health in childhood, together with health behaviour, are seen to directly affect health in adulthood. Child health also influences opportunities for cognitive development and educational progress
- The influence of cognitive development and educational performance, together with the identities through which young people negotiate their transition to adulthood, is seen as a more indirect pathway. These dimensions are represented as shaping socio-economic circumstances in adulthood – circumstances which, in turn, have a major influence on adult health
- What begins in the model with inter-generational disadvantage therefore ends in intra-generational disadvantage, with continuities in disadvantage both from parent to child, and from childhood to adulthood
- The framework does not provide a complete explanation of lifecourse influences on adult health because adult circumstances – through early and mid-adulthood and into old age – also shape adult health. Inequalities in adult circumstances therefore play a powerful role in inequalities in adult health.

The framework focuses on children born into disadvantaged circumstances. But it can be used to highlight the contrasting fortunes of children born into poorer and better-off families. Children of parents with advantaged backgrounds are likely to start off life in good health. Their parents can provide them with the childhood experiences that promote their continuing physical and emotional development. They can set them on a course that enables them to accumulate the resources – cognitive, educational, social, behavioural

– needed to navigate their way successfully through the education system and into the labour market. As part of this process, children of advantaged parents are likely to defer cohabitation and parenthood, and to avoid hazardous health behaviours such as becoming regular smokers. The advantages they enjoy as adults further benefit their health and provide the opportunity to maintain health-promoting lifestyles.

Mapping policies and policy impacts

Assessing the contribution of policies to breaking the link between childhood disadvantage and poor adult health is a complex process. It takes time for the effects of policies to become evident, by which point other factors may have intervened to alter the direction and scale of change.

Our lifecourse framework provides a way of conceptualising this complex process. It does so by breaking down the link between childhood disadvantage and adult health into its constituent elements – parental disadvantage and poor childhood circumstances; a set of interlocking child-to-adult pathways; and poor circumstances and poor health in adulthood. This means that Figure 12 can also be used as a framework for mapping policies, for identifying which policies are tackling disadvantage at each point in the sequence:

- In the current and rising generation of parents
- In the material and social conditions of poor children
- In their developmental health (physical, emotional, cognitive) and health behaviour
- In their educational and social trajectories
- In their adult lives
- In their adult health.

Both mainstream policies (relating to social security, employment, social housing, education, healthcare, etc) and new programmes (welfare-to-work and teenage pregnancy programmes, regeneration and new deal for community programmes, Sure Start, health action zones, etc) are likely to be included in the 'policy map'. These policies and programmes can be seen to act on the sequence of interlocking and intermediary outcomes that link childhood disadvantage to poor adult health. For example, the appropriate outcome against which to assess policies designed to improve the material and social conditions for poor children, like the working families' tax credit or the welfare to work programme for lone mothers, would be an improvement in children's standard of living: in their material living conditions and their opportunities to enjoy

the kind of positive experiences that other children take for granted. Positive impacts on other outcomes – on children's developmental health and health behaviour, their educational and social trajectories, and their health in adulthood – are clearly important, but these would be regarded as secondary and additional criteria against which the policy would be assessed.

Using this approach, it would be possible to envisage policy assessments focusing on particular links in the chain of risks running from childhood disadvantage to poor adult health. These link-specific assessments could build towards an overarching review of how, and how effectively, policies were improving the health chances of poor children and tackling the wider socio-economic inequalities in health.

5 Conclusions and implications for improving the evidence base for policy

Implications for improving the evidence base for policy

Undertaking this work has highlighted a range of gaps in the evidence base. Many of these are already widely recognised. We highlight the need for:

- Evaluations of the effects of interventions to reduce poverty on children's social and material circumstances, developmental health and social trajectories
- Reviews of (and primary research on) the social and material circumstances, developmental health and social trajectories of children in groups vulnerable to poverty, in particular children in young and lone-mother households, and African-Caribbean, Pakistani and Bangladeshi households
- Broader reviews of (and primary research on) the social and material circumstances, developmental health and social trajectories of African-Caribbean and Asian children
- Reviews of (and primary research on) how mainstream welfare agencies influence the developmental health of poor children
- Development of research designs to map the effects of welfare policies on childhood disadvantage and adult health
- A policy mapping exercise to identify where and how policies address the links between childhood disadvantage and poor health in adulthood.

We recommend that the evaluations and reviews are based on studies in the UK and in countries with similar welfare systems (including the Nordic countries) because their conclusions need to be relevant to the UK policy context.

Section 4 has already considered the last suggested priority, to map policies onto the lifecourse framework. This 'policy map' would inform the development of research designs to monitor policy impacts.

Below we look in more detail at two specific gaps in the evidence base, relating to how mainstream welfare agencies influence the developmental health of poor children; and to the circumstances and developmental health of African-Caribbean and Asian children. We also consider the development of research designs through which to monitor policy impacts.

Two specific gaps

Improving the evidence base on how mainstream welfare agencies influence the developmental health of poor children

Working through mainstream services is one of the underlying principles of the government's Programme for Action on Tackling Health Inequalities (Department of Health, 2003). Improving the evidence base on how mainstream welfare agencies influence the developmental health of poor children is important for three related reasons.

- First, most of the evidence that informs current policies derives from studies highlighting the role of families in shaping the developmental health of children. Research on the role of statutory agencies is much less well represented in the policy evidence base.
- Second, mainstream welfare agencies – social security, education, health, social services, criminal justice – are actively engaged in the processes through which childhood disadvantage exerts its influence on adult health. The material circumstances in which poor children live are powerfully determined by welfare institutions, eg half the UK's poor children live in households on income support, and the majority live in social housing. The developmental pathways that poor children follow are also shaped by publicly funded welfare services. For example, their physical and cognitive development is

supported and monitored via the maternal and child health services, by preschool and school-age education, by the social and youth services and by the wider network of community development and health promotion services. This suggests that improved understanding of the impact of statutory welfare services on the material circumstances and developmental health of poor children should be a priority. In particular, those designing, delivering and monitoring policies should be clear about where and how welfare agencies can make a positive contribution to the conditions and developmental health of poor children – and about where these services have negative effects.

- Third, being clear about the impact of existing policies is important when designing and evaluating new policies to break the transmission of disadvantage and poor health across the lifecourse and between generations. These new policies are seen as central to tackling childhood disadvantage and reducing health inequalities (Department of Health, 1999, 2002). The new policies combine reforms to mainstream policies (eg the introduction of the working families' tax credit into the social security system) and the introduction of new and targeted policies (eg Sure Start). The impact of these important reforms and programmes on childhood circumstances and on health inequalities will be mediated through existing policies. It is therefore possible that existing policies are reinforcing the disadvantaged pathways which the new interventions are trying to break. If this is so, positive effects of the interventions will be diluted and possibly neutralised. This suggests that an appreciation of the impact of mainstream services on the developmental health and social trajectories of children from poorer and more disadvantaged families, and of the impact of the school system in particular, provides an important baseline of evidence on which to build evaluations of the new initiatives.

Major strides could be made to enhance the evidence base by bringing together findings on the contribution of mainstream services to the material circumstances and developmental health of children from different socio-economic backgrounds. These findings are currently spread across research on poverty, health, education, social work and child protection, crime and youth (un)employment. An important feature of any review of this rich array of research would be to focus on the transmission of advantage, as well as disadvantage. An important seam of research is highlighting how parents, with the social confidence and cognitive skills that education brings, are able to provide their children with the forms of knowledge and types

of behaviour needed to fit in comfortably and perform well at school, while parents without these resources find it harder to equip their children for the dominant culture of school and society.

Improving the evidence base on the circumstances and developmental health of African-Caribbean and Asian children

The evidence base for policies to improve children's health and life chances is grounded in studies that capture experiences and outcomes in the majority white population. There is an urgent need to strengthen this evidence base by integrating research on the social and material circumstances, and developmental health, of African-Caribbean and Asian children in Britain.

An initial step would be to map and review studies that give insight into how children's circumstances influence the constituent pathways identified in the framework – how the circumstances in which African-Caribbean and Asian children grow up influence the development of their physical and emotional health, their cognitive skills and educational performance, their social identities and their health behaviours. While limited by the research available, such reviews should provide evidence on how the experience of socio-economic disadvantage and racial discrimination combine to restrict opportunities to develop resources in these key areas of developmental health. These reviews are likely to trawl widely for relevant research, and to include quantitative and qualitative studies, both in the community and of children's experiences of welfare agencies and the education system.

Integral to these initial reviews would be the task of identifying how the evidence base on childhood disadvantage and adult health, for children with different cultural backgrounds and ethnic identities, could be strengthened and maintained.

Conclusions

Our aim in this short piece of work is to provide a framework through which to understand how childhood circumstances are linked to health in adult life – and how, specifically, childhood disadvantage is linked to poor health in later life. The framework also sheds light on health inequalities. It suggests that inequalities in childhood circumstances, working particularly through inequalities in developmental health and social trajectories, make an important contribution to inequalities in adult health. But in focusing

on childhood, the framework does not take account of the powerful influences of adult circumstances on adult health – nor of how inequalities in adult circumstances contribute to inequalities in health in adulthood.

Highlighting key pathways linking poor childhood circumstances to poor adult health, the framework provides a tool for identifying where and how policies can contribute to improving the health prospects of poor children. It suggests that policies which work directly on these pathways, and on the social and material conditions in which they are embedded, should be a central part of strategies to improve the health prospects of poor children, and to address the wider socio-economic inequalities in health.

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