GROWING UP IN SCOTLAND:

Health inequalities in the early years

GUS

GROWING UP IN SCOTLAND

smarter
scotland
SCOTTISH GOVERNMENT

GROWING UP IN SCOTLAND:
Health inequalities in the early years

GROWING UP IN SCOTLAND:
Health inequalities in
the early years

Catherine Bromley* and Sarah Cunningham-Burley^

*Scottish Centre for Social Research
^Centre for Research on Families and Relationships, University of Edinburgh

Prepared for The Scottish Government: Children, Young People and Social Care
Directorate by the Scottish Centre for Social Research

ACKNOWLEDGEMENTS

Contents

This report uses data from the first four waves of the Growing Up in Scotland study (GUS) to explore health inequalities in the early years. The measures explored include health outcomes and risk factors for poor health spanning the time from the early stages of pregnancy until just before the children's fourth birthday.

This report aims to answer the following questions:

- What is the extent and character of health inequalities in the early years?

- What factors, if any, correlate with the avoidance of negative early health outcomes, among families from disadvantaged backgrounds?

This report starts by introducing the measures of health and risk factors for poor health, that are the focus of the analysis. It also introduces the socio-demographic factors used to explore the extent of inequalities in these health measures. It then illustrates the extent to which poor health outcomes and exposure to risk factors for poor health are associated with socio-demographic factors at different stages in the early years. The final stage of the analysis attempts to answer the second of the above questions by identifying factors that appear to be associated with positive outcomes for children from disadvantaged backgrounds.

Health inequalities in the early years

This chapter mapped out the extent of health inequalities in the early years. The analysis spanned the period from around the time of the children's birth to just before their fourth birthdays. A wide range of measures were used to illustrate inequalities in outcomes such as the children's birth weight, their experience of long-term health problems, accidents, poor psychosocial health and wider developmental problems. It also looked at a range of risk factors for poor health which included maternal smoking, maternal health, children's physical activity levels and their diet (including breastfeeding). All these outcomes and risk factors were explored in relation to area deprivation, household income, and household socio-economic classification. It showed that:

- Exposure to the kinds of risks that can impact on health and development in the early years, and have been shown in the wider literature to have implications for later life, are not uniformly or randomly distributed across the population at this very early point in life. Significant inequalities exist with those in the most deprived areas, the lowest income households or routine and semi-routine households found to have worse health outcomes, and higher exposures to risks for poor outcomes, than their more advantaged counterparts.

- Although overall levels of outcomes such as long-term health conditions and poor general health are relatively low in the early years, and appear not to change much each year, this analysis shows that there is in fact quite a high degree of individual-level change in health outcomes in this period. However, this would not necessarily be evident in an analysis that compared a different group of children over time without being able to explore individual pathways in the way that GUS permits.

- While the persistence of poor outcomes was quite variable, exposure to risks such as smoking and poor maternal health were somewhat more stable. For example, of those children whose mothers smoked at some point in their early years, most were exposed to this on a prolonged rather than temporary basis.

- Across all the outcomes and risk factors explored, inequalities in exposure to risk factors were generally larger than those evident for outcomes. However, within the outcomes explored, behavioural, psychosocial and linguistic problems showed much starker inequalities than physical ones such as poor general health.

- The more disadvantaged households can be said to face a double burden in their experience of health inequalities as both the children and adults within them are at greater risk of negative outcomes.

Factors associated with avoiding negative outcomes among disadvantaged children

The analysis in this chapter explored the factors associated with avoiding negative outcomes among disadvantaged children with a particular focus on the concept of resilience. Resilience has been defined as *"the process of withstanding the negative effects of risk exposure, demonstrating positive adjustment in the face of adversity or trauma, and beating the odds associated with risks"* (Bartley, 2006). The kinds of factors that have been thought to help children at high risk of negative outcomes to avoid them are wide ranging. This chapter explored a range of possible factors including: maternal, family and household characteristics and behaviours; neighbourhood characteristics; and social support networks.

The extent to which these measures were associated with negative outcomes was explored for all children in the first instance.

The key findings were:

- The findings in relation to all children reinforce the evidence that there are strong associations between child outcomes and maternal health and behaviours such as smoking, long-term health problems or disability as well as confidence in parenting abilities. It should be recognised, though, that the experience of having a child with negative health outcomes may in itself influence these maternal measures.

- A number of factors within households also showed associations with the avoidance of negative outcomes, for example the consumption of fruit and vegetables and higher levels of physical activity. The findings also suggest possible associations with measures relating to tenure stability and major life events, parental feelings about household income and the home learning environment (the latter is likely to be related to the measures of cognitive and language development used in this stage of the analysis).

- It has also been suggested that neighbourhoods provide an important source of resilience for families. Based on two measures of satisfaction with local services and judgments of the child friendliness of local areas, positive assessments of these aspects were associated with fewer negative outcomes.

- The extent of social support appeared to be associated with avoiding negative outcomes. Regular attendance at parent and toddler groups throughout the child's life and the ability to draw on support at short notice were both more common among children with low negative outcomes.

To identify resilience it is necessary to show what factors are associated with avoiding negative outcomes among children who are at an increased risk of them. It was clear from the analysis of health inequalities that for most of the negative outcomes of interest, children living in the most deprived areas, in the lowest income households and in semi-routine and routine households were most likely to experience them. Therefore the next stage of the analysis focused on children from disadvantaged backgrounds – those from any of the three socio-economic groups at most risk of negative outcomes. This approach disentangles the association between resilience and socio-economic background which might have explained the findings outlined above.

The analysis showed that:

- Only a few of the resilience measures were independently associated with avoiding negative outcomes. Therefore, factors such as area deprivation, income or socio-economic classification clearly have a major influence. In other words, this emphasizes the difficulty of countering very powerful economic and structural influences on early life.

- The significant resilience measures were quite different in nature to each other. For example, children were less likely to have negative outcomes if their mother had not experienced long-term health problems, or if they lived in a household with at least one adult in full-time work, or if they had a more enriching home learning environment. These different kinds of factors would have very wide ranging policy implications.

- Some of the significant associations that remain are surprising – for example, even within disadvantaged groups, older maternal age is a predictor of avoiding negative outcomes.

- It is clear that most of the resilience measures that are significantly associated with avoiding negative outcomes do not sit entirely within the health domain and that effective action to promote resilience and address child health inequalities requires action at many different levels and from a wide range of agencies and bodies.

Conclusions

- While the persistence of poor outcomes was quite variable, exposure to risks such as smoking and poor maternal health were somewhat more stable. This suggests that the consequences in later life associated with early exposure to such risks are likely to be evident for decades.

- The analysis of health inequalities, and the exploration of resilience, both highlighted the extent to which more disadvantaged households experience a double burden in their experience of health inequalities with children and adults within them being at greater risk of negative outcomes. The major focus on early years currently evident in Scottish Government policy making therefore needs to be alive to the fact that tackling health inequalities in children also requires action to address the health inequalities experienced by their parents and wider families.

- The findings from the exploratory analysis of resilience suggest that relatively few of the potential resilience measures explored were significant once socio-economic factors were taken into consideration, which indicates that boosting resilience cannot alone reduce children's risk of poor health outcomes.

- A major recent study of resilience and health (Mitchell *et al.,* 2009) drew a number of conclusions but one has particular resonance in the context of this research – as poverty was such a strong predictor of poor outcomes (in their study the measure was mortality), resilience was likely to have only a very small contribution to the reduction of negative outcomes. However, this is not to detract from the finding that some factors (such as the home learning environment) were shown to be associated with the avoidance of negative outcomes which suggests that some levers to mitigate the impact of disadvantage might exist.

- Although a study such as GUS can demonstrate the sequence over time between possible explanatory factors and outcomes, it still cannot provide definitive conclusions about the direct relationship between them. There is always the possibly that some additional unmeasured factor, related to both the outcome and apparently explanatory factor, is what actually explains the association found. To truly establish cause and effect is very complex and usually requires experimental methods and the accumulation of evidence from numerous different sources. In the absence of experimental evidence, this kind of analysis therefore contributes to the wider accumulation evidence in favour of intervening in the early years. However, it should be noted that significant evidence about the effectiveness of interventions in the early years has already been accumulated (Hallam, 2008).

- The extent of the socio-economic inequalities identified in this piece of work, coupled with the suggestion that resilience to negative outcomes might come in the form of actions to address a wide and disparate range of factors makes it clear that that tackling health inequality requires input at many levels from a wide range of actors. This is not in the gift of the health service or other service providers alone.

chapter
INTRODUCTION

1
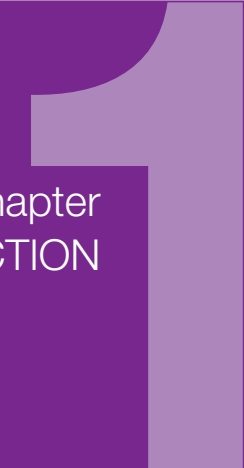
1.1 Context

At least four of the Scottish Government's 15 National Outcomes (Scottish Government, 2007) are directly relevant in the context of an analysis of health inequality, and the avoidance of negative outcomes, in the early years. These are:

Our children have the best start in life and are ready to succeed

We have improved the life chances for children, young people and families at risk

We have tackled the significant inequalities in Scottish society

We live longer healthier lives

This report uses data from the first four years of the Growing Up in Scotland study (GUS) to explore health inequalities in the early years. The inequalities include a number of different indicators of physical and mental health, as well as indicators of exposure to known risk factors for poor health. There has been an increasing focus on health inequalities over the last decade or so in Scotland (Scottish Government, 2008), the rest of the UK (Marmot, 2010) and globally (Wilkinson and Marmot, 2003). Coupled with this, the emphasis on early years has also grown in prominence in this period. The two most significant recent policy developments in Scotland that bring these aspects together are *Equally Well*, the report of the 2007 Ministerial Taskforce on Health Inequalities (Scottish Government, 2008), and the *Early Years Framework* that resulted from a joint initiative between the Scottish Government and the Convention of Scottish Local Authorities (Scottish Government and COSLA, 2008).

GUS can help contribute to the development and implementation of early years policy in two ways. Firstly, it can help to provide an evidence base of both the overall extent of, and inequalities in, negative outcomes for young children. Information such as this can be used to identify important areas for action and to gauge, over time, whether the character or prevalence of these changes (for example, by comparing the two groups of children in the current study and by comparing them with future cohorts). Secondly, it can help to suggest factors that might potentially exacerbate or ameliorate poor outcomes which can then result in policies or initiatives being targeted in those areas. While official statistics exist for a number of health outcomes for children, largely based on routine surveillance data, GUS is unique in its ability to paint a very broad picture of children's life in the early years, and examine the factors that influence the quality of their experiences and outcomes.

GUS is an important longitudinal research project aimed at tracking the lives of two cohorts of Scottish children from the early years, through childhood and beyond. Its principal aim is to provide information to support policy-making, but it is also intended to be a broader resource that can be drawn on by academics, voluntary sector organisations and other interested parties. Focusing initially on a cohort of 5,217 children aged 0-1 years old (the birth cohort) and a cohort of 2,859 children aged 2-3 years old (the child cohort), the first wave of fieldwork began in April 2005 and annual data collection from both cohorts has been undertaken since that time.[1] This report focuses on children in the birth cohort.

This report comprises two main sections plus a conclusion which address the following two questions:

- What is the extent and character of health inequalities in the early years?
- What factors, if any, correlate with the avoidance of negative early health outcomes, among families from disadvantaged backgrounds?

The first section (Chapters 1-3) outlines some of the important concepts that need to be taken into consideration when exploring health inequalities. This chapter provides an overview of health inequality as a concept, ways it is measured and its significance in early life. Chapter 2 includes a summary of the measures that are explored throughout the rest of the report. Chapter 3 addresses the first of the two questions above and maps out the extent and character of inequalities in the early years based on the measures outlined in Chapter 2. Chapter 3 also includes some discussion of the ways in which different socio-demographic factors influence early life outcomes and exposures.

The second section (Chapters 4-5) addresses the second question above. It considers a number of factors that might help explain differences in outcomes for children and explores the extent to which they are relevant once disadvantage has been controlled for. This analysis specifically explores measures that are commonly framed in terms of resilience to negative outcomes and includes factors such as neighbourhood characteristics, parenting attributes as well as the extent of social support available to parents.

All of the statistics have been weighted by a specially constructed weight to adjust for non-response and sample selection. Both weighted and unweighted sample sizes are given in each table. All analyses have been weighted and the standard errors have been adjusted to take account of the clustered sampling.

---

1   Further information on the design, development and future of the project is available from the study website: www.growingupinscotland.org.uk

1.2 What is health inequality?

Poor health in early life has been shown to have significant and long-term consequences that reach into adulthood. Some outcomes, including the incidence of certain diseases at very late stages in life, have been linked to pre-natal circumstances (Marmot, 2010; Claussen, Davey Smith, and Thelle, 2003; Wilkinson and Marmot, 2003; Ben-Shlomo and Yuh, 2002). The fact that poor health, as well as risk factors for poor health, is significantly socially patterned is also well established (Scottish Government, 2008; Marmot, 2010). Within developed countries such as Scotland and the UK, a child's risk of a wide range of negative health outcomes and circumstances such as mortality before the age of one, low birth weight, not being breastfed, exposure to maternal smoke and alcohol in the womb, smoke in the home and accidents have been shown to be greater for children from less advantaged backgrounds, measured in terms of their family's income, social class and experience of multiple deprivation (Wadsworth and Butterworth, 2006; Marmot, 2005; ONS, 2004; Roberts, 2000).

The report of the Scottish Government's Ministerial Task Force on Health Inequalities, *Equally Well*, highlighted the early years as a priority area of concern and recommended a number of actions be addressed at this crucial life stage (Scottish Government, 2008). The Scottish Government/COSLA *Early Years Framework* is committed to levelling the outcomes and opportunities for all children and, of critical interest to this piece of work, to identifying those children at risk of poor outcomes (Scottish Government, 2009a).

The World Health Organisation's founding definition of health was "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".[2] *Equally Well* adopted that definition in its work and defined health inequalities in the early years in two ways. Firstly, inequalities can relate to negative outcomes such low birth weight or other indicators of a failure to thrive. Secondly, it can mean inequalities in exposure to risk factors that increase the likelihood of, or perpetuate, poor health outcomes. These include poor diet, lack of physical exercise, parental drug or alcohol misuse, being in care, living in a poor physical environment and family poverty. The analysis in this report is based on these definitions of health and health inequalities.

---

2   See: http://www.who.int/about/definition/en/print.html

1.3 Measures of health inequality

The academic literature on health inequality can be characterised as having three broad themes. Firstly, there is an obvious focus on which aspects of health are of most interest in terms of the extent of inequality in their distribution. The health outcomes for children most typically examined include low birth weight, all cause infant mortality (death in the first year of life), cause-specific infant mortality, as well as morbidity measures such as chronic illness, acute episodes and accident rates. More broadly, health inequalities are also considered in terms of exposure to social and behavioural factors likely to be hazardous to health, such as parental smoking (in the womb and in the home), poor diet (including low breast feeding rates), and limited opportunities for exercise and early cognitive development. No single standard indicator of health inequality exists, for good reason. In most cases the availability of data shapes what analysis can be performed. More importantly, multiple indicators of inequality are necessary if policy is going to be devised to help reduce inequalities because reducing the gap for one indicator could easily leave other gaps untouched. Also, because the extent of inequality varies depending on the measure explored, one measure with a very unequal distribution could potentially overstate the extent of inequalities, while a measure for which the gap between groups is much smaller could do the opposite.

The second focus of the literature on health inequality concerns the arguably more fundamental question: "inequality of what?" This issue exists on two levels. First there is the question of whether health inequality simply refers to any unequal distribution of a health outcome, or whether it is specific to differences in health across social groups that result in less affluent people having worse outcomes (Murray *et al*., 1999; Braveman *et al*., 2000; Murray *et al.*, 2000). This report defines health inequality as the unequal socio-economic patterning of outcomes which disadvantages less affluent children. GUS is not well placed to explore inequalities in relation to race and ethnicity or parental sexual orientation, though it could be used to explore inequality related to gender and some religious groups. This leads us to the second aspect of the debates around the question of inequality of what – through which socio-economic groups should health be examined? A significant body of literature also exists in answer to this question, though no consensus exists on the ideal way of measuring health differences (for example, Galobardes *et al*., 2007, 2006a, 2006b; Kaplan and Lynch, 2000). This is not the place to explore fully the debates surrounding the numerous measures that exist. However, it is important to set out clearly why each measure being used has been chosen and what it contributes to our understanding of differences in health.

The third broad theme evident in the literature relates to the many different ways in which differences in health can be quantified. This is of critical importance because the conclusions drawn about the same set of data can be very different depending on what measure of inequality has been used (Wagstaff *et al.*, 1991). Significant debate on this topic has taken place with the main issues being the role of absolute versus relative measures and simple versus more complex indices (Wagstaff *et al*., 1991; Mackenbach and Kunst, 1997; Regidor, 2004a, 2004b). This literature, and its approach, is evident in the choice of indicators being used in the Scottish Government's long-term monitoring of health inequalities project (Scottish Government, 2009b) and the Scottish Public Health Observatory's guide to measuring and monitoring health inequality (Munoz-Aroyo and Sutton, 2007). This report follows the recommendation in much of the literature that both absolute and relative measures should be utilised, and that complex analysis should be complemented by simpler descriptive measures (Mackenbach and Kunst, 1997). The sections below set out why health inequality matters and outline the specific measures that used in this report.

1.4 The significance of health inequality in the early years

Having considered some of the definitional issues and controversies surrounding the study of health inequality, an arguably more fundamental question arises of why health inequalities in childhood matter? Concern about socioe-conomic differences in health, among both adults and children, is clearly a major area of policy concern across the globe. In Scotland, the *National Performance Framework*, *Early Years Framework*, and *Equally Well*, collectively set the policy context and the intention to close the gap between children from the most and least advantaged groups in society. In addition, the 2010 Marmot Review of health inequalities in England made the early years its highest priority for action and recommended significant investments are made to reduce inequalities from the earliest stage in life. The kinds of policy interventions Marmot's review recommends echo much of what was set out in *Equally Well* and the *Early Years Framework* in terms of support for parents in the early years, the importance of high quality childcare, and targeted interventions in the pre- and post-natal windows.

In the health context, there has been a shift in recent years away from solely focusing on adult behavioural risk factors for conditions such as hypertension or cardiovascular disease, towards various pre and post-natal factors such as low birthweight (Power, *et al*., 2007; Ben-Shlomo and Kuh, 2002; Barker, 1997; Wadsworth *et al*., 1997). For example, the 2009 annual report from Scotland's Chief Medical Officer (Scottish Government, 2009c) sets out the evidence suggesting the importance of positive early life experiences for long-term health and wellbeing. For these reasons, socio-economic differences in health in the early years are not simply a matter of immediate concern, but they also have implications that stretch for decades to come. The most important point to note is that this emphasis on the early years is equally concerned with direct health outcomes at this stage in life and with the quality of the wider nurturing environment within the family and local community, and in particular the importance of consistent and supportive parenting. The second part of this report returns to this theme in its discussion of resilience and factors that protect against negative outcomes.

1.5 What this analysis adds

Official statistics are collected about health outcomes and risk factors in the early years which can demonstrate the extent of health inequalities for a number of measures, such as low birthweight, smoking in pregnancy, and hospitalisation and death rates from specific causes. These are usually disaggregated using area level deprivation, or, in the case of mortality figures, by a measure of the occupational status of the household. However, a data source such as GUS can be used to supplement these kinds of figures in two specific ways. Firstly, a much wider set of information about the child's health and development can be collected in GUS than could ever be collected at a national level about all children. Secondly, and perhaps more importantly, far more is known about the GUS children's family and home circumstances, for example their income, other aspects of the home environment and parental attitudes and behaviours. So, although area deprivation can be a useful proxy measure of individual level deprivation, the extent and range of measures explored in this report provide more insight than deprivation can alone.

As the discussion above notes, recognition of the importance of early childhood experiences has gained prominence in recent years and consequently there is increasing interest in the potential for screening children at an early age for factors such as their meeting of developmental milestones, readiness to learn, or for emotional, social or conduct disorders, all of which GUS routinely includes. GUS might therefore usefully contribute evidence to help inform policy development in this area.

chapter

MEASURING HEALTH INEQUALITIES IN GUS

2

2.1 Measures used in this report

This report is not designed to be exhaustive. Instead, it provides a snapshot of the potential that the GUS data can contribute to this area. The measures that have been chosen for exploration are to a large extent pragmatic as the space available to explore this topic is limited. However, the choice has been guided by factors of key policy relevance in Scotland.

2.1.1 Health outcomes and risk factors

As noted in the previous chapter, health inequalities can be fairly broadly defined to include differences in: specific health outcomes (such as low birthweight, obesity, long-term conditions, accidents); health related risk factors that impact directly on children (such as poor diet, low levels of physical activity, exposure to tobacco smoke); as well as exposure to wider risks from parental/familial behaviours and environmental circumstances (maternal depression and/or poor physical health, alcohol consumption, limited interaction, limited cognitive stimulation, poor housing, lack of access to greenspace). The longitudinal design of GUS means that for some of these measures it is possible to investigate repeated exposure to risk factors and experience of poor outcomes as well as at single points in time.

One of the most common measures of health status in analyses of adult health is self-assessed general health which has been shown to be associated with long-term morbidity and mortality, as well as being an important marker of health inequality in adulthood (Idler and Benyamini, 1997; Measuring Inequalities in Health Working Group, 2003). However, there are actually very few children within the GUS sample whose health is said to be bad or very bad by their parents (just 6% at 10 months and 7% at 46 months). In part this will be because the main determinant of poor general health is old age while the more extreme negative health outcomes that children can experience have a low prevalence in the population in the first place. There is also a high likelihood that sample attrition and differential response at the first wave will have excluded children with very serious health conditions, for example children who spend a significant amount of time in hospital or those with terminal conditions. Finally, as highlighted in *Equally Well*, looked after children are at significant risk of negative health outcomes and the GUS sample cannot capture the experiences of this group of children.[3]

---

3   Acute illness was initially considered for exploration. However, changes to the question wording across the sweeps meant that the measure was not consistent across all years. Also, the question in GUS measures how many different conditions children have had, rather than how many illness episodes have been experienced, so it was not an ideal measure for this report's purposes.

The following list sets out the measures explored in this report. In line with the WHO and *Equally Well* definitions of health and health inequalities, the measures span a range of outcomes and risk factors. The list is not exhaustive and a more in depth analysis of this topic could consider a wider range of factors, for example more of the developmental milestones. However, they reflect a broad spread of factors of policy concern and are all likely to be of interest as explanatory variables for later outcomes once the children reach adulthood. The 2010 reports on persistent poverty and maternal mental ill-health are likely to also be of interest to readers of this report as both include analysis of health outcomes (Barnes *et al*., 2010; Marryat and Martin, 2010).

Pregnancy, birth and shortly after	
Outcomes	**Risk factors**
Low birth weight	Maternal smoking in pregnancy
Time in special care baby unit after birth	Poor maternal health in pregnancy
Problems with feeding, sleeping, or health in first three months	Bottle feeding
Longer term child health and development	
Outcomes	**Risk factors**
Problems with feeding, sleeping, allergies, health or language development	Low physical activity levels
Parent assessed general health of child	Unhealthy eating habits
Long-term health conditions	Maternal smoking (in early childhood)
Accidents	Maternal mental and physical ill-health
Body mass index (outwith healthy weight)	
Behavioural, emotional or psychological problems	

It is important to stress that although some of the measures are directly associated with mothers, this is not meant to imply that there is no role for fathers. Instead, it is a reflection of the fact that, in order to collect detailed information on the pregnancy and birth of the child, the study sought to interview the child's natural mother at the first sweep of data collection. We acknowledge that this means that important insights about the children's lives will be lost by focusing on one key carer rather than on all the relationships children have, but there is not scope in the study to interview all the children's parents and carers at each sweep.

2.1.2 Inequality measures

Much analysis is limited by what measures have been collected and in this respect GUS is somewhat unusual in having a number of options from which to choose. Starting with the local context, the Scottish Index of Multiple Deprivation will be the primary factor of interest, with the prevalence of selected health outcomes and risk factors compared across quintiles of this variable (these split the sample into five equally sized groups). This is in line with the approach taken by the Scottish Government's long-term monitoring of health inequalities project. To date this has focused primarily on adult health, with the exception of low birthweight, and uses the income and employment domains of the SIMD index, rather than the whole index, as its inequality measure. The whole index includes a health domain (measuring mortality and illness rates, emergency hospital admissions, drug and alcohol related admissions, low birthweight and prescription rates for anxiety, psychosis or depression) which can cause problems when the analysis being conducted also includes some of these measures (for example, analysis of mortality rates by SIMD). However, the use of the full index is less problematic when analysing the child health outcomes selected above as only one of the measures also features in the health domain, birthweight. For this reason, and the fact that this report is considering a range of socio-economic measures, the full index will be used but caution needs to be exercised when considering the association between low birthweight and SIMD.

However, a significant proportion of families living in the most deprived areas are not socially or materially disadvantaged while many families with limited resources live in non-deprived areas. For this reason additional measures of family level deprivation will also need to be explored. The first of which is household income.[4] Evidence from the US suggests that household income is a key factor shaping the outcomes of children with long-term conditions with those from low income households having poorer health and worse outcomes in terms of days of schooling lost and overall attainment than children with long-term conditions from wealthier households (Case, Lubotsky and Paxson, 2002). UK evidence also suggests that income is an important marker of health inequality in childhood (Emerson *et al*., 2006). Income will also be explored using quintiles.

---

4   Household income only started to be included routinely in social surveys within the last decade so its use in analyses of health inequality is less extensive than is the case for area level measures which date back to the 1980s, or social class, which has been measured for many decades. For more discussion of the measurement of income in surveys, and how it is measured in GUS, see the report on persistent poverty (Barnes *et al*., 2010).

Other important measures of disadvantage include employment status, socio-economic status and mother's educational attainment. All of which have been shown to be associated with child outcomes in many of the GUS reports published to date. The initial analysis for the report looked at socio-economic classification rather than employment status (which just measures whether a person is in work or not) as the former is a clearer marker of structural inequalities within the labour market. However, due to space constraints socio-economic classification will only be referred to briefly in the text and no tables will be shown. Maternal education is considered in the second half of the report, which explores resilience to poor outcomes.

The proportion of children experiencing the health outcome, or risk factor of interest, at each time point will be compared across deprivation and household income quintiles. When looking at area deprivation it is important to be clear that this is an aggregate measure of local circumstances and does necessarily reflect individual experiences (Macintyre, 1997).

This detailed analysis of SIMD and income looks at all levels of these two measures and does not simply contrast children in the highest and lowest deprivation areas or the highest and lowest income quintiles. This makes it possible to identify whether patterns are linear or follow some other form. However, for simplicity a single relative measure of inequality for each factor is also presented (the relative risk) which shows the magnitude of the difference between the most and least disadvantaged groups in the overall measure.[5] Relative risk can be a useful illustration of the strength of association between the prevalence of a factor of interest in two groups, but it can be misleading if considered in isolation. For example, if the prevalence of something is 1% in the least disadvantaged group and 5% in the most, then the relative risk between them is 5. If the prevalences were 10% and 20% then the relative risk is lower: 2. A fivefold increase in risk could be of huge clinical or policy significance, but in some circumstances a smaller relative risk might be considered more important if the overall prevalence in question is higher and therefore affects more people. So, factors such as the baseline and overall prevalence, as well as the actual implications of the factor being considered, need to be borne in mind as well.

---

5   Note that the relative risks presented here do not estimate the difference between the two categories that happen to have the highest and lowest prevalence for the outcome. As a measure of inequality it compares the most and least disadvantaged groups according to the underlying classification, regardless of the pattern in the data.

chapter
3

THE EXTENT AND CHARACTER OF HEALTH
INEQUALITIES IN THE EARLY YEARS
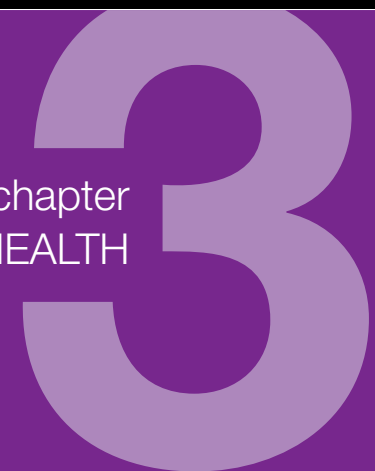
3.1 Key findings about health inequalities in the first four years

- This analysis spanned the period from around the time of the children's birth to just before their fourth birthdays. A wide range of measures were used to illustrate inequalities in outcomes such as the children's birthweight, their experience of long-term health problems, accidents, poor psychosocial health and wider developmental problems. It also looked at a range of risk factors for poor health which included maternal smoking, maternal health, children's physical activity levels and their diet (including breastfeeding). All these outcomes and risk factors were explored in relation to area deprivation, household income, and household socio-economic classification.

- It showed that exposure to the kinds of risks that can impact on health and development in the early years, and have been shown in the wider literature to have implications for later life, are not uniformly or randomly distributed across the population at this very early point in life. Significant inequalities exist with those in the most deprived areas, the lowest income households or routine and semi-routine households found to have worse health outcomes, and higher exposures to risks for poor outcomes, than their more advantaged counterparts.

- Although overall levels of outcomes such as long-term health conditions and poor general health are relatively low in the early years, and appear not to change much each year, this analysis shows that there is in fact quite a high degree of individual-level change in health outcomes in this period. However, this would not necessarily be evident in an analysis that compared a different group of children over time without being able to explore individual pathways in the way that GUS permits.

- While the persistence of poor outcomes was quite variable, exposure to risks such as smoking and poor maternal health were somewhat more stable. For example, of those children whose mothers smoked at some point in their early years, most were exposed to this on a prolonged rather than temporary basis.

- Across all the outcomes and risk factors explored, inequalities in exposure to risk factors were generally larger than those evident for outcomes. However, within the outcomes explored, behavioural, psychosocial and linguistic problems showed much starker inequalities than physical ones such as poor general health.

- The more disadvantaged households can be said to face a double burden in their experience of health inequalities as both the children and adults within them are at greater risk of negative outcomes.

3.2 Introduction

This chapter maps out socio-demographic inequalities in the various health outcomes and risk factors for poor health outlined in the previous chapter over five stages of life. Although the first GUS interview took place when the children were 10 months old, retrospective information was collected during that first interview about the pregnancy and birth which has been utilised here. The five stages explored are:

- Pregnancy, birth and the first three months,

- 10 months,

- 22 months,

- 34 months, and

- 46 months.

It starts by looking at the measures relating to the pregnancy, birth and first three months. It then looks at three physical health outcomes captured across all four years between the interviews conducted at 10 and 46 months, as well as some specific behavioural and developmental outcomes at 46 months. It then looks at a number of risk factors for poor health measured at various points.

3.3 Pregnancy, birth and the first three months

The measures presented in this section focus on both the mother and the child. The remaining sections focus more heavily on factors associated with the child, with a smaller number of measures of maternal or parental factors likely to pose adverse risk for the child (such as smoking).

3.3.1 Risk factors and health outcomes in the early stages

Table 3.1 shows the total population prevalence for each of the factors of interest. The most common negative factor was three in ten (30%) mothers said that they had planned to bottle feed before their child was born. One in four (25%) mothers had smoked during their pregnancy and about one in eight (13%) described their health as not very, or not all good, during that time.

The best measure we have of the earliest point in the children's lives is whether their conception was planned or accidental. Around one in four (24%) pregnancies had not been planned at all and a further 17% were described as having not been planned but not actively prevented either. Fetal health can be linked to factors prior to conception as well as at the early stages of development. For example, folic acid supplementation is recommended prior to conception and for the first 12 weeks of pregnancy to help reduce the risk of neural tube defects.[6] Unplanned pregnancies are therefore less likely to involve these kinds of pre-conception steps that can promote fetal health.

Table 3.1 Risk factors for negative child outcomes, during pregnancy

Risk factor	
	%
Pregnancy planning	
Planned by mother and father	58
Planned by mother but not father	1
Not planned but nothing done to prevent it	17
Not planned at all	24
Maternal smoking	
Smoked frequently or occasionally	25
Did not smoke	75
Maternal health in pregnancy	
Very/fairly good	87
Not very/not at all good	13
Breastfeeding plans before birth	
Planned to breastfeed	64
Planned to bottle feed	30
No strong preference	6
Bases	
Weighted	*5109*
Unweighted	*5108*

Note: Bases vary for each measure, those shown are the lowest of the range

---

6   See, for example, the Food Standards Agency's advice on this:
     http://www.eatwell.gov.uk/healthydiet/nutritionessentials/vitaminsandminerals/folicacid/

Table 3.2 looks at some of the circumstances of the children's births. Medical literature tends to make a distinction between children born at full term with a low birthweight, and the weights of premature babies or multiple births, as the reasons for their low weights can be rather different. In common with the approach taken by the Scottish Government long-term monitoring of inequality and low birthweight, the measure used here excludes multiple births (twins etc) but does not take account of pre-maturity which is itself linked to deprivation in singleton pregnancies (Scottish Government, 2009b).

Just 6% of singleton babies were low weight, while twice as many of all babies, 12%, spent time in an incubator or neonatal intensive care unit after birth. In common with Table 3.1, there was a much higher prevalence of exposure to a negative risk factor, never being breastfed (40%), than of a direct poor health outcome, such as low birthweight.

Table 3.2   Child health outcomes and risk factors for negative outcomes, at birth

Health outcome/risk factor	
	%
Birth weight (singleton births)	
Low	6
Not low	94
Bases	
Weighted	*5074*
Unweighted	*5117*
Time in SCBU/NNU after birth	
Yes	12
No	88
Was child ever breastfed	
Yes	60
No	40
Bases	
Weighted	*5216*
Unweighted	*5216*

Moving away from the very early stages, Table 3.3 looks at outcomes in terms of parents' reports of problems in the first three months. The most commonly reported problem was with sleeping (38% said this was a big or a bit of a problem), followed jointly by feeding or health problems other than allergies (17%), while allergies were reported by 7% of parents.

Table 3.3   Problems in first three months

	Big or bit of a problem	Not a problem
	%	%
Extent of problems with:		
Sleeping	38	62
Feeding	17	83
Allergies	7	93
Other health problems	17	83
Bases		
Weighted: 5205		
Unweighted: 5205		

Note: Bases vary for each measure, those shown are the lowest of the range

The key point to note from these first three tables is that direct health outcome measures such as low birthweight, time in an incubator after birth, or early health problems are relatively less common than exposures to risk factors for poor health such as smoking in pregnancy or bottle feeding.

3.3.2 Inequalities in the early stages

Table 3.4 presents the above figures about the pregnancy, birth and first three months by quintiles of the Scottish Index of Multiple Deprivation (this splits all areas of Scotland into five roughly equally sized groups from the least to most deprived fifth of areas). Three key points stand out from this table. Firstly, with the exception of the problems reported at three months, all the factors display some social patterning indicative of health inequality, and in many cases these patterns show a steady linear trend in line with increasing deprivation (all associations presented in the table are statistically significant apart from the reported problems with allergies or other health problems).

The relative risk figures (see section 2.1.2 for explanation) presented in the penultimate column show the magnitude of the difference between the most and least disadvantaged areas. The biggest relative risks were for smoking during pregnancy (9% versus 43%, respectively) and for pregnancies that were not planned at all (8% versus 39%). The largest absolute differences in risk (that is, the size of the gap between the most and least deprived areas) were in relation to the two feeding measures (planning to bottle feed and never breastfeeding). The smallest inequalities were in relation to post-natal incubation (11% versus 15%) and low birthweight (5% versus 8%). The latest official statistics on low singleton birthweight show that the relative risk of low birthweight between the most and least deprived 10% of areas was 2.2 (Scottish Government, 2009b), therefore the GUS figures (which compare the most and least 20% of areas) are broadly in line with this.

The higher likelihood of reporting problems with sleep and, to an extent, feeding, among families in less deprived areas is interesting. The finding about feeding might be a result of problems with breastfeeding which is more common among less deprived areas, hence the reverse gradient. However, as this report is focusing on inequalities that confer a disadvantage for less affluent children extensive exploration of these patterns is outwith our scope.

Table 3.4   **Health outcomes and risk factors in pregnancy, at birth and in first three months by Scottish Index of Multiple Deprivation quintile**

	SIMD quintile					Relative risk	Risk difference
	5th – least deprived	4th	3rd	2nd	1st – most deprived		
	%	%	%	%	%		
Risk factors							
Pregnancy not planned at all	8	17	21	29	39	4.8	31
Smoked in pregnancy	9	17	21	31	43	4.9	34
Health in pregnancy not very/ not at all good	9	12	13	14	17	1.8	8
Planned to bottle feed	15	21	27	36	46	3.1	31
Never breastfed	21	29	35	47	60	2.8	38
Health outcomes							
Low birth weight (singletons)	5	4	5	6	8	1.6	3
SCBU/NNU after birth	11	11	11	12	15	1.4	4
Problems with:							
Sleep	45	41	37	34	34	0.8	-11
Feeding	19	18	15	19	15	0.8	-4
Allergies	7	6	8	8	8	1.1	0
Other health problems	19	15	16	19	19	1.0	0
Bases							
Weighted	*919*	*989*	*995*	*945*	*1261*		
Unweighted	*996*	*1042*	*1025*	*907*	*1138*		

Notes:

The relative risk is the prevalence in the most deprived areas divided by the prevalence in the least deprived areas, the risk difference is the difference in the prevalence in the two areas. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range.

Table 3.5 looks at the factors shown above that had unequal distributions in favour of the least deprived in relation to household income only and reveals some interesting patterns. For example, the relative risk of both unplanned pregnancy and smoking in pregnancy is higher here than found in relation to area deprivation. This is accounted for by both lower levels of these factors among those in the highest income households than in the least deprived areas, as well as higher rates in the lowest income households compared with the most deprived quintiles.

The birthweight and incubator measures show smaller relative risks than the other measures, as seen above with area deprivation. However, it should be noted that relative risk is a measure subject to imprecision, in the same way that any percentage reported from a survey is, and will therefore have an associated margin of error. Therefore, tests of the significance of any differences between relative risks for the same measures across different socio-demographic measures would need to be conducted before definitive conclusions could be drawn.

Table 3.5   Health outcomes and risk factors in pregnancy, at birth and in first three months by equivalised household income quintile

	Equivalised household income quintile						
	1st – highest	2nd	3rd	4th	5th – lowest	Relative risk	Risk difference
	%	%	%	%	%		
Risk factors							
Pregnancy not planned at all	6	12	19	28	49	7.5	42
Smoked in pregnancy	8	13	18	33	51	6.3	43
Health in pregnancy not very/ not at all good	9	11	13	17	16	1.7	7
Planned to bottle feed	13	18	29	38	50	4.0	38
Never breastfed	20	27	40	48	64	3.2	44
Health outcomes							
Low birthweight	6	5	6	8	9	1.5	3
SCBU/NNU after birth	10	10	11	14	14	1.4	4
Bases							
Weighted	*851*	*967*	*834*	*950*	*979*		
Unweighted	*903*	*999*	*845*	*935*	*910*		

Notes:

The relative risk is the prevalence in the lowest income quintiles divided by the prevalence in the highest income quintiles, the risk difference is the difference in the prevalence in the two income categories. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range

As noted in Chapter 2, analysis was also carried out looking at household socio-economic classification. For all but one of the measures explored so far – maternal health – the difference between households headed by someone in a professional or managerial job and those headed by someone in a semi-routine or routine job showed a similar pattern to those presented above for area deprivation and income.

3.4 Health measures in the first four years of life

The previous section looked at early outcomes and risk factors for poor later outcomes in combination. As the number of measures that can be explored from 10 months onwards is much larger, a sharper distinction is made from this point onwards between children's direct health outcomes (physical, psychosocial and developmental/cognitive) and risk factors for poor outcomes.

The following sections therefore start by outlining the prevalence of a number of health outcomes and exposures to risks likely to have an adverse impact on health at 10, 22, 34 and 46 months. This should help to introduce readers to each measure as well as provide a baseline point of comparison for the detailed tables that follow looking at differences by socio-demographic group. For some measures the figures for specific years are explored, whereas for others the full potential of the longitudinal design of the study has been tapped and the measures focus on multiple outcomes across the years rather than just at specific time points.

3.5 Overview of health outcomes

3.5.1 Physical health

This section starts by presenting the overall figures for the main health outcome measures available at each sweep of data collection, as well as some composite measures that look at children's experiences spanning the period between 10 and 46 months.

The number of outcome measures increased notably at later sweeps with the introduction of standardised assessments of cognitive ability (at 34 months), child psychosocial health (at 46 months), and direct measurements of height and weight at 46 months.

Table 3.6 shows that the prevalence of long-term conditions was highest at 46 months (17%) and ranged between 11% and 14% in the three earlier years with no obvious pattern. Almost one in three (28%) children were described by their parents as having a long-term condition at some point in their first four years of life. However, as Figure 3.1 illustrates, these categories appear to have been very fluid as very few children were described as having a long-term condition on more than one occasion between the ages of 10 and 46 months, and just 4% were persistently in this category.

The proportion of parents or carers describing their child's health as fair, bad or very bad followed a similar pattern. The overall prevalence was low in most years, at around 6-7%, but a higher proportion – 18% of children – were described as having fair or worse health at some point in this period. Persistent fair or worse health was very uncommon; just 3% of children were described in these terms in at least three of the four years.

A high degree of movement into and out of poor states of health is not surprising as many childhood illnesses and conditions can be serious in the short to medium term but do not go on to become enduring problems. For example, some skin, respiratory or allergic conditions clear up within a couple of years, while many serious conditions present at birth or in the first year of life will have been treated successfully by the age of 3 or 4.

Figure 3.1   Persistent long-term health problems and fair/bad/very bad health
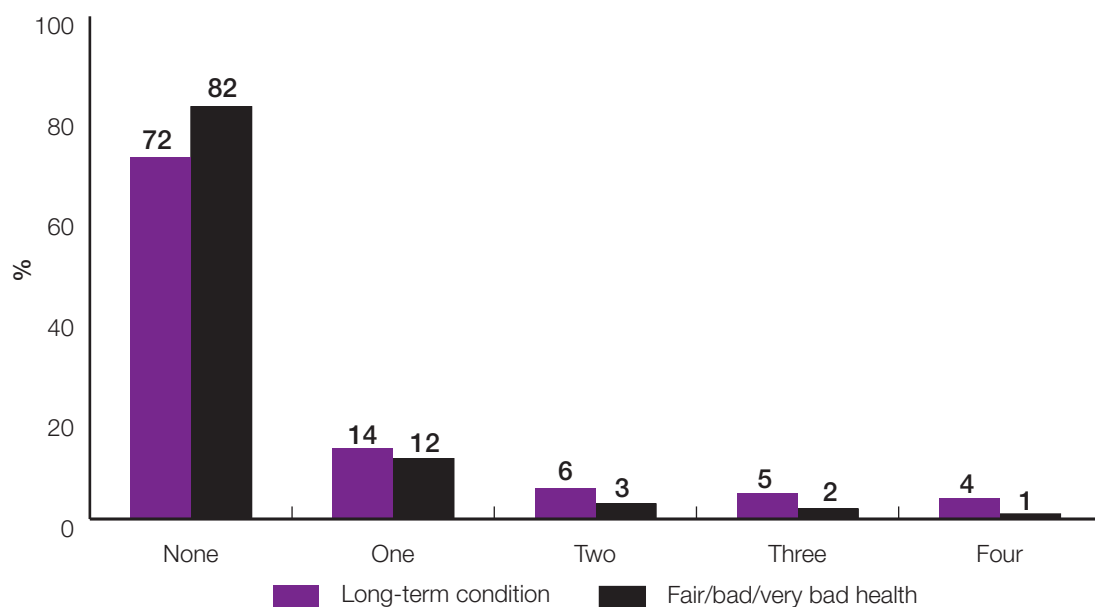
Sample size: 3837-3844

Accidents requiring medical attention were relatively uncommon at 10 months, but doubled in the following year (from 10% to 23%), probably due to increased independent (but faltering) mobility as the children began to walk. They show a slight decline after that to just under one in five children requiring medical attention for an accident in year preceding the interviews at 34 and 46 months. Overall, a fifth (20%) of children experienced two or more accidents requiring attention between their birth and 46 months.

It is also worth noting that the accident measure only includes incidents for which the child was taken to a doctor, dentist, health centre or hospital. This is designed to help parents differentiate between more and less serious accidents. However, it means that the accidents captured by this measure might vary depending on the parents' propensity to seek help or feel the need for their child to be checked. This could be related to parents' confidence, experience and attitude to risk, as well as on the accessibility of local health services. This is not to diminish the usefulness of the measure, but is simply highlighted to clarify what was measured so that can be taken into consideration when the results are presented.

Table 3.6   Health outcomes at 10, 22, 34 and 46 months

Health outcome	10 months	22 months	34 months	46 months
	%	%	%	%
Long-term health problems or disabilities				
Yes	13	11	14	17
No	87	89	86	83
Long-term health problems at least once between 10 and 46 months	–	–	–	28
General health (parent assessed)				
Very good/good	94	93	94	93
Fair/bad/very bad	6	7	6	7
Fair/bad/very bad health at least once between 10 and 46 months	–	–	–	18
Accidents requiring medical attention in past year				
0	90	77	81	82
1 or more	10	23	19	18
2 or more accidents between 10 and 46 months	–	–	–	20
Bases				
Weighted	*5217*	*4512*	*4193*	*3994*
Unweighted	*5217*	*4512*	*4193*	*3994*

Note:

Bases vary for each measure, those shown are for the whole sample

3.5.2 Problems reported by parents

Table 3.7 looks at some of the kinds of problems parents reported over the course of the first four years of their child's life. The nature of the problems asked about changed over this period to reflect the fact that different developmental stages often pose different challenges.

The questions about allergies and other health problems showed some fluctuations over the stages but with no notable patterns. In contrast, problems with sleeping became less common by 34 months while feeding became more of an issue as time progressed and was in fact the most commonly reported of the problems by the age of 46 months (41% said this was a bit of or a big problem). Two behavioural measures were introduced at 34 months relating to interactions with other children and general behaviour. At 46 months twice as many parents reported general behavioural problems than said their child's behaviour to other children was a problem (31% versus 16%).

Table 3.7   Problems reported by parents in the last three months, at 0-3, 10, 22, 34 and 46 months

	0-3 months	10 months	22 months	34 months	46 months
Big or bit of a problem:		%	%	%	%
Sleeping	38	33	n/a	29	n/a
Feeding	17	14	n/a	35	41
Allergies	7	10	n/a	11	12
Other health problems	17	16	n/a	14	14
Behaviour to other children	n/a	n/a	n/a	19	16
General behaviour	n/a	n/a	n/a	26	31
Bases					
Weighted	*5217*	*5217*	*4512*	*4193*	*3994*
Unweighted	*5217*	*5217*	*4512*	*4193*	*3994*

Note:

Bases vary for each measure, those shown are for the whole sample

n/a= not asked or not asked in a directly comparable way

The direct cognitive assessments carried out at age 34 months measured language development and problem solving ability. These were reported in detail in Bromley (2009) which showed that below average attainment was significantly associated with socio-economic disadvantage. In addition to these assessments, parents were asked if they had any concerns about their child's language development at 46 months.[7] Around a fifth (19%) of children were judged to have at least one problem with their language development. The correspondence between these two separate measurements was high; children who scored below average on the vocabulary assessment at 34 months were more likely than those with average scores or above to be described as having language problems by their parents a year later. The analysis below in Section 3.6 focuses on the question about language concerns at 46 months.

3.5.3   Psychosocial health

Some notable additions to the questionnaire were made when the children were 46 months old. Firstly, there was a standardised assessment of the children's social, emotional and psychological development using the Strengths and Difficulties Questionnaire (Goodman, 1997). Parents answered 25 questions about a range of aspects of their child's behaviour from which normal, borderline and abnormal scores for various domains, as well as an aggregate assessment, can be derived. The detailed analysis of this presented in section 3.6 focuses on children with borderline and abnormal scores for the total difficulties measure and for the conduct and hyperactivity domains.

By way of introduction, Table 3.8 presents the overall figures for all children and shows that children were more likely to be assessed as having problems in relation to conduct (14%) and hyperactivity (12%) and that abnormal scores for the total difficulties measure were much less common at just 5%. Boys were more likely than girls to have borderline or abnormal scores in relation to total difficulties, conduct, hyperactivity, and pro-social behaviour, whereas differences were less pronounced for emotional symptoms and peer problems.

---

7   The concerns parents could choose were: his/her language is developing slowly; it is hard for other people to understand him/her; he/she doesn't seem to understand other people; he/she pronounces words poorly; he/she doesn't hear well; he/she stutters; other concerns.

Table 3.8   Strengths and difficulties at age 46 months, by sex

	Boys	Girls	All
	%	%	%
Emotional symptoms			
– Normal	92	93	92
– Borderline	5	4	4
– Abnormal	3	3	3
Conduct problems			
– Normal	65	72	68
– Borderline	19	15	17
– Abnormal	16	13	14
Hyperactivity			
– Normal	76	85	80
– Borderline	9	6	8
– Abnormal	14	9	12
Peer problems			
– Normal	82	85	84
– Borderline	9	8	9
– Abnormal	8	7	8
Pro-social behaviour			
– Normal	86	93	89
– Borderline	10	4	7
– Abnormal	5	3	4
Total difficulties score			
– Normal	86	91	88
– Borderline	8	6	7
– Abnormal	7	4	5
Bases			
Weighted	*2026*	*1909*	*3935*
Unweighted	*2015*	*1926*	*3941*

Note: Bases vary for each measure, those shown are for the total difficulties score (the lowest of the range)

3.5.4 Body mass index

Obesity is a growing problem in most of the developed world and much of the developing world too (Foresight, 2008). Childhood obesity is a particular concern and is the subject of specific policy interventions in Scotland, including a national outcome to reduce the rate of increase in unhealthy weight among children between 2008 and 2011 (Scottish Government, 2007) and a new guideline for clinical practice (SIGN, 2010).

Direct measures of the children's height and weight were taken at 46 months. These were used to derive their body mass index (BMI) which was compared with standard growth charts for children of this age to assess whether they were underweight, normal weight, overweight or obese. The most recent Scottish Health Survey report contains full details of the methodology used in Scotland to calculate children's BMI, which GUS also follows (Gray and Leyland, 2009). Although BMI is not a perfect measure of body fat, because it cannot take account of skeletal or muscle density, it is nevertheless a good enough approximation to be useful in studies such as GUS.

The Scottish Government's preferred indicator of BMI in children is the proportion outwith the healthy weight range (underweight, overweight and obese combined); 28% of the children were in this category at age 46 months (10% were obese, 16% overweight and 2% underweight).

3.6 Inequalities in health outcomes

3.6.1 Area deprivation

Table 3.9 compares the proportion of children in each deprivation category whose parents described them as having: a long-term health problem or disability at least once between their birth and 46 months; fair, bad or very bad health on at least one occasion; and children who have had more than 2 accidents requiring medical attention since their birth.

One in ten (11%) children in the least deprived areas were described as having poor health at least once since their birth compared with one in four (24%) in the most deprived areas. The prevalence of this appeared to increase in a linear fashion across the groups as deprivation increased. Both the relative risk and the absolute difference between the least and most deprived groups were similar for long-term health problems and accident rates. However, the overall patterns were somewhat different. The risk of having a long-term health problem at least once since birth increased in line with increasing deprivation, from 24% of children in the least deprived areas to 33% in the most. In contrast, the risk of having had two or more accidents since birth was largely similar across the first four groups (ranging between 17% and 20% with no obvious pattern) but was higher among children in the most deprived areas at 26% (the difference between children in the most and least deprived areas was statistically significant).

This suggests that reducing inequalities in the overall rate of poor health and long-term conditions in children in the early years might require action targeted across the whole population. In contrast, accident rates might benefit from a more targeted approach focusing on children in the most deprived areas. Further analysis of the nature of the accidents might assist this. The overview of health outcomes presented in section 3.5.1 showed that accidents were at their most common between the ages of one and two. Further analysis of the association between deprivation and accidents in each individual year of life suggests that this is also the point at which inequalities in accident rates are at their most pronounced (18% of children in the least deprived areas had an accident between the age of 10 and 22 months compared with 28% in the most deprived areas). This might therefore be the age at which interventions to reduce accident rates could have most impact.

Turning now to focus on some of the health and developmental problems asked about at 46 months, Table 3.9 shows some small, but statistically significant, differences between parental reports of problems with allergies, asthma and other health problems by area deprivation. Further analysis of this found that problems with allergies and asthma were also significantly associated with deprivation at 34 months, but not at 10 months. The overall difference between groups was quite small at 46 months (10% in the least deprived areas versus 14% in the most) so this emergence of a pattern over time might simply be caused by the findings at 10 months being anomalous, or it could possibly reflect a real change in the burden of these kinds of conditions among more deprived children over time. Similarly, parental reports of problems associated with other health issues were associated with deprivation at 46 months but not at any of the earlier stages (12% in the least deprived areas mentioned this at 46 months versus 16% in the most). These two patterns might be an interesting area for further investigation.

Table 3.9 shows that parents in the most deprived areas were twice as likely as those in the least deprived areas to have concerns about their child's language, 26% compared with 12%. The increase from the least to most deprived areas appeared to follow a fairly linear pattern.

The BMI measure introduced at 46 months was not significantly associated with area deprivation. This was true for both the proportion of children whose weight was outwith the healthy range, as well as for the subset of children classified as obese (both measures were also explored separately for boys and girls and the same lack of association was found). Previous analyses of children's BMI and area deprivation in Scotland was inconclusive (Hirani and Stamatakis, 2005). On the whole, few associations were significant and those that were did not follow any obvious pattern. However, analysis of these trends in England, where the sample size for the analysis is much larger, has tended to show higher levels of obesity among children from more deprived areas, in semi-routine

and routine households and in low income households (Scholes and Heeks, 2008; Jotanga, *et al*., 2005). However, it is worth noting that these analyses were based on a much wider age range of children whereas the GUS sample children are all the same age. It is therefore possible that an association between socio-demographic factors and unhealthy weight emerges when children are older.

As outlined above, the range of available measures of behavioural problems was much greater at 46 months; all showed very similar patterns of increasing reports of problems in line with increasing deprivation. For example, the proportion of children described by a parent as having problematic behaviour towards other children rose from 10% to 24%, while reported general behavioural problems rose from 28% to 37%, between the least and most deprived areas.

These patterns were supported by the standardised assessment of psychosocial health, which includes behaviour, conducted using the Strengths and Difficulties Questionnaire (SDQ). Figure 3.2 presents the abnormal and borderline scores across deprivation categories for each of the SDQ's domains, as well as the total difficulties score (derived from all the domains apart from pro-social behaviour). This clearly demonstrates a strong association between deprivation and poor psychosocial health at this very young age; the proportion of children with borderline or abnormal scores increased in line with increasing deprivation. The difference between children in the least and most deprived areas was the most extreme in relation to conduct problems (23% versus 41% had borderline or abnormal scores for this), hyperactivity (13% versus 27%), and total difficulties (7% versus 20%). Table 3.9 also presents the proportions for these three particular domains.

The SDQ conduct domain covers behaviours such as lying, cheating, stealing, fighting, having tantrums as well as general obedience. The hyperactivity domain captures aspects such as restlessness, fidgeting, poor concentration, compulsiveness and low attention span. All of these kinds of difficulties have significant consequences for children's well-being, their relationships with carers and other children, and their ability to settle into the formal school environment. The fact that 31% of children were assessed as having conduct problems before their fourth birthday is somewhat worrying. More concerning is the fact that the prevalence of this almost doubles between the least and most deprived areas. For many children these kinds of problems will not be severe enough to warrant intervention, but those who would benefit are spatially concentrated in more deprived areas which has obvious resource implications for service providers.

Table 3.9   Health outcomes by Scottish Index of Multiple Deprivation quintile

Health outcomes	SIMD quintile					Relative risk	Risk difference
	5th – least deprived	4th	3rd	2nd	1st – most deprived		
	%	%	%	%	%		
Longitudinal measures:							
Long-term health problems at least once between 10 and 46 months	24	25	27	30	33	1.4	9
Fair/bad/very bad health at least once since birth	11	14	16	22	24	2.2	13
2 or more accidents since birth	17	18	20	18	26	1.5	9
Measures at 46 months:							
A bit of a/big problem:							
Allergies/asthma	10	12	10	13	14	1.3	3
Other health problems	12	11	14	16	16	1.3	3
Behaviour to other children	10	13	15	16	24	2.3	14
Behaviour in general	28	26	33	31	37	1.4	10
Any language development concerns	12	13	18	23	26	2.2	14
BMI outside healthy range (ns)	26	28	28	30	29	1.1	3
Borderline/abnormal SDQ scores:							
Total difficulties	7	6	11	13	20	2.7	13
Conduct	23	25	32	34	41	1.8	18
Hyperactivity	13	14	19	24	27	2.1	14
Bases							
Weighted	*746*	*774*	*761*	*731*	*923*		
Unweighted	*867*	*855*	*821*	*663*	*735*		

Notes:

The relative risk is the prevalence in the most deprived areas divided by the prevalence in the least deprived areas, the risk difference is the difference in the prevalence in the two areas. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range.

Figure 3.2 **Strengths and Difficulties Questionnaire individual domain scores, by SIMD quintile (46 months)**
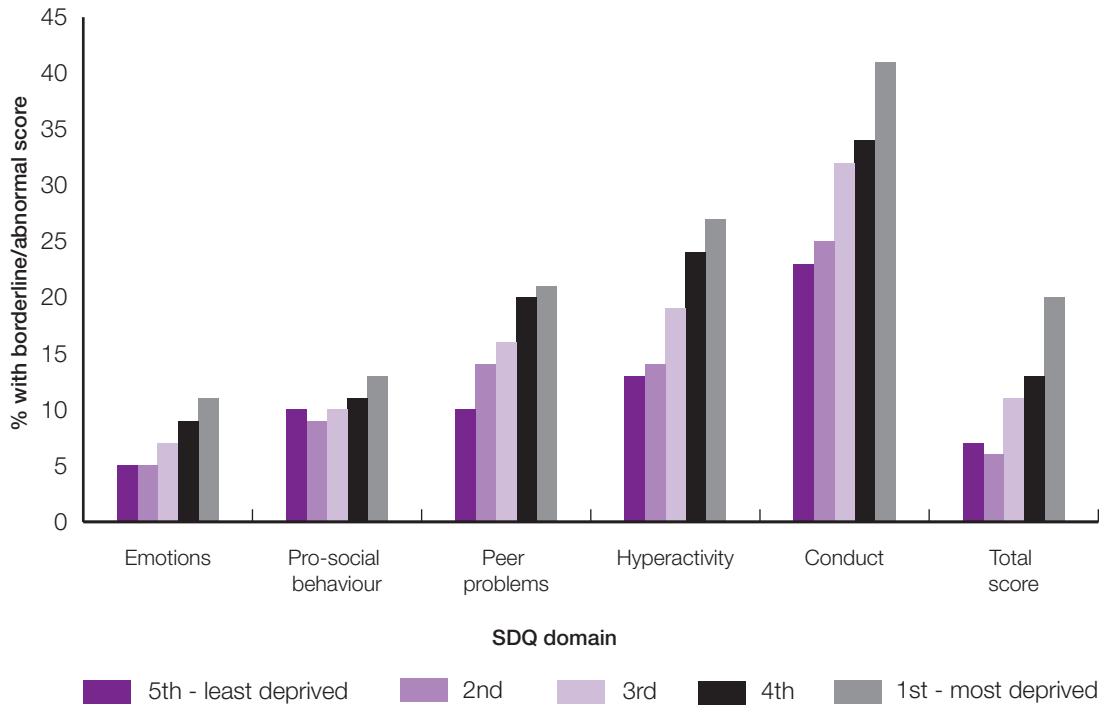
3.6.2 Household income

Table 3.10 presents the patterns by household income for a selection of the outcome measures, suggesting a very strong link between outcomes and income. The patterns for household income are broadly similar to those for deprivation with the relative risks greatest for language development and behavioural problems, and poor general health since birth.

The relative risks associated with the SDQ scores appear even starker for household income than with area deprivation, but it should be noted that the overall proportions in each income quintile were actually very similar to those in the deprivation quintiles. Very small differences in the underlying prevalence figures can result in disproportionately bigger differences in the relative risks.

Table 3.10 Health outcomes by equivalised household income quintile

Health outcomes	Equivalised household income quintile					Relative risk	Risk difference
	1st – highest	2nd	3rd	4th	5th – lowest		
	%	%	%	%	%		
Longitudinal measures:							
Long-term health problems at least once between 10 and 46 months	26	24	27	28	34	1.3	8
Fair/bad/very bad health at least once since birth	12	12	15	21	26	2.2	14
2 or more accidents since birth	16	19	18	22	24	1.5	8
Measures at 46 months:							
Any language development concerns	10	10	16	23	28	2.8	18
Borderline/abnormal SDQ scores:							
Total difficulties	4	7	8	14	21	4.8	17
Conduct	23	25	26	35	44	1.9	21
Hyperactivity	12	15	19	20	28	2.3	16
Bases							
Weighted	*625*	*684*	*732*	*748*	*946*		
Unweighted	*726*	*763*	*774*	*719*	*765*		

Notes:

The relative risk is the prevalence in the lowest income quintile divided by the prevalence in the highest income quintile, the risk difference is the difference in the prevalence in the two income categories. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range.

3.6.3 Socio-economic classification (NS-SEC)

The analysis of the same outcomes by NS-SEC showed that in all cases the prevalence of poor outcomes was largely similar for children in lower supervisory and technical households and semi-routine and routine households. In most cases children in managerial and professional households stood out as the least likely of all the NS-SEC groups to be at risk of poor outcomes.

3.6.4 Conclusion

The Scottish Government and COSLA's *Early Years Framework*, and *Equally Well*, consider health inequalities in the early years to be important explanations for differences in children's readiness to learn and adapt to the formal school environment. Policy interventions to try and narrow the gap between more and less advantaged children in terms of their health, wellbeing and wider development before they enter the education system need to be alert to the extent to which some children are behind their peers at this key stage. This analysis has attempted to reflect some of the problems children in Scotland face before they have reached the age of four.

The prevalence at such a young age of the kinds of psychosocial and language development problems outlined in the preceding sections illustrates the kinds of challenges schools and parents face at that crucial transition stage. A sizeable minority of children in the least advantaged social groups have experienced poor health, or a long-term condition beyond the usual array of acute illness children commonly experience in the early years, or multiple accidents requiring medical attention before they are four. More notably, problems with language development and with behaviour are clearly evident. The fact that these kinds of negative outcome are very unequally distributed among children, with those in the most disadvantaged groups at greatest risk, highlights the imperative for direct early interventions to remedy the immediate consequences of these outcomes, as well as the need for policy to address the broader social and economic influences that foster inequalities.

Having looked at health outcomes for children, the next section now explores exposures to risk factors for negative outcomes in the early years.

3.7 Exposure to risk factors likely to have an adverse impact on health

The first table in this section, Table 3.11, looks at some risk factors for poor health outcomes over the four years. As described in Chapter 2, these risks can have both immediate consequences, or long-term implications, or both. Although these tend to have been measured at less frequent intervals than most of the outcome measures discussed above, these risk factor measures provide important information about children's exposure to them in the early years.

Table 3.11   Risk factors for poor health, at 10, 22, 34 and 46 months

Risk factors	10 months	22 months	34 months	46 months
	%	%	%	%
Maternal factors:				
Current smoker	28	n/a	28	n/a
Smoker when child was 10 months and 34 months			23	
Long-term health problem or disability	16	18	17	20
Long-term health problem or disability at least once since child's birth				35
Child factors:				
Low fruit consumption (0-1 different types/day)	n/a	15	n/a	n/a
Low vegetable consumption (0-1 different types/day)	n/a	30	n/a	n/a
Consumes sweets/chocolate at least once a day	n/a	43	n/a	n/a
Consumes crisps/savoury snacks at least once a day	n/a	46	n/a	n/a
Has non-diet soft drinks at least once a day	n/a	12	n/a	n/a
Bases				
Weighted	*5187*	*4475*	*4071*	*3978*
Unweighted	*5188*	*4481*	*4150*	*3981*

Notes:

Bases vary for each measure, those shown are for the lowest of the range

n/a= not asked or not asked in a directly comparable way

A quarter of children (24%) had a mother who both smoked when they were 10 and 34 months old. A further 8% of mothers either smoked when their child was 10 months but gave up by the time they were 34 months, or were non-smokers at 10 months but smokers at 34 months. Table 3.12 and Table 3.13 below focus on the quarter of children that can be said to have been exposed to maternal smoke on a prolonged basis, at least when they were 10 and 34 months old (some will have been exposed for longer, but this information was not collected when the children were 46 months old).

The proportion of children whose mothers reported having a long-term health problem or disability increased a little between 10 and 46 months (from 16% to 20%). As with children's long-term conditions, there was a high degree of movement into and out of this category. Just 6% of children had a mother with a long-term condition throughout their first four years of life, but 35% did so for at least one period. The tables below focus on the prevalence of this latter measure. Maternal mental health was also explored when the children were 10 months old, using a scale from a standardized measure, the SF12 questionnaire mental health component.[8] This scale is designed to yield an average score for the whole population of 50; differences in mean SF12 maternal mental health component scores when the children were 10 months are presented in section 3.8.

Two aspects of the children's lifestyles were measured at 22 and 34 months. At 22 months, parents were asked how many different types of fruit and vegetable their children eat on a typical day. While this data cannot be used to judge whether children met the "5 a day" recommendation, it is a useful proxy measure of how much fruit and vegetables they consume. Low consumption of either of these items was defined as eating none, or just one, type per day.

Low fruit consumption was less common than low vegetable consumption (15% versus 30%), which might suggest that parents find it easier to feed their children fruit than vegetables. Parents were also asked how often their children consume sweets, crisps, savoury snacks, and non-diet drinks. Over four in ten children were reportedly eating confectionery or crisps/savoury snacks every day at 22 months, though far fewer, just 12%, were drinking non-diet drinks as often as this.

Physical activity was measured at 34 months by asking how much time children spent doing various physical activities in the previous week (such as running, cycling, swimming). A total estimate of time was derived from their answers and this measure was used to split the children into four equal sized groups ranging from the least active quarter to the most active (see Marryat *et al*., (2009) for a full discussion of children's activity at 34 months). The tables in section 3.8 focus on the 26% of children in least active group and explore whether low activity levels vary according to social groups.

---

8   The SF-12 questionnaire measures health related quality of life and covers the impact of physical, emotional and psychological symptoms on people's physical functioning and ability to carry out normal activities. It is a shortened version of the widely used SF-36 questionnaire. See: http://www.sf-36.org/tools/sf12.shtml

3.8 Inequalities in exposure to risk factors for poor health outcomes

3.8.1 Area deprivation

Table 3.12 explores differences in exposure to the risk factors discussed in section 3.7 by area deprivation. The first point to note is that some of the risk factors for poor outcomes show much higher prevalences, and often greater inequality in their distribution, than was the case for the direct health outcomes explored in the corresponding Table 3.9. For example, with maternal smoking, the factor with the largest absolute and relative difference between the levels of deprivation, there was a fivefold increase in children's prolonged exposure to this between those in the least and most deprived areas (from 8% to 41%). The proportion of children whose mothers had experienced a long-term health problem or disability at least once since their birth also increased in line with deprivation, from 27% in the least deprived areas to 42% in the most. Similarly, the variation in mean scores on the mental health component of the SF12 questionnaire was significant; mothers in the most deprived areas had the lowest scores indicating higher levels of mental health problems.

All three indicators highlight the extent of the double burden of health inequalities experienced in households with young children. Not only are the children in more deprived areas at greater risk of poor outcomes, so too are their mothers (and wider family), which in turn acts as a negative risk factor for the children. Improving the health and outcomes for children therefore requires interventions targeted at improving outcomes for their close carers as well.

Children's eating habits all show large absolute and relative differences between the most and least deprived areas. Under one in ten (8%) of children in the least deprived areas consumed 0-1 different types of fruit a day compared with almost one in four (23%) of children in the most deprived areas. The corresponding proportions who typically eat 0-1 different vegetables a day were 22% and 37%. The reverse was true for daily consumption of sweets, crisps or non-diet drinks. Around a third of children in the least deprived areas consumed sweets or crisps every day compared with half of those in the most deprived areas. It is worth noting that the absolute differences between the most and least deprived areas were the same for both fruit and vegetables (15 percentage points). However, the relative risk is larger for fruit consumption because the underlying prevalence of low fruit consumption was lower overall. This is a good illustration of the need to consider large relative risks in the context of the underlying prevalence figures. In this instance it would be incorrect to conclude that the larger relative risk means a greater problem exists in relation to fruit than vegetable consumption.

Rather than looking at all five of the diet measures, the remaining tables in this section focus on fruit and vegetable consumption. The health benefits of a diet with a wide range of fruit and vegetables are well established so children who consume a limited variety of them can therefore be considered to be at an objective disadvantage relative to those who do not. In contrast, regular consumption of sweets, crisps and sugary drinks is not necessarily directly harmful unless the rest of the diet is unbalanced, dental hygiene is poor and activity levels are low.

As outlined in section 3.7, the questions about physical activity at 34 months were used to group the children according to their overall level across a number of activities. Table 3.12 looks at the least active children, defined as being in the lowest 25% of the distribution. Children in the least deprived areas were around half as likely as those in the most to be in this low activity group (18% versus 34%). The association between area deprivation and activity levels could be due to a lack of resources at the household level (such as access to a garden) or it could be related to the quality and provision of open spaces and play facilities in the local area. There is certainly scope for much further exploration of this than there is space in this report, and a much more detailed assessment of children's activity has been introduced at age 6 which would help with this.

Table 3.12   Risk factors for poor health outcomes by Scottish Index of Multiple Deprivation quintile

Risk factors	SIMD quintile					Relative risk	Risk difference
	5th – least deprived	4th	3rd	2nd	1st – most deprived		
	%	%	%	%	%		
Maternal factors:							
Mother smoked when child was 10 & 34 months old	8	15	21	28	41	5.1	33
Long-term health problem/ disability at least once since child's birth	27	32	35	37	42	1.6	15
Mean score on SF12 mental health scale (10 months)	51.4	50.9	49.9	49.3	48.7	–	-2.7
Standard error of mean	0.21	0.26	0.33	0.37	0.31	–	–
Child factors:							
Eating habits (22 months)							
Eats 0-1 different fruits a day	8	11	13	20	23	2.9	15
Eats 0-1 different vegetables a day	22	29	28	34	37	1.7	15
Eats sweets at least daily	30	35	42	48	56	1.9	26
Eats crisps at least daily	35	42	46	49	54	1.5	19
Has sugary drinks at least daily	6	10	11	15	17	2.6	10
Low physical activity level (34 months)	18	22	25	31	34	1.9	16
Weighted bases	*769*	*789*	*804*	*730*	*980*		
Unweighted bases	*895*	*867*	*854*	*671*	*792*		

Notes:

The relative risk is the prevalence in the most deprived areas divided by the prevalence in the least deprived areas, the risk difference is the difference in the prevalence in the two areas. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range.

3.8.2 Houshold income

Table 3.13 reveals some very similar patterns to Table 3.12. The absolute and relative risks of prolonged exposure to maternal smoking were greater for income than with area deprivation which is due to a marginally higher smoking rate among those in the lowest income households, and a marginally lower rate among those in the highest, than was the case in relation to the corresponding deprivation quintiles.

The proportion of children whose mothers have had a long-term health problem at least once since their birth was also higher in the lowest income households than in the most deprived areas, which helps to illustrate the importance of being able to look at inequality from more than one perspective to include measures of direct household resources as well as those pertaining to the areas in which people live. The patterns in relation to diet and physical activity also confirm the fact that household level resources are a strong determinant of exposure to risk factors for poor health in the early years and that further exploration of these patterns to disaggregate the household and area level influences of these risks could be enlightening.

Table 3.13   Risk factors for poor health outcomes by equivalised household income quintile

Risk factors	Equivalised household income quintile						
	1st – highest	2nd	3rd	4th	5th – lowest	Relative risk	Risk difference
	%	%	%	%	%		
Maternal factors:							
Mother smoked when child was 10 & 34 months old	6	11	18	27	45	7.5	39
Long-term health problem/ disability at least once since child's birth	26	28	34	34	47	1.8	21
Mean score on SF12 mental health scale (10 months)	51.4	50.6	50.8	49.3	48.0	–	-3.4
Standard error of mean	0.24	0.29	0.36	0.33	0.41	–	–
Child factors:							
Eating habits (22 months)							
Eats 0-1 different fruits a day	7	10	13	18	25	3.6	18
Eats 0-1 different vegetables a day	22	24	28	35	39	1.7	16
Low physical activity level (34 months)	15	21	26	28	33	2.2	18
Weighted bases	*617*	*763*	*709*	*816*	*911*		
Unweighted bases	*710*	*846*	*743*	*787*	*742*		

Notes:

The relative risk is the prevalence in the lowest income quintile divided by the prevalence in the highest income quintile the risk difference is the difference in the prevalence in the two income categories. These two measures were calculated using the raw data whereas the percentages in each column have been rounded to the nearest whole number; the relative risks and risk differences cannot therefore be calculated from the percentages presented.

Bases vary for each measure, those shown are the lowest of the range.

3.8.3 Socio-economic classification (NS-SEC)

Prolonged maternal smoking increased progressively across the five NS-SEC categories with the gap at its most extreme between professional and managerial households and semi-routine and routine households. The pattern for low fruit consumption was similar. In contrast, levels of low vegetable consumption and low activity were broadly similar across all groups except for professional and managerial households where these were the least common. Both the relative risk and absolute difference between the highest and lowest NS-SEC groups for maternal long-term health problems was lower than was evident for deprivation or household income. The pattern of association was not linear, 31% of mothers in professional and managerial households experienced long-term health problems at least once since their child was born compared with 34%-40% in all other groups. It is possible that poor maternal health could impact on household income if mothers' earning potential is affected as a consequence. However, as this NS-SEC measure reflects the household member with the highest status, there is probably less of a possibility that the relationship could work in that direction for this factor.

3.8.4 Conclusion

Some of the patterns discussed in the three preceding sections (3.8.1 to 3.8.3) looking at inequalities in exposure to risk factors are notable for the way in which the same measure can sometimes display a different pattern of association depending on the socio-demographic through which it is viewed. In addition, different variables revealed variations in relation to the same demographic factor, as shown in the above discussion of maternal ill-health and NS-SEC.

This reinforces the points made in Chapter 1 about the multifaceted nature of health inequality and its manifestations. However, the broad picture mapped out in this section does confirm to the overall message that drew the preceding section about outcomes to a conclusion.

Exposure to the kinds of risks that can affect health and development in the early years, and can have implications for decades to come, are not uniformly or randomly distributed across the population. Children from less affluent backgrounds are at a significant disadvantage in terms of their exposure to factors as seemingly diverse as physical activity, maternal mental health or smoking rates. The fact that the diets of children in less affluent circumstances appear to be higher in energy dense foods and lower in fruit and vegetables, and that low activity levels are highest among this group, suggests that the absence of health inequalities in unhealthy weight or obesity could well be temporary.

3.9 Summary measure of negative outcomes

To aid the analysis in the next chapter a summary measure of negative outcomes was created by summing a number of the negative outcomes experienced by children in their early years. This scale was not meant to have any substantive meaning in terms of estimating the overall prevalence of negative outcomes among children in the population; that would be a highly reductive approach and would be meaningless as it could never include all potential outcomes that are important to capture. However, for analytic purposes a scale such as this can be more helpful to explore associations with other factors than one or two single measures, which risks missing key children if the outcomes selected did not happen to be the ones that best reflect outcomes in general. In line with the definition of health set out in Chapter 1, the scale included a mixture of physical health outcomes as well as developmental, behavioural and psychosocial ones and spanned the period from birth to 46 months. For reasons that will explained further in the next chapter, it did not include any of the risk factors presented in the section above as this would limit the potential to use these in the exploration of resilience. The items in the scale were as follows, children were given one point for each outcome they had experienced:

- Low birthweight

- Time in an incubator or neo-natal unit following birth

- Fair/bad/very bad health at least once between 10 and 46 months

- Two or more accidents between 10 and 46 months

- Long-term health problems at least once between 10 and 46 months

- Any language development difficulties (reported by parent at 46 months)

- General behaviour problems (reported by parent at 46 months)

- Borderline/abnormal total difficulties SDQ scores (parental assessment at 46 months)

- Below average verbal ability (direct assessment at 34 months)

- Below average problem solving ability (direct assessment at 34 months)

Although the maximum score possible was 10, no child scored more than nine and just 0.5% had a score as high as this. A quarter (24%) of children had a score of zero and a further three in ten (29%) scored just one. The figure below shows the distribution of the scores for all children (in the first bar presented for each score). In the second set of bars the scores of children living in the most deprived area quintile are shown. Doing this illustrates the fact that children in more deprived areas are less likely than average to have low scores and more likely to have higher scores.

Figure 3.3   Negative health outcome scale in the 0 to 4 years period for all children and for those in the most deprived quintile of the Scottish Index of Multiple Deprivation
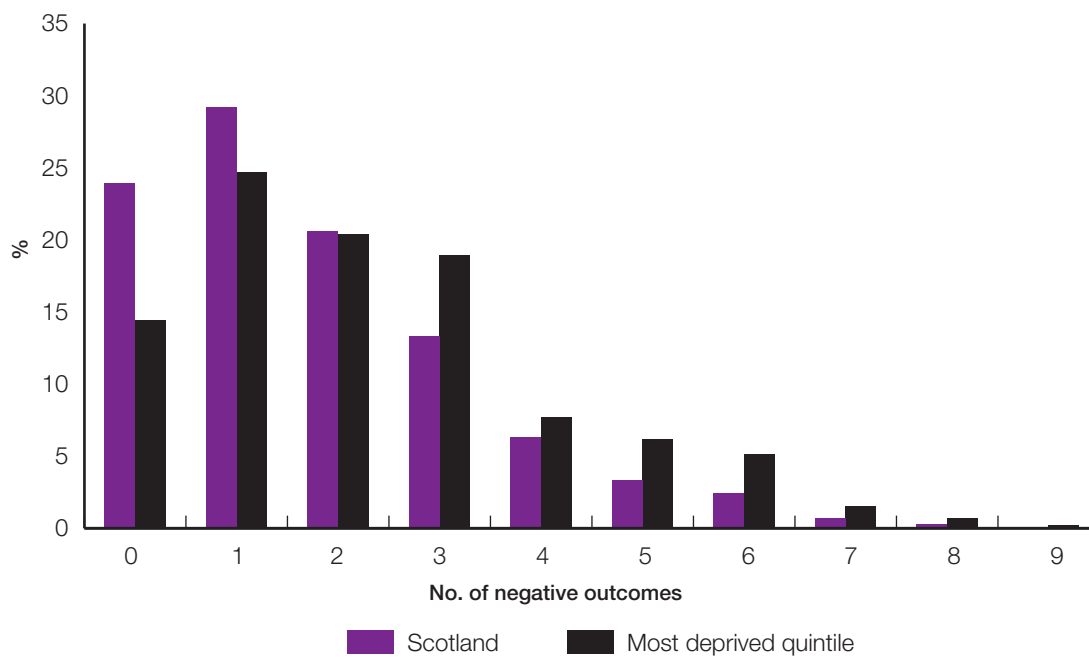
chapter
AVOIDING NEGATIVE OUTCOMES

4

4.1 Key findings about the avoidance of negative health outcomes

The analysis in this chapter explored the factors associated with avoiding negative outcomes among disadvantaged children with a particular focus on the concept of resilience. Resilience has been defined as *"the process of withstanding the negative effects of risk exposure, demonstrating positive adjustment in the face of adversity or trauma, and beating the odds associated with risks"* (Bartley, 2006). The kinds of factors that have been thought to help children at high risk of negative outcomes to avoid them are wide ranging. This chapter explored a range of possible factors including: maternal, family and household characteristics and behaviours; neighbourhood characteristics; and social support networks.

The extent to which these measures were associated with negative outcomes was explored for all children in the first instance.

The key findings were:

- The findings in relation to all children reinforce the evidence that there are strong associations between child outcomes and maternal health and behaviours such as smoking, long-term health problems or disability as well as confidence in parenting abilities. It should be recognised, though, that the experience of having a child with negative health outcomes may in itself influence some of these maternal measures.

- A number of factors within households also showed associations with the avoidance of negative outcomes, for example the consumption of fruit and vegetables and higher levels of physical activity. The findings also suggest possible associations with measures relating to tenure stability and major life events, parental feelings about household income and the home learning environment (the latter is likely to be related to the measures of cognitive and language development used in this stage of the analysis).

- It has also been suggested that neighbourhoods provide an important source of resilience for families. Based on two measures of satisfaction with local services and judgments of the child friendliness of local areas, positive assessments of these aspects were associated with fewer negative outcomes.

- The extent of social support appeared to be associated with avoiding negative outcomes. Regular attendance at parent and toddler groups throughout the child's life and the ability to draw on support at short notice were both more common among children with low negative outcomes.

To identify resilience it is necessary to show what factors are associated with avoiding negative outcomes among children who are at an increased risk of them. It was clear from the analysis of health inequalities that for most of the negative outcomes of interest, children living in the most deprived areas, in the lowest income households and in semi-routine and routine households were most likely to experience them. Therefore the next stage of the analysis focused on children from disadvantaged backgrounds – those from any of the three socio-economic groups at most risk of negative outcomes. This approach disentangles the association between resilience and socio-economic background which might have explained the findings outlined above.

This showed that:

- Only a few of the resilience measures were independently associated with avoiding negative outcomes. Therefore, factors such as area deprivation, income or socio-economic classification clearly have a major influence. In other words, this emphasizes the difficulty of countering very powerful economic and structural influences on early life.

- The significant resilience measures were quite different in nature to each other. For example, children were less likely to have negative outcomes if their mother had not experienced long-term health problems, or if they lived in a household with at least one adult in full-time work, or if they had a more enriching home learning environment. These different kinds of factors would have very wide ranging policy implications.

- Some of the significant associations that remain are surprising – for example, even within disadvantaged groups, older maternal age is a predictor of avoiding negative outcomes.

- It is clear that most of the resilience measures that are significantly associated with avoiding negative outcomes do not sit entirely within the health domain and that effective action to promote resilience and address child health inequalities requires action at many different levels and from a wide range of agencies and bodies.

4.2 Introduction

This chapter starts by briefly mapping out what is meant by resilience in the wider health and child development literature. It then presents the measures from GUS that will be used to explore the concept. The final part of the chapter discusses the analysis conducted to attempt to answer the question of whether any factors appear to be associated with the avoidance of negative outcomes among children from disadvantaged background.

4.3 What is resilience?

Bartley (2006:4) suggests that: *"The notion of resilience refers to the process of withstanding the negative effects of risk exposure, demonstrating positive adjustment in the face of adversity or trauma, and beating the odds associated with risks."* The concept of resilience has a longer history in psychology and ecology than in the fields of health and social science (Tunstell *et al.*, 2005). In psychology, resilience tends to focus on individual character traits and resources, and is a major concept in child development (see for example Goldstein and Brooks, 2005). In contrast, its adoption by researchers in the health field has seen resilience extended to mean something related to individuals, places and communities (Mitchell *et al.*, 2009). Indeed, some place particular emphasis on the wider social context in which resilience is fostered, for example Gilligan (2004:94) states that *"[t]he degree of resilience displayed by a person in a certain context may be said to be related to the extent to which that context has elements that nurture this resilience"*.

A series of linked projects between 2003 and 2007 explored resilience and health in relation to a wide range of factors including the presence of strong personal relationships (within families and between individuals within communities), positive relationships between parents and children, enriching environments with opportunities for children to play and learn, neighbourhood support networks and social capital, and educational attainment (Bartley, 2006).

The ability to identify possible factors that promote resilience among individuals and communities which might act as a buttress to the kinds of socio-economic disadvantage that so often result in inequalities in outcomes – as presented in Chapter 3 – is of obvious interest to policy makers. However, Wilkinson (cited in Bartley, 2006) argues that while it is clearly right for societies to provide ways of protecting people from the negative consequences of adversity, and to continuously seek better means of doing so, these kinds of policy interventions are not necessarily any less expensive or less difficult to deliver than interventions that might diminish the root causes of disadvantage.

4.4 The definition of resilience in this report

In common with Bartley's (2006) definition above, to explore children's ability to withstand the negative effects of risk exposure we need to distinguish between those who have generally avoided adverse outcomes in their early years and those who have not. The summary measure of negative outcomes outlined at the end of the previous chapter is therefore the starting point for the analysis.

Resilience is arguably a rather meaningless concept if it cannot be demonstrated that negative outcomes have been avoided despite there being a high likelihood of them occurring. It was clear in Chapter 3 that for most of the negative outcomes of interest, children living in the most deprived areas, in the lowest income households and in semi-routine and routine households were the most likely to experience them.

One way of establishing whether children have avoided negative outcomes despite being in a high risk group (i.e. living in a deprived area, low income household, semi-routine and routine household) would be to look at the association between negative outcomes and various resilience measures in each of these three most disadvantaged groups separately. However, the sample is not big enough to restrict the analysis in this way. Instead a pragmatic choice was made to classify children as disadvantaged if they were from any of the three socio-economic groups at most risk of negative outcomes, but not in *any* of the least deprived categories for these measures (the highest income, the least deprived areas, or professional/managerial households). This additional exclusion was important because children living in the most deprived areas can come from families in the highest income or professional/managerial households. This resulted in an unweighted sub-sample of around 1,000 children.

The inclusion of a wide range of measures in the negative outcomes scale means that the proportion of children in this disadvantaged sub-group of around 1,000 children who avoided all ten of the negative outcomes (and therefore have scores of zero) is quite small. For this reason the analysis of resilience presented here focuses on children with scores of one or zero.

4.5 Potential measures of resilience

As outlined above, resilience can be operationalised in many different ways and in relation to numerous aspects of a child's early experiences. It is never easy to investigate a complex topic such as this using a study that did not have that specific aim as one of its central objectives. However, GUS is fairly broad in its reach and much of what it has covered relates either directly or indirectly to the theory of resilience so while it does not have as comprehensive a set of measures as might be ideal for this purpose, it certainly has enough to allow at least a preliminary scoping of the topic. This should therefore be treated as exploratory and intended to signal future possibilities for analysis of existing data or further questions in GUS.

The kinds of resilience measures identified from within the study's four sweeps can be grouped into four broad themes linked to the characteristics of parents, the family and household setting, the neighbourhood context, and the degree of social support available to the main carer, child and wider family unit. Although these four headings are all linked in some way to the wider literature on resilience, they are not meant to be definitive nor are they fixed. Indeed, many of the measures discussed below could be assigned to more than one of the headings used. What matters is not the allocation of individual measures to specific groups, but rather whether the measures themselves tell us anything meaningful or useful in terms of the central question being addressed:

- What factors, if any, correlate with the avoidance of negative early health outcomes, among families from disadvantaged backgrounds?

The measures presented in the following tables include some of the risk factors that were explored in Chapter 3, such as maternal health and smoking, and children's diet and activity levels, as well as some new ones. As noted in the previous chapter, the negative outcomes scale excluded the risk factors for poor health explored in this report. This is because these risk factors are not only of interest in terms of the inequality in children's exposure to them, but also in terms of their potential to moderate negative outcomes.

To help introduce the resilience measures, and to illustrate the extent of their overall prevalence, the following tables compare the scale of negative outcomes for all children in relation to resilience. We will return to the question of whether any of these factors are associated with the avoidance of negative outcomes among children from disadvantaged backgrounds after these measures have been mapped out.

4.5.1 Maternal factors

Table 4.1 looks at the association between the number of negative outcomes experienced and a range of possible resilience measures relating to mothers or main carers. The measures highlighted here focus on behaviours that might potentially protect children from experiencing negative outcomes. The main point of the table is to compare the prevalence of potential resilience measures across each of the four groups of children, from those on the left hand side with scores of one or less on the negative outcomes scale, through to those with scores of four to nine.[9] If children with 0-1 negative outcomes have greater exposure to the resilience measure than children with two or more this indicates that it might be associated with avoiding negative outcomes. The total "stock" of each form of resilience in the population is presented in the final column.

---

9   Unlike the tables in Chapter 3, these tables compare the number of negative outcomes children experienced according to each resilience measure, rather than the other way round, so the relative risk associated with each factor cannot be calculated.

For example, 69% of all children had mothers who did not smoke when they were 10 or 34 months old. The prevalence of this was higher (76%) among children with one or less negative outcomes, and much lower (51%) among those with four or more. So having a mother who does not smoke is associated with avoiding negative outcomes. The patterns were similar for the three other measures explored previously in Chapter 3, i.e. long-term health problems, breastfeeding and maternal mental ill-health as measured by the SF-12.

Maternal education is often considered to be an important asset and many studies have shown that it promotes, or is at least associated with, positive outcomes for children (Bradshaw and Martin, 2008). Children with scores of one or less were more likely than those with scores of four to nine to have mothers educated to degree level or above (34% versus 18%) and less likely to have mothers with no qualifications (6% and 16%), or with standard grades (15% and 26%). Some of this pattern is accounted for by mothers' ages when their child is born, and it is clear that children with a low negative outcome score are more likely than those with higher scores to have a mother aged 25 or over.

The table also explores two attitudinal measures based on questions asked when the children were 10 months old. Mothers were asked to assess their parenting ability, having a mother who thought she was a very good parent was more common for children with scores of one or less. Conversely, having a mother who said she was an average or worse parent was much more common among children scoring four to nine.

A composite measure of mothers' attitudes towards asking for help about parenting was created by combining the answers to three statements: "If you ask for help or advice on parenting from professionals like doctors or social workers, they start interfering or trying to take over"; "it's difficult to ask people for help or advice about parenting unless you know them really well"; and "It's hard to know who to ask for help or advice about being a parent". Disagreement with the three statements was considered indicative of having more positive views about help-seeking. Positive views about help-seeking were more common among children with one or less negative outcomes.

The direction of the association between outcomes and the three final resilience measures in the table could well flow in the opposite direction to that suggested by proponents of resilience as a protective factor. For example, negative outcomes for children might impact on maternal well-being and on confidence levels in relation to their parenting skills, rather than the other way round. It is worth noting at this point that none of the patterns presented in the tables should be interpreted as implying anything concrete about the relationship between factors beyond the fact of their association. These results cannot be used to draw conclusions about causation or the direction these associations take.

It is clear from the outset that the association between outcomes and resilience displays a very similar pattern to that seen in Chapter 3 in relation to outcomes and socio-economic factors. The final stage of the analysis in this chapter addresses the fact that many of the associations outlined here are very likely to be partly explained by differences in socio-economic circumstances. The relationships apparent in Table 4.1 to Table 4.3 might well disappear (or at least reduce) when factors such as deprivation, income or NS-SEC are considered as well (see section 4.6).

Table 4.1 Number of negative health outcomes by maternal resilience measures

Resilience measures	Number of negative health outcomes				
	One or less	Two	Three	Four or more	Total
	%	%	%	%	%
Mother did not smoke when child was 10 & 34 months old	76	69	59	51	**69**
No long-term health problem/ disability since child's birth	72	66	53	50	**65**
Child was breastfed	64	58	55	50	**60**
Maternal education					
Degree	34	25	19	18	**28**
HE below degree	38	42	39	36	**39**
Higher grades	9	7	7	4	**7**
Standard grades	15	17	21	26	**17**
No qualifications	6	9	14	16	**9**
Maternal age					
35+	24	17	18	14	**21**
25-34	57	56	49	42	**54**
15-24	19	27	33	44	**26**
Assessment of parenting ability					
A very good parent	37	34	32	27	**34**
A better than average parent	28	26	23	22	**26**
Average or worse parent	35	39	44	50	**39**
	Mean scores				
Attitude to seeking help about parenting (higher mean score = more positive)	10.4	10.1	9.7	9.6	**10.1**
Standard error of mean	0.04	0.07	0.09	0.10	**0.03**
SF12 mental health scale (higher mean score = better mental health)	51.3	49.8	47.8	47.0	**50.0**
Standard error of mean	0.18	0.34	0.48	0.51	**0.15**
Bases					
Weighted	*2005*	*775*	*499*	*491*	*3770*
Unweighted	*2131*	*762*	*465*	*424*	*3782*

Note:
Bases vary for each measure, those shown are the lowest of the range.

4.5.2 Home and family resilience measures

The measures in Table 4.2 include the two diet questions and the physical activity scale explored in Chapter 3. These are included here as potential indicators of behaviours that might help to build resilience among disadvantaged children if they are encouraged in the home. The differences between the groups are not as stark as was the case with some of the factors shown in Table 4.1. In contrast, how much experience parents had had with children before the study child was born does not appear to have any association with the number of negative outcomes experienced.

The measures of tenure stability and major life events are an attempt at capturing the extent to which children have experienced upheaval in their first four years of life. It is possible that these kinds of disruptions in early life could result in already disadvantaged children being at greater risk of negative outcomes when compared with similarly disadvantaged children who have had more stable lives. Neither are perfect measures and there is of course a direct correlation between attrition in a study like this and major upheavals of these kinds so it is possible that the families in the sample are not wholly typical of the wider population when it comes to measures such as these. Although the differences between the groups are relatively small at around seven percentage points, these measures are worth exploring further at the next stage of the analysis.

The income measure is based on responses to a question included every year that asks parents how they feel about their household income. The scale ranges from "living very comfortably on present income" to "finding it very difficult". Answers from all four years were combined and the sample was split into four roughly equal sized groups ranging from the most positive quarter to the least positive. Although we have direct measures of income this arguably taps a rather different aspect which is closer to capturing the extent to which families are free from the stresses associated with money worries. Children with scores of one or less are more likely to live in households with more positive feelings about their income and, conversely, those scoring four to nine were twice as likely to live in households in the least positive group.

The final measure presented in Table 4.2 is an index of the children's home learning environment. It was originally developed to assess the association between children's activities at 10, 22 and 34 months and their cognitive development at 34 months (Melhuish, 2010). The index covers aspects such as: how often the children have been read to; done activities such as painting, singing rhymes, or playing educational games; and the number of books in the home. Higher scores on the index indicate children who have experienced a higher number of these items. The negative outcomes scale includes the two cognitive ability measures at 34 months that have been shown to be associated with the home learning index so it is not surprising that higher scores on it are also associated with low scores on the negative outcomes scale.

Table 4.2   Number of negative health outcomes by home/family resilience measures

Resilience measures	Number of negative health outcomes				
	One or less	Two	Three	Four or more	Total
	%	%	%	%	%
Eats 2+ different fruits a day	88	86	80	75	**85**
Eats 2+ different vegetables a day	73	68	66	63	**70**
High physical activity level	26	28	24	19	**25**
Experience with children (prior to child's birth)					
A lot	9	10	9	13	**10**
Quite a lot	15	14	14	13	**14**
Not very much	14	16	10	9	**13**
None at all	12	11	12	9	**12**
Already had children	51	49	56	55	**52**
Lived at same address since 10 months old (high stability)	68	64	63	61	**66**
No major life events since child 10 months old*	40	38	35	33	**38**
Feelings about income over 4 years (quartiles)					
1st – Most positive	29	19	13	13	**23**
2nd	22	22	21	18	**21**
3rd	29	31	30	30	**29**
4th – least positive	20	28	36	39	**26**
	Mean scores				
Home learning environment (higher mean score = more enriched environment)	46.7	44.2	43.1	38.9	**44.7**
Standard error of mean	0.21	0.39	0.47	0.55	**0.17**
Bases					
Weighted	*2039*	*790*	*509*	*503*	*3841*
Unweighted	*2159*	*775*	*473*	*435*	*3842*

Notes:

Bases vary for each measure, those shown are the lowest of the range.

*The events covered each year from 22 months were: new parent/partner; parent not resident full time; parent married; new baby; another child moving into or out of house; death of sibling, parent or grandparent; illness of parent or sibling. It is of course possible that other kinds of major life events will have happened to these families, but they have not been captured by this set of questions.

4.5.3 Neighbourhood resilience measures

Table 4.3 looks at the extent to which neighbourhoods can confer resilience. As the introduction to this chapter outlined, community resilience has featured prominently in the literature around resilience and health in recen t years. GUS includes a fairly large number of questions about services and parents' views of them, as well as more general items to measure satisfaction with neighbourhoods. The two measures in the table are composite scales based on two sets of questions asked when the children were 34 months old. The child friendliness scale was based on five questions originally developed for use in the 'Starting Well Demonstration Project' evaluation in Glasgow (Mackenzie *et al*., 2004) and was explored in full in a previous GUS report (Bradshaw *et al*., 2009). The questions covered aspects such as whether the area is a good place to bring up children, whether people in the local neighbourhood can be trusted with children.

As shown in the table, children who scored one or less on the negative outcomes scale were more likely than those with scores of four-nine to live in an area rated as being highly child friendly (21% versus 12%), and were less likely to live in areas with a low rating (15% versus 26%). This is likely to be explained in part by area deprivation which is related to both negative outcomes and perceptions of child friendliness. The next stage of the analysis in Section 4.6 addresses this.

The second scale measured parents' satisfaction with services and facilities in their local area. The aspects covered were local health and childcare services, educational establishments, and facilities for adults, teenagers and young children (see Bradshaw *et al*., 2009). Once again, children with scores of one or less on the negative outcomes scale were more likely than those with higher scores to live in areas rated highly in terms of their local services, and less likely to live in areas with low ratings.

Table 4.3   Number of negative health outcomes by neighbourhood resilience measures

Resilience measures	Number of negative health outcomes				
	One or less	Two	Three	Four or more	Total
	%	%	%	%	%
Child friendliness of local area					
High	21	15	13	12	**18**
Medium	65	62	62	62	**63**
Low	15	23	25	26	**19**
Satisfaction with local facilities					
High	34	29	26	22	**30**
Medium	29	24	21	23	**26**
Low	37	47	53	56	**44**
Base (child friendliness)					
Weighted	*1884*	*721*	*483*	*460*	*3548*
Unweighted	*2029*	*714*	*454*	*400*	*3596*
Base (satisfaction with facilities)					
Weighted	*1473*	*593*	*401*	*373*	*2840*
Unweighted	*1581*	*583*	*370*	*326*	*2860*

Note:

Bases vary for each measure, those shown are the lowest of the range.

4.5.4 Social support networks

Finally, in Table 4.4, we look at measures of social support and networks. In many ways this table overlaps with the previous tables as it encompasses aspects related to parental behaviour and neighbourhood networks (in the form of attending parent and toddler groups) as well as support for families from grandparents, friends or other family members.

The first measure in Table 4.4 uses the question asked each year about attendance at parent/toddler groups to assess how many years mothers reported doing this. Although the differences between children with low and high scores on the negative outcome scale were not large, they were statistically significant.

The next measure used a similar approach and calculated the total number of years in which parents reported they would have difficulties finding someone at short notice to look after their child for a day. About half of mothers said this would not be difficult for them every year it was asked, but the proportion was higher among children with low scores on the negative outcomes scale and lower among those with scores of four to nine. The pattern was similar in relation to whether parents said at 10 months that they had family or friends with medical knowledge or training who they could call on for advice about their child's health. In contrast, a similar proportion across all groups had a high level of support from the child's grandparents at the age of 10 months.

Table 4.4   Number of negative health outcomes by social support resilience measures

Resilience measures	Number of negative health outcomes				
	One or less	Two	Three	Four or more	Total
Years parent has attended a parent/toddler group					
Four	10	10	6	5	**9**
Three	21	18	17	12	**18**
Two	20	21	19	22	**20**
One	19	21	22	23	**20**
Never	31	31	36	39	**32**
Years parent has said it would be difficult to find help at short notice to look after child					
Never difficult	55	49	47	38	**50**
One	17	17	19	19	**17**
Two	11	13	15	15	**13**
Three	9	11	12	16	**11**
Four	8	10	7	12	**9**
High level of grandparental support when child 10 months	22	24	24	24	**23**
Friend/family member with medical knowledge when child 10 months	45	41	42	35	**43**
Bases					
Weighted	*2039*	*789*	*509*	*504*	*3841*
Unweighted	*2159*	*775*	*473*	*435*	*3842*

Note:

Bases vary for each measure, those shown are the lowest of the range.

Most of the figures presented in the above tables suggest an association between the avoidance of negative outcomes and individual, family, neighbourhood and support network related resilience measures. However, we know from Chapter 3 that children from the least disadvantaged socio-economic groups are the most likely to have few negative outcomes in their first four years. The association between low negative outcomes and parents having friends or family members with medical knowledge or training is likely to result from people from more advantaged groups being more likely to know people like this, rather than from any direct benefits that this access to medical knowledge might confer.

None of the patterns highlighted above should be considered in any way to indicate possible causal links between resilience and outcomes. So, while the above analysis has been useful in setting the scene for the next stage of the analysis, and in illustrating the extent of certain resilience measures in the population, it has little to offer by way of useful recommendations for policy to help children from disadvantaged backgrounds avoid negative outcomes. The next section turns its focus to some analysis that might prove more useful in this respect.

4.6 What factors appear to protect disadvantaged children from negative outcomes?

4.6.1 Analysis method

This stage of the analysis focused only on children from more disadvantaged backgrounds. To recap, to identify resilience it is necessary to show what factors are associated with avoiding negative outcomes among children who are at an increased risk of them. As set out in Section 4.4, this was done by restricting this final stage of the analysis to children who live in either the most deprived areas, in the lowest income households, or in semi-routine and routine households – and do not live the least deprived area deprivation quintile, the highest household income quintile or in professional and managerial households.

The resilience measures set out in the preceding tables were explored using logistic regression. This technique assessed the extent to which each of the resilience factors had an independent association with avoiding negative outcomes (having a score of one or less on the negative outcomes scale), when all other factors were taken into account. This whole approach helped to overcome the problem discussed above of how to disentangle the association between resilience and socio-economic background.

There are many ways to approach analysis such as this and certainly there are more sophisticated statistical techniques that could be applied to control for the association between affluence and the resilience measures outlined above. However, this approach was chosen because it was thought to be clear and easily interpretable.[10] This analysis hopefully highlights the fact that this is an area worthy of more detailed exploration, and illustrates the increasing analytic potential that GUS is offering as the study progresses.

4.6.2 Regression results

Table A1 in the Appendix presents the full results of the logistic regression. Table 4.5 highlights the key statistically significant findings. In addition to the resilience measures explored above in Section 4.5, some other factors were included in the model, either because they are known to be critical in terms of explaining outcomes (such as sex), or because they capture additional important aspects of resilience that have specific resonance among more disadvantaged families (such as adult employment status). Although the largest differences between the most and least disadvantaged children will have been accounted for by removing those from the least deprived areas, the highest income households, and professional and managerial households, the remaining categories for these three measures were still included in the analysis.

The number of factors explored in the regression was relatively high for this type of analysis. One of the dangers associated with this kind of approach is that using a standard threshold of 5% for statistical significance will result in one in twenty findings being significant by chance. This therefore needs to be borne in mind when interpreting the results. One option is to raise the threshold to 1% so the risk of chance findings reduces. However, with this analysis it is also possible that real differences in the population will not be detected as significant because the sample size in the disadvantaged sub-population of around 1,000 cases is too small. Further restricting the interpretation by setting a stricter significance level therefore increases the risk of missing genuine results. The key point is that the findings of all types of analysis should be interpreted with reference to the prior hypotheses that led to the analysis being conducted in the first place, and with regard to the existing evidence in the field. It should not be considered in isolation nor treated as definitive.

---

10 The statistical analysis and approach used in this report represents one of many available techniques capable of exploring this data. Other analytical approaches may produce different results from those reported here.

Odds ratios, and their confidence intervals, are a useful indication of the size of the effect estimated in this kind of analysis.[11] While statistical significance is an important indicator of whether a finding has relevance in the wider population, effect sizes are arguably more important when it comes to determining the policy significance of findings. A factor that is highly statistically significant but has a small effect might not warrant much action, especially if the costs associated with it would be hard to justify in terms of its likely overall impact.

The factors that were found to have an independent association with avoiding negative outcomes (after taking into account all the measures shown in the table in the appendix) are set out below. The analysis compared the odds of the groups listed in the left hand column of avoiding negative outcomes relative to the odds of the comparison group shown in brackets. The second column presents the odds ratio associated with each factor and the third shows the range of values for the odds ratio that we can be 95% confident includes the true population value for that factor. In all cases the odds ratio is higher than one which shows that the odds of avoiding negative outcomes increased relative to the comparison group.[12]

The wider the confidence interval, the less precise the estimate, for example, the confidence interval for maternal age suggests that compared with children whose mothers were aged 15-24 when they were born, the odds of children whose mothers were aged 35 and over avoiding negative outcomes ranged between 1.21 and 3.14. This means that the effect of having a mother aged 35 or over could be as small as a 21% increase in odds, or it could be as large as a 214% increase. This wide interval will be a result of the relatively small sample size for older mothers and all that can be concluded is that there is a positive association but its magnitude cannot be precisely estimated.

---

11 The confidence intervals in the rest of the table are in line with what might be expected with a sample size such as this. GUS analyses typically involve the whole sample which, with around 4,000 cases, usually result in much more precise estimates. This analysis was not designed with the intention of estimating the strength of association between factors with a high degree of precision, it was intended as an exploration of resilience as a concept in explaining the avoidance of negative outcomes. For this reason, the discussion focuses on the factors identified rather than on the estimated effect sizes.

12 The two scale measures did not have comparison groups, instead their odds ratios are an estimate of the increase in odds associated with a one unit change in the underlying values in the scale.

Table 4.5   Factors significantly associated with avoiding negative outcomes among more disadvantaged children

	Odds ratio	95% confidence interval
Child factors		
**Being a girl (being a boy)	1.49	1.12-1.97
Maternal factors		
**More positive attitudes to seeking help (scale)	1.10	1.02-1.19
*Mother did not have any long-term health conditions or disabilities in child's first four years (one or more conditions)	1.51	1.08-2.12
*Age at child's birth 35+ (age 15-24)	1.95	1.21-3.14
Household factors		
**A more highly enriched home learning environment (scale)	1.03	1.02-1.04
*At least one adult in the household in full-time employment (no adult in full-time employment)	2.03	1.19-3.45
Neighbourhood factors		
*Medium level of satisfaction with the facilities in the local area (low level)	1.59	1.15-2.21

*Overall measure is significant at 5% level, **Overall measure is significant at 1% level or below.

The first point to note is that actually very few of the resilience measures explored in Tables 4.1-4.4 showed a significant association. This in part confirms the suspicions noted above that the relationships between outcomes and resilience were a product of their underlying socio-economic distribution.

However, it is also true that a number of the significant findings are perhaps surprising. For example, maternal age at birth is highly socially patterned so to find a significant association even when the most advantaged children have been removed from the analysis suggests that the current policy focus on younger mothers is well placed. In addition to this, the Scottish Government's sexual health strategy includes policies to widen young women's contraceptive choices with the aim of raising the age of women's first conception.

As the scale included factors such as below average cognitive development, language and behavioural problems, all of which are much more common in boys, it is unsurprising that that this analysis found a difference between boys and girls. However, it should be borne in mind that the scale might not have been very good at detecting the kinds of negative outcomes that girls experience, so this finding should not be used to conclude that *only* boys have additional support needs in the early years.

Melhuish (2010) concluded that the particularly strong association between the home learning environment index and the verbal aspect of the cognitive development assessment was related to the fact that the measure includes a high number of language-related activities, and the fact that language development changes markedly around the time that the assessments were carried out. The negative health outcomes scale included two negative language development measures (lower than average verbal ability at 34 months and parental reports of problems with language development at 46 months) so the association between the home learning index and avoiding negative outcomes found here is also likely to be a result of this. However, as this is a particularly critical stage of life for language and wider cognitive development it is appropriate that the outcomes being captured reflect this. These findings add to the evidence that appears to be mounting in favour of these kinds of activities being of intrinsic value in relation to children's outcomes. Further analysis of this index in relation to other outcomes captured in GUS might prove useful.

The finding that higher satisfaction levels with services were associated with avoiding negative outcomes needs some careful reflection.[13] It is possible that parents of children who experience multiple negative outcomes have greater need for the kinds of services covered in this measure and that their lower satisfaction levels reflect a greater awareness of local service provision relative to those with children with better outcomes. Although it could reflect something about the kinds of services available within communities that is independent of the area characteristics measured by the deprivation index.

Chapter 3 described the fact that children from disadvantaged backgrounds face a double burden of health inequality in terms of their own increased risks of negative outcomes as well as those of their immediate family. The fact that maternal long-term health was associated with avoiding negative outcomes reinforces this message. Action to prevent children experiencing negative outcomes in their early years therefore seems to require attention to their main carer's health as well as to their own.

---

13 Note that the fact that the significant association was between medium and low levels, rather than high and low levels is likely to be due to the small sample size for the high satisfaction category. The key point is that the relationship is telling us something about people with low satisfaction levels relative to other groups, rather than anything specific about having medium satisfaction levels.

The fact that the factors associated with resilience range from ones specific to the child through to aspects of the local neighbourhood suggest that it was correct to operationalise resilience as something with many levels. However, the significant factors are quite different in nature which could also suggest that resilience was either too broadly specified in the analysis, or is too wide ranging to be considered as a single concept. Either way, there are likely to be very different policy responses required to promote factors such as having at least one adult in a household in full-time work, having a positive attitude towards seeking help, or living in an area where services are highly rated.

One very obvious implication does stand out – many of the factors that appear to be associated with avoiding negative health outcomes fall outside the traditional remit of the health service. This certainly chimes with the cross-portfolio approach to setting and delivering outcomes set out in *Equally Well*, and in the *Early Years Framework*. It therefore reinforces the message that attempts to reduce health inequality and to promote the best start in life will only succeed if they are acknowledged as having policy implications across the board and not just within one or two limited domains.

chapter
CONCLUSION

5

5

The analysis in this report spanned the period from around the time of the children's birth to just before their fourth birthdays. It showed that exposure to the kinds of risks that can impact on health and development in the early years, and have been shown in other literature to have implications for decades to come, are not uniformly or randomly distributed across the population at this very early point in life. Significant inequalities exist with those in the most deprived areas, the lowest income households or routine and semi-routine households found to have worse health outcomes and higher exposures to risks for poor outcomes than their more advantaged counterparts.

While the persistence over the years of poor outcomes was quite variable, exposure to risks such as smoking and poor maternal health were somewhat more stable. This suggests that the consequences in later life associated with early exposure to such risks are likely to be evident for decades.

Across all the outcomes and risk factors explored, inequalities in exposure to risk factors were generally larger than those evident for outcomes. However, within the outcomes explored, behavioural, psychosocial and linguistic problems showed much starker inequalities than physical ones such as poor general health. This might well reflect the nature of what aspects of development are most significant at this stage in life so future patterns might potentially change.

The analysis of health inequalities in Chapter 3, and the exploration of resilience in Chapter 4, both highlighted the extent to which more disadvantaged households experience a double burden in their experience of health inequalities with children and adults within them being at greater risk of negative outcomes. The major focus on early years currently evident in Scottish Government policy making therefore needs to be alive to the fact that tackling health inequalities in children also requires action to address the health inequalities experienced by their parents and wider families.

A major recent study of resilience and health (Mitchell *et al*., 2009) drew a number of conclusions but one has particular resonance in the context of this research – as poverty was such a strong predictor of poor outcomes (in their study the measure was mortality), resilience was likely to have only a very small contribution to the reduction of negative outcomes. However, this is not to detract from the finding that some factors (such as the home learning environment) were shown to be associated with the avoidance of negative outcomes which suggests that some levers to mitigate the impact of disadvantage might exist.

The findings from the exploratory analysis of resilience suggest that relatively few of the potential resilience measures explored were significant once socio-economic factors were taken into consideration. Although a study such as GUS can demonstrate the sequence over time between possible explanatory factors and outcomes, it still cannot provide definitive conclusions about the direct relationship between them. There is always the possibly that some additional unmeasured factor, related to both the outcome and apparently explanatory factor, is what actually explains the association found. To truly establish cause and effect is very complex and usually requires experimental methods and the accumulation of evidence from numerous different sources. In the absence of experimental evidence, this kind of analysis therefore contributes to the wider accumulation of evidence in favour of intervening in the early years. However, it should be noted that of significant evidence about the effectiveness of interventions in the early years has already been accumulated (Hallam, 2008).

The extent of the socioeconomic inequalities identified in this piece of work, coupled with the suggestion that resilience to negative outcomes might come in the form of actions to address a wide and disparate range of factors makes it clear that that tackling health inequality requires input at many levels from a wide range of actors. This is not in the gift of the health service or other service providers alone.

References

Barker, D.J. (1997). Fetal nutrition and cardiovascular disease in later life. *British Medical Bulletin*. 53 (1): 96-108.

Barnes, M., Chanfreau, J. and Tomaszewski, W. (2010). *Growing Up in Scotland: The Circumstances of Persistently Poor Children*. Edinburgh: Scottish Government.

Bartley, M. [ed.] (2006). *Capabilities and resilience: beating the odds*. London: UCL Department of Epidemiology and Public Health. Available from: www.ucl.ac.uk/capabilityandresilience/beatingtheoddsbook.pdf [Accessed 16 March 2010].

Ben-Shlomo, Y. and Kuh, D (2002) A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology*. 31, 285-293.

Braveman, P., Krieger, N. and Lynch, J. (2000). Health inequalities and inequalities in Health. Feedback. *Bulletin of the World Health Organisation*. 78 (2): 232-233.

Bradshaw, P. and Martin, C. (2008). *Growing Up in Scotland: Exploring the experience and outcomes for advantaged and disadvantaged families*. Edinburgh: Scottish Government.

Bradshaw, P. (2009). *Growing Up in Scotland: Parenting and the neighbourhood context report*. Edinburgh: Scottish Government.

Bradshaw, P. and Tipping, S. (2010). *Growing Up in Scotland: Children's social, emotional and behavioural characteristics at entry to primary school*. Edinburgh: Scottish Government.

Bromley, C. (2009). *Growing Up in Scotland: The impact of children's early activities on cognitive development*. Edinburgh: Scottish Government.

Case, A., Lubotsky, D. and Paxson, C. (2002). Economic Status and Health in Childhood: The Origins of the Gradient. *The American Economic Review*. 92 (5): 1308-1334.

Claussen, B., Davey Smith, G. and Thelle, D. (2003). Impact of childhood and adulthood socio-economic position on cause specific mortality: the Oslo Mortality Study. *Journal of Epidemiology and Community Health*. 57: 40–45.

Emerson, E., Graham, H. and Hatton, C. (2006). *Household income and health status in children and adolescents in Britain*. European Journal of Public Health. 16 (4): 354-60.

Foresight (2008). *Tackling Obesities: Future Choices – Project Report (2nd edition)*. London: Government Office for Science.

Galobardes, B., Lynch, J.W. and Davey Smith, G. (2007). Measuring socioeconomic position in health research. *British Medical Bulletin*. 1-17.

Galobardes, B., Shaw, M., Lawlor, D.A., Lynch, J.W. and Davey Smith, G. (2006a) Indicators of socioeconomic position (part 1). *Journal of Epidemiology and Community Health*. 60, 7-12.

Galobardes, B., Shaw, M., Lawlor, D.A., Lynch, J.W. and Davey Smith, G. (2006b). Indicators of socioeconomic position (part 2). *Journal of Epidemiology and Community Health*. 60, 95-101.

Gilligan, R. (2004). Promoting resilience in child and family social work: issues for social work practice, education and policy. *Social Work Education*. 23: 93–104.

Goldstein, S. and Brooks, R.B. (2005). [eds] *Handbook of Resilience in Children*. New York: Springer.

Gray, L. and Leyland, A. (2009). Chapter 7: Obesity. In Bromley, C., Bradshaw, P. and Given, L. [eds.] (2009) *The Scottish Health Survey 2008*. Edinburgh: Scottish Government.

Hallam, A. (2008). *The effectiveness of interventions to address health inequalities in the early years: a review of relevant literature*. Edinburgh: Scottish Government.

Hirani, V. and Stamatakis, E. (2005). Chapter 5: Anthropometric measurements, overweight and obesity. In Bromley, C., Shelton, N. and Sproston, K. [eds.] *The 2003 Scottish Health Survey – Volume 3: Children*. Edinburgh: Scottish Executive.

Jotangia, D., Moody, A., Stamatakis, E. and Wardle, H. (2005) *Obesity among children under 11*. [Revised 2007]. London: Department of Health.

Lynch, J. and Kaplan, G. (2000). Socioeconomic position. In Berkman, L.F. and Kawachi, I. (eds) *Social Epidemiology*. New York: Oxford University Press, 13-35.

Mackenbach, J.P. and Kunst, A.E. (1997) Measuring the magnitude of socioeconomic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Soc Sci Med*, 44(6), 757-71.

Mackenzie, M., Shute, J., Berzins, K. and Judge, K. (2004). *The independent evaluation of 'Starting Well': Final report*. Edinburgh: Scottish Executive.

Macintyre, S. (1997). The Black Report and beyond. *Social Science and Medicine*. 44 (6): 723-45.

Marmot, M. (2010). *Fair Society, Healthy Lives – The Marmot Review*. London: Strategic Review of Health Inequalities in England post-2010. Available from: www.ucl.ac.uk/marmotreview [Accessed 15 Feb 2010].

Marmot, M. (2005). Social Determinants of Health Inequalities. *The Lancet*. 365: 1099-104.

Marryat, L. Skafida, V. and Webster, C. (2009). *Growing Up in Scotland: Sweep 3 food and activity report*. Edinburgh: Scottish Government.

Marryat, L. and Martin, C. (2010). *Growing Up in Scotland: Maternal mental health and its impact on child behaviour and development*. Edinburgh: Scottish Government.

Melhuish, E. (2010 forthcoming) *Impact of the Home Learning Environment on Child Cognitive Development: Secondary Analysis of Data From 'Growing Up In Scotland'*. Edinburgh: Scottish Government.

Mitchell, R., Gibbs, J., Tunstall, H., Platt, S. and Dorling, D. (2009). Factors which nurture geographical resilience in Britain: a mixed methods study. *Journal of Epidemiology & Community Health* 63: 18-23.

Munoz-Aroyo, R. and Sutton, M. (2007). *Measuring socio-economic inequalities in health: a practical guide*. Scottish Public Health Observatory. Available from: http://www.scotpho.org.uk/home/Publications/scotphoreports/pub_measuringinequalities.asp [Accessed 4 January 2010]

Murray, C.J.L., Gakidou, E.E. and Frenk, J. (1999). Health inequalities and social group differences: what should we measure? *Bulletin of the World Health Organisation*. 77 (7): 537-543.

Murray, C.J.L., Gakidou, E.E. and Frenk, J. (2000). Response to P. Braveman *et al.* Feedback. *Bulletin of the World Health Organisation*. 78 (2): 234-5.

Office for National Statistics (2004). *The Health of Children and Young People – Social Inequalities*. [online]. Available from: http://www.statistics.gov.uk/children/ [Accessed 21 August 2009]

Power, C., Atherton, K., Strachan, D., Shepherd, P., Fuller, E., Davis, A., Gibb, I., Kumari, M., Lowe, G., Macfarlane, G., Rahi, J., Rodgers, B. and Stansfield, S. (2007). Life course influences on health in British adults: effects of socio-economic position in childhood and adulthood. *International Journal of Epidemiology*. 36 (3): 532-9.

Regidor, E. (2004) Measures of health inequalities: part 1. *Journal of Epidemiology and Community Health*. 58, 858-861.

Regidor, E. (2004) Measures of health inequalities: part 2. *Journal of Epidemiology and Community Health*. 59, 900-903.

Roberts, H. (2000). *What Works in Reducing Inequalities in Child Health? – Summary*. London: Barnardos.

Scholes, S. and Heeks, F. (2008). Chapter 2: BMI, overweight and obesity. In Craig, R. and Mindell, J. [Eds.] *Health Survey for England 2006 – Obesity and other risk factors in children*. Leeds: The Information Centre.

Scottish Government (2007) *Scottish Budget Spending Review 2007*, Edinburgh: Scottish Government.

Scottish Government (2008). *Equally Well – Report of the ministerial task force on health inequalities*. Edinburgh: Scottish Government.

Scottish Government/COSLA (2009a). *The Early Years Framework*. Edinburgh: Scottish Government.

Scottish Government (2009b). *Long-Term Monitoring of Health Inequalities: Headline indicators – September 2009*. Edinburgh, Scottish Government.
Available from: http://www.scotland.gov.uk/Publications/2009/09/25112211/0 [Accessed 15 February 2010]

Scottish Government (2009c). *Health in Scotland 2009 – Shedding Light on Hidden Epidemics*. Edinburgh: Scottish Government.
Available from: http://www.scotland.gov.uk/Publications/2009/12/16103619/0 [Accessed 15 February 2010]

Scottish Intercollegiate Guidelines Network. (2010). *115: Management of Obesity – A national clinical guideline*. Edinburgh: SIGN/NHS Quality Improvement Scotland.

Tunstall, H., Mitchell, R., Gibbs, J. and Platt S. (2005) 'Searching for resilience: areas of Britain with lower than expected mortality rates' (unpublished MS).

Wadsworth, M (1997) Health Inequalities in the Life Course Perspective. *Social Science and Medicine*. 44 (6), 859-869.

Wadsworth, M. and Butterworth, S. (2006). Early life. In Marmot, M. and Wilkinson, R. (eds) *Social Determinants of Health* (2nd Edition). Oxford: Oxford University Press, 267-298.

Wagstaff, A., Paci, P. van Doorslaer, E. (1991). On the measurement of inequalities in health. *Social Science and Medicine*. 33 (5), 545-57

Wilkinson, R. and Marmot, M. (2003). *The Solid Facts*. Copenhagen: World Health Organisation.

Appendix

The following table presents the full results of the logistic regression described in Section 4.6.2. For each variable included in the model a reference category was chosen against which the other categories were compared. The reference categories are shown below in brackets.

The regression results are presented as odds ratios for each category within an independent variable, all of which have a significance value and 95% confidence intervals attached. Odds ratios estimate the effect of each individual independent variable on the outcome variable, adjusted for all other independent variables in the regression model. For variables with categories, logistic regression compares the odds of a reference category (shown in the tables in brackets) with that of the other categories. An odds ratio of greater than one indicates that the group in question is more likely to demonstrate this characteristic than is the chosen reference category, an odds ratio of less than one means they are less likely. For example, in the second column of Table A.1, girls have an odds ratio of 1.49. This indicates that the odds of girls avoiding negative outcomes are 1.49 times greater than they are for boys (the reference category).

For continuous, scale variables, such as the first three shown in Table A1, the odds ratio shows the change in odds associated with a one unit change in the scale. For example, the odds of avoiding negative outcomes increase by 1.03 for each increase in the home learning environment scale.

The final column shows the significance value for each independent variable. Those with a value greater than 0.05 are not considered to be statistically significant.

Table A.1   Estimate odds ratios for avoiding negative outcomes by resilience measures and other associated risk factors

	Odds Ratio	P value for each category	95% Conf. Interval	P value for variable
Attitude to seeking help	1.10	0.012	1.02 – 1.19	**0.012**
SF12 mental health scale	1.01	0.480	0.99 – 1.02	0.480
Home learning environment	1.03	0.000	1.02 – 1.04	**0.000**
SIMD*				0.686
(1st – most deprived)				
2nd	1.13	0.650	0.66 – 1.92	
3rd	0.84	0.447	0.52 – 1.33	
4th	1.07	0.726	0.72 – 1.61	
Household income*				0.076
(5th – lowest)				
2nd	0.80	0.571	0.36 – 1.76	
3rd	1.12	0.673	0.66 – 1.89	
4th	0.62	0.015	0.42 – 0.91	
Missing	1.05	0.900	0.46 – 2.39	
NS-SEC*				0.413
(Semi-routine & routine)				
Inter-mediate	0.72	0.092	0.49 – 1.06	
Small employers/own account workers	0.82	0.438	0.50 – 1.36	
Lower supervisory & technical	0.95	0.790	0.64 – 1.41	
Mother's education				0.715
(No qualifications)				
Degree	1.55	0.279	0.70 – 3.46	
HE below degree	1.22	0.409	0.75 – 1.99	
Higher grades	1.67	0.263	0.67 – 4.14	
Standard grades	1.17	0.541	0.70 – 1.94	
Sex of child				**0.006**
(Boy)				
Girl	1.49	0.006	1.12 – 1.97	
Family type				0.199
(Lone parent)				
Couple	1.38	0.199	0.84 – 2.28	

	Odds Ratio	P value for each category	95% Conf. Interval	P value for variable
Maternal smoking				0.355
(Mother smoked when child was 10 & 34 months old)				
Mother smoked at 10 or 34 months	0.93	0.764	0.57 – 1.51	
Mother did not smoke when child was 10 & 34 months old	1.21	0.253	0.87 – 1.69	
Maternal long-term illness				**0.017**
(1+ long-term health problem/ disability since child's birth)				
No long-term health problem/ disability since child's birth	1.51	0.017	1.08 – 2.12	
Pregnancy planning				0.881
(Planned)				
Not planned/not prevented	0.99	0.944	0.70 – 1.40	
Unplanned	0.91	0.631	0.61 – 1.36	
Breastfeeding				0.529
(Not breastfed)				
Breastfed	0.90	0.529	0.65 – 1.25	
Mother's age at birth				**0.023**
(15-24)				
25-34	1.40	0.065	0.98 – 2.01	
35+	1.95	0.007	1.21 – 3.14	
Assessment of parenting ability				0.102
(Average or worse parent)				
A very good parent	0.98	0.917	0.62 – 1.54	
A better than average parent	1.40	0.054	0.99 – 1.97	
Can't say	0.49	0.181	0.17 – 1.41	
Fruit consumption				0.892
(Eats 0-1 different fruits a day)				
Eats 2+ different fruits a day	0.97	0.891	0.62 – 1.53	
Vegetable consumption				0.594
(Eats 0-1 different vegetables a day)				
Eats 2+ different vegetables a day	1.10	0.594	0.77 – 1.57	

	Odds Ratio	P value for each category	95% Conf. Interval	P value for variable
Physical activity level (quartiles)				0.937
(Lowest quartile)				
2nd	0.99	0.979	0.67 – 1.49	
3rd	0.88	0.588	0.55 – 1.40	
4th – highest	0.90	0.634	0.59 – 1.39	
Experience with children				0.910
(Not very much/none)				
A lot	0.82	0.494	0.45 – 1.47	
Quite a lot	1.01	0.963	0.61 – 1.66	
Already had children	0.90	0.639	0.59 – 1.38	
Missing	0.70	0.402	0.31 – 1.62	
Tenure stability				0.221
(Moved at least twice in four years)				
Not moved at all	1.21	0.221	0.89 – 1.65	
Child friendliness of local area				0.277
(Low)				
Medium	1.10	0.631	0.73 – 1.66	
High	1.37	0.229	0.82 – 2.29	
Missing	1.54	0.167	0.83 – 2.86	
Satisfaction with local facilities				0.048
(Low)				
Medium	1.59	0.006	1.15 – 2.21	
High	1.04	0.860	0.66 – 1.63	
Missing	1.23	0.281	0.84 – 1.80	
Household employment status				0.019
(No adult in work)				
At least 1 adult working full time	2.03	0.010	1.19 – 3.45	
At least 1 adult working part time	1.14	0.604	0.69 – 1.86	
Feelings about income over 4 years (quartiles)				0.572
(Least positive quartile)				
1st and 2nd most positive	1.14	0.483	0.79 – 1.64	
3rd most positive	1.24	0.298	0.83 – 1.85	

	Odds Ratio	P value for each category	95% Conf. Interval	P value for variable
Years parent has attended a parent/toddler group				0.937
(None)				
One	0.95	0.817	0.63 – 1.43	
Two	0.88	0.553	0.58 – 1.34	
Three or four	0.91	0.682	0.56 – 1.47	
Years parent has said it would be difficult to find help at short notice to look after child				0.644
(Three or four)				
Never difficult	1.28	0.286	0.81 – 2.01	
One	1.24	0.387	0.76 – 2.02	
Two	0.96	0.862	0.59 – 1.56	
Level of grandparental support when child 10 months (quartiles)				0.235
(Lowest quartile)				
1st – highest	1.55	0.043	1.01 – 2.38	
2nd	1.20	0.361	0.80 – 1.80	
3rd	1.14	0.566	0.72 – 1.80	
Friend/family member with medical knowledge when child 10 months				0.369
(No)				
Yes	0.88	0.369	0.67 – 1.16	
Major life events since child 10 months old				0.188
(2 or more)				
None	0.96	0.856	0.65 – 1.43	
One	1.29	0.142	0.92 – 1.80	

Note p value for model = 0.048; weighted sample size: 1,278, unweighted sample size 1,071.

*The 5th (least deprived) SIMD quintile, 1st (highest) income quintile, and professional/managerial NS-SEC categories are missing as these cases were excluded from the analysis.

Scottish Centre *for* Social Research

crfr

centre for research on
families and relationships

The Scottish Government