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The Duration of Bad Housing and Living Standards of Children in Britain

MATT BARNES¹, SARAH BUTT & WOJTEK TOMASZEWSKI

National Centre for Social Research, UK

ABSTRACT

Improving children's living standards is a top priority for government policy makers. Whilst the presence of a link between bad housing and child outcomes has been acknowledged in a number of studies, there is little evidence on how long children live in bad housing for and whether the duration of living in bad housing is associated with other poor outcomes for children. This research uses five waves of data from the Families and Children Study, a representative longitudinal study of families with children in Britain, to show that the longer children live in bad housing the more vulnerable they are to a range of other poor outcomes included in the Government's Every Child Matters framework. The research implies that policy-makers need to focus on reducing the substantial number of children who live in bad housing for long periods and that interventions in housing provision for families are likely to lead to improvements in many other aspects of children's lives.

Key Words: Property conditions, housing policy, overcrowding, children, panel data

¹ Corresponding address: Dr Matt Barnes, Employment, Welfare & Crime Group, National Centre for Social Research, 35 Northampton Square, London EC1V 0AX, UK. Email: Matt.Barnes@natcen.ac.uk

Introduction

The problem of children living in bad housing represents a significant challenge for policy makers intent on improving children's wellbeing. It has been estimated that well over a million children and young people in Britain live in bad housing (Shelter, 2006), coping with problems such as unfit physical conditions, overcrowding, living in temporary accommodation, and fuel poverty. Families with children are among the groups most at risk of certain housing problems, most notably overcrowding (DCLG, 2007). It is acknowledged that housing may exert a particular influence on the well being of children, given the relatively large amount of time they spend in the home (Harker, 2006). There are now a range of government targets relating to housing, many of which focus specifically on vulnerable groups, including families with children. These include the Fuel Poverty Action Plan (DEFRA, 2008) and specific PSA targets on decent housing and temporary accommodation (HM Treasury, 2009).

A considerable body of research evidence supports the link between living in bad housing and poor child outcomes. The link between poor housing and health outcomes has long been acknowledged (see Shaw, 2004 for a review of the evidence) and the effect on children's health may be particularly severe. A study by the British Medical Association (2003), for example, found that children were more likely than adults to suffer health problems as a result of damp or mould. Overcrowding has been shown to put children at greater risk of contracting infectious diseases which, aside from the immediate effects on health, has also been linked to slower growth (ODPM, 2004). There is also a well-established link between housing difficulties and poor educational performance. Many of these studies focus on the disruptive effects of homelessness or living in temporary accommodation (Vostanis and Cumella, 1999; Mitchell et al., 2004). There is also evidence that overcrowding can affect educational attainment, not least because it makes it difficult for children to find somewhere quiet in which to do homework (Goux and Maurin, 2003; ODPM, 2004). There is less research focusing on other areas of child well being, such as emotional well being, safety, and social relationships (see Harker, 2006 for a review of the available evidence). However, Barnes et al (2006) found evidence that housing problems are associated with a wide range of negative outcomes for children besides physical ill health and poor school attainment. These include bullying, fear of crime, having to visit hospital accident and emergency departments, truancy, and the frequency with which friends visit the house.

A significant limitation of previous research, however, is that it is based purely on cross-sectional data, focussing on the coincidence of bad housing and poor child outcomes at one particular point in time. Much recent research into social problems such as child poverty emphasises the importance of taking a dynamic perspective and looking at evidence across multiple time points (see Smith and Middleton, 2007 for a recent review of the literature on income poverty dynamics). There are a number of reasons for doing so. First, it is only by looking at evidence over time that we are able to estimate the true extent of the problem. There are around twice as many children who experience child poverty during childhood than when a point-in-time measure is used (Smith and Middleton, 2007). Secondly, outcomes for children and their families depend on the duration of their poverty experience. It has been argued that poverty persistence rather than severity is the key to understanding household exclusion (Magadi and Middleton, 2005). Third, studying dynamics is helpful in understanding who experiences problems and why, providing information on not only the social characteristics which make problems more likely but also on the events which can trigger movements in and out of poor conditions (Bradbury et al, 2001).

Generally speaking, longitudinal research into specific social problems such as housing has lagged behind dynamic research into poverty. Where housing has been considered, it is usually only as one indicator among many contributing to social deprivation more generally (see for example Whelan et al., 2001; Vegeris and Perry, 2003). Nevertheless, there is evidence that poor housing follows different dynamics from those of income poverty and therefore has the potential to exert a distinct influence on well being (Ayala and Navarro, 2007). Studies exploring the effect of changes in housing find some evidence that housing improvements can have a beneficial effect on health, reinforcing the message that housing can impact upon well being (Thomson et al., 2003; Pevalin et. al, 2008). However, that research focuses primarily on the relationship between bad housing and adult well being. This includes cohort analysis looking at the long-term effect of experiencing poor housing in

childhood, which demonstrates a significant relationship between childhood housing conditions and adult health status (Ghodsion and Fogelman, 1988; Marsh et al., 2000). There is, to date, no longitudinal research which focuses specifically on children and the relationship between different housing histories and outcomes during childhood.

This paper seeks to fill this gap by using longitudinal data from a unique panel study of families with children to provide robust and detailed quantitative evidence linking the length of time children live in bad housing to other poor outcomes during childhood. Influenced by the research into the effects of child poverty discussed above, it specifically considers two questions. First, is there evidence that those children experiencing bad housing on a persistent basis are more at risk from other negative outcomes than children who experience bad housing on a temporary basis only? Secondly, what are the characteristics associated with different durations of bad housing? The evidence provided in answer to these two questions will improve our understanding of the children most likely to suffer as a result of poor housing and hence the most appropriate focus of government policies designed to alleviate the problem.

Data: The Families and Children Study (FACS)

The research uses data from the Families and Children Study (FACS), which is a series of annual surveys that investigate the lives of British families with dependent children. FACS is commissioned by the Department for Work and Pensions (DWP) and carried out by the National Centre for Social Research (NatCen). FACS began in 1999 with a survey of lone-parent and low-to-middle income couple families. We use data from 2001, when the FACS sample was enlarged to include all families with children, to 2005, the latest data available to analysts at the time of the research.

FACS collects a range of information on children and their families. The survey covers a number of themes related to work, income, receipt of social security benefits and tax credits, housing, deprivation and hardship. The survey also collects a range of socio-demographic information from parents and children, including family composition, educational qualifications, health and disability status, and social activities and relationships. This provides the opportunity to investigate the association between living in bad housing and child well-being.

FACS is also a panel survey; it follows the same families at annual intervals, meaning it is possible to explore how circumstances of children change over time. This makes FACS quite different from the specialist surveys on housing (such as the Survey of English Housing, and, the English Housing Conditions Survey), which are not longitudinal and, despite being very detailed in their coverage of the housing topic, do not collect information on child well-being.

Table 1 shows that approximately 7,000 families and 15,000 children take part in FACS each year. This research uses data from the 6,341 children whose family took part in the FACS survey in all five years from 2001 to 2005. The response rate to the FACS survey is high, with approximately four-fifths of eligible families providing a productive interview each year. As with other studies, certain families are more likely to choose not to take part in the survey, including families with younger children, non-whites and those living in London (Lyon et al, 2007). As FACS is a household survey it does not interview families in temporary accommodation, such as hostels and bed & breakfast, nor those that are homeless.

FACS is a panel survey and hence suffers from attrition. On average, between one quarter and one fifth of respondents drop out after the first year in the study, followed by roughly ten per cent in years thereafter (Lyon et al, 2007). Our research uses the appropriate weights supplied with the data to correct for any systematic differences in non-response and attrition. The FACS study itself is topped up each year with new families to ensure it remains representative of families with children in Britain. Given the costs of repeatedly interviewing the same respondents, many panel studies are conducted on a small scale leading to problems with sample size. However, FACS is a large scale study and, because it focuses specifically on families with children, ensures a larger sample of children than it would be possible to obtain from general household panel surveys such as the British Household Panel Survey.

Table 1 **Number of families and children in FACS, 2001-2005**

Year of FACS survey	Number of families with children	Number of children
2001	7,721	15,959
2002	7,358	15,287
2003	7,250	15,056
2004	6,940	14,099
2005	6,976	13,814
2001 – 2005 (panel)	2,956	6,341

Source: Families and Children Study 2001-2005

Measures

Bad housing is a general term used in this research to designate various problems or disadvantages concerning housing conditions. There are many different aspects of bad housing and for the purpose of this research we have selected three major housing problems that can be measured with FACS data: overcrowding, poor state of repair, and, inadequate heating.

There are a number of challenges in using FACS to measure bad housing. FACS asks parents for their *opinions* on their housing - unlike the specialist housing surveys, where the English Housing Conditions Survey (EHCS), for example, uses an independent surveyor to assess the accommodation. By asking parents for their opinions on their accommodation, information from FACS is likely to be subject to bias as certain families might be more likely to report problems with housing than others (for example, social tenants may be more likely to report problems than owner occupiers, who may be reluctant to focus on problems that they may have to correct themselves, or at least pay someone else to do). However, self-reporting of opinions is useful information in its own right, as it captures families' perception of their accommodation. As well as being a proxy for the objective state of housing, parents' negative perceptions of their accommodation may in itself impact on child wellbeing, influencing self-confidence or children's willingness to invite friends round for example. It is also worth noting that, despite the differences in data collection methods, estimates of bad housing from FACS are comparable to estimates from the specialist housing surveys.

Overcrowding

The definition of overcrowding used in this research mirrors the 'official bedroom standard' methodology. The bedroom standard states that a standard number of bedrooms are required for each household in accordance with its age/sex/marital status composition and the relationship of the members to one another. A separate bedroom is required for each married or cohabiting couple, for any other person aged 21 or over, for each pair of adolescents aged 10 - 20 of the same sex, and for each pair of children under 10. Any unpaired person aged 10 - 20 is paired, if possible with a child under 10 of the same sex, or, if that is not possible, he or she is counted as requiring a separate bedroom, as is any unpaired child under 10 years old. This standard is then compared with the actual number of bedrooms (including bed-sitters) available for the sole use of the household. If a household has fewer bedrooms than required by the standard, it is deemed to be overcrowded. The bedroom standard is calculated in FACS from information on the size and composition of the household and from a question asked to the mother about the number of bedrooms in the accommodation.

FACS question: How many separate bedrooms do you have here? (include only rooms to which respondent's household has access. 'Bedrooms' includes boxrooms and bedrooms not currently used as bedrooms)

Poor state of repair

The second measure of bad housing that we use in this research relates to an accommodation's state of repair. FACS asks mothers to pick from a list of problems with the

home and these are added cumulatively to give an overall number of repairs that the accommodation requires. Creating a composite index such as this is an established methodology that has been widely used and tested in research on material deprivation (see for example Whelan et al., 2001, 2004). A number of tests were conducted to select the most appropriate threshold to define accommodation in poor state of repair, including triangulating the index with data from other questions on state of repair. For instance, no families living in accommodation that required three or more repairs described their accommodation as being in an 'excellent state of repair' and very few (8 per cent) described it as 'very good'. The results of these tests suggested that accommodation with at least three items requiring repair should be defined as in poor state of repair. This decision was also influenced by the need to have an adequate number of children experiencing bad housing to allow for more complex statistical analyses.

FACS question: Are there any repairs that need to be done to your home such as the problems listed on this card? (give as many that apply)

- Rising damp in floor or walls;
- Water getting in from roof, gutters or windows;
- Bad condensation problems;
- Problems with mould growth;
- Problems with electrical wiring;
- Problems with plumbing;
- General rot and decay;
- Problems with insects;
- Problems with mice or rats;
- Problems with drafts;
- Other repairs (respondent free to indicate).

Inadequate heating

The third and final measure of bad housing we use in this research focuses on inadequately heated accommodation. This measure identifies families that are unable to keep their accommodation warm enough in winter. FACS does ask families why they were unable to keep their accommodation warm enough, but we were unable to incorporate this in our measure because of small sample size issues. For information, the most common reasons that families thought their homes were insufficiently heated included inefficient or broken heating, poor insulation and cost. Families reporting inadequate heating were also less likely to have central heating and more likely to have a pre-payment meter.

FACS question: In winter, are you able to keep this accommodation warm enough? [yes, no]

The duration of bad housing

This research follows an approach used in much of the literature on poverty dynamics (for example, see Jenkins and Rigg, 2001) to measure the time children spend in bad housing. For each of the three housing problems under consideration, children were assigned to a category according to the number of years that they experienced that particular housing problem between 2001 and 2005.

- None = 0 years with the housing problem
- Short-term = 1 to 2 years with the housing problem
- Persistent = 3 to 5 years with the housing problem

Constructing longitudinal measures of bad housing raises a number of methodological issues that FACS, to a large extent, allows us to address. Monitoring change requires that the variables of interest be measured in a consistent way over the time period considered. This means that we can be more confident that any changes in children's housing circumstances represent a genuine variation rather than being an artefact of differences in the way variables are measured. The questions used to measure each of the three housing problems in FACS

were asked in a consistent format over all five waves of the study 2001 to 2005. The only slight inconsistency occurs with the poor state of repair measure as a shorter list of items was asked to families in 2001 than in the other four years. However, further analyses have shown this not to have an impact on the longitudinal measure.

Also, once we start to consider dynamics and move beyond a simple dichotomous indicator of bad housing, the question of how best to categorise children according to their different housing histories becomes more involved. Any classification will necessarily be imperfect given the data available only cover a discrete period of time and is censored at each end – in other words we do not know the child's housing history before 2001 or after 2005. The way we classify children's bad housing history follows an approach used in much of the literature on poverty dynamics - it models the duration of children's bad housing experience according to the number of years spent in bad housing over the five-year period being considered.

Child outcomes

This research uses an outcomes-based approach to assess the well-being of children and bases it on *Every Child Matters* (ECM), the Government's national programme to improve the life chances of all children and young people. The ECM framework identifies five outcomes important to the well-being of children and young people and creates a structure for the government's aim for every child, whatever their background or their circumstances, to have the support they need to:

- Be healthy;
- Stay safe;
- Enjoy and achieve ;
- Make a positive contribution; and
- Achieve economic well-being.

FACS includes a wealth of information on the education and health of each child in the family, including the parent's perception of the child's school performance in core subjects, school behaviour, and specific physical and mental health illness. Table 2 maps ECM outcomes and FACS indicators as specified by the ECM framework. The 'outcomes' are the conditions of well-being desired for children, families or communities. The 'indicators' describe how we measure these conditions using the FACS data. Information about children is collected from the latest wave of FACS (2005). We also make use of the child self-completion questionnaire, asked to secondary school children (aged 11 to 15 years). This separate questionnaire asks children about a variety of outcomes linked to school, anti-social behaviour and happiness. The self-completion questionnaire is not included in every wave of FACS and was not asked in 2005. Hence when we want to use information from the child-self completion questionnaire to measure a child outcome we use information from 2004 and when we want to use the standard survey information (e.g. child's health as reported by the mother) we use information from 2005. Table 2 also shows the age of children from which information is collected, as some outcomes are only relevant to children of a certain age.

As Table 2 shows, FACS has a good coverage of the outcomes specified in the ECM framework and provides multiple indicators for a selection of the outcomes. Only for the *Make A Positive Contribution* domain is FACS unable to provide information for the majority of outcomes. As with the measures of bad housing, the information collected on child outcomes is subjective, either reported by the mother about her children or from the children themselves. This can be beneficial for some measures, such as on children's satisfaction where getting the views of children themselves is paramount. However, other measures may be less exact, particularly where the mother is asked about an issue to do with her child that she knows less about – such school attainment. Consequently our measures of child outcomes may not match exactly with official estimates. However, as discussed earlier, one of the strengths of surveys such as FACS is that it allows for analysis across a number of themes, such as housing and child outcomes, which is not possible with other more specialist sources, particularly administrative data.

Table 2 Every Child Matters Outcomes and Indicators from FACS

	Outcomes (from ECM)	Indicators (from FACS)
Be Healthy	Physically healthy	- Long-standing illness, disability, infirmity ¹ - Skin conditions or allergies etc. ¹ - Chest or breathing problem, asthma etc. ¹ - Stomach, liver, digestive problems etc. ¹
	Mentally and emotionally healthy	- Feel unhappy about own health ⁵ - Feel unhappy about life as a whole ⁵
	Sexually healthy	Not available in FACS
	Live healthy lifestyles	- Spent less than 1 hour per week on physical activity ²
	Choose not to take illegal drugs	- Smokes, drinks or uses illegal drugs ⁴
Stay Safe	Safe from maltreatment, neglect, violence and sexual exploitation	Not available in FACS
	Safe from accidental injury and death	- Visited A&E twice or more in last year ¹
	Safe from bullying and discrimination	- Bullied in or out of school ²
	Safe from crime and anti-social behaviour in and out of school	- Worry about being robbed or mugged ⁵
	Have security, stability and be cared for	- Feel unhappy about family ⁵ - Run away from home ⁵
Enjoy And Achieve	Ready for school	- No quiet place at home to do homework ⁵
	Attend and enjoy school	- Skipped school 3 or more times ² - Feel unhappy about school work ⁵
	Achieve stretching national educational standards at primary school	- Mother's perception of poor attainment in English and maths ²
	Achieve personal and social development and enjoy recreation	- Has not seen friends in last week ⁵
	Achieve stretching national educational standards at secondary school	- Mother's perception of poor attainment in English and maths
Make A Positive Contribution	Engage in decision making and support the community and environment	Not available in FACS
	Engage in law-abiding and positive behaviour in and out of school	- Suspended or excluded from school ³ - Punished at school three or more times ⁵ - Been in trouble with the police ⁴
	Develop positive relationships and choose not to bully or discriminate	- Not important to do well at school ⁵
	Develop self-confidence and successfully deal with significant life changes and challenges	Not available in FACS
	Develop enterprising behaviour	Not available in FACS
Achieve Economic Well-Being	Engage in further education, employment or training on leaving school	Not available in FACS
	Are ready for employment	Not available in FACS
	Live in decent homes and sustainable communities	- Measures of bad housing
	Access to transport and material goods	- Family cannot afford an annual holiday ¹ - Family cannot afford new clothes ¹ - Family does not have access to a car ¹
	Live in households free from low income	- Living in a family in income poverty ¹

Notes: The outcomes relate to different age groups of children, defined by whom the FACS questions were asked to or aimed at. These age groups are indicated as follows: ¹ All dependent children (aged 0-15 years or 16-18 and in full time education), ² Children aged 5-15 years, ³ Children aged 5-18 years, ⁴ Children aged 8-18 years, ⁵ Children aged 11-15 years. Information for this last category of children was collected from children themselves via self-completion questionnaire. The other information was collected from the mother.

Analytical techniques

The statistical analysis is based on logistic regression models. The first set of models is used to determine whether the duration of bad housing is associated with various indicators of child well-being. The second set of models is used to identify the children most at risk of persistent bad housing. Importantly, in both steps we seek to assess the importance of the duration of bad housing by directly contrasting children living in persistent and short-term bad housing.

In both sets of models we seek to control for a range of background characteristics of children to explore the importance of the duration of bad housing. Existing research using cross-sectional data has identified a range of factors that are associated with a greater likelihood of experiencing bad housing, such as tenure, deprivation, family type, work status, and ethnicity (DCLG, 2007; Dale et al 1996), and with child outcomes, such as poverty, family size and parental health (Oroyemi et al, 2009; Barnes et al, 2008) – indeed many of these factors can be associated with both. These factors are measured at the start of our observation period (2001) and used to ‘predict’ bad housing durations and child outcomes measured later in this period. Given that poverty is likely to be linked to a number of child outcomes, we include a measure of poverty duration over the observation period (2001-2005). We also utilise the longitudinal nature of FACS to include a measure of whether the family has moved house over the period. Table 3 shows a detailed list of the contextual variables used in the research. Other potentially useful information, such as the presence of extended family nearby, could not be included in the analysis as it is not collected in FACS.

Due to a large number of potentially important contextual factors, a stepwise procedure was employed to fit the most parsimonious sets of variables for each model. In the case of categorical variables, all dummy variables were tested and entered to the model simultaneously, thereby eliminating a potential problem with using stepwise regression techniques with multinomial independent variables (as described in Cohen, 1991).

Some of the contextual factors were excluded from the final models due to multicollinearity. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. The association between bad housing and poverty was in question here. However cross-sectional correlations between poverty and bad housing indicators were extremely modest, ranging from 0.08 in the case of poor state of repair to 0.20 for overcrowding. Correlations between longitudinal variables were somewhat stronger (ranging from 0.25 for overcrowding to 0.35 for inadequate heating) but still not of concern. The models were also set up to exclude potentially exogenous variables. For example, poverty and debt were omitted when modelling child outcomes from the *Achieve economic well-being* domain.

Before describing the results it is important to note that our analyses cannot prove causation, just associations in the data. However, by taking advantage of the longitudinal nature of FACS we limit the possibility of reciprocal causation, for example child outcomes measured in 2005 cannot be a direct cause of contextual variables measured in 2001. In this way, although still not formally testing causality we may be more confident about the direction of the relationships we find.

Table 3 Contextual factors used in regression models

Variable name	Year measured	Categories
Characteristics of the child		
Sex of child	2001	Boy, Girl
Age of child	2001	0-4, 5-9, 10-14, 15-18
Characteristics of the child's parents		
At least one parent has academic qualifications	2001	Yes, No
Age group of mother	2001	Under 25, 25-29, 30-34, 35-39, 40-44, 45+
Mother suffers from mental health problems ¹	2001	Yes, No
At least one parent has a physical health problem or disability	2001	No parent sick/disabled, any parent sick/disabled
Ethnic group of mother ¹	2001	White, Black, Asian, Other
Characteristics of the child's family		
Family composition and work status	2001	Lone parent 16+ / 0-15 hours, Couple both 16+ / one 16+ / both 0-15 hours
Number of dependent children	2001	1,2,3,4+
Age of youngest child	2001	0-4, 5-10, 11-18
Housing tenure	2001	Owner, social tenant, private tenant, other
Has debts ²	2001	Yes, No
Has savings ²	2001	Yes, No
Income poverty (60% of median) ²	2001	Income above poverty line, income below poverty line, self-employed
Claimed means tested benefits ²³	2001-2005	No, 1-2 years, 3-5 years
Moved house	2001-2005	Yes, No
Characteristics of the child's area		
Index of Multiple Deprivation	2001	Deciles
Region	2001	North East, North West, Yorkshire and Humber, East Midlands, West Midlands, South West, Eastern, London, South East, Wales, Scotland

Notes:

¹ Only asked of mother, not of father.

² Variables excluded from the regression model when considering the 'Achieve economic well-being' child outcomes.

³ Used as a measure of persistent poverty as low income measure not available in early years of FACS at time of research.

Results

The incidence of bad housing

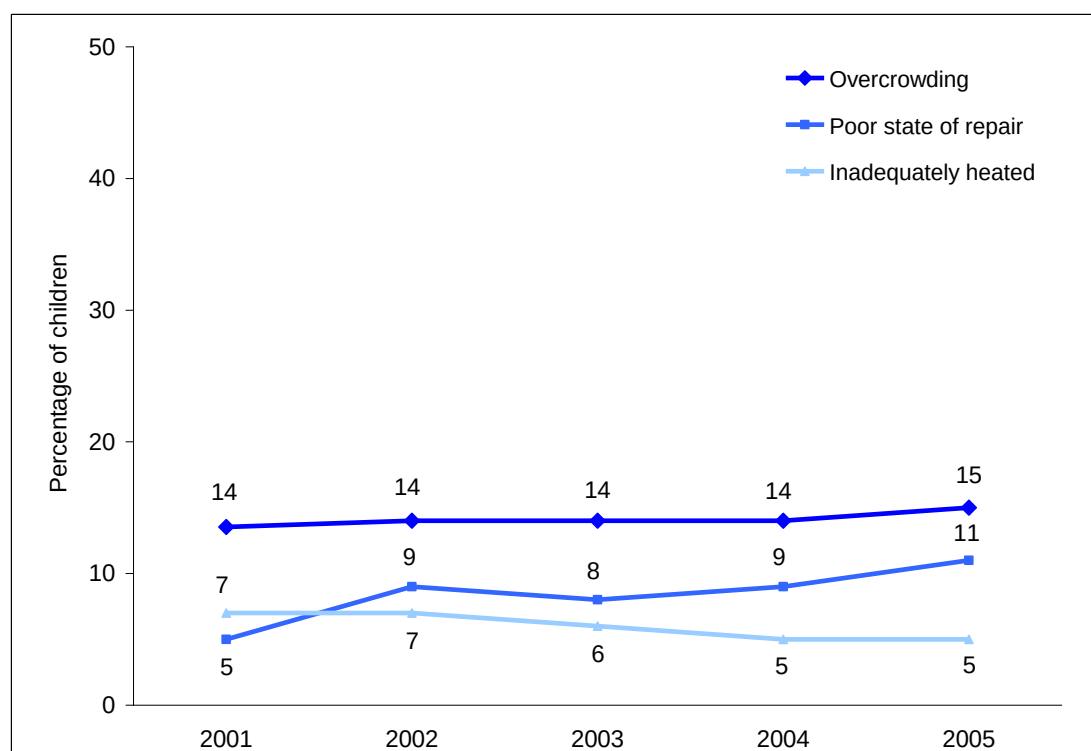
According to FACS, in Britain in 2005:

- One in seven (15 per cent) dependent children were living in overcrowded accommodation;
- One in ten (11 per cent) dependent children were living in accommodation with poor state of repair; and
- One in twenty (5 per cent) children were living in accommodation with inadequate heating.

Figure 1 shows that the rates of all three types of bad housing are roughly stable over the five-year period under investigation. An estimate of poor state of repair for 2001 is not shown as the list of housing problems presented to the respondent in that year was slightly different from the list used in the four subsequent years. The majority of children lived in homes free from any of the three housing problems. One in four children (25 per cent) experienced at

least one form of bad housing and only a minority of children (5 per cent) experienced multiple housing problems (not shown in Figure 1).

Figure 1 Incidence of bad housing, 2001-2005



Note: The lower figure for poor state of repair in 2001 can be explained by the list of housing problems presented to the respondent in the FACS survey being slightly different from the list used in the four subsequent years.

Base: Dependent children in Britain

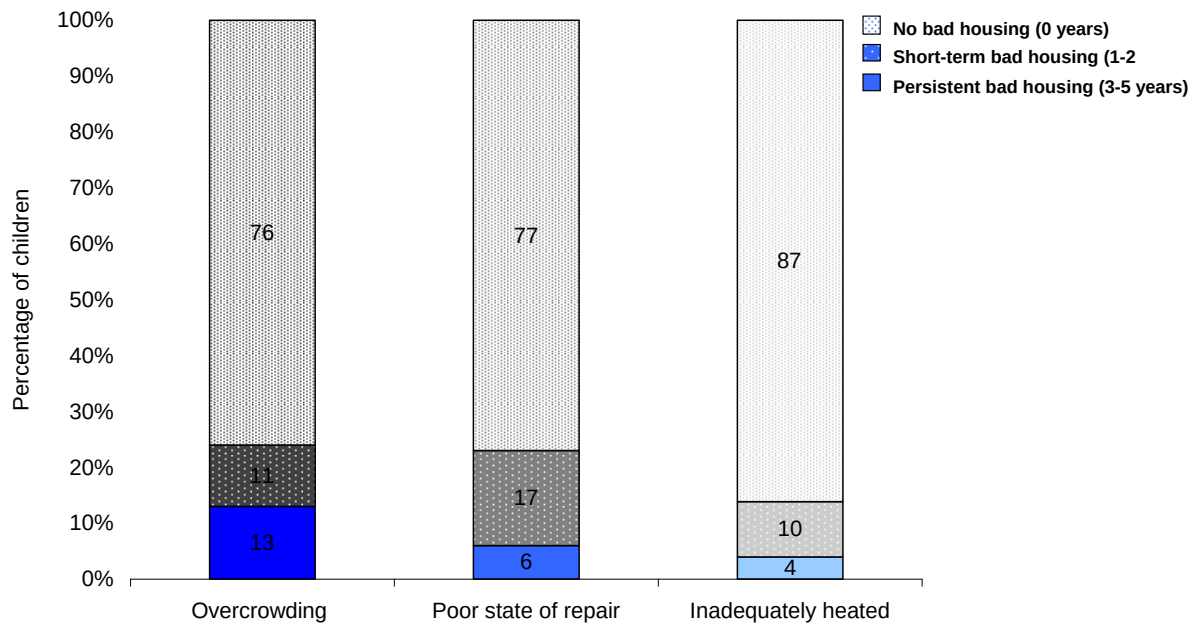
Source: FACS 2001-2005

Figure 2 shows the duration that children experienced each of the three housing problems between 2001 and 2005. When compared with Figure 1 above, we see that the proportion of children affected by bad housing is significantly higher than the figures presented for a given point in time may suggest. For example, one in four (25 per cent) children experienced overcrowding on at least one occasion between 2001 and 2005, compared with around one in seven (14-15 per cent) children who experienced overcrowding according to any of the five annual measurements.

The differences between the longitudinal and the point in time estimates arise because of the dynamic nature of bad housing. Some children move into or out of bad housing from one year to the next, whilst for others the experience of bad housing is more permanent. Overall, overcrowding was the housing problem most likely to have the longest duration. This makes sense, as it is likely to be more difficult for families to overcome the problem of overcrowding compared with the problems of poor state of repair or inadequate heating.

As Figure 2 shows, a significant minority of children (13 per cent) had persistently lived in overcrowded accommodation between 2001 and 2005. A smaller proportion of children had persistently lived in accommodation in poor state of repair (6 per cent) or inadequately heated accommodation (4 per cent).

Figure 2 Duration of bad housing, 2001-2005



Base: Dependent children in Britain
Source: FACS 2001-2005

The duration of bad housing and outcomes for children

As described above, we use logistic regression to determine whether the duration of bad housing is associated with various measures of child well-being, while controlling for a range of, potentially confounding, contextual factors. Because one of our goals is to assess the importance of the duration of living in bad housing, we set up our analytical models to directly compare living in persistent bad housing with a more temporary experience. This was done by setting 'short-term bad housing' as the reference category in the regression models. In this way, we can directly compare the difference between a short-term experience of bad housing and avoiding bad housing on the one hand, and between short-term and a more persistent experience on the other.

The analysis presented in Table 4 illustrates whether living in persistent bad housing is associated with each child outcome. The first column ('None') presents the odds ratio of a given outcome for children who did not experience bad housing between 2001 and 2005 compared with those who experienced short-term bad housing over the same period. Similarly, the second column ('Persistent') directly compares the children in persistent and short-term bad housing.

Table 4 demonstrates that the duration of living in bad housing is important for predicting a range of negative outcomes for children. The analysis shows that an increased duration of living in bad housing is associated with higher odds of disadvantage. What is important about these findings is that they add to the evidence suggesting a 'housing effect' in two ways. First, we show that there is an independent relationship between bad housing and child outcomes by controlling for other relevant socio-demographic and economic factors associated with child outcomes. Secondly, we demonstrate that the longer children live in bad housing the greater their risk of negative outcomes – children permanently living in bad housing face a higher risk of many negative outcomes than children that lived in bad housing on a short-term basis.

Table 4 also shows that children's outcomes varied according to the type of bad housing that they lived in. Children who lived in overcrowded accommodation faced other disadvantages across the Every Child Matters framework, including feeling unhappy about their health, having no quiet place to do their homework, being suspended or excluded from school and living in a family where parents cannot afford an annual holiday or new clothes for their children. They were also more likely to not have a quiet place at home to do their

homework. The risk of two of these outcomes - feeling unhappy about own health and living in a family that cannot afford new clothes - was higher for children persistently living in overcrowded accommodation than for those living in overcrowded accommodation on a short-term basis. Children who persistently lived in overcrowded children were also more likely to spend less than an hour a week on physical activity than children not living in overcrowded accommodation (Although none of the effects pertaining to this outcome appears to be significant in Table 4 there is, in fact, a statistically significant difference between the children who did not live in bad housing and those with a persistent experience of bad housing.)

As suggested in other research, health problems are clearly associated with children who lived in accommodation in poor state of repair, especially those who persistently lived in these conditions. The longer children lived in accommodation in poor state of repair, the more likely they were to have a long-standing health problem, disability or infirmity. In terms of more specific illnesses, children living in accommodation in poor state of repair were more likely to face chest or breathing problems, such as asthma, and stomach, liver or digestive problems. Children living in accommodation in poor state of repair (whether on a short-term or a more persistent basis) were also more likely to smoke, drink alcohol or use illegal drugs. Other disadvantages that these children face tend to span the stay safe Every Child Matters domain, including being more likely to be bullied, worry about being robbed or mugged, and to feel unhappy about their family. The odds of feeling unhappy about their family was four times higher for children who persistently lived in accommodation in poor state of repair than for those with a short-term experience.

Children who lived in accommodation that suffers from inadequate heating also lived in families that face a number of other economic disadvantages, including inability to afford an annual holiday, not having access to a car and living in family in income poverty. Of these, not having access to a car was directly associated with the duration of living in inadequately heated housing. This suggests issues of affordability and specifically points at families with little disposable income – many of whom face fuel poverty (Liddell, 2008).

As mentioned before, the models estimated here included a range of contextual variables. By including the characteristics of children, their family and their local area in the analysis, we can identify the factors other than bad housing that are associated with negative outcomes for children. These factors are not the main focus of this research and are not reported in detail here. However, just to give a few examples and add context to the main findings, we found a relationship between poor health of children and poor health of their parents, and that girls were more worried than boys about being mugged or robbed. Also, children with no quiet place at home to do their homework were more likely to be found in rented accommodation and in areas such as London and the West Midlands (which have higher concentration of ethnic minority, poorer, and larger families). We also found that boys, children from lone-mother families and children who move house a number of times tend to do less well at school, and the much-studied associations between material deprivation, debts, a lack of savings and poverty.

Table 4 Associations between the duration of bad housing and negative outcomes for children, odds ratios

Outcome by ECM domain	Over-Crowding 2001-2005 (ref: short term)		Poor State of repair 2001-2005 (ref: short term)		Inadequate Heating 2001-2005 (ref: short term)	
	None	Persistent	None	Persistent	None	Persistent
Be healthy						
Long-standing illness, disability or infirmity ¹			0.80 *	1.38 *		
Skin conditions or allergies etc. ¹						
Chest or breathing problem, asthma etc. ¹			0.69 **	1.43		
Stomach, liver, digestive problems etc. ¹			0.78	2.54 *		
Spent <1 hour/week on physical activity ²	0.79	1.24				
Smokes, drink alcohol or use illegal drugs ⁴			0.60 **	0.80		
Feel unhappy about own health ⁵	2.32	4.23 **				
Feel unhappy about life as a whole ⁵						
Stay safe						
Visited A&E twice or more ¹						
Bullied in or out of school ²			0.78 *	1.67 **		
Worry about being robbed or mugged ⁵			0.61 **	1.15		
Feel unhappy about family ⁵			0.98	4.04 *		
Run away from home ⁵						
Enjoy and achieve						
Skipped/bunked off school 3 or more times ²					0.52	1.48
Poor attainment in English and maths ²						
No quiet place at home to do homework ⁵	0.36 **	1.23				
Has not seen friends in last week ⁵						
Feel unhappy about school work ⁵						
Make a positive contribution						
Not important to do well at school ⁵						
Suspended or excluded from school ³	0.55 *	1.12				
Punished at school three or more times ⁵						
Been in trouble with the police ⁴						
Achieve economic well-being						
Family cannot afford an annual holiday ¹	0.54 ***	0.84			0.46 ***	1.70
Family cannot afford new clothes ¹	0.94	1.89 *	0.55 **	1.14		
Family does not have access to a car ¹					0.73	3.15 **
Living in a family in income poverty ¹					0.68 *	1.27

Base: Dependent children in Britain

Source: FACS 2001-2005

Notes:

- Asterisks represent statistical significance: *** = p<.001, ** = p<0.01, * = p<0.05

- The outcomes relate to different age groups of children, defined by whom the FACS questions were asked to or aimed at. These age groups are indicated as follows: ¹ All dependent children (aged 0-15 years or 16-18 and in full time education), ² Children aged 5-15 years, ³ Children aged 5-18 years, ⁴ Children aged 8-18 years, ⁵ Children aged 11-15 years

- All models included a range of control variables, see Table 3. We only show coefficients for the bad housing variables. Full results are available from the authors on request.

- Interaction terms were added to the models but rejected because they were not able to produce sensible results, mainly because of the relatively low numbers of children living in bad housing in the FACS data.

Children most at risk of persistent bad housing

Longitudinal data allows us to go beyond simply investigating the characteristics of children who are living in bad housing at a particular point in time. It can help us to identify which characteristics are associated with a greater risk of experiencing bad housing on a persistent rather than short-term basis. This is important because, as we have already shown, children who live in bad housing for longer are at greater risk of a range of other negative outcomes.

As described earlier, regression analysis was used to identify the children most at risk of persistent bad housing. This was achieved by fitting two separate logistic regression models for each form of bad housing: the first contrasts the characteristics of children living in bad housing (combining the short-term and persistent measures) with those who avoided bad housing altogether; and the second directly contrasts children living in persistent and short-term bad housing. The aim of the second model was to identify the characteristics associated with a longer duration of bad housing. Unlike in the case of the outcomes analysis described earlier, the same set of contextual factors was fitted in both models. These variables were selected both on a theoretical basis (some of the factors used previously were more important for analysis of child outcomes than for being considered as a risk factor of bad housing), as well as for statistical reasons (to avoid problems of multicollinearity and endogeneity).

Table 5 presents the results of the modeling. Let us start with briefly commenting on the results from the first model, which contrasts the characteristics of children living in bad housing with children who avoided bad housing altogether. Even after taking into account a range of other characteristics, a clear relationship between tenure type and the experience of bad housing remains. Children living in rented accommodation (both private and social) were at a much higher risk of experiencing each form of bad housing than children who lived in owner-occupied accommodation. Unsurprisingly, having more children in the household increased the risk of overcrowding; large families with four or more children were also more likely to be living in accommodation in poor state of repair. Families with no parent with academic qualifications were more likely to be living in accommodation in poor state of repair or that was inadequately heated. Families with younger mothers (under 25 years) were more likely to be living in accommodation in poor state of repair, while those with older mothers (45 years and older) were least likely to be living in overcrowded or inadequately heated accommodation.

Families, where at least one parent had limiting, long term illness, were disproportionately likely to be living in accommodation in poor state of repair or that was inadequately heated. This finding, combined with corresponding findings related to child health outcomes, suggests a possible link between living in bad housing and the health status of whole families, not just children.

Lone parent families (regardless of the parent's working status) and those couples where neither of the parents was working (more than 16 hours a week) faced an increased risk of living in accommodation in poor state of repair or that was insufficiently heated, as were self-employed families and those who had debts or had no savings. Income poor families were more likely than non-poor families to be living in overcrowded accommodation. These findings suggest a link between economic position of the family and the risk of experiencing bad housing.

There was also a geographical gradient to the risk of living in overcrowded accommodation or accommodation in poor state of repair. Families in London, Wales, Scotland and the North West were among those most likely to experience these problems. Interestingly, there were no regional differences regarding the risk of living in inadequately heated accommodation. Area deprivation was very strongly related to the risk of living in overcrowded accommodation; the pattern was similar, although the relationships were weaker, in the case of poor state of repair and inadequate heating.

Having described the risk factors related to living in bad housing per se, we now turn to directly investigating the effect of duration of bad housing (the second column in Table 5). We can see that many of the factors strongly significant in the first model, are no longer significant. Notably, the factors mostly absent are those related to the economic status of the family (employment, poverty, savings, debt) and deprivation.

Demographic and personal characteristics dominate among the factors explicitly related to the duration of living in bad housing. Families with three or more children were disproportionately likely to be living in persistent, rather than short term, overcrowded accommodation as were families where none of the parents have academic qualifications.

Families with very young mothers (under 25 years) faced an increased risk of living in accommodation in poor state of repair as were the families where at least one of the parents suffered from a long-term illness. Ethnicity was another important factor directly associated with the risk of living in bad housing: families with an Asian mother were more likely to persistently live in overcrowded accommodation but less likely to persistently live in accommodation in poor state of repair. Families with a Black mother were much more likely than other families to live in accommodation with inadequate heating.

Table 5 Factors that increase the likelihood of persistent bad housing, odds ratios

	Over-crowding		Poor state of repair		Inadequate heating	
	Experienced at least once rather than not at all 2001-2005	Experienced persistently rather than short-term 2001-2005	Experienced at least once rather than not at all 2001-2005	Experienced on persistently rather than short-term 2001-2005	Experienced at least once rather than not at all 2001-2005	Experienced on persistently rather than short-term 2001-2005
Child's sex (ref: boy)						
Girl	0.92	0.93	0.95	1.20	1.01	0.95
Child's age group (ref: 0-4)						
5-9 years	1.11	0.83	0.92	1.05	0.90	1.47
10-14 years	1.34	1.13	0.96	1.16	0.93	1.39
15-18 years	0.91	-	4.30	0.00	3.21	0.00
Number of children (ref: 2)						
1 child	0.51 ***	0.80	1.00	0.66 *	0.90	1.22
3 children	2.35 ***	2.01 ***	1.11	1.08	0.91	0.77
4+ children	11.60 ***	6.00 ***	2.31 ***	0.65 *	1.21	0.94
Age of youngest child (ref: 0-4)						
5-10	1.32 *	1.04	0.95	0.81	1.01	1.00
11-18	0.80	1.11	0.94	0.56	1.17	0.97
Parents' qualifications (ref: has quals)						
No qualifications	1.41 ***	1.38 *	1.02	1.12	1.35 **	1.12
Mother's age group (ref: 30-34)						
Under 25 years	1.33	0.74	1.33	2.84 ***	1.36	0.64
25-29 years	0.95	0.49	1.20	1.29	0.97	1.00
35-39 years	0.89	1.34	0.99	1.47	0.85	0.89
40-44 years	0.79	1.02	1.39 **	1.28	0.62 **	1.46
45+ years	0.84	0.53 *	1.18	1.91	0.55 *	0.48
Parents' health (ref: no problems)						
Limiting, long term illness	1.13	0.92	1.50 ***	1.64 **	1.66 **	1.10
Mother's ethnic origin (ref: White)						
Black	1.31	1.48	0.99	1.61	0.89	9.15 ***
Asian	1.16	2.01 *	0.64 **	0.42 *	1.44	1.87
Other	1.06	0.58	2.20 ***	1.51	1.81	3.37 *
Work status (ref: couple, both work 16hrs+)						
Lone parent, working 16hrs+	1.21	1.64	2.02 ***	0.93	1.57 **	1.94
Lone parent, working <16hrs	1.40	1.01	2.45 ***	0.62	2.32 ***	1.93
Couple, one working	1.18	1.34	1.18	0.56 **	0.99	1.36

16hrs+						
Couple, neither working 16hrs+	1.11	1.07	2.28 ***	0.57	2.00 **	1.12
Tenure (ref: owner occupier)						
Social renter	1.71 ***	0.98	1.35 **	0.89	1.89 ***	1.45
Private renter	1.75 ***	0.79	1.87 ***	1.06	3.94 ***	1.85
Other	2.29 ***	0.90	1.15	0.59	1.00	-
Poverty (ref: not in poverty)						
Living below poverty line	1.40 **	0.92	0.97	1.32	1.24	1.09
Self-employed	0.80	0.40 ***	1.51 ***	1.04	1.45 *	0.79
Debts (ref: none)						
Has debts	1.16	1.29	2.53 ***	1.42 *	2.43 ***	1.47
Savings (ref: has savings)						
Does not have savings	1.18	1.06	1.35 ***	1.24	1.69 ***	0.82
Region (ref: South East)						
North East	1.24	1.32	0.75	0.30	0.91	1.85
North West	1.31	2.41 **	0.78	0.61	1.27	1.82
Yorkshire & Humber	1.10	0.71	0.85	0.75	1.71 *	2.28
East Midlands	0.98	0.88	1.00	0.91	1.45	2.91
West Midlands	0.79	1.25	0.98	0.92	1.11	1.76
South West	1.54 *	1.59	0.96	1.08	1.35	3.39
Eastern	0.79	1.79	0.46 ***	0.85	1.03	2.00
London	1.76 **	3.40 ***	1.42 *	0.88	1.19	1.57
Wales	1.88 **	1.32	1.39	0.62	1.57	1.18
Scotland	1.59 *	2.48 **	0.72	0.51	0.86	2.04
Area deprivation (ref: least deprived decile)						
2 nd decile	1.44	0.70	1.23	1.47	1.36	0.60
3 rd decile	1.97 **	1.24	1.39	1.21	1.46	1.68
4 th decile	2.29 ***	2.01	2.21 ***	2.01	1.58	0.56
5 th decile	2.82 ***	1.91	1.50 *	0.96	1.10	0.87
6 th decile	2.65 ***	1.24	1.42	1.79	1.99 *	1.77
7 th decile	2.83 ***	1.98	1.77 **	1.77	2.22 **	0.76
8 th decile	4.51 ***	1.68	1.75 **	2.44	2.02 *	1.01
9 th decile	3.28 ***	1.08	1.66 **	2.21	1.72	1.79
Most deprived	4.50 ***	2.19	1.67 *	3.13	1.54	1.79
Constant	0.03 ***	0.20 **	0.07	0.17	0.02 ***	0.05
Pseudo R sq (Nagelkerke)	0.35	0.28	0.22	0.12	0.28	0.20
N	6169	1472	6204	1449	6024	816

Base: Dependent children in Britain

Source: FACS 2001-2005

Notes:

- Reference category in brackets

- Asterisks represent statistical significance: *** = p<.001, ** = p<0.01, * = p<0.05

Conclusions

Whilst the link between poor housing and child well being is now widely acknowledged amongst both the academic and policy communities, a reliance on cross-sectional evidence means that our understanding of the specific circumstances under which poor housing may influence child outcomes, or the extent to which different experiences of bad housing may lead to better or worse outcomes for children, remains incomplete. Building on the insights gained from research into the dynamics of child poverty, this paper has taken a longitudinal approach to studying the link between bad housing and child outcomes. It used panel data provided by the Families and Childrens Study (FACS) to explore the different housing

histories of children aged 0 to 15 over a five-year period. Specifically, it considered the duration of bad housing and the extent to which a range of different child outcomes are influenced by whether housing problems are experienced on a persistent rather than merely a short-term basis. The results provide a number of new insights into the relationship between bad housing and child well-being which go beyond those provided by a purely cross-sectional perspective and which serve to emphasise the important role that housing has to play in influencing child outcomes.

The longitudinal evidence indicates that the problem of bad housing is likely to be more widespread than official point in time estimates would suggest. For example, as many as one in four children were found to have suffered from overcrowding on at least one occasion over the period 2001 to 2005. This contrasts with estimates based on individual years which pick up only around one in seven children suffering from the problem at any one point in time. Policy makers intent on addressing the problem of bad housing, need to be fully aware of the scale of the problem with which they are dealing.

However, it is not necessarily the experience of bad housing per se which is a problem; the amount of time spent in bad housing also matters. Results suggest that children experiencing persistent bad housing (i.e. for three or more years out of five) often had worse outcomes than those children who merely experienced housing problems on a temporary basis (i.e. for one or two years). This held true for all three of the housing problems considered here (overcrowding, accommodation in poor state of repair and inadequately heated) and for child outcomes from across the Every Child Matters framework. Furthermore, these relationships persisted even after controlling for other associated factors such as income poverty.

The fact that other negative outcomes not only occur alongside bad housing but also have an increased chance of occurring the longer the time spent in bad housing, provides yet more support for the idea that bad housing has a distinct effect on child wellbeing. What appears crucial therefore is the need for policy makers to consider the impact of housing, and of bad housing in particular, when designing policies centred on child welfare. This is not to suggest that bad housing should necessarily be a solitary outcome for policy makers, given that this research has shown that the impacts of bad housing cross into other policy areas. However, it is likely that efficiency savings can be made with relation to other policy goals, as interventions in housing provision and quality are likely to lead to improvements in many of the other outcomes of child well-being.

Evidence of a link between the duration of bad housing and other negative outcomes suggests that policy makers may, perhaps, be best served by targetting their efforts towards those children experiencing bad housing on a persistent basis. This leads on to the question of which children are most at risk from persistent bad housing. The answer varies to some extent depending on the particular housing problem under consideration. Unsurprisingly, larger families were at more risk of persistent overcrowding, suggesting an ill fit between family size and accommodation space. Younger mothers were more likely to persistently live in accommodation in poor state of repair, perhaps highlighting the difficulties young women have with simultaneously setting up home and dealing with motherhood. Black families were more likely to persistently live in inadequately heated accommodation, suggesting that grants for insulation and energy measures around the home are failing to reach these families, perhaps due to barriers such as language difficulties, poor integration and negative experiences of previous grant schemes.

Whilst this paper has made some progress towards exploring the impact of different housing trajectories on children's wellbeing, there remains much scope for further longitudinal analysis on this issue. This paper has focused on a relatively short space of time, five years. Building on existing cohort analysis, research is needed into the longer-term effects of bad housing for children and whether, and if so how, the influence of bad housing varies as children get older. There is a need to look not just at the duration of bad housing but also at transitions, to identify those factors associated with movements into and out of bad housing and the specific effects of these transitions on child well being. It may be the case, for example, that the effect of a given number of years spent in bad housing varies depending on whether bad housing is experienced in several short spells compared with one long spell. Finally, in addition to looking at the experience of different housing problems in isolation there is a need to consider the very real likelihood that many children may experience two or more of these problems simultaneously and the combined impact that experiencing multiple housing problems may have on child wellbeing. The tools provided by longitudinal analysis

and the availability of large scale panel surveys such as the Family and Children Study provide us with the means to go on and answer such questions in future research.

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