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House Condition
Survey
2002

Housing and Health in Scotland



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Housing and Health in Scotland

Analysis of the 2002 Scottish House Condition Survey

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Executive Summary

This report sets out the findings of a detailed analysis of the information available from the Scottish House Condition Survey 2002 on housing and health in Scotland.

- This report examines four measures of health outcomes: the respiratory health of children; the respiratory health of adults; self-assessed health and psychosocial well-being across a series of housing and housing-related characteristics.
- This report details small but statistically significant associations between housing and health. No conclusions about causality can be made.
- Approximately 27% of Scottish households that contain at least one child, include a child or children with symptoms of respiratory health problems.
- Significant predictors of whether a child had symptoms of respiratory health problems include: heating usage within the dwelling; respondents' satisfaction with heating; tenure and dwelling type.
- Factors not associated with the respiratory health of children include: fuel poverty; overcrowding; extent of central heating and level of disrepair of the dwelling.
- In approximately 29% of households adult respondents had symptoms of respiratory health problems.
- Significant predictors of whether respondents had symptoms of respiratory health problems are: heating usage within the dwelling; satisfaction with heating and whether someone was home all day; tenure and dwelling type.
- Factors not associated with adult respiratory health include: fuel poverty; extent of central heating; disrepair to dwelling and type of heating.
- Approximately 70% of respondents assessed their health as either 'very good' or 'good'. Around 2% of respondents assessed their health as 'very bad'.
- Significant predictors of whether respondents assessed their health as 'bad or very bad' are: tenure; the energy rating of the dwelling; satisfaction with home and satisfaction with neighbourhood.
- Factors not associated with self-assessed health include: disrepair; fuel poverty; fuel type; number of children and overcrowding.
- Approximately 18% of respondents had a 'high' General Health Questionnaire-12 (GHQ12)¹ score of 4 or above.
- Significant predictors of a high GHQ12 score are: tenure; location (urban or rural); satisfaction with home; satisfaction with neighbourhood and satisfaction with heating.
- Factors not associated with a high GHQ12 score include: age of respondent; overcrowding; disrepair to dwelling; fuel poverty; dampness and dwelling type.
- Tenure is the only significant predictor across all reported health outcomes and is significant after controlling for classifications such as income, age and gender of respondents.
- Despite this it is not possible to infer a causal relationship between tenure and health. Many factors associated with tenure are not included in this study and they could account for the association. These factors include; diet; lifestyle; genetic predisposition and environment.
- Relative level of heating use is a significant predictor of respiratory health in both adults and children and is more important than the presence or extent of central heating.

¹ The GHQ12 is a well-established survey instrument designed to detect possible psychiatric morbidity in the general population. It is based on 12 questions about general levels of happiness, depression, anxiety and sleep disturbance over the four week period prior to interview. A score of 4 or more is used as a threshold to identify respondents with a possible psychiatric disorder.

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1. Introduction: Housing and Health in Scotland

In recent years there has been a focus on the effects of cold and damp housing on the health of occupants, particularly with regard to asthma and other respiratory conditions. There is a general acceptance that improved housing offers the prospect of better health and less sickness linked to damp and cold. Given this focus on the relationship between housing and health there is a need to explore the links between the two. The Scottish House Condition Survey (SHCS) is the only national survey which collects data relevant to this aim.

Research reports that explore the association between housing and poor health typically begin with caveats and warnings about the confounding factors at work in any such analysis. This report is no different. Both poor housing and poor health are closely correlated with socio-economic factors such as income, unemployment and social class. In any analysis it is therefore necessary to fully control for these factors, which is, in practice, exceptionally difficult. The only way to be completely certain that aspects of housing cause changes in health status is to conduct a carefully controlled experimental study. Given these caveats, analyses of survey results such as those from the SHCS can only establish the association between health and house condition at a single point in time and must not be understood as suggesting causality.

The SHCS is first and foremost a survey of house condition. However, as noted above, the relationship between housing and health has been recognised for some time now and it is appropriate therefore that health topics be covered in a survey such as the SHCS. Any attempt to explore this relationship however is bound by the limitations of both the housing and health data collected by the SHCS and in this respect it is important to note that the SHCS does not gather comprehensive data on the health of respondents.

Notwithstanding this, the extent and quality of health data collected by the SHCS has increased since the survey's inception in 1991 and the 2002 SHCS collected data on four health topics:

- Presence of long-term limiting illness/disability;
- Respiratory health of the respondent and children in the home;
- Self-assessed health;
- Psychosocial well-being.

Long-term illness and disability is covered at length in the Main Report of the 2002 Survey and there is therefore no need to reproduce those findings here. Instead, this report will cover those areas not included in the Main Report.

Questions exploring self-assessed health and long-term limiting illness are well-established in government household surveys. The SHCS used the standard questions on these topics.

Respiratory health of the respondent and children in the home

The 2002 SHCS set out to explore the association between respiratory health and housing conditions through the development of a respiratory health severity scale. Professor Stephen Platt of Edinburgh University's Research Unit in Health, Behaviour and Change was commissioned to undertake this work. The main objectives of the commission were to explore and identify questions for measuring respiratory disease/symptoms appropriate for both adults and children; and to identify and suggest scales for respiratory disease/symptoms which are reliable and valid and can allow for comparison with other research.

A series of questions were developed and asked of respondents and all children in the household. These questions explored the prevalence and frequency of respiratory health symptoms such as wheezing and coughs and also sought to establish whether those affected by these symptoms had received medical treatment. (Appendix B details the full list of questions).

Psychosocial well-being

In order to measure the association between general well-being and housing the Chief Medical Officer for Scotland requested that the SHCS incorporate the General Health Questionnaire-12 (GHQ12) questionnaire. The GHQ12 is a well-established survey instrument designed to detect possible psychiatric morbidity in the general population. It is based on 12 questions about general levels of happiness, depression, anxiety and sleep disturbance over the four week period prior to interview. A score of 4 or more is used as a threshold to identify respondents with a possible psychiatric disorder. The GHQ12 questionnaire can be found in Appendix B.

All health measures were assessed against key household and dwelling characteristics collected as standard by the SHCS. These include: household type; dwelling type; date of construction, tenure and urban/rural location. In addition, variables were derived from the data to assess respondents satisfaction with and usage of the dwelling's heating system. This was based on discussions with the Research Unit on Health, Behaviour and Change at Edinburgh University.

The object of the analyses in this report is twofold:

1. to assess the association between health and key household and dwelling characteristics;
2. to describe the prevalence of these health measures amongst Scottish households.

Unravelling risk and prevalence: modelling housing and health in Scotland

This report presents a number of frequency tables which show the prevalence of health issues across various dwelling and household characteristics. These tables are informative with respect to the profile and distribution of health problems across various household types in Scotland. It is not possible, however, to state with certainty, on the basis of an inspection of frequency tables alone that these are causal characteristics since they do not account for the influence of other factors.

For example, it may be shown in a frequency table that children have respiratory problems in 21% of detached dwellings, whereas the same is true for 30% of children in terraced houses. This may lead to the conclusion that house type affects the likelihood of respiratory problems amongst children; this is not necessarily correct. When the facts that households who live in terraced houses are more likely to contain smokers and have unsatisfactory central heating than households living in detached houses are taken into account, dwelling type itself becomes non-significant. It is not dwelling type that is best associated with respiratory health, but factors that are associated with dwelling type. **For this reason it is of paramount importance that conclusions about the association between housing and health are not drawn from the frequency tables.**

Box 1.1: Using the frequency tables

Like all sample surveys, the SHCS produces estimates of the proportions within the population as a whole. These estimates may differ from the true rate of prevalence in the population and thus must be interpreted in the light of this potential divergence, or sampling error.

Rather than report confidence intervals for every estimate in this report, which would have made the presentation extremely complex, the background to and means of calculating confidence intervals are set out in Appendix D.

Conventions

Figures are rounded to the nearest 500. Percentages are rounded to the nearest integer. For this reason frequencies may not always sum to the population total and percentages may not always sum to 100.

Where an asterisk appears, this means that the estimate would have to be based on fewer than 30 cases and is hence omitted for reasons of statistical reliability.

Where the symbol † appears, this represents an estimate derived from between 30 and 100 cases and which should be treated with considerable caution.

In order to properly explore the relationship between health and housing, a series of logistic regression analyses were conducted for each health variable. Logistic regression analysis controls for all variables entered into the analysis. It can therefore reveal which factors are significant and independent predictors of a binary dependent variable, such as whether or not a household contains children with respiratory problem symptoms. It can also be used to calculate the odds² of a household containing children with respiratory problems according to changes in the predictor variables.

Where it appears that the figures in the frequency tables do not seem to be in accordance with the results of the logistic analysis, it should be understood that logistic regression analysis is a sophisticated statistical technique, the results from which are far more valid and informative than frequency tables alone. A brief explanation of regression analysis follows and should be read by those unfamiliar with the technique before reading the report.

² Odds can be understood as the ratio of the probability of an event occurring over the probability of it not occurring.

Box 1.2: Understanding logistic regression analysis

An important feature of this analysis is the fact that an entire set of variables can all be taken into account simultaneously. The results then show which variables are independent significant predictors of the health variable in question. In other words, it might be shown in the frequency tables that households with higher incomes are less likely to contain children with respiratory problems than households with low incomes. However, when the fact that high income households are more likely to live in private tenures, are more likely to have satisfactory heating, and are less likely to smoke are all taken into account, the impact of income on the likelihood of children's respiratory health will be removed. Any association that income has with children's respiratory health is better accounted for by other variables and it can be concluded that it is not income that is relevant, but smoking behaviour, tenure and heating. It might be true that income is a good predictor of smoking behaviour, tenure and heating and through its effect on these variables it effects respiratory health, but it does not effect respiratory health directly.

It is also important to understand the concept of relative risks when considering the results of regression analyses. Within each variable (e.g. tenure) one value (e.g. private renter) is set as the reference category. This means that the risk of respiratory health problems of any other value within that variable (e.g. owner-occupiers) can only be understood in comparison to the reference category. That the reference category has no risk value associated with it does *not* mean that households within that category have a zero risk of containing children with respiratory health problems. Nor does it mean that the risk of those dwellings containing children with respiratory health problems is equal to the risk of the population as a whole. It is essential for the operation of the model that a value within each category of variables is set as the reference point in this way, but it is important to interpret the information presented in terms of relative and not absolute risk of respiratory health problems.

Finally, it is important to understand the difference between the significance of variables included within the models, and the overall predictive power of the model. This can be quite difficult to grasp and it often appears as if the results are contradicting themselves. The overall power of a logistic regression model is assessed by examination of the classificatory tables. In each case these are provided in the appendices. The higher the percentage correct of positive cases (e.g. cases where a child in the household did have respiratory symptoms, or where the respondent did score 4 or more on the GHQ12) the better the predictive power of the model.

2. Housing and Child Respiratory Health

Note that throughout this chapter only households with children are included in the analyses.

Research in this area has typically focused on the effects of dampness and condensation and associated fungal growths in contributing to asthma and other respiratory problems. Existing research suggests an association between poor housing and poor health in children. For example, Wilkinson³ cites research that children living in damp housing show a greater prevalence of respiratory problems, vomiting, headaches and fever. The 2002 SHCS sought to explore the relationship between poor housing and the respiratory health of children by developing and administering those respiratory health questions discussed in the introduction to the report.

The following explores the relationship between housing and child respiratory health in two ways. A series of frequency tables demonstrate the profile of symptoms of respiratory health problems across housing factors and the regression analysis establishes those factors which are significant predictors of respiratory problems amongst children.

Table 2.1 shows which respiratory health problems were reported by the respondent as being present among any children in the household. Table 2.2 shows the number of children who experienced at least one symptom in each household. This table shows that the majority of households containing children (approximately 73%) do not contain children with any respiratory problems. The binary scale shown in Table 2.2 is used throughout the rest of the chapter to show the frequencies and percentages of households containing children with respiratory problems by various housing and social factors.

Table 2.1: Households containing children with specific respiratory health problem symptoms

	No.	%
Wheezing/whistling symptoms		
No child	489000	81
At least one child	114500	19
Dry cough at night		
No child	511500	85
At least one child	92000	15
Taking medicine for respiratory problem		
No child	514500	85
At least one child	89000	15
Had antibiotics for respiratory infection		
No child	552000	92
At least one child	51500	9
Had asthma attack in past 12 months		
No child	543500	90
At least one child	60000	10
Total	603500	100

³ Wilkinson, D (1999) *Poor Housing and Ill Health: A Summary of Research Evidence*, The Scottish Office Central Research Unit

Table 2.2: Households containing children with respiratory health problem symptoms

Number of children with symptoms	No.	%
0	439000	73
1	55000	9
2	35000	6
3	29500	5
4	31500	5
5	13500	2
Binary scale		
No child with symptoms	439000	73
At least one symptom	164500	27
Total	603500	100

Results

- The predictive power of the logistic regression model was very weak; the model was able to correctly predict whether a child in the household had respiratory symptoms 4.9% of the time, i.e. for 54 out of 1091 cases.
- If the adult respondent had respiratory problems him/herself then it is twice as likely that children in the household will also have respiratory symptoms than if the adult respondent did not. This is the largest and most significant variable in the model (Table 2.3).
- Children in social tenures are more likely to have respiratory health problems than children in private tenures (Table 2.3).
- Children who live with a smoker are more likely to have respiratory problems than if they do not (Table 2.3).
- Children in flats are less likely to have respiratory problems than those in houses (Table 2.3).
- Similarly, table 2.5 seems to suggest that children are more likely to have respiratory problems if they live in overcrowded dwellings, but overcrowding⁴ was excluded from the final model as it had no power to predict children's respiratory health.
- There is no association between children's respiratory health and either NHER (national home energy rating) or fuel poverty.
- Table 2.6 does seem to suggest that dwellings with damp are more likely to contain children with respiratory health problems than dwellings without damp. When damp was included in the regression model but heating usage was not, damp was not a significant predictor of children's respiratory health. In addition, there is no association between the presence of damp and heating usage (see appendix, table A3). We can therefore be confident that the relationship between heating usage and children's respiratory health is not concealing any relationship between damp and children's respiratory health.
- The risk of children having respiratory problems is higher in households with high heating usage, compared to those with medium usage. The risk is not different between households with low usage and those with high usage (Table 2.6).
- Both the prevalence and the risk of children having respiratory problems is higher in households in which the respondents claim that heating is not satisfactory in winter. More objective measures, such as the existence and extent of central heating, or the type of fuel type used, are not associated with children's respiratory health.

⁴ Measured by The Bedroom Standard

As indicated above, the results of the modelling exercise showed that most housing variables had little or no power to predict children's respiratory health problems. The final model with the best fit included the following variables:

- Dwelling type (house or flat)
- Level of heating usage (see Box 2.1).
- Presence of smoker in household
- Tenure (private or social)
- Whether adult respondent had respiratory health problems
- Satisfaction with heating

Variables that were excluded from the model because they had no power to predict whether any children in the household had any respiratory problems were:

- Average heating score
- Bedroom standard
- Currently or ever owned furry pets
- Currently or ever owned non-furry pets
- Date of construction
- Extent of central heating
- Fuel poverty
- Health board
- Tolerable standard
- Income
- Level of disrepair
- Location (urban/rural)
- NHER
- Presence of damp
- Primary fuel source
- Socioeconomic status

Box 2.1: Heating usage

A measure of how much householders heat their homes was calculated by adding up the number of hours respondents reported heating each room of their dwelling during both week days and weekends. Different households could therefore arrive at the same total number of hours via quite different heating regimes. For example, one household might heat just one room constantly throughout the week and leave all other rooms permanently unheated, while another household might heat every room equally for a couple of hours a day during the week and permanently at the weekend.

Various other measures of heating usage were devised (e.g. proportion of rooms heated, total heating divided by number of rooms) but it was this measure that proved to have the most predictive power with respect to children's respiratory health.

It should be noted that this measure does not take into account variation in effectiveness of heating or the actual temperatures achieved.

Low: up to 55 hours a week
Medium: between 55 and 77 hours a week
High: over 77 hours a week

The relative risks of each variable are shown in table 2.3. It should be noted however that the model had very limited predictive power (see appendices, table A2) and as such it is possible to conclude that **housing factors play only a very small part in altering the risks of a household containing children with respiratory health problems.**

Table 2.3: Logistic regression model for children’s respiratory health. (Complete table can be seen in Appendix A)

	Significance	Odds ratio	Relative risk
heating usage: low	0.03	Reference category	
heating usage: medium	0.44	0.93	no difference
heating usage: high	0.05	1.18	higher risk
heating satisfactory		Reference category	
heating not satisfactory	0.03	1.25	higher risk
adult respondent has no resp. problem		Reference category	
adult respondent has resp. problem	0.00	2.06	much higher risk
private tenure		Reference category	
social tenure	0.00	1.63	higher risk
no smokers in household		Reference category	
smoker in household	0.02	1.20	higher risk
house		Reference category	
flat	0.00	0.83	lower risk

Note that risk is relative to reference category within each group

The relationship between heating usage and children’s respiratory health is interesting. As mentioned in the introduction, cross-sectional studies such as this one do not allow the direction of causality to be established and this is a particularly good example. It is possible that overheating homes leads to an increased risk of respiratory problems amongst children. It is equally possible, however, that householders increase their heating usage in reaction to their children’s respiratory problems. The fact that householders who consider their heating system to be unsatisfactory are more likely to have children with respiratory problems indicates that the former is more likely, but experimental or longitudinal research is required to answer this question adequately.

Frequency tables

Table 2.4: Child respiratory health by dwelling type and date of construction

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
House type				
detached houses	101500	79	27000	21
semi-detached houses	106000	71	43500	29
terraced houses	109500	70	47000	30
Tenement	72000	73	26500	27
4-in-block	38500	72	15500	28
flat in a converted building	*	73	*	27
tower / slab	7500†	68	*	32
Date of construction				
Pre-1919	77500	79	20000	21
1919-1944	56000	70	24500	30
1945-1964	102500	67	50500	33
1965-1974	73500	71	29500	29
1975-1982	41500	75	14000	25
1983-1990	27500	76	8500†	24
1991-1997	36000	76	11000†	24
post-1997	24500	78	7000†	22

Table 2.5: Child respiratory health by characteristics of dwelling

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
Bedroom Standard				
3+ above standard	19500	77	6000	23
2 above standard	37000	76	11500	24
1 above standard	133000	75	44000	25
equal to standard	209500	72	81500	28
below standard	40000	65	22000	35
Disrepair				
some disrepair	358000	72	140500	28
no disrepair	81000	77	24000	23
Urgent disrepair				
no urgent disrepair	297000	73	107000	27
some urgent disrepair	142000	71	57500	29
Condition of dwelling				
not poor	319500	73	115500	27
poor	119500	71	49000	29
Tolerable standard				
below	*	90	*	10
above	435500	73	164000	27

Table 2.6: Child respiratory health by heating characteristics of dwelling

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
Main fuel type				
mains gas	344000	73	124000	27
electric	54500	66	28000	34
other fuel	40500	76	12500	24
Extent of central heating				
full	398500	73	146000	27
partial	24000	65	12800	35
none	16000†	73	6000†	27
NHER group⁵				
poor	22000	71	9000†	29
moderate	251500	73	94000	27
good	161000	73	59500	27
Fuel poverty				
fuel poor	20500	73	7500†	27
not fuel poor	410500	73	154000	27
Any damp or condensation?				
some	59000	68	28000	32
none	376000	74	134500	26
unobserved	4500	66	*	34
Is heating satisfactory?				
yes	383500	74	133000	26
no	55500	64	31500	36
Heating usage				
low	181000	73	66000	27
medium	130000	76	41000	24
high	120000	69	54500	31
missing	8000†	70	*	30

⁵ A NHER less than 2 is 'poor'. Dwellings with a NHER of 3 –67 are rated 'moderate' Those with a score of 7 and above are rated 'good'.

Table 2.7: Child respiratory health by health board

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
Highland	16500†	73	6000†	27
Grampian	46000	71	19000	29
Tayside	33500	78	9500†	22
Fife	28500	69	13000†	31
Lothian	67000	75	22500	25
Borders	9500†	82	*	18
Forth Valley	24500	73	*	27
Argyll & Clyde	36500	70	16000	30
Greater Glasgow	75500	72	29000	28
Lanarkshire	48500	70	20500	30
Ayrshire & Arran	33500	74	11500†	26
Dumfries & Galloway	12500†	74	4500†	26
Orkney	2000†	70	1000†	30
Shetland	2000†	77	1000†	23
Western Isles	2500†	79	*	21

Table 2.8: Child respiratory health by presence of pets and smokers in household

	No child with symptoms		Child(ren) with symptoms	
	No.	%	%	No.
Have pets in the house?				
no	199000	74	68500	26
yes	240000	71	96500	29
Any smokers in the house?				
yes	170500	67	82000	33
no	268500	76	82500	24

Table 2.9: Child respiratory health by household type, tenure and location.

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
Household type				
single parent	88000	67	44000	33
small family	238000	76	74500	24
large family	113000	71	46500	29
Tenure				
owner occupier	292500	77	85500	23
LA/Other public	95000	63	55000	37
HA/Housing coop	25000	64	14000	36
private renter	27000	73	10000†	27
Location				
rural	70500	72	27000	28
urban	368500	73	138000	27

Table 2.10: Child respiratory health by weekly income

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
< £100	5000†	79	*	21
£100 –199.99	53500	68	25000	32
£200 –299.99	77500	68	36500	32
£300 –399.99	78500	71	31500	29
£400 –499.99	69500	73	25000	27
£500 –699.99	93500	77	28000	23
£700+	60000	79	16000	21

Table 2.11: Child respiratory health by adult respondent's respiratory health

	No child with symptoms		Child(ren) with symptoms	
	No.	%	No.	%
Adult respondent has respiratory problems				
no	350000	78	101000	22
yes	89000	58	63500	42

3. Housing and Adult Respiratory Health

As with the respiratory health of children, existing research suggests a link between poor house condition and respiratory conditions amongst those in the dwelling⁶. As with chapter 2 this chapter looks at adult respiratory health by presenting a series of frequency tables which outline the profile across housing factors. The regression analysis identifies those factors which are significant predictors of respiratory problems amongst adults.

Table 3.1 shows the number of symptoms experienced by respondents. The results are similar to those for children's respiratory symptoms in that the majority of respondents (approximately 71%) experience no respiratory problems and of those that do, most experience only one or two symptoms.

Table 3.1: Respiratory health problem symptoms amongst respondents

Number of symptoms	No.	%
0	1550000	71
1	275500	13
2	131000	6
3	97000	4
4	64000	3
5	50500	2
6	24500	1
Binary scale		
No symptoms	1550000	71
At least one symptom	642500	29
Total	2192500	100

⁶ For a review of evidence see Gill, P. & de Wildt, G. (2003) *Housing and Health: the role of primary care*, Radcliffe Medical Press

Results

- The overall power of the logistic regression model was very weak. The model was able to correctly predict whether a respondent had respiratory problems 7.9% of the time, i.e. for 336 out of 4,240 households.
- Male respondents are at higher risk of respiratory problems than female respondents when all other factors are taken into account (Table 3.2). When other factors are not taken into account, this relationship is not evident (Table 3.3).
- Respondents aged over 50 years are at higher risk of respiratory problems than those aged under 50 (Table 3.2).
- Table 3.4 indicates that symptoms are more likely amongst those living in tower/slab dwellings and, with the exception of flats in converted buildings, those living in flats are more likely to have symptoms than those in houses. In the regression analysis however, the difference between types of houses and types of flats proved to be non-significant. Accordingly, the variable was changed to 'flats' and 'houses' only and the results show that respondents living in flats are more likely to have respiratory problems than those living in houses.
- There is no difference in the percentage of respondents with symptoms according to measures of disrepair and whether or not the dwelling is above or below the statutory Tolerable Standard (Table 3.5).
- Heating use proved to be an important predictor of adult respiratory health: the model demonstrates that those whose heating usage is either 'high' or 'low' are more likely to have symptoms of respiratory problems than those whose heating usage is 'medium'. The existence of central heating alone did not effect the risk of adult respiratory health, but the existence of central heating does influence heating usage.
- Respondents who are unlikely to be home all day and consider their heating to be satisfactory are less likely to have respiratory problems than households in any other situation. Households within which the heating is not satisfactory and some-one is likely to be home all day are most likely to suffer respiratory problems (Table 3.2). In this context it is worth noting that ill, disabled or elderly householders are most likely to be home all day.
- There is very little difference in the percentages of respondents with symptoms between NHER levels or fuel poverty categories (Table 3.6). These variables were also excluded from the model because they had no predictive power.
- Approximately 35% of respondents living in dwellings with damp or condensation have respiratory problems compared to roughly 28% in non-damp dwellings (Table 3.6). However, the presence of damp or condensation is not predictive of respiratory health problems in the analysis. When damp is entered in the model but heating satisfactory*home all day is not, damp is a significant predictor of adult respiratory health (see Appendices, table A8). However when heating satisfactory*home all day is included, the presence of damp is rendered non-significant. Given that there is a strong association between damp and heating satisfactory*home all day (see appendices, table A7) this indicates that damp is relevant to adult respiratory health, but the association is concealed by the closer association between respiratory problems and heating satisfactory*home all day.
- The percentage of respondents with respiratory symptoms tends to be higher in non-family household types (single pensioner, single adult, etc.) although it is relatively high in single parent households (Table 3.9).
- The risk of having respiratory problems if there is a smoker in the household is roughly one and a half times higher than if there is not.

As indicated above, the results of the modelling exercise showed that most housing variables had little or no power to predict adult respiratory health problems. The final model with the best fit included the following variables:

- Age of respondent
- Central heating usage
- Ever owned furry pets
- Gender
- Health board
- Householder being home all day and satisfied with heating (see Box 3.1).
- Presence of smokers in household
- Tenure (social or private)
- Type of dwelling (house or flat)

Variables that were excluded from the model because they had no power to predict whether or not respondent had respiratory health problems were:

- Any disrepair
- Bedroom standard
- Damp (but see text above)
- Date of construction
- Extent of central heating
- Fuel poverty
- Presence of furry pets in household
- Primary fuel source
- Rural or urban location
- Tolerable standard
- Type of heating
- Weekly income

Box 3.1: Heating satisfaction and home all day

Heating was not satisfactory if householders said that their heating was inadequate during the winter and that this was a problem.

Households containing at least one member who was retired, unemployed or looking after the home or family were considered likely to be 'home all day'.

The relative risks of each variable are shown in table 3.2. As with children's respiratory health, it should be noted that the model had very limited predictive power (see appendices, table A5) and as such **it is possible to conclude that housing factors play only a very small part in altering the risks of respiratory health problem symptoms in adults.** It should further be noted that not all differences between variable categories and the reference categories are significant. It is important to check the statistical significance of any differences before drawing conclusions from the results.

It is of interest to note that while 'ever had furry pets' is a significant predictor of respiratory health problems, 'currently have furry pets' is not. It is possible that there are two effects at work here; people who have furry pets are more likely to have respiratory problems, but people with respiratory problems, aware of the effect furry pets have, are likely to avoid having furry pets. The two effects would cancel each other out in this kind of analysis resulting in the model finding no association between the presence of furry pets and respiratory health.

Table 3.2: Logistic regression model for adult respiratory health. (Complete table can be seen in Appendix A)

	Significance	Odds ratio	Relative risk
male		reference category	
female	0.00	0.87	lower risk
<20	0.69	1.11	no difference
20-29	0.47	1.06	no difference
30-39	0.02	0.86	lower risk
40-49	0.00	reference category	
50-59	0.00	1.23	higher risk
60-69	0.00	1.35	higher risk
70-79	0.00	1.47	higher risk
80+	0.02	1.25	higher risk
never had furry pets		reference category	
ever had furry pets	0.00	1.28	higher risk
Greater Glasgow	0.00	reference category	
Highland	0.56	0.93	no difference
Grampian	0.12	0.88	no difference
Tayside	0.00	0.72	lower risk
Fife	0.07	0.82	no difference
Lothian	0.01	0.83	lower risk
Borders	0.05	0.78	lower risk
Forth Valley	0.00	0.71	lower risk
Argyll & Clyde	0.00	0.75	lower risk
Lanarkshire	0.17	0.89	no difference
Ayrshire & Arran	0.47	0.94	no difference
Dumfries & Galloway	0.08	0.81	no difference
Orkney	0.02	0.73	lower risk
Shetland	0.09	0.80	no difference
Western Isles	0.00	0.52	lower risk
no smokers in household		reference category	
any smokers in household	0.00	1.48	higher risk
heating usage: little	0.00	reference category	
heating usage: medium	0.05	0.91	lower risk
heating usage: lots	0.03	1.11	higher risk
heating satisfactory - out all day	0.00	reference category	
heating satisfactory - home all day	0.00	1.33	higher risk
heating not satisfactory - out all day	0.00	1.36	higher risk
heating not satisfactory - home all day	0.00	2.14	higher risk
house		reference category	
flat	0.00	1.17	higher risk
private tenure		reference category	
social tenure	0.00	1.53	higher risk

Note that risk is relative to reference category within each group

Frequency tables

Table 3.3: Adult respiratory health by gender, age, marital status and health of respondent

	No symptoms		Symptoms	
	No.	%	No.	%
Gender of respondent				
male	646500	70	279500	30
female	903500	71	363000	29
Age of respondent (years)				
under 30	166500	72	66000	28
30-39	335000	76	103000	24
40-49	316500	74	109500	26
50-59	258000	70	111500	30
60-69	216000	66	113500	34
70-79	172500	64	96500	36
80+	87500	68	40500	32
Marital status				
married	776000	74	275000	26
cohabiting	113500	71	46500	29
single	263500	70	111000	30
widowed	204500	64	112500	36
divorced	124000	66	64000	34
separated	68500	67	33500	33
Respondent has long-term illness/disability				
no	1298500	80	333000	20
yes	251500	45	309000	55

Table 3.4: Adult respiratory health by dwelling type and date of construction

	No symptoms		Symptoms	
	No.	%	No.	%
House type				
detached houses	321500	78	90500	22
semi-detached houses	328000	71	131000	29
terraced houses	351000	71	143500	29
tenement	333000	67	164000	33
4-in-block	153500	66	77500	34
flat in a converted building	30000	79	8000†	21
tower / slab	33500	56	26500	44
Date of construction				
pre-1919	333500	75	112500	25
1919-1944	212000	68	98500	32
1945-1964	354000	67	177000	33
1965-1974	247500	68	115500	32
1975-1982	138000	74	48000	26
1983-1990	97000	73	36000	27
1991-1997	101000	74	35000	26
post-1997	68000	79	18000	21

Table 3.5: Adult respiratory health by characteristics of dwelling

	No symptoms		Symptoms	
	No.	%	No.	%
Bedroom Standard				
3+ above standard	101500	76	31500	24
2 above standard	271500	74	96500	26
1 above standard	594000	71	248500	29
equal to standard	506500	69	230500	31
below standard	76500	69	34000	31
Disrepair				
some disrepair	1235500	70	525500	30
no disrepair	315500	73	115500	27
Urgent disrepair				
no urgent disrepair	1049500	71	428500	29
some disrepair	502000	70	212500	30
Condition of dwelling				
not poor	1174000	71	482000	29
poor	377500	70	159000	30
Tolerable standard				
below	14000†	69	6000†	31
above	1536000	71	634500	29

Table 3.6: Adult respiratory health by heating characteristics of dwelling

	No symptoms		Symptoms	
	No.	%	No.	%
Extent of central heating				
full	1355000	71	546500	29
partial	117500	69	51500	31
none	76500	65	40500	35
Main fuel type				
mains gas	1117000	72	444000	28
electric	296000	67	147500	33
other fuel	138000	74	49000	26
NHER group				
poor	118500	67	57500	33
moderate	933000	71	376000	29
good	481000	71	198000	29
Fuel poverty				
fuel poor	195500	68	90000	32
not fuel poor	1314000	71	536500	29
Any damp or condensation?				
some	194000	65	103000	35
none	1342000	72	531500	28
unobserved	15500	70	6500†	30
Is heating satisfactory?				
yes	1400500	72	538000	28
no	149500	59	104500	41
Heating usage				
low	703000	71	293000	29
medium	387500	74	139500	26
high	415500	68	193000	32
missing	43500	73	16500	27

Table 3.7: Adult respiratory health by health board

	No symptoms		Symptoms	
	No.	%	No.	%
Highland	63500	71	26000	29
Grampian	154500	70	67000	30
Tayside	129000	74	46000	26
Fife	105000	72	41500	28
Lothian	246500	73	89000	27
Borders	36500	75	12000	25
Forth Valley	89500	74	32000	26
Argyll & Clyde	133500	72	50500	28
Greater Glasgow	255500	66	133500	34
Lanarkshire	155500	69	71000	31
Ayrshire & Arran	111500	69	49500	31
Dumfries & Galloway	45500	72	17500	28
Orkney	7000	76	2000	24
Shetland	7000	72	2500	28
Western Isles	9500	82	2000†	18

Table 3.8: Adult respiratory health by presence of pets and smokers in household

	No symptoms		Symptoms	
	No.	%	No.	%
Ever had pet(s)?				
no	356000	74	124000	26
yes	1194000	70	518000	30
Have pet(s) now?				
no	943500	71	386500	29
yes	606500	70	256000	30
Any smokers in the house?				
yes	548500	64	309000	36
no	1001500	75	333500	25

Table 3.9: Adult respiratory health by tenure and location.

	No symptoms		Symptoms	
	No.	%	No.	%
Household type				
single adult	233500	68	108500	32
small adult	277500	74	98500	26
single parent	90000	68	41500	32
small family	236500	77	72500	23
large family	120500	76	38000	24
large adult	162500	73	61500	27
older smaller	209500	67	102500	33
single pensioner	220500	65	120000	35
Tenure				
owner occupier	1037000	76	330500	24
LA/Other public	314000	60	211000	40
HA/Housing coop	75500	60	51000	40
private renter	123500	71	50000	29
Location				
rural	263500	74	91500	26
urban	1286000	70	550500	30

Table 3.10: Adult respiratory health by income

	No symptoms		Symptoms	
	No.	%	No.	%
< £100	83500	69	38000	31
£100 -199.99	369000	64	205000	36
£200 -299.99	313500	67	153000	33
£300 -399.99	239000	72	93500	28
£400 -499.99	184000	75	61500	25
£500 -699.99	213000	79	58000	21
£700+	137000	81	31500	19

4. Housing and Self-Assessed Health

This chapter covers self-assessed health. It should be noted that the subjectivity inherent in these questions can lead to perceptions of health status differing between respondents who may have exactly the same health status if measured objectively. It is possible therefore that respondents with identical conditions will give quite different views on their health status.

This first part of this chapter discusses the result of the regression analysis to identify those factors associated with self-assessed health. Frequency tables then set out the prevalence of self-assessed health across dwelling and household characteristics.

Tables 4.3 to 4.12 show the frequencies of responses to the self-assessed health question by various dwelling and household characteristics. In these tables 'bad' and 'very bad' assessments have been grouped together. For the purposes of modelling self-assessed health 'very good', 'good' and 'fair' responses were also grouped together to create a binary variable.

Table 4.1: Self-assessed health of respondents

	No.	%
Very good	845500	39
Good	667500	31
Fair	463000	21
Bad	164500	8
Very bad	51500	2
Total	2192000	100

Results

- The majority of respondents (about 70%) assessed their health as either 'good' or 'very good' whilst just over a fifth of respondents described their health as 'fair'. Approximately 10% of respondents described their health as being either 'bad' or 'very bad' (Table 4.1).
- The overall power of the logistic regression model was weak. The model was able to correctly predict whether a respondent had bad or very bad self-assessed health 16.8% of the time, i.e. for 241 out of 1,434 households.
- There is little difference in self-assessed health status between male and female respondents. In the logistic regression analyses gender was combined with various other variables to see if it affected the risk of bad self-assessed health through its interaction with these variables. It was found that the combination of gender and 'any long-term illness or disability' was the best predictor. Compared to females with no long-term illness, men with no long-term illness are less likely to assess their health as 'bad' or 'very bad'; men with a long-term illness are between 7 and 11 times more likely, and women with long-term illness are between 8 and 11 times more likely of perceiving their health as 'bad' or 'very bad'. Long-term illness/disability was self-reported by respondents.
- Respondents aged between 20 and 39, and from age 60 onwards have lower risk of bad or very bad self-assessed health compared to respondents aged 40-49 years.
- Respondents who are married, co-habiting or single appear less likely to describe their health as 'bad' or 'very bad' than those who are divorced or widowed in table 4.3, but this is not supported by the regression analysis which found this variable to have no predictive power.
- Table 4.8 shows that fewer respondents in households where smokers are present report their health as very good than in those households where smokers are not present and more report their health as being 'bad or very bad'. This is supported by the regression analysis which shows respondents living in households where at least one person smokes to be at far greater risk of assessing their health as bad or very bad.
- The condition of the dwelling (measured by state of repair and whether it falls below the statutory Tolerable Standard) makes no difference to self-assessed health (Table 4.5).
- Approximately 29% of fuel poor households perceive their health as 'very good' compared to around 40% of non-fuel poor households although there is no difference in the proportion perceiving their health as 'bad or very bad' between fuel poor and non-fuel poor households (Table 4.6). Fuel poverty is not a significant predictor of self-assessed health when all other variables are controlled for, but NHER is. Respondents living in good NHER dwellings are less likely to perceive their health as 'bad' or 'very bad' compared to those with moderate NHERs. There is no difference between moderate and poor NHER dwellings.
- It is estimated that 2% of households with an income over £700 per week perceive their health as 'bad or very bad' compared to approximately 12% of households where income was less than £100 per week (Table 4.7). The regression analyses show that the only significant differences were between households earning £100-199.99 per week with those earning over £500 per week. The differences between £100-199 and £200-299 or £300-399 were not significant.
- Looking across health board areas the proportion of households perceiving their health status as 'bad or very bad' ranges from approximately 3% in Orkney to 13% in greater Glasgow and Lanarkshire (Table 4.7). Health board remained a significant predictor of self-assessed health even when all other variables were taken into account.
- There appears to be a clear relationship between perceptions of health and satisfaction with home and neighbourhood. Those satisfied with their home are more likely to perceive their health as 'very good' than those very dissatisfied and much less likely to perceive it as 'bad or very bad'. Similar results are found when looking at neighbourhoods with those who consider their neighbourhood as being 'very good' more likely to perceive their health as 'very good' (Table 4.10). These associations were confirmed by the regression analyses.

- The second most significant predictor of how respondents assess their own health after gender by long-term illness or disability is whether or not the respondent has any respiratory health problems. As such, it can be seen that all those variables that predict respiratory health problems are also relevant to self-assessed health.

Table 4.2 shows the results of the regression model and the odds ratios of the variables included. The final model with the best fit included the following variables:

- Age of respondent
- Any respiratory problems
- Gender and long-term illness or disability
- Health Board
- NHER
- Presence of smokers in household
- Respondents assessment of neighbourhood
- Satisfaction with home
- Tenure
- Weekly income

Variables that were excluded from the model because they had no power to predict self-assessed health were:

- Any disrepair
- Any serious disrepair
- Bedroom standard
- Damp
- Date of construction
- Dwelling type
- Extent of central heating
- Fuel poverty
- Main fuel type
- Number of children
- Pets in household
- Rural or urban location
- Socioeconomic status
- Tolerable standard

That satisfaction with home and respondents assessment of their neighbourhood are both significant predictors of self-assessed health is a particularly interesting result. It could be argued that both are indicators of 'negative affectivity', in other words, a tendency to view things negatively. Even the measure 'long-term illness or disability' could be seen this way, as the measure is self-reported and has no objective basis (418,000 households consider themselves or their partner to have a long-term illness or disability but only 90,000 receive any state benefit that would verify this).

Table 4.2: Logistic regression model for self-assessed health. (Complete table can be seen in Appendix A)

	Significance	Odds ratio	Relative risk
under 20	0.25	0.54	no difference
20-29	0.00	0.56	lower risk
30-39	0.00	0.70	lower risk
40-49	0.00		reference category
50-59	0.57	1.06	no difference
60-69	0.00	0.69	lower risk
70-79	0.01	0.75	lower risk
80+	0.11	0.80	lower risk
female, no long-term illness/disability	0.00		reference category
male, no long-term illness/disability	0.05	0.78	lower risk
male, long-term illness/disability	0.00	8.93	extremely higher risk
female, long-term illness/disability	0.00	9.31	extremely higher risk
owner-occupier	0.00		reference category
LA/other public	0.00	1.42	higher risk
HA/co-op	0.00	1.48	higher risk
private renter	0.14	1.26	no difference
no smokers in household			reference category
smoker in household	0.00	1.49	higher risk
Greater Glasgow	0.00		reference category
Highland	0.07	0.65	no difference
Grampian	0.24	0.85	no difference
Tayside	0.98	1.00	no difference
Fife	0.19	0.78	no difference
Lothian	0.68	0.95	no difference
Borders	0.12	0.68	no difference
Forth Valley	0.75	0.96	no difference
Argyll & Clyde	0.99	1.00	no difference
Lanarkshire	0.07	1.27	no difference
Ayrshire & Arran	0.01	0.71	lower risk
Dumfries & Galloway	0.00	0.51	lower risk
Orkney	0.00	0.24	lower risk
Shetland	0.00	0.39	lower risk
Western Isles	0.50	0.86	no difference
moderate NHER	0.03		reference category
poor NHER	0.49	0.92	no difference
good NHER	0.02	1.18	higher risk
<£100	1.00	1.00	no difference
£100 -199.99 p.w.	0.00		reference category
£200 -299.99 p.w.	0.21	1.11	no difference
£300 -399.99 p.w.	0.42	1.09	no difference
£400 -499.99 p.w.	0.97	1.01	no difference
£500 -699.99 p.w.	0.04	0.72	lower risk
£700+	0.00	0.44	lower risk
home v. satisfied	0.00		reference category
home: satisfied	0.02	1.19	higher risk
home: neither	0.00	1.58	higher risk
home: dissatisfied	0.00	1.74	higher risk
home v. dissatisfied	0.00	2.62	higher risk
home: no opinion	0.83	1.20	no difference
neighbourhood v. good	0.00		reference category
neighbourhood: good	0.70	0.97	no difference
neighbourhood: poor	0.01	1.43	higher risk
neighbourhood v. poor	0.02	1.48	higher risk
neighbourhood: no opinion	0.03	2.80	higher risk
does not have respiratory problems			reference category
has respiratory problems	0.00	2.31	much higher risk

Note that risk is relative to reference category within each group.

Frequency tables

Table 4.3: Self-assessed health by gender, age, marital status and health of respondent

	Very Good		Good		Fair		Bad or very bad	
	No.	%	No.	%	No.	%	No.	%
Gender of respondent								
male	369500	40	290000	31	178500	19	88000	10
female	476000	38	378000	30	284500	22	128000	10
Age of respondent								
under 30	123500	51	74500	31	30500	13	13000	5
30-39	222000	51	123500	28	65500	15	25500	6
40-49	192000	45	120500	29	72500	17	37000	9
50-59	130500	35	107500	29	83500	23	48000	13
60-69	93000	29	110000	34	83500	26	38500	12
70-79	61500	23	86500	32	84500	32	35000	13
80+	23000	18	45000	35	42500	33	18500	14
Marital status of respondent								
married	458500	44	321000	31	192000	18	79000	8
cohabiting	76000	47	49500	31	25000	16	10000†	6
single	151000	40	115500	31	74000	20	34000	9
widowed	72500	23	97500	31	99500	31	47500	15
divorced	50500	27	56500	30	49000	26	32000	17
separated	37000	36	27500	27	23000	23	14000	14
Is respondent long term sick or disabled?								
no	805500	49	552000	34	229500	14	44500	3
yes	40000	7	116000	21	233500	42	172000	31

Table 4.4: Self-assessed health by dwelling type and date of construction

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Dwelling type								
detached house	206500	50	129000	31	59000	14	17500	4
semi-detached house	183500	40	144000	31	96500	21	35000	8
terraced house	183000	37	146500	30	110000	22	55500	11
tenement	167000	34	152000	31	114000	23	64000	13
4-in-a-block	71500	31	68000	29	59500	26	32000	14
flat in a converted building	20000	52	12000†	32	5000†	13	*	4
tower / slab	11500†	19	17000†	28	20500	34	11000†	18
Date of Construction								
pre-1919	204000	46	144000	32	70000	16	28000	6
1919-1944	104000	33	93000	30	74000	24	40000	13
1945-1964	163000	31	163000	31	136000	26	69000	13
1965-1974	132500	36	108000	30	82000	23	41000	11
1975-1982	81000	43	55000	29	34000	18	16500	9
1983-1990	54500	41	41500	31	27000	20	10000†	8
1991-1997	63000	46	41000	30	24500	18	7500†	6
post-1997	40500	47	22500	26	18000†	21	*	5

Table 4.5: Self-assessed health by characteristics of dwelling

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Bedroom standard								
3+ above standard	66000	50	42000	31	20000	15	5500†	4
2 above standard	148500	40	116500	32	72500	20	30500	8
1 above standard	313500	37	258500	31	188000	22	83000	10
equal to standard	275000	37	215000	29	161000	22	86500	12
below standard	39500	36	36000	32	23500	21	12000†	11
Disrepair								
some	667500	38	533000	30	378000	21	183000	10
none	175000	41	135000	31	87000	20	34000	8
Urgent disrepair								
some	571500	39	453000	31	315500	21	138000	9
none	271000	38	215500	30	149000	21	78500	11
Condition of dwelling								
not poor	627500	38	505000	30	360000	22	164000	10
poor	215500	40	163000	30	104500	20	53000	10
Tolerable Standard								
below	7500†	36	6500†	31	4500†	23	*	9
above	834500	38	662000	30	459500	21	214500	10

Table 4.6: Self-assessed health by heating characteristics of dwelling

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Primary fuel source								
mains gas	619500	40	469000	30	319000	20	154000	10
electric	145000	33	136500	31	109500	25	53000	12
other fuel	78500	42	62500	33	36500	19	9500†	5
NHER								
poor	63500	36	57500	33	37500	21	18000	10
moderate	519500	40	404500	31	269000	21	116000	9
good	250500	37	197000	29	151500	22	80000	12
Fuel poverty								
fuel poor	81500	29	96500	50	76500	27	31000	11
not fuel poor	741500	40	550500	30	378000	20	181000	10
Extent of central heating								
full	744500	39	578500	30	394500	21	184000	10
partial	60000	35	49000	29	42000	25	18500	11
none	37000	32	40000	34	26500	23	14000†	12
Any damp?								
some	93000	31	95500	32	75000	25	33500	11
none	742000	40	564500	30	386000	21	181000	10
Is heating satisfactory?								
yes	635500	40	490000	31	329000	21	141000	9
no	51500	26	58000	29	54000	27	37500	19
Heating usage								
low	389500	39	312000	31	204500	21	90000	9
medium	220000	42	160000	30	102500	19	45000	8
high	213500	35	175500	29	143000	24	76500	13
missing	22500	37	20000	33	12500	21	5000†	9

Table 4.7: Self-assessed health by health board

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Health board								
Highland	39000	43	26500	30	19000	21	5000†	6
Grampian	83500	38	78500	35	42500	19	17500	8
Tayside	67500	39	56500	32	33500	19	17500	10
Fife	58000	40	49500	34	29000	20	10000†	7
Lothian	146000	44	97000	29	63000	19	29000	9
Borders	22000	45	15000	31	9000†	18	3000†	6
Forth Valley	45500	38	35500	29	27500	23	13000	11
Argyll & Clyde	68500	37	54000	29	42000	23	20000	11
Greater Glasgow	141500	36	111000	29	86000	22	51000	13
Lanarkshire	78500	35	67000	30	52500	23	28500	13
Ayrshire & Arran	60500	38	47500	30	37000	23	15500	10
Dumfries & Galloway	21500	34	20500	33	16000	26	4500†	7
Orkney	4500	47	3000	33	1500†	18	*	3
Shetland	4000	44	3000	34	1500†	18	*	4
Western Isles	5000	45	3500	29	2000†	19	1000†	8

Table 4.8: Self-assessed health by presence of smokers and pets in household

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Any smokers in household?								
yes	280500	33	256000	30	202500	24	119000	14
no	565000	42	411500	31	260500	20	97500	7
Any pets in house?								
no	500500	38	414000	31	285000	21	130500	10
yes	345000	40	253500	29	178000	21	85500	10

Table 4.9: Self-assessed health by household type, tenure and location

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
Household type								
single adult	133000	39	95500	28	68000	20	45000	13
small adult	172500	46	108000	29	66500	18	29000	8
single parent	46500	35	42500	32	28500	22	14000	11
small family	163500	53	88000	29	42000	14	15500	5
large family	74500	47	48000	30	25500	16	10500†	7
large adult	94000	42	69000	31	43000	19	18000	8
older smaller	89000	29	104500	34	80000	26	38500	12
single pensioner	72500	21	112500	33	109500	32	46000	14
Tenure								
owner occupier	628500	46	423000	31	236000	17	80000	6
LA/Other public	112000	21	151000	29	160000	30	102000	19
HA/Housing coop	32500	26	35500	28	37000	29	21500	17
private renter	73000	42	58000	33	29500	17	12500†	7
Location								
urban	146000	41	115000	32	71500	20	23000	7
rural	700000	38	552500	30	391500	21	193000	11

Table 4.10: Self-assessed health by weekly income

	Very Good		Good		Fair		Bad or Very Bad	
	No.	%	No.	%	No.	%	No.	%
< £100	34000	28	41000	34	32000	26	14500	12
£100 -199.99	143500	25	179000	31	166500	29	85500	15
£200 -299.99	151500	32	142000	30	115000	25	58500	13
£300 -399.99	137500	41	101500	30	64000	19	29500	9
£400 -499.99	124000	50	72500	30	33500	14	15500	6
£500 -699.99	148500	55	80000	30	34000	12	8500†	3
£700+	101500	60	45500	27	17000	10	4000†	2

Table 4.11: Self-assessed health by satisfaction with home and neighbourhood.

	Very Good		Good		Fair		Bad or very bad	
	No.	%	No.	%	No.	%	No.	%
Satisfaction with home								
very satisfied	534500	45	339500	28	226500	19	93500	8
fairly satisfied	267000	33	277500	34	190000	23	87000	11
neither	23500	30	23500	29	21000	26	11500	15
fairly dissatisfied	14000	25	16000	28	15000	26	12500	22
very dissatisfied	6000†	15	10500†	28	9500†	26	11500†	31
Bothered by noise								
very often	23500	27	24500	28	23000	26	16500	19
fairly often	68500	32	64500	30	52500	25	28000	13
not very often	247000	36	220500	32	155500	23	66000	10
never	506000	42	356500	30	231500	19	105500	9
Satisfaction with neighbourhood								
very good	521000	44	353500	30	224500	19	95000	8
fairly good	278000	34	262000	32	189000	23	81000	10
fairly poor	33000	28	33500	28	31000	26	22500	19
very poor	13000	20	17500	27	17500	27	16500	26
no opinion	*	12	*	37	*	14	*	37

Table 4.12: Self-assessed health by respiratory health problems

	Very Good		Good		Fair		Bad or very bad	
	No.	%	No.	%	No.	%	No.	%
Does respondent have respiratory problem?								
no	589500	46	407000	32	207500	16	65000	5
yes	97500	18	141000	27	175500	33	113500	21

5. Housing and psychosocial well-being

Due to the sensitive nature of the questions asked in the GHQ12 it was administered separately from the rest of the social questionnaire. All adult respondents were asked if they wished to take part and 87% of those who completed the social questionnaire also completed the GHQ12.

As described in the introduction, the GHQ12 is a well-established survey instrument designed to detect possible psychiatric morbidity in the population. It does this by asking 12 questions about general levels of happiness, anxiety and sleep disturbance. A score of 4 or more is used as a threshold to identify respondents with a possible psychiatric disorder. It is important to note that the GHQ12 seeks respondents' views on how they have been feeling in the past few weeks and is designed to identify short-term changes in psychosocial well-being rather than long-term psychiatric disorders. To this end respondents make replies about their present state "over the past few weeks" and if their present feelings are unlike their usual state.

This chapter seeks therefore to explore the prevalence of 'high' GHQ12 scores (i.e. those scoring over 4) and identify through the regression analysis which aspects of housing are associated with psychosocial well-being.

The frequency tables show the number and percentage of respondents who scored 0, 1-3 and 4+, while the logistic regression analyses necessarily combined those who scored 0 with those who scored 1-3 to create a binary variable. The regression model analyses the risk of respondents scoring 4 or more.

Table 5.1: GHQ12 scores

GHQ12 score	No.	%
0	1295500	59
1	270000	12
2	149000	7
3	90500	4
4	77500	4
5	64500	3
6	45500	2
7	41000	2
8	37500	2
9	31500	1
10	29000	1
11	23000	1
12	37500	2
GHQ12 score grouped		
0	1295500	59
1-3	509500	23
4+	387000	18
Total	2192000	100

Table 5.2: Frequencies of responses to individual GHQ12 questions

Have you recently....		
	No.	%
...been able to concentrate on whatever you're doing?		
better than usual	81500	4
same as usual	1766000	81
less than usual	287000	13
much less than usual	57500	3
...lost much sleep over worry?		
not at all	728000	33
no more than usual	1100500	50
rather more than usual	273500	13
much more than usual	90000	4
...felt you were playing a useful part in things?		
more so than usual	183000	8
same as usual	1729000	79
less useful than usual	219000	10
much less useful	61000	3
...felt capable of making decisions about things?		
more so than usual	163000	7
same as usual	1836500	84
less useful than usual	162500	7
much less useful	30000	1
...felt constantly under strain?		
not at all	522000	24
no more than usual	1207500	55
rather more than usual	361500	17
much more than usual	101000	5
...felt you couldn't overcome your difficulties?		
not at all	780500	36
no more than usual	1171000	53
rather more than usual	195000	9
much more than usual	46000	2
...been able to enjoy your normal day-to-day activities?		
more so than usual	118000	5
same as usual	1653000	75
less useful than usual	330000	15
much less useful	91000	4
...been able to face up to your problems?		
more so than usual	106500	5
same as usual	1867500	85
less useful than usual	179000	8
much less useful	39500	2
...been feeling unhappy and depressed?		
not at all	871500	40
no more than usual	942500	43
rather more than usual	281500	13
much more than usual	96500	4

...been losing confidence in yourself?		
not at all	1020500	47
no more than usual	872000	40
rather more than usual	225000	10
much more than usual	74500	3
...been thinking of yourself as a worthless person?		
not at all	1413000	64
no more than usual	612500	28
rather more than usual	113500	5
much more than usual	53500	2
...been feeling reasonably happy, all things considered?		
more so than usual	212000	10
same as usual	1737500	79
less useful than usual	182500	8
much less useful	60000	3
Total	2192000	100

Results

- Approximately 59% of respondents reported no disturbances to their psychosocial well-being in the few weeks prior to survey. Around 12% reported one disturbance, and about 18% experienced 4 or more. 'Feeling constantly under strain' was the disturbance most likely to be reported by respondents, while 'thinking of self as a worthless person' was the least likely to be reported (Table 5.1).
- The overall power of the logistic regression model was higher for this variable than for any other health outcome included in this report. The model was able to correctly predict whether a respondent scored 4 or above for 27.3% of cases. This suggests that variables collected by the SHCS are more relevant to psychological health than they are to respiratory symptoms or self-assessed health. It does not follow that housing is more important to psychological health than to other measures of health though, because, as shown below, most of the significant predictors were not related to the dwelling.
- Age was not a significant predictor of scoring over 4 when all other variables were controlled for in the regression analysis. Gender was however, with females being at higher risk than males.
- Table 5.4 does indicate that widowed, divorced and separated people are more likely to score 4+ and this is supported in the regression analysis: there is no difference between single people and married or cohabiting people in the risk of reporting recent psychosocial disturbances, but those who are widowed, divorced or separated are at higher risk.
- There is no association between NHER, extent of central heating or the existence of damp in the dwelling and GHQ12 score. Respondents who report their heating is not satisfactory, however, are at higher risk of also reporting recent psychosocial disturbance.
- Table 5.10 seems to suggest that respondents living in social tenures are more likely to score above 4 on the GHQ12, whereas the logistic regression analysis shows that when all other variables are taken into consideration, the risk is lower for those living in LA/other public tenures than it is for owner occupiers.
- Rural respondents had a lower risk than urban respondents of scoring 4 or more (Table 5.3).
- Table 5.10 indicates an association between income and GHQ12 score with low income being associated with higher scores. This was confirmed in the regression model.
- Whether respondent had a long-term illness or disability was important in predicting the risk of them also having suffered recent psychosocial disturbance. Long-term illness/disability was self-reported by respondents. A series of logistic regression analyses showed that individual illness/disability types were better predictors than the summary variable, as only visual impairments, mobility/other physical disability, mental health problems and circulatory problems increased the risk of a high GHQ12 score.
- The most important predictor of recent psychosocial disturbance risk was self-assessed health, with those reporting very good health were at far lower risk of reporting psychosocial disturbances than those with good, fair, bad or very bad self-assessed health. This is unsurprising as respondents probably did not separate psychosocial from physical health when responding to the self-assessed health questions.

The final model with the best fit included the following variables:

- Circulatory problem
- Gender
- Marital status
- Mental health problem
- Presence of pets in household
- Respondents assessment of neighbourhood
- Rural or urban location
- Satisfaction with heating
- Satisfaction with home
- Self-assessed health
- Socioeconomic status
- Tenure
- Visual impairment
- Weekly income

The following variables were excluded from the model because they had no power to predict GHQ12 score:

- Age of respondent
- Any disrepair
- Any serious disrepair
- Bedroom standard
- Damp
- Date of construction
- Dwelling type
- Extent of central heating
- Extent of heating usage
- Fuel poverty
- Health board
- Main fuel type
- NHER
- Number of children
- Presence of smokers in household
- Tolerable standard

Table 5.3: Logistic regression model for GHQ12 score binary (Complete table can be seen in Appendix A)

	Significance	Odds ratio	Relative risk
owner occupier	0.02	reference category	
LA/Other public	0.01	0.84	lower risk
HA/Housing coop	0.46	1.08	no difference
private renter	0.60	0.94	no difference
married/cohabiting	0.00	reference category	
single	0.74	1.03	no difference
widowed	0.01	1.27	higher risk
separated/divorced	0.00	1.33	higher risk
female		reference category	
male	0.00	0.82	lower risk
urban		reference category	
rural	0.01	0.84	lower risk
SAH Very good	0.00	reference category	
SAH Good	0.00	2.25	higher risk
SAH Fair	0.00	4.97	higher risk
SAH Bad	0.00	12.07	much higher risk
SAH Very bad	0.00	18.39	much higher risk
home v. satisfied	0.00	reference category	
home: satisfied	0.10	1.10	no difference
home: neither	0.00	1.46	higher risk
home: dissatisfied	0.00	1.54	higher risk
home v. dissatisfied	0.00	2.29	higher risk
home: no opinion	0.69	1.28	no difference
weekly income <£300		reference category	
weekly income >£300	0.01	0.83	lower risk
employed full-time	0.00	reference category	
employed part-time	0.13	1.20	no difference
looking after home	0.00	1.48	higher risk
retired	0.00	0.62	lower risk
unemployed/Gov Training	0.00	1.86	higher risk
further/Higher Education	0.43	1.20	no difference
long-term illness	0.19	1.16	no difference
other	0.14	1.37	no difference
no pets in household		reference category	
pets in household	0.00	1.27	higher risk
neighbourhood v. good	0.00	reference category	
neighbourhood: good	0.00	1.28	higher risk
neighbourhood: poor	0.00	1.67	higher risk
neighbourhood v. poor	0.00	2.21	higher risk
neighbourhood: no opinion	0.80	1.14	no difference
heating satisfactory		reference category	
heating not satisfactory	0.00	1.27	higher risk
no visual impairment		reference category	
visual impairment	0.00	1.61	higher risk
no physical disability		reference category	
mobility/other physical disability	0.00	1.41	higher risk
no mental health problem		reference category	
mental health problem	0.00	3.94	higher risk
no circulatory problem		reference category	
circulatory problem	0.02	1.22	higher risk

Note that all risks are relative to reference category.

Frequency tables

Table 5.4: GHQ12 score by gender, age, marital status and disability of respondent.

	0		1-3		4+	
	No.	%	No.	%	No.	%
Gender of respondent						
male	571000	62	216500	23	139000	15
female	724500	57	293000	23	248500	20
Age of respondent						
under 20	10000†	59	4500†	27	*	14
20-29	126500	56	61000	27	38000	17
30-39	267500	61	94500	22	75000	17
40-49	258500	61	87000	21	77500	18
50-59	219000	59	73000	20	78000	21
60-69	197000	60	75000	23	54000	17
70-79	157000	59	70000	26	40000	15
80+	60500	47	45000	35	22500	18
Marital status of respondent						
married	689000	65	224000	21	142500	14
cohabiting	98500	61	36500	23	27000	17
single	203000	55	95500	26	71000	19
widowed	161500	51	89000	28	64000	20
divorced	95000	51	41500	22	50000	27
separated	49000	47	23000	22	32500	31
Respondent has long term illness or disability?						
no	963500	68	291500	21	154000	11
yes	332000	42	218000	28	233000	30

Table 5.5: GHQ12 score by dwelling type and date of construction

	0		1-3		4+	
	No.	%	No.	%	No.	%
Dwelling type						
detached	254500	69	73500	20	40000	11
semi-detached	258000	63	88000	22	62000	15
terraced houses	257000	59	100500	23	76500	18
tenement	222500	52	106000	25	100000	23
4-in-block	108000	54	50500	25	40500	20
flat in converted building	22500	68	8000	23	3000	8
tower/Slab	21000	42	15000	29	14500	29
Date of construction						
pre-1919	243000	62	90000	23	59500	15
1919-1944	153000	57	62500	23	51500	19
1945-1964	258000	56	110500	24	95000	20
1965-1974	189500	58	75000	23	59500	18
1975-1982	103500	63	37500	23	22500	14
1983-1990	73000	62	26000	22	19000	16
1991-1997	77000	65	24000	20	17000	14
post-1997	45500	62	15500	21	12500	17

Table 5.6: GHQ12 score by characteristics of dwelling

	0		1-3		4+	
	No.	%	No.	%	No.	%
Bedroom standard						
3+ above standard	79500	68	22500	19	14500	12
2 above standard	210500	65	68500	21	44000	14
1 above standard	439500	59	175500	24	124500	17
equal to standard	358000	56	153000	24	133000	21
below standard	56000	58	20500	21	20000	21
Disrepair						
some	910500	59	359500	23	277500	18
none	233000	62	81500	22	59000	16
Urgent disrepair						
some	779500	60	296000	23	222000	17
none	363500	58	145000	23	114500	18
Condition of dwelling						
not poor	865000	60	330500	23	256000	18
poor	278500	59	110000	23	80500	17
Tolerable standard						
below	10000	59	*	20	*	21
above	1132500	60	437500	23	333000	17

Table 5.7: GHQ12 score by heating characteristics of dwelling

	0		1-3		4+	
	No.	%	No.	%	No.	%
Primary fuel source						
mains gas	823000	60	311500	23	240000	17
electric	211000	55	93500	25	76500	20
other	109000	66	35500	22	20000	12
NHER group						
poor	88500	59	36500	24	26000	17
moderate	706500	61	253500	22	189500	16
good	333000	56	145000	24	117500	20
Extent of central heating						
full	1001500	60	380500	23	290000	17
partial	84500	58	36000	24	26000	18
none	55000	56	23500	24	20000	20
Any damp or condensation?						
Some	139500	53	67000	26	54500	21
none	992500	60	369000	22	279500	17
Heating satisfactory?						
Yes	1191500	61	440000	23	309500	16
no	104000	41	70000	28	77500	31
Fuel poverty						
not fuel poor	982500	60	367500	22	285500	17
fuel poor	133000	56	61000	26	43000	18
Heating use						
low	592000	59	233500	23	233500	23
medium	326500	61	121500	23	121500	23
high	350000	58	140000	23	140000	23
missing	27000	53	14500	28	14500	28

Table 5.8: GHQ12 score by health board

	0		1-3		4+	
	No.	%	No.	%	No.	%
Health board						
Highland	55500	64	20000	23	11500†	13
Grampian	145500	63	51500	22	35500	15
Tayside	101500	60	40000	24	28500	17
Fife	92500	60	34000	22	28000	18
Lothian	198500	60	75500	23	55000	17
Borders	31500	61	12000	23	8000†	15
Forth Valley	70500	59	27000	23	21500	18
Argyll & Clyde	113000	59	44500	23	35500	18
Greater Glasgow	205000	54	93500	25	81500	21
Lanarkshire	133000	59	52500	23	38000	17
Ayrshire & Arran	88500	57	37500	24	29000	19
Dumfries & Galloway	39500	60	15000	23	11500†	18
Orkney	7000	74	1500	18	1000†	8
Shetland	7000	70	2000†	20	1000†	10
Western Isles	7000	65	2500†	22	1500†	14

Table 5.9: GHQ12 score by presence of pets and smokers in household

	0		1-3		4+	
	No.	%	No.	%	No.	%
Any pets in household?						
no	785000	59	324500	24	216000	16
yes	510500	59	185000	21	171000	20
Any smokers in household?						
yes	458500	53	200500	23	199500	23
no	837000	63	309000	23	187500	14

Table 5.10: GHQ12 score by household type, tenure and location

	0		1-3		4+	
	No.	%	No.	%	No.	%
Household type						
single adult	180500	54	76500	23	80500	24
small adult	239000	63	82000	22	59000	16
single parent	61000	46	31000	24	40000	30
small family	202000	65	64500	21	44000	14
large family	99000	63	33500	21	24500	16
large adult	141000	63	49000	22	34000	15
older smaller	195500	63	73000	23	44500	14
single pensioner	177000	52	100000	30	60500	18
Tenure						
owner occupier	892500	65	295500	22	179000	13
LA/Other public	247000	47	137000	26	142000	27
HA/Housing coop	62500	49	29000	23	36000	28
private renter	93500	54	48500	28	30000	17
Location						
rural	228500	64	81000	23	499000	14
urban	1067000	58	428500	23	337500	18

Table 5.11: GHQ12 score by weekly income

	0		1-3		4+	
	No.	%	No.	%	No.	%
< £100	58500	50	33000	28	26500	22
£100 -199.99	299000	52	149500	26	127000	22
£200 -299.99	256000	55	105500	23	104000	22
£300 -399.99	204000	61	74500	22	55000	17
£400 -499.99	160000	65	54500	22	31000	13
£500 -699.99	191500	70	54000	20	26000	10
£700+	118500	70	35000	21	16000	9

Table 5.12: GHQ12 score by satisfaction with home and neighbourhood

	0		1-3		4+	
	No.	%	No.	%	No.	%
Satisfaction with home						
very satisfied	773000	64	265500	22	162500	14
fairly satisfied	458500	56	199500	24	163500	20
neither	33000	44	21000	28	21500	29
fairly dissatisfied	22000	39	15500	27	19000	34
very dissatisfied	8000†	22	8500†	23	20000	55
no opinion	*	55	*	22	*	23
Satisfaction with neighbourhood						
very good	764000	64	267500	22	163500	14
fairly good	457500	57	196000	24	155500	19
fairly poor	52000	43	32000	26	37500	31
very poor	20500	32	13000†	21	30000	47
no opinion	*	40	*	28	*	31

Table 5.13: GHQ12 score by respiratory and self-assessed health

	0		1-3		4+	
	No.	%	No.	%	No.	%
Any respiratory symptoms?						
no	1003500	65	334000	22	205000	13
yes	292000	45	176000	27	182000	28
Self-assessed health						
very good	642500	75	158000	19	50500	6
good	421000	63	158000	24	86000	13
fair	200500	43	135500	29	127500	27
bad	27500	17	46500	28	90000	55
very bad	4500†	9	11500†	23	33500	68

6. Conclusions: Housing and Health in Scotland

This report indicates that certain dimensions of housing, for example tenure and dwelling type, appear to have some association with specific aspects of health. The associations are very modest however, and it is clear that while housing may affect health to some extent, much of the variance in health outcomes remain unaccounted for by housing factors alone.

Table 6.1 summarises the housing variables (as distinct from lifestyle variables such as income, any smokers in household etc) that proved to be significant predictors of the health measures included in this report. The only housing variable that affected all health measures in this report is tenure.

Table 6.1: Housing variables (not lifestyle variables) that predict health status

Health type	Housing variable that is predictive of health status
Children's respiratory health	Heating usage Satisfaction with heating Tenure Dwelling type
Adult respiratory health	Heating usage Satisfaction with heating*anyone home all day Tenure Dwelling type
Self-assessed health	Tenure NHER Satisfaction with home Satisfaction with neighbourhood
Psychosocial well-being	Tenure Location Satisfaction with home Satisfaction with neighbourhood Satisfaction with heating

These findings appear to be broadly in accord with existing research establishing a link between housing and health. However, despite the broad similarity, the results both contradict and support current conclusions, particularly in relation to those factors of housing which are most closely associated with health problems. For example this study found no association between dampness and condensation and respiratory problems amongst children, yet there was some relationship for adults and a recent document produced by the World Health Organisation (WHO) reports that dampness and mould growth are significantly related to respiratory problems such as asthma⁷.

By contrast, the same WHO document cites studies which indicate that satisfaction with heating and indoor temperature are both associated with respiratory problems. This study did not examine indoor temperature but satisfaction with the heating system was associated with increased risk of respiratory symptoms for both children and adults.

Tenure is a significant predictor of all health measures. With the exception of psychosocial health, householders in the social rented sector are at higher risk of poor health than those in the private sector. That tenure is a significant predictor of health even when socio-economic status, income, age and gender of respondent have all been controlled for demonstrates that it is not the association of tenure with these variables that accounts for the relationship. In other words, it is not just because people who live in public tenure dwellings tend to have low incomes and are more likely to smoke that they are at higher risk of poor health.

It is possible, however, that other confounding variables not collected by the SHCS account for the association, or that people with poor health gravitate toward public tenures and flats.

The second main conclusion to be drawn from this report is that heating usage is more important with respect to respiratory health than the provision or the capacity for heating, although the provision of central heating is strongly associated with heating usage (Table

⁷ World Health Organisation (2004) *Review of Evidence on Housing and Health*. World Health Organisation.

6.2). It is also important to note that the association between respiratory health and heating usage indicates that under usage and over usage are both predictors of poor respiratory health, not just under usage as is often assumed.

Table 6.2: Extent of central heating by heating usage

	Full		Partial		None	
	No.	%	No.	%	No.	%
Heating usage						
little	809500	44	87500	54	90500	80
medium	490500	26	34000	21	10000	9
lots	557500	30	40000	25	12500	11
total	1857500	100	161500	100	112500	100

While respondents' subjective satisfaction with heating is a significant predictor for 3 of 4 of the health measures included here, objective measures such as type or extent of central heating and fuel poverty are not predictive of health status. Furthermore, it is worth noting that there is very little association between type or extent of central heating, or fuel poverty, with respondents reported satisfaction with heating.

It is worthwhile at this point returning to the caveats about housing and health mentioned in the introduction. Cross-sectional studies such as the SHCS are not able to take account of all the possible factors affecting health status in the way experimental studies can. Variables that are not included in this report but are likely to have effects on the health of the population include diet, lifestyle (e.g. exercise, stress), working environment, childhood environment, parents health, presence of dust mites, inherited predisposition and environment in utero. When the likely importance of all these factors combined is considered it is not surprising that housing factors alone play such a small part in predicting the health of inhabitants.

Appendix A: Regression analyses methodology and tables

Backward conditional binary logistic regression analyses were used in all four chapters, dependent variables being grouped into two categories where necessary. This was considered acceptable given a) the extreme skewness of all the dependent variables and b) the need for simplicity.

For each dependent variable the same process was followed:

1. The first model included all variables available in the SHCS 2002 dataset that we had any reason to suppose might be related to the dependent variable based on existing literature. Where different versions of the same variable were available only one was included in any model.
2. In the second model all variables that were automatically excluded by SPSS or that did not reach the required level of significance ($p < 0.05$) were removed from the model.
3. A series of models were then tested using variations on those independent variables that had more than one form, and combining some variables where to do so was logical and could have been revealing.
4. The final models reported here were selected by examination of the classification tables, in particular the percentage of 'incidents' (e.g. adults with respiratory problems) correct. Pseudo- R^2 and model chi-squares given the degrees of freedom were also used in assessing which models were best.

Table A1: Results of the final logistic regression model with children's respiratory symptoms as the dependent variable (0=no children with symptoms, 1= at least one child with symptoms).

	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
heating usage: little	7.1	2	0.03			
heating usage: medium	0.6	1	0.44	0.93	0.78	1.11
heating usage: lots	3.9	1	0.05	1.18	1.00	1.40
heating satisfactory (yes)	4.9	1	0.03	1.25	1.02	1.52
adult respondent has resp. problem (no)	82.5	1	0.00	2.06	1.76	2.41
tenure (private)	33.6	1	0.00	1.63	1.38	1.93
smoker in household (no)	5.2	1	0.02	1.20	1.03	1.40
dwelling type (house)	4.5	1	0.0	0.83	0.69	0.99
Constant	390.7	1	0.0	0.23		

Category in brackets is reference category.

N=4057

Model chi-square = 191.99, df=7, p<0.001

-2 log likelihood =4539.80

Table A2: Classification table

		Predicted		
		no child with symptoms	child(ren) with symptoms	Percentage Correct
Observed	no child with symptoms	2923	35	98.8
	child(ren) with symptoms	1037	54	4.9
Overall Percentage				73.5

Table A3: Cross tabulation between heating usage and damp.

			Rising or penetrating damp		Total
			damp	no damp	
Heating usage	little	Count	15	160	175
		Expected Count	9.4	165.6	175.0
	medium	Count	67	1064	1131
		Expected Count	60.9	1070.1	1131.0
	lots	Count	136	2607	2743
		Expected Count	147.7	2595.3	2743.0
Total		Count	218	3831	4049
		Expected Count	218.0	3831.0	4049.0

Pearson Chi-square=5.11, df=2, p=0.078.

Table A4: Results of the final logistic regression model with adult respondent respiratory symptoms as the dependent variable (0=no symptoms, 1=symptoms).

	Wald	df	p	Exp(B)	95% CI for EXP(B)	
					Lower	Upper
gender (male)	12.26	1	0.00	0.87	0.81	0.94
age: 40-49	76.02	7	0.00			
age: <20	0.16	1	0.68	1.11	0.67	1.84
age: 20-29	0.52	1	0.47	1.06	0.91	1.24
age: 30-39	5.46	1	0.02	0.86	0.76	0.98
age: 50-59	11.32	1	0.00	1.23	1.09	1.39
age: 60-69	19.52	1	0.00	1.35	1.18	1.54
age: 70-79	28.16	1	0.00	1.47	1.27	1.69
age: 80+	5.80	1	0.02	1.25	1.04	1.50
ever had furry pets (no)	30.36	1	0.00	1.28	1.17	1.40
Greater Glasgow	50.64	14	0.00			
Highland	0.34	1	0.56	0.93	0.74	1.18
Grampian	2.46	1	0.12	0.88	0.75	1.03
Tayside	16.33	1	0.00	0.72	0.61	0.84
Fife	3.34	1	0.07	0.82	0.67	1.01
Lothian	7.32	1	0.01	0.83	0.73	0.95
Borders	3.69	1	0.05	0.78	0.61	1.01
Forth Valley	17.30	1	0.00	0.71	0.60	0.83
Argyll & Clyde	15.00	1	0.00	0.75	0.65	0.87
Lanarkshire	1.89	1	0.17	0.89	0.76	1.05
Ayrshire & Arran	0.53	1	0.47	0.94	0.81	1.10
Dumfries & Galloway	3.02	1	0.08	0.81	0.64	1.03
Orkney	5.85	1	0.02	0.73	0.57	0.94
Shetland	2.96	1	0.09	0.80	0.63	1.03
Western Isles	22.22	1	0.00	0.52	0.40	0.68
any smokers in household (no)	98.55	1	0.00	1.48	1.37	1.60
heating usage: low	18.07	2	0.00			
heating usage: medium	3.93	1	0.05	0.91	0.83	1.00
heating usage: high	4.81	1	0.03	1.11	1.01	1.21
heating satisfactory - out all day	101.96	3	0.00			
heating satisfactory - home all day	32.90	1	0.00	1.33	1.21	1.47
heating not satisfactory - out all day	8.86	1	0.00	1.36	1.11	1.66
heating not satisfactory - home all day	99.74	1	0.00	2.14	1.85	2.49
dwelling type (house)	12.46	1	0.00	1.17	1.07	1.28
tenure (private)	98.93	1	0.00	1.53	1.41	1.67
constant	345.39	1	0.00	0.21		

Category in brackets is reference category.

N=14706

Model chi-square = 797.13, df=31, p<0.001

-2 log likelihood =16952.37

Table A5: Classification table

		Predicted		Percentage Correct
		no symptoms	symptoms	
Observed	no symptoms	10183	283	97.3
	symptoms	3904	336	7.9
	Overall Percentage			71.5

Table A6: Cross tabulation between heating usage and damp

		Rising or penetrating damp			Total
			damp	no damp	
Heating usage	little	Count	51	721	772
		Expected Count	47.9	724.1	772.0
	medium	Count	264	3452	3716
		Expected Count	230.4	3485.6	3716.0
	lots	Count	587	9472	10059
		Expected Count	623.7	9435.3	10059.0
Total		Count	902	13645	14547
		Expected Count	902.0	13645.0	14547.0

Pearson chi-square=7.74, df=2, p=0.021.

Table A7: Cross tabulation between heating satisfaction*home all day and damp

		Rising or penetrating damp			Total
			damp	no damp	no damp
heating constrained by home all day	heating satisfactory - out all day	Count	250	4675	4925
		Expected Count	305.4	4619.6	4925.0
	heating satisfactory - home all day	Count	471	7556	8027
		Expected Count	497.7	7529.3	8027.0
	heating not satisfactory - out all day	Count	53	494	547
		Expected Count	33.9	513.1	547.0
	heating not satisfactory - home all day	Count	128	920	1048
		Expected Count	65.0	983.0	1048.0
Total		Count	902	13645	14547
		Expected Count	902.0	13645.0	14547.0

Pearson chi-square=88.84, df=3, p<0.001.

Table A8: Results of the logistic regression model with adult respondent respiratory symptoms as the dependent variable (0=no symptoms, 1=symptoms) and presence of damp instead of satisfaction with heating * home all day.

	Wald	df	p	Exp(B)	95% CI for EXP(B)	
					Lower	Upper
gender (male)	10.13	1	0.00	0.88	0.82	0.95
age: 40-49	146.42	7	0.00			
age: <20	0.66	1	0.42	1.23	0.75	2.03
age: 20-29	1.52	1	0.22	1.10	0.94	1.29
age: 30-39	2.42	1	0.12	0.91	0.80	1.03
age: 50-59	15.56	1	0.00	1.28	1.13	1.44
age: 60-69	49.35	1	0.00	1.56	1.38	1.76
age: 70-79	69.26	1	0.00	1.75	1.53	1.99
age: 80+	17.01	1	0.00	1.45	1.21	1.72
ever had furry pets (no)	28.91	1	0.00	1.27	1.17	1.39
Greater Glasgow	52.60	14	0.00			
Highland	0.71	1	0.40	0.90	0.71	1.14
Grampian	4.59	1	0.03	0.84	0.72	0.99
Tayside	19.02	1	0.00	0.70	0.59	0.82
Fife	4.46	1	0.03	0.80	0.65	0.98
Lothian	11.43	1	0.00	0.79	0.69	0.91
Borders	4.49	1	0.03	0.76	0.59	0.98
Forth Valley	20.78	1	0.00	0.69	0.58	0.81
Argyll & Clyde	20.26	1	0.00	0.71	0.61	0.83
Lanarkshire	3.37	1	0.07	0.86	0.73	1.01
Ayrshire & Arran	1.65	1	0.20	0.90	0.77	1.06
Dumfries & Galloway	3.99	1	0.05	0.78	0.61	1.00
Orkney	7.08	1	0.01	0.71	0.55	0.91
Shetland	4.13	1	0.04	0.77	0.60	0.99
Western Isles	20.12	1	0.00	0.54	0.41	0.71
any smokers in household (no)	112.62	1	0.00	1.53	1.41	1.65
heating usage: little	5.34	2	0.07			
heating usage: medium	0.79	1	0.37	0.92	0.78	1.10
heating usage: lots	0.08	1	0.78	1.02	0.87	1.21
Any damp (no)	6.85	1	0.01	1.22	1.05	1.41
dwelling type (house)	12.56	1	0.00	1.17	1.07	1.28
tenure (private)	162.64	1	0.00	1.70	1.57	1.85
constant	170.76	1	0.00	0.24		

Category in brackets is reference category.

N=14547

Model chi-square = 672.17, df=29, p<0.001

-2 log likelihood =16795.29

Table A9: Classification table

		Predicted		percentage correct
		no symptoms	symptoms	
Observed	no symptoms	10137	220	97.9
	symptoms	3950	240	5.7
	Overall Percentage			71.3

Table A10: Results of the final logistic regression model with self-assessed health as the dependent variable (0=very good, good or fair, 1=bad or very bad).

	Wald	p	Sig.	Exp(B)	95% CI for EXP(B)	
					Lower	Upper
40-49	36.82	7	0.00			
under 20	1.33	1	0.25	0.54	0.19	1.53
20-29	12.73	1	0.00	0.56	0.41	0.77
30-39	8.65	1	0.00	0.70	0.56	0.89
50-59	0.33	1	0.57	1.06	0.86	1.31
60-69	11.04	1	0.00	0.69	0.55	0.86
70-79	6.04	1	0.01	0.75	0.60	0.94
80+	2.55	1	0.11	0.80	0.60	1.05
female, no LTI/D	862.29	3	0.00			
male, no LTI/D	3.87	1	0.05	0.78	0.60	1.00
male, LTI/D	471.89	1	0.00	8.93	7.33	10.89
female, LTI/D	547.87	1	0.00	9.31	7.72	11.22
owner occupier	22.00	3	0.00			
LA/Other public	18.98	1	0.00	1.42	1.21	1.66
HA/Housing coop	11.29	1	0.00	1.48	1.18	1.86
private renter	2.16	1	0.14	1.26	0.93	1.70
any smokers in household? (no)	34.12	1	0.00	1.49	1.30	1.70
Greater Glasgow	51.51	14	0.00			
Highland	3.30	1	0.07	0.65	0.41	1.03
Grampian	1.41	1	0.24	0.85	0.65	1.11
Tayside	0.00	1	0.98	1.00	0.76	1.30
Fife	1.71	1	0.19	0.78	0.54	1.13
Lothian	0.17	1	0.68	0.95	0.76	1.19
Borders	2.47	1	0.12	0.68	0.42	1.10
Forth Valley	0.10	1	0.75	0.96	0.74	1.24
Argyll & Clyde	0.00	1	0.99	1.00	0.79	1.26
Lanarkshire	3.26	1	0.07	1.27	0.98	1.64
Ayrshire & Arran	6.60	1	0.01	0.71	0.54	0.92
Dumfries & Galloway	8.63	1	0.00	0.51	0.32	0.80
Orkney	15.36	1	0.00	0.24	0.12	0.49
Shetland	9.43	1	0.00	0.39	0.22	0.71
Western Isles	0.46	1	0.50	0.86	0.55	1.34
NHER: moderate	6.92	2	0.03			
NHER: poor	0.47	1	0.49	0.92	0.73	1.17
NHER: good	5.63	1	0.02	1.18	1.03	1.35
weekly income: £100 -199.99	20.93	6	0.00			
weekly income: <£100	0.00	1	1.00	1.00	0.75	1.34
weekly income: £200 -299.99	1.59	1	0.21	1.11	0.95	1.30
weekly income: £300 -399.99	0.66	1	0.42	1.09	0.89	1.33
weekly income: £400 -499.99	0.00	1	0.97	1.01	0.77	1.31
weekly income: £500 -699.99	4.28	1	0.04	0.72	0.53	0.98
weekly income: £700+	11.52	1	0.00	0.44	0.28	0.71
very satisfied with home	33.70	5	0.00			
fairly satisfied with home	5.59	1	0.02	1.19	1.03	1.37
neither satisfied/dissatisfied with home	8.66	1	0.00	1.58	1.17	2.15
fairly dissatisfied with home	10.67	1	0.00	1.74	1.25	2.43
very dissatisfied with home	24.39	1	0.00	2.62	1.79	3.83

Continued...

no opinion about home	0.04	1	0.83	1.20	0.22	6.44
neighbourhood very good	18.79	4	0.00			
neighbourhood: fairly good	0.15	1	0.70	0.97	0.84	1.12
neighbourhood: fairly poor	7.81	1	0.01	1.43	1.11	1.83
neighbourhood very good	18.79	4	0.00			
neighbourhood: fairly good	0.15	1	0.70	0.97	0.84	1.12
neighbourhood: fairly poor	7.81	1	0.01	1.43	1.11	1.83
neighbourhood very poor	5.87	1	0.02	1.48	1.08	2.02
neighbourhood: no opinion	4.61	1	0.03	2.80	1.09	7.18
respondent has respiratory problems (no)	157.95	1	0.00	2.31	2.03	2.64
Constant	589.70	1	0.00	0.02		

Category in brackets is reference category.

N=14625

Model chi-square = 2623.31, df=46, p<0.001

-2 log likelihood =6759.51

Table A11: Classification table

		Predicted		
		very good, good or fair	bad or very bad	percentage correct
Observed	very good, good or fair	13004	187	98.6
	bad or very bad	1193	241	16.8
Overall Percentage				90.6

Table A12: Results of the final logistic regression model with GHQ12 binary as the dependent variable (0=0-3, 1=4+).

	Wald	df	p	Exp(B)	95% CI for EXP(B)	
					Lower	Upper
owner occupier	9.70	3	0.02			
LA/Other public	6.43	1	0.01	0.84	0.73	0.96
HA/Housing coop	0.55	1	0.46	1.08	0.88	1.32
private renter	0.28	1	0.60	0.94	0.74	1.19
married/cohabiting	17.02	3	0.00			
single	0.11	1	0.74	1.03	0.87	1.22
widowed	7.10	1	0.01	1.27	1.07	1.52
separated/divorced	12.10	1	0.00	1.33	1.13	1.56
gender (female)	12.63	1	0.00	0.82	0.73	0.91
urban/rural (urban)	6.47	1	0.01	0.84	0.73	0.96
SAH very good	756.47	4	0.00			
SAH good	104.25	1	0.00	2.25	1.93	2.63
SAH fair	386.33	1	0.00	4.97	4.23	5.83
SAH bad	589.90	1	0.00	12.07	9.87	14.75
SAH very bad	338.58	1	0.00	18.39	13.49	25.08
very satisfied with home	28.58	5	0.00			
fairly satisfied with home	2.66	1	0.10	1.10	0.98	1.24
neither satisfied/dissatisfied with home	8.04	1	0.00	1.46	1.12	1.89
fairly dissatisfied with home	8.46	1	0.00	1.54	1.15	2.07
very dissatisfied with home	20.07	1	0.00	2.29	1.59	3.29
no opinion about home	0.16	1	0.69	1.28	0.37	4.44
weekly income (<£300)	6.37	1	0.01	0.83	0.72	0.96
employed full-time	98.94	7	0.00			
employed part-time	2.25	1	0.13	1.20	0.95	1.51
looking after home	8.94	1	0.00	1.48	1.14	1.91
retired	28.66	1	0.00	0.62	0.52	0.74
unemployed/Gov Training	22.00	1	0.00	1.86	1.44	2.42
further/Higher Education	0.63	1	0.43	1.20	0.76	1.90
long-term illness	1.74	1	0.19	1.16	0.93	1.45
other	2.21	1	0.14	1.37	0.90	2.09
any pets in house? (no)	18.10	1	0.00	1.27	1.14	1.41
neighbourhood very good	46.94	4	0.00			
neighbourhood: Fairly good	17.10	1	0.00	1.28	1.14	1.44
neighbourhood: Fairly poor	21.13	1	0.00	1.67	1.34	2.07
neighbourhood very poor	29.99	1	0.00	2.21	1.66	2.93
neighbourhood: No opinion	0.07	1	0.80	1.14	0.43	3.02
heating satisfactory (yes)	9.12	1	0.00	1.27	1.09	1.48
visual impairment (no)	9.83	1	0.00	1.61	1.19	2.16
mobility/other physical disability (no)	20.88	1	0.00	1.41	1.22	1.64
mental health problem (no)	66.77	1	0.00	3.94	2.84	5.48
circulatory problem (no)	5.70	1	0.02	1.22	1.04	1.43
Constant	777.18	1	0.00	0.05		

Category in brackets is reference category.

N=13053

Model chi-square = 2415.13, df=35, p<0.001

-2 log likelihood =9565.14

Table A13: Classification table

		Predicted		
		0-3	4+	Percentage Correct
Observed	0-3	10475	334	96.9
	4+	1632	612	27.3
	Overall Percentage			84.9

Appendix B: Questions asked of respondent

ADULT RESPIRATORY HEALTH

[Respondent asked questions about own health]

ASK ALL

CHE1 In general, how would you say your health has been over the past 12 months. Would you say it was....

1. Very good
2. Good
3. Fair
4. Bad
5. Very Bad

CHE2 Have you had any wheezing or whistling in your chest at any time in the last 12 months?

1. Yes ASK CHE3 to CHE5
2. No GO TO CHE5

IF 'YES'

CHE3 Have you been at all breathless when wheezing noise was present?

1. Yes
2. No

CHE4 Have you had this wheezing or whistling when you did not have a cold?

1. Yes
2. No

ASK ALL

CHE5 Have you been woken up with a feeling of tightness in your chest at any time in the last 12 months?

1. Yes
2. No

CHE6 Have you been woken by an attack of shortness of breath at any time in the last 12 months?

1. Yes
2. No

CHE7 Are you currently taking any medicine (including inhalers, aerosols, or tablets) for asthma?

1. Yes
2. No

CHE8 Have you ever had asthma?

1. Yes ASK CHE9 to CHE13
2. No GO TO CHE14

IF 'YES'

CHE9 Was this confirmed by a doctor?

1. Yes
2. No

CHE10 Have you had an attack of asthma in the last 12 months?

1. Yes
2. No

CHE11 How old were you when you had your first attack of asthma?

__ years

CHE12 How old were you when you had your most recent attack of asthma?

__ years

CHE13 How many attacks of asthma have you had in the last 12 months

___ attacks

ASK ALL

CHE14 Do you have any nasal allergies including hay fever?

1. Yes
2. No

CHE15 Have you ever suffered a two year period or more during which you experienced coughing and phlegm on most days?

1. Yes ASK CHE16
2. No GO TO CHE18

IF 'YES'

CHE16 And would you say that you suffered that problem for periods of 3 months or more each of those years?

1. Yes
2. No

CHILDREN'S RESPIRATORY HEALTH

[Respondent asked questions asked about health of each child in household]

ASK ALL

CHE17 Have any of your children had any wheezing or whistling in the chest in the last 12 months?

1. Yes ASK CHE18 to CHE22
2. No GO TO CHE23

IF 'YES'

CHE18 How many attacks of wheezing has your child had in the last 12 months?

1. 1-3
2. 4-12
3. more than 12

CHE19 In the last 12 months how often, on average, has your child's sleep been disturbed due to wheezing?

1. Never woken with wheezing
2. Less than one night a week
3. One or two nights a week
4. More than two nights a week

CHE20 In the last 12 months has wheezing ever been severe enough to limit your child's speech to only one or two words at a time between breaths?

1. Yes
2. No

CHE21 Has your child been woken by an attack of wheezing in the last 12 months?

1. Yes
2. No

CHE22 In the last 12 months has your child's chest sounded wheezy during or after exercise?

1. Yes
2. No

ASK ALL

CHE23 In the last 12 months has your child had a dry cough at night, apart from a cough associated with a cold or chest infection?

1. Yes
2. No

CHE24 Has your child had more than 3 courses of antibiotics for respiratory infections (chest, ears or throat) in the last 12 months?

1. Yes
2. No

CHE25 Is your child currently taking any medicine (including inhalers, aerosols or tablets) for asthma?

1. Yes
2. No

CHE26 Has your child had an attack of asthma in the last 12 months?

1. Yes
2. No

GHQ12

We would like to know how your health has been in general **over the past few weeks**.

Please answer **ALL** the questions by putting a tick (✓) in the box below the answer which you think most applies to you.

Please be assured that all answers you give will be treated in the strictest confidence and you will **NOT** be identified in the results.

HAVE YOU RECENTLY:

- Q1.** been able to concentrate on whatever you're doing? **Better than usual** **Same as usual** **Less than usual** **Much less than usual**
- (tick **one** box)
- ₁ ₂ ₃ ₄
-
- Q2.** lost much sleep over worry? **Not at all** **No more than usual** **Rather more than usual** **Much more than usual**
- (tick **one** box)
- ₁ ₂ ₃ ₄
-
- Q3.** felt you were playing a useful part in things? **More so than usual** **Same as usual** **Less useful than usual** **Much less useful**
- (tick **one** box)
- ₁ ₂ ₃ ₄
-
- Q4.** felt capable of making decisions about things? **More so than usual** **Same as usual** **Less so than usual** **Much less capable**
- (tick **one** box)
- ₁ ₂ ₃ ₄
-
- Q5.** felt constantly under strain? **Not at all than usual** **No more than usual** **Rather more than usual** **Much more than usual**
- (tick **one** box)
- ₁ ₂ ₃ ₄

HAVE YOU RECENTLY:

Q6. felt you couldn't overcome your difficulties?
(tick **one** box)

Not at all	No more than usual	Rather more than usual	Much more than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q7. been able to enjoy your normal day-to-day activities?
(tick **one** box)

More so than usual	Same as usual	Less so than usual	Much less than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q8. been able to face up to your problems?
(tick **one** box)

More so than usual	Same as usual	Less able than usual	Much less able
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q9. been feeling unhappy and depressed?
(tick **one** box)

Not at all	No more than usual	Rather more than usual	Much more than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q10. been losing confidence in yourself?
(tick **one** box)

Not at all	No more than usual	Rather more than usual	Much more than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q11. been thinking of yourself as a worthless person?
(tick **one** box)

Not at all	No more than usual	Rather more than usual	Much more than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Q12. been feeling reasonably happy, all things considered?
(tick **one** box)

More so than usual	About same as usual	Less so than usual	Much less than usual
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Appendix C: Sample bases

Children's respiratory health

Any child in household with wheezing/whistling symptoms?	
No	3447
yes	809
Any child in household with dry cough at night?	
No	3617
yes	639
Any child in household had antibiotics for respiratory infection?	
No	3909
Yes	347
Any child in household taking medicine for respiratory problem?	
No	3610
yes	646
Any child in household had asthma attack in past 12 months?	
No	3815
yes	441
Number of children with respiratory health problems	
0	3098
1	374
2	256
3	211
4	222
5	95

	No child with symptoms	At least one child with symptoms
Date of construction		
Pre-1919	513	133
1919-1944	397	169
1945-1964	769	363
1965-1974	514	210
1975-1982	319	106
1983-1990	200	63
1991-1997	243	76
post-1997	143	38
Type of dwelling		
Detached houses	787	208
Semi-detached houses	804	323
Terraced houses	793	342
Tenement	405	152
4-in-block	239	103
Flats in converted buildings	28	11
Tower/Slab	42	19
Bedroom standard		
3+ above standard	146	40
2 above standard	258	78
1 above standard	987	331
Equal to standard	1444	567
Below standard	263	142
Primary fuel type		
Mains gas	2257	818
Electric	445	210
Other fuel	395	130
Is heating satisfactory?		
Yes	2706	937
No	392	221

	No child with symptoms	At least one child with symptoms
NHER group		
poor	176	74
moderate	1832	672
good	1057	397
Extent of central heating		
full	2791	1018
partial	208	101
none	95	37
unknown	4	2
BTS		
BTS	17	3
Not BTS	3077	1152
Any disrepair?		
Yes	2552	991
no	546	167
Any urgent disrepair?		
No	2086	760
Yes	1012	398
Any condensation / damp		
Yes	425	193
No	2640	948
unobserved	33	17
Condition of dwelling		
Not poor	2233	818
poor	865	340
Fuel poverty		
Fuel poor	147	53
Not fuel poor	2897	1083

	No child with symptoms	At least one child with symptoms
Tenure		
Owner occupier	2022	586
LA/Other public	716	406
HA/Housing coop	202	109
Private renter	158	57
Location		
Rural	671	235
Urban	2427	923
Household weekly income		
< £100	33	10
£100 -199.99	366	165
£200 -299.99	519	256
£300 -399.99	592	227
£400 -499.99	506	186
£500 -699.99	660	207
£700+	415	102
Household type		
Single parent	580	287
Small family	1679	534
Large family	839	337
Location		
Rural	671	235
Urban	2474	923
Adult respondent has Respiratory Problems		
No	2461	724
Yes	637	434

	No child with symptoms	At least one child with symptoms
Pets in house currently?		
No	1354	461
Yes	1744	697
Any smokers in house?		
Yes	1217	576
No	1881	582
Health Board		
Highland	84	31
Grampian	276	113
Tayside	234	68
Fife	112	32
Lothian	451	162
Borders	79	18
Forth Valley	255	94
Argyll & Clyde	301	126
Greater Glasgow	468	174
Lanarkshire	240	106
Ayrshire & Arran	246	91
Dumfries & Galloway	83	32
Orkney	84	37
Shetland	90	30
Western Isles	95	24
Highland	112	31

Adult respiratory health

Adult respiratory health continuous scale (0-6)	
0	13085
1	2254
2	1113
3	818
4	514
5	425
6	208
Adult respiratory health binary scale	
no symptoms	13085
at least one symptom	5332

	No symptoms	symptoms
Date of construction		
Pre-1919	2079	698
1919-1944	1521	685
1945-1964	2618	1260
1965-1974	1764	798
1975-1982	1057	363
1983-1990	690	264
1991-1997	663	225
post-1997	382	101
Type of dwelling		
Detached houses	2599	704
Semi-detached houses	2466	1007
Terraced houses	2568	1061
Tenement	1790	924
4-in-block	994	510
Flats in converted buildings	176	52
Tower/Slab	181	136
Bedroom standard		
3+ above standard	754	220
2 above standard	2057	715
1 above standard	4088	1709
Equal to standard	3371	1532
Below standard	501	218
unknown	3	0
Primary fuel type		
Mains gas	7258	2916
Electric	2137	1026
Other fuel	1377	451
Unobtainable	2	1

	No symptoms	symptoms
NHER group		
poor	923	422
moderate	6559	2586
good	3151	1324
Extent of central heating		
full	9387	3767
partial	903	368
none	468	245
unknown	16	14
BTS		
BTS	97	41
Not BTS	10667	4351
Any disrepair?		
Yes	8622	3616
no	2152	778
Any urgent disrepair?		
yes	7346	2949
No	3428	1445
Any condensation / damp		
Yes	1370	695
no	9301	3652
unobserved	103	47
Condition of dwelling		
Not Poor	8133	3316
poor	2641	1078
Fuel poverty		
Fuel poor	1494	632
Not fuel poor	9000	3663

	No symptoms	symptoms
Tenure		
Owner occupier	8655	2711
LA/Other public	2813	1797
HA/Housing coop	739	471
Private renter	878	353
Location		
Rural	2944	983
Urban	10141	4349
Household weekly income		
< £100	685	297
£100 -199.99	3222	1694
£200 -299.99	2628	1286
£300 -399.99	2039	786
£400 -499.99	1552	504
£500 -699.99	1762	500
£700+	1106	249
Household type		
Single adult	1856	837
Small adult	2267	812
Single parent	738	337
Small family	1983	619
Large family	1062	331
Large adult	1388	523
Older smaller	1845	876
Single pensioner	1946	997
Marital status		
Married	6715	2368
Cohabiting	888	374
Single	2073	843
Widowed	1806	943
Divorced	1033	538
separated	570	266
Long-term illness/disability		
No	10862	2726
yes	2223	2606
Is heating satisfactory?		
Yes	11824	4485
no	1261	847

	No symptoms	symptoms
Sex of respondent		
Male	5416	2314
Female	7669	3018
Age of respondent		
under 30	1261	526
30-39	2686	856
40-49	2694	884
50-59	2288	947
60-69	1852	953
70-79	1520	825
80+	784	341
Pets in house currently?		
No	7732	3133
Yes	5353	2199
Ever had pets?		
No	2901	984
Yes	10184	4348
Any smokers in house?		
Yes	4627	2566
No	8458	2766
Health board		
Highland	368	157
Grampian	1108	466
Tayside	1083	383
Fife	507	201
Lothian	1886	731
Borders	363	126
Forth Valley	1112	382
Argyll & Clyde	1370	523
Greater Glasgow	1876	979
Lanarkshire	935	430
Ayrshire & Arran	995	465
Dumfries & Galloway	356	141
Orkney	383	119
Shetland	342	141
Western Isles	401	88

Self-assessed health

Self-assessed health	
very good	7061
good	5616
fair	3939
bad	1385
very bad	416

	Very good	Good	Fair	Bad or very bad
Date of construction				
Pre-1919	1244	904	456	173
1919-1944	762	652	530	262
1945-1964	1205	1194	987	492
1965-1974	927	768	587	280
1975-1982	622	435	246	117
1983-1990	383	290	204	77
1991-1997	410	267	159	52
post-1997	228	134	94	27
Type of dwelling				
Detached houses	1627	1042	494	140
Semi-detached houses	1374	1105	727	267
Terraced houses	1295	1088	834	412
Tenement	860	812	668	374
4-in-block	453	436	398	217
Flats in converted build.	112	71	35	10
Tower/Slab	60	90	107	60
Bedroom standard				
3+ above standard	490	307	143	34
2 above standard	1100	890	562	220
1 above standard	2131	1780	1318	568
Equal to standard	1799	1437	1086	581
Below standard	260	229	153	77
Primary fuel type				
Mains gas	3948	3055	2134	1037
Electric	1046	985	783	349
Other fuel	786	603	345	94
NHER group				
poor	495	428	299	123
moderate	3617	2834	1902	792
good	1598	1310	1021	546
Fuel poverty				
Fuel poor	622	715	573	216
Not fuel poor	5027	3785	2618	1233
Extent of central heating				
full	5086	4017	2779	1272
partial	466	374	308	123
none	221	245	166	81
unknown	8	8	10	4
BTS				
BTS	47	46	34	11
Not BTS	5729	4597	3226	1466
Unknown	5	1	3	3

	Very good	Good	Fair	Bad or very bad
Any disrepair				
Yes	4590	3732	2666	1250
no	1191	912	597	230
Any urgent disrepair				
Yes	3968	3172	2209	946
no	1813	1472	1054	534
Condition of dwelling				
Poor	4309	3502	2514	1124
Not poor	1472	1142	749	356
Damp				
Some	651	660	526	228
none	5078	3928	2710	1237
Is heating satisfactory?				
Yes	5343	4160	2803	1180
no	438	484	460	300

	Very good	Good	Fair	Bad or very bad
Sex of respondent				
Male	3052	2420	1534	724
female	4009	3196	2405	1077
Respondents age				
under 30	900	554	233	100
30-39	1812	990	533	207
40-49	1619	1035	605	319
50-59	1174	957	701	403
60-69	816	927	742	320
70-79	535	773	741	296
80+	205	380	384	156
Marital status				
Married	3949	2785	1668	681
Cohabiting	585	394	204	79
Single	1148	905	600	263
Widowed	653	846	855	395
Divorced	437	455	409	270
separated	289	231	203	113
Is respondent long-term sick or disabled?				
No	6696	4611	1917	364
yes	365	1005	2022	1437
Tenure				
Owner occupier	5200	3535	1973	658
LA/ other public	1038	1337	1389	846
HA / housing co-op	326	326	356	202
Private renter	497	418	221	95
Location				
Rural	1612	1271	781	263
urban	5449	4345	3158	1538
Household weekly income				
< £100	273	329	268	112
£100 -199.99	1238	1534	1438	706
£200 -299.99	1268	1169	979	498
£300 -399.99	1166	877	536	246
£400 -499.99	1040	613	278	125
£500 -699.99	1223	674	286	79
£700+	814	370	141	30

Household type				
Single adult	1033	751	555	354
Small adult	1389	906	541	243
Single parent	385	346	226	118
Small family	1392	726	354	130
Large family	663	422	219	89
Large adult	796	591	361	163
Older smaller	762	924	720	315
Satisfaction with home				
Very satisfied	4424	2888	1928	783
Fairly satisfied	2258	2300	1617	720
Neither	208	198	187	100
Fairly dissatisfied	116	140	124	104
Very dissatisfied	50	80	76	91
No opinion	5	10	7	3
Satisfaction with neighbourhood				
Very good	4480	3093	1991	823
Fairly good	2214	2110	1560	658
Fairly poor	259	264	240	175
Very poor	103	136	141	131
No opinion	5	13	7	14
Any pets in house?				
No	4042	3369	2395	1059
yes	3019	2247	1544	742
Any smokers in household?				
Yes	2345	2156	1701	991
no	4716	3460	2238	810
Bothered by noise?				
Very Often	184	183	176	133
Fairly Often	529	495	420	228
Not Very Often	2016	1824	1300	537
Never	4328	3103	2039	901
Cant Say	4	11	4	2
Does respondent have any respiratory symptoms?				
No	4970	3492	1774	538
yes	811	1152	1489	942

Health board				
Highland	225	156	112	32
Grampian	595	545	303	131
Tayside	543	476	296	151
Fife	275	239	143	51
Lothian	1094	758	520	245
Borders	217	151	91	30
Forth Valley	549	445	345	155
Argyll & Clyde	695	558	433	207
Greater Glasgow	1050	810	633	362
Lanarkshire	470	403	317	175
Ayrshire & Arran	526	438	345	151
Dumfries & Galloway	163	164	131	39
Orkney	236	164	89	13
Shetland	209	165	89	20
Western Isles	214	144	92	39

GHQ12

GHQ Score-12 point scale	
0	9630
1	1919
2	1064
3	665
4	577
5	453
6	326
7	296
8	278
9	219
10	208
11	166
Q1 - concentrate	
better than usual	581
same as usual	13015
less than usual	2055
much less than	417
Q2 - lost sleep	
not at all	5424
no more than usual	8011
rather more than	1969
much more than	664
Q3 - useful part	
more so than usual	1302
same as usual	12753
less useful than	1571
much less useful	442
Q4 - making decisions	
more so than usual	1155
same as usual	13557
less so than usual	1141
much less capable	215
Q5 - under strain	
not at all	3874
no more than usual	8871
rather more than	2593
much more than	730

Q6 - overcome difficulties	
not at all	5763
no more than usual	8580
rather more than usual	1398
much more than usual	327
Q7 - normal daily activities	
more so than usual	841
same as usual	12207
less so than usual	2381
much less than usual	639
Q8 - face problems	
more so than usual	753
same as usual	13729
less able than usual	1297
much less able	289
Q9 - unhappy/depressed	
not at all	6448
no more than usual	6910
rather more than usual	2028
much more than usual	682
Q10 - losing confidence	
not at all	7506
no more than usual	6406
rather more than usual	1627
much more than usual	529
Q11 - worthless person	
not at all	10340
no more than usual	4524
rather more than usual	822
much more than usual	382
Q12 - reasonably happy	
more so than usual	1490
about same as usual	12828
less so than usual	1335
much less than usual	415

	0	1-3	4+
Date of construction			
Pre-1919	1532	551	353
1919-1944	1127	431	363
1945-1964	1910	806	685
1965-1974	1349	528	414
1975-1982	804	275	173
1983-1990	524	184	131
1991-1997	513	149	107
post-1997	266	89	60
Type of dwelling			
Detached houses	2049	577	303
Semi-detached houses	1947	686	463
Terraced houses	1882	729	568
Tenement	1203	575	571
4-in-block	702	319	278
Flats in converted build.	130	46	25
Tower/Slab	112	81	78
Bedroom standard			
3+ above standard	595	163	94
2 above standard	1601	515	330
1 above standard	3039	1193	870
Equal to standard	2414	1012	870
Below standard	374	129	122
Primary fuel source			
Mains gas	5381	2024	1575
Electric	1560	647	530
Other fuel	1083	340	181
Fuel poverty			
Not fuel poor	6816	2486	1917
Fuel poor	1015	449	310
Missing	194	78	59
NHER			
Poor	693	266	195
moderate	5011	1761	1274
Good	2203	945	788
Central Heating			
Full	6999	2605	1976
Partial	662	260	192
None	351	141	113
Unknown	13	7	5
Tolerable standard			
Below	73	26	19
Above	7946	2986	2266
Unknown	6	1	1
Any disrepair			
Yes	6398	2465	1905
no	1627	548	381
Any urgent disrepair			
Yes	2508	3013	2286
no	5517	2027	1513
Standard of dwelling			
Poor	6062	2258	1743
Not poor	1963	755	543
Any damp?			
Some	1000	455	372
none	6946	2529	1895
Is heating satisfactory?			
Yes	8860	3152	2233
no	770	496	557

	0	1-3	4+
Sex of respondent			
Male	4201	1531	998
Female	5429	2117	1792
Age of respondent			
under 20	58	30	16
20-29	854	382	260
30-39	1976	657	531
40-49	1964	650	587
50-59	1723	561	564
60-69	1496	562	389
70-79	1129	506	285
80+	430	300	158
Marital status			
Married	5311	1676	1062
Cohabiting	705	254	186
Single	1392	621	486
Widowed	1175	637	454
Divorced	704	296	363
Separated	343	164	239
Respondent has long-term illness or disability			
No	7080	2066	1115
Yes	2550	1582	1675
Health board			
Highland	284	103	62
Grampian	892	321	215
Tayside	732	289	209
Fife	389	144	118
Lothian	1358	502	392
Borders	281	103	69
Forth Valley	757	287	239
Argyll & Clyde	1020	394	323
Greater Glasgow	1347	583	504
Lanarkshire	704	274	201
Ayrshire & Arran	696	296	240
Dumfries & Galloway	267	101	80
Orkney	334	79	38
Shetland	305	85	46
Western Isles	264	87	54
Any pets in household			
No pets	5639	2224	1512
pets	3991	1424	1278
Any smokers in household			
Yes	3407	1445	1443
No	6223	2203	1347
Tenure			
Owner occupier	6603	2118	1269
LA/Other public	1909	1019	1047
HA/Housing coop	529	231	287
Private renter	589	280	187
Location			
Rural	2240	752	469
urban	7390	2896	2321
Household type			
Single adult	1260	505	565
Small adult	1766	583	413
Single parent	449	218	284
Small family	1529	486	337
Large family	790	263	187
Large adult	1085	354	256
Older smaller	1478	533	316
Single pensioner	1273	706	432

	0	1-3	4+
Weekly income			
< £100	410	217	177
£100 -199.99	2165	1067	911
£200 -299.99	1905	760	754
£300 -399.99	1566	539	412
£400 -499.99	1217	398	228
£500 -699.99	1442	395	196
£700+	868	256	103
Satisfaction with home			
Very satisfied	5682	1901	1166
Fairly satisfied	3448	1417	1180
Neither	264	161	161
Fairly dissatisfied	168	108	143
Very dissatisfied	57	58	136
No opinion	11	3	4
Rating of neighbourhood			
Very good	5871	1984	1216
Fairly good	3238	1353	1114
Fairly poor	360	214	249
Very poor	148	89	200
No opinion	13	8	11
Any respiratory symptoms			
No	7513	2407	1485
Yes	2117	1241	1305
Self-assessed health			
Very good	4789	1127	372
Good	3133	1118	616
Fair	1462	992	932
Bad	210	331	643
Very bad	36	80	227

Appendix D: Confidence intervals

All sample surveys produce estimates of the proportions within the population as a whole. These estimates may differ from the true rate of prevalence in the population. It is important to know the extent of this possible divergence – known as sampling error – when interpreting the estimates. One approach to assessing sampling error is to calculate a confidence interval, usually a 95% confidence interval. This is a range around the estimate within which 95 out of a 100 estimates would fall if 100 surveys were conducted.

The table below provides a rough guide for confidence intervals surrounding percentages.

The unweighted number of dwellings can be found in Appendix C, while the column should be chosen that is most close to the percentage reported in the frequency tables. The figure given is one side of an estimated 95% confidence interval surrounding that percentage and should be both subtracted from and added to each reported percentage to give a 95% confidence interval.

The methodology for calculating more precise confidence intervals for both percentages and frequencies can be found in most basic statistics reference books.

Table D1: Confidence interval look-up table for percentages

Unweighted number of dwellings	Percentage												
	1	5	10	20	30	40	50	60	70	80	90	95	100
15168	0.16	0.35	0.48	0.64	0.73	0.78	0.80	0.78	0.73	0.64	0.48	0.35	0.16
15000	0.16	0.35	0.48	0.64	0.73	0.78	0.80	0.78	0.73	0.64	0.48	0.35	0.16
12500	0.17	0.38	0.53	0.70	0.80	0.86	0.88	0.86	0.80	0.70	0.53	0.38	0.17
10000	0.20	0.43	0.59	0.78	0.90	0.96	0.98	0.96	0.90	0.78	0.59	0.43	0.20
9000	0.21	0.45	0.62	0.83	0.95	1.01	1.03	1.01	0.95	0.83	0.62	0.45	0.21
8000	0.22	0.48	0.66	0.88	1.00	1.07	1.10	1.07	1.00	0.88	0.66	0.48	0.22
7000	0.23	0.51	0.70	0.94	1.07	1.15	1.17	1.15	1.07	0.94	0.70	0.51	0.23
6000	0.25	0.55	0.76	1.01	1.16	1.24	1.27	1.24	1.16	1.01	0.76	0.55	0.25
5000	0.28	0.60	0.83	1.11	1.27	1.36	1.39	1.36	1.27	1.11	0.83	0.60	0.28
4000	0.31	0.68	0.93	1.24	1.42	1.52	1.55	1.52	1.42	1.24	0.93	0.68	0.31
3000	0.36	0.78	1.07	1.43	1.64	1.75	1.79	1.75	1.64	1.43	1.07	0.78	0.36
2000	0.44	0.96	1.31	1.75	2.01	2.15	2.19	2.15	2.01	1.75	1.31	0.96	0.44
1000	0.62	1.35	1.86	2.48	2.84	3.04	3.10	3.04	2.84	2.48	1.86	1.35	0.62
900	0.65	1.42	1.96	2.61	2.99	3.20	3.27	3.20	2.99	2.61	1.96	1.42	0.65
800	0.69	1.51	2.08	2.77	3.18	3.39	3.46	3.39	3.18	2.77	2.08	1.51	0.69
700	0.74	1.61	2.22	2.96	3.39	3.63	3.70	3.63	3.39	2.96	2.22	1.61	0.74
600	0.80	1.74	2.40	3.20	3.67	3.92	4.00	3.92	3.67	3.20	2.40	1.74	0.80
500	0.87	1.91	2.63	3.51	4.02	4.29	4.38	4.29	4.02	3.51	2.63	1.91	0.87
400	0.98	2.14	2.94	3.92	4.49	4.80	4.90	4.80	4.49	3.92	2.94	2.14	0.98
300	1.13	2.47	3.39	4.53	5.19	5.54	5.66	5.54	5.19	4.53	3.39	2.47	1.13
200	1.38	3.02	4.16	5.54	6.35	6.79	6.93	6.79	6.35	5.54	4.16	3.02	1.38
100	1.95	4.27	5.88	7.84	8.98	9.60	9.80	9.60	8.98	7.84	5.88	4.27	1.95

