The Riviera Housing and Health Survey

A report to the Eaga Partnership Charitable Trust

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behalf of the Torbay
Healthy Housing
Group. 2003

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EXECUTIVE SUMMARY

This report describes the conduct, analysis and results of a postal survey of residents of social housing in Torquay, South Devon. The survey concerned housing conditions and health, in particular emotional health of residents.

BACKGROUND

Much evidence already exists of an association between poor housing conditions and poor health. This is intuitively logical but causality is questionable. Living in substandard housing is also a source of chronic stress, likely to result in physical illness. Chronic stress is also associated with depression. Poor housing conditions often result in the weakening of social support systems and inhabitants of such housing perceive that they have little personal control over their living conditions, making depression more likely.

The researchers are members of an established health and housing group, the Torbay Healthy Housing Group, with a programme of interrelated projects in this field. The results of this survey will not only add to evidence on the relationship between housing and health but contribute to a major funding bid being worked up by the Group.

THE STUDY

The aims of the study were to examine the extent of the relationship between physical and emotional health and housing conditions. The method was a cross-sectional postal survey to all households owned by the Riviera Housing Trust in Torbay, South Devon. The questionnaire elicited information on both the physical conditions in the house or flat and the physical and mental health of its occupants.

RESULTS

The response rate to the survey was 38% (1053 household and 2219 individual questionnaires). Poor housing conditions were associated with poor mental health and well-being, but not with minor illnesses or physical conditions.

The project was entirely funded by the Eaga Partnership Charitable Trust. Any errors are the responsibility of the project team.

INTRODUCTION, BACKGROUND AND AIMS OF THE STUDY

The Torbay Healthy Housing Group

The Torbay Healthy Housing Group (THHG) is an intersectorial collaboration involving landlords, health workers, primary care trusts, researchers, local people and others. Its most notable achievement to date has been the Watcombe Housing Study, an attempt to assess the health impact of housing upgrades by means of a randomised trial. A description of the Watcombe Study is published elsewhere[1] and the full report has recently been approved by the Department of Health[2]. It is the intention of the Group to continue the rigorous assessment of the health effects of housing conditions, continuing the cordial and productive relationships established thus far. The long-term goal of the Group will be to have a sustainable programme of high quality research in this field.

The present study not only complements our existing five funded projects, allowing us to develop future funding applications, it also provides valuable information in its own right to landlords, health professionals and researchers in the field about the relationship between housing conditions and health.

The Difficulties of Housing Research

Housing research is a notoriously difficult area, since those who live in deficient housing are also likely to suffer from numerous other disadvantages such as unemployment, social exclusion and a poor standard of education, all of which may exert their own effect on health. These act as confounding factors, making it difficult to show, scientifically, that housing exerts an independent effect. Some writers in housing and health argue that it is reductionist to try to separate out single influential factors and that it should be sufficient merely to prove the link between general deprivation and health, in a holistic manner.[3] However, since a common aim of housing research is to inform government policy on the reduction of health inequalities, the separation of individual effects is desirable. Assuming this is possible, a number of questions need to be asked. Does housing exert an independent effect on health? If it does, which particular aspects of poor housing are responsible? Does it effect mental health, physical health, general well being, or all of these? Are there any particular illnesses or conditions that are particularly associated with poor housing conditions? This research attempts to address these questions.

Poor housing may be deficient in many ways. The external environment may be dangerous, dirty and ugly. The conditions inside the house may be overcrowded, damp, cold or mouldy and the air quality may be poor. The indoor environment is likely to have a major effect on

health in climates such as our own since it has been estimated that in the UK, the majority of the population spend 90% of their time indoors, with 70% of this being inside their own homes.[4] This study focuses on the internal environment of a house, which will be defined by the indoor temperature, humidity and visible mould. Damp and cold are extremely widespread problems in UK housing, particularly housing in a poor condition. The Building Research Institute estimated in 1998 that approximately 2 million homes suffered from severe damp and a further 2.5 million showed some signs of damp. Mould growth can result from damp and both may have a significant effect on health. The effect on children's health should be of particular concern since it has been suggested that the housing health risks accumulated during their early years can have a permanent effect. Marsh[5] suggests that the impact of multiple housing deprivation on health appears to be of the same order of magnitude and possibly greater than that posed by excessive drinking. Also that "acting to improve the housing conditions of both adults and children would be of benefit, but addressing the conditions of children in particular would deliver direct benefits in terms of improved current health and would bring indirect benefits in reducing the likelihood of ill-health in later life".

The Riviera Housing Trust (RHT) assumed control of all 3000 social housing properties in Torbay in the year 2000. One of the promises made to its new tenants was that all its dwellings would be totally renovated over a five-year period, which presents an ideal research opportunity to study any health changes accompanying these renovations. The THHG plans a future, large scale, intervention study into the health effects of housing renewal. It intends to target part of this research on a particular condition or group of conditions. In order to plan this future research efficiently two types of, currently unavailable, information about the study population are needed: demographic details and baseline health status information.

Study Aims

The aims of the present survey were:

- To assess the prevalence of common illnesses among the residents of social housing in Torbay.
- To assess levels of emotional well being among these residents.
- To assess the quality of housing provided to this population, in particular in terms of cold and damp.
- To assess the extent of any relationship between housing conditions and physical and mental health.

LITERATURE REVIEW

A review of research in the area of health and housing clearly shows the difficulties that researchers face. Previous research has focussed on four main areas: overcrowding, high-rise housing, housing type and location and housing conditions. This review concentrates on the final area. Electronic databases ASSIA, BIDS, BIOMED, CAREDATA, PSYCHINFO and MEDLINE were searched, using the key words *housing* + *mental health* or *depression* or *emotional distress* or *health* or *illness*. Certain housing journals were also hand searched. A recent Medical Research Council systematic review on the health effects of housing improvements[6] was used as a starting point for relevant papers on housing and mental health.

Studies in this area have been either qualitative, descriptive, intervention or longitudinal, and have physical or mental health outcomes or both. Many have been criticised for the use of self-report data for the measurement of health status or housing conditions. However evidence suggests that subjective assessments of health status are more highly correlated to morbidity and mortality than objective measures, and are not necessarily a source of reporting bias[7].

Qualitative Studies

A recent study by Ellaway, Macintyre & Fairley[8] carried out a short-term qualitative study of the impact of improved housing on health. Two areas in Scotland were chosen, with improved and unimproved areas of social housing. These were compared. Interviews were carried out on a non-random group of volunteers. The resulting interview data clearly showed the extent to which the residents themselves believed that poor housing affected their health. The problems mentioned most often were childhood asthma, stress, tiredness and anxiety and depression in the adults. High levels of smoking were also mentioned and frequent use of health services. The residents in better housing reported better physical and mental health in children and adults, and less cigarette smoking.

Descriptive Studies

In 1986 Martin, Platt & Hunt[9] conducted a household survey of 500 homes in Edinburgh. Environmental health officers measured humidity and damp and householders made subjective assessments of damp. The Nottingham Health Profile was used to measure self-reported health status. The only significant finding among adults was that those living in damp conditions were more likely to experience emotional distress. For children, more numerous significant associations were found between damp and pains, nerves, diarrhoea

and headache. This study has been criticised for the use of self-report health data. However, double blinding was used which enabled the objective assessments of damp made by the Environmental Health Officers to be compared with subjective damp assessments made by householders. The two were found to be comparable. Some attempt was also made to address the problem of confounding factors by attempting to achieve homogenous samples of damp and non-damp households with respect to socio-demographic details, household income and smoking.

A study by Platt, Martin, Hunt & Lewis[10] examined the relationship between damp and mould growth and children's health. A cross-sectional study was conducted on a random sample of 597 households containing children in Glasgow, Edinburgh and London. A surveyor assessed housing conditions. Health was measured by structured interview. Information was also collected on smoking, type of heating, washing and drying facilities, pets, economic activity and various details about household income. The housing condition survey team and the health interview team were blinded from each other's results. They found that adults living in damp and mouldy dwellings were more likely to report a greater number of symptoms such as nausea and vomiting, blocked nose, breathlessness, and bad nerves. These differences persisted after controlling for confounding factors and other sorts of bias. A dose-response relationship was found between the number of symptoms and the degree of damp and mould, allowing the authors to infer a causal relationship between illness and cold and damp.

Blackman et al[11] carried out a large-scale household survey on housing and health in two areas of West Belfast. The study area was Divis Flats, an inner city area with high-density system built housing with serious building and environmental defects, and a poor local reputation. The comparison area was Twinbrook, also an area with poor public sector housing, but locally considered much better, with traditionally built houses and private gardens. Some attempt was made to ensure that both the areas were roughly equivalent in some environmental aspects and location. Self-reported health data was collected by interview for approximately 1300 adults and 900 children. Data were also collected on health service use. The authors found associations between cold, damp and overcrowding and respiratory illness, digestive problems and psychological distress in Divis children, which were not found in Twinbrook children. There were also significant differences in health service use. The adult data showed that respiratory conditions and psychological stress were linked to housing defects but also to housing type and location. Blackman found that, for adults, the location and area of the property is at least as important as its structural condition.

Hyndman[12] conducted a study of British Bengalis in East London, in very poor housing. This population was chosen because it was assumed to be more homogenous than most UK populations. A survey of 60 Bengali families, 30 with central heating and 30 without, was carried out. Both objective and subjective measures of housing conditions and various health measures were collected by interview. Information was also gathered on smoking, social class, overcrowding, occupation, age and sex. Most of the unheated homes were damp and mouldy. Many significant relationships between health and damp and mould were found, the most significant one being between asthma and cold. A dose-response relationship was demonstrated, with those living in cold homes being twice as likely to report breathing problems and those with mould were two and a half times as likely. Diarrhoea and vomiting also showed a dose-response relationship with damp and mould. Associations were also found between both reported and observed mould and depression

Kearns[13] assessed the relationship between housing stressors and mental health in two marginalized urban populations in New Zealand. A control sample was selected at random. The two populations were those who were inadequately housed, and those with serious mental health problems. A Housing and Health Interview Schedule was used to measure current housing conditions and the GHQ12 to measure psychological distress. The results indicated that being housed inadequately significantly worsened mental health. Two major moderating factors were identified; gender and household composition. Women appeared to suffer more mental health problems as a result of poor housing than men and those living alone seemed to suffer less distress from poor housing conditions.

Strachan[14] conducted a study in Edinburgh using a sample of children in the city's primary schools. Subjective and objective measures were taken of both lung function and humidity and mould growth in the bedroom. After adjustment for confounding factors, he found a significant relationship between parental report of wheeze and mould in the bedroom. A possible dose response relationship was also found between subjective reports of the severity of breathing problems and the amount of mould. However, no such relationship was found when the respiratory problems were clinically diagnosed. The author concludes that the likelihood of a parent reporting a breathing problem was a function of the amount of visible mould, rather than the condition of bronchospasm itself. This study has been criticised for a time period of over a year between measurements of housing conditions and health.

In 1996 Hopton & Hunt[15] re-analysed a sample of 451 household interviews from a household interview survey that had been done on a public sector housing estate in Glasgow notorious for damp, to examine the relationship between poor housing and mental health. A GHQ30 score of over 5 was used as a definition of mental health problems, and an attempt was made to correlate this with self-reported data on housing condition, length of time at the address, unemployment, chronic illness, income and whether health was a factor in a move to the current address. The researchers found that mental health problems were significantly correlated with self-reported household dampness.

In 1998 Kahlmeier et al[16] carried out a telephone interview survey of a random sample of 2157 people who had moved once in 1997, either within Basel, Switzerland or out of Basel. Details on potential sources of bias were collected such as sex, age, household composition, household income, education and type of moving. The participants were also asked their main reason for moving, self-rated health both before and after moving, and 40 indicators of housing quality assessed at their previous and present address. These 40 indicators were then grouped into 8 dimensions, using factor analysis. An attempt was made to associate changes in environmental housing quality with changes in the well being of movers, whilst taking into account possible confounding factors. Improved self-rated health was most strongly associated with the two dimensions most closely related to the building itself, particularly its physical condition.

In 1999 Marsh et al[5] carried out a re-analysis of data collected by the National Child Development Survey. The aim was to discover whether housing deprivation had an independent effect on health. The housing dimensions used were physical characteristics, location, satisfaction with housing, past homelessness and independent assessments of housing difficulties. They found that multiple housing deprivation led to a 25% greater risk of disability or severe illness across the life-course. There was also some evidence of a dose-response relationship since greater housing deprivation appeared to lead to a greater probability of ill health. They also found that poor current housing conditions in adults are associated with ill health. More importantly, however, they found that even among adults currently living in non-deprived conditions, ill health was more likely among those who experienced housing deprivation early in life. The authors suggest that these results may be considered causal.

In 2000 Evans et al[17] carried out a secondary analysis of 8889 responses to the OHLS3 postal questionnaire, that had been sent out to a random sample of adults in 1997. The self-reported health outcomes used were the prevalence of long-standing illness, presence of

asthma, use of health services and a global measure of health (SF36). Housing dampness was assessed by self-report. The results showed that housing dampness was significantly related to asthma and long-standing illness as well as health service use. There was also some evidence of a dose-response relationship. The SF36 results also showed that both damp and cold housing were significantly associated with poorer perceived health status. The effect of cold showed a more significant effect than damp. The major limitation of this study was that the data were collected for a different purpose and thus there were some important omissions. For example, there was no information on pet ownership (an important factor in atopic asthma) and the age range was limited to 18-64.

A retrospective study was carried by Green et al[18] on the health effects resulting from decreasing the amount of damp and mould in 4 tower blocks in Sheffield. An energy rating was taken for the properties both before and after renovation. However, the health survey was completed only after renovation. A control sample of unimproved tower blocks was used. Some attempt was made to match the test and control sample for original energy ratings, and 6 different confounding factors such as lifestyle and socio-economic status of residents. The SF36 was used to measure health status. Only the domains of physical role and energy/vitality showed significant improvement in the residents of renovated tower blocks. The researchers experienced great difficulty matching test and control groups for employment status. Also, its cross-sectional design meant that health factors that took longer to improve were not detected.

A postal survey was conducted by Packer et al[19], to study the relationship between damp and health. The results showed that damp was highly correlated with long-term illness, disability and infirmity. Long-term illness was 12% higher in damp households and a dose-response effect was evident.

The Shepherds Bush Housing Association in London is conducting an ongoing study. An interview survey is being used to collect data from 2 groups of tenants: those whose homes are being refurbished or re-housed and those whose housing is unlikely to change. The objectives are to investigate the impact of refurbished and reallocated housing on well being and health. Approximately 100 households are being added to the survey each year. The preliminary results show an improvement in self-reported health status for movers or those whose homes have been renovated.

Limitations of Descriptive Studies

Many of the studies[11,13,17,19] do not take sufficient account of confounding factors. In these cases it is difficult to infer that any health differences are due to poor housing conditions and not to other aspects of the deprivation experienced by the residents.

Blinding is seldom possible in housing and health research and thus both respondent and researcher are sources of bias[11-16,18]. Respondents are likely to be aware that self-report of poor housing and health status could lead to an improvement in their housing conditions. Over-reporting is therefore probable.

Some of the studies[5,10] attempted to infer causality as a result of their findings. This is probably inappropriate from descriptive studies.

Most of the studies were also cross-sectional[9-13,16,18], thus taking no account of any further changes, which might occur over time.

Intervention Studies

Intervention studies in housing are relatively rare. Such studies avoid many of the pitfalls of descriptive designs, and may be more successfully used to infer causality. The gold standard in intervention research is the randomised controlled trial, since the use of random selection to allocate participants to either case or control groups ensures, as closely as possible, that both groups are similar. Randomisation is only considered to be ethical if there is genuine uncertainty about the value of the intervention. The majority of improvements to the internal environment of a house cannot realistically be viewed with this uncertainty, and so examples of randomised trials are uncommon. One method of overcoming ethical objections is 'randomisation to waiting list' in which properties are randomised to order of renovation, those on the waiting list may then be used as controls. In housing intervention studies some aspect of the environment is changed; for example, the property is renovated or the household is re-housed in another property which is preferable in some way. The accompanying health changes are then studied. The studies may either be prospective or cross-sectional.

A prospective case-control study in 1986 by Iversen, Bach and Lundqvist[20] observed changes in health status accompanying the installation of new windows as an energy conservation measure in medium-rise flats in Copenhagen and several other provincial cities. The study is partly observational but has been treated here as an intervention study, since some aspects of its design are similar. The experimental group showed significant

improvement in rheumatic symptoms, and in inconvenience caused by noise. Some attempt was made to address confounding factors but the study population was highly specific, making generalisation difficult.

A prospective case-control study was done by Halpern et al[21] on the Eastlake estate, which was scheduled for improvement to the outside of the houses and the wider external environment. Improvements such as new PVC windows, porches and front doors, the closing of alleys, resurfacing of roads and the re-building of garages were carried out. A small number of interviews were carried out on the oldest female in each household at several different stages in the renovation plan. Questions were asked on demographic details, mental health, self-esteem and attitudinal items about living on the estate. The results showed that the programme of renovations produced significant improvements in the mental health, and social support felt by residents.

A prospective, before and after study by Ambrose et al[22] studied the health gains accompanying an SRB regeneration programme in central Stepney, London, between 1995/6 and 2000. Residents either had their housing improved or were re-housed in superior accommodation. A household survey was conducted by home interview, on self-reported health status, access to health and other services, fear of crime and levels of satisfaction with housing, episodes of illness, illness days, and symptoms. The results showed more illness episodes in the “after” group although fewer of them resulted in a doctor’s visit, and a significant decrease in the number of illness days per person. Symptoms that showed significant reductions were aches and pains, asthmatic and bronchial conditions as well as stress and depression. The survey respondents also perceived a better sense of security and less fear of crime in the after survey.

A study in Cornwall by Somerville, Mackenzie, Owen & Miles[23] tried to link the installation of central heating to an improvement in asthma in child residents. Child asthmatics were identified in 98 households and their diagnosis confirmed by a clinician. A Housing Officer assessed housing conditions with regard to heating type, damp, mould and insulation. The parent of each asthmatic child filled in an asthma symptom questionnaire and the number of days lost from school was also counted. The same questionnaires were repeated every 3 months after housing renovation. The frequency of asthma symptoms decreased significantly following the installation of central heating and children also lost less time from school, due to asthma. The lack of a control group in this study makes causality difficult to infer.

A study undertaken by Blackman, Harvey, Lawrence & Simon[24] tried to link neighbourhood renewal in the Scotswood area of Newcastle upon Tyne, and residents' health. A structured interview was used to investigate respiratory function, mobility, depression, housing problems such as cold, damp and draughts, housing defects, certain neighbourhood features, general health status, psychological distress in both adults and children and health service use. Interviews were carried out on the main householder before and after renewal work. Data were obtained for 209 people from 98 households. The intervention included environmental improvements, external fabric repairs, refurbishment of individual dwellings and security and road safety improvements. The results showed that improved 'community' mental health was associated with the reduction in draughts, and environmental and security improvements. Respiratory health did not change significantly and neither did health service use. The individual mental health scores of both children and adults improved after renovation and smoking declined sharply.

The Riverside Project is an ongoing intervention study being conducted in a deprived area of Cardiff by Evans et al[17]. It aims to quantify the environmental health changes that accompany the renovation work carried out by the City of Cardiff as part of their Urban Renewal Scheme. The renovation programme aims to make most homes structurally sound and energy efficient. The design is quasi-experimental since randomisation was not considered ethical. The households were studied one year before renovation, shortly before renovation, and six months to a year after renovation. Houses that were as yet unimproved were used as controls. An environmental scientist measured changes in temperature, dampness, and certain indoor pollutants. A health visitor administered health status questionnaires, diaries and some objective measurements for adults and children with chronic conditions that were thought to be related to environmental factors. Data on general health are also being collected.

Another study by Huxley et al[25] is currently being analysed. A major urban regeneration programme in Wythenshawe, Manchester was used to study the accompanying changes in mental health, common mental illnesses and well-being. A baseline health survey was carried out on 2600 residents. Information was obtained by postal survey on mental health status, quality of life, personal circumstances and consulting behaviour. The survey was repeated approximately two years later to study any changes. Two subgroups of 200 people each will also be chosen for qualitative interview, on the basis of vulnerability, or not, to mental health problems. The study is taking place in two areas matched for deprivation and age of property. The experimental area has been earmarked for urban regeneration under the Single Regeneration Budget, while the control area will remain unchanged.

A further ongoing trial in the Watcombe area of Torbay, by Somerville et al[2] is currently in the last stages of analysis. This trial has used a randomisation to waiting list design. A sample of 119 homes was selected, with 50 being randomised to renovation first (the test group), with the remaining homes to be renovated later (the control group). Questionnaire, interview and environmental surveys collected information on health problems, such as asthma, heart disease and arthritis and rheumatism, the internal environment and economic data. The information was collected at baseline and 12 months after renovation. The renovation included cavity wall and roof space insulation, and installation of central heating and ventilation systems. The test and control groups were found to be well balanced for possible confounders.

Limitation of Intervention Studies

Control groups are essential in intervention studies to allow proper comparison of any changes accompanying the intervention. Designs such as the before and after study[22-24] lack this essential element and are of limited use, since it is difficult to dissociate any experimentally induced changes from naturally occurring changes, due to the passage of time. Another major hurdle facing the designer of an intervention study lies in the selection of control groups and the method used to assign participants to these groups, since selection bias may result. Random allocation of subjects is by far the most methodologically sound method since it ensures, if the sample size is large enough, that similar levels of confounding appear in each group, allowing the conclusion that any observed difference is due to the experimental effect. The use of randomisation raises serious ethical issues and should only be considered if there is genuine doubt as to the therapeutic effect of the intervention. Only two studies have designs that use randomisation.[1,29]

Intervention trials are far more scientifically rigorous if some attempt is made at blinding. This is clearly problematic with housing renovation, since participants are likely to be aware which group they are in. Blinding the investigator is sometimes a possibility and can reduce the possibility of bias, but was not used in any of the above studies.

Frequently, studies are published with sample sizes that are too small[21,23,24] and thus do not have sufficient power to detect small effects, or to produce generalisable results.

Cross-sectional studies do not take account of any changes that might occur across time. It seems highly likely that any health changes produced by changes in housing conditions are long-term, and thus only detectable in longitudinal studies.

Longitudinal Studies

Longitudinal studies have the advantage of following health changes over time, which is a more sensitive design.

Wilner et al[26] conducted two studies in 1958 and 1960. Data were used from the Johns Hopkins Longitudinal Study, carried out in Baltimore, USA. This study investigated the effects of housing quality on physical and mental health and social adjustment. A case-control design was employed where the participants were members of 1000 families, with 400 in the test group and 600 in the control. There was an attempt to achieve homogenous samples on 13 variables which were considered important confounders, such as family size, income and education. Subsequently it was found that the two groups were not well matched for housing quality, the housing quality of the test group being significantly worse. Problems also arose because the control families tended to move frequently. Baseline interviews gathered data on housing quality, demographics, morbidity, social adjustment and other minor details. Subsequently 400 families were moved out of the slum housing into a new public housing project.

The 1958 study focussed on morbidity. Every 10 weeks the female heads of each household, in both groups, were interviewed to determine household morbidity levels. Information was collected on minor illness, chronic conditions, disability and use of health services. The results showed an initial increase in morbidity in the intervention group at the 9-month follow-up, but a small reduction in morbidity in the intervention group at the 18-month follow-up.

The 1960 study describes the effects of housing quality on physical and mental health and social adjustment of the test and control families after 18 months. Items were included on how the families felt about their new housing, changes in family activities, opinions on their social status, and various questions to assess their psychological state. The reviewers found that the test families showed an increase in family activities undertaken together, neighbourly interactivity and awareness of the improved environment. Much less improvement was found in social status and psychological health. The researchers note that 18 months may not have been long enough for improvements in these areas. The frequency of movement between properties in the control group also made comparison between the two difficult. No account was taken in this study of confounding factors.

A study by Wambem[27] in central California in 1967 focussed on two groups of residents, both living in very substandard housing. One group was re-housed, and one was not. Data on the use of outpatient facilities by each group were studied over 18 months, both before re-housing, and for a year afterwards. Some difficulty was experienced in matching the two groups for housing quality before re-housing, since the control group's housing was not quite as poor as the test group. The results showed a significant improvement in health, as measured by outpatient visits, in the test group. An age effect was also found, with the youngest and oldest groups showing the most significant health improvement.

The Carp[28] case-control study described longitudinal differences in disability and health between two groups of elderly people. One group moved to new housing that was specifically designed for the elderly, the other group remained in their original housing. Data on disability and health were collected by home interviews from approximately 300 respondents at baseline, after 1 and 8 years. The study did not make the methods used for matching of the case and control groups clear, and the populations used were small. The results showed that an improved environment resulted in better mental and physical health and a significant decrease in mortality.

A randomised, controlled trial was carried out by Elton & Packer[29] in 1986. The trial was prospective and aimed to find out whether anxiety and depression were improved by re-housing. The study was limited to those who gave mental health symptoms as their reason for wanting to be re-housed. The participants were 56 tenants of Salford City Council. Their housing was of various types and suffered from problems such as being in a poor condition, noise and a dirty environment. Data were collected by interview on the participant's life and housing situation, and a self-administered mental health questionnaire (DSSI/sAD). Those who scored over a certain threshold on the DSSI/sAD were randomly allocated to the priority or non-priority re-housing group and the members of each group were paired. The re-housed group was re-interviewed shortly after re-housing and both groups were followed up after 12 months. The groups were well matched for age, sex, social class and psychiatric diagnoses. However, the non-priority group was over-represented by widows. The results showed a clear improvement in mental health for at least a year after re-housing. The major methodological problem was the impossibility of blinding the participants to the treatment (i.e. rehousing).

A study on the residents of substandard housing in Liverpool, by Green et al, is in the process of being written up. It will compare changes in a cohort of 200 households who are moving from high to low rise accommodation against another group of 200 households who

are not moving. The study's aims are to establish an association between improvements in the housing stock and changes in the health status and quality of life of the residents, and to measure the extent to which health gain and improved standards of living are associated with specific levels of investment in the housing stock. Also, to establish any variation in demand for health and community services following the move. The residents will be re-interviewed 2 years after the initial interview.

Limitations of Longitudinal Studies

The selection of an appropriate cohort is a major downfall of many longitudinal studies. Many cohorts chosen are highly selective[28,29] and not necessarily representative of the population at large. These groups are often chosen because of their cohesiveness and low drop out rates.

Summary of Previous Research

Many studies have found significant associations between housing conditions and physical health, particularly with respiratory conditions, and mental illnesses such as stress, depression and anxiety. These findings would support a theory of poor housing resulting in physical and mental illness due to its ability to act as a chronic stressor and an immune suppressant.

From the review above it is clear that housing and health research has, for the most part, not been sufficiently scientifically rigorous. Many studies cannot be used for causal inference for reasons of design, and other problems such as allocation of participants to case and control groups. Also many studies collect information by proxy[29,30,31]. For example, the head of the household is asked to provide information about the health of its other members. This method is fraught with difficulty, and is likely to lead to inaccurate data.

Planned Future Research

The planned future housing intervention research to be carried out by the THHG intends to overcome as many as these difficulties as possible. If possible, it aims to randomly allocate residents to the intervention or the control group and to use a longitudinal design, with follow-up over at least one year. This paper describes the process of collecting demographic, socio-economic, housing and health data from the residents of properties owned by the RHT to enable the proper planning of this research. The data produced will also provide the opportunity to make other hypotheses on the association between certain aspects of health and housing conditions.

METHOD

Populations

For the purposes of this survey we have two populations. Firstly, we require information about the quality of the housing stock. Second, we require information about the residents of those houses. Our sample is all houses owned by the Riviera Housing Trust (RHT) and all residents within them. RHT owns properties over the whole of the coastal area of Torbay in South Devon. The only exceptions to this general rule are the households used in the pilot study and the Watcombe estate which is part of another research project[1].

The Questionnaire (see Appendix A)

The postal questionnaire elicited information on the residence itself (eg its temperature), the household (eg number of residents, household income), and the health of individuals within it.

The residence. Questions covered usual temperature, visible mould (and where this is), and damp.

The household. Questions covered number in household, age, health, employment status, and benefits.

Individuals. Questions concerned smoking, drinking, overall health (EuroQol)[32] and emotional health (GHQ12)[33].

The questionnaire format was one of closed questions with limited space for elaboration. The design was user-friendly, with extensive use of graphics and easy to follow instructions.

Ethical Considerations

Although the respondents were not patients and research ethics committee approval not therefore strictly necessary, the subject matter was sensitive and expert guidance sought from the Torbay Local Research Ethics Committee (LREC).

The Committee raised a number of objections. They did not consider it ethical that one person was being asked to fill in confidential medical details, on behalf of other members of the household. Not only was this breaching medical confidentiality but the Committee felt that we would not achieve accurate responses to sensitive questions. However, the LREC agreed that an adult could fill in the questionnaire on behalf of a child of less than 16 years.

After much discussion, it was decided to split the questionnaire into two parts. One would contain information common to the household such as income, benefits claimed, number of people in the house, etc. The other would contain personal, confidential questions on mental and physical health, along with demographic questions on age and sex.

Thus one householder completed the section about the residence and another about their own personal health and handed on the personal health and health behaviour section to all other adults in the household, each of which could be returned in a separate reply paid envelope. An adult was requested to complete a separate health questionnaire (just including recent illnesses) for each under 16 in the household. This somewhat cumbersome arrangement was the only way we were able to satisfy the legitimate concerns of the LREC but probably had a detrimental effect on our response rate.

Covering Letter

The covering letter advised respondents of the nature and purpose of the survey. It explained the requirements and format of the questionnaire and gave reassurance that information provided would only be seen by the research team and not used for any other purpose. (See Appendix B)

Questionnaire Development

After an initial pre-pilot among colleagues to test for general comprehensibility the questionnaire was sent to a pilot sample of 100 respondents taken from our target population. A higher response rate in the pilot should be expected, since each pilot household had volunteered to help with surveys. The response rate was 48% after one reminder, sent two weeks after the initial posting.

Several issues arose as a result of the pilot:

The number of individual questionnaires sent to each household was reduced from 6 to 5. If this was inadequate, respondents were invited to telephone for extra copies.

A Likert-type answer scale was added to the housing condition questions on cold and damp to assess the degree of these conditions. An answer category on the actual rooms affected by mould was added to the visible mould question.

The number of income categories was reduced from 5 to 4, omitting the highest band.

The benefits question was changed, as result of answers in the 'Other' box. A list of benefits was taken from a government booklet 'Harmonised Concepts for Questions in Government Social Surveys' 1996[34] that produced suggested question formats for government surveys. Details were brought up to date with information from the Social Security website.

An analysis of illnesses entered in the 'Other' box resulted in epilepsy being added to the list of conditions. It was also decided to add two further elements to each condition question, in order to detect self-diagnosis of a condition. Each checklist item had two further parts added to find out whether the respondent had seen a doctor and/or received a prescription.

The employment question was re-worded slightly since it appeared to be difficult for respondents to understand.

Public Involvement

Experience with the Watcombe Study of health and housing has taught the value of involving participants as much as possible in the research process. Indeed, we regard this partnership as both ethically important and methodologically desirable. Local radio and newspapers carried features on the forthcoming survey advising tenants of its purpose and form. The importance of a high response rate was stressed. Local tenants' groups were particularly targeted, both with articles in newsletters and progress reports at residents' meetings.

SWEB kindly donated a fridge freezer as a prize for a draw to be made from among respondents and a short piece appeared in the local newspaper on the selection of the winner.

Letters were also sent to local GPs and hospital consultants who would possibly hear about the survey from patients. A copy is attached at Appendix D.

Survey Administration

The final questionnaires were printed by the University of Plymouth printroom. Administration of the survey was conducted from the RDSU offices, Tamar Science Park, Plymouth. A freepost address was obtained for reply envelopes. The 3000 questionnaire packs, each containing one household questionnaire and the five personal questionnaires and envelopes were despatched from the Science Park in batches of 500. The whole of the despatch was conducted in just over a week.

Despatch and return of questionnaires was recorded on a bespoke Access database. Each questionnaire was given a unique survey number to identify responders. Non responding households were sent a reminder letter at two weeks. (Appendix C).

Returned questionnaires were inspected for missing values and coded appropriately (to distinguish a "don't know" from a "no response", for example). Data were then entered into Excel spreadsheets (one each for housing data and personal data) related by survey number. The files were converted to SPSS (10)[35] for analysis.

Analysis

Question reliability checks were conducted between pairs of questions to test for respondent accuracy and question reliability.

After initial data cleaning and validation, analysis started with basic frequency distributions represented either graphically or in tabular form in the following pages.

GHQ12 responses were converted into scores, using the 0,1,2,3 scoring method. Illnesses were added together to produce a symptom score of between 0 and 13. The benefits claimed were added together to produce a total of between 0 and 6 benefits. Dates of birth were converted into age in years. Employment status was used to produce a categorical variable of Socially Included (paid employment, looking after family, in education and retired) or Socially Excluded (unemployed and permanently sick or disabled).

Univariate analyses were carried out to examine the relationships between the outcome and predictor variables. Appropriate tests of significance were then applied. A multivariate analysis was then carried out on each outcome variable using a model consisting of all three housing conditions and smoking and drinking. All main effects and two-way interactions were explored.

RESULTS

RESPONSE RATE

2804 questionnaire packs were despatched. 1053 household questionnaires were returned, or 37.7% of those with valid addresses.

From these 2219 individual replies were received. It is not possible to convert this to a response rate as there is no denominator for our population. (The RHT has only one contact name per household).

RESIDENTS' CHARACTERISTICS

Age (Figure 1) and Gender (Figure 2)

There were two clear peaks in the frequency distribution. The first occurs in children and teenagers between 5 and 18 years. The second was in old age pensioners of between 66 and 84 years. There were fewer respondents between 18 and 30 years, which is likely to be because people in this age group are less likely to respond to questionnaires.

The respondent population was 42.5% male and 57.5% female, with a non-response rate for this question of 9%. It is common for women to show higher response rates for postal surveys. However the differences in response rates for both sexes is quite narrow. More women than men responded in all age groups of over 17 years old, particularly among the 31-50 and 66-80 age groups. In the age groups under 17 years old, slightly more boys responded than girls. The greater response from women among the older age groups is probably due to longer life expectancy rates. See Figure 2.

Figure 1 - Age of respondents

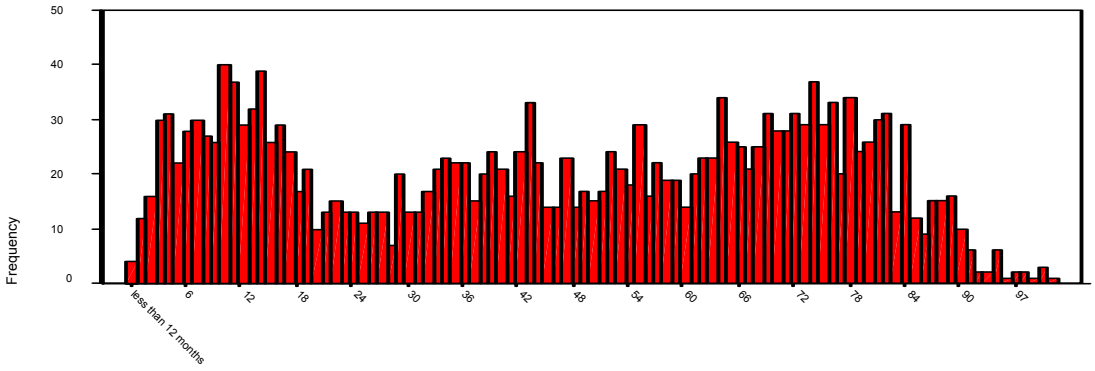
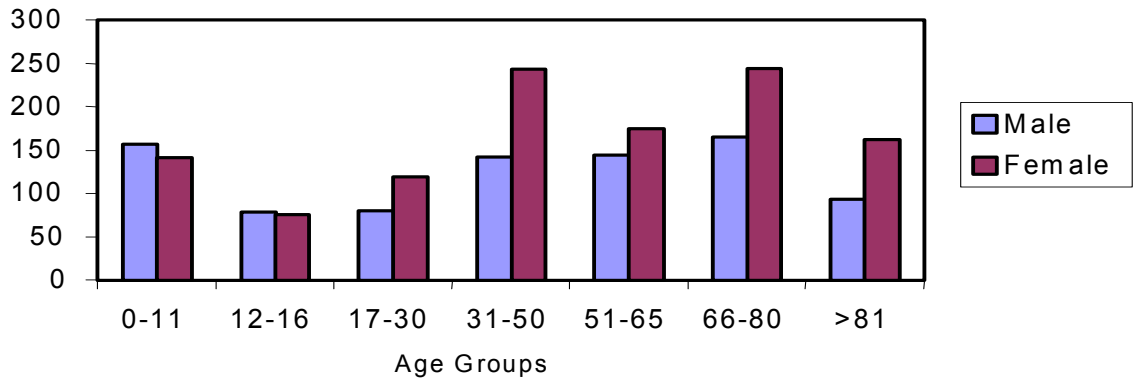


Figure 2 – Age distribution by gender

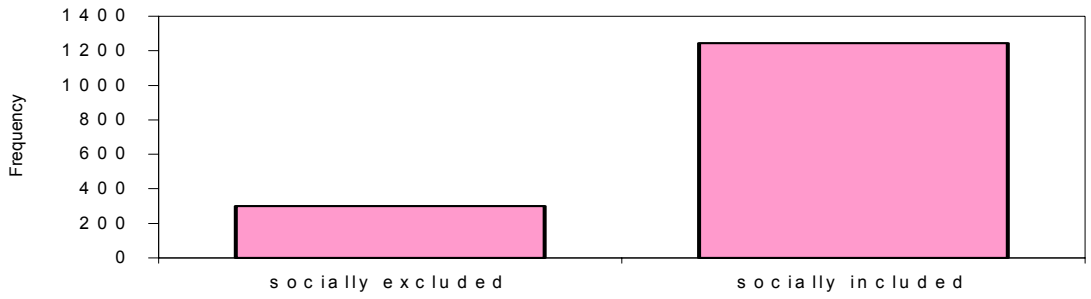


Employment and Social Inclusion (Figure 3)

Only 22% of respondents were in paid work, with only 13% of these in full time work. 647 (29%) were retired, 297 (13%) were permanently sick or disabled, 197 (13%) were looking after the family, either part or full time, 107 (7%) were unemployed, 51 (3%) were in education, full or part time and 44 (3%) classed themselves as employed other. These percentages do not add up to 100 since many respondents ticked more than one category. These figures were further combined to compute socially excluded (unemployed, permanently sick and disabled) and socially included variables (employed, looking after family, in education and employed other). By this method 80.5% of respondents were classified as being socially included and 19.5% as being socially excluded. There was a high rate of non-response for the employment question with approximately 10% of adults not ticking any of the categories. Government produced statistics on deprivation for the South

West of England show that 8 of the 12 electoral wards of Torbay are in the most deprived national quartile (http://www.devon.gov.uk/dris/commstat/csta_mnu.htm1).

Figure 3 – Social Inclusion



Health Risk Behaviours

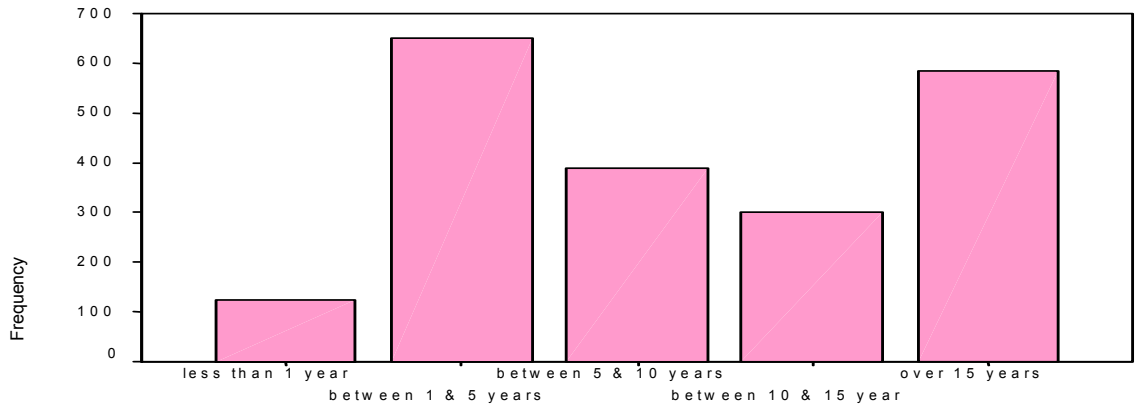
A very high proportion (37%) of the adult population smoked. Similar smoking rates were found among participants in the Watcombe study[1]. There was a high non-response rate of 11.7 % for this question. The largest percentage of respondents (26.9%) drink once or twice a week, with 21% claiming never to drink and 20% drinking once or twice a month. Only 7% of the population drink every day or less than once or twice a year. Thus the majority are moderate drinkers. The smoking and drinking questions also had a high non-response rate of almost 10%.

HOUSEHOLD CHARACTERISTICS

Time lived in house (Figure 4)

28.5% of respondents had lived at their address for 15 years or more. 31.7% had lived there for between 1 and 5 years, while 19 and 14.7% had lived in their homes for 5-10 and 10-15 years respectively. Thus the sample was biased toward those who had lived in their homes for a long time and a reasonably short time of between 1 and 5 years.

Figure 4 – Time in house frequency distributions

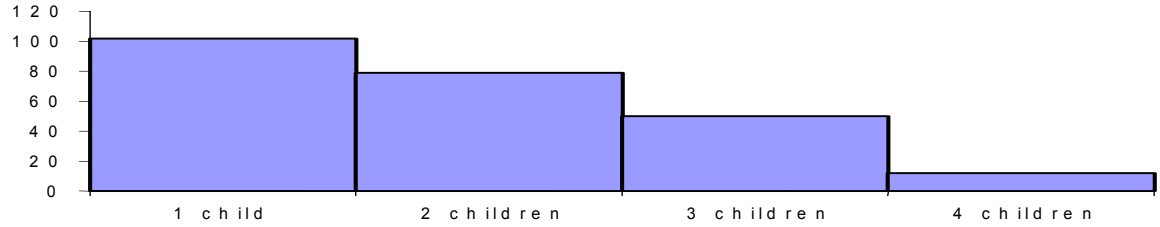


The time lived in a dwelling was strongly positively associated with age (0.436).

Number of children in the house (Figure 5)

Twenty three percent of households contained children who were 16 years of age and under. The number of children in each household varied from 1 to 4. See Figure 5.

Figure 5 – Frequency distribution of number of children in household



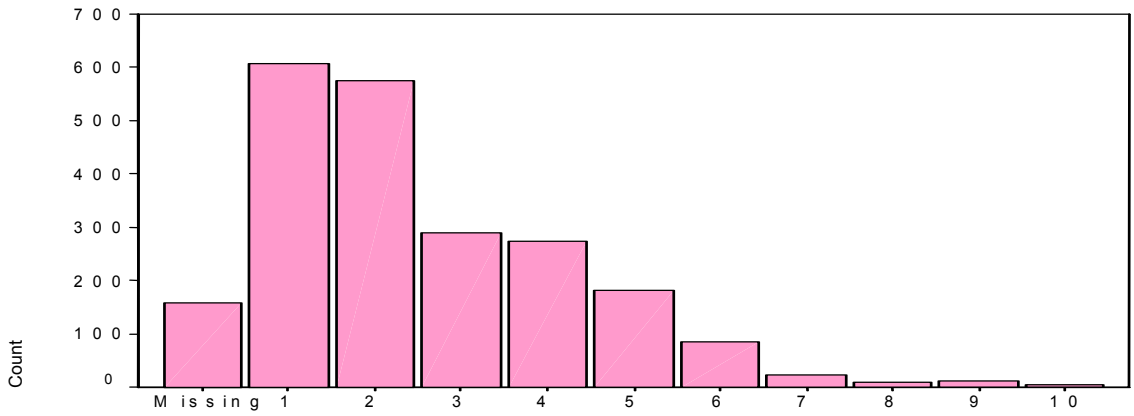
Number of people living in house (Figure 6)

The number of people living in each household varied from 1 person to 10 persons. 84.8% lived in households of between 1 and 4 people, the mean number being 2.68.

Descriptive Statistics

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
People in house	2061	1	10	2.68	1.678

Figure 6 – Frequency distribution of number of children in household

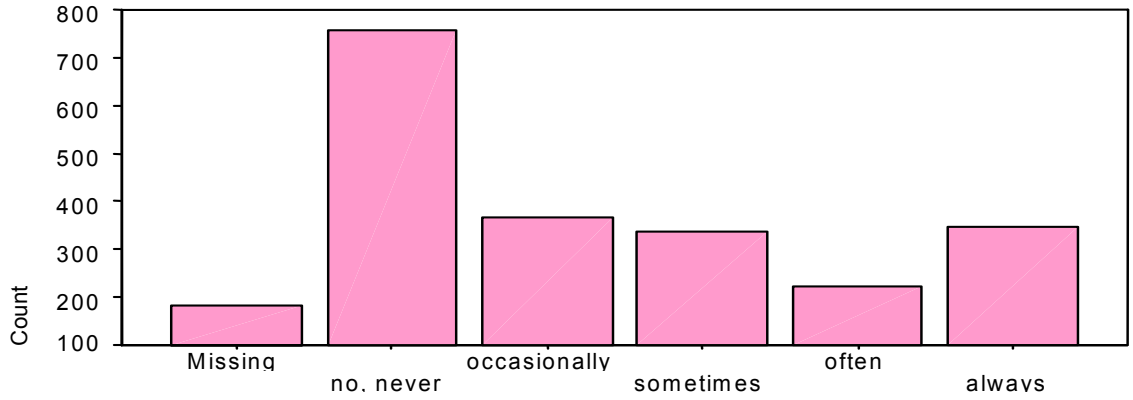


HOUSING CONDITIONS

Temperature (Figure 7)

Although nearly 38% of responding households lived in a dwelling that was never too cold, over a quarter of respondents (27%) said that they lived in a house that was often or always too cold.

Figure 7 – House too cold



Visible Mould (Figures 8 & 9)

This variable was measured in two ways. First, respondents were merely required to say whether they had visible mould in their home. If they did, they then had to specify which rooms it affected. These rooms were added together to make a total mould score. A very high percentage of respondents (42%) indicated that they had some visible mould in their dwelling. The number of mouldy rooms, which ranged from 0 to 5, roughly quantified the amount of mould.

Although over 57% had no visible mould in their homes, over 30% said they had 1 or 2 mouldy rooms.

Figure 8 – Visible Mould

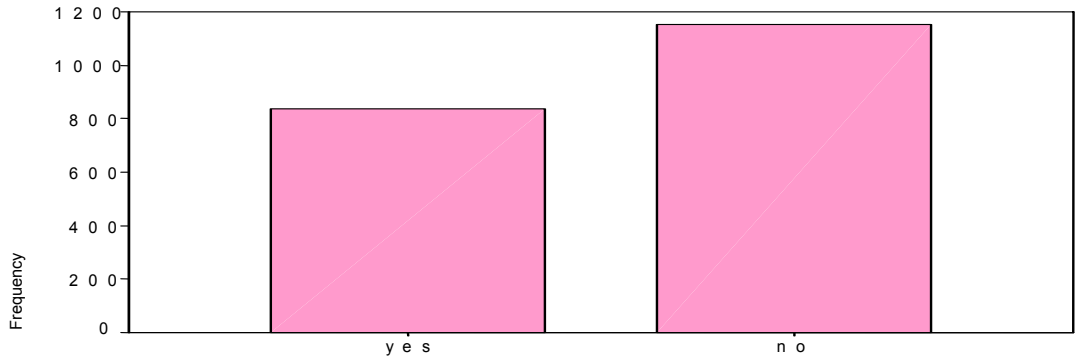
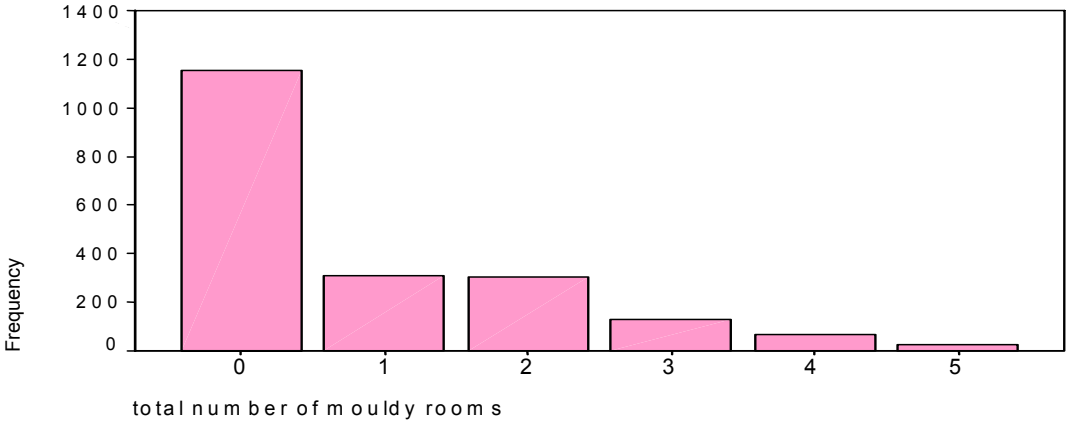


Figure 9 - Number of mouldy rooms frequency distribution



House Damp (Figure 10)

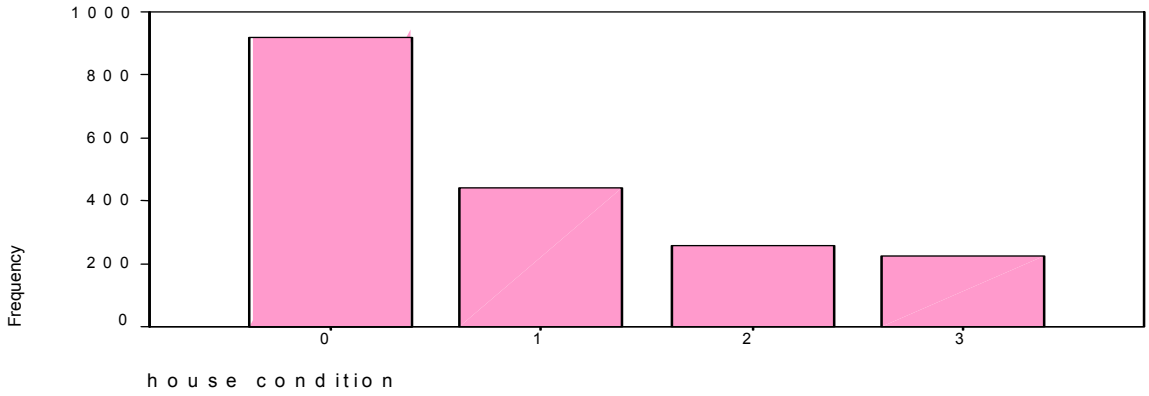
Although nearly half the sample (48.9%) reported that they never had a damp house, over 30% reported that their home was sometimes or occasionally damp.

Figure 10 – House Damp

Overall Condition Measure (Figure 11)

A final measure of housing conditions was constructed by adding together the presence of cold, damp and mould to get a picture of the severity of the housing conditions. This measure ranged from 0 where neither cold, mould nor damp existed to 3 where all three existed. Half the sample indicated that they had 1, 2 or 3 of the conditions, indicating very poor housing conditions across the sample.

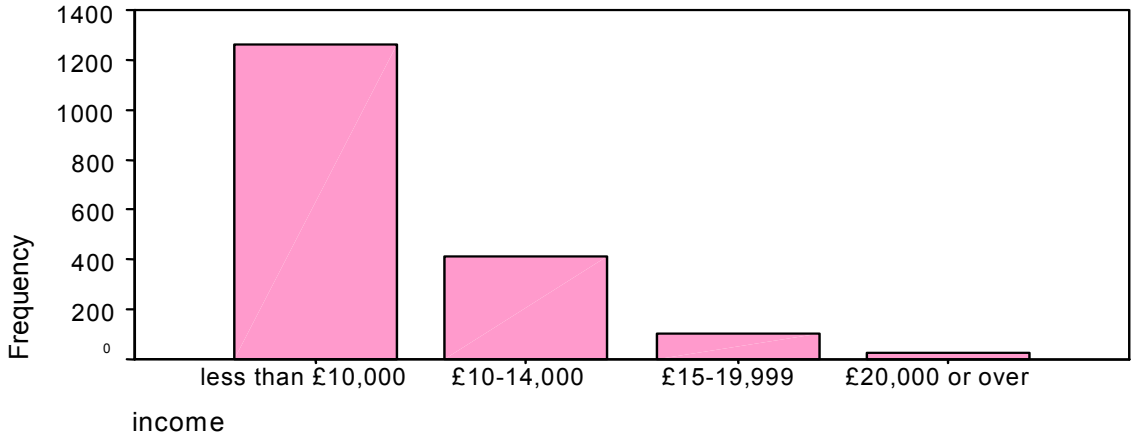
Figure 11 – House condition



INCOME AND BENEFITS (Figure 12)

70% of households received less than £10 000 income per annum.

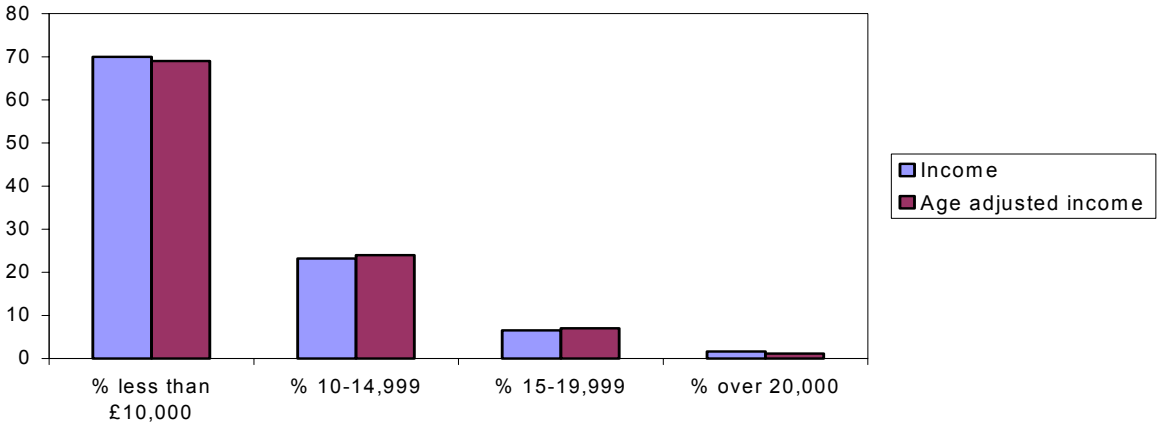
Figure 12 - Income



A statistic was also calculated for the income of those of working age, to see whether the income results were biased by the age distribution of the sample. However, the percentage

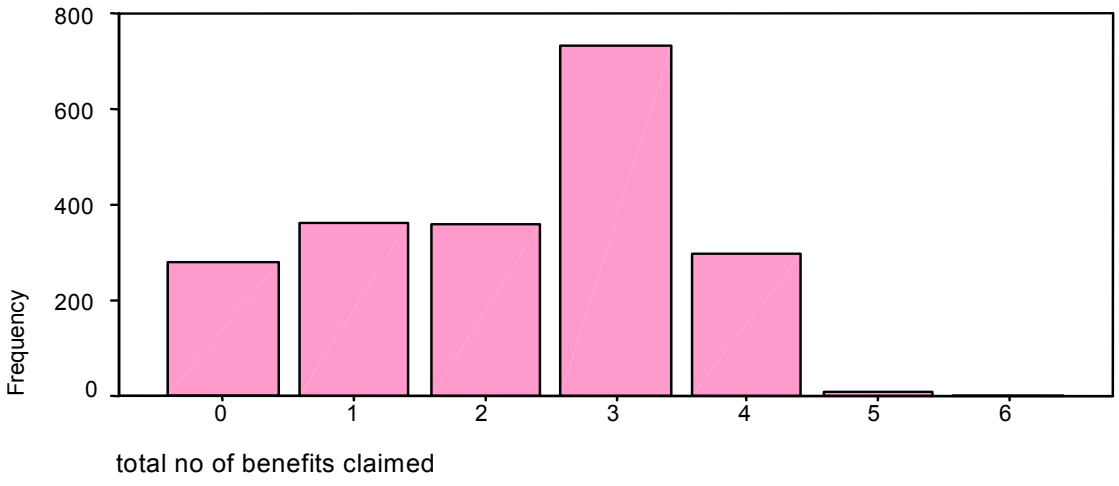
on less than £10,000 per annum only dropped to 68.8%, so income was no biased by age. See Figure 13.

Figure 13 – Income and Working Age Income



The benefit categories ticked were added together to give a total benefit score, giving a rough measure of deprivation levels. Only 13.6% of our sample did not claim any benefits, with the largest proportion (35.9%) claiming 3 of the 5 benefits. The most commonly claimed benefits were housing benefit (64.9%) and council tax benefit (63.2%). See Figure 14.

Figure 14 – Total number of benefits claimed



HEALTH VARIABLES

Individual Conditions

The most frequent illness reported was arthritis and rheumatism, with 482 cases (21.7% of the sample), followed by asthma with 474 cases (21.4% of the sample), high blood pressure

441 (19.9% of the sample), tiredness and fatigue 411, headache 388, anxiety & depression 324, angina 236, chronic bronchitis/emphysema 119, diabetes 114, stroke 93 and finally epilepsy with 40 cases. The other illness box was frequently used and recorded 453 cases.

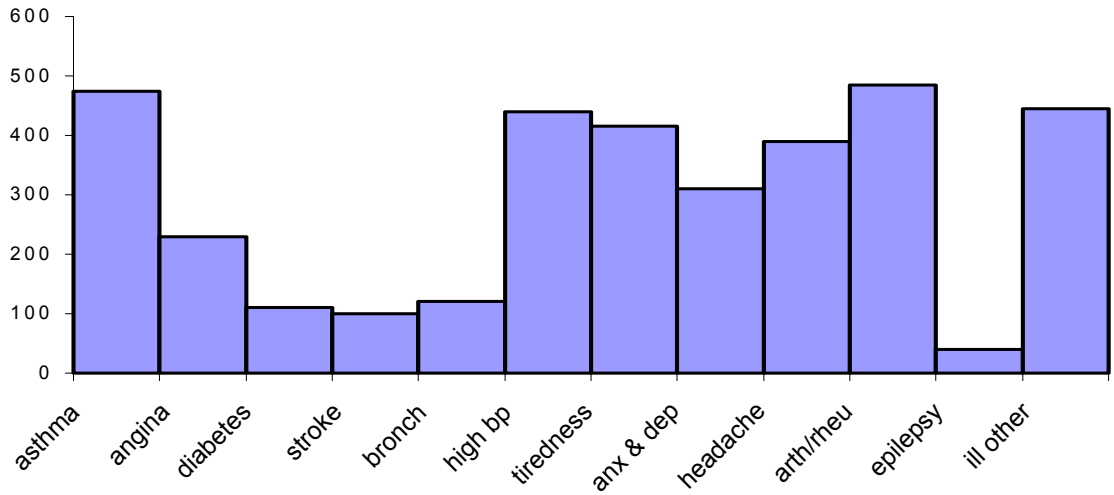
Our population appeared to be an unusually sick one when compared with those produced by the Health Survey for England and Morbidity Statistics from General Practice (MSGP) (see Table 1). The only exception was chronic bronchitis and emphysema where the prevalence was lower than that in the MSGP. The greatest differences occurred in epilepsy, high blood pressure, angina, asthma, stroke and arthritis and rheumatism where the RHT survey produced rates that were at least 3 times as high as the other surveys. It did not prove possible to find published prevalence rates for tiredness or headaches, so no comparisons were made here. See Figure 15 for illness prevalence.

Table 1 – Comparison of survey results and results from other sources

Condition	% RHT Survey	% Other Sources *
Diabetes	5.1	3
Anxiety/Dep	14.6	8
Epilepsy	1.8	0.6
High Blood Pressure	19.9	6.2
Angina	10.6	3.1
Asthma	21.4	7.5
Chronic Bronch & Emphysema	5.4	8.4
Stroke	4.2	0.9
Arthritis/Rheu	21.7	4.4

* Health Survey for England 1996 or 4th Morbidity Statistics from General Practice (1992)

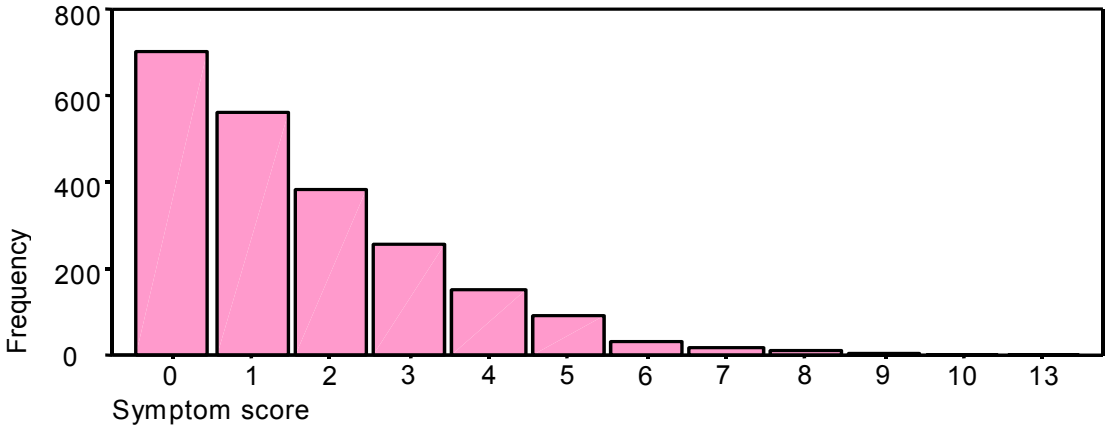
Figure 15 – Illness Prevalences



Symptom Score

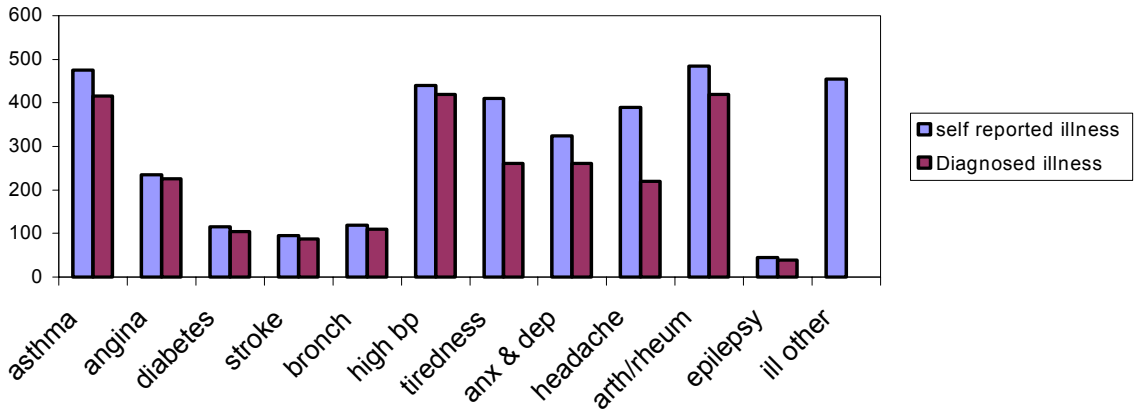
The conditions checklist was collapsed into a symptom score, with each illness ticked adding one point to the symptom score. Very high rates of illness were revealed, with only 32% of respondents with none of the listed illnesses, 25% with 1 illness, 17% with 2 illnesses, and the remaining percentage had 3 illnesses or more. The maximum possible number of illnesses was 12. See Figure 16

Figure 16 – Number of conditions



An attempt was made to detect self-diagnosis of conditions by calculating the decrease in prevalence when the criteria of attending a doctor or obtaining a prescription were used. This separated subjective from objective diagnosis of illness. As can be seen from Figure 17 the prevalence of most illnesses showed only a slight reduction using the validating criteria. However, tiredness and headache showed significant differences. This is likely to be because many people would not visit a doctor to seek advice for these conditions and prescriptions are also often inappropriate.

Figure 17 – Prevalence of self-reported and clinically diagnosed illness



An age profile was also tabulated for each illness to determine which age groups suffered most from each illness (see Table 2). The age groupings chosen varied with the known pattern for the illness. For instance, for stroke those under middle age were grouped together while those older were separated out into several groups.

Table 2 – Illness prevalences by Age Group

	Age Group	%
Asthma	5 years and under	10.8
	6-11 years	13.1
	12-16 years	9.8
	17-45 years	26.6
	46 years and over	39.9
Angina	40 years and under	2.1
	41-50 years	0.4
	51-60 years	11
	61-70 years	18.2
	71 years and over	68.2
Diabetes	10 years and under	0.9
	11-20 years	1.8
	21-50 years	9.7
	51 years and over	87.7
Tiredness	20 years and under	10.9
	21-40 years	23.6
	41-60 years	29.4
	61 years and over	14.8
Headache	20 years and under	18.6
	21-40 years	26.8
	41-60 years	29.1
	61-70 years	11.1
	71 years and over	14.4
Epilepsy	10 years and under	17.5
	11-20 years	7.5
	21-40	15
	41-60	27.5
	61 years and over	32.5

	Age Group	%
Stroke	40 years and under	1.1
	41-50 years	2.2
	51-60 years	7.5
	61-70 years	22.6
	71 years and over	76.3
Bronch & Emphy	20 years and under	13.4
	21-40 years	8.4
	41-60 years	19.3
	61 years and over	58.8
High BP	20 years and under	0.9
	21-40 years	3.4
	41-60 years	19.7
	61 years and over	76
Anx/Dep	20 years and under	5.9
	21-40 years	29.6
	41-60 years	37
	61 years and over	27.5
Arth/Rheu	20 years and under	6
	21-40 years	5.4
	41-60 years	15.3
	61-70 years	21.2
	71 years and over	52.1

Other Illness

An analysis of a 35% sample of the illnesses entered in the 'Other illness' box was conducted. A very large spread of different illnesses was found with the majority only being

found once or twice. The following conditions were mentioned more than three times in the sample of 159 questionnaires analysed. None of the conditions appeared often enough to appear in a future checklist.

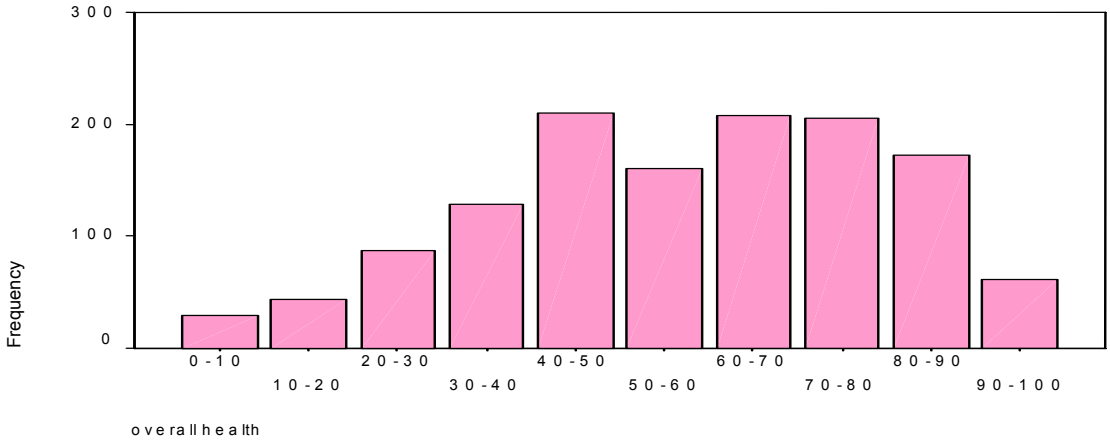
Table 3 – other illnesses

Condition	Number of occurences
Ankylosing Spondilitis	3
Use of diuretics	3
Leg ulcer	3
Deafness	3
Learning difficulties	3
Frequent chest infections	4
Gall bladder problems	4
Frequent influenza	4
Frequent ear infection	5
Irritable bowel syndrome	5
Under active thyroid gland	5
Frequent D & V	5
High cholesterol	6
Osteoporosis	7
Frequent colds/coughs	7
Back problems	8

EuroQol (Figure 18)

21% of respondents did not complete this question so the results recorded must be viewed with caution. It is assumed that respondents found the thermometer format difficult to use. Out of those who responded, the majority fell in the middle to high score range, and thus rated their health as moderate to good. A score of between 0-30 may be regarded as poor overall health, 31-60 medium overall health and 61 and higher good overall health.

Figure 18 – Overall health

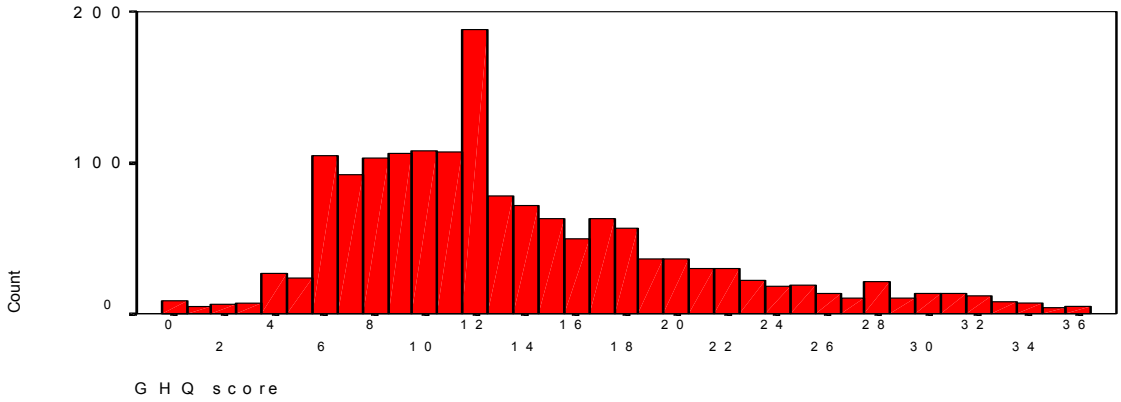


Mental Health (Figure 19)

The GHQ 12 was scored as a pure score where the 4 possible answer categories for each question were scored 0,1,2,3, as recommended in the User's Guide to the GHQ (Goldberg & Williams). The non-response rate for most of the 12 questions was approximately 10%. As can be seen from Figure 19 the distribution was negatively skewed, showing that on the whole respondents had few, if any, mental health problems. However, a sizeable proportion suffer from poor mental health. The peak for a score of 12 is an artefact produced by respondents ticking the second option (same as usual), and thus scoring 1 for each of the 12 questions.

	Minimum	Maximum	Mean	Std. Deviation
ghqscore	0	36	13.50	6.836

Figure 19 – GHQ 12 Score Frequency Distribution



ASSOCIATIONS WITH POOR HEALTH

Univariate Analyses

Associations, significant at the 0.05 level, are shown in Table 4.

Individual conditions. All the conditions were positively associated with **age** except anxiety and depression, headache and epilepsy. Asthma was negatively associated with age. This is an expected result since all the positively associated conditions are more common in old age.

Only high blood pressure, tiredness, anxiety and depression, headaches and arthritis and rheumatism were associated with **gender**, where women were more likely than men to suffer from these conditions.

Several conditions (angina, diabetes, stroke, bronchitis, high blood pressure, arthritis and rheumatism and epilepsy) were negatively associated with being in **paid work**. Angina, high blood pressure and arthritis and rheumatism were negatively associated with being in **education**. Asthma, tiredness, anxiety and depression and headaches were positively associated with **looking after the family**, whereas angina, diabetes, stroke, high blood pressure and arthritis associated negatively. Angina, high blood pressure and arthritis and rheumatism were negatively associated with **unemployment**, whereas epilepsy had a positive association. Being **permanently sick and disabled** was highly significantly associated with all the conditions, except asthma, which was negatively associated. **Retirement** was positively associated with angina, diabetes, stroke, high blood pressure and arthritis and rheumatism, and negatively with asthma, tiredness, anxiety and depression and headache. Many of the employment status associations with illness are a result of their connection with age, since age is also negatively associated with paid work, education and unemployment, and positively associated with being retired and permanently sick and disabled.

Angina and anxiety and depression were positively associated with **smoking**, and diabetes and arthritis and rheumatism were negatively so. **Drinking** was positively associated with angina, diabetes, high blood pressure, tiredness, arthritis and rheumatism. These results suggest that drinking is a more useful predictor variable than smoking.

The **amount of time lived in the dwelling** associated negatively with asthma, chronic bronchitis, tiredness, anxiety and depression, headache and epilepsy. It had a positive association with high blood pressure and arthritis and rheumatism. The **number of people who lived in the household** had a positive association with asthma, tiredness, headache

and epilepsy, but negatively with angina, high blood pressure and arthritis and rheumatism. This is also likely to be a function of age. Older people are more likely to have lived in a dwelling for longer and to live in smaller households.

Asthma, chronic bronchitis, tiredness, anxiety and depression, headache and epilepsy were all positively associated with a **cold house**. However, high blood pressure and arthritis and rheumatism were negatively associated. Asthma, tiredness, anxiety and depression, headache and epilepsy were positively associated with the presence of **mould** in the house, and high blood pressure and arthritis and rheumatism negatively associated. Living in a **damp** house is positively associated with asthma, chronic bronchitis, tiredness, anxiety and depression, headaches and epilepsy. It is negatively associated with angina, high blood pressure and arthritis and rheumatism. The negative associations are likely to be a function of age since angina, arthritis/rheumatism and high blood pressure are highly positively associated with age, according to the univariate analyses older people were less likely to live in cold, mouldy and damp homes.

Income was negatively associated with **angina, high blood pressure** and **arthritis and rheumatism** but positively associated with **headache**. This is a function of age since age is strongly positively associated to all these conditions and negatively associated with income. The number of benefits claimed was positively associated with **all the conditions** except high blood pressure.

Symptom Score. There was a positive association with **age**, being **permanently sick and disabled** and **retirement** and well as **total benefits claimed**. It is negatively associated with being in **paid work** or **education** or being **unemployed**, as well as with **drinking** and the **number of people in the house**. A higher symptom score was also associated with **gender**, where women were more likely to have a higher number of symptoms than men. These results are to be expected, since the number of conditions a respondent has is bound to rise with age.

GHQ Score 12. A high GHQ score is positively associated with looking after the family, being permanently sick and disabled, smoking, the number of people in the house and all three of the housing conditions, as well as with the number of benefits claimed. It is negatively associated with age, retirement, and amount of time lived in the house.

There were many interactions between the predictor and outcome variables. Most of the conditions were highly positively associated with each other, although asthma showed slightly weaker associations. The symptom score is also highly negatively associated with the EuroQol score and highly positively associated with the GHQ score.

Table 4 - Univariate analyses to look at the relationships between the outcome variables and possible predictor variables

	Asthma	Angina	Diabetes	Stroke	Bronch	High BP	Tired	Anx/dep
Age	<.001[1]	<.001[1]	<.001[1]	<.001[1]	<.001[1]	<.001[1]	<.001[1]	.009[1]
Sex	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	.001[3]	<.001[3]	.002[3]
Paid work	NS[3]	<.001[3]	.001[3]	<.001[3]	.010[3]	<.001[3]	NS[3]	NS[3]
Education	NS[3]	.008[3]	NS[3]	NS[3]	NS[3]	<.001[3]	NS[3]	.028[3]
Fam care	<.001[3]	<.001[3]	.010[3]	.003[3]	NS[3]	<.001[3]	<.001[3]	<.001[3]
Unempl	NS[3]	.006[3]	NS[3]	NS[3]	NS[3]	.005[3]	NS[3]	NS[3]
Perm sick	<.001[3]	<.001[3]	.012[3]	<.001[3]	<.001[3]	.003[3]	<.001[3]	<.001[3]
Retired	<.001[3]	<.001[3]	<.001[3]	<.001[3]	NS[3]	<.001[3]	<.001[3]	<.001[3]
Empl other	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]	NS[3]
Smoke	.038[3]	<.001[3]	.006[3]	NS[3]	NS[3]	<.001[3]	NS[3]	<.001[3]
Drink	NS[3]	<.001[3]	.001[3]	<.001[3]	NS[3]	<.001[3]	.039[3]	NS[3]
Time in house	<.001[5]	<.001[5]	.009[5]	.016[5]	NS[5]	<.001[5]	NS[5]	.012[5]
People in house	<.001[5]	<.001[5]	<.001[5]	<.001[5]	.003[5]	<.001[5]	NS[5]	.002[5]
House cold	.003[5]	<.001[5]	<.001[5]	.012[5]	NS[5]	<.001[5]	NS[5]	<.001[5]
House damp	<.001[5]	<.001[5]	.001[5]	.003[5]	NS[5]	<.001[5]	NS[5]	.012[5]
Vis mould	<.001[3]	<.001[3]	.007[3]	<.001[3]	NS[3]	<.001[3]	.045[3]	NS[3]
Income	NS[5]	<.001[5]	<.001[5]	<.001[5]	NS[5]	<.001[5]	NS[5]	NS[5]
Total benefits	<.001[5]	<.001[5]	NS[5]	<.001[5]	<.001[5]	NS[5]	.003[5]	.001[5]

	Headache	Arth/rheu	Epilepsy	Other ill	GHQ score	Symp score	EuroQol
Age	.005[1]	<.001[1]	NS[1]	NS[1]	r=-0.111, p<.001[2]	r=0.317, p<.001[2]	r=-0.155, p<.001[2]
Sex	.001[3]	<.001[3]	NS[3]	NS[3]	NS[1]	<.001[1]	.003[1]
Paid work	NS[3]	<.001[3]	.030[3]	.049[3]	.001[2]	<.001[2]	<.001[2]
Education	NS[3]	<.001[3]	NS[3]	NS[3]	NS[4]	.016[4]	.022[4]
Fam care	<.001[3]	<.001[3]	NS[3]	NS[3]	<.001[4]	NS[4]	NS[4]
Unempl	NS[3]	.001[3]	.001[3]	NS[3]	.033[1]	.035[1]	NS[1]
Perm sick	NS[3]	<.001[3]	<.001[3]	<.001[3]	<.001[1]	<.001[1]	<.001[1]
Retired	<.001[3]	<.001[3]	NS[3]	NS[3]	<.001[1]	<.001[1]	NS[1]
Empl other	NS[3]	NS[3]	NS[3]	NS[3]	NS[1]	NS[1]	NS[1]
Smoke	.029[3]	<.001[3]	NS[3]	NS[3]	<.001[1]	NS[1]	NS[1]
Drink	.045[3]	<.001[3]	NS[3]	NS[3]	.021[4]	<.001[4]	<.001[4]
Time in house	.014[5]	<.001[5]	NS[5]	NS[5]	r=-0.141, p.001[6]	NS[6]	NS[6]
People in house	<.001[5]	<.001[5]	NS[5]	NS[5]	r=0.100, p<.001[6]	r=-0.211, p<.001[6]	r=0.109, p<.001[6]
House cold	<.001[5]	<.001[5]	NS[5]	NS[5]	r=0.142, p<.001[6]	NS[6]	NS[6]
House damp	<.001[5]	<.001[5]	NS[5]	NS[5]	r=0.161, p<.001[6]	NS[6]	NS[6]
Vis mould	<.001[3]	<.001[3]	NS[3]	NS[3]	<.001[1]	NS[1]	.015[1]
Income	.016[5]	<.001[5]	NS[5]	NS[3]	NS[6]	NS[6]	r=0.097, p
Total benefits	.002[5]	<.001[5]	<.001[5]	<.001[5]	r=0.139, p<.001[6]	r=0.155, p<.001[6]	r=-0.250, p<.001[6]

[1] t-test [2] Pearson's correlation [3] Chi-squared test [4] ANOVA
[5] Mann-Whitney test [6] Spearman's correlation NS = Not significant at p=0.05

Univariate Analysis of Variance

One of the main objectives of the survey was an attempt was to link housing conditions to the dependent variables:- illnesses, GHQ12 score, EuroQol score and symptom score. A univariate analysis of variance was used to find out how much of the variance in the dependent variables could be accounted for by housing conditions. A model was built using the three housing conditions alongside smoking and drinking, since they were considered 'purer' than the other available confounding factors of social exclusion, income and benefits claimed. These factors are inter-linked with too many others to provide a clear picture. Smoking and drinking, however, are health risk behaviours and can be considered to be independent of other possibly confounding factors. The ANOVA results are also useful to find out how the five factors (three housing conditions and smoking and drinking) interacted with each other and how this effected the dependent variables. Only main effects and two-way models were used, since three way models were extremely difficult to interpret. The predictor variables of drinking, house cold and house damp were split into groups to make interpretation easier.

Only adults were used for this analysis, since children did not answer the EuroQol, GHQ or the health risk behaviour questions. The variables of damp, cold and drinking were collapsed into smaller groups to make interpretation of the results simpler. Significance at the 0.05 level was used and only significant results have been entered into Table 5. None of the variance of chronic bronchitis and emphysema or epilepsy was explained by housing conditions or smoking and drinking or their possible interactions, in spite of significant results shown in the previous analyses. See Table 5 below for the results.

Table 5 – Analysis of Variance

	ARTH/RHEU		**ANX/DEP**		**TIREDNESS**		**HIGH BP**		**ASTHMA**		**EUROQOL**	
R Sqrd Value	0.082		0.067		0.034		0.06		0.029		0.061	
	F	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**
SMOKE	20.44	0.00	30.45	0.00			18.19	0.00	5.239	0.022		
DRINK	10.15	0.00	7.999	0.00	3.811	0.022	3.803	0.023			15.316	0.00
HSEMLD											9.14	0.003
HSEDMP							4.056	0.044				
HSECLD												
SMOKE*DRINK												
SMOKE*HSEMLD												
SMOKE*HSECLD												
SMOKE*HSEDMP			3.847	0.05	3.696	0.05						
DRINK*HSEMLD	3.062	0.05										
DRINKE*HSEDMP												
DRINK*HSECLD											2.608	0.034
HSEMLD*HSEDMP					7.959	0.005			9.977	0.002		
HSEMLD*HSECLD												
HSEDMP*HSECLD												

	GHQSCR		ANGINA		DIABETES		STROKE		HEADACHE		SYMSCORE	
R Sqrd Value	0.078		0.043		0.036		0.027		0.043		0.043	
	F	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**	**F**	**Sig**
SMOKE	36.91	0.00	6.876	0.01	5.247	0.022						
DRINK	5.669	0			4.942	0.007			4.473	0.012	11.91	0.00
HSEMLD	4.482	0.03										
HSEDMP							5.525	0.019				
HSECLD												
SMOKE*DRINK											4.416	0.012
SMOKE*HSEMLD												
SMOKE*HSECLD												
SMOKE*HSEDMP	6.784	0.01										
DRINK*HSEMLD			3.512	0.03								
DRINKE*HSEDMP												
DRINK*HSECLD												
HSEMLD*HSEDMP												
HSEMLD*HSECLD												
HSEDMP*HSECLD							4.016	0.018				

These results clearly show that nearly every dependent variable showed a significant main effect with smoking, drinking or both. The exception was stroke. The only significant housing condition main effects are high blood pressure and stroke with house damp, GHQ score and EuroQol with house mould. There were, however, several significant interaction effects. Symptom score showed a significant result with smoking*drinking, which is perhaps not surprising since the variable consists of the number of conditions added together and smoking and drinking combined are likely to cause a greater number of illnesses. Both arthritis/rheumatism and angina show a significant effect with drinking*house mould. In both cases, those who live in mouldy houses are more likely to have both illnesses than those who do not. The amount of alcohol drunk moderates this relationship since those who drink frequently show much less difference in levels of illness than those who never drink. Other interaction effects were found between drink*house cold and EuroQol scores, and house mould*house damp and tiredness and asthma and finally stroke and house damp*house cold.

Profile of GHQ score variance as explained by housing condition and health risk behaviour model

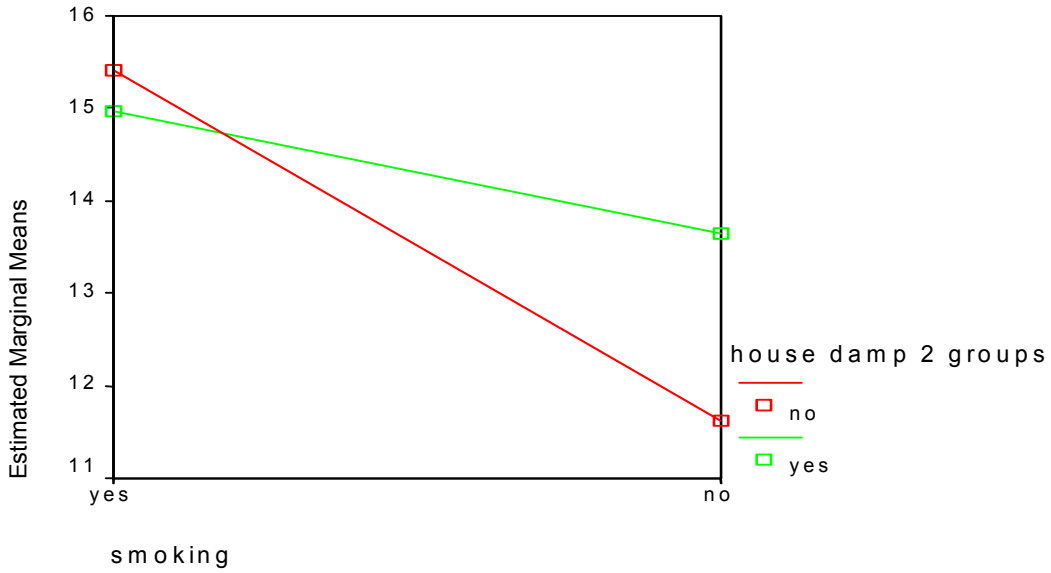
The GHQ score variance is the most appropriate dependent variable to choose when attempting to link housing conditions with mental health. Only a small amount of the variance in the GHQ scores was explained by our chosen model. However, there were several main effects and interaction effects among the five factors of the model. Significant main effects were found with both smoking and drinking, which was also true of most of the other dependent variables. Another important main effect was also found with visible mould. GHQ

score was the only dependent variable apart from the EuroQol score to show this result. This finding supports previous research that has found a link between poor mental health and mould. Surprisingly no such link was found between anxiety and depression in our survey and household mould, although the link with the EuroQol score shows that perceived global health and wellbeing is affected by mould in the home.

A significant interaction effect was also found between the GHQ score and smoking interacting with house damp, see Figure 20 below.

Figure 20 below clearly shows that those living in damp houses have a higher mean GHQ score than those who live in dry houses and those who smoke also have higher mean GHQ scores than non-smokers. However the significant interaction between smoking and damp allows further exploration. Non-smokers in damp houses have much higher mean GHQ scores than non-smokers in dry houses (13.7 and 11.5). However, the interaction occurs because smokers in damp houses show a lower mean GHQ score than smokers in dry houses (15-15.4): the difference is smaller than for non-smokers, but it is significant. There are many possible reasons for this. For instance, if the dampness is caused by condensation this is likely to be improved by ventilation such as open windows. Smokers are more likely to have their windows open than non-smokers, thus drying the internal environment of the house, resulting in an improvement in mean GHQ scores. Dampness on its own, however, does not account for a significant amount of variance in GHQ scores. Similar interaction effects were found between smoking*house damp and anxiety and depression and tiredness. These two variables can be assumed to be similar to the GHQ score, thus reinforcing the finding that dampness when combined with smoking has a deleterious effect on mental health.

Figure 20 – GHQ scores



Regression Analysis

Regression analysis was used to assess the independent associations between the predictor and outcome variables. See Tables 6 and 7 below for the results. The most significant predictor variables were selected by SPSS and are listed in order of importance. A significance level of 0.05 was used.

Table 6 - Multiple regression of continuous outcome variables with predictors

Dependent Variable	Beta	R Squared	**Dependent Variable**	Beta	R Squared
Symptom Score		**0.101**	GHQ Score		**0.108**
Predictors:-			**Predictors:-**		
Age	**0.244**		**social inclusion**	**0.174**	
Total Benefits	**0.164**		**smoking**	**0.136**	
Social Inclusion	**0.13**		**visible mould**	**0.107**	
Income	**0.091**		**time in house**	**-0.092**	
Sex	**0.08**		**total benefits**	**0.088**	
Drinking	**-0.073**		**sex**	**0.064**	
Time in House	**-0.063**		**drinking**	**-0.057**	
EQ5D VAS Score		**0.172**			
Predictors:-					
Social Inclusion	**-0.249**				
Age	-0.244				
Total Benefits	-0.158				
Visible Mould	-0.152				
Time in House	**0.095**				
Drinking	0.09				
Sex	-0.077				

Table 7 - Logistic regressions for categorical outcome variables with predictors

	Asthma	Angina	Diabetes	Stroke	Bronch	High BP
R sq	0.04	0.31	0.11	0.20	0.09	0.19
Age		OR=1.04, p<.001	OR=1.04, p<.001	OR=1.06, p<.001		OR=1.04, p<.001
Sex		OR=0.59, p=.014				
Paid work						
Education						
Fam care	OR=0.878, p<.001					OR=1.10, p=.031
Unempl						
Perm sick	OR=0.910, p=.001	OR=0.81, p<.001	OR=0.86, p<.001	OR=0.76, p<.001	OR=0.82, p<.001	
Retired		OR=0.89, p=.028			OR=0.86, p=.001	
Empl other			OR=0.81, p=.03			
Smoke					OR=0.47, p=.013	
Drink						
Time in house					OR=0.80, p=.039	
People in house						
House cold						
House damp						
Vis mould						
Income						
Total benefits		OR=1.25, p=.017				

	Tired	Anx/dep	Headache	Arth/rheu	Epilepsy	Other ill
R sq	0.07	0.16	0.13	0.31	0.15	0.05
Age				OR=2.13, p<.001		
Sex	OR=1.69 , p=.005	OR=2.28 , p<.001		OR=1.85, p=.043		
Paid work				OR=1.85, p=.043		
Education					OR=0.73, p=.012	
Fam care			OR=0.91, p=.009	OR=1.18, p=.003		
Unempl						
Perm sick	OR=0.86 , p<.001	OR=0.84 , p<.001		OR=0.80, p<.001	OR=0.84, p=.027	OR=1.16, p<.001
Retired		OR=1.09 , p=.006	OR=1.14, p<.001			OR=1.06, p=.011
Empl other						
Smoke		OR=0.51 , p<.001		OR=1.58, p=.019		
Drink			OR=1.18, p=.011			
Time in house	OR=0.83 , p=.004	OR=0.82 , p=.006	OR=0.85, p=.039			
People in house					OR=0.56, p=.045	
House cold						
House damp						
Vis mould						
Income						OR=0.79, p=.035
Total benefits			OR=1.38, p<.001		OR=1.89, p=.027	

Notes: OR is Odds Ratio. Empty cells are all *non-significant* at p = 0.05.

Regression analysis shows that none of the major physical conditions or minor illnesses can be significantly predicted by any of the housing conditions. The major predictors for these physical conditions are age, sex, social inclusion and total number of benefits claimed. Measures of mental health and wellbeing can be predicted by one of the housing condition variables, of which visible mould is the most important and most strongly predicts wellbeing and GHQ score. It is also more weakly predictive of tiredness and symptom score. House damp is predictive for headaches and a cold house of anxiety and depression.

The amounts of variance explained by all the quoted independent variables are, in each case, fairly small.

DISCUSSION

Background Characteristics in Respondents and their Houses

The frequency data show that the respondents came from all age groups, in reasonable numbers. Nearly a quarter of households had resident children. More females responded in all age groups over 17 years of age. However, there were slightly more responses from male than female children. There is a tendency for females to respond more readily to postal surveys[36].

The population showed low levels of employment, with less than a quarter in paid work. When classified as either socially included or excluded, nearly 20% were classified as excluded socially. The population was financially deprived with very low incomes and were claiming a high number of benefits. The figures produced by the South West Public Health Observatory for the year 2000[37], show that 8 of the 12 electoral wards in Torbay are in the first national quartile (i.e. 24.7-74.3%) of people who are income deprived, and the other 4 wards are in the second national quartile (15.8%-24.6%). Our figures fit with this profile.

High proportions of the population are frequent smokers and drinkers.

The highest proportions of respondents had either lived in their home for a long time, or a relatively short time. Most households (84.8%) were small, with between 1 and 4 members.

In the main, housing conditions were very poor with over 25% living in a cold house, 42% having at least some visible mould and nearly a third living in a dwelling that was sometimes damp.

Both the population and the housing provide an excellent opportunity to examine the relationship between housing and health.

Outcome Characteristics - Main Findings

By comparison with the populations studied by other recent health status surveys, our population was in much poorer health, with all conditions (apart from chronic bronchitis and emphysema) being at least twice, and sometimes four times, as prevalent (see Results Table 3). The most prevalent conditions were arthritis and rheumatism and asthma, with epilepsy being reported least often. An analysis of responses in the 'Other illness' box produced a wide range of answers. None of them occurred often enough to merit a place in

a checklist. Picavet's 1998[36] study found that respondents to a postal survey reported slightly lower health status than those responding to an interview survey, so it is possible that morbidity rates are artificially raised here.

Self-diagnosis of conditions, as measured by the difference between the frequency of the conditions and the frequency of consulting a doctor and/or receiving a prescription for the condition, was not common for the more serious illnesses such as stroke, diabetes and chronic bronchitis and emphysema. Perhaps, not surprisingly, it was much more common for minor illnesses such as tiredness, headache and anxiety and depression, when tenants might be less likely to consult a health professional.

Most of the conditions, as expected, roughly followed the general pattern of becoming more prevalent with age. The exceptions were the psychosomatic illnesses of tiredness, headache and anxiety and depression, which were most prevalent among those of middle age, i.e. 41-60 years.

Most (54.1%) considered their overall health to be moderately good, with 33.6% considering it to be excellent and only 12.3% considering it to be poor. GHQ scores showed a slightly different pattern with 56.2% having good mental health, 35.6 % having moderate mental health and only 8.6% having poor mental health. Meltzer et al's[38] 1996 psychiatric morbidity survey found that 3 factors were strongly related to mental ill-health: employment status (those in paid employment were half as likely to suffer mental health problems as the economically inactive); drug and alcohol abuse; and gender (women showed higher incidences than men). He also found that people living in accommodation rented from local authorities or housing associations were twice as likely as owner-occupiers to have mental health problems. Our results seem to mirror those of Meltzer's survey.

The population of respondents is much sicker and poorer than the norm and lives in poorer housing. This is possibly partly a result of two health selection processes that presently operate in social housing: medical priority allocation of social housing and the selling off of quality social housing stock[39]. The 'Right to Buy' initiative of the 1980s has brought about significantly diminished good quality social housing stock, meaning that the remaining dwellings are often allocated on a medical priority basis. This would account for the high level of illness and permanently sick and disabled residents.

Housing Condition Predictor Associations with Outcome Variables - Main Findings

Table 6 in the Results section shows that, *all three housing conditions were positively associated with the three psychosomatic conditions* i.e. anxiety and depression, headache and tiredness. Regression analysis (Table 6) shows that only the GHQ is predicted by the housing condition predictor variables. Although the univariate analyses showed a large number of associations, it would appear that they are due to the strong associations with age and income. High blood pressure and arthritis and rheumatism were negatively associated with all three housing conditions. This is probably because of the strong positive correlation that both illnesses have with age, since in our sample age is negatively correlated to poor housing conditions and the elderly are thus less likely to live in substandard housing. This is possibly due to the high percentage of sheltered housing that is specifically designed for the elderly. Interestingly, symptom score was not significantly associated with any of the housing conditions and thus poor housing appeared to have no influence on the number of conditions from which people suffered; it just makes certain conditions more likely.

GHQ score is positively associated with all three of the housing conditions, with very similar correlation sizes showing for each condition. The strongest association is with house damp, although the difference is marginal. Surprisingly, EuroQol scores did not correlate with to any of the housing conditions, even though they are strongly associated with both GHQ score and symptom score.

All illnesses have a psychological element. however, it is fair to assume that illnesses such as headache, tiredness and anxiety and depression have a greater psychosomatic element than conditions such as diabetes or stroke. The univariate analysis confirms this assumption since the three psychosomatic conditions show much stronger associations with GHQ score than any of the other conditions. It is therefore possible to conclude that illnesses which are strongly associated with mental health are also most highly associated with housing conditions. The strong association between the GHQ score and all the housing conditions supports this theory.

Analysis of Variance in Outcome Variables due to Predictor Variables

Care should be taken in the interpretation of these results since the amount of variance explained is small. However, all the results discussed below were significant at the 0.05 level.

Only the main effects of damp and mould accounted for a significant proportion of the variance in any of the dependent variables. Damp, for the variance in high blood pressure and stroke, and mould for the variance in GHQ and EuroQol scores.

There were, however, several significant interactions. Where a significant interaction was found, further analysis of variance was carried out by splitting one of the independent variables into groups to explore the meaning of its interaction with the other independent variable. The interaction of drinking*mould was significant for two outcome variables; arthritis/rheumatism and angina. In both these cases significant variance in the outcome variables was only explained when mould was combined with no drinking. Further investigation is probably needed to help produce a satisfactory explanatory theory. The two significant interactions of mould*damp and damp*cold which explain significant amounts of the variance for asthma, tiredness and stroke, respectively, are also difficult to explain. Variance of the three illnesses is only affected if both the relevant housing conditions are present in the dwelling. Logically one might expect this relationship to be additive, i.e. if damp and mould exist together more of the condition in question should result. The interaction graphs did not show this, however. Higher levels of asthma and tiredness resulted when damp existed in the absence of mould, with the lowest rates resulting from no damp and no mould. Further investigation is required to throw light on these findings. The significant interaction between damp*cold and stroke seems easier to explain. Cold conditions can increase the blood pressure and therefore the viscosity of the blood making the possibility of suffering a stroke more likely. If the dwelling is *not damp*, stroke is <u>much more likely</u> if the house is *sometimes cold*, rather than never or always. If the dwelling is *damp* stroke is <u>slightly less likely</u> when *sometimes cold* rather than never or always cold. Therefore one might surmise that an occasional period of cold increases the risk of a stroke more in a dry than a damp house. The variance explained in EuroQol scores by the interaction of drinking*cold are only significant when cold is combined with moderate drinking. The difference in GHQ scores explained by the smoking*damp interaction is only significant when there is no smoking. The same significant interaction was found to explain the variance in anxiety and depression and tiredness, two variables that are highly correlated to GHQ scores. In both cases significant relationships were only found with housing damp when the respondents did not smoke. Smokers being more likely to have windows open, as detailed in the Results section, is a possible explanation for this relationship.

The Value of Housing Conditions as Predictors for the Health Variables

The results of the regression analysis clearly show that housing conditions are only good predictors of anxiety and depression, headache, tiredness, GHQ score, symptom score and

EuroQol scores. Illnesses with a more physical rather than psychological base cannot be predicted in this way. Mould seems to be the most useful predictor for measures of mental health and wellbeing. Again, caution should be exercised in interpretation since the R squared values are small.

Non-respondents

There is no available information about the non-respondents. Those with physical problems are more likely to respond to surveys and those with mental health problems are less so[37]. It is thus possible that the GHQ and EuroQol scores and the prevalence of the psychosomatic disorders are artificially low.

CONCLUSION

The results should be interpreted cautiously, since this is a cross-sectional survey of health, which is a longitudinal process. According to our results, housing conditions seem only to have a significant effect on mental health and wellbeing. This is possibly because mental health might be more reactive in response to environmental conditions, than illnesses with a more physical profile which might need a longer time scale. Mental health and well being scores are especially likely to be affected by visible mould in the home. Physical illnesses and the number of illnesses do not seem to be associated with poor housing conditions, in our sample. With these results in mind, the best future direction for an intervention study, on this population, would be to study the changes in mental health and well being scores that accompany housing improvement.

Main Findings

Our findings have been largely consistent with the finding of other researchers in this field who have found that damp, mouldy and cold housing conditions are linked to poor mental health [9-12,15,22,29]. However, we were not able to show any such links with physical health, either with individual conditions or the number of conditions from which participants suffered. Many previous studies have been able to show these links, particularly with respiratory conditions, nausea and vomiting and other digestive complaints and arthritis and rheumatism[10-12,14,17,19,20,22,23,26]. Other researchers have also found associations with more general health[5,16,18,27,28]. This was not matched by results from the EuroQol VAS on global health and wellbeing. Our results did not show a correlation between EuroQol results and any of the three housing conditions. However, the ANOVA results did show that significant amounts of the variance of house mould and the drink*house cold interaction were explained by EuroQol scores.

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May 2002 Confidential


RIVIERA HOUSING PROJECT

TENANTS' SURVEY

This questionnaire is in two parts. The first part contains general questions about the household and is for the householder to fill in. The second part is for individuals to fill in and asks for more personal information (for example about your health). Please ask each member of your household who is over 16 years (including yourself) to fill it in themselves and return it separately in the REPLY PAID envelope provided. The parent or guardian of any child under 16 years should fill it in on their behalf. Both parts are completely confidential and no information will be passed beyond our research unit.

We have enclosed enough personal questionnaires for a household of up to five people. Please only count people as household members if they live with you for at least half the time (this means 4 or more days in each week or more than 6 months in a year). If your household has more than five people in it please ring 01752 764225 between 9am and 5pm for extra questionnaires.

PART 1 THE HOUSEHOLD

1 How long have you lived in your house?

(please tick one box like this) ☑

Less than 1 year	Between 1 & 5 years	Between 5 & 10 years	Between 10 & 15 years	Over 15 years
☐	☐	☐	☐	☐

2 How many people live in your house? ☐☐

(Please fill in like this - if 3 people write | 0 | 3 | *)*

3 The condition of your house

(Please circle the most appropriate answer for each question)

Is your house too cold to be comfortable when the weather is cold?

no, never | occasionally | sometimes | often | always

Does your house have visible mould on the walls and or ceiling?

Yes ☐ **No** ☐

If Yes which rooms are affected?

Kitchen ☐ Bathroom ☐ Bedrooms ☐ Living room/Dining room ☐ Others ☐

Is your house damp?

no, never | occasionally | sometimes | often | always

4 What is your combined household income?
(*please add together the incomes of all the members of the household and tick the correct box)*

Less than £10,000 per year ☐	**£10,000 and £14,999 per year** ☐	**£15,000 and £19,999 per year** ☐	**£20,000 per year or over** ☐

5 Does *anyone* in the household claim any of the following benefits?
(Please tick all that apply)

Council Tax Benefit ☐
Income Support ☐
Working Families Tax Credit ☐
Housing Benefit ☐
Disability Working Allowance ☐

Other *(please tick box and write in details below)* ☐

.....

Please now fill in a personal questionnaire yourself and also pass one to each member of your household who is over 16 years for them to fill in and return in the envelope provided. For children and young people under 16, please complete a personal questionnaire on their behalf.

Thank you very much.

May 2002 Confidential

PART 2 PERSONAL INFORMATION

There is a separate personal questionnaire like this for each member of the household. Please fill it in with your details and return it separately in the FREEPOST envelope provided. This is to ensure that your personal information remains confidential. If you have children under 16, please complete the first three questions for each child.

1 AGE *Please write your date of birth, or the date of birth of the child, in the box provided like this. If your date of birth is the 23rd of October 1963, put*

2	3	1	0	6	3

2 SEX *Please tick one box for yourself or the child.*

Male ☐ **Female** ☐

3 ILLNESSES *Please look at the list of illnesses below. Tick the big box if you or the child have suffered from this illness in the last 12 months. Tick the first small box if you or the child have seen a doctor about it and tick the second small box if you or the child have received a prescription for it.*

Asthma or wheeze ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐
Angina or Heart Disease ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐
Diabetes ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐
Stroke ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐
Chronic bronchitis or emphysema ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐
High Blood Pressure ☐	**I have seen a doctor** ☐	**I have received a prescription** ☐

Tiredness or Fatigue ☐	I have seen a doctor ☐ I have received a prescription ☐	**Anxiety and/or Depression** ☐	I have seen a doctor ☐ I have received a prescription ☐
Headache ☐	I have seen a doctor ☐ I have received a prescription ☐	**Arthritis/ Rheumatism** ☐	I have seen a doctor ☐ I have received a prescription ☐
Epilepsy ☐	I have seen a doctor ☐ I have received a prescription ☐	**Other** ☐	Please write details in the box below

……
……

****

The next six questions are for people who are <u>16 years or over</u>. If you are filling this in on behalf of a child, please stop here.

****

EMPLOYMENT *Please tick the box or boxes which best describe what you do. These questions are for members of the household who are <u>16 or over</u>.*

4 Are you in paid work? Yes ☐ No ☐

If Yes, is it full-time? ☐ part-time? ☐

5 If you are <u>not</u> in paid work, do any of the following apply?

In education	**full-time**	☐	**part-time**	☐
Looking after your family	**full-time**	☐	**part-time**	☐
Unemployed	☐			
Permanently sick or disabled	☐			
Retired	☐			
Other (*please tick the box and write in details below)*	☐			

……
……

6 SMOKING *This question is for members of the household who are 16 or over.*

Do you smoke regularly? This means more than one cigarette (cigar or pipe) per week. *Please tick the correct box*

Yes	No
☐	☐

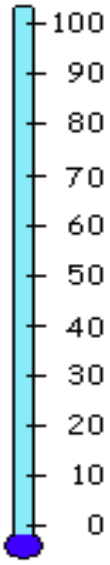
7 DRINKING *Please tick the correct box. This question is for members of the household who are 16 or over.*

How often have you had an alcoholic drink of any kind in the last 12 months?

- **Every day or almost every day** ☐
- **Once or twice a week** ☐
- **Once or twice a month** ☐
- **Once or twice a year** ☐
- **Less than once or twice a year** ☐
- **Not at all** ☐

8 OVERALL HEALTH *This question is for members of the household who are 16 or over. We would like to know how you feel your overall health state is at present. Please mark the thermometer below at a place, that you feel, represents your overall health state.*

Best possible Health state



Worst possible Health state

9 GENERAL HEALTH *This question is for members of the household who are 16 or over. We would like to know how your health has been in general over the past few weeks. Please answer all the questions by ticking the box under the answer which most nearly applies to you.* ***It is important that you try to answer all the questions.***

Have you recently:-

been able to concentrate on whatever you're doing?	**Better than usual** ☐	**Same as usual** ☐	**Less than usual** ☐	**Much less than usual** ☐
lost much sleep over worry?	**Not at all** ☐	**No more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐

felt that you are playing a useful part in things?	**More so than usual** ☐	**Same as usual** ☐	**Less useful than usual** ☐	**Much less useful** ☐
felt capable of making decisions about things?	**More so than usual** ☐	**Same as usual** ☐	**Less so than usual** ☐	**Much less capable** ☐
felt constantly under strain?	**Not at all** ☐	**No more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐
felt you couldn't overcome your difficulties?	**Not at all** ☐	**No more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐
been able to enjoy your normal day-to-day activities?	**More so than usual** ☐	**Same as usual** ☐	**Less so than usual** ☐	**Much less than usual** ☐
been able to face up to your problems?	**More so than usual** ☐	**Same as usual** ☐	**Less able than usual** ☐	**Much less able** ☐
been feeling unhappy and depressed?	**Not at all** ☐	**No more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐
been losing confidence in yourself?	**Not at all** ☐	**No more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐
been thinking of yourself as a worthless person?	**Not at all** ☐	**Not more than usual** ☐	**Rather more than usual** ☐	**Much more than usual** ☐
been feeling reasonably happy, all things considered?	**More so than usual** ☐	**About same as usual** ☐	**Less so than usual** ☐	**Much less than usual** ☐

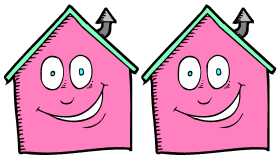
We may be contacting you at a later date to invite you to take part in a more detailed survey about your health. Please fill in your name and address or the name and address of the child below.

……

……

……

Thank you very much for filling in this questionnaire. Please return it separately in the **FREEPOST** envelope provided.



May 2002

Dear Tenant

I am sending your household a health survey to fill in. This survey is being conducted by the University of Plymouth and the Riviera Housing Trust to try to find out which illnesses are most common among Riviera Housing Trust tenants.

The survey is in two parts. There is one copy of the first part. This has general questions about your household, and is for you to fill in. There are 5 copies of the second part. This has individual questions for each person in the household, including yourself.

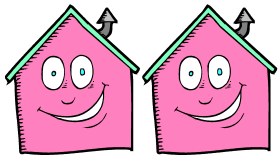
We hope that the results of this survey will help us to do a larger study in Torbay on housing conditions and health. The information you provide will not be used for any other purpose or be passed outside the research team.

All returned surveys will be entered into a PRIZE DRAW. The prize is a Whirlpool fridge freezer worth about £235 kindly donated by SWEB. So remember, the more surveys your household returns, the greater the chance that you will win the draw!!!!

Thank you for taking the time to fill in this survey. All the information you send will be confidential and will be destroyed when the study has finished. If you have any questions about the survey please feel free to contact me or Mr Andy Barton on 01752-764225.

Yours truly,

Sarah Sullivan,
Survey Manager, Research and Development Support Unit



February 2002

Dear Tenant

You may remember a questionnaire pack sent to you approximately two weeks ago from the Torbay Healthy Housing Group.

According to our records we have not yet received all replies from your address. If you have already sent back both parts of the questionnaire, please ignore this letter.

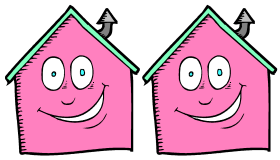
The research team need as many replies as possible for this important research to be successful and so we would be very grateful for replies from your household. Please rest assured that the information you provide is completely confidential and will only be used by the project group.

If you have lost or mislaid your questionnaires please ring 01752-764225 for more copies.

Thank you very much.

Yours faithfully

Sarah A Sullivan
Survey Co-ordinator



May 2002

Dear Dr……

The Research and Development Support Unit at Plymouth University and the Riviera Housing Trust in Torbay are collaborating in order to undertake research on housing on health.

You may already be aware that the Riviera Housing Trust are now responsible for all the social housing in Torbay and are at present embarking on a 5 year renovation plan of all their properties. The Research and Development Support Unit hope to study any health effects that arise as a result of the renovation work.

The initial stage of this project is a health prevalence survey of all Riviera Housing Trust tenants in order to find out their baseline health status. We intend to send each household of tenants a simple, brief questionnaire requesting demographic and health details. The health section consists of tickboxes listing 11 common conditions. Any information provided by the tenants is confidential and will be known only to members of the research team.

This letter is for your information only. The research team thought that a few tenants might, on receipt of the questionnaire, contact their doctor for advice. If this happens please ask the patient to ring the telephone number on the questionnaire.

Many thanks for your time. If you have any queries regarding either the letter or the research do not hesitate to contact either myself or Mr Andrew Barton on 01752-764225 or 01752-315112.

Yours sincerely

S A Sullivan
Survey Manager, RDSU

ISBN 1-84102-120-2

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