HEALTHY & POSITIVE AGEING INITIATIVE

Housing and health: results from the HaPAI survey

2018

The Healthy and Positive Ageing Initiative (HaPAI) is a joint research programme led by the Department of Health with the Health Service Executive, the Age-friendly Ireland Programme, and The Atlantic Philanthropies.

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This report presents information collected by the HaPAI Age-friendly Cities and Counties Survey, a study involving adults aged 55 and older in 21 Local Authorities in Ireland.

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An Roinn Sláinte DEPARTMENT OF HEALTH

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PREFACE

This report was completed by the Healthy and Positive Ageing Initiative (HaPAI) which is a research programme led by the Department of Health in association with the HSE, the Age-Friendly Ireland Programme, and The Atlantic Philanthropies. The HaPAI was established in order to achieve Goal 4 of the National Positive Ageing Strategy (1): *Support and use research about people as they age to better inform policy responses to population ageing in Ireland.* National Goal 4 involves two objectives:

- Continue to employ an evidence-informed approach to decision-making at all levels of planning; and
- Promote the development of a comprehensive framework for gathering data in relation to all aspects of ageing and older people to underpin evidence-informed policy making.

The HaPAI is also aligned with several goals and actions of Healthy Ireland – A Framework for Improved Health and Wellbeing 2013-2025 (2), the national framework for the improvement of population health and wellbeing, and the WHO's Active Ageing: A Policy Framework (3) which provides key policy proposals for enabling active ageing in our societies. The HaPAI commenced in 2015 and is operational in a number of different areas of activity:

- The development of national indicators of older people's health and wellbeing, leading to the 2016 publication of a biennial report on the health and wellbeing of older people in Ireland;
- The establishment of a research fund to commission targeted additional research to fill identified data gaps required to cover all indicators, relevant to the design or configuration of future services and supports for older people; and
- At a local level, the development of indicators using either national data broken down to the county level where possible, or additional data collected locally and published in a series of county reports in selected counties.

EXECUTIVE SUMMARY

The vast majority of older people currently live in privately owned homes in Ireland, and have lived there for a considerable length of time. Older people also have a higher risk of experiencing fuel poverty and those with chronic illnesses and disabilities are particularly vulnerable. Therefore housing conditions, facilities, maintenance and adaptation are key issues for the security and healthy ageing of the population.

Supporting evidence-informed strategies and programmes

The purpose of this study was to provide up-to-date evidence about the housing conditions, facilities and maintenance issues faced by older people in Ireland and to determine how these housing problems are linked to non-communicable disease: respiratory conditions such as chronic lung disease, and bone conditions such as arthritis.

For the first time in Ireland this information is reported at local level in order to support housing and healthy ageing programmes and interventions in local areas. Data is from the HaPAI Age-friendly Cities and Counties Survey, which involved 10,500 adults aged 55 and older in 21 Local Authority areas.

Key findings for adults aged 55+

- One-in-five (20.7%) had housing facility problems;
- One-in-ten (10.2%) had housing condition problems;
- One-in-ten (10.4%) were unable to keep their home adequately warm in the past 12 months;
- 7.0% had to go without heating in the past 12 months;
- One-in-five (20.3%) had difficulty with the cost of housing upkeep;
- One-in-five (20.6%) had difficulty carrying out maintenance themselves;
- Poor housing conditions, such as damp and rot, and heating problems were strongly associated with respiratory problems;
- Housing facility problems were associated with an increased likelihood of having a bone and joint conditions; and
- There was a strong association between poor housing conditions and bone and joint conditions.

Strategy pointer

Despite a number of schemes available to assist in upgrading and maintaining housing, a considerable number of adults aged 55 years and older continue to report problems. These housing problems are associated with an increased likelihood of respiratory and bone conditions.

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INTRODUCTION

Positive ageing and age-friendly environments

1. INTRODUCTION

IRELAND'S AGEING POPULATION

Demographic change has the potential to create opportunities and challenges for communities of the future. The demographics of Ireland are changing rapidly and according to a 2017 report from the Economic and Social Research Institute (ESRI) between 2016 and 2030 the population share of people aged 65 and over will increase from 13% to between 17% and 19 % and the number of people aged 65 and over is projected to increase by between 58% and 63% during this time (4).

Demographic ageing represents a triumph in development, as people are living longer lives due to better food, health care, sanitation, education and economic wellbeing (5). However, demographic ageing also has implications for public strategies and policies, service provision, long-term planning, and society as a whole in areas as diverse as housing, transport, education, employment, tourism, business development, and civic and social engagement.

Older adults contribute to both their extended families and the wider community in a variety of ways including financial support, family care or other supports and through active citizenship in their communities. Importantly, these relationships are often reciprocal, with older adults benefitting in terms of improved quality of life and psychological wellbeing. Far from being reliant on familial and social support, older members of society are in many instances net contributors to their extended family and communities. As such, it is important that we continue to move away from a predominantly health and medical focus on the ageing population towards a more holistic approach that also includes broader social and economic characteristics (6).

POSITIVE AGEING

Strategies and plans such as the National Positive Ageing Strategy (NPAS) (1) and Healthy Ireland – *A Framework for Improved Health and Wellbeing 2013-2025* (2), have recognised this new reality and have sought to take a different approach to planning for this new Ireland. There has been a shift in the perception of ageing towards the more positive perspective, conceptualising later life as a period of continued growth and development for older people. This view is central to the vision set out in the NPAS and is consistent with international developments in relation to ageing, and in particular the WHO's *Active Ageing: A Policy Framework* (3).

The NPAS set out a vision for Ireland as

"…a society for all ages that celebrates and prepares properly for individual and population ageing. It will enable and support all ages and older people to enjoy physical and mental health and wellbeing to their full potential. It will promote and respect older people's engagement in economic, social, cultural, community and family life, and foster better solidarity between generations".

This vision translated into four goals:

1. Remove barriers to participation and provide more opportunities for the continued involvement of people as they age in all aspects of cultural, economic and social life in their communities according to their needs, preferences and capacities.
2. Support people as they age to maintain, improve or manage their physical and mental health and wellbeing.
3. Enable people to age with confidence, security and dignity in their own homes and communities for as long as possible.
4. Support and use research about people as they age to better inform policy responses to population ageing in Ireland

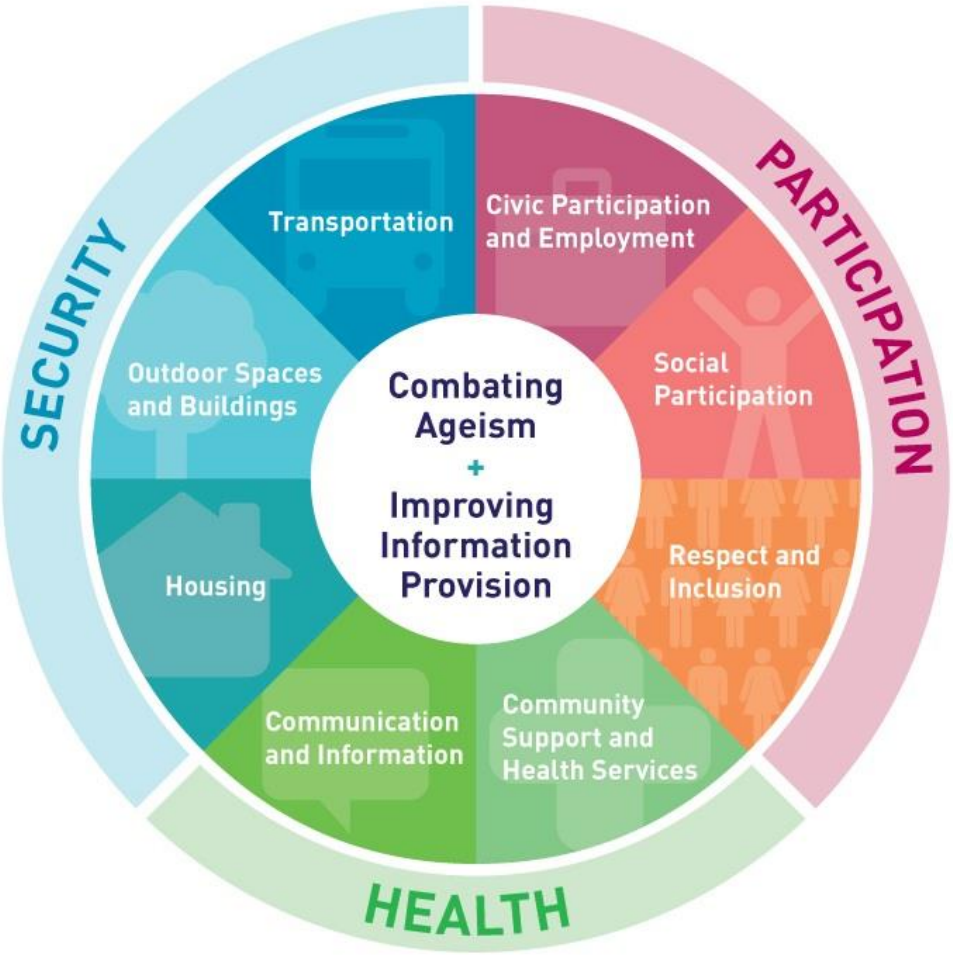
From the outset it was intended that implementation of the NPAS would require a 'whole of government' response, and be framed within the implementation of Healthy Ireland (2). At local level, the WHO Age Friendly Cities and Counties (AFCC) programme was identified in the National Positive Ageing Strategy (1) as being an important approach to improving the lives of older people throughout the country.

The concept of 'age-friendliness' is linked to an initiative started by the WHO in 2007 called the WHO Global Age-Friendly Cities project (7). In an age-friendly community, policies, services and structures related to the physical and social environment are designed to support and enable older people to "age actively" – that is, to live in security, enjoy good health and continue to participate fully in society. Public and commercial settings and services are made accessible to accommodate varying levels of ability, to recognise the great diversity among older persons and to promote their inclusion and contribution in all areas of community life.

The Age Friendly Cities and Counties programme was built on the understanding that the wide-ranging change and planning required to prepare for demographic ageing called for a collaborative approach. In each local authority, the Age Friendly Cities and Counties programme provides a mechanism for the relevant local agencies and stakeholders, working under the aegis of the Local Authorities, to ensure that their combined resources are used optimally, delivering necessary services to older people within their own local communities. These stakeholders include agencies from local governments, non-profit organisations, advocacy groups, older people themselves and the broader community.

Each Local Authority in Ireland has committed to developing an Age Friendly Programme based on the World Health Organisation (WHO) Age-Friendly Cities Framework and Guidelines (7). An age-friendly environment fosters health and wellbeing by focusing on and nurturing eight domains which are closely aligned with the goals of the NPAS as illustrated in Figure 1.

FIGURE 1 NATIONAL POSITIVE AGEING STRATEGY GOALS ALIGNED WITH WHO AGE-FRIENDLY CORE DOMAINS



This report focuses on the WHO Age-friendly core domain of *'Housing'* which is aligned with Objective 3.2 "facilitate older people to live in well-maintained, affordable, safe and secure homes, which are suitable to their physical and social needs" under Goal 3, Security, of the NPAS. This report has two aims:

Aim 1: Profile housing conditions, facilities, and heating problems among adults aged 55+.

Aim 2: Investigate the association between housing conditions, heating, and health conditions.

This report is organised as follows: section 2 presents relevant literature and strategies relating to housing conditions, facilities and heating, as well as the relationship between housing and health. Section 3 outlines the methods used in this study. Section 4 presents the results of this study by describing the prevalence of housing problems in each Local Authority areas and according to a range of demographic and socio-economic factors. We then present the results of analysis that examines the association between housing problems (facilities, conditions and heating) and respiratory and bone conditions. Section 5 concludes the report.

CHAPTER TWO

BACKGROUND

Housing and healthy and positive ageing, housing conditions, fuel poverty, maintenance, energy efficiency, and housing adaptation

2. BACKGROUND

HOUSING AND HEALTHY AND POSITIVE AGEING

Increasing life expectancy and healthy lifespan means that older adults are living longer in their own homes. Older people are also spending more time in their own homes, with the oldest old spending 80% of their time in the home (8). Almost half of older people live in houses that were built before 1960 which means they are more likely to experience issues with housing conditions and facilities (9). Poor quality housing may hinder "ageing in place", which is the ability to stay in one's home as a person ages (10).

Housing maintenance is an important factor in healthy ageing; the home environment and perceived housing quality have been found to be major determinants of the well-being of older people (11,12). Good quality housing also reduces the rate of admissions to residential care (13). Living at home is preferred by most older people due to the psychological, physical and psychosocial benefits associated with autonomy and independence (14), and so, increased efforts are being made to enable older people to live in their own homes for as long as possible.

PROBLEMS WITH HOUSING CONDITIONS

A report of housing conditions using data from The Irish Longitudinal Study on Ageing (TILDA) found that nearly three-in-five adults over the age of 50 have at least one housing condition problem in Ireland (15). Problems with damp, mould and moisture, structure, and rot are among the most common housing condition problems of older people (15). Previous research has shown that there are large variations in the amount of housing condition problems reported based on the age of dwelling, household income and tenure (16). Older dwellings are more likely to be in poorer condition (16) and older people living in houses built prior to 1919 are nearly three times more likely to report damp or mould problems than those living in houses built in 2001 or after (15). Building standards have improved over time and newer housing tends to be better equipped with energy efficient measures such as insulation and superior glazing. Furthermore, the analysis of TILDA showed that older people living in rented accommodation are more likely to experience difficulties with housing conditions than those who own their own home and this difference has, in part, been attributed to greater financial stability and resources among owner-occupiers to maintain the home compared with Local Authority tenants (15).

HEATING AND FUEL POVERTY

Fuel poverty has been defined as needing to spend 10% or more of a household's net income to adequately heat the home (17). Older people who live alone, have a chronic illness or disability or have a low income are more likely to experience fuel poverty as well as older people who live in a poorly insulated home or without

central heating (9). Older people in Ireland experience a 'dual burden' in terms of fuel poverty, meaning they are more likely to experience fuel poverty and suffer from a health condition as a result (9). Cold temperatures and inadequate heating in homes combine to increase the risk of mortality and physical and mental health problems among older people (18). A report by Geddes et al. (18) reviewing the direct and indirect influence of fuel poverty and cold housing on health suggests that cold housing can increase the occurrence of death by worsening existing cardiovascular disease and respiratory disease. Additionally, fuel costs may result in reduced funds for food, for example, and indirectly has a negative effect on health as a result of a poor diet. A survey completed by older people over the severe cold winter (2010-2011) in the Republic of Ireland found that 24% reported that their homes were too cold and 62% of them were worried about being able to afford fuel to heat their homes (9). As mentioned above, older people are more likely to live in older houses and therefore are less likely to live in an energy efficient home (9) and they are also more likely to experience difficulty heating their homes, particularly where there is no central heating.

HOUSING MAINTENANCE

Later life can be associated with increasing difficulty maintaining a home, especially for those who are living alone. A recent study found that the most common maintenance difficulties for older people include outdoor maintenance such as cleaning the gutters, mowing the lawn and painting, and household tasks such as cleaning and vacuuming (19). In a study of challenges to 'ageing in place' in the USA, Fausset at al. (19) found that men were more concerned with the difficulty of carrying out outdoor maintenance and older adults who were single were more concerned with heavy indoor duties such as cleaning floors and changing linens. The authors found that the majority of solutions to managing difficult tasks were person-related (85%) including outsourcing help, assistance from others, perseverance, and tools and technologies. The remaining respondents availed of environment-related solutions for managing difficult tasks including home re-modelling and moving to an apartment or condominium.

ENERGY EFFICIENCY AND ENERGY POVERTY

Improving the thermal efficiency of homes is suggested to be the most appropriate solution to fuel poverty: an energy efficient house can reduce fuel costs, improve health and contribute to climate sustainability (18). In Ireland the Better Energy Warmer Homes Scheme (20) aims to enhance the energy efficiency and warmth of the homes of older people by installing a range of energy efficiency measures, such as attic insulation, draught-proofing and cavity wall insulation, free of charge. The scheme is administered by the Sustainable Energy Authority of Ireland (SEAI) and by 2014 the scheme had assisted in the improvement of over 112,000 energy poor homes. Also, Local Authorities have been provided with funding to introduce retrofitting measures to improve the thermal efficiency of older houses and apartments by providing insulation and efficient condensing boilers to older adults living in poor housing conditions. In 2011, the Irish Government published *Warmer Homes - A Strategy for Affordable Energy in Ireland* (20) which aims to reduce

energy poverty by making energy more affordable for low-income households, ensuring that families and individuals can live in a warm home that will support their health, well-being and quality of life. Since the publication of this strategy, additional retrofit schemes have been introduced and all energy consumers have been granted statutory protections. As a result of these measures, the proportion of energy consumers that face the possibility of being disconnected from their energy supplier has been significantly reduced.

HOUSING FACILITIES AND ADAPTATION

As people grow older, their needs begin to change and depending on the quality of their dwelling, difficulties may emerge with housing facilities. According to Stimson et al. (21) a home represents "a combination of personal and financial security, family memories and a sense of place and well-being", and there is a wealth of literature that demonstrates that the majority of people wish to remain in their own homes for as long as possible (22,23). 'Ageing in place', defined as "remaining living in the community, with some level of independence, rather than in residential care" (24), is important for personal identity in relation to autonomy and independence, security and familiarity, and a sense of attachment or connection on a community level (25).

There is also evidence that as people age, they are more likely to attempt to cope with a widening disparity between the quality of the dwelling and their health and social needs, rather than move to a more suitable dwelling (26). A report published by Clúid Housing (22) investigating the housing needs and support needs of older people indicates that almost half of older people are worried about the possibility of moving into a nursing home in the future. Out of the 15% who reported that they would like to move out their homes in the future, the majority would prefer to move into Clúid social housing or Clúid sheltered housing rather than a nursing home. The prospect of moving was seen as stressful and the option of moving into a nursing move was viewed negatively by many respondents. Older people may wish to move out of their own home for a number of reasons: home is unsuitable for their needs, unsafe neighbourhood, illness or a lack of community.

The concept of 'lifetime housing' has been considered by the Department of Environment, Heritage and Local Government in their 'Quality Housing for Sustainable Communities' (27) report which outlines that new housing needs to be accessible for younger people, older people and people with disabilities and that designers need to consider the current, future and changing needs of the prospective occupants. The report also emphasises that older people who would like to remain living in their own homes should be able to do so without costly home improvement or modification.

In 2011, the National Housing Strategy for People with Disabilities 2011-2016 (28) was published which aimed to "facilitate access, for people with disabilities, to the appropriate range of housing and related support services, delivered in an integrated and sustainable manner, which promotes equality of opportunity, individual choice and independent living". The strategy provided a framework for the delivery of housing to people with disabilities through mainstream approaches.

Regarding older people, the strategy aims to provide assistance to people with age-related mobility problems, for example, to ensure that they can live in their own homes and communities for as long as possible.

In Ireland, there have been a number of government grant schemes to fund necessary home improvements or adaptations in order to support and enhance independent living. Key target groups have included older people living on low-incomes (29) who require support for adaptations such as installation of a level access shower, grab-rails, a stair-lift or access ramps; older people who require financial support to make improvements to the condition of their home (30) such as re-wiring, fixing structural damage, cleaning and painting, and dry-lining; and those with an intellectual, physical or sensory disability or a mental health issue (31) who require support to improve or adapt their home. These strategies and schemes reflect the value placed on 'ageing in place' in Ireland and acknowledge the role of housing as a social determinant of health and wellbeing.

CHAPTER THREE

METHODS

Data, fieldwork, study measures, analysis, and study sample overview

3. METHODS

DATA AND SAMPLE

Data is from the Healthy and Positive Ageing Initiative (HaPAI) survey. This was a random-sample, population representative survey of people aged 55 and older, living in 20 Local Authority areas in 2015-2016. The following Local Authorities participated in the survey: Dublin City; South Dublin; Fingal; Dun Laoghaire-Rathdown; Galway City; Galway County; Clare; Limerick City and County; Kildare; Kilkenny; Laois; Louth; Meath; Wexford; Wicklow; Cavan; Cork City; Cork County; Mayo; and Tipperary. Approximately 500 interviews were completed in each local authority area with the exception of Limerick where both the city and county were surveyed separately and 500 interviews were carried out in each area. The results for Limerick City and County are presented separately in the tables below. Data was collected between 2015 and 2016.

The target population for this survey includes all community-dwelling members of the population aged 55 and older in each Local Authority. This sample did not include people aged 55 and older who were in long-term care or living in an institution at the time of survey.

A multi-stage random-route sampling strategy was used to generate a sample of this population. This sampling approach involved several steps. Firstly, a random sample of 50 District Electoral Divisions (DED) in each Local Authority was selected as the primary sampling units (PSUs). Within each selected DED a starting address was selected at random. Beginning with this address a total of 10 interviews were to be completed in each of the 50 areas.

Detailed information on the approach that interviewers took to identify eligible households within each area for the survey is described below. In summary, from their starting address, interviewers called to every fifth house. The interviewer asked to speak to a person aged 55 years or older in the household. One person aged 55 or older per household was invited to complete the interview. If there were two or more older people in the household the interviewer applied the 'next birthday' rule to select one participant.

FIELDWORK AND DATA COLLECTION

A total of 10,540 interviews were conducted in Ireland between 2015 and 2016. Each participant completed a structured Computer-Assisted Personal Interview (CAPI) in their own home with a trained interviewer from Amárach Research. Participants were also invited to complete an additional, separate, paper-based survey which included subjective wellbeing (depressive mood and quality of life) and experience of elder abuse.

RESPONSE RATES AND SAMPLE WEIGHTS

The response rate is the proportion of selected households that included an eligible participant who completed an interview. The overall response rate was 56%, and this ranged from 51% to 63% across the areas. This includes an estimate of the households who are likely to contain an eligible household member, but for which eligibility was not determined. The response rate and number of respondents within each Local Authority area are reported in Table 3 below.

Response rates typically vary among different groups within a given population such as different age groups or levels of education. This variation can lead to biased estimates when reporting results. In order to adjust for this, sample weights have been applied to the survey data. The sample weights corresponded to the number of people, with a given set of characteristics, in the population that were represented by each survey participant. Weights which were applied to the survey sample were estimated using the Census (2011). The characteristics compared were age, gender, educational attainment (primary/secondary/third level) and marital status (married/not married).

TABLE 1 SAMPLE AND RESPONSE RATE

Area	Sample (n value)	Response Rate (%)
Clare	500	59
Cork County	501	58
Cork City	501	56
Cavan	500	56
Dublin City	502	57
Dublin Fingal	502	50
Dun Laoghaire-Rathdown	502	51
Dublin South	501	57
Galway County	518	55
Galway City	504	63
Kildare	500	62
Kilkenny	500	55
Laois	501	60
Limerick City	501	59
Limerick County	502	59
Louth	500	53
Meath	500	56
Mayo	502	51
Tipperary	502	54
Wicklow	500	57
Wexford	501	51
Total	10,540	56

MEASURES

A list of the indicators included in the analysis for this report is provided in Table 3. As shown, we have included a wide range of important demographic characteristics and socio-economic status indicators.

TABLE 2 DEMOGRAPHIC AND SOCIO-ECONOMIC MEASURES

Measures	Description
Demographic Indicators	
Gender	Male or female
Age	Age group categories used in this study: 55+, 55-64, 55-69, 65+, 65-74, 70+ and 75+
Marital status	Married/living with a partner as married, single (never married), divorced/separated, or widowed
Household composition	Living alone, living with spouse/partner, or living with family/non-family (with or without spouse/partner)
Location of home	Open countryside, village, or town, city or city suburb
Socio-economic indicators	
Material Deprivation	Responding 'no' to two or more items from a list of 11 items about the household E.g. Does the household replace any worn out furniture.
Income	Income bands: €501 up to €1,000; €1,001 up to €1,500; €1,501 up to €2,500; €2,501 or more. A missing category is also included due to missing information (32.4%).
Education	Primary or none, secondary, or third level

The HaPAI survey contained a number of questions that asked respondents about the home they lived in. The specific survey questions asked and the response categories are shown in Table 4. For this report, we focused on three features of the home: housing conditions which refer to the physical conditions of the home; housing facilities both indoor and outdoor; and, adequate heating.

TABLE 3 HOUSING FACILITIES, CONDITIONS AND UPKEEP MEASURES

Measures	Description
Housing conditions	Do you have any of the following problems with your own accommodation? Response categories: rot in windows, doors or floors; damp or leaks in walls or roof? Responses: yes, to some extent, no.
Housing facilities	Do you have any of the following problems with your own accommodation? Response categories: shortage of space; home too big for current needs; lack of indoor flushing toilet; lack of a bath or shower; lack of downstairs toilet/bathroom facilities; lack of place to sit outside (e.g. garden, balcony, terrace). Responses: yes, to some extent, no.
Adequate heating	Have you been able to keep your home adequately warm in the last 12 months? Responses: yes/no.
Adequate heating	Have you ever had to go without heating during the last 12 months through lack of money? Responses: yes/no.
Difficulties with upkeep of home	Do you have the following problem with your accommodation – difficulties with carrying out maintenance or upkeep yourself; difficulties with cost of upkeep? Responses: yes, to some extent, no.

We also included indicators of two health behaviours that are associated with differences in health outcomes: smoking and physical activity. The HaPAI survey included two questions on smoking: the first survey question asked if respondents currently smoked tobacco products and those who responded that they did not were then asked if they had smoked tobacco products in the past. From these two questions it was possible to categorise respondents as current smokers, past smokers, or never smokers.

The physical activity indicator used in the HaPAI survey was adapted from the International Physical Activity Questionnaire (IPAQ). Respondents were asked how many days in the previous seven they did moderate and/or vigorous physical activity. Moderate physical activity was defined as activities that take moderate physical effort and make you breathe somewhat harder than normal. The examples provided in the survey instructions were: carrying light loads, cycling at a regular pace, or doubles tennis? Vigorous physical activities were described as activities

that take hard physical effort and make you breathe much harder than normal. The examples provided in the survey instructions were: heavy lifting, digging, aerobics, or fast bicycling? For both, respondents were instructed to think only about those physical activities that they did for at least 10 minutes at a time. As well as capturing the number of days that respondents did moderate and vigorous physical activity, they were also asked the number of minutes they did the activities. Minutes spent doing vigorous activity were weighted by two and then summed with total moderate activity minutes to estimate a total physical activity minutes score. The WHO recommends that adults should undertake at least 30 minutes per day of moderate intensity activity on five days per week (or 150 minutes per week). Based on this recommendation we created a dichotomous variable that captured whether respondents achieved 150+ minutes of physical activity per work or not. It is this indicator of physical activity that is included in our analysis.

These health behaviour indicators and the corresponding categories that we included in the following analysis for this report are summarised in Table 4. The health conditions that are investigated in this study are summarised in Table 5.

TABLE 4 HEALTH BEHAVIOUR MEASURES

Measures	Description
Smoking	Do you currently smoke tobacco products? Did you ever smoke tobacco products in the past? Response categories: Current smoker; Past smoker; Never smoked.
Physical activity	During the last 7 days on how many days did you do (a) moderate physical activities (b) vigorous physical activities? How much time did you usually spend doing moderate / vigorous physical activities on one of those days? Response categories: Meets recommended 150+ minutes; Does not meet recommended 150+ minutes.

In this report we focussed on two health outcomes: respiratory conditions and bone conditions. These measures are summarised in table 5 below.

TABLE 5 HEALTH CONDITIONS

Measures	Description
Bone conditions	Has a doctor ever told you that you have any of the following conditions? Arthritis; osteoporosis, hip fracture, wrist fracture. Response: yes or no.

Respiratory condition	Has a doctor ever told you that you have any of the following conditions? Asthma, chronic lung disease (including bronchitis and emphysema). Response: yes or no.

ANALYSIS

All descriptive statistics were computed using Stata (Version 14) and percentages are reported with 95% confidence intervals (95% CI). Descriptive statistics were carried out to examine the proportion of those aged 55+who report problems with housing conditions, facilities, upkeep and heating in each Local Authority area. Bivariate analysis was conducted to explore the association between each housing problem and demographic, socio-economic and health characteristics.

In the next chapter we report the results of a series of mixed effects logistic regression analyses that examine the association between housing problems and both respiratory and bone conditions. A multilevel approach was taken to account for the two-stage sampling strategy employed that involved respondents (level 2) being sampled from within Local Authority regions (level 1). An important advantage of this technique is it enables us to statistically control for the effect of a number of factors simultaneously.

SAMPLE CHARACTERISTICS

Sample characteristics are presented in Table 5. Just over half were female (52.7%) and almost half were aged less than 65 years (46.5%). Two-thirds (65.0%) were married and 10.1% were single/never married. Almost one-in-five (17.9%) had a third level education. Half of the sample was retired (50.9%) and a further 25.0% were in paid employment. Almost one-in-ten respondents were considered to be materially deprived. As is typical in surveys like this one, there was a lot of missing information on household income: respondents either refused to answer the question about their income or could not do so. Of those who did respond, the distribution of household income was quite even across the sample.

TABLE 6 SAMPLE CHARACTERISTICS

Characteristics		%	(95% CI)
Gender	Male	**47.3**	(46.0-48.5)
	Female	**52.7**	(51.5-54.0)
Age	55-64	**46.5**	(44.9-48.1)
	65-74	**31.5**	(30.3-32.7)
	75+	**22.0**	(20.7-23.3)
Marital status	Married/living with a partner	**65.0**	(63.5-66.5)
	Single (never married)	**10.1**	(9.3-11.0)
	Separated/divorced	**6.2**	(5.5-6.9)
	Widowed	**18.7**	(17.8-19.8)
Education	Primary or less	**34.4**	(32.3-36.4)
	Secondary	**47.8**	(46.1-49.5)
	Third Level	**17.9**	(16.6-19.2)
Employment Status	Retired	**50.9**	(49.2-52.6)
	Employed/self-employed	**25.0**	(23.7-26.4)
	Looking after home/family	**14.2**	(13.1-15.4)
	Other	**9.9**	(9.0-10.8)
Material deprivation	No	**92.1**	(91.2-93.0)
	Yes	**7.9**	(7.0-8.8)
Income	€501 up to €1,000	**15.1**	(13.6,16.6)
	€1,001 up to €1,500	**14.3**	(13.0,15.6)
	€1,501 up to €2,500	**20.8**	(19.3,22.5)
	€2,501 or more	**17.4**	(15.7,19.3)
	Missing	**32.4**	(29.8,35.1)
Location	Open countryside	**24.2**	(21.6-27.0)
	Village	**17.9**	(15.9-20.2)
	Town (1500+ population)	**25.4**	(22.8-28.2)
	City (inner)	**4.9**	(3.3-7.2)
	City (suburb)	**27.5**	(24.4-30.9)
Smoking status	Current smoker	**18.3**	(17.1-19.5)
	Past smoker	**29.1**	(27.5-30.7)
	Never smoked	**52.6**	(50.8-54.4)
Physical activity	Meets recommended (150+ minutes)	**51.1**	(49.1-53.1)

	Does not meet recommended (150+ minutes)	**48.9**	(46.9-50.9)

CHAPTER FOUR

RESULTS

Current housing problems and housing problems, respiratory and bone conditions

4. RESULTS

HOUSEHOLD CHARACTERISTICS

As shown in Table 7, the majority (97.7%) of respondents lived in a house. A small proportion of those aged 55+ in Dun Laoghaire lived in an apartment (7.9%) compared with less than 3.0% in all other areas. Over two-thirds (87%) of those aged 55+ have lived in their current home for over 10 years and average length of time in their current home is 31.7 years.

Just over one quarter of those aged 55+ live alone (27.4%), however this was notably higher in areas such as Dublin City (32.9%) and Tipperary (33.0%) and lower in South Dublin (15.8%). The majority live with their spouse or partner (54.4%) and 18.1% live in a multi-person household with their spouse and children, and/or other relatives.

TABLE 7 HOUSEHOLD CHARACTERISTICS

Characteristics		Yes (%)	(95% CI)
Household composition	Living alone	**27.4**	(26.1,28.8)
	Living with spouse/partner	**54.4**	(52.8,56.1)
	Living with family/non-family (without or without spouse/partner)	**18.1**	(16.8,19.5)
Accommodation type	House	**97.7**	(96.7,98.4)
Location of home	Urban	**57.9**	(54.5,61.2)
	Rural	**42.1**	(38.8,45.5)
Years in current home		**Mean (31.7)**	SE* (0.36)

Note: *SE standard error.

HOUSING FACILITIES

One-in-five (20.7%, CI 95%: 19.1-22.5) of the over 55s reported housing facility problems. These included: a shortage of space; home too big for current needs; lack of indoor flushing toilet; lack of a bath or shower; lack of downstairs toilet/bathroom facilities; and lack of place to sit outside (e.g. garden, balcony, or terrace).

The proportion of adults who have housing facility problems did not differ by age or gender. Those who were married and adults who were living with others (either spouse or family) were less likely to report housing facility problems. Those with higher incomes also reported fewer problems. A greater proportion of the over 55s who were living alone, and were materially deprived reported having housing facility problems. Although only a small proportion of the over 55s in the study

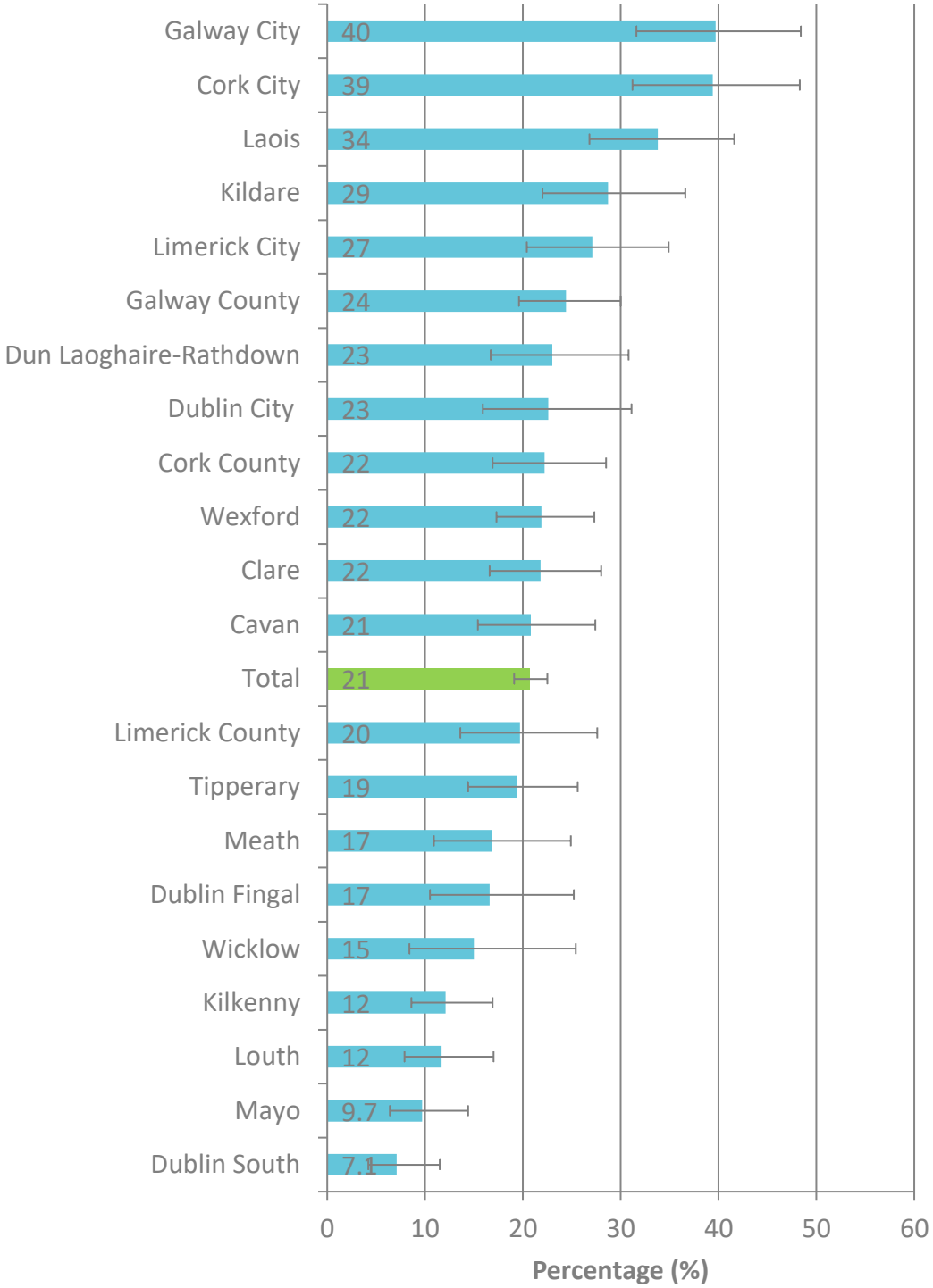
were out of work (either looking for work, permanently sick or disabled, or in full-time education) a higher proportion of these adults reported housing facility problems compared with those who were working, retired, and looking after home and family. A higher proportion of current smokers (26%) reported facility problems in their home compared to 21% of past smokers and 19% of those who never smoked. Finally, a higher proportion of older adults who did not meet the recommended 150 minutes or more of physical activity per week reported housing facility problems.

TABLE 8 HOUSING FACILITIES BY RESPONDENT CHARACTERISTICS

Characteristics		Yes (%)	(95% CI)
Age	Age 55-64	**20.5**	(18.4,22.7)
	Age 65-74	**20.1**	(17.8,22.5)
	Age 75+	**22.2**	(19.7,25.0)
Gender	Male	**19.8**	(17.9,21.8)
	Female	**21.6**	(19.7,23.7)
Marital status	Never married	**25.3**	(21.1,29.9)
	Married/Living with partner	**18.0**	(16.4,19.7)
	Separated/divorced	**28.4**	(23.7,33.7)
	Widowed	**25.1**	(22.2,28.3)
Household composition	Living alone	**27.0**	(24.2,30.0)
	Living with spouse/partner	**18.4**	(16.7,20.2)
	Other (spouse/family/non-family)	**18.4**	(15.8,21.3)
Occupational status	Retired	**19.6**	(17.7,21.6)
	Employed/self-employed	**16.6**	(14.5,18.9)
	Out of work	**33.6**	(29.1,38.5)
	Looking after home/family	**23.1**	(20.0,26.7)
Income (bands)	€501 up to €1,000	**28.7**	(25.3,32.4)
	€1,001 up to €1,500	**24.1**	(20.8,27.8)
	€1,501 up to €2,500	**20.4**	(17.8,23.3)
	€2,501 or more	**15.7**	(13.3,18.5)
	Missing	**18.4**	(15.9,21.3)
Material deprivation	Yes	**46.3**	(41.0,51.8)
	No	**18.4**	(16.8,20.1)
Educational attainment	Primary or less	**22.9**	(20.3,25.7)
	Secondary	**20.0**	(18.0,22.1)
	Tertiary	**18.5**	(16.4,20.9)
Location of home	Open countryside	**17.2**	(14.7,19.9)
	Village	**20.9**	(17.9,24.3)
	Town	**20.3**	(17.6,23.3)
	City (suburb)	**21.7**	(18.4,25.4)
	City (inner)	**34.6**	(23.2,48.0)
Smoking status	Current smoker	**25.9**	(23.0,29.0)
	Past smoker	**20.7**	(18.1,23.5)
	Never smoker	**19.0**	(17.2,20.9)
Physical activity (150 mins/week)	Yes	**17.7**	(15.8,19.7)
	No	**23.9**	(21.7,26.3)

As shown in Figure 2, older adults living in inner city locations were most likely to report problems with housing facilities. This was particularly apparent in Cork City and Galway City. Mayo, Louth, and Dublin South had the lowest percentage of reported housing facility problems.

FIGURE 2 HOUSING FACILITY PROBLEMS AMONG ADULTS AGED 55+, BY LOCAL AUTHORITY AREA



HOUSING CONDITIONS

One-in-ten (10.2%, CI 95%: 9.2-11.4) of the over 55s had housing condition problems. This included any problem with rot in windows, doors or floors and/or with damp or leaks in walls or roof.

As shown in Table 9, the proportion of adults who reported housing condition problems did not differ by age or gender. Adults who were married/living with a partner, and those who were living with others (spouse or other family) were less likely to report housing condition problems.

Although only a small proportion of the over 55s in the study were out of work (either looking for work, permanently sick or disabled, or in full-time education) a higher proportion of these adults reported housing conditions problems compared with those who were working, retired, and/or looking after home and family. Adults with lower household incomes, lower education, and those who are materially deprived were more likely to report having housing condition problems. The proportion of adults who experience housing condition problems did not vary by urban or rural location.

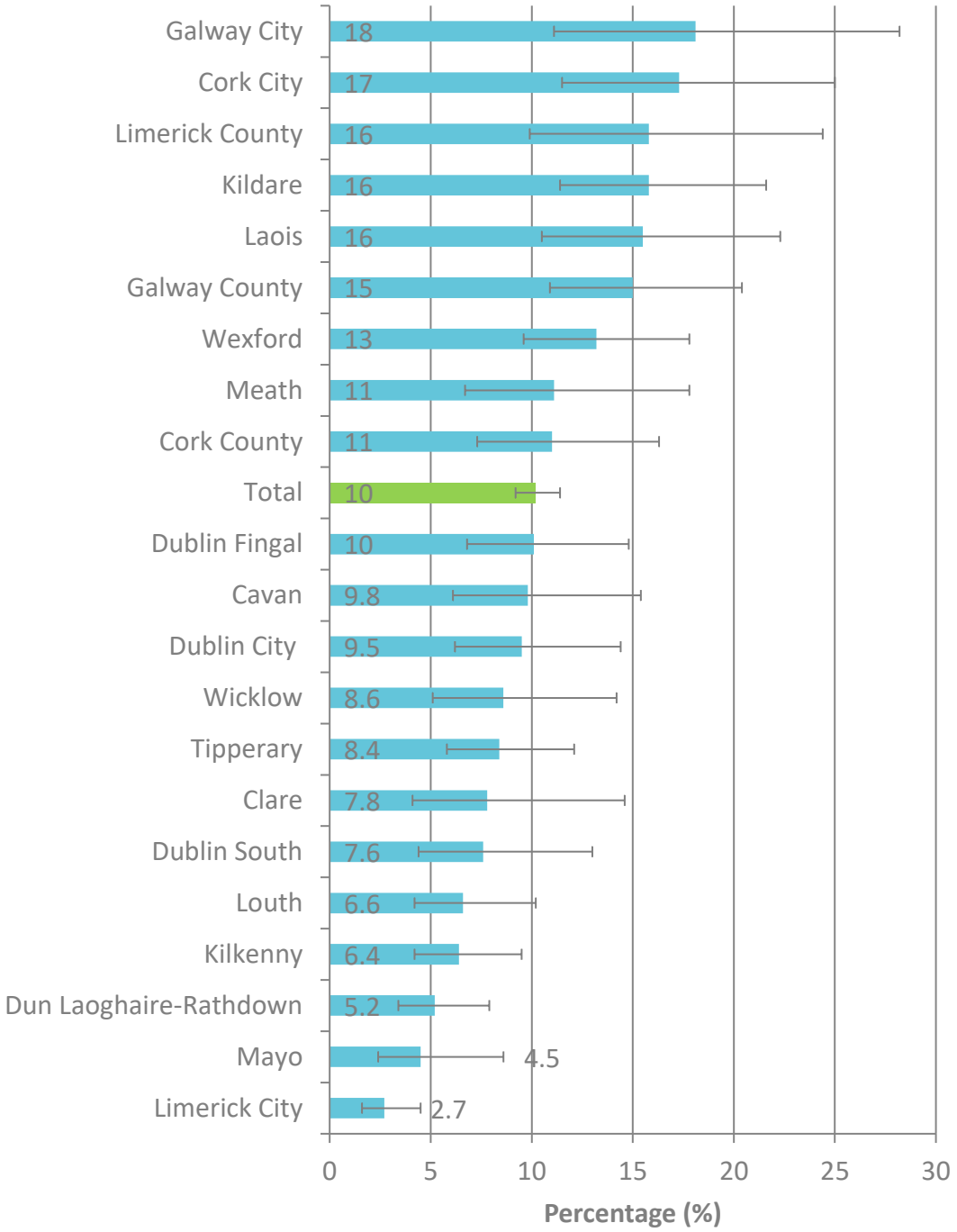
Turning to health behaviours, we found that a higher percentage of smokers reported housing condition problems and respondents who did not meet the recommended 150 minutes (or more) of physical activity per week were also more likely to report housing condition problems.

TABLE 9 HOUSING CONDITIONS BY RESPONDENT CHARACTERISTICS

Characteristic		Yes (%)	(95% CI)
Age	Age 55-64	**10.9**	(9.4,12.7)
	Age 65-74	**8.7**	(7.4,10.1)
	Age 75+	**10.9**	(9.2,12.9)
Gender	Male	**10.6**	(9.2,12.1)
	Female	**9.9**	(8.7,11.3)
Marital status	Single (ever married)	**15.6**	(12.4,19.3)
	Married/Living with partner	**8.1**	(7.1,9.4)
	Separated/divorced	**18.7**	(14.5,23.7)
	Widowed	**11.8**	(10.0,13.9)
Household composition	Living alone	**14.1**	(12.2,16.2)
	Living with spouse/partner	**8.4**	(7.2,9.8)
	Other (spouse/family/non-family)	**9.8**	(8.0,12.0)
Occupational status	Retired	**9.2**	(8.1,10.5)
	Employed/self-employed	**8.7**	(7.1,10.6)
	Out of work	**20.3**	(16.6,24.7)
	Looking after home/family	**9.4**	(7.3,12.0)
Income (bands)	€501 up to €1,000	**16.7**	(14.3,19.4)
	€1,001 up to €1,500	**15.8**	(13.1,18.9)
	€1,501 up to €2,500	**8.4**	(6.7,10.4)
	€2,501 or more	**7.3**	(5.7,9.4)
	Missing	**7.5**	(6.2,9.0)
Material deprivation	Yes	**28.3**	(24.1,33.0)
	No	**8.6**	(7.6,9.8)
Educational attainment	Primary or less	**13.6**	(11.7,15.8)
	Secondary	**8.9**	(7.7,10.2)
	Tertiary	**7.3**	(6.0,8.8)
Location of home	Open countryside	**11.4**	(9.3,13.8)
	Village	**10.7**	(8.7,13.1)
	Town	**9.3**	(7.6,11.2)
	City (suburb)	**11.4**	(5.5,22.4)
	City (inner)	**9.6**	(7.8,11.7)
Smoking status	Current smoker	**15.1**	(12.8,17.7)
	Past smoker	**10.1**	(8.6,11.9)
	Never smoker	**8.5**	(7.4,9.7)
Physical activity (150 minutes per week)	Yes	**8.1**	(6.9,9.5)
	No	**12.5**	(11.0,14.0)

As shown in Figure 3, the highest rate of housing condition problems was reported in Galway City while the lowest was reported in Limerick City.

FIGURE 3 HOUSING CONDITIONS PROBLEMS AMONG ADULTS AGED 55+, BY LOCAL AUTHORITY AREA



HEATING

Less than one-in-ten (7%) of the over 55s had to go without heating in the past 12 months. One-in-ten (10%) of the over 55s were unable to keep their home adequately warm in the past 12 months.

As shown in Table 10, a higher proportion of females, those aged 55-64 and those who live alone reported difficulty keeping their home adequately warm and going without heat due to cost in the last 12 months. A higher proportion of adults who were never married and those who were separated or divorced reported difficulty keeping their home adequately warm and going without heating due to cost in the last 12 months.

Those who are out of work, those on low incomes and those who were materially deprived were more likely to report that they had difficulty keeping their home adequately warm and went without heating due to cost in the past 12 months. A higher proportion of urban dwellers reported difficulty keeping the home adequately warm and going without heat in the last 12 months due to cost. Finally, a higher percentage of smokers reported that they had difficulty keeping their home adequately warm and that they went without heating due to cost in the past 12 months.

As shown in Table 11, in terms of physical activity, twice the percentage of those who did not meet the weekly physical activity guidelines reported difficulty keeping their home adequately warm and going without heating due to cost in the previous 12 months.

TABLE 10 HEATING PROBLEMS BY RESPONDENTS' DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS AND LOCATION

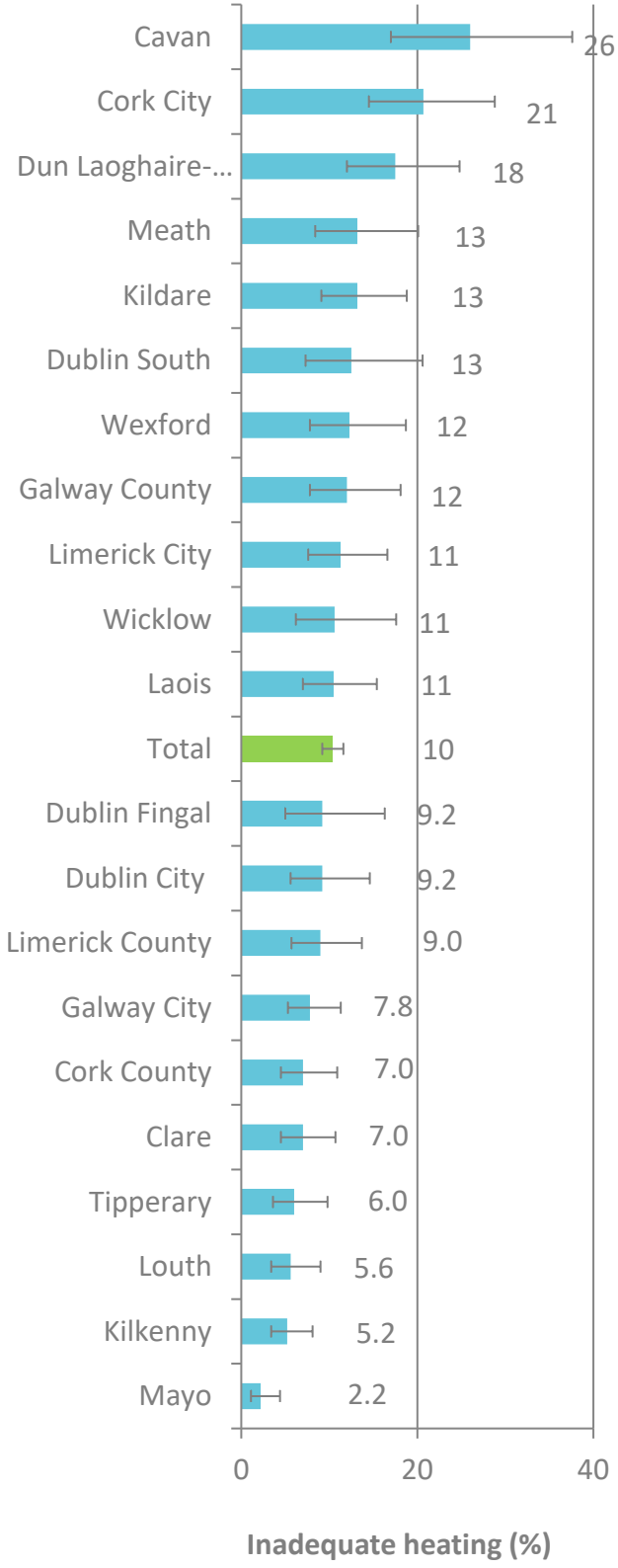
		Unable to keep home adequately warm		Gone without heating	
		Yes (%)	(95% CI)	Yes (%)	(95% CI)
Age	Age 55-64	11.9	(10.4,13.6)	8.1	(7.0,9.3)
	Age 65-74	8.8	(7.4,10.4)	6.2	(5.1,7.5)
	Age 75+	9.4	(7.7,11.4)	6.1	(4.9,7.5)
Gender	Male	9.8	(8.6,11.2)	6.4	(5.5,7.4)
	Female	10.9	(9.5,12.5)	7.6	(6.6,8.8)
Marital status	Single (never married)	14.2	(11.5,17.6)	12.4	(10.0,15.2)
	Married/Living with partner	8.7	(7.5,10.1)	4.5	(3.8,5.4)
	Separated/divorced	17.6	(14.1,21.7)	17.9	(14.2,22.3)
	Widowed	11.7	(9.6,14.2)	9.3	(7.6,11.4)
Household composition	Living alone	14.0	(12.0,16.2)	11.5	(9.9,13.3)
	Living with spouse/partner	8.8	(7.5,10.2)	11.5	(3.5,5.2)
	Other (spouse and family, family only, or non-family)	9.9	(7.8,12.4)	11.5	(6.9,10.8)
Occupational status	Retired	8.1	(6.9,9.5)	5.4	(4.6,6.3)
	Employed/self-employed	9.6	(7.9,11.6)	4.0	(3.1,5.3)
	Out of work	22.2	(18.3,26.6)	20.2	(16.6,24.2)
	Looking after home/family	11.9	(9.5,14.8)	9.3	(7.2,11.9)
Income (bands)	€501 up to €1,000	15.3	(12.6,18.5)	14.7	(12.4,17.2)
	€1,001 up to €1,500	10.5	(8.3,13.1)	8.2	(6.3,10.6)
	€1,501 up to €2,500	8.3	(6.6,10.4)	4.2	(3.2,5.6)
	€2,501 or more	8.4	(6.4,11.0)	2.9	(1.8,4.5)
	Missing	10.4	(8.5,12.7)	7.0	(5.7,8.7)
Material deprivation	Yes	39.0	(32.0,44.1)	43.2	(38.2,48.3)
	No	7.8	(6.7,9.0)	3.9	(3.3,4.6)
Educational attainment	Primary or less	12.8	(10.8,15.2)	9.5	(8.0,11.2)
	Secondary	9.5	(8.2,11.0)	6.5	(5.6,7.7)
	Tertiary	8.1	(6.6,9.9)	3.7	(2.7,5.1)
Location of home	Open countryside	7.7	(6.1,9.6)	5.1	(4.0,6.4)
	Village	8.6	(6.8,10.9)	6.8	(5.2,8.8)
	Town	11.9	(9.8,14.4)	8.3	(6.7,10.3)
	City (suburb)	12.0	(9.5,15.1)	7.7	(6.2,9.6)
	City (inner)	13.1	(7.8,21.1)	7.0	(4.0,12.1)
Total		10.4	(9.2,11.6)	7.0	(6.3,7.9)

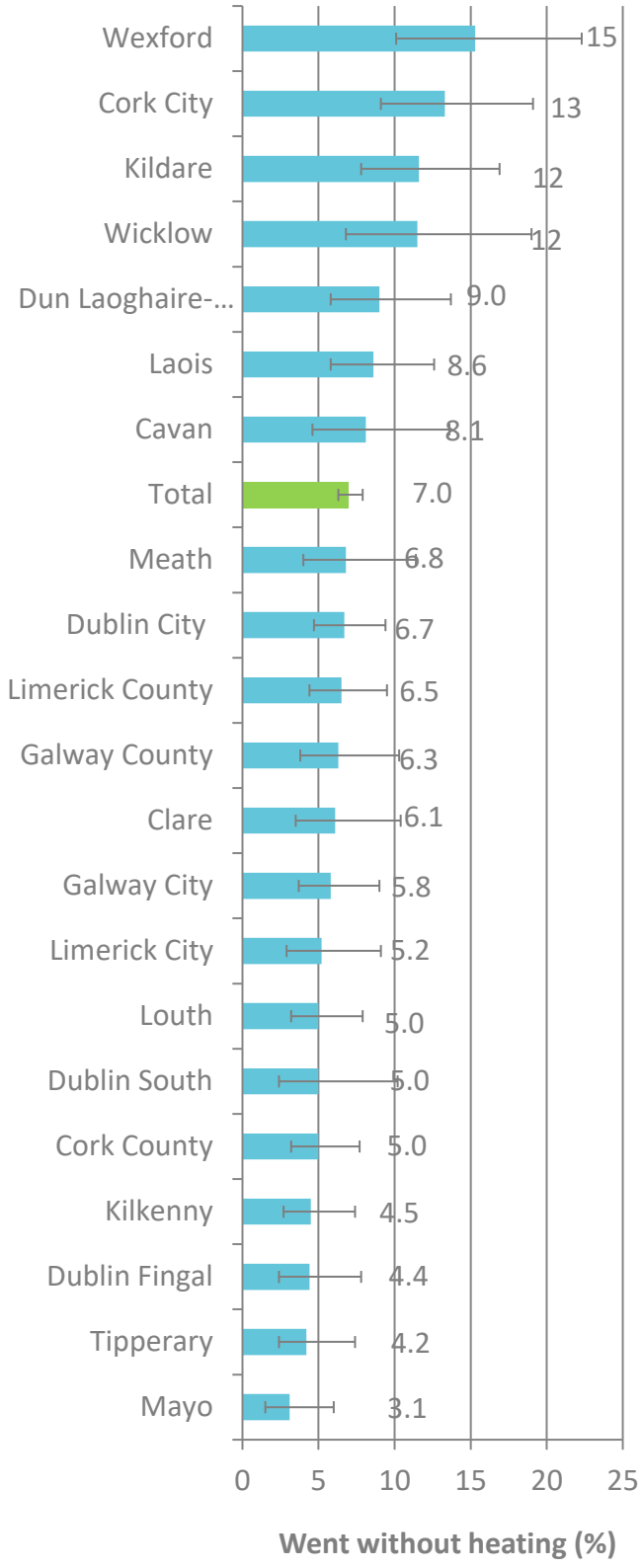
TABLE 11 HEATING PROBLEMS BY RESPONDENTS' HEALTH BEHAVIOURS

		Unable to keep home adequately warm		Gone without heating	
		Yes (%)	(95% CI)	Yes (%)	(95% CI)
Smoking status	Current smoker	16.1	(13.7,18.9)	13.3	(11.3,15.7)
	Past smoker	7.9	(6.5,9.6)	7.5	(6.2,9.1)
	Never smoker	9.7	(8.2,11.3)	4.5	(3.8,5.4)
Physical activity	Meets recommended (150+ minutes)	6.9	(5.8,8.1)	5.1	(4.3,6.1)
	Does not meet recommended (150+ minutes)	14.0	(12.3,15.9)	9.1	(7.9,10.4)
Total		10.4	(9.2,11.6)	7.0	(6.3,7.9)

As shown in Figure 4, among the 21 Local Authority areas, Mayo had the lowest percentage of respondents who reported that they were unable to keep their house adequately warm and also that they had to go without heating due to cost in the last 12 months. One-quarter of older adults in Cavan reported that they were unable to keep their house adequately warm, while 15.3% in Wexford went without heating due to cost in the last 12 months.

FIGURE 4 HEATING PROBLEMS BY LOCAL AUTHORITY AREA





HOUSING UPKEEP AND MAINTENANCE

One-in-five (20%) had difficulty with the cost of upkeep and one-in-five (21%) had difficulty carrying out maintenance themselves. As shown in Table 12, women and those aged 75+ were more likely than men to report having difficulty with housing maintenance. Those who are married or living with a partner were less likely to report any difficulties with maintenance.

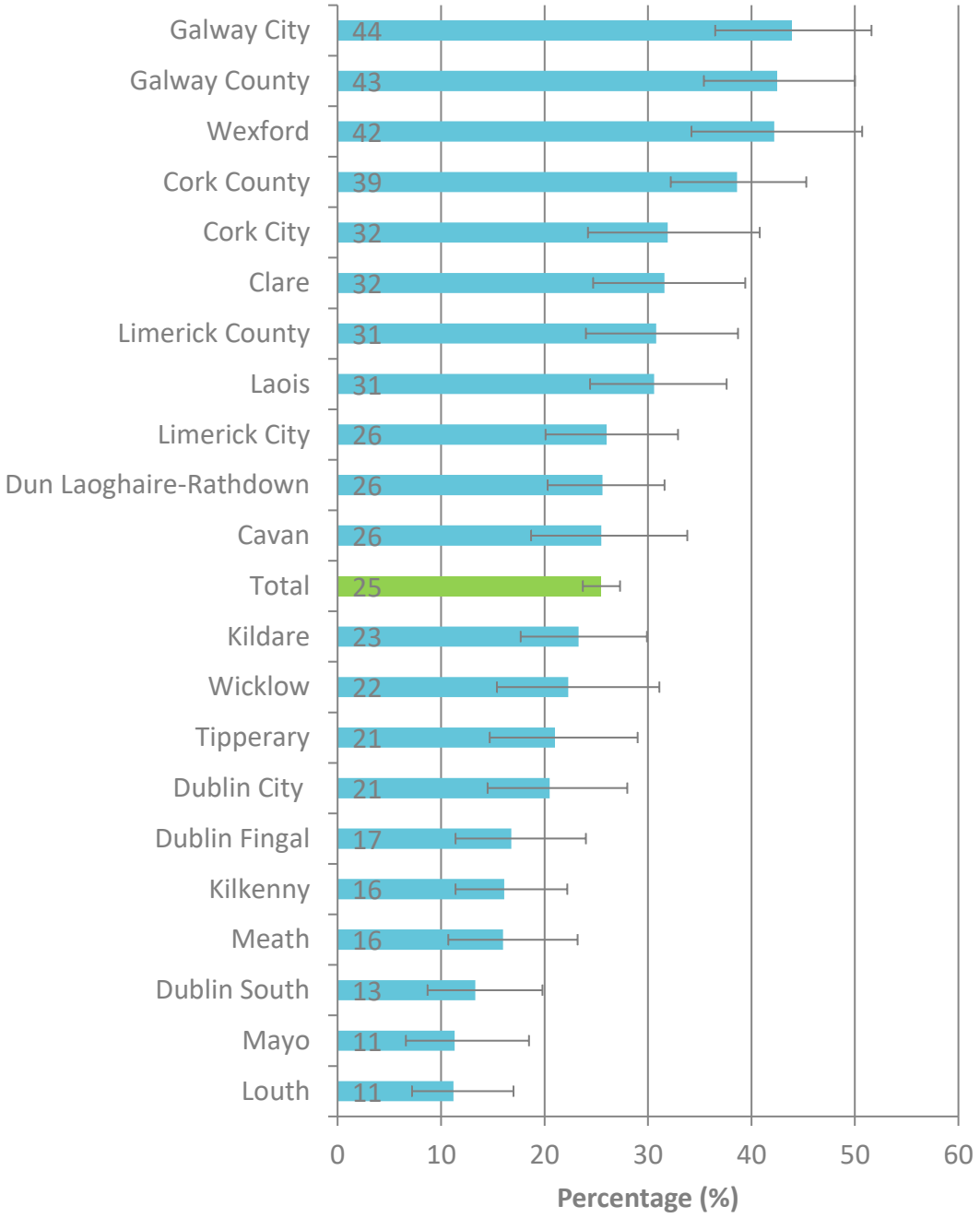
Those who are living alone, those who are out of work, and those with lower education were more likely to have difficulty with housing maintenance. In terms of location, adults who reported living in the open countryside were more likely to report difficulty carrying out maintenance whereas adults who reported living in inner city areas were more likely to report experiencing maintenance difficulties due to the financial cost.

TABLE 12 HOUSING MAINTENANCE BY RESPONDENTS' CHARACTERISTICS

		Any difficulty		Cost of maintenance		Carrying out maintenance	
		Yes (%)	(95% CI)	Yes (%)	(95% CI)	Yes (%)	(95% CI)
Age	Age 55-64	21.0	(19.0,23.2)	18.1	(16.2,20.2)	15.7	(13.9,17.7)
	Age 65-74	25.0	(22.7,27.4)	19.8	(17.8,22.1)	19.8	(17.8,22.0)
	Age 75+	35.5	(32.3,38.8)	25.6	(22.9,28.6)	31.8	(28.8,35.1)
Gender	Male	22.2	(20.3,24.3)	18.0	(16.3,19.9)	16.9	(15.2,18.7)
	Female	28.3	(26.2,30.6)	22.3	(20.3,24.4)	23.9	(21.8,26.1)
Marital status	Single (never married)	32.9	(28.6,37.5)	27.9	(24.0,32.2)	28.2	(24.0,32.9)
	Married/Living with partner	19.4	(17.8,21.2)	15.0	(13.5,16.6)	14.7	(13.3,16.3)
	Separated/divorced	36.6	(31.2,42.3)	33.5	(28.4,38.9)	29.2	(24.3,34.6)
	Widowed	38.6	(35.2,42.2)	30.3	(27.1,33.6)	33.8	(30.6,37.2)
Household composition	Living alone	37.4	(34.3,40.5)	30.4	(27.7,33.4)	32.4	(29.5,35.4)
	Living with spouse/partner	20.0	(18.2,21.9)	15.2	(13.6,16.9)	15.4	(13.8,17.1)
	Other (spouse & family/family only/non-family)	23.7	(20.7,27.0)	20.3	(17.5,23.4)	18.2	(15.5,21.2)
Occupational status	Retired	27.5	(25.4,29.8)	20.8	(18.9,22.8)	23.1	(21.1,25.3)
	Employed/self-employed	16.1	(14.0,18.3)	12.7	(10.9,14.8)	11.3	(9.6,13.2)
	Out of work	37.2	(32.6,42.0)	33.9	(29.5,38.7)	28.3	(24.2,32.8)
	Looking after home/family	26.4	(23.1,29.9)	22.5	(19.5,25.9)	22.4	(19.2,25.9)
Income (bands)	€501 up to €1,000	43.3	(39.5,47.3)	37.1	(33.3,41.1)	37.1	(33.3,41.1)
	€1,001 up to €1,500	32.8	(29.0,36.8)	27.2	(23.7,31.0)	26.7	(23.1,30.6)
	€1,501 up to €2,500	21.8	(18.8,25.2)	17.6	(15.1,20.5)	16.6	(13.9,19.8)
	€2,501 or more	17.9	(15.1,21.1)	12.4	(10.2,15.1)	12.5	(10.4,15.0)
	Missing	20.3	(18.0,22.7)	15.2	(13.1,17.5)	16.9	(14.8,19.2)
Material deprivation	No	22.7	(21.0,24.5)	17.3	(15.8,18.9)	18.3	(16.7,19.9)
	Yes	58.0	(52.6,63.2)	54.4	(49.0,59.7)	47.3	(41.8,52.9)
Educational attainment	Primary or less	30.5	(27.6,33.7)	24.7	(22.0,27.6)	26.0	(23.3,28.8)
	Secondary	23.9	(22.0,26.0)	19.2	(17.4,21.2)	18.6	(16.9,20.5)
	Tertiary	19.6	(17.3,22.2)	14.9	(12.9,17.2)	15.4	(13.2,17.8)
Location of home	Open countryside	30.3	(26.9,33.9)	22.1	(19.1,25.5)	25.3	(22.2,28.7)
	Village	25.3	(21.7,29.2)	20.2	(16.9,23.9)	19.9	(16.6,23.6)
	Town	22.9	(20.0,26.2)	18.6	(15.9,21.6)	18.2	(15.7,21.0)
	City (suburb)	23.7	(20.6,27.0)	19.8	(17.0,22.8)	18.7	(15.8,22.1)
	City (inner)	25.2	(14.5,40.2)	23.4	(13.8,36.9)	22.0	(12.3,36.2)
Total		25.4	(23.7,27.3)	20.3	(18.7,22.0)	20.6	(18.9,22.3)

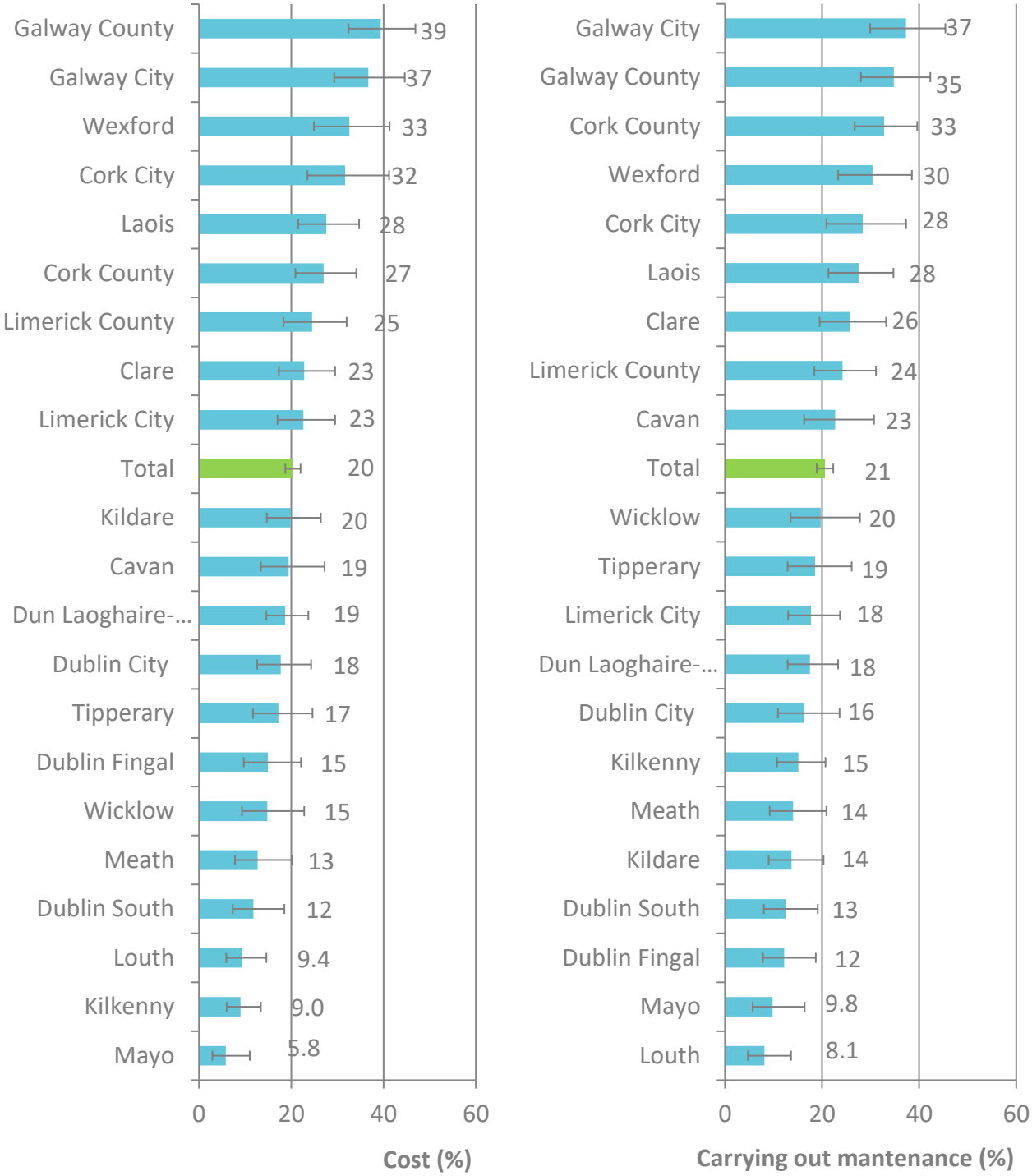
As shown in Figures 4 and 5 below, Galway City and Galway County had the highest percentage of adults aged 55 years and older who reported difficulties with housing maintenance. Louth, Mayo and South Dublin had the lowest proportion of housing maintenance problems.

FIGURE 5 HOUSING MAINTENANCE PROBLEMS, BY LOCAL AUTHORITY AREA



Note: Includes respondents who have difficulty with cost, carrying out maintenance, or both.

FIGURE 6 PROBLEMS WITH COST AND CARRYING OUT MAINTENANCE, BY LOCAL AUTHORITY AREA



THE RELATIONSHIP BETWEEN HOUSING CONDITIONS, FACILITIES AND HEATING AND HEALTH

Poor housing conditions and inadequate heating can impact on health status in several ways, including direct exposure to risks for specific diseases (32), reduced expenditure in other areas important to health such as diet (33) and increased stress and anxiety associated with housing affordability (34) and maintenance. Across Europe, a social gradient has been found whereby poor housing conditions have a disproportionately negative affect on those who are less affluent (35).

The respiratory problems considered in this report are asthma and chronic lung disease which includes chronic bronchitis and emphysema. As shown in Table 13, overall, 8.3% of respondents had at least one of these respiratory problems with 5.4% reporting that they had asthma and 3.9% reporting a chronic lung disease.

TABLE 13 RESPIRATORY PROBLEMS

Condition	Yes (%)	(95% CI)
Asthma	**5.4**	(4.8,6.1)
Chronic lung disease	**3.9**	(3.3,4.4)
Any respiratory problem	**8.3**	(7.5,9.1)

The HaPAI survey asked if respondents had any of four bone problems (Table 14). Arthritis was the most commonly cited condition (31.3%) followed by osteoporosis (9.3%), hip fracture (3.5%), and wrist fracture (2.1%). Taken together, 37% of respondents had one or more of these conditions.

TABLE 14 BONE CONDITIONS

Condition	Yes (%)	(95% CI)
Arthritis	**31.3**	(29.7,33.0)
Wrist fracture	**2.1**	(1.7,2.6)
Hip fracture	**3.5**	(3.1,4.1)
Osteoporosis	**9.3**	(8.5,10.3)
Any bone condition	**37.0**	(35.2,38.8)

Table 15 shows the proportion of adults aged 55 years and older who reported a respiratory or bone condition, according to a number of socio-demographic characteristics. The highest prevalence of respiratory conditions was reported by those aged 65-74 years, although this was not significantly different from those aged 75 years and older. On the other hand, the prevalence of bone conditions increased with age so that more than half of adults (55.7%) aged 75 years and older reported at least one of the bone conditions considered here.

While a similar proportion of men and women had a respiratory condition, a higher proportion of women than men had a bone condition. There was little difference in the prevalence of respiratory conditions according to marital status while widowed respondents were significantly more likely than others to have a bone condition.

Likely related to this, we found that older adults who lived alone were more likely to report both conditions. In terms of occupational status, out of work respondents were the most likely group to have a respiratory condition while those in employment were least likely. A significantly greater proportion of those in retirement, those out of work and those looking after the home/family reported having a bone condition compared to those in employment.

There was some evidence of a u-shaped relationship for household income and respiratory conditions, with a higher proportion of those earning in the middle of the income range reporting greater respiratory conditions. The relationship between household income and bone conditions was more linear with the proportion of respondents who reported a condition higher in lower income groups. However, this result should be interpreted cautiously due the difficulty of accurately capturing income information in surveys and subsequent large amount of missing information.

Adults aged 55 years and older who were materially deprived were significantly more likely to report these problems with 16.9% (vs. 7.6%) reporting a respiratory condition and 55.6% (vs. 41.1%) reporting a bone condition. There was a clear education gradient with the likelihood of having one of the conditions lowest among those with the highest levels of education.

Finally, there was little difference in the prevalence of respiratory conditions according to where respondents live while the rate of bone conditions was highest among those living in the open countryside.

TABLE 15 RESPIRATORY AND BONE CONDITIONS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS AND SOCIO-ECONOMIC STATUS

		Respiratory problems		Bone conditions	
Characteristic		Yes (%)	(95% CI)	Yes (%)	(95% CI)
Age	Age 55-64	**7.5**	(6.4,8.6)	**23.8**	(21.7,26.0)
	Age 65-74	**9.3**	(8.0,10.7)	**37.4**	(35.0,39.8)
	Age 75+	**8.6**	(7.0,10.6)	**55.7**	(52.6,58.7)
Gender	Male	**8.0**	(7.0,9.1)	**29.1**	(27.0,31.3)
	Female	**8.6**	(7.5,9.7)	**40.4**	(38.3,42.6)
Marital status	Single (never married)	**9.9**	(7.8,12.6)	**36.2**	(32.3,40.2)
	Married/Living with partner	**7.1**	(6.3,8.0)	**28.9**	(26.9,30.8)
	Separated/divorced	**11.3**	(8.5,15.0)	**44.9**	(39.2,50.6)
	Widowed	**10.4**	(8.7,12.4)	**52.9**	(49.6,56.2)
Household composition	Living alone	**10.9**	(9.4,12.5)	**46.4**	(43.6,49.3)
	Living with spouse/partner	**7.2**	(6.3,8.2)	**29.9**	(27.8,32.1)
	Other (spouse and family, family only, or non-family)	**7.6**	(6.1,9.4)	**33.4**	(30.2,36.7)
Occupational status	Employed/self-employed	**5.2**	(4.1,6.4)	**17.1**	(14.9,19.5)
	Retired	**8.5**	(7.5,9.7)	**41.6**	(39.5,43.8)
	Out of work	**15.5**	(12.5,19.1)	**37.7**	(33.1,42.5)
	Looking after home/family	**8.0**	(6.4,9.9)	**41.5**	(38.0,45.2)
Income (bands)	€501 up to €1,000	**9.6**	(8.0,11.4)	**46.4**	(42.4,50.5)
	€1,001 up to €1,500	**12.0**	(9.6,14.9)	**44.5**	(40.6,48.5)
	€1,501 up to €2,500	**8.6**	(7.1,10.5)	**35.4**	(32.2,38.7)
	€2,501 or more	**5.5**	(4.3,7.0)	**31.0**	(27.1,35.1)
	Missing	**7.3**	(6.2,8.6)	**27.6**	(25.1,30.4)
Material deprivation	No	**7.6**	(6.9,8.4)	**33.7**	(31.9,35.5)
	Yes	**16.9**	(13.8,20.6)	**55.6**	(50.6,60.6)
Educational attainment	Primary or less	**11.7**	(10.0,13.7)	**43.8**	(40.8,46.8)
	Secondary	**7.1**	(6.3,8.1)	**32.5**	(30.4,34.6)
	Tertiary	**4.7**	(3.7,5.8)	**25.2**	(22.8,27.9)
Location of home	Open countryside	**9.4**	(7.9,11.2)	**42.1**	(38.9,45.4)
	Village	**7.7**	(6.2,9.5)	**32.6**	(29.3,36.0)
	Town	**7.8**	(6.5,9.2)	**34.9**	(32.1,37.9)
	City (suburb)	**9.0**	(5.3,14.9)	**30.8**	(21.7,41.7)
	City (inner)	**8.0**	(6.4,9.9)	**31.4**	(28.0,35.1)
Total		**8.3**	(7.5,9.1)	**35.1**	(33.4,36.8)

HOUSING AND RESPIRATORY CONDITIONS

In this final section we summarise the results of statistical analysis to determine the association between each type of housing problem and respiratory conditions. The statistical models are presented at the end of results summary (Tables 16 to 18).

Housing facilities and respiratory conditions

Table 16 shows a series of mixed effects logistic regression models that examined the association between respondents' housing facility problems and respiratory conditions. The first model (shown in Table 16) shows a strong independent association between the two variables. Respondents who reported problems with one or more of the housing facilities listed were 31% more likely to also report a respiratory condition.

In the second model presented in Table 16, we tested whether this association remains when controlling for respondents' tobacco smoking status (current smoker, past smoker, or never smoked) and whether or not they meet the WHO recommendation of 150 minutes of rigorous or moderate physical activity per week. The results of this analysis show that the association between housing facility problems and respiratory conditions remained, albeit weakened, even when smoking and physical activity were both controlled for.

We also found that past and current smokers were more than twice as likely as respondents who never smoked to report a respiratory condition. Also, respondents who were physically active for 150 minutes or more per week were less likely than their peers to have a respiratory problem.

The third model shown in Table 16 includes a number of socio-demographic characteristics. These were included to further test the strength of the relationship between housing facility problems and respiratory conditions. The inclusion of these characteristics fully accounted for the independent association observed in the first two models so that there was no longer a statistically significant association between housing facility problems and respiratory conditions.

Instead, we found that smoking, low physical activity, lower education, being female, material deprivation, and being engaged full-time looking after the family and/or household, were all strongly associated with respiratory conditions. Furthermore, compared to those living in the open countryside, those living in villages or large towns were less likely to report respiratory conditions.

When these results are taken together we can conclude that the relationship between facilities and respiratory problems is fully explained by health behaviours and socio-demographic characteristics.

Housing conditions and respiratory conditions

Table 17 shows the relationship between poor housing conditions, such as damp and rot, and respiratory problems. There was a strong independent association between the two: respondents who reported condition problems were 89% more likely than those who reported no such problems to have at least one respiratory condition.

The inclusion of smoking status and physical activity in the model (model 2) explained some of this relationship but respondents who reported housing condition problems were still 64% more likely than those who reported no such problems to have at least one respiratory problem.

The association between housing conditions and respiratory problems was also not explained by different socio-demographic characteristics. Even when controlling for differences in health behaviours (smoking and physical activity) and socio-demographic characteristics, poor housing conditions was still associated with a 37% greater likelihood of having a respiratory condition.

Being a former smoker was the strongest predictor of respiratory problems: past smokers were more than twice as likely as those who have never smoked to report a respiratory problem. As expected, current smokers also had an increased likelihood of reporting respiratory problems. Meeting the weekly recommended level of physical activity significantly was associated with a significant reduction in the likelihood of having a respiratory problem.

The inclusion of a number of socio-demographic indicators in model 3 (Table 17) did not fully account for the relationship between poor housing conditions and respiratory conditions. As well as this relationship and the association between poorer health behaviours and respiratory conditions, we also found that women were more likely than men to have respiratory conditions as well as those who were out of work compared to retirees.

Lower education and material deprivation were also associated with an increased likelihood of respiratory problems while living in a village or large town (compared to the open countryside) was associated with a decreased likelihood of respiratory problems.

Heating problems and respiratory conditions

Table 18 shows the relationship between heating problems and respiratory conditions. Specifically, respondents were asked if they had been unable to keep their home adequately warm in the last 12 months.

There was a strong independent association between the two: respondents who were unable to keep their home adequately warm were 82% more likely to have a respiratory condition. While the strength of this relationship was weakened by the inclusion of smoking status and physical activity in the second model, it remained strong and statistically significant with those who were unable to keep their home adequately warm 62% more likely to have a respiratory condition.

Being a current or former smoker was also associated with an increased likelihood of having a respiratory condition while meeting the recommended levels of weekly physical activity was associated with a reduced likelihood.

The association between respiratory conditions and the inability to keep a house warm in the previous 12 months remained strong even after the inclusion of a broad range of health behaviours and socio-demographic characteristics (model 3). This suggests that the inability to adequately heat ones' home is an independent

risk factor for respiratory conditions. As with the earlier models (Tables 16 and 17) the strongest socio-demographic predictors of respiratory conditions were being female, lower education, being out of work, material deprivation, and living in a village or large town (compared to living in the open countryside).

TABLE 16 ASSOCIATIONS BETWEEN RESPONDENTS' RESPIRATORY CONDITIONS, HOUSING FACILITIES, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
Characteristics		OR	95% CI	OR	95% CI	OR	95% CI
Housing facility problems	No facility problems			Reference			
	Facility problems	**1.31**	(1.11-1.54)	**1.19**	(1.01-1.41)	**1.02**	(0.86-1.22)
Smoking status	Never smoked			Reference			
	Current smoker			**2.04**	(1.68-2.48)	**1.74**	(1.42-2.15)
	Past smoker			**2.42**	(2.05-2.84)	**2.36**	(1.99-2.79)
Meets physical activity guidelines	No			Reference			
	Yes			**0.51**	(0.44-0.60)	**0.63**	(0.54-0.73)
Education	3rd Level			Reference			
	Primary/None					**1.85**	(1.46-2.35)
	Secondary					**1.41**	(1.13-1.75)
Age group	55-64			Reference			
	65-74					**1.17**	(0.94-1.44)
	75+					**1.07**	(0.83-1.37)
Gender	Male			Reference			
	Female					**1.24**	(1.05-1.46)
Marital status	Married or living with a partner			Reference			
	Single (never married)					**1.01**	(0.68-1.49)
	Separated / divorced					**1.13**	(0.75-1.70)
	Widowed					**1.04**	(0.72-1.49)
Household composition	Living alone			Reference			
	Living with spouse or partner					**0.90**	(0.62-1.29)
	Other (spouse and family/family only/ non-family)					**0.93**	(0.71-1.22)
Employment Status	Retired			Reference			
	Paid employment					**1.21**	(0.94-1.55)
	Looking after home/family					**2.01**	(1.50-2.69)
	Other					**1.28**	(0.95-1.73)

Table 16 continued

		Model 1		Model 2		Model 3	
Characteristics		**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Income	€501 up to €1,000			Reference			
	€1,001 up to €1,500					**1.22**	(0.96-1.56)
	€1,501 up to €2,500					**1.23**	(0.96-1.58)
	€2,501 or more					**1.13**	(0.84-1.52)
	Missing					**1.03**	(0.81-1.31)
Material deprivation	No			Reference			
	Yes					**1.73**	(1.37-2.18)
Location	Open countryside			Reference			
	Village					**0.75**	(0.59-0.95)
	Town (1500+ population)					**0.78**	(0.62-0.98)
	City (inner)					**0.74**	(0.46-1.17)
	City (suburb)					**0.86**	(0.66-1.12)
Constant		**0.79**	(0.69,0.91)	**0.71**	(0.06,0.08)	**0.03**	(0.02,0.06)

TABLE 17 ASSOCIATIONS BETWEEN RESPONDENTS' RESPIRATORY CONDITIONS, HOUSING CONDITION, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Housing condition problems	No conditions problems			Reference			
	Conditions problems	**1.89**	(1.55-2.30)	**1.64**	(1.34-2.00)	**1.37**	(1.11-1.69)
Smoking status	Never smoked			Reference			
	Current smoker			**2.00**	(1.64-2.42)	**1.73**	(1.41-2.13)
	Past smoker			**2.41**	(2.04-2.83)	**2.35**	(1.99-2.78)
Physical activity	Does not met recommended			Reference			
	Meets recommendations			**0.52**	(0.45-0.61)	**0.63**	(0.54-0.74)
Education	3rd Level			Reference			
	Primary/None					**1.83**	(1.44-2.32)
	Secondary					**1.41**	(1.13-1.75)
Age group	55-64			Reference			
	65-74					**1.17**	(0.95-1.44)
	75+					**1.06**	(0.83-1.37)
Gender	Male			Reference			
	Female					**1.24**	(1.05-1.46)
Marital status	Married or living with a partner			Reference			
	Single (never married)					**1.00**	(0.67-1.47)
	Separated/divorced					**1.11**	(0.74-1.67)
	Widowed					**1.04**	(0.72-1.49)
Household composition	Living alone			Reference			
	Living with spouse or partner					**0.90**	(0.62-1.29)
	Other (spouse and family, family only, or non-family)					**0.92**	(0.71-1.21)
Employment Status	Retired			Reference			
	Employed/self-employed					**1.21**	(0.94-1.55)
	Out of work					**1.99**	(1.49-2.66)
	Looking after home or other					**1.30**	(0.97-1.75)

Table 17 continued

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000			Reference			
	€1,001 up to €1,500					**1.23**	(0.96-1.56)
	€1,501 up to €2,500					**1.25**	(0.97-1.60)
	€2,501 or more					**1.14**	(0.85-1.54)
	Missing					**1.05**	(0.83-1.33)
Material deprivation	No			Reference			
	Yes					**1.64**	(1.30-2.07)
Location	Open countryside			Reference			
	Village					**0.75**	(0.60-0.95)
	Town (1500+ population)					**0.79**	(0.63-0.99)
	City (inner)					**0.74**	(0.47-1.18)
	City (suburb)					**0.87**	(0.67-1.13)
Constant		**0.08**	(0.07,0.09)	**0.07**	(0.06,0.08)	**0.03**	(0.01,0.06)

TABLE 18 ASSOCIATIONS BETWEEN RESPONDENTS' RESPIRATORY CONDITIONS, HEATING PROBLEMS, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Heating problems	No heating problems			Reference			
	Heating problems	**1.82**	(1.48-2.22)	**1.62**	(1.32-2.00)	**1.28**	(1.02-1.60)
Smoking status	Never smoked			Reference			
	Current smoker			**1.98**	(1.63-2.41)	**1.72**	(1.39-2.12)
	Past smoker			**2.45**	(2.08-2.89)	**2.39**	(2.02-2.83)
Physical activity	Does not met recommended			Reference			
	Meets recommendations			**0.52**	(0.45-0.61)	**0.63**	(0.54-0.74)
Education	3rd Level			Reference			
	Primary/None					**1.86**	(1.46-2.37)
	Secondary					**1.41**	(1.13-1.75)
Age group	55-64			Reference			
	65-74					**1.16**	(0.94-1.43)
	75+					**1.07**	(0.84-1.38)
Gender	Male			Reference			
	Female					**1.25**	(1.06-1.47)
Marital status	Married or living with a partner			Reference			
	Single (never married)					**1.00**	(0.67-1.48)
	Separated/divorced					**1.12**	(0.75-1.69)
	Widowed					**1.04**	(0.72-1.50)
Household composition	Living alone			Reference			
	Living with spouse or partner					**0.90**	(0.62-1.30)
	Other (spouse and family, family only, or non-family)					**0.92**	(0.70-1.20)
Employment Status	Retired			Reference			
	Employed/self-employed					**1.21**	(0.94-1.55)
	Out of work					**2.01**	(1.50-2.70)
	Looking after home or other					**1.25**	(0.93-1.69)

Table 18 continued

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000				Reference		
	€1,001 up to €1,500					**1.22**	(0.96-1.56)
	€1,501 up to €2,500					**1.22**	(0.95-1.57)
	€2,501 or more					**1.13**	(0.84-1.52)
	Missing					**1.01**	(0.79-1.28)
Material deprivation	No				Reference		
	Yes					**1.62**	(1.28-2.06)
Location	Open countryside				Reference		
	Village					**0.76**	(0.60-0.96)
	Town (1500+ population)					**0.78**	(0.62-0.98)
	City (inner)					**0.74**	(0.47-1.18)
	City (suburb)					**0.86**	(0.66-1.12)
Constant		**0.08**	(0.07,0.09)	**0.07**	(0.06,0.08)	**0.03**	(0.02,0.06)

HOUSING AND BONE CONDITIONS

In this Section we turn our attention to bone conditions that include arthritis, wrist fracture, hip and fracture and osteoporosis. The statistical models are presented in tables 19 to 21 at the end of the section and follow the same steps as those in the previous chapter. Again, we examine in turn the relationship between bone conditions and housing facilities, housing conditions, and inadequate heating.

In each case, firstly we examine the independent association between housing problems and bone conditions (model 1); secondly, we test whether the relationship between the two can be explained by differences in smoking behaviour and physical activity (model 2); and finally, we control for a number of socio-demographic characteristics (model 3).

Housing facilities and bone conditions

Table 19 shows that there is a significant independent association between housing facility problems and bone conditions with facilities problems associated with a greater likelihood of bone conditions. As earlier, this is not evidence of a causal relationship between the two, merely a statistical association. The strength of this relationship decreases only slightly when smoking status and physical activity are controlled for.

As for these health behaviours, past smokers were significantly more likely than those who never smoked to have a bone condition. There was no difference between current smokers and respondents who never smoked. Unsurprisingly, given that conditions such as fractures and arthritis may impair mobility, there was a strong association between physical activity and bone conditions.

Respondents who did not meet the recommended 150 minutes or more physical activity per week were twice as likely to have a bone condition. The strength of this relationship is reduced from 0.51 (95% CI: 0.47-0.55 to 0.71 (95% CI: 0.64-0.78) when we control for socio-demographic characteristics.

The inclusion of health behaviours and socio-demographics in model 3, while lessening it, does not fully account for the association between housing facilities and bone conditions as it remains statistically significant.

Of the socio-demographic characteristics included in the model, women and older adults were more likely to report a bone condition as well as those with lower levels of education. Adults aged 55 years and older who were not married or cohabiting were more likely than those who were to have a bone condition. Those living in multi-person household were more likely than those who lived alone to have a bone condition. This may include some respondents who require care due to conditions such as arthritis.

Compared to the other occupational status groups, retirees were least likely to have bone condition. Material deprivation was again associated with an increased odds ratio of having a bone condition and lastly, compared to older adults living in the open countryside; those living in villages or city suburbs were less likely to have a bone condition.

Housing conditions and bone conditions

The second piece of analysis in this Section examined the association between problems with housing conditions and bone conditions. As shown in Table 20 there was a strong association between housing conditions and bone conditions with poorer housing associated with bone conditions.

The inclusion of health behaviours and socio-demographics in model 3, while lessening it, does not fully account for the association between housing condition problems and bone conditions as it remains statistically significant. With an Odds Ratio of 1.36 (95% CI: 1.17-1.57) we can conclude that adults who have housing condition problems are 36% more likely to have a bone condition. The association between housing condition problems and bone health is stronger than that observed for housing facility problems in the previous section, where the Odds Ratio was 1.27 (95% CI: 1.14-1.42).

Of the socio-demographic characteristics included in the model, women and older adults were more likely to report a bone condition. Lower levels of education were associated with an increased likelihood of bone conditions among older adults. Adults aged 55 years and older who were not married or cohabiting were more likely than those who were to have a bone condition.

Those living in multi-person household were more likely than those who lived alone to have a bone condition. This may include some respondents who require care due to conditions such as arthritis. Compared to the other occupational status groups, retirees were least likely to have bone condition. Material deprivation was again associated with an increased odds ratio of having a bone condition and lastly, compared to older adults living in the open countryside; those living in villages or city suburbs were less likely to have a bone condition.

Heating problems and bone conditions

Finally, the association between heating problems and bone conditions is shown in Table 21. There was a strong independent association between the two: respondents who had difficulty keeping their home adequately warm were 32% more likely to have a bone condition. Although the strength of this association was reduced to 1.23 (95% CI: 1.07-1.41) once smoking and physical activity were controlled for, it remained statistically significant. Of these two health behaviours, former smokers were more likely than those who never smoked to report a bone condition while those who did not reach the recommended 150 minutes or more of physical activity per week were twice as likely to do so.

As previously, the final model presented here also includes a range of socio-demographic characteristics. Most important here is the finding that there is no statistically significant association between older adults ability to keep their home adequately warm and bone conditions. In other words, the association between the two discussed above was due to differences in the socio-demographic characteristics and health behaviours of respondents, rather than there being any direct relationship.

Another interesting consequence of controlling for socio-demographic characteristics is that current smokers were also now found to be more likely than non-smokers to have a bone condition while the association between physical activity and bone conditions is in part explained by differences in socio-demographic characteristics.

TABLE 19 ASSOCIATIONS BETWEEN RESPONDENTS' BONE CONDITIONS, HOUSING FACILITY PROBLEMS, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Facility problems	No facility problems				Reference		
	Facility problems	**1.51**	(1.37-1.67)	**1.45**	(1.31-1.60)	**1.27**	(1.14-1.42)
Smoking status	Never smoked				Reference		
	Current smoker			**1.02**	(0.90-1.14)	**1.16**	(1.02-1.32)
	Past smoker			**1.52**	(1.38-1.67)	**1.60**	(1.44-1.77)
Physical activity	Does not met recommended				Reference		
	Meets recommendations			**0.51**	(0.47-0.55)	**0.71**	(0.64-0.78)
Education	3rd Level				Reference		
	Primary/None					**1.46**	(1.27-1.68)
	Secondary					**1.30**	(1.16-1.47)
Age group	55-64				Reference		
	65-74					**1.55**	(1.37-1.77)
	75+					**2.73**	(2.35-3.17)
Gender	Male				Reference		
	Female					**1.71**	(1.55-1.89)
Marital status	Married or living with a partner				Reference		
	Single (never married)					**1.29**	(1.01-1.64)
	Separated / divorced					**1.64**	(1.27-2.11)
	Widowed					**1.45**	(1.16-1.80)
Household composition	Living alone				Reference		
	Living with spouse or partner					**1.09**	(0.87-1.36)
	Other (spouse and family, family only, or non-family)					**1.19**	(1.01-1.41)
Employment Status	Retired				Reference		
	Employed/self-employed					**1.81**	(1.57-2.10)
	Out of work					**2.02**	(1.66-2.47)
	Looking after home or other					**1.71**	(1.43-2.04)

Table 19 continued

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000				Reference		
	€1,001 up to €1,500					**1.02**	(0.87-1.19)
	€1,501 up to €2,500					**1.12**	(0.96-1.30)
	€2,501 or more					**1.05**	(0.88-1.26)
	Missing					**0.79**	(0.69-0.92)
Material deprivation	No				Reference		
	Yes					**1.63**	(1.38-1.93)
Location	Open countryside				Reference		
	Village					**0.79**	(0.68-0.92)
	Town (1500+ population)					**0.98**	(0.85-1.14)
	City (inner)					**0.84**	(0.62-1.13)
	City (suburb)					**0.75**	(0.62-0.90)
Constant		**0.48**	(0.41,0.56)	**0.60**	(0.51,0.70)	**0.11**	(0.08,0.15)

TABLE 20 ASSOCIATIONS BETWEEN RESPONDENTS' BONE CONDITIONS, HOUSING CONDITION, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Condition problems	No condition problems				Reference		
	Condition problems	**1.68**	(1.47-1.91)	**1.55**	(1.35-1.77)	**1.36**	(1.17-1.57)
Smoking status	Never smoked				Reference		
	Current smoker			**1.01**	(0.90-1.14)	**1.16**	(1.02-1.32)
	Past smoker			**1.52**	(1.38-1.67)	**1.60**	(1.44-1.77)
Physical activity	Does not met recommended				Reference		
	Meets recommendations			**0.51**	(0.47-0.55)	**0.71**	(0.65-0.78)
Education	3rd Level				Reference		
	Primary/None					**1.45**	(1.26-1.66)
	Secondary					**1.30**	(1.15-1.46)
Age group	55-64				Reference		
	65-74					**1.55**	(1.37-1.77)
	75+					**2.72**	(2.35-3.16)
Gender	Male				Reference		
	Female					**1.71**	(1.55-1.89)
Marital status	Married or living with a partner				Reference		
	Single (never married)					**1.27**	(1.00-1.62)
	Separated / divorced					**1.62**	(1.26-2.08)
	Widowed					**1.45**	(1.16-1.81)
Household composition	Living alone				Reference		
	Living with spouse or partner					**1.08**	(0.87-1.35)
	Other (spouse and family, family only, or non-family)					**1.18**	(1.00-1.39)
Employment Status	Retired				Reference		
	Employed/self-employed					**1.82**	(1.58-2.11)
	Out of work					**2.02**	(1.66-2.47)
	Looking after home or other					**1.74**	(1.45-2.07)

Table 20 continued

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000				Reference		
	€1,001 up to €1,500					**1.02**	(0.88-1.19)
	€1,501 up to €2,500					**1.12**	(0.96-1.31)
	€2,501 or more					**1.05**	(0.88-1.26)
	Missing					**0.79**	(0.68-0.92)
Material deprivation	No				Reference		
	Yes					**1.68**	(1.41-2.00)
Location	Open countryside				Reference		
	Village					**0.80**	(0.69-0.92)
	Town (1500+ population)					**0.99**	(0.86-1.15)
	City (inner)					**0.86**	(0.64-1.17)
	City (suburb)					**0.76**	(0.63-0.91)
Constant		**0.51**	(0.44,0.60)	**0.64**	(0.54,0.74)	**0.12**	(0.08,0.16)

TABLE 21 ASSOCIATIONS BETWEEN RESPONDENTS' BONE CONDITIONS, HEATING PROBLEMS, SOCIO-DEMOGRAPHIC CHARACTERISTICS, AND SOCIO-ECONOMIC STATUS

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Condition problems	No condition problems				Reference		
	Condition problems	**1.32**	(1.16-1.52)	**1.23**	(1.07-1.41)	**1.06**	(0.91-1.24)
Smoking status	Never smoked				Reference		
	Current smoker			**1.03**	(0.92-1.16)	**1.16**	(1.02-1.33)
	Past smoker			**1.52**	(1.38-1.68)	**1.60**	(1.44-1.77)
Physical activity	Does not met recommended				Reference		
	Meets recommendations			**0.50**	(0.46-0.55)	**0.70**	(0.64-0.77)
Education	3rd Level				Reference		
	Primary/None					**1.47**	(1.28-1.69)
	Secondary					**1.3**	(1.16-1.47)
Age group	55-64				Reference		
	65-74					**1.55**	(1.36-1.76)
	75+					**2.73**	(2.35-3.16)
Gender	Male				Reference		
	Female					**1.72**	(1.56-1.90)
Marital status	Married or living with a partner				Reference		
	Single (never married)					**1.27**	(1.00-1.61)
	Separated / divorced					**1.63**	(1.27-2.10)
	Widowed					**1.43**	(1.14-1.78)
Household composition	Living alone				Reference		
	Living with spouse or partner					**1.06**	(0.85-1.33)
	Other (spouse and family, family only, or non-family)					**1.17**	(0.99-1.38)
Employment Status	Retired				Reference		
	Employed/self-employed					**1.81**	(1.56-2.09)
	Out of work					**2.03**	(1.67-2.48)
	Looking after home or other					**1.69**	(1.42-2.02)

Table 21 continued

		Model 1		Model 2		Model 3	
		OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000				Reference		
	€1,001 up to €1,500					**1.02**	(0.88-1.19)
	€1,501 up to €2,500					**1.12**	(0.96-1.31)
	€2,501 or more					**1.05**	(0.88-1.26)
	Missing					**0.79**	(0.68-0.92)
Material deprivation	No				Reference		
	Yes					**1.68**	(1.41-2.00)
Location	Open countryside				Reference		
	Village					**0.8**	(0.69-0.92)
	Town (1500+ population)					**0.99**	(0.86-1.15)
	City (inner)					**0.86**	(0.64-1.17)
	City (suburb)					**0.76**	(0.63-0.91)
Constant		**0.51**	(0.44,0.60)	**0.64**	(0.54,0.74)	**0.12**	(0.08,0.16)

CHAPTER FIVE CONCLUSIONS

5. CONCLUSIONS

Aging in place, the ability to stay in your own home as you age, is a key component of age-friendly environments and poor quality housing is often a barrier to older adults' ability to live independently in their own home. We have shown here that poorer standard of housing, as well as hindering 'ageing in place', is strongly associated with a number of adverse health outcomes. Numerous schemes to-date including The Better Energy Warmer Homes Scheme, Local Authority funding, the Warmer Homes strategy (20), Mobility Aids Grant Scheme (29), and the Housing Adaptation Grant for People with a Disability (31), have had some success in improving the homes of older adults which in turn enables them to continue living in their own homes into older age. However, our findings show that there is a sizeable number of adults aged 55+ who might benefit from targeted housing schemes.

Our findings with regard to respiratory conditions were broadly consistent across the three features of housing - facilities, conditions, and heating. With the exception of housing facilities, such as the absence of a bath or shower, health behaviours and socio-demographic characteristics failed to fully account for the relationship between housing and respiratory conditions among adults aged 55 years and older. This suggests that poorer housing, regardless of other factors, increases the risk of respiratory problems among older adults in Ireland.

We also identified a number of other characteristics of this population that were associated with an increased likelihood of both respiratory and bone conditions. Being a current or former smoker was associated with an increased risk. Interestingly, this risk was highest among former smokers, which suggests that quitters may have only stopped smoking when they felt that smoking was directly affecting their respiratory health. While we found no link between household income and respiratory conditions, material deprivation greatly increased the likelihood of having a respiratory condition, even when we adjusted for many other factors, including health behaviours.

Lower education was also strongly associated with both respiratory and bone conditions and this is consistent with research in a broad range of health outcomes that show a strong link between education and both health behaviours and health status outcomes (36).

It is important to emphasise that the findings reported here are based on a cross sectional analysis and we cannot therefore establish the causal direction of the any of the associations we have reported. For example, we know from other research that physical activity is protective against bone conditions but in the current analysis we cannot rule out reverse causality. It may be the case that having bone problems may lead to reduced physical activity.

When interpreting the results it is also important to bear in mind that all of the information provided is based on respondents' own reports, therefore we cannot entirely discount the possibility that in some cases it may be that the presence of a respiratory or bone condition a priori heightens respondents' awareness or criticism of the standard of their housing, therefore making them more likely to report problems. For example, a healthy person may find a certain level of damp acceptable and unproblematic whereas a person with asthma may be therefore primed to be more conscious of damp and rot.

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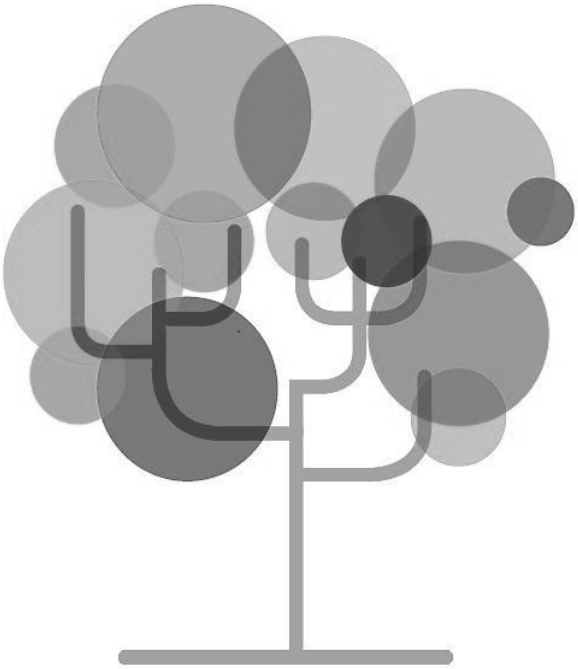

HEALTHY & POSITIVE
AGEING INITIATIVE