HEALTHY & POSITIVE
AGEING INITIATIVE

Preventative healthcare utilisation: 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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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

Positive ageing strategies have been established globally to enhance the wellbeing, health and quality of life of older people. The promotion of preventative health approaches is an objective of the National Positive Ageing Strategy and a core element of the World Health Organisation's Age-Friendly Cities -A guide.

Supporting evidence-informed strategies and programmes

The purpose of this study was to provide up-to-date evidence about the uptake of preventative health interventions, including flu vaccination, mammograms, blood tests to test for cholesterol, blood pressure checks, prostate examinations and PSA blood tests among older people in Ireland and to identify factors that may explain differences between individuals and groups in the uptake rates of these screening programmes. For the first time in Ireland this information is reported at local level in order to support positive and healthy ageing programmes and schemes 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+

- Overall, 64.9% of adults aged 65 years and older were vaccinated against influenza in the previous 12 months.
- Among adults aged 55+, 75.3% had their cholesterol levels checked and 80.6% had their blood pressure tested.
- Half (52%) of the female respondents had a mammogram in the past year.
- Overall, 41.3% of men aged 65 years and older had a prostate examination in the previous 12 months while 50.6% had a PSA examination.
- Men with combined private and public health insurance were significantly more likely to have had a prostate and/or PSA examination.
- Health insurance cover is an important determinant of a range of health screening behaviours for both men and women.

Strategy pointer

Primary and secondary preventative health interventions are integral to ensuring that the population maintains good health into older age. Although a number of screening programmes have been a success in reaching at-risk populations, other preventative health measures such as screenings for prostate cancer may not be utilised by all who may benefit from them and this uneven distribution is at least partly shaped by material resources and health insurance coverage.

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CHAPTER ONE

INTRODUCTION

Positive ageing, age-friendly environments, and preventative health

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
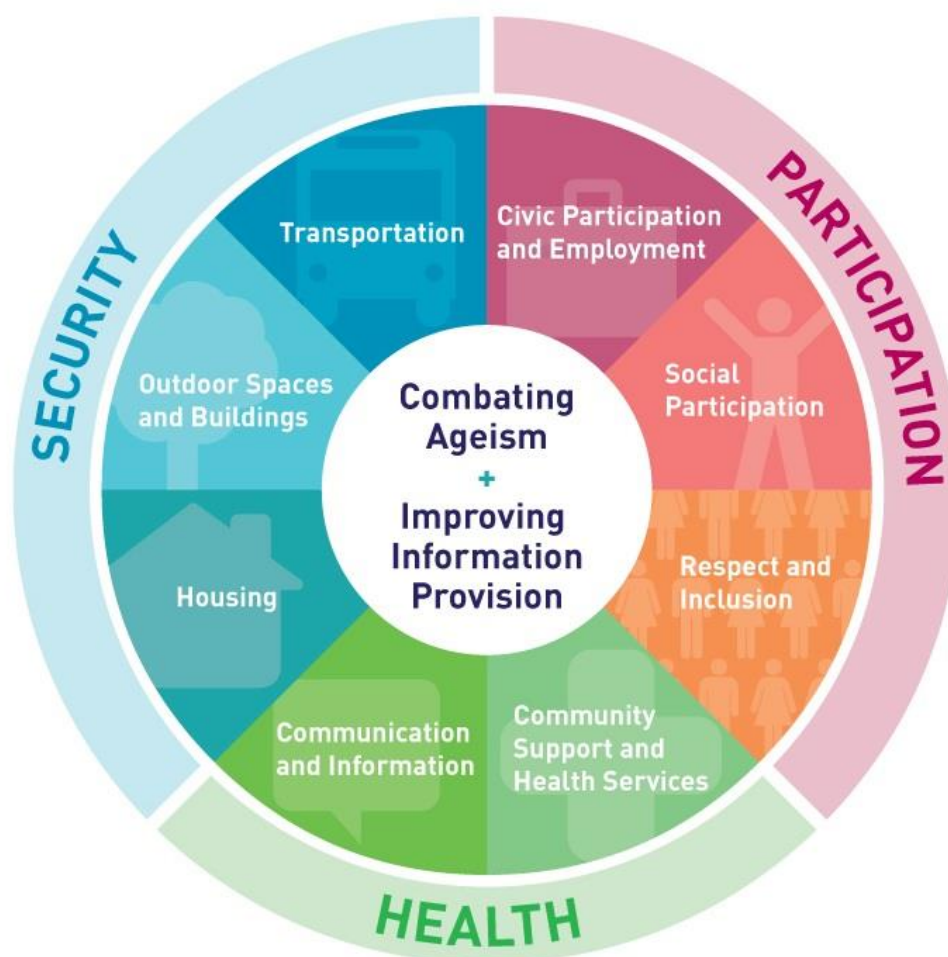
This report focuses on the WHO Age-friendly core domain of 'Community support and health services' which is aligned with Objective 2.1 which aims to "*prevent and reduce disability, chronic disease and premature mortality as people age by supporting the development and implementation of policies to reduce associated lifestyle factors*". This falls under Goal 2, to support people as they age to maintain, improve or manage their physical and mental health and wellbeing, of the NPAS.

Chronic diseases, also known as non-communicable diseases, are long-lasting, slow in progression and non-infectious. There are four main categories of chronic disease: cardiovascular disease, cancers, chronic respiratory diseases and diabetes (8). Chronic diseases are the leading causes of death and disease burden in Ireland. In 2015, 31% of deaths were attributed to cardiovascular disease, 29% of deaths were attributed to cancers, and 13% of deaths were attributed to chronic respiratory diseases (9).

In 2013, the WHO published the Global Action Plan for the Prevention and Control of Non-Communicable Diseases with the aim of reducing the occurrence of chronic

diseases by targeting four behavioural risk factors: tobacco use, unhealthy diet, alcohol overuse, and physical inactivity (9). In Ireland, following the publication of Healthy Ireland – A Framework for Improved Health and Wellbeing 2013-2025 (10), preventative health actions and strategies have been implemented to combat tobacco use, unhealthy eating, alcohol overuse, physical inactivity and poor mental health with the aim of reducing the risk of chronic disease and increasing healthy life expectancy (11,12). Meanwhile, since the 2006 National Cancer Strategy a range of cancer-preventing and health promoting actions have been implemented including the introduction of a national bowel screening programme and the national cervical screening programme (13).

STUDY AIMS

In this study, we will investigate the uptake of three primary preventative health interventions (flu vaccination, cholesterol blood test, and blood pressure check) and three secondary preventative health interventions (mammogram screening, prostate examination, and PSA blood test).

> Aim 1: Examine the uptake rates of the flu vaccination, mammograms, blood tests to test for cholesterol, blood pressure checks, prostate examinations and PSA blood tests among older adults within the previous 12 months.
>
> Aim 2: Identify factors and characteristics of individuals and/or target groups that may explain variations in the uptake rates of these screening services and flu vaccination.

This report is organised as follows: Section 2 outlines the methods used in this study. Section 3 presents the results of this study by firstly presenting a brief background on the flu vaccination, blood tests to test for cholesterol, blood pressure checks, prostate examinations and PSA blood tests. This is followed by a summary of the distribution of flu vaccinations, cholesterol blood tests, and blood pressure checks by the socio-demographic, socio-economic and health insurance coverage and geographic distribution in 21 Local Authority areas in Ireland.

The results section then examines factors associated with preventative health screenings; flu vaccination, a cholesterol blood test; having a blood pressure check in the previous 12 months.

We then present the results of analysis focussed on mammogram screening among women, and prostate and PSA blood tests among men. Section 5 contains the conclusions from the report.

CHAPTER TWO

METHODS

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

2. 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 +, living in 21 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; Limerick County; Kildare; Kilkenny; Laois; Louth; Meath; Wexford; Wicklow; Cavan; Cork City; Cork County; Mayo; and Tipperary. Data was collected between 2015 and 2016.

The target population for this survey includes all community-dwelling members of the population aged 55 + in each Local Authority. This sample did not include people aged 55 + 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+ in the household. One person aged 55+ 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. Respondents 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. A total of 10,540 surveys were completed.

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 1 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

The specific questions asked of respondents regarding each of the six preventative screening programmes are shown in Table 2. The question on mammograms was asked of women only, while only men were asked about prostate examinations and PSA blood tests.

Measures	Question
Flu Vaccination	During the past 12 months, have you received the flu vaccine?
Cholesterol blood test	During the past 12 months, have you received a blood test to test for cholesterol?
Blood pressure check	During the past 12 months, have you received a blood pressure check?
Mammogram	Women only: During the past 12 months, have you had a mammogram or an x-ray of the breast?
Prostate examination	Men only: During the past 12 months, have you had an examination of your prostate to screen for cancer?
PSA blood test	Men only: During the past 12 months, have you had a PSA blood test to screen for cancer?

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, socio-economic status, health status and healthcare indicators.

ANALYSIS

All descriptive statistics were computed using Stata (Version 14) and percentages are reported with 95% confidence intervals (95% CI). We completed a series of mixed effects logistic regression analyses to try to explain differences in preventative health update (vaccination and screening). 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). The aim of this analysis was to identify the socio-demographic, socio-economic, health status, access to health information, and health insurance coverage factors associated with non-use of flu vaccination and screening services.

TABLE 3 DEMOGRAPHIC, SOCIO-ECONOMIC, SOCIAL AND HEALTH MEASURES

Measures	Description
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 (without or without spouse/partner)
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 our 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.
Location of home	Open countryside, village or urban (town, city or city suburb)
Education	Primary or none, secondary, or third level
Self-rated health	How is your health in general? Very good or good, fair, or bad or very bad
Chronic conditions	None, one chronic condition, two or more chronic conditions
Access to health information	Do you ever experience difficulty getting information about health services or entitlements? Yes or no
Health insurance coverage	Type of cover; full medical card only, GP visit card only, private health insurance only, joint cover, no cover

SAMPLE CHARACTERISTICS

Sample characteristics are presented in Table 4. 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 4 RESPONDENT 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)

CHAPTER THREE

RESULTS

Distribution of immunisation, screening and testing by sample characteristics and factors associated with immunisation, screening and testing.

3. Results

3.1. PREVENTATIVE HEALTH AMONG MEN AND WOMEN

In this section we focus on flu vaccination among adults aged 65+, and cholesterol blood tests and blood pressures checks for adults aged 55+.

Flu vaccination

Influenza, more commonly known as flu, is an acute contagious respiratory illness that results from being infected with an influenza virus. Symptoms of influenza include fever, sore throat, headache, dry cough and sore muscles or joints (13). Immunisation is available against influenza in Ireland and is offered from September onwards every year before the influenza season begins. Influenza vaccination is recommended to children over the age of 6 months and adults with a chronic disease or syndrome, adults over the age of 50, healthcare workers, residents of nursing homes, pregnant women, those with immunosuppression due to disease or treatment, those working with farm animals, and companions of at-risk individuals (13). It is highly recommended that these high-risk groups get vaccinated as influenza could cause complications and potentially be life threatening.

During the 2015/2016 influenza season, in Ireland, 1,856 cases of influenza were hospitalised and 161 of these were admitted to the ICU. Hospitalisation was highest among children under the age of 5 and adults over the age of 65. Eighty-four deaths due to influenza were recorded during this season. It was reported that 89% of influenza-like-illness patients who were tested for the influenza virus were not vaccinated during the 2015/2016 season. Among influenza patients aged 65 and over, 64% were not vaccinated during the 2015/2016 season (14).

The EU recommends that 75% of older people get vaccinated against seasonal influenza (15), however, uptake of the flu vaccination during 2014/2015 failed to reach the recommended level (16). Thirty-six outbreaks of influenza were noted in the influenza season of 2015/2016, significantly less outbreaks than the influenza season of 2014/2015 during which 90 outbreaks of the virus were reported. The outbreaks occurred in 21 community hospitals/residential care facilities, 13 acute hospital settings and 2 schools (14). Increasing the uptake of influenza vaccination will lead to increased 'herd immunity'; this is when a sufficient amount of people are immunised against influenza, it decreases the chance of an influenza outbreak and in turn protects unimmunised individuals or those who are unable to get immunised from contracting the illness (17).

Flu vaccination uptake among older people has been associated with a range of demographic, socio-economic, health-related and behavioural factors (18). Age is associated with uptake of the flu vaccination, such that people over the age of 75 are more likely to get the flu vaccine (19, 20). Some studies suggest that men are more likely to get vaccinated than women (21, 22) and married people are more

likely to get vaccinated compared to single or widowed people (23). The association between flu vaccine uptake and education is inconsistent with studies reporting higher uptake rates among both higher education levels (24) and lower education levels (19). Lower socioeconomic status has continuously been associated with lower vaccination rates; however a reverse gradient has been documented within countries that have strongly implemented flu vaccination programs (18). Flu vaccination is higher among older people with chronic disease (19) and also among those who received the flu vaccine in the prior year (25). Older people who rate their health as 'poor' or 'fair' are more likely to get the flu vaccination than those who rate their health as 'good' (19,23) and smokers are less likely to receive the flu vaccination (26).

The flu vaccination is strongly recommended for people aged 65 years and older due to the high risk of complication from contracting the influenza virus. This section provides descriptive statistics on the uptake of the flu vaccination among older people, in particular people aged 65+. Just under two thirds (65%) of both men and women aged 65+ received the flu vaccination within the previous 12 months and three quarters of adults aged 75 years and older did so.

The flu vaccination is free to all medical card and GP only medical card holders in the Republic of Ireland, as well as a number of at-risk groups, including all persons aged 65 years and older.

Cholesterol blood test

Cholesterol levels are indicative of an individual's risk for a number of chronic diseases including heart disease, stroke and atherosclerosis (27).

High levels of cholesterol while asymptomatic are associated with an increased risk of developing coronary heart disease and stroke, with the risk being slightly greater for men than women (28). A blood test to examine cholesterol levels, also known as a lipid profile or lipid panel, typically reports 1) total cholesterol, 2) LDL cholesterol (bad cholesterol), 3) HDL cholesterol (healthy cholesterol), and 4) triglycerides. A result of five mmol/l or below is a healthy level of cholesterol in the blood. High levels of cholesterol may result from hereditary factors or consuming too much unsaturated fat (29) and other deleterious health behaviours. A healthy diet and body weight is recommended as the best defence against developing high cholesterol. Cholesterol blood tests are not available under the medical card scheme as they are deemed non-essential, therefore individuals must meet the cost of having the test.

Blood pressure check

High blood pressure is symptomatic of a range of chronic diseases including heart disease and stroke (30). A blood pressure reading shows the amount of work the heart has to do to pump blood around the body in order to provide it with the energy and oxygen it needs to function. A normal blood pressure reading is typically 120mmHg (systolic) over 80mmHg (diastolic). A reading of 140mmHg over 90mmHg or higher indicates high blood pressure. High blood pressure is caused by a

multitude of factors including being overweight, an unhealthy diet, the over consumption of sodium and the under consumption of fruit and vegetables (31).

Distribution of flu vaccinations, cholesterol blood tests and blood pressure checks

Table 5 shows the distribution of flu, and cholesterol blood tests, and blood pressure checks by the socio-demographic characteristics of participants. Flu vaccination results are reported for adults aged 65+ and cholesterol blood tests and blood pressure checks are reported for adults aged 55+. A similar proportion of men and women had been vaccinated against influenza in the previous 12 months while women were more likely than men to have had a cholesterol blood test and blood pressure check. There was a significantly higher uptake of all three screenings by older participants.

In terms of marital status, widowed respondents were the most likely group to have attended each of the health screenings which most likely reflects the older age profile of this group rather than there being a direct relationship between marital status and preventative health. This is supported by the fact that the average age of widowers is 76 years compared to 65 years for the other groups.

Older adults who live alone were most likely to have attended for each of the health screenings in the previous 12 months while those who lived in family households were least likely to have had a cholesterol blood test or blood pressure check. There is some evidence of an education gradient, with uptake of the three health screenings highest among those with the lowest levels of education. While this pattern might seem somewhat counter-intuitive at first, it can likely be explained by the fact that older respondents have lower levels of education on average and level of education is strongly correlated with the type of health insurance coverage people have which in turn effects access to and uptake of preventative health screening programs.

Turning to participants' principal economic status, take-up of flu vaccines was highest among those looking after the family home on a full-time basis and lowest among those in paid employment. On the other hand, cholesterol and blood pressure screening was highest among retirees and again lowest among those who were still economically active.

No clear pattern emerged with regard to household income although those who reported the highest income were least likely to have attended any of the three screenings. This may be explained by the fact that those with the highest incomes are also more likely to be younger, in paid employment, and have higher levels of education.

Finally, a higher percentage of respondents considered materially deprived had been vaccinated against influenza, while the opposite was true for cholesterol screening. There was no difference in blood pressure checks between deprived and not with 81% of both groups having been screened.

TABLE 5 UPTAKE OF THE FLU VACCINE, CHOLESTEROL BLOOD TEST, AND BLOOD PRESSURE BY SOCIO-DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Characteristic		Flu Vaccine		Cholesterol blood test		Blood pressure check	
		%	95% (CI)	%	95% (CI)	%	95% (CI)
Gender	Male	64.8	(62.5-67.4)	73.9	(71.8-75.9)	79.1	(77.1-81.0)
	Female	65.0	(62.2-67.2)	76.6	(74.5-78.5)	81.9	(80.0-83.7)
Age	55-64	n/a	n/a	66.7	(64.2-69.2)	72.6	(70.1-75.0)
	65-74	57.2	(54.8-59.6)	80.7	(78.6-82.6)	84.6	(82.6-86.3)
	75+	75.8	(73.2-78.2)	85.9	(83.8-87.8)	91.9	(90.2-93.4)
Marital status	Married/Living with partner	61.5	(59.0-63.9)	74.3	(72.3-76.3)	79.0	(77.0-80.9)
	Never married	64.9	(59.8-69.7)	73.6	(69.8-77.1)	79.3	(75.7-82.5)
	Separated/divorced	59.3	(50.6-67.5)	69.5	(64.6-74.1)	78.3	(73.9-82.1)
	Widowed	71.8	(68.7-74.7)	81.5	(78.9-83.9)	87.7	(85.3-89.7)
Household composition	Living alone	70.9	(68.2-73.4)	78.4	(76.1-80.6)	84.4	(82.2-86.3)
	Living with spouse	61.6	(59.0-64.1)	76.4	(74.3-78.4)	80.6	(78.5-82.5)
	Living with spouse and family or others	61.3	(55.3-66.9)	66.2	(62.2-70.0)	73.6	(69.7-77.1)
	Living with family or others but not spouse	60.3	(47.3-72.1)	74.8	(67.0-81.3)	85.7	(78.9-90.6)
Educational attainment	Primary or less	67.7	(64.8-70.4)	79.3	(76.7-81.7)	84.2	(81.7-86.4)
	Secondary	63.7	(60.9-66.5)	73.3	(71.2-75.4)	78.7	(76.6-80.7)
	Tertiary	59.6	(55.8-63.3)	73	(70.2-75.7)	78.9	(76.2-81.4)
Occupational status	Retired	66.1	(64.0-68.2)	81.6	(79.8-83.3)	86.7	(85.0-88.2)
	Employed (including self-employed)	41.9	(36.5-47.5)	63.3	(60.0-66.4)	67.5	(64.2-70.7)
	Looking after home/family	69.4	(64.4-73.9)	76.8	(73.3-79.9)	84.1	(81.0-86.8)
	Other	63.5	(53.4-72.6)	71.4	(67.3-75.2)	77.8	(73.8-81.3)
Income (bands)	€501 up to €1,000	70.3	(66.7-73.7)	77.3	(74.3-80.0)	83	(80.2-85.5)
	€1,001 up to €1,500	68.9	(65.0-72.5)	81.5	(78.4-84.3)	84.9	(81.7-87.5)
	€1,501 up to €2,500	62.4	(58.8-65.9)	77.5	(74.4-80.3)	83.4	(80.4-86.1)
	€2,501 or more	57.9	(53.5-62.1)	72.0	(68.4-75.3)	77.0	(73.5-80.1)
	Missing	64.1	(60.1-68.0)	72.0	(68.9-74.8)	77.7	(74.8-80.3)
Household deprivation	No	64.1	(62.0-66.1)	75.8	(74.1-77.5)	80.8	(79.1-82.4)
	Yes	75.8	(70.1-80.6)	72.1	(67.3-76.4)	81.0	(77.0-84.4)
Total		64.9	(62.9-66.8)	75.3	(73.6-76.9)	80.6	(79.0-82.1)

Note: flu vaccination reported for adults aged 65 and older only.

Table 6 shows the percentage of adults aged 55+ who were vaccinated against influenza, had cholesterol blood tests, and blood pressure checks according to the type of health insurance coverage they had. A high proportion of respondents who had joint health insurance coverage, that is, those with both private and public insurance, had been vaccinated against influenza while less than one third of those with no coverage at all had done so. Again, those with joint coverage, followed by those with a full medical card were most likely to have been screened for cholesterol in the previous 12 months or had their blood pressure checked.

TABLE 6 UPTAKE OF THE FLU VACCINE, CHOLESTEROL BLOOD TEST, AND BLOOD PRESSURE CHECK, BY HEALTH INSURANCE COVERAGE

Health insurance coverage	Flu vaccine		Cholesterol blood test		Blood pressure test	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Full medical card only	70.8	(68.1-73.3)	80.7	(78.6-82.6)	86.5	(84.7-88.1)
GP visit card only	51.2	(39.6-62.7)	62.9	(53.9-71.1)	68.0	(59.8-75.2)
Health insurance only	45.8	(41.5-50.2)	72.2	(69.4-74.9)	77.2	(74.4-79.7)
Joint cover	72.1	(69.1-74.9)	84.6	(82.0-86.9)	89.5	(87.1-91.5)
No cover	28.9	(21.9-37.1)	48.7	(43.3-54.0)	53.8	(48.2-59.3)
Total	64.9	(62.9-66.8)	75.3	(73.6-76.9)	80.6	(79.0-82.1)

Note: flu vaccination reported for adults aged 65 and older only.

Geographic differences

Uptake rates for flu vaccination, cholesterol blood test, and blood pressure checks within each Local Authority area survey are presented in Figures 3-5 in the following pages. Figures 2 (page 26) shows that the overall uptake of the flu vaccination among the over 65s ranged from 46% to 79% across the 21 Local Authority areas. Figure 3 (page 27) shows t that overall uptake of the cholesterol blood test among the over 55s ranged from 61% to 87% across the 21 Local Authority areas. Figure 4 (page 29) shows that overall uptake of blood pressure checks among the over 55s ranged from 65% to 90% across the 21 Local Authority areas.

FIGURE 2 FLU VACCINE UPTAKE WITHIN THE PREVIOUS 12 MONTHS AMONG PEOPLE AGED 65+, BY LOCAL AUTHORITY AREA
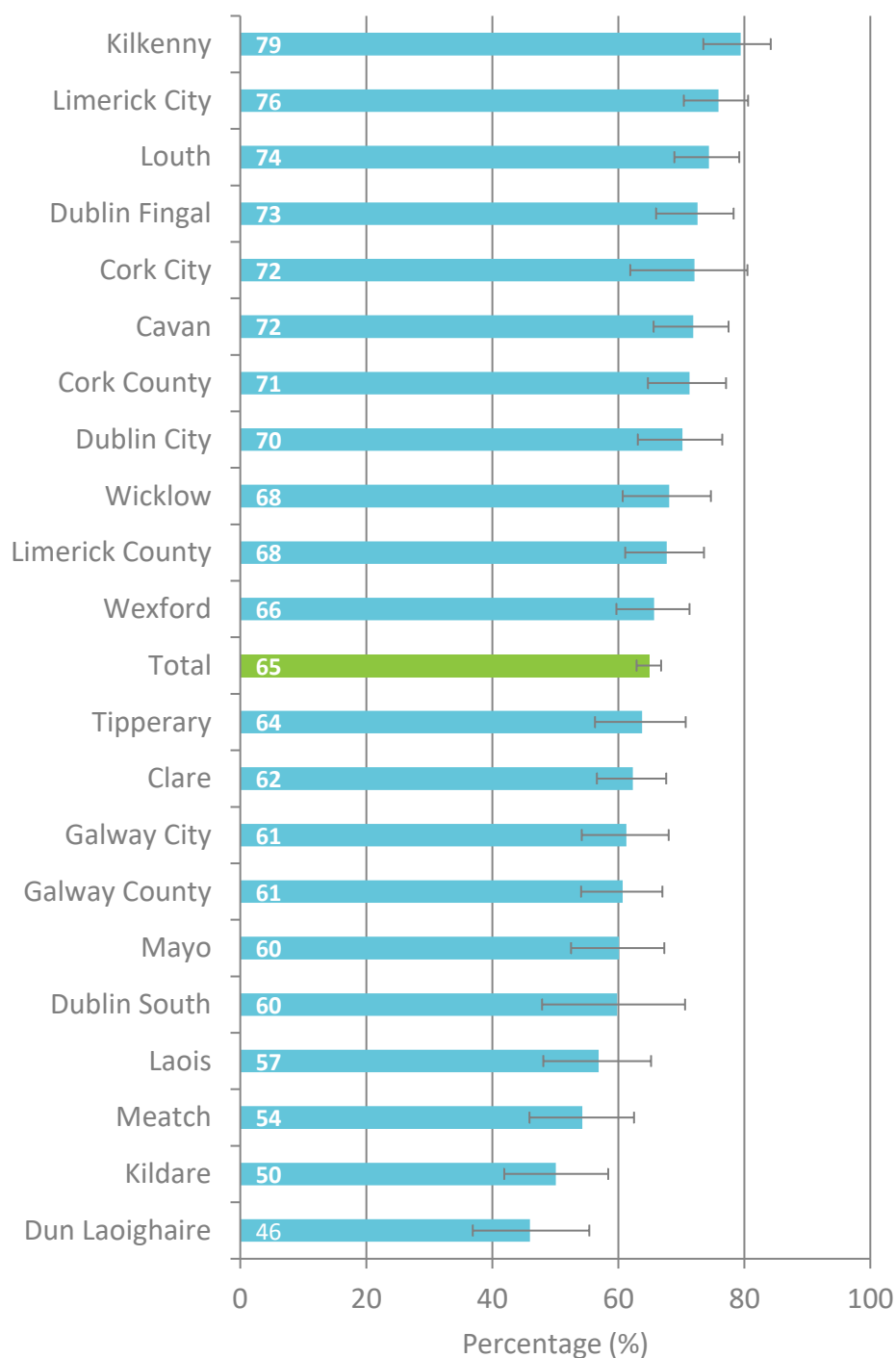
FIGURE 3 CHOLESTEROL BLOOD TEST UPTAKE WITHIN THE PREVIOUS 12 MONTHS AMONG PEOPLE AGED 55+, BY LOCAL AUTHORITY AREA

Local Authority Area	Percentage (%)
Limerick City	87
Kilkenny	84
Clare	83
Wicklow	83
Cork County	82
Tipperary	82
Limerick County	81
Mayo	80
Cavan	79
Louth	79
Wexford	79
Galway County	77
Total	75
Dublin City	74
Galway City	72
Meath	71
Dublin Fingal	71
Laois	70
Dublin South	69
Cork City	67
Kildare	65
Dun Laoighaire	61
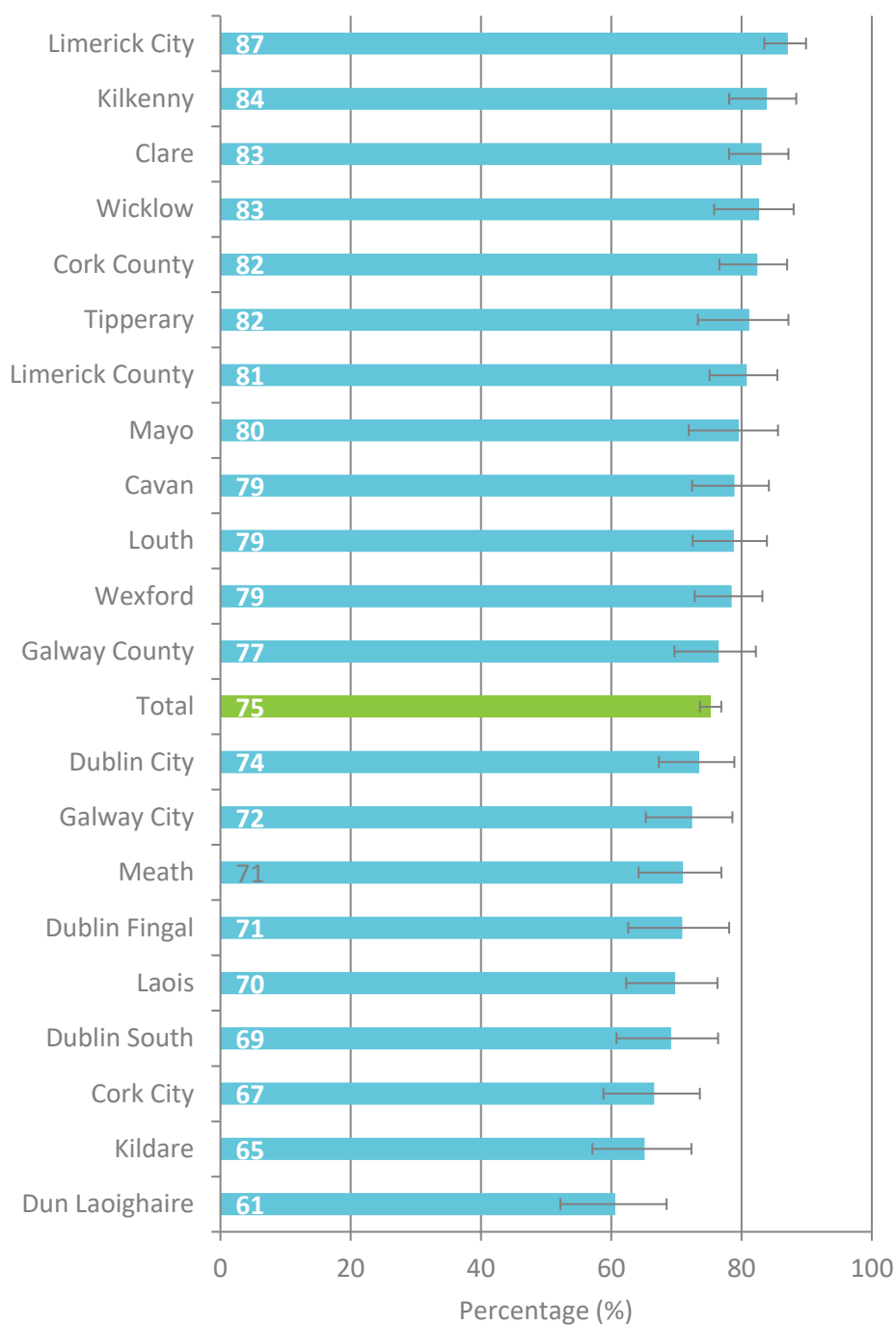
FIGURE 4 BLOOD PRESSURE CHECKS WITHIN THE PREVIOUS 12 MONTHS AMONG PEOPLE AGED 55+, BY LOCAL AUTHORITY AREA

Local Authority Area	Percentage (%)
Limerick City	90
Tipperary	88
Kilkenny	88
Wicklow	87
Wexford	87
Cork County	86
Clare	86
Limerick County	86
Mayo	86
Cavan	84
Galway County	84
Louth	84
Total	81
Dublin City	80
Galway City	80
Dublin Fingal	76
Laois	76
Meath	76
Kildare	74
Dublin South	72
Cork City	71
Dun Laoighaire	65
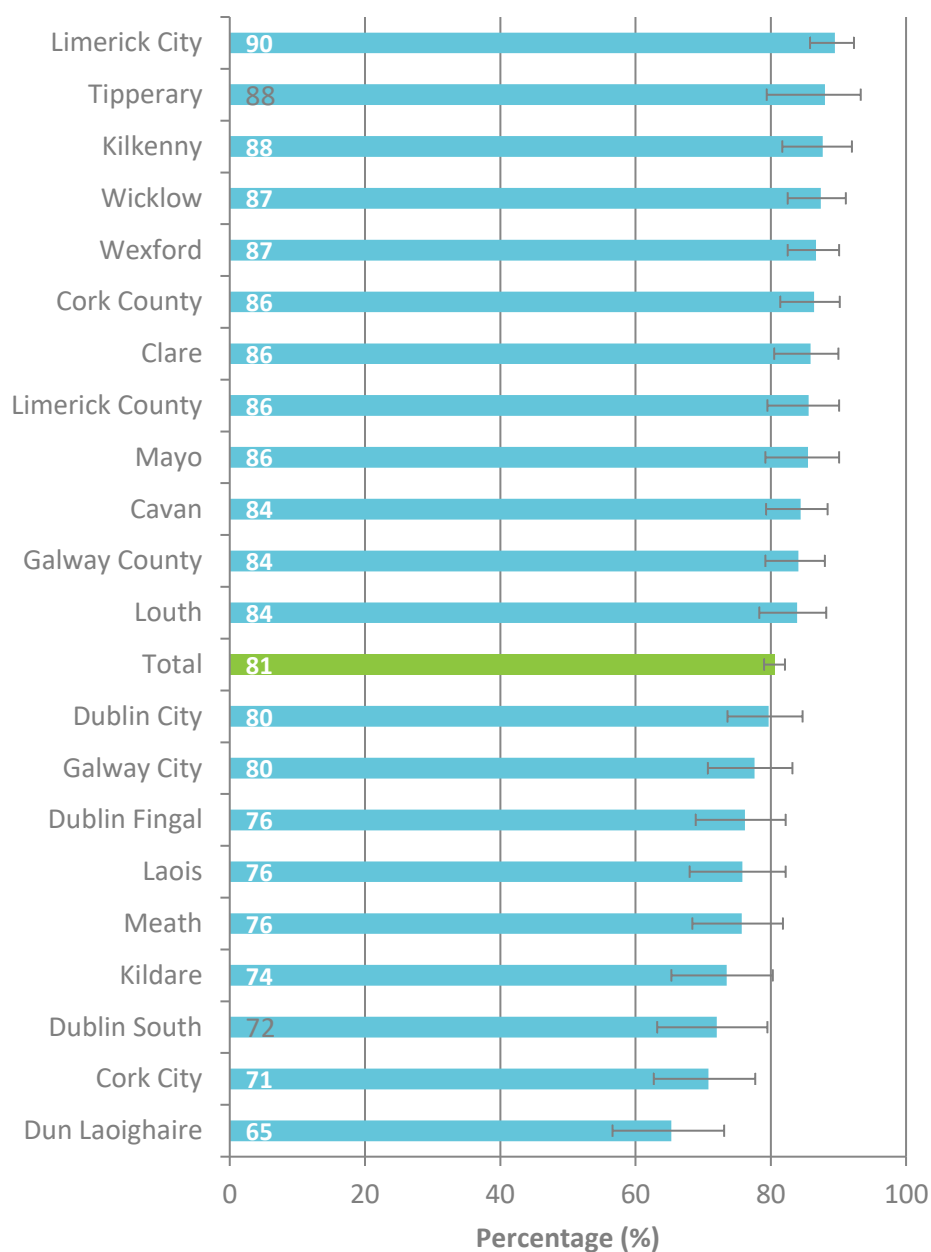
FACTORS ASSOCIATED WITH PREVENTATIVE HEALTH

In this section we report the results of a series of mixed effects logistic regression analyses to try to explain some of the differences we have described in the uptake of flu vaccinations, cholesterol blood tests, and blood pressure checks. 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). The aim of this analysis is to identify the socio-demographic, socio-economic, health status, access to health information, and health insurance coverage factors associated with respondents failing to attend preventative health screening in the previous 12 months.

Four models are presented sequentially for each preventative health screening measure. In the first model, only socio-demographic characteristics are included (gender, age, marital status, household composition, education, employment status, household income, material deprivation, and self-reported urban or rural location. In the second model, a measure of self-rated health and number of chronic illnesses are added. In the third model we include an indicator that captures information on the level of difficulty that adults aged 55+ have in getting health information. Importantly, as the earlier descriptive statistics suggest that health insurance coverage may be an important predictor of preventative health screening, in the final statistical model we examine the effect that different types of coverage have on the likelihood of availing of health screenings, while controlling for the other characteristics and indicators included in the previous models.

Results are presented as odds ratios which show the odds that a given group is more or less likely than the reference group to which they are being compared to have had the relevant preventative health screening. An odds ratio greater than one represents an increased likelihood whereas an odds ratio less than one represents' a decreased likelihood. So, values above one mean that the particular group was more likely to have been vaccinated while values below one mean that they were less likely to have been vaccinated. For example, in our first analysis (Table 7), females have an odds ratio of 0.89 compared to men for not having had the flu vaccine. This means that women were 11% less likely than men to have been vaccinated against influenza. Conversely, adults age 75+ were 2.3 times more likely than those aged 65 to 74 to have had the vaccine in the previous 12 months. For each estimate, 95% confidence intervals are also reported which provide an estimate of the accuracy of the parameter estimate, that is, the odds ratio. Also, if a value of 1.00 does not fall between the confidence interval we can say that there is a statistically significant difference between the groups being compared.

Factors associated with flu vaccination among adults aged 65+

The full results for iterative models are presented in Table 7. When controlling for socio-demographic and socio-economic characteristics in model 1, women were slightly less likely than men to have been vaccinated against influenza, while adults aged 75+ were more than twice as likely as those aged 65 to 74 to have been vaccinated. These associations remain even after controlling for all of the other

indicators (model 4). There is some evidence (models 2 through 4) that older adults who were divorced, separated, or widowed, were less likely to have had a flu vaccine. Older adults who lived with family or non-family but not a spouse were least likely to be vaccinated against influenza. This relationship remains even after controlling for other factors.

Respondents who were in paid employment were almost twice as likely to not have been vaccinated against flu, compared to retirees. Although this relationship remains when other factors are controlled for, the strength of the association was reduced as demonstrated by the reduction in the odds ratio from 0.51 in model 1 to 0.66 in model 4. Even though there was no association between monthly household income and flu vaccination, respondents considered materially deprived were 57% more likely to have been vaccinated, compared to their more advantaged peers. However, this association is fully accounted for by the inclusion of other factors and is most likely accounted for by differences in entitlements to health insurance coverage.

Older adults with poorer self-rated health and / or one or more chronic conditions were significantly more likely to have had a flu vaccination in the previous 12 months. Finally, there was a very strong association between the type of medical insurance coverage respondents had and flu vaccination with coverage of any type associated with an increased odds of being vaccinated. Individuals with joint insurance coverage were 4.5 times more likely than those with no coverage to have been vaccinated against flu while those with a full medical card were 3.65 times more likely to have done so.

TABLE 7 FACTORS ASSOCIATED WITH HAVING BEEN VACCINATED AGAINST FLU IN THE PREVIOUS 12 MONTHS (AGE 65+)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	Male	Reference							
	Female	0.89	(0.79-1.00)	0.90	(0.79-1.01)	0.89	(0.78-1.00)	0.86	(0.76-0.98)
Age	55-64	na							
	65-74	Reference							
	75+	2.37	(2.09-2.68)	2.19	(1.93-2.49)	2.21	(1.94-2.52)	1.80	(1.57-2.07)
Marital status	Married or living with a partner	Reference							
	Single (never married)	0.76	(0.54-1.07)	0.73	(0.51-1.04)	0.75	(0.52-1.07)	0.76	(0.52-1.10)
	Separated / divorced	0.77	(0.52-1.13)	0.65	(0.43-0.97)	0.65	(0.43-0.97)	0.61	(0.40-0.93)
	Widowed	0.93	(0.68-1.26)	0.86	(0.62-1.18)	0.85	(0.62-1.18)	0.86	(0.62-1.21)
Household composition	Living alone	Reference							
	Living with spouse or partner	0.80	(0.58-1.09)	0.78	(0.57-1.08)	0.78	(0.56-1.09)	0.81	(0.57-1.14)
	Living with spouse/partner and other family	0.84	(0.66-1.07)	0.82	(0.64-1.05)	0.83	(0.64-1.06)	0.82	(0.64-1.07)
	Living with family or non-family (not spouse)	0.62	(0.43-0.90)	0.59	(0.40-0.85)	0.57	(0.39-0.84)	0.55	(0.37-0.82)
Education	Primary/None	Reference							
	Secondary	0.93	(0.82-1.06)	0.98	(0.86-1.12)	0.99	(0.86-1.13)	1.06	(0.91-1.22)
	Third Level	0.90	(0.77-1.06)	0.98	(0.83-1.16)	0.99	(0.83-1.17)	1.07	(0.89-1.29)
Occupational Status	Retired	Reference							
	Paid employment	0.51	(0.42-0.62)	0.57	(0.46-0.70)	0.55	(0.45-0.68)	0.66	(0.53-0.82)
	Looking after home or family	1.11	(0.92-1.33)	1.07	(0.89-1.29)	1.09	(0.90-1.32)	1.10	(0.91-1.34)

Category		Model 1 OR	(95% CI)	Model 2 OR	(95% CI)	Model 3 OR	(95% CI)	Model 4 OR	(95% CI)
	Other	0.88	(0.63-1.23)	0.79	(0.55-1.13)	0.78	(0.53-1.13)	0.85	(0.58-1.25)
Income	€501 up to €1,000	Reference							
	€1,001 up to €1,500	1.03	(0.86-1.25)	1.06	(0.88-1.29)	1.02	(0.83-1.24)	1.04	(0.85-1.27)
	€1,501 up to €2,500	1.07	(0.88-1.28)	1.06	(0.88-1.29)	1.04	(0.86-1.26)	1.02	(0.83-1.25)
	€2,501 or more	0.89	(0.71-1.10)	0.89	(0.71-1.11)	0.89	(0.71-1.11)	0.98	(0.77-1.25)
	Missing	1.01	(0.84-1.20)	1.05	(0.88-1.26)	1.06	(0.88-1.28)	1.11	(0.91-1.35)
Material deprivation	No	Reference							
	Yes	1.57	(1.25-1.97)	1.31	(1.03-1.66)	1.27	(0.99-1.63)	1.18	(0.91-1.52)
Location	Urban	Reference							
	Open countryside	0.78	(0.66-0.92)	0.77	(0.65-0.91)	0.78	(0.65-0.93)	0.82	(0.69-0.98)
	Village	0.85	(0.73-0.99)	0.89	(0.76-1.04)	0.90	(0.76-1.05)	0.92	(0.78-1.09)
Self-rated health	Very good or good			Reference					
	Fair			1.26	(1.10-1.45)	1.25	(1.09-1.44)	1.33	(1.15-1.54)
	Bad or very bad			1.67	(1.26-2.21)	1.68	(1.26-2.25)	1.67	(1.24-2.24)
Chronic illnesses	None			Reference					
	One			1.35	(1.17-1.57)	1.34	(1.16-1.55)	1.32	(1.13-1.54)
	Two or more			1.82	(1.57-2.11)	1.80	(1.55-2.09)	1.60	(1.37-1.87)
Difficulty getting health information	No					Reference			
	Yes					1.20	(0.97-1.47)	1.19	(0.96-1.46)
Health insurance coverage	No cover							Reference	
	Full medical card only							3.65	(2.67-4.99)
	GP visit card only							1.66	(1.03-2.68)
	Health insurance only							1.68	(1.22-2.33)
	Joint cover							4.50	(3.27-6.19)

Factors associated with having a cholesterol blood test in the previous 12 months among adults aged 55+

As shown in Table 8, there was no apparent gender difference in cholesterol blood tests in the first model which only includes the socio-demographic characteristics of participants. However, once we control for the other factors included in our model, we find that women are 14% more likely than men to have had a cholesterol blood test in the previous 12 months. There was a linear relationship with age that sees older respondents more likely than younger ones to have had the test.

While education was not predictive of cholesterol blood tests in the first model that contains socio-demographic and socio-economic characteristics only, once health status was controlled for, we found that respondents with a third level education were 29% more likely than those with a primary level education or less to have been screened for cholesterol. This association fails to reach statistical significance once we include health insurance coverage. Being in paid employment was again associated with a reduced likelihood of being screened and this association remained strong even when controlling for other potential explanatory factors.

Before controlling for other factors, there was an association between monthly household income and cholesterol screening with those with incomes between €1,501 and €2,501 more likely than those with monthly incomes less than €1,000 to have been screened. This association fails to reach statistical significance once the level of difficulty getting health information, difficulty accessing health services, and health insurance coverage are controlled for.

Although flu vaccination rates were higher among older adults considered materially deprived, this group was significantly less likely than those who were not materially deprived, to have had their cholesterol checked. Importantly, these differences are not accounted for by variation in health insurance coverage.

Poorer self-rated health and chronic illnesses were associated with an increased likelihood of having cholesterol levels checked in the previous 12 months.

Difficulty accessing health information was associated with a one-quarter decrease in the likelihood of being screened for high cholesterol.

Finally, older adults with any form of health coverage were far more likely to have had their cholesterol checked in the previous 12 months with those with joint private and public coverage 3.27 times more likely to have done so.

TABLE 8 FACTORS ASSOCIATED WITH HAVING A CHOLESTEROL BLOOD TEST IN THE PREVIOUS 12 MONTHS (AGE 55+)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	Male				Reference				
	Female	1.08	(0.97-1.20)	1.10	(0.98-1.23)	1.12	(1.00-1.25)	1.14	(1.01-1.28)
Age	55-64				Reference				
	65-74	1.63	(1.43-1.86)	1.48	(1.29-1.71)	1.52	(1.31-1.75)	1.43	(1.23-1.67)
	75+	2.29	(1.92-2.72)	1.79	(1.49-2.16)	1.85	(1.53-2.23)	1.50	(1.23-1.84)
Marital status	Married or living with a partner				Reference				
	Single (never married)	0.93	(0.72-1.22)	0.92	(0.69-1.22)	0.97	(0.72-1.30)	0.97	(0.72-1.31)
	Separated / divorced	0.86	(0.66-1.13)	0.80	(0.60-1.07)	0.77	(0.57-1.03)	0.77	(0.57-1.05)
	Widowed	1.04	(0.80-1.34)	0.94	(0.72-1.23)	0.92	(0.69-1.21)	0.95	(0.71-1.26)
Household composition	Living alone				Reference				
	Living with spouse or partner	1.07	(0.83-1.37)	1.15	(0.88-1.50)	1.14	(0.87-1.49)	1.17	(0.88-1.55)
	Living with spouse/partner and other family	0.96	(0.77-1.19)	0.98	(0.78-1.23)	0.96	(0.76-1.21)	0.97	(0.76-1.24)
	Living with family or non-family (not spouse)	0.78	(0.56-1.09)	0.81	(0.57-1.16)	0.79	(0.55-1.15)	0.82	(0.56-1.20)
Education	Primary/None				Reference				
	Secondary	0.94	(0.82-1.07)	0.99	(0.86-1.14)	1.00	(0.86-1.15)	0.95	(0.82-1.11)
	Third Level	1.11	(0.95-1.30)	1.29	(1.09-1.53)	1.29	(1.09-1.53)	1.14	(0.95-1.37)
Employment Status	Retired				Reference				
	Paid employment	0.60	(0.52-0.69)	0.74	(0.64-0.86)	0.74	(0.63-0.86)	0.82	(0.70-0.96)
	Looking after home or family	0.92	(0.77-1.09)	0.94	(0.78-1.13)	0.94	(0.78-1.13)	0.94	(0.77-1.13)
	Other	0.87	(0.71-1.05)	0.72	(0.58-0.90)	0.76	(0.61-0.95)	0.80	(0.64-1.01)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Income	€501 up to €1,000				Reference				
	€1,001 up to €1,500	**1.27**	(1.05-1.53)	**1.26**	(1.03-1.53)	**1.21**	(0.99-1.48)	**1.20**	(0.98-1.48)
	€1,501 up to €2,500	**1.21**	(1.01-1.45)	**1.26**	(1.04-1.52)	**1.25**	(1.03-1.52)	**1.20**	(0.98-1.46)
	€2,501 or more	**1.20**	(0.99-1.46)	**1.19**	(0.97-1.46)	**1.17**	(0.95-1.45)	**1.11**	(0.89-1.38)
	Missing	**1.06**	(0.90-1.25)	**1.11**	(0.93-1.32)	**1.09**	(0.91-1.30)	**1.05**	(0.87-1.27)
Material deprivation	No				Reference				
	Yes	**0.71**	(0.59-0.85)	**0.57**	(0.47-0.70)	**0.62**	(0.50-0.76)	**0.63**	(0.51-0.79)
Location	Urban				Reference				
	Open countryside	**1.42**	(1.21-1.66)	**1.38**	(1.16-1.63)	**1.42**	(1.19-1.69)	**1.46**	(1.23-1.75)
	Village	**1.22**	(1.06-1.40)	**1.24**	(1.06-1.44)	**1.23**	(1.05-1.43)	**1.31**	(1.12-1.53)
Self-rated health	Very good or good				Reference				
	Fair			**0.97**	(0.84-1.13)	**1.00**	(0.86-1.16)	**1.06**	(0.91-1.24)
	Bad or very bad			**1.56**	(1.14-2.12)	**1.59**	(1.16-2.19)	**1.58**	(1.14-2.18)
Chronic illnesses	None				Reference				
	One			**2.31**	(2.04-2.62)	**2.28**	(2.00-2.59)	**2.30**	(2.01-2.62)
	Two or more			**4.33**	(3.73-5.03)	**4.25**	(3.64-4.95)	**3.95**	(3.38-4.62)
Difficulty getting health information	No				Reference				
	Yes					**0.79**	(0.65-0.95)	**0.76**	(0.63-0.92)
Health insurance coverage	No cover				Reference				
	Full medical card only							**2.16**	(1.77-2.64)
	GP visit card only							**1.26**	(0.91-1.75)
	Health insurance only							**2.27**	(1.88-2.74)
	Joint cover							**3.27**	(2.62-4.08)

Factors associated with having a blood pressure check among adults aged 55+

In our first model in Table 9 that includes the socio-demographic and socio-economic characteristics of participants, there was no apparent gender difference in the percentage of older adults who had their blood pressure checked in the previous 12 months. However, once we control for the other factors included in our model, we find that women are 19% more likely than men to have done so.

The likelihood of having a blood pressure check in the previous 12 months increased with age. Although age difference did lessen somewhat, this pattern remained even when other factors were controlled for.

Differences according to education were also observed with a third level education in particular associated with a greater likelihood of having blood pressure checked. Similar to flu vaccine and cholesterol blood tests, older adults in paid employment were significantly less likely than retirees to have had their blood pressure checked. Older adults with the lowest monthly household income and those considered materially deprived were significantly less likely to have had their blood pressure checked and these associations were not explained by the inclusion of other potentially explanatory factors, including the type of health insurance coverage. Also, the probability of older adults who were materially deprived not having their blood pressure checked was exacerbated by poorer self-rated health and having at least one chronic condition (model 2).

There is evidence of some geographic variation with respondents who live in rural areas more likely than those from urban centres to have had their blood pressure checked in the previous 12 months.

Having at least one chronic illness was the strongest predictor of having blood pressure checked and this pattern was consistent despite controlling for differences in health insurance coverage, which itself was strongly associated with differences in the likelihood of having been screened. As with the other health screenings discussed so far, those with joint coverage were most likely to have done so, followed by those with private health insurance, and full medical cards.

TABLE 9 FACTORS ASSOCIATED WITH HAVING A BLOOD PRESSURE CHECK IN THE PREVIOUS 12 MONTHS (AGE 55+)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	Male				Reference				
	Female	1.11	(0.99-1.25)	1.16	(1.03-1.32)	1.17	(1.03-1.33)	1.19	(1.05-1.36)
Age	55-64				Reference				
	65-74	1.63	(1.41-1.89)	1.43	(1.22-1.67)	1.45	(1.23-1.70)	1.36	(1.15-1.61)
	75+	3.08	(2.51-3.78)	2.32	(1.86-2.90)	2.46	(1.96-3.10)	1.89	(1.48-2.41)
Marital status	Married or living with a partner				Reference				
	Single (never married)	0.89	(0.66-1.20)	0.91	(0.66-1.25)	0.97	(0.70-1.35)	0.93	(0.67-1.31)
	Separated / divorced	0.89	(0.66-1.20)	0.80	(0.58-1.11)	0.77	(0.55-1.07)	0.75	(0.53-1.05)
	Widowed	1.00	(0.75-1.34)	0.91	(0.67-1.24)	0.88	(0.64-1.21)	0.90	(0.65-1.25)
Household composition	Living alone				Reference				
	Living with spouse or partner	0.91	(0.69-1.20)	1.01	(0.75-1.37)	0.99	(0.73-1.35)	0.98	(0.71-1.35)
	Living with spouse/partner and other family	0.92	(0.72-1.17)	0.93	(0.72-1.21)	0.92	(0.71-1.21)	0.89	(0.67-1.18)
	Living with family or non-family (not spouse)	0.87	(0.60-1.28)	0.97	(0.64-1.47)	0.94	(0.60-1.46)	0.97	(0.62-1.53)
Education	Primary/None				Reference				
	Secondary	1.01	(0.87-1.16)	1.08	(0.92-1.27)	1.11	(0.94-1.30)	1.05	(0.89-1.25)
	Third Level	1.22	(1.03-1.45)	1.48	(1.23-1.79)	1.50	(1.23-1.82)	1.29	(1.04-1.58)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Employment Status	Retired				Reference				
	Paid employment	0.51	(0.44-0.59)	**0.65**	(0.55-0.76)	**0.65**	(0.55-0.77)	**0.72**	(0.60-0.85)
	Looking after home or family	1.02	(0.84-1.24)	**1.06**	(0.85-1.30)	**1.06**	(0.86-1.32)	**1.04**	(0.83-1.30)
	Other	0.87	(0.70-1.08)	**0.70**	(0.55-0.89)	**0.73**	(0.57-0.94)	**0.76**	(0.58-0.99)
Income	€501 up to €1,000				Reference				
	€1,001 up to €1,500	1.29	(1.04-1.59)	**1.28**	(1.03-1.60)	**1.23**	(0.98-1.55)	**1.22**	(0.96-1.54)
	€1,501 up to €2,500	1.42	(1.16-1.73)	**1.54**	(1.24-1.91)	**1.54**	(1.24-1.93)	**1.46**	(1.16-1.84)
	€2,501 or more	1.31	(1.06-1.63)	**1.36**	(1.08-1.72)	**1.37**	(1.08-1.73)	**1.28**	(1.00-1.64)
	Missing	1.14	(0.95-1.37)	**1.23**	(1.00-1.50)	**1.23**	(1.00-1.51)	**1.16**	(0.94-1.44)
Material deprivation	No				Reference				
	Yes	0.80	(0.65-0.98)	**0.63**	(0.50-0.79)	**0.65**	(0.51-0.83)	**0.68**	(0.53-0.88)
Location	Urban				Reference				
	Open countryside	1.41	(1.17-1.69)	**1.33**	(1.10-1.61)	**1.37**	(1.12-1.67)	**1.39**	(1.14-1.71)
	Village	1.13	(0.97-1.32)	**1.15**	(0.97-1.36)	**1.13**	(0.95-1.34)	**1.21**	(1.01-1.44)
Self-rated health	Very good or good				Reference				
	Fair			**0.98**	(0.83-1.16)	**0.99**	(0.83-1.18)	**1.06**	(0.88-1.27)
	Bad or very bad			**1.95**	(1.29-2.95)	**2.02**	(1.31-3.11)	**1.92**	(1.24-2.97)
Chronic illnesses	None				Reference				
	One			**2.48**	(2.16-2.85)	**2.46**	(2.14-2.83)	**2.47**	(2.13-2.86)
	Two or more			**6.40**	(5.33-7.68)	**6.18**	(5.12-7.45)	**5.79**	(4.78-7.02)
Difficulty getting health	No				Reference				
	Yes					**1.00**	(0.80-1.26)	**0.95**	(0.75-1.20)

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
information									
Health insurance coverage	No cover				Reference				
	Full medical card only							**2.43**	(1.96-3.02)
	GP visit card only							**1.34**	(0.95-1.88)
	Health insurance only							**2.56**	(2.10-3.12)
	Joint cover							**4.16**	(3.25-5.32)

Discussion

Although we found a flu vaccination rate of 64.9%, which is below the figure recommended by the EU (14), it must be remembered that this survey includes a sample of community-dwelling adults and therefore does not capture a number of the at-risk groups targeted for flu vaccination in this country, such as older adults in care and hospital settings.

Similar to previous research, we did find that older adults and men were more likely to have had the flu vaccine, even after controlling for a range of other factors (15–18). This age difference most likely explains the fact that respondents who were in paid employment, and therefore younger on average, were significantly less likely to have been vaccinated while conversely, older retirees, were more likely to have been. This finding suggests that the targeting of older adults for the flu vaccine is working. However, it also points to the fact that adults aged less than 65 years who are employed in non-healthcare settings, are at an increased risk of contracting the flu virus and in particular if they work in settings in which they are in contact with the public, including potentially at-risk groups.

The importance of providing free vaccinations to less advantaged groups is clearly seen by the large effect of medical insurance coverage. In particular, having access to a full medical card greatly increased the likelihood of having the vaccine. In line with previous research in this area (15), the flu vaccination programme also appears to have been successful in reaching another target group, those with chronic conditions and poorer self–rated health.

Although we do not have a direct measure of social class available to us, the absence of educational or income differences in vaccination rates suggests that uptake is somewhat evenly distributed across the socio-economic spectrum. This is not surprising given the inconsistent findings regarding the potential association between socio-economic status and flu vaccination to date (15,19).

As both cholesterol and blood pressure tests are often carried out when individuals present with an existing condition, it is unsurprising that there was a particularly strong association between the presence of chronic conditions and having been screened for high cholesterol and low or high blood pressure. Despite this, we still see the importance of health insurance coverage, private or public, among our respondents.

As discussed above, respondents considered materially deprived were more likely than their more advantaged peers to have had the flu vaccine and this was most likely because this group were entitled to free public health insurance which covers the cost of the vaccine. However, when we examined the relationship between material deprivation and both cholesterol blood tests and blood pressure checks, (neither of which are provided for free under public health insurance), we found that the most materially deprived were significantly less likely to have been tested for both, despite the higher prevalence of both conditions among poorer members of society (20,21).

This presents somewhat of a difficult picture to interpret as we found that those on medical cards were more likely to be screened, yet a sizeable group entitled to public health insurance coverage, those who were materially deprived, were less likely to be screened. One possible answer to this is that this group is in better health those better off economically. However, as already referred to, this is highly unlikely. Another possible explanation is that the most economically deprived, while provided initially free access to health services, find them-selves in the position of being unable to pay for subsequent care interventions, even when required, which leads to the possibility that their morbidities are not being treated or managed to the same degree as other members of society due to an ability to pay.

Finally, it is important to note that difficulty accessing health information was a barrier to having been tested for high cholesterol. As this condition is related to lifestyle factors, diet in particular, it may be that some older adults are doubly disadvantaged. In the first instance they may, in part through a lack of health knowledge or awareness, have poorer dietary and other lifestyle habits, while also not having the information to avail of primary preventative health screening when needed.

3.2. PREVENTATIVE HEALTH AMONG WOMEN AGED 55 TO 64 YEARS

Mammogram

A mammogram is a method of imaging breast tissue with low energy x-rays and is generally used for the early detection of breast cancer. During an examination, each breast is imaged separately to detect any masses or calcifications. Mammograms enable the early diagnosis and treatment of breast cancer and reduce the risk of breast cancer-related death (22).

It is estimated that 2,883 new cases of breast cancer are diagnosed in Ireland every year. Breast cancer is the most common form of cancer among women, accounting for 30% of all female cancer cases in Ireland. There is a 9.6% chance of developing the disease up until the age of 74 in Ireland. Forty-one per cent of breast cancer patients are aged 55-64, 18% of breast cancer patients are aged 65-74 and 18% of breast cancer patients are aged 75 and above. Each year 711 women die from the disease (23). Breast cancer also occurs among men but at a much lower rate than among women. Approximately 34 cases of male breast cancer occur each year, accounting for 0.3% of all male cancer cases in Ireland (24).

BreastCheck provides a free mammogram service for women in Ireland. There are four regional units responsible for the delivery of the programme (BreastCheck Eccles Unit, BreastCheck Merrion Unit, BreastCheck Southern Unit, and BreastCheck Western) as well as a number of mobile screening units also.

The programme invites eligible women for a mammogram every two years to screen for breast cancer. The programme provides a service in 22 counties (25). As a result of the 2006 National Cancer Strategy, the target group of the national breast cancer screening programme has been modified to include women between the ages of 50 and 64. Over 480,000 women have attended breast screening appointments since the programme began in 2000, over 1.37 million mammograms have been carried out and more than 8,500 cancers have been detected as a result (25). Early detection of breast cancer increases one's chances of successful treatment and survival. Women between the ages of 55 and 64 who are diagnosed with stage I breast cancer have a 99% chance of surviving 5 years after their diagnosis whereas women of the same age who are diagnosed with stage IV breast cancer have a 26% chance of surviving 5 years after their diagnosis (26).

A number of demographic, socio-economic, health-related and behavioural factors have been associated with the uptake of mammograms. Age is associated with mammogram uptake such that women aged 50-69 have higher rates of attendance than women aged 40-50 or women aged 70+ (27,28). Studies have shown that retired women and educated women are more likely to attend screening (29,30). Breast cancer screening has been found to be significantly higher among women who have private health insurance, who previously attended a cancer screening, who are non-smokers or ex-smokers and who drink alcohol (29,31). Women who attend breast cancer screening have been found to have better knowledge about

breast cancer and the risks associated with breast cancer and also more knowledge about mammograms than women who do not attend breast cancer screening (32).

Free mammograms are currently offered to women aged 55 to 69 years in Ireland. However, at the time of data collection, only women aged 55 to 64 years were eligible for free screening. This section of the report will provide descriptive statistics on the uptake of mammograms among women aged 55-64.

As shown in Table 10, over half of women aged 55-64 (52%) had a mammogram in the previous 12 months. In terms of marital status, a higher proportion of women who were married or cohabiting (53.8%) did so, although this difference was not statistically significant. There were no clear educational differences with a similar proportion of each educational group having had a mammogram. Given that the target age group for breast cancer screening is 55 to 64 years and that this is pre-statutory retirement age, it is noteworthy that a higher percentage of retired women (59.1%) had attended a mammogram screening.

Finally, economic factors appear to play some role in explaining differences in the uptake of mammograms with women considered materially deprived as the least likely of any of the groups included to have had a mammogram in the previous 12 month with 39.8% having done so. Similarly, there appears to be some evidence that attendance rates for mammograms are higher among women in higher income households. These issues will be explored further in subsequent multivariate analysis.

TABLE 10 UPTAKE OF MAMMOGRAMS AMONG WOMEN AGED 55 TO 64 YEARS, BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

		Had mammogram		Did not have mammogram	
		%	(95% CI)	%	(95% CI)
Marital status	Married/Living with partner	53.8	(50.0-57.5)	46.2	(42.5-50.0)
	Never married	46.8	(36.4-57.6)	53.2	(42.4-63.6)
	Separated/divorced	49.5	(40.8-58.4)	50.5	(41.6-59.2)
	Widowed	44.7	(35.2-54.6)	55.3	(45.4-64.8)
Household composition	Living alone	46.9	(39.7-54.3)	53.1	(45.7-60.3)
	Living with spouse	53.6	(49.4-57.8)	46.4	(42.2-50.6)
	Living with spouse and family or others	52.6	(46.5-58.5)	47.4	(41.5-53.5)
	Living with family or others but not spouse	44.8	(29.9-60.6)	55.2	(39.4-70.1)
Educational attainment	Primary or less	52.3	(44.4-60.0)	47.7	(40.0-55.6)
	Secondary	51.6	(47.5-55.6)	48.4	(44.4-52.5)
	Tertiary	52.8	(47.7-58.0)	47.2	(42.0-52.3)
Occupational status	Retired	59.1	(52.4-65.6)	40.9	(34.4-47.6)
	Employed (inc. self-employed)	51.2	(46.6-55.8)	48.8	(44.2-53.4)
	Looking after home/family	48.3	(42.6-54.1)	51.7	(45.9-57.4)
	Other	51.4	(42.6-60.1)	48.6	(39.9-57.4)
Income (bands)	€501 up to €1,000	48.9	(40.4-57.6)	51.1	(42.4-59.6)
	€1,001 up to €1,500	44.2	(35.7-53.1)	55.8	(46.9-64.3)
	€1,501 up to €2,500	54.5	(47.8-61.0)	45.5	(39.0-52.2)
	€2,501 or more	51.0	(44.5-57.5)	49.0	(42.5-55.5)
Household deprivation	No	53.3	(49.9-56.6)	46.7	(43.4-50.1)
	Yes	39.8	(31.1-49.2)	60.2	(50.8-68.9)
Total		52.0	(48.7-55.3)	48.0	(44.7-51.3)

Health insurance cover

Unlike the pattern observed for the earlier health screenings which consistently saw respondents with no medical cover the least likely group to avail of screening, Table 11 shows that women with GP visit only medical cards (32%) were the least likely group to have had a mammogram, followed by those with no cover (43%). Again however, women with joint coverage, that is both a medical card and private health insurance, were most likely to have had a mammogram in the previous 12 months.

TABLE 11 UPTAKE OF MAMMOGRAMS AMONG WOMEN AGED 55 TO 64 YEARS, BY HEALTH INSURANCE COVERAGE

		Had mammogram		Did not have mammogram	
		%	(95% CI)	%	(95% CI)
Health insurance	Full medical card only	49.6	(43.5-55.7)	50.4	(44.3-56.5)
	GP visit card only	31.8	(20.6-45.6)	68.2	(54.4-79.4)
	Health insurance only	57.3	(52.7-61.8)	42.7	(38.2-47.3)
	Joint cover	63.3	(53.4-72.2)	36.7	(27.8-46.6)
	No cover	43.0	(35.7-50.6)	57.0	(49.4-64.3)
Total		52.0	(48.7-55.3)	48.0	(44.7-51.3)

Location

As shown in Table 12, uptake of mammograms was highest among respondents living in the open countryside (59%) followed by respondents living in villages (51%) and respondents living in large towns. The lowest rate was found in the suburban areas of cities.

TABLE 12 UPTAKE OF MAMMOGRAMS AMONG WOMEN AGED 55 TO 64 YEARS, BY LOCATION

		Had mammogram		Did not have mammogram	
		%	(95% CI)	%	(95% CI)
Location of home	Open countryside	58.7	(52.7-64.4)	41.3	(35.6-47.3)
	Village	51.1	(43.9-58.3)	48.9	(41.7-56.1)
	Town	50.1	(43.9-56.4)	49.9	(43.6-56.1)
	City suburb	27.9	(14.8-46.3)	72.1	(53.7-85.2)
	City (inner)	53.6	(47.0-60.1)	46.4	(39.9-53.0)
Total		52.0	(48.7-55.3)	48.0	(44.7-51.3)

Geographic differences in mammogram uptake

As shown in Figure 5, the mammogram uptake rate ranged from 35% to 80% across 21 Local Authority areas.

FIGURE 5 UPTAKE OF MAMMOGRAMS AMONG WOMEN AGED 55 TO 64, BY LOCAL AUTHORITY AREA
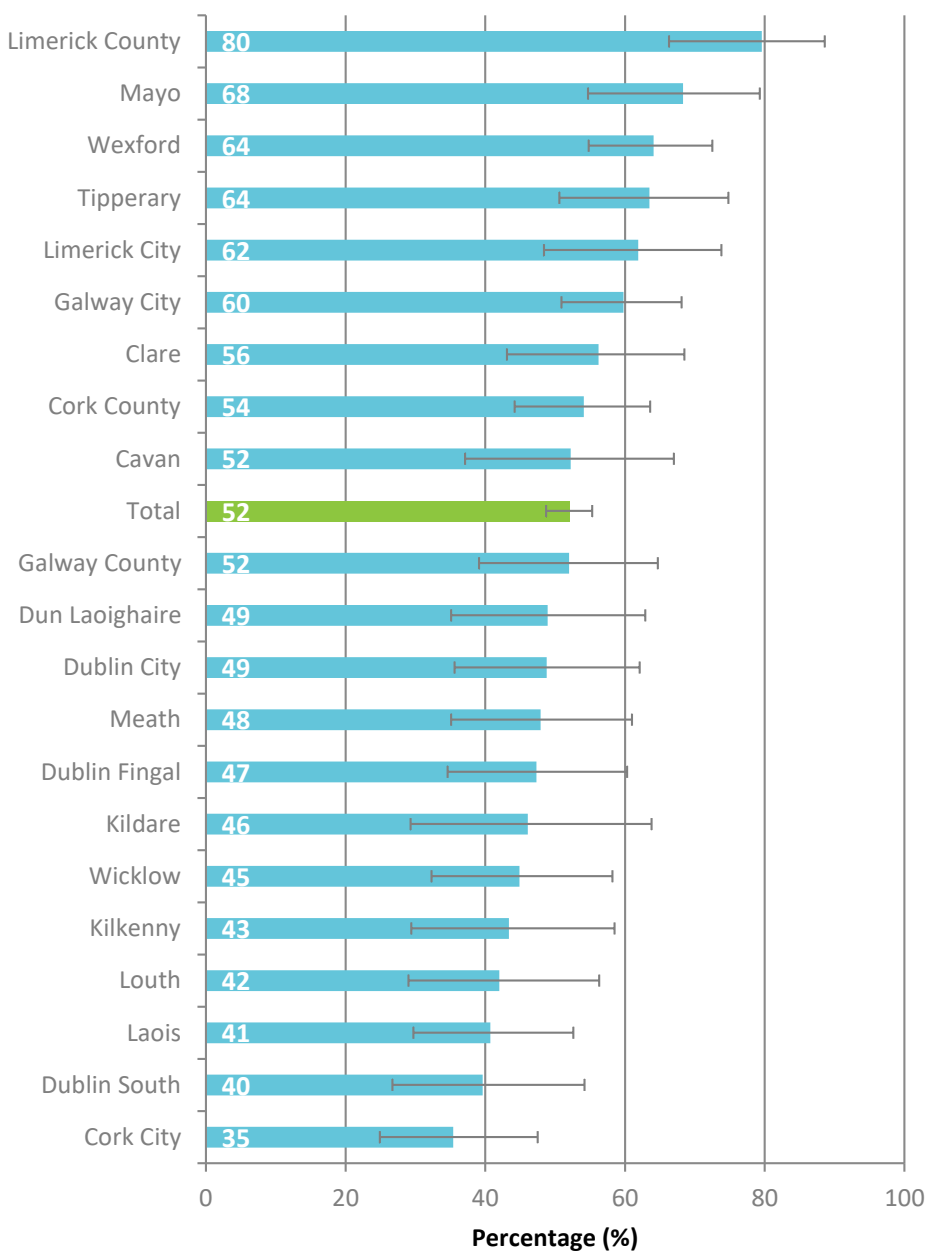
Factors associated with having a mammogram in the previous 12 months among women aged 55-64 years

Table 13 shows that the uptake of mammograms is highest among the younger of the 55 to 64 age group and decreases with age. Model 1 shows that each additional year in age is associated with a 5% decrease in the likelihood of having had a mammogram in the previous 12 months.

In terms of principal economic status, women who had retired before the age of 65 were the most likely group to have had a mammogram while those who looked after the family or home were the least likely to have done so, followed by those in paid employment.

TABLE 13 FACTORS ASSOCIATED WITH HAVING A MAMMOGRAM IN THE PREVIOUS 12 MONTHS

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age in years		**0.95**	(0.92-0.99)	**0.95**	(0.92-0.99)	**0.95**	(0.92-0.99)	**0.95**	(0.91-0.98)
Marital status	Married or living with a partner			Reference					
	Single (never married)	**0.90**	(0.54-1.49)	**0.94**	(0.56-1.58)	**0.93**	(0.55-1.58)	**1.01**	(0.59-1.74)
	Separated / divorced	**0.96**	(0.62-1.49)	**1.00**	(0.63-1.57)	**0.97**	(0.61-1.56)	**1.09**	(0.67-1.78)
	Widowed	**0.80**	(0.48-1.33)	**0.80**	(0.48-1.35)	**0.80**	(0.47-1.38)	**0.91**	(0.53-1.58)
Household composition	Living alone			Reference					
	Living with spouse or partner	**1.02**	(0.64-1.62)	**1.07**	(0.67-1.73)	**1.04**	(0.64-1.70)	**1.18**	(0.71-1.94)
	Living with spouse/partner and other family	**1.06**	(0.70-1.59)	**1.09**	(0.71-1.65)	**1.03**	(0.67-1.58)	**1.12**	(0.72-1.75)
	Living with family or non-family (not spouse)	**0.83**	(0.46-1.51)	**0.90**	(0.48-1.68)	**0.88**	(0.45-1.70)	**0.99**	(0.51-1.92)
Education	Primary/None			Reference					
	Secondary	**0.98**	(0.72-1.35)	**0.90**	(0.65-1.26)	**0.92**	(0.66-1.28)	**0.86**	(0.61-1.20)
	Third Level	**0.96**	(0.68-1.36)	**0.88**	(0.61-1.26)	**0.91**	(0.63-1.32)	**0.79**	(0.54-1.16)
Employment Status	Retired			Reference					
	Paid employment	**0.66**	(0.51-0.86)	**0.65**	(0.49-0.87)	**0.66**	(0.50-0.88)	**0.67**	(0.50-0.91)
	Looking after home or family	**0.55**	(0.41-0.74)	**0.53**	(0.39-0.72)	**0.55**	(0.40-0.75)	**0.58**	(0.42-0.79)
	Other	**0.67**	(0.47-0.96)	**0.63**	(0.43-0.92)	**0.65**	(0.44-0.95)	**0.73**	(0.49-1.08)

Income	€501 up to €1,000			Reference					
	€1,001 up to €1,500	1.10	(0.74-1.63)	1.08	(0.72-1.61)	1.07	(0.71-1.60)	1.07	(0.71-1.62)
	€1,501 up to €2,500	1.49	(1.03-2.15)	1.62	(1.11-2.37)	1.60	(1.09-2.34)	1.48	(1.00-2.20)
	€2,501 or more	1.42	(0.97-2.09)	1.53	(1.04-2.27)	1.52	(1.02-2.26)	1.36	(0.89-2.06)
	Missing	1.45	(1.02-2.06)	1.55	(1.08-2.22)	1.54	(1.07-2.21)	1.37	(0.94-2.01)
Material deprivation	No			Reference					
	Yes	0.66	(0.47-0.95)	0.69	(0.48-1.01)	0.71	(0.48-1.04)	0.81	(0.54-1.21)
Location	Urban			Reference					
	Open countryside	1.16	(0.87-1.55)	1.10	(0.83-1.47)	1.08	(0.81-1.44)	1.05	(0.78-1.41)
	Village	0.95	(0.73-1.24)	0.95	(0.73-1.25)	0.90	(0.69-1.18)	0.93	(0.70-1.23)
Self-rated health	Very good or good			Reference					
	Fair			0.75	(0.56-1.02)	0.75	(0.56-1.02)	0.76	(0.56-1.04)
	Bad or very bad			0.74	(0.43-1.27)	0.75	(0.43-1.29)	0.80	(0.46-1.38)
Chronic illnesses	None			Reference					
	One			1.48	(1.18-1.87)	1.48	(1.17-1.87)	1.52	(1.19-1.93)
	Two or more			1.72	(1.31-2.27)	1.69	(1.27-2.23)	1.74	(1.31-2.33)
Difficulty getting health information	No			Reference					
	Yes					1.07	(0.75-1.51)	0.99	(0.69-1.42)
Health insurance coverage	No cover			Reference					
	Full medical card only							0.93	(0.65-1.33)
	GP visit card only							0.78	(0.44-1.37)
	Health insurance only							1.43	(1.05-1.95)
	Joint cover							1.92	(1.23-3.01)

3.3. PREVENTATIVE HEALTH AMONG MEN AGED 55 +

Prostate examination and PSA blood test

It is estimated that 3,400 new cases of prostate cancer are diagnosed in Ireland every year. Prostate cancer is the most common form of cancer among men, accounting for 31% of all male cancer cases in Ireland. There is a 13.7% chance of developing the disease up until the age of 74 in Ireland. Thirty-nine per cent of prostate cancer patients are aged 50-64, 41% of prostate cancer patients are aged 65-74 and 18% of prostate cancer patients are aged 75 and above. Each year 504 men die from the disease (33).

Prostate screening is a method of examining the prostate for the early detection of prostate cancer. The screening involves a digital rectal examination. A digital rectal examination is carried out to identify any abnormalities in the prostate gland. Another method of testing for the presence of prostate cancer is a Prostate Specific Antigen (PSA) blood test. This blood test is used to test if the level of PSA in the blood is above normal for one's age range. A high reading may indicate the presence of prostate cancer (34).

The chance of developing prostate cancer increases with age and the stage at which the cancer is detected has an impact on treatment success and chances of survival. Men between the ages of 55 and 64 who are diagnosed with stage I prostate cancer have a 97.4% chance of surviving 5 years after their diagnosis whereas men of the same age who are diagnosed with stage IV prostate cancer have a 51.3% chance of surviving 5 years after their diagnosis. These rates of survival decrease among older men with prostate cancer (26).

A study utilising data from the Eurobarometer found that the uptake of PSA screening was significantly associated with marital status, smoking status, socio-economic status, education level and age (35). Prostate cancer screening is significantly higher among men aged 50+ than men aged 40-50 (35–37) and some studies suggest that uptake rates increase with age (35,38). Prostate cancer screening was found to be higher among married men (37,38), non-smokers (39), the employed (36), those with health insurance and those with a family history of prostate cancer (38). Health-related factors such as self-rated health and health locus of control are associated with prostate screening attendance, such that men who rated their health as 'good' or 'excellent' were significantly more likely to attend screening as well as men who believe that they themselves rather than their health-care provider have responsibility over their health (36).

Unlike breast cancer screening, there is no nationwide prostate screening programme in place. The 2006 National Cancer Strategy decided against the implementation of a national prostate screening programme due to the lack of evidence on the effectiveness of prostate screening methods (40). Crucially, it is unknown whether a nationwide prostate screening programme would reduce the number of prostate cancer-related deaths (34).

As shown in Table 14, a similar percentage of men aged 65 to 74 years, and over 75 years, had a prostate examination and / or a PSA blood test in the previous 12 months.

A higher percentage of those living with a spouse/partner had an examination of the prostate (44.1%) than those living alone (38.1%) and those living with family/non-family (35.3%). Over half of older men living with a spouse/partner had a PSA blood test within the

previous 12 months (53.6%) compared to 47% of those living alone and 44.4% of those living with non-family or family members other than a spouse.

Uptake of both prostate cancer screening (44.9%) and PSA blood tests (55.6%) was highest among men who had retired from work. There were some educational differences apparent at the descriptive level with a higher proportion of men with a third level education having received a prostate examination (43.2%) or PSA blood test (54.1%) within the previous 12 months.

Economic factors may play a role in cancer screening for men with higher monthly household incomes and less material disadvantage associated with higher rates of screening.

TABLE 14 UPTAKE OF PROSTATE EXAMINATIONS OR PSA BLOOD TESTS AMONG MEN AGED 65+, BY SOCIO-DEMOGRAPHIC AND SOCIO ECONOMIC CHARACTERSITICS

		Prostate examination		PSA blood test	
		%	(95% CI)	%	(95% CI)
Gender	Male	41.3	(38.8-43.8)	50.6	(47.8-53.4)
Age	65-74	45.3	(41.9-48.6)	56.9	(53.1-60.6)
	75+	45.1	(40.8-49.4)	53.8	(49.4-58.2)
Marital status	Married/Living with partner	42.7	(39.8-45.6)	51.7	(48.5-54.9)
	Never married	35.4	(30.1-41.1)	43.3	(37.5-49.2)
	Separated/divorced	35.5	(27.9-43.8)	46.9	(38.6-55.4)
	Widowed	40.9	(35.6-46.5)	53.5	(47.6-59.3)
Household composition	Living alone	38.1	(34.2-42.1)	47.0	(42.7-51.3)
	Living with spouse	44.1	(40.9-47.2)	53.6	(50.2-57.0)
	Living with spouse and family or others	35.8	(31.2-40.6)	44.7	(39.4-50.2)
	Living with family or others but not spouse	29.1	(17.0-45.2)	40.3	(26.5-55.8)
Educational attainment	Primary or less	41.9	(37.9-46.0)	49.9	(45.6-54.2)
	Secondary	40.0	(37.0-43.1)	49.8	(46.4-53.3)
	Tertiary	43.2	(38.9-47.7)	54.1	(49.1-58.9)

Health insurance cover

Consistent with each of the preventative health screenings we have examined in this report, both prostate examinations and PSA blood tests were most prevalent among men who had both private and public health insurance, while the lowest level of screening was found among respondents who had no form of health insurance coverage (Table 15).

TABLE 15 UPTAKE OF PROSTATE EXAMINATIONS OR PSA BLOOD TESTS AMONG MEN AGED 65+, BY HEALTH INSURANCE COVERAGE

		Prostate examination		PSA blood test	
		%	(95% CI)	%	(95% CI)
Health insurance	Full medical card only	39.4	(35.8-43.1)	49.0	(45.1-53.0)
	GP visit card only	24.5	(16.3-35.1)	47.5	(35.7-59.5)
	Health insurance only	44.2	(39.9-48.5)	53.8	(49.0-58.5)
	Joint cover	50.9	(46.2-55.6)	59.9	(54.9-64.6)
	No cover	26.6	(21.2-32.8)	31.7	(25.5-38.6)
Total		41.3	(38.8-43.8)	50.6	(47.8-53.4)

Location

As shown in Table 16, a higher proportion of men aged 65 years and older living in the open countryside had an examination of the prostate within the previous 12 months (45.3%), than those living in a town, city or city suburb (40.5%) and those living in a village (37.7%). The pattern for PSA testing was the same with a higher proportion of older men living in the open countryside had a PSA blood test to screen for the cancer within the previous 12 months (59.7%) than those living in a town, city or city suburb (48.2%) or those living in a village (44.7%).

TABLE 16 UPTAKE OF PROSTATE EXAMINATIONS OR PSA BLOOD TESTS AMONG MEN AGED 65+, BY LOCATION

		Prostate examination		PSA blood test	
		%	(95% CI)	%	(95% CI)
Location of home	Open countryside	45.3	(40.4-50.3)	59.7	(54.4-64.7)
	Village	37.7	(32.5-43.2)	44.7	(39.0-50.5)
	Town	40.1	(36.1-44.2)	48.7	(44.4-53.0)
	City suburb	27.0	(17.6-38.9)	30.3	(20.5-42.3)
	City (inner)	43.5	(38.9-48.2)	51.0	(45.4-56.6)
Total		41.3	(38.8-43.8)	50.6	(47.8-53.4)

Geographic distribution

Figure 6 shows the percentage of men aged 65 years and older within each of the Local Authority areas who had a prostate examination in the previous 12 months.

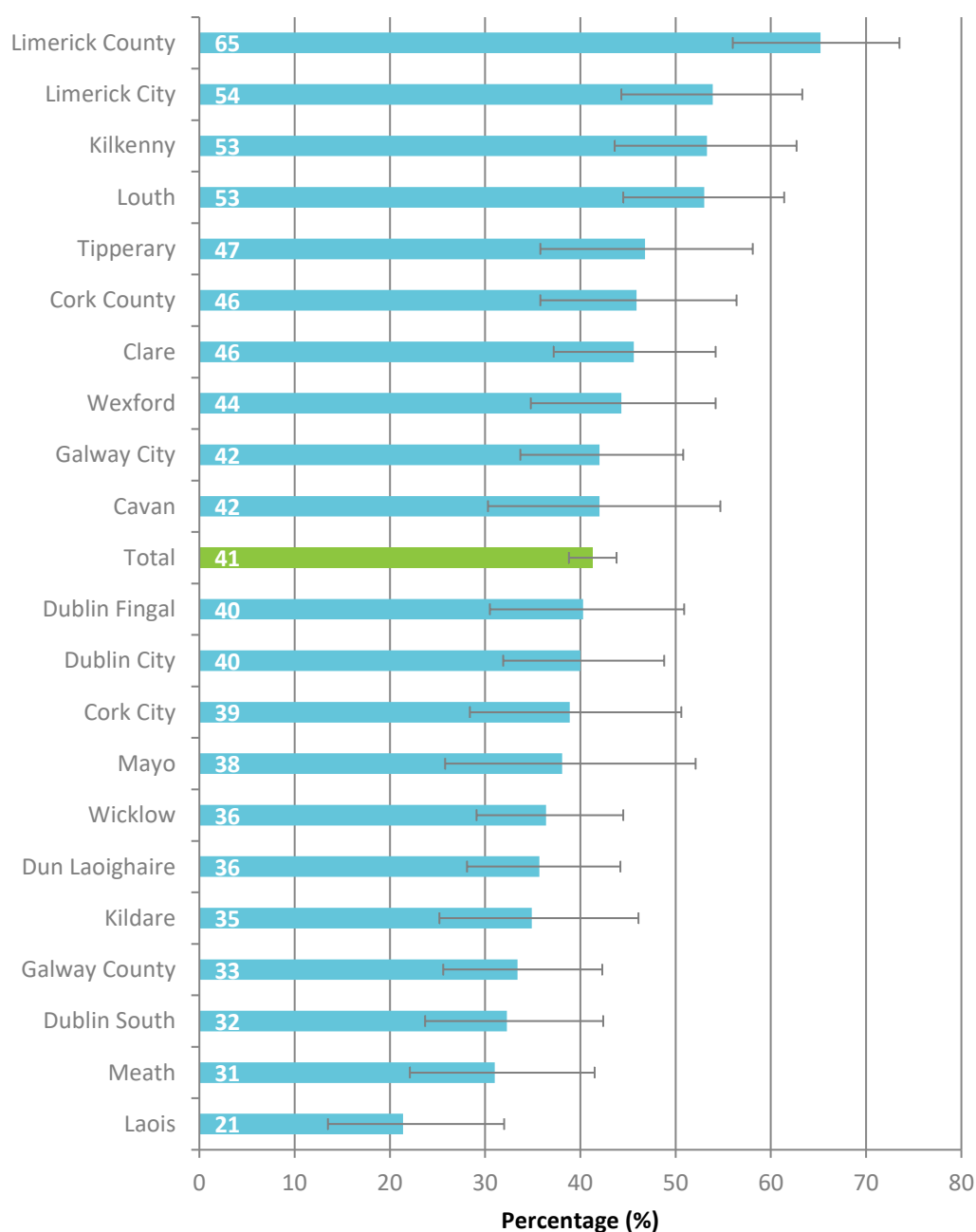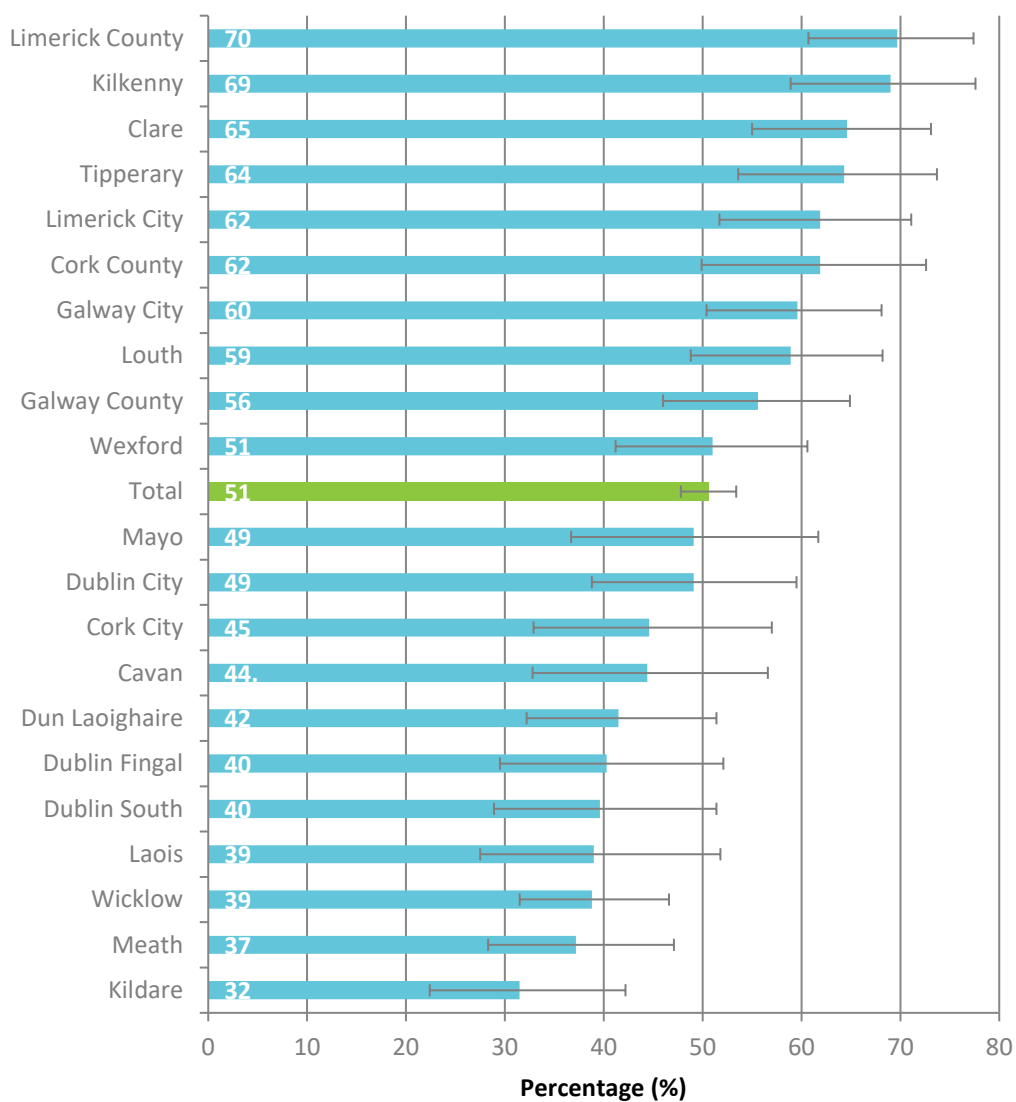**FIGURE 6 UPTAKE OF PROSTATE EXAMINATIONS AMONG MEN AGED 65+, BY LOCAL AUTHORITY AREA**

Figure 7 shows that the proportion of men who had a PSA blood test within the previous 12 months. The proportion of men who had a PSA blood tests ranged from 32% to 70%.

Factors associated with having a prostate examination in the previous 12 months

The results of a mixed effects logistic regression are presented in Table 17. Men aged 65 to 74 years were more likely than those aged 75 years and older to have had their prostate examined in the previous 12 months. There was some evidence of an association between education and prostate cancer screening examinations as highly educated men were more likely to have been examined in the previous 12 months. However, this association does not reach statistical significance once we control for health insurance coverage. The probability of men having a prostate examination in the previous 12 months was strongly related to their economic status with rates of screening was highest among those with higher household incomes and less material disadvantage. The likelihood of having a prostate examination also increased with the number of reported chronic conditions.

Finally, men with no health insurance coverage or a GP visit card only, were least likely to have had a prostate examination while those with joint coverage, followed by private health insurance and a full medical card were most likely to have done so in the previous 12 months.

TABLE 17 FACTORS ASSOCIATED WITH HAVING A PROSTATE EXAMINATION IN THE PREVIOUS 12 MONTHS

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	**OR**	95% CI	**OR**	95% CI	**OR**	95% CI
Age	55-64				Reference				
	65-74	**1.30**	(1.09-1.56)	**1.27**	(1.06-1.52)	**1.29**	(1.07-1.55)	**1.19**	(0.98-1.44)
	75+	**1.21**	(0.98-1.49)	**1.11**	(0.89-1.37)	**1.14**	(0.92-1.42)	**0.95**	(0.75-1.20)
Marital status	Married or living with a partner				Reference				
	Single (never married)	**0.84**	(0.59-1.19)	**0.84**	(0.59-1.21)	**0.84**	(0.58-1.21)	**0.87**	(0.60-1.28)
	Separated / divorced	**0.88**	(0.60-1.30)	**0.87**	(0.59-1.29)	**0.81**	(0.54-1.21)	**0.80**	(0.53-1.22)
	Widowed	**0.86**	(0.60-1.22)	**0.84**	(0.59-1.21)	**0.82**	(0.57-1.19)	**0.85**	(0.58-1.24)
Household composition	Living alone				Reference				
	Living with spouse or partner	**1.03**	(0.73-1.44)	**1.03**	(0.73-1.46)	**0.99**	(0.70-1.42)	**0.97**	(0.67-1.39)
	Living with spouse/partner and other family	**0.90**	(0.66-1.23)	**0.93**	(0.68-1.26)	**0.90**	(0.65-1.24)	**0.87**	(0.63-1.21)
	Living with family or non-family (not spouse)	**0.67**	(0.39-1.17)	**0.67**	(0.38-1.17)	**0.65**	(0.36-1.16)	**0.62**	(0.34-1.13)
Education	Primary/None				Reference				
	Secondary	**1.12**	(0.96-1.30)	**1.12**	(0.96-1.31)	**1.15**	(0.99-1.35)	**1.11**	(0.94-1.30)
	Third Level	**1.21**	(1.01-1.45)	**1.26**	(1.04-1.53)	**1.26**	(1.04-1.53)	**1.12**	(0.91-1.38)
Employment Status	Retired				Reference				
	Paid employment	**0.81**	(0.68-0.97)	**0.87**	(0.72-1.05)	**0.89**	(0.73-1.07)	**0.90**	(0.74-1.10)
	Looking after home or family	**0.73**	(0.41-1.28)	**0.81**	(0.45-1.45)	**0.69**	(0.37-1.26)	**0.71**	(0.39-1.31)
	Other	**0.89**	(0.68-1.16)	**0.91**	(0.69-1.19)	**0.94**	(0.72-1.24)	**0.96**	(0.72-1.28)
Income	€501 up to €1,000				Reference				
	€1,001 up to €1,500	**1.76**	(1.38-2.24)	**1.74**	(1.36-2.22)	**1.78**	(1.39-2.28)	**1.90**	(1.47-2.45)
	€1,501 up to €2,500	**1.55**	(1.24-1.94)	**1.51**	(1.20-1.89)	**1.49**	(1.18-1.88)	**1.48**	(1.16-1.88)

		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
	€2,501 or more	1.57	(1.22-2.01)	1.54	(1.20-1.99)	1.54	(1.19-1.99)	1.50	(1.15-1.96)
	Missing	1.61	(1.29-2.01)	1.65	(1.32-2.06)	1.67	(1.33-2.09)	1.68	(1.33-2.13)
Material deprivation	No				Reference				
	Yes	0.53	(0.40-0.70)	0.53	(0.40-0.70)	0.55	(0.41-0.74)	0.57	(0.42-0.77)
	Urban				Reference				
Location	Open countryside	1.03	(0.85-1.24)	1.02	(0.85-1.24)	1.00	(0.82-1.21)	1.02	(0.84-1.24)
	Village	0.86	(0.72-1.03)	0.87	(0.73-1.04)	0.84	(0.70-1.00)	0.88	(0.73-1.06)
Self-rated health	Very good or good				Reference				
	Fair			0.92	(0.78-1.08)	0.94	(0.80-1.11)	0.99	(0.84-1.17)
	Bad or very bad			0.85	(0.63-1.14)	0.85	(0.62-1.16)	0.90	(0.66-1.24)
Chronic illnesses	None				Reference				
	One			1.44	(1.23-1.69)	1.44	(1.23-1.69)	1.44	(1.22-1.70)
	Two or more			1.63	(1.38-1.92)	1.61	(1.36-1.91)	1.54	(1.29-1.83)
Difficulty getting health information	No				Reference				
	Yes					0.85	(0.67-1.08)	0.85	(0.67-1.08)
	No cover				Reference				
Health insurance coverage	Full medical card only							1.39	(1.05-1.84)
	GP visit card only							0.99	(0.61-1.60)
	Health insurance only							1.65	(1.27-2.16)
	Joint cover							2.28	(1.72-3.04)

Factors associated with having a PSA blood test in the previous 12 months

As seen in Table 18 men aged 65 to 74 years were significantly more likely to have had a PSA blood test in the previous 12 months. After controlling for the other variables in our analysis, this age group were 19% more likely than those aged 55 to 64 to have had a PSA test. There was a clear education gradient showing that the higher the education level, the greater the likelihood of having a PSA blood test.

In terms of men's economic status, there was a positive association between monthly household income and PSA blood test while men considered materially deprived were almost 50% less likely than their peers to have done so. Consistent with each of the preventative health screenings considered earlier, men who had one or more chronic health conditions were significantly more likely than those who did not to have had a PSA blood test in the previous 12 months. Finally, there were again clear differences in the uptake of PSA blood tests according to which type of health insurance coverage a person had with those who had joint coverage almost three times more likely than men who had neither private nor public health insurance coverage to have had a PSA blood test in the previous 12 months. These were followed by men with private health insurance, a GP visit card only, and full medical card only.

TABLE 18 FACTORS ASSOCIATED WITH HAVING A PSA BLOOD TEST IN THE PREVIOUS 12 MONTHS

		Model 1		Model 2		Model 3		Model 4	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age	55-64				Reference				
	65-74	1.37	(1.15-1.64)	1.34	(1.12-1.62)	1.40	(1.16-1.69)	1.29	(1.06-1.57)
	75+	1.18	(0.95-1.47)	1.03	(0.82-1.28)	1.05	(0.84-1.32)	0.86	(0.67-1.09)
Marital status	Married or living with a partner				Reference				
	Single (never married)	0.95	(0.66-1.36)	0.95	(0.66-1.38)	0.93	(0.64-1.36)	1.01	(0.69-1.50)
	Separated / divorced	1.12	(0.76-1.65)	1.08	(0.72-1.61)	1.02	(0.68-1.54)	1.10	(0.72-1.68)
	Widowed	1.09	(0.77-1.56)	1.07	(0.74-1.54)	1.06	(0.73-1.55)	1.16	(0.79-1.71)
Household composition	Living alone				Reference				
	Living with spouse or partner	1.21	(0.86-1.71)	1.25	(0.88-1.78)	1.20	(0.83-1.72)	1.25	(0.86-1.82)
	Living with spouse/partner and other family	1.18	(0.86-1.61)	1.22	(0.89-1.68)	1.19	(0.85-1.66)	1.22	(0.87-1.71)
	Living with family or non-family (not spouse)	0.70	(0.41-1.20)	0.72	(0.42-1.25)	0.68	(0.38-1.21)	0.66	(0.37-1.20)
Education	Primary/None				Reference				
	Secondary	1.18	(1.01-1.38)	1.23	(1.05-1.44)	1.23	(1.05-1.45)	1.20	(1.02-1.43)
	Third Level	1.42	(1.18-1.72)	1.57	(1.29-1.92)	1.50	(1.23-1.84)	1.34	(1.08-1.67)
Employment Status	Retired				Reference				
	Paid employment	0.74	(0.62-0.89)	0.85	(0.71-1.03)	0.88	(0.72-1.07)	0.93	(0.76-1.13)
	Looking after home or family	0.37	(0.20-0.68)	0.40	(0.21-0.76)	0.41	(0.21-0.78)	0.41	(0.21-0.79)
	Other	0.85	(0.65-1.11)	0.84	(0.63-1.10)	0.88	(0.66-1.16)	0.86	(0.64-1.15)
Income	€501 up to €1,000				Reference				
	€1,001 up to €1,500	1.73	(1.36-2.21)	1.72	(1.34-2.21)	1.67	(1.29-2.15)	1.74	(1.34-2.26)
	€1,501 up to €2,500	2.08	(1.66-2.60)	2.02	(1.60-2.54)	1.93	(1.52--2.45)	1.86	(1.45-2.37)
	€2,501 or more	1.58	(1.24-2.03)	1.56	(1.21-2.02)	1.54	(1.19-2.00)	1.50	(1.14-1.96)
	Missing	1.53	(1.22-1.90)	1.57	(1.25-1.97)	1.54	(1.22-1.94)	1.55	(1.22-1.97)

		OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Material deprivation	No							Reference	
	Yes	**0.51**	(0.39-0.67)	**0.49**	(0.37-0.65)	**0.49**	(0.37-0.66)	**0.52**	(0.39-0.70)
Location	Urban							Reference	
	Open countryside	**1.20**	(0.98-1.46)	**1.15**	(0.94-1.41)	**1.14**	(0.93-1.40)	**1.15**	(0.93-1.41)
	Village	**0.84**	(0.70-1.01)	**0.85**	(0.71-1.02)	**0.82**	(0.68-0.99)	**0.86**	(0.71-1.04)
Self-rated health	Very good or good							Reference	
	Fair			**0.87**	(0.74-1.03)	**0.87**	(0.73-1.03)	**0.90**	(0.76-1.07)
	Bad or very bad			**0.89**	(0.66-1.22)	**0.84**	(0.61-1.17)	**0.89**	(0.64-1.23)
Chronic illnesses	None							Reference	
	One			**1.76**	(1.50-2.07)	**1.74**	(1.48-2.05)	**1.78**	(1.50-2.10)
	Two or more			**2.40**	(2.02-2.86)	**2.41**	(2.02-2.88)	**2.37**	(1.97-2.84)
Difficulty getting health information	No							Reference	
	Yes					**0.92**	(0.72-1.17)	**0.91**	(0.71-1.16)
Health insurance coverage	No cover							Reference	
	Full medical card only							**1.75**	(1.32-2.33)
	GP visit card only							**1.85**	(1.16-2.96)
	Health insurance only							**1.96**	(1.50-2.58)
	Joint cover							**2.90**	(2.16-3.89)

Discussion

Similar to other studies, we found that older men were more likely than younger ones to have had a prostate examination or a PSA blood test. However, in the case of prostate examinations, this difference was fully explained by the inclusion of other factors in our analysis. Regarding the PSA blood test, some age differences remained with men aged 54 to 74 years more likely than younger or older respondents to have had the test in the previous 12 months. While we found no educational differences in the rates of prostate examinations, higher education was associated an increased likelihood of having had a PSA blood test in the previous 12 months.

Economic factors were the strongest predictors of both methods of prostate cancer screening in this cohort. In particular, higher household income and the absence of material deprivation were associated with an increased likelihood of being screened for prostate cancer. Similarly, health insurance coverage, particularly, joint private and public coverage was associated with a greatly increased likelihood of being screened. These effects remained strong even when other characteristics of the respondents were controlled for. This again suggests that in the absence of national programmes that are free at the point of delivery, many potentially at risk groups may miss out on opportunities for the early detection of disease, including cancers. Given the current absence of an efficacious screening method for prostate cancer this is likely to remain the case (34,40).

CHAPTER FOUR

CONCLUSIONS

5. Conclusion

Overall, preventative health screening rates for cholesterol and blood pressure were high, particularly considering that this survey included community-dwelling adults and therefore did not capture information on older adults in care settings. However, this fact may not be as positive as first appears when one considers that both of these tests are administered in the main when individuals present with existing health problems, including chronic conditions.

Providing preventative health screenings free of financial cost does appear to increase uptake and importantly is also successful in reaching more deprived members of society. This is clearly evidenced in the case of the flu vaccine and also the findings that more disadvantaged older adults are less likely to have attended screenings when there is a monetary cost. Similarly, targeted programmes like BreastCheck do succeed in reaching many of at risk groups.

Access to health information does not appear to be a barrier to adults aged 55 + availing of preventative health screenings. However, accessing information is only one aspect of health literacy, and less related to actual behaviour that other health information processing domains such as judging information. Furthermore health literacy in relation to healthcare and disease prevention appears to be higher among older adults in Ireland compared with health literacy related to health promotion. This may be explained by increased interaction with the healthcare system as people age. The Irish Cancer society have played a central role in the promotion of health literacy in the past decade, and their health information campaigns are a good example of accessible information, and a health literate healthcare system in practice. GPs are an important focal point for the provision of information to older people and patients.

As the population ages, public health strategies and programmes have an important role in ensuring that the population maintains in good health into older age. Primary and secondary preventative health interventions are integral to achieving this. We have seen here that screening programmes such as BreastCheck and the flu vaccination preventative programmes have had success in reaching the most at-risk groups in society. We have however also seen that other preventative health measures such as screenings for prostate cancer may not be utilised by all who may benefit from them and this uneven distribution is at least partly shaped by material resources and health insurance coverage.
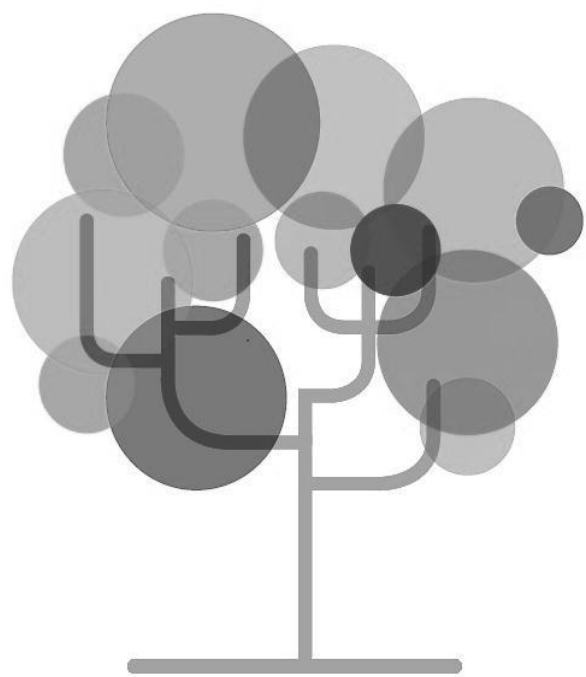
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