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Uptake of cancer screening services among middle and older ages in Ireland: the role of healthcare eligibility



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ABSTRACT

Objectives: The aim of this analysis was to examine the association between public healthcare eligibility combined with private health insurance (PHI) status and the uptake of breast and prostate cancer screening services among middle and older age groups in Ireland.

Study design: This is a cross-sectional analysis using The Irish Longitudinal Study on Ageing (TILDA).

Methods: The analysis included 6902 people aged 50 years and older who completed an in-house interview as part of TILDA. The interview collects information on a range of demographic, socio-economic, health and health service usage variables including the uptake of cancer screening services. An eligibility variable was created using information on public healthcare entitlement and PHI status. The association between eligibility and the uptake of two cancer screening services—mammogram and prostate-specific antigen (PSA) test—was examined using weighted multivariate logistic regression analysis.

Results: The uptake of a mammogram and PSA testing was significantly higher in those with PHI. This relationship held after controlling for a range of confounders including health and socio-economic status.

Conclusions: More research is required to identify the reasons for the higher uptake of cancer screening services among those with PHI, given that insurance does not confer any advantages in accessing these services. It is possible that the higher uptake is explained by differential access to secondary care services between those with and without PHI. Consideration of the integrated nature of healthcare systems is essential when seeking to maximise the uptake of services (such as cancer screening) that potentially involve multiple parts of the healthcare system.

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Introduction

Recognising the potential of cancer screening services as a means of maintaining good health and saving lives, most high-income countries have introduced various universal cancer screening programmes. However, despite often being offered free at the point of use, studies from across Europe have shown that a significant minority of the population does not avail of such services.^{1–3} In addition, those who participate tend to differ from those who do not participate in such programmes. Although age and sex have shown mixed associations with uptake of various cancer screening programmes,^{4,5} a consistent finding across high-income countries appears to be higher uptake among higher socio-economic groups.^{2,4}

In Ireland, there is a complex system of eligibility for healthcare services. There are two main categories of entitlement to public health services. Those in category I (medical cardholders) are entitled to, largely, free public healthcare services. Those in category II are entitled to subsidised public hospital services and prescription medicines but pay the full cost of general practitioner (GP) services and other primary and community care services. In November 2005, the GP visit card was introduced; GP visit cardholders are entitled to free GP visits but otherwise have the same entitlements as category II individuals. Eligibility for a medical/GP visit card is assessed primarily on the basis of an income means test, with the threshold for GP visit cards being 50% higher than that for the full medical card. In the summer of 2015, a GP visit card was extended to all children younger than 6 years, as well as to people aged 70 years and older. In 2017, approximately 33% of the population had a medical card, and 10% had a GP visit card.⁶

Many of those in category II and some of those in category I purchase private health insurance (PHI). In 2017, approximately 43% of the population held PHI.⁶ PHI in Ireland is mainly used to provide cover for private or semiprivate acute hospital services, delivered in both public and private hospitals. Although a nominally common waiting system for public and private patients within the public healthcare system was introduced in 2008, privately insured patients' faster routes of access to initial consultations in consultants' private rooms and to diagnostic tests ensure that they gain faster access to public hospital elective care, whereas public patients can experience long waits.^{7,8} A small number of PHI policies provide partial reimbursement of certain primary care expenses such as GP visits and physiotherapy.⁹

There are a number of national cancer screening programmes in Ireland (including screening for breast, cervical and bowel cancer), where screening is provided free of charge to eligible groups. To date, a small body of work has looked at the uptake of cancer screening in Ireland, including inequalities in uptake.^{10–12} Moore et al.,¹¹ for example, found high uptake of cancer screening among those with PHI relative to those without, although their analysis did not control for other socio-economic and health characteristics which may also influence uptake. Similarly, Walsh et al.¹⁰ found uptake of cancer screening services to be associated with insurance

status, but that analysis did not include an indicator of eligibility for public healthcare services.

The aim of this analysis therefore was to examine the association between public healthcare eligibility combined with PHI status and the uptake of cancer screening services in Ireland among a cohort of middle- and older-aged adults. Two cancer screening services were included—mammogram for breast cancer screening and PSA testing for prostate cancer screening. These services were chosen as one is provided within a national screening programme (BreastCheck), whereas the other is not, so it might be expected that public healthcare eligibility and PHI would operate differently across the two services.

Methods

Study design and population

Data for the analysis were derived from The Irish Longitudinal Study on Ageing (TILDA). TILDA is a nationally representative sample of community-dwelling individuals aged 50 years and older in Ireland and includes an extensive set of variables on the health and socio-economic circumstances of older people. The sampling procedure and the study design have been previously described.¹³ In short, the RANSAM sampling system was used to randomly target households, and all household residents aged 50 years or older and their spouse/partner (of any age) were invited to participate in the study. The household response rate was 62%, leading to a final wave one sample of 8172 adults aged 50 years and older who completed an in-home interview between October 2009 and February 2011. Data collection involved an in-home computer-aided personal interview; a self-completion questionnaire completed and returned by the participants; and a comprehensive health assessment carried out by research nurses in a dedicated health centre or, if required, a modified assessment carried out in the participant's own home.

Currently, there are four waves of data. The analysis presented in this article is based on wave three of the study (undertaken in 2014/15) and includes data from the in-home interview for 6902 individuals.¹⁴

Dependent variables

Two cancer screening services are included in this analysis—mammogram and PSA test. For each service, the relevant question in TILDA refers to 'since your last interview, have you had the relevant service'. In the vast majority of cases, the last interview refers to wave two data collection, meaning that it covers a period of approximately two years.

The analysis for each of the services was restricted to particular age/sex groups.

- In Ireland, at the time of the data collection (2014/15), the national breast screening programme invited women aged 50–64 years on a two-yearly cycle for a free breast mammogram. In this analysis, therefore, the sample included women aged between 50 and 64 years.

- At present, there is no national prostrate screening programme in Ireland. However, previous research has shown that a majority of older men in Ireland (71%) had a PSA test or prostate examination to screen for cancer in the previous two years.¹¹ While there are no specific guidelines about the use of PSA testing, the Irish Cancer Society suggests that men discuss the possibility of taking a PSA test with their doctor from the age of 40–50 years, depending on risk factors. Routine testing of those older than 70–75 years is not generally advised.¹⁵ For the purpose of this analysis, all men aged 50 years and older are included. Initial analysis showed differential uptake between ‘younger’ and ‘older’ men, and the analysis was therefore stratified by age (50–64 years and 65 years and older).

Independent variables

The independent variables were selected with reference to Andersen's model of health services utilisation.¹⁶ The predisposing factors included sex, age group (50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80+ years), marital status (married, never married, divorced/separated, widowed), education (primary/none, secondary, third level) and economic activity (retired, employed, self-employed, unemployed, permanently sick or disabled, looking after family or home, education/training, other). The enabling factors included household income (<€10,000, €10,000–€20,000, €20,000–€40,000, €40,000–€70,000 and €70,000 plus), location (Dublin city or country, another city or town and rural) and eligibility category. An eligibility variable was created for this analysis using information on public healthcare entitlement and PHI status. It includes four mutually exclusive eligibility categories—medical/GP visit card only (38% of the total sample), PHI only (35% of the sample), both medical/GP visit card and PHI (18% of the sample) and neither medical/GP visit card nor PHI (9% of the sample). Need for health care was assessed through three questions on health status: presence of long-term illness (yes, no), self-reported general health status (excellent/very good, good, fair/poor) and self-reported mental health (excellent/very good, good, fair/poor).

Statistical analysis

The uptake for each service was described in the whole study population, as well as in specific subgroups. Multivariate analyses were used to investigate associations between service use and predisposing, enabling and need factors. Models were estimated using weighted multivariate logistic regression analysis. Potential multicollinearity between the independent variables was examined by calculating the mean and individual and covariate variance inflation factors. The results are presented with adjusted odds ratios (ORs).

Results

Uptake of a mammogram among eligible women was 86%, whereas uptake of the PSA test was 67% for men aged 50 years and older. Table 1 shows the adjusted ORs describing the

Table 1 – Association between mammogram uptake and a range of demographic, socio-economic and health characteristics—results from a weighted multivariate logistic regression (adjusted odds ratios and 95% confidence intervals [CIs])—women aged 50 to 64 years, n = 1481.

Variable	Odds ratio (95% CI)
Age (years)	
50–54	1.00
55–59	1.61 (1.51–1.71)
60–64	1.36 (1.28–1.45)
Marital status	
Married	1.00
Never married	0.40 (0.39–0.42)
Separated/divorced	0.78 (0.76–0.81)
Widowed	0.84 (0.80–0.88)
Education	
Primary/none	1.00
Secondary	1.11 (1.07–1.15)
Third level	1.12 (1.07–1.17)
Economic activity	
Retired	1.00
Employed	0.95 (0.91–0.99)
Self-employed	1.13 (1.05–1.21)
Unemployed	0.61 (0.58–0.65)
Permanently sick/disabled	1.02 (0.97–1.08)
Looking after family/home	0.60 (0.57–0.62)
Education/training	0.46 (0.41–0.51)
Other	0.24 (0.21–0.26)
Income (€)	
<10,000	1.00
10,000–20,000	0.89 (0.85–0.93)
20,000–40,000	1.39 (1.32–1.45)
40,000–70,000	1.16 (1.10–1.23)
70,000+	1.37 (1.28–1.47)
Area	
Dublin city or country	1.00
Another town or city	0.77 (0.75–0.80)
Rural	0.79 (0.76–0.82)
Long-term illness	
Yes	1.00
No	1.13 (1.09–1.16)
General health	
Excellent/very good	1.00
Good	1.18 (1.14–1.22)
Fair/poor	0.77 (0.74–0.80)
Mental health	
Excellent/very good	1.00
Good	1.15 (1.12–1.19)
Fair/poor	0.63 (0.60–0.65)
Eligibility	
Medical/GP visit card only	1.00
PHI only	1.99 (1.91–2.07)
Both medical/GP care and PHI	3.69 (3.46–3.93)
Neither medical/GP card nor PHI	0.82 (0.79–0.85)

PHI, private health insurance; GP, general practitioner.

relationship between the uptake of a mammogram and a range of demographic, socio-economic, eligibility and health variables. Among this cohort, uptake of a mammogram was significantly higher among those aged 55–59 and 60–64 years (relative to those aged 50–54 years) and highest among those who were currently married. Consistent with the international literature, in general, uptake was higher in those with higher levels of education and income. However, the

relationship between self-reported health status and mammogram uptake was more ambiguous. For example, relative to those with excellent or very good general health, the odds of uptake of a mammogram were significantly higher among those with good general health (OR = 1.18, 95% confidence interval [CI]: 1.14–1.22) and significantly lower among those in poor general health (OR = 0.77, 95% CI: 0.74–0.80). A similar relationship was found for self-reported mental health. Uptake of a mammogram was significantly lower in those living in a town or urban area outside of Dublin (OR = 0.77, 95% CI: 0.75–0.80) and in those living in a rural area (OR = 0.79, 95% CI: 0.76–0.82) relative to those living in Dublin.

In terms of public healthcare eligibility and PHI status, relative to those with a medical/GP visit card only, uptake of a mammogram was significantly higher among those with PHI only (OR = 1.99, 95% CI: 1.91–2.07) and those with both PHI and medical/GP visit card (OR = 3.69, 95% CI: 3.46–3.93). Those with neither PHI nor a medical/GP visit card were significantly less likely to have received a mammogram (OR = 0.82, 95% CI: 0.79–0.85).

Table 2 shows the adjusted ORs describing the relationship between the uptake of a PSA test and a range of demographic, socio-economic, eligibility and health characteristics for men aged 50–64 years and older than 65 years separately in a multivariate logistic regression. Similar to the uptake of a mammogram, there was a clear socio-economic gradient with significantly higher uptake among those with higher levels of education and income. The relationship between health status and utilisation of the PSA test differed somewhat for the two age groups. For the older age group (65+ years), PSA testing tended to be higher in those with poorer self-reported health; however, the relationship between health status and uptake of the PSA test for the younger age group (50–64 years) showed a less obvious pattern, although those with the worst self-reported mental health were significantly less likely to have received a PSA test (OR = 0.51, 95% CI: 0.49–0.52) relative to those with the best self-reported mental health.

Contrary to a mammogram, uptake of a PSA test was higher in those living outside of Dublin. For example, in the younger age group, the odds of uptake was 1.22 (95% CI: 1.19–1.25) in those living in a town or city other than Dublin and 1.28 (95% CI: 1.25–1.31) for those living in a rural area.

In terms of public healthcare eligibility and PHI status, for both age groups, relative to those with a medical/GP visit card only, uptake of the PSA test was significantly higher among those with PHI. For example, for those aged 50–64 years, with PHI only, the odds of uptake of a PSA test were 1.79 (95% CI: 1.74–1.84), whereas for those with both PHI and medical/GP visit card, the odds of utilisation were 2.90 (95% CI: 2.74–3.06). Those with no additional cover were less likely than medical/GP visit cardholders only to receive a PSA test in the younger age group (OR = 0.87, 95% CI: 0.84–0.90) but more likely at the older age groups, although not significantly so (OR = 1.03, 95% CI: 0.98–1.08).

Discussion

In this study, uptake of a mammogram and PSA testing was found to be significantly higher in those with PHI, despite PHI

Table 2 – Association between prostate-specific antigen (PSA) uptake and a range of demographic, socio-economic and health characteristics—results from a weighted multivariate logistic regression (adjusted odds ratios and 95% confidence intervals [CIs])—men aged 50–64 years (n = 1142) and men older than 65 years (n = 1231).

Variable	Ages 50–64 yrs	Ages 65+ yrs
	Odds ratio (95% CI)	Odds ratio (95% CI)
Age (years)		
50–54	1.00	
55–59	1.30 (1.24–1.35)	
60–64	1.98 (1.90–2.07)	
65–69		1.00
70–74		1.04 (1.00–1.06)
75–79		0.70 (0.68–0.72)
80+		0.56 (0.54–0.57)
Marital status		
Married	1.00	1.00
Never married	1.15 (1.12–1.19)	0.49 (0.48–0.51)
Separated/divorced	0.80 (0.78–0.83)	0.74 (0.71–0.77)
Widowed	0.74 (0.71–0.78)	1.11 (1.07–1.14)
Education		
Primary/none	1.00	1.00
Secondary	1.44 (1.40–1.48)	1.25 (1.22–1.28)
Third level	1.53 (1.48–1.57)	1.30 (1.26–1.34)
Economic activity		
Retired	1.00	1.00
Employed	1.01 (0.98–1.04)	0.73 (0.69–0.77)
Self-employed	0.94 (0.91–0.97)	1.08 (1.04–1.11)
Unemployed	0.68 (0.66–0.71)	–
Permanently sick/ disabled	0.72 (0.70–0.75)	0.82 (0.76–0.89)
Looking after family/ home	0.29 (0.25–0.33)	–
Education/training	2.15 (1.87–2.46)	–
Other	1.02 (0.94–1.10)	2.65 (2.18–3.22)
Income (€)		
<10,000	1.00	1.00
10,000–20,000	1.71 (1.65–1.77)	0.95 (0.91–1.00)
20,000–40,000	1.85 (1.78–1.92)	0.90 (0.86–0.94)
40,000–70,000	1.98 (1.90–2.06)	1.19 (1.13–1.25)
70,000+	2.16 (2.07–2.27)	1.46 (1.37–1.58)
Area		
Dublin city or country	1.00	1.00
Another town or city	1.22 (1.19–1.25)	1.28 (1.25–1.31)
Rural	1.28 (1.25–1.31)	1.32 (1.28–1.35)
Eligibility		
Medical/GP visit card only	1.00	1.00
PHI only	1.79 (1.74–1.84)	2.15 (2.08–2.22)
Both medical/GP care and PHI	2.90 (2.74–3.06)	2.08 (2.02–2.13)
Neither medical/GP card nor PHI	0.87 (0.84–0.90)	1.03 (0.98–1.08)
Long-term illness		
Yes	1.00	1.00
No	0.68 (0.67–0.70)	0.66 (0.64–0.67)
General health		
Excellent/very good	1.00	1.00
Good	0.88 (0.86–0.90)	1.05 (1.02–1.07)
Fair/poor	1.12 (1.09–1.16)	1.15 (1.12–1.19)
Mental health		
Excellent/very good	1.00	1.00
Good	0.97 (0.95–0.99)	1.12 (1.10–1.15)
Fair/poor	0.51 (0.49–0.52)	0.72 (0.69–0.74)

PHI, private health insurance; GP, general practitioner.

offering little advantage in terms of accessing these services. These relationships held even after controlling for a range of demographic, socio-economic and health characteristics of respondents. In addition, the differences between those with and without PHI for the cohort included in this analysis were greater than those observed across other characteristics including income and education.

In Ireland, a mammogram is offered to all eligible women free of charge, given PHI does not give preferential access for this service. In relation to the PSA test, there is no national prostate screening programme, although many men receive a PSA test from their GP and those without a medical/GP visit card would pay for such a GP visit. Therefore again, PHI status offers little advantage in accessing a PSA test except for the limited number of people who may have PHI, which provides some cover for primary care services.

There are a number of possible explanations for the strong association between PHI and uptake of a mammogram and PSA testing observed in this cohort. However, given the different means of accessing these screening services and the different age/sex groups that participate, it is possible that different factors are contributing to the observed relationship between PHI and mammogram uptake and PHI and PSA testing.

Given that previous research has consistently shown higher uptake of cancer screening among higher socio-economic groups^{2–4,17} and that uptake of PHI in Ireland is more common among the higher socio-economic groups, the associations observed in this analysis could be driven by socio-economic differences between those with and without insurance not captured by the socio-economic variables included in the analysis. However, given that the analysis controls for education, income and economic activity, it is unlikely that the strong relationship between PHI and uptake of a mammogram and PSA testing is fully explained by this residual socio-economic status.

Second, the positive association between PHI and uptake of a mammogram and PSA testing could be explained by some unobserved variables that influence the uptake of PHI and preventive services, such as risk aversion.¹⁸ Evidence from the UK found some support for this assertion.¹⁹ On the other hand, McHugh et al.²⁰ found no association between PHI and another preventive service, flu vaccination, in Ireland. Courbage and Rey²¹ proposed that risk of the severity of a potential disease may lead to higher uptake of preventive treatment, which may explain this disparity. Nevertheless, risk aversion may not explain all of the observed associations between PHI and uptake of a mammogram and PSA testing.

Third, it is possible that the positive association between PHI and uptake of a mammogram and PSA testing is explained by differential access to secondary care services between those with and without PHI. As noted in the Introduction, those with PHI in Ireland can access initial consultations and diagnostic tests within the public healthcare system more quickly than those without PHI. Therefore, those without PHI may be less inclined to access cancer screening services because of expectations of delays in receiving follow-up diagnostic and treatment services in the public healthcare system. For PSA testing, it is also possible that medical

professionals (including GPs who generally administer the PSA test) are influenced by an individual's insurance status when deciding to recommend or undertake PSA testing. If the speed with which a patient moves along any part of a care pathway can be expedited by PHI, then differences in utilisation are likely to exist throughout the care pathway.¹⁰

More work is required to better understand the reasons for the higher uptake of screening services among the insured as they may have important implications for the design and reform of healthcare systems. If differential access to secondary care services among the insured and non-insured is driving or contributing to the uptake (or non-uptake) of screening services, then more consideration is potentially required on addressing these differentials when seeking to maximise the uptake of screening services. Furthermore, the role of PHI in influencing the uptake of PSA testing requires further exploration and, in particular, whether PHI is contributing to overuse of PSA testing, given that testing is generally only recommended for select groups.¹⁵

A strength of the current analysis is that it included a large, nationally representative sample of community-dwelling adults aged 50 years and older in Ireland. However, as is common to all surveys, there are some limitations. The reliance on self-reported information especially on the uptake of preventive services introduces the possibility of recall bias and reporting error.¹ Previous research has shown that survey data tend to overestimate cancer screening uptake.²² This is a potential issue with the current analysis in which the uptake rate for a mammogram (86%), for example, is higher than the number emanating from administrative sources (77%).²³ Although the difference may be explained by people's tendency to overstate the uptake of preventive services in surveys, other explanations may also be at play. For example, the survey results will include women who received a mammogram because they had potential symptoms of breast cancer or previously had breast cancer, whereas such women would not be included in the administrative figures. Another potential explanation for the discrepancy relates to the characteristics of those who completed the survey. Individuals with lower levels of educational attainment are somewhat under-represented in TILDA,¹³ and cancer screening uptake tends to be lower among those with lower educational levels. The use of weights (based on age, sex and educational attainment²⁴), however, in the current analysis should at least partly address differential non-response.

Some studies have linked administrative data sets including information on breast screening uptake to surveys (which include information on the demographic and socio-economic characteristics) to avoid the issue of reporting error.¹ Given data availability, such an approach is not currently possible in the Irish context.

Author statements

Ethical approval

Given that the analysis used secondary data, no ethical approval was required.

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Competing interests

The authors declare no conflict of interest.

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