Growing Up in Ireland
National Longitudinal Study of Children

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UNDERSTANDING USE OF GENERAL PRACTITIONER SERVICES AMONG CHILDREN IN IRELAND

INFANT COHORT

REPORT 7

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UNDERSTANDING USE OF GENERAL PRACTITIONER SERVICES AMONG CHILDREN IN IRELAND

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Anne Nolan, Richard Layte

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EXECUTIVE SUMMARY

Equity of access to health care is regarded as a key objective of national and international health policy. As the first point of contact for most individuals' interactions with the health service, the role of the general practitioner (GP) is crucial. GPs in Ireland act as gatekeepers for access to secondary care services; therefore, GPs play a pivotal role in providing a wide range of primary care services to the population, and by extension, reducing reliance on more costly acute hospital services. The current Irish system of financing GP care is unusual internationally as over half the population pay the full cost of GP care at the point of use. In summer 2015, free GP care for all children aged under 6 years and all adults aged 70+ years was introduced, and the current Programme for Government commits to the extension of free GP care to all under 18 years of age.

International research has shown that timely access to appropriate health care may have significant positive effects on child health. In addition, child health has a strong causal relationship with later life outcomes such as education and employment as well as adult health. Better Outcomes, Brighter Futures, the national policy framework for children and young people in Ireland, highlights the importance of early intervention and prevention for improving child health outcomes, noting that what happens early in life affects health and wellbeing in later life. In this context, it is important to understand the extent to which the current system of healthcare financing in Ireland, and in particular, eligibility for primary care free at the point of delivery, shapes the pattern of GP use adjusting for the need for health care. Such an analysis also contributes to an assessment of the possible impact of extending free GP care to further groups of children on the demand for GP services.

Growing up in Ireland (GUI), the national longitudinal study of children in Ireland, offers the ideal evidence base with which to evaluate the impact of the current system of public healthcare eligibility on GP utilisation among children in Ireland. GUI was established in 2006 with the objective of describing the lives of children in Ireland, establishing what is typical and normal, as well as what is atypical and problematic, in order to improve Irish policy and services. GUI surveys two cohorts of children, an Infant Cohort and a Child Cohort. This report focuses on the Infant Cohort. The Infant Cohort of over 11,000 children and their families was first surveyed between September 2008 and April 2009 when the children were 9 months old. From January 2011 to August 2011, the families were contacted again, when the children were 3 years of age, and 88 per cent of families participated in the second wave. In addition to providing comprehensive data on multiple domains of child and family life, the availability of longitudinal data (i.e., repeated observations on the same children) allows us to investigate the impact of changes in eligibility for free GP care on changes in GP visiting over time.

Using data from the first two waves of the Infant Cohort of GUI (i.e., when the children were aged 9 months and 3 years), this report examines the following research questions:

- Does eligibility for free GP care affect children's use of GP services?
- Does type of private health insurance cover affect children's use of GP services?
- Are user fees for GP care a particular burden on children from low income families without a medical card?
- As children are dependent on their parents for decision-making in relation to healthcare utilisation, do parental characteristics (e.g., family structure, education, employment status, etc.) affect their child's use of GP services?

The report distinguishes between five mutually exclusive categories of public healthcare eligibility, which differ in the degree to which the patient faces user fees for primary care services:

- Full medical card – free GP visits at the point of use;
- GP visit card – free GP visits at the point of use;

- Private health insurance, with cover for GP expenses – full cost, with full or partial reimbursement by private health insurance;
- Private health insurance, without GP cover – full cost;
- 'No cover', i.e., without a full medical card, GP visit card or private health insurance – full cost.

When the children were aged 3 years in 2011, 34 per cent had a full medical card, 4 per cent had a GP visit card, 26 per cent had private health insurance with GP cover, 20 per cent had private health insurance without GP cover, and 16 per cent had 'no cover'. In 2008 in contrast (i.e., just as the recession was beginning), when the children were aged 9 months, rates of full medical and GP visit card cover were significantly lower (at 26 per cent and 3 per cent respectively), and rates of private health insurance cover were significantly higher (29 per cent had private health insurance with GP cover, and 23 per cent had private health insurance with no GP cover).

GP visiting information refers to the number of GP visits in the previous 12 months, reported by the primary caregiver (the recall period is 9 months for wave 1). Both waves of the data contain detailed information on child health, household socio-economic characteristics and parental health and behaviours. Independent variables are grouped into those reflecting need for health care (e.g., child health status, birth weight, etc.), and those related to the socio-economic characteristics of the household (e.g., income, urban/rural location, etc.).

The analysis found:

- At both 9 months and 3 years of age, children with a full medical or GP visit card (i.e., who are entitled to free GP visits) had a significantly higher number of GP visits per annum than children with 'no cover' (i.e., without a full medical card, GP visit card or private health insurance), even after adjusting for differences in health need and other family and child characteristics between the groups (Chapter 2);
- In comparison with those with 'no cover' (i.e., without a full medical card, GP visit card or private health insurance), children with private health insurance with no GP cover had a significantly higher number of GP visits, despite both groups facing the full out-of-pocket cost of GP care (Chapter 2);
- Children who gained a full medical or GP visit card between the age of 9 months and 3 years had a higher number of GP visits compared to children who remained paying the full price of GP care between the age of 9 months and 3 years. Becoming eligible for a full medical or GP visit card was associated with an increase of 0.6 GP visits (or 25 per cent) (Chapter 4);
- However, for those who lost a full medical or GP visit card between the age of 9 months and 3 years, there was no significant difference in the number of GP visits in comparison with those children who retained their full medical or GP visit card (i.e., having free GP care) (Chapter 4);
- Focusing on those children without a full medical or GP visit card, there is evidence that children in higher income households had a higher number of GP visits (particularly at the age of 9 months), suggesting barriers to access among lower income children without a full medical or GP visit card (Chapter 3);
- Focusing on other family characteristics, it was found that mother's health status was a significant determinant of her child's use of GP services, with children of mothers with poorer health having higher levels of GP visiting. Other socio-economic characteristics of the mother such as education were not significant however (Chapter 3).

These results suggest a number of implications for policy. First, while child health is an important determinant of GP visiting in Ireland, public healthcare entitlements are also important, with those who face the full out-of-pocket cost of GP care having significantly fewer GP visits. The data do not allow us to assess whether those without a full medical or GP visit card in the Irish context are foregoing 'necessary' care. However evidence from other settings suggests that removing financial barriers to access to healthcare among children has a significant positive impact on child health, and later-life outcomes. Second, notwithstanding current policy proposals, this report provides evidence to show that income was an important determinant of GP visiting for children without a full medical or GP visit card, particularly at age 9 months. By age 3 however, this effect was largely absent, suggesting that wider eligibility for a full medical or GP visit card during the recession may have protected those who were previously above the threshold. Finally, the estimates from the longitudinal analysis (where the same children and families were observed at 9 months and 3 years of age) are directly relevant to current policy proposals. The analysis shows that for those children who became eligible for a full medical or GP visit card between the age of 9 months and 3 years, there was an increase in the annual number of GP visits of approximately 0.6 visits, or approximately 25 per cent. This estimate does not distinguish between gaining a full medical and a GP visit card, and does not take into account possible changes in health need that may have also occurred over that period. However, the analysis provides additional information for policymakers currently tasked with extending free GP care to other groups of children, and may aid policymakers in costing future proposals and assessing the capacity implications of this increased demand.

Chapter 1

INTRODUCTION

1.1 CONTEXT

Equity of access to healthcare is regarded as a key objective of national and international health policy. As the first point of contact with the health service, the role of the general practitioner (GP) is crucial. GPs in Ireland act as gatekeepers for access to secondary care services; therefore, GPs play a pivotal role in providing a wide range of primary care services to the population, and, by extension, reducing reliance on more costly acute hospital services (Nolan et al., 2007). The current Irish system of financing GP care is unusual internationally because a large proportion of the population are obliged to pay the full cost of GP care at the point of use (Ruane, 2010; Smith, 2010; Evetovits et al., 2012). A major reform of this system was announced in 2011, comprising the introduction of a system of universal health insurance (UHI) and free GP care for all, regardless of income. The first pillar of the reform, the introduction of UHI, in the form of competing private insurers, was delayed initially and then shelved after recent research illustrated how expenditure would increase substantially under the proposed model of UHI (Wren et al., 2015), and would not achieve universal coverage (Wren and Connolly, 2016). The second main pillar of the reform was the introduction of free GP care at the point of use for all, on a phased basis by age. In summer 2015, free GP care for all children aged under six years and all adults aged 70+ years was introduced and current plans commit to the extension of free GP care to the under-18s (Government of Ireland, 2016).

Currently, there are two main categories of eligibility[1] for public health services in Ireland. Those in Category I (full medical-card holders) are entitled to free public health services (including GP services),[2] while those in Category II are entitled to subsidised public hospital services and prescription medicines,[3] but must pay the full cost of GP services (and in general, GPs charge the same fee for adult and child consultations). In 2010, the average cost of a GP consultation was estimated at €51 (National Consumer Agency, 2010). In October 2005, the GP visit card was introduced; GP visit-card holders have the same entitlements to free GP care as Category I individuals, but the same entitlements as Category II individuals for all other public health services (including prescription medicines).[4]

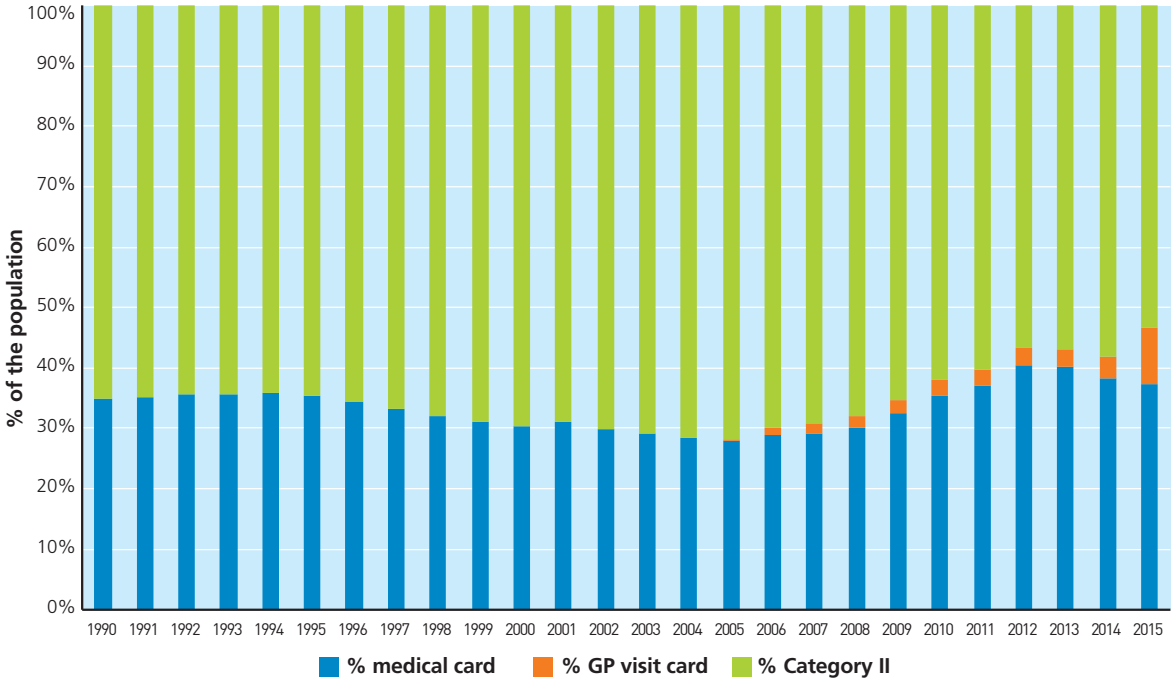
Eligibility for a full medical/GP visit card is assessed primarily on the basis of an income means test. The income thresholds for the GP visit card are 50 per cent higher than for the full medical card. In certain cases, individuals who are otherwise ineligible for a full medical/GP visit card may be granted a card on a 'discretionary' basis, if they have particular health needs which would cause them undue hardship.[5] There is also a small number of groups with automatic entitlement to a full medical card (e.g. foster children).[6] Over the period 2001-2008, all individuals aged 70 years and over were automatically entitled to a full medical card (not including dependants), regardless of income (Government of Ireland, 2001). The automatic entitlement was removed from 1 January 2009 (Government of Ireland, 2008). Since July 2015, all those aged over 70 are automatically entitled to a GP visit card.

A further layer of complexity is added to the Irish system by the existence of private health insurance (PHI), which plays both a supplementary and complementary role in the Irish healthcare system.[7] Just under 50 per cent of the population have PHI, which mainly provides cover for private acute hospital services (which may be delivered in public hospitals), but which increasingly offers full or partial reimbursement of certain primary care expenses. Full medical-card and GP visit-card holders may take out PHI if they wish, but the numbers with such 'dual cover' are small.[8]

[1] A distinction is made between eligibility and entitlement. For example, where an individual applies for and meets the qualifications/requirements for a benefit, he or she is 'eligible' to receive the benefits offered. The benefits offered (e.g. free public healthcare) refer to the specific 'entitlements' that must be provided to those that are eligible.
[2] Since October 2010, full medical-card holders must pay a fixed copayment per item for prescription medicines (currently €2.50, up to a maximum of €25 per family per month).
[3] Those in Category II are liable for the entire cost of prescription medicines, up to a monthly deductible of €144 per family.
[4] Table 4.1 in Evetovits et al. (2012) summarises entitlements to public healthcare in Ireland in greater detail.
[5] In April 2012, 3.2 per cent of full medical cards and 14.3 per cent of GP visit cards were issued on a 'discretionary' basis (HSE, 2013).
[6] Retention of a full medical card for a specified period, without means-testing, is also permitted for specific circumstances (e.g. participation in government employment/education schemes; retention of medical card for three years after return to work from a period of unemployment of 12 months or more).
[7] Supplementary or duplicative PHI offers access to health services that are already covered by the public health system, offers subscribers greater choice of provider (often private providers) and enables them to bypass waiting lists for publicly financed treatment. Complementary PHI may cover services that are excluded from the public healthcare system, or it may reimburse the costs of public user charges (Thomson and Mossialos, 2009).
[8] In 2009, an estimated 46 per cent of the population held PHI only; 5 per cent held both a full medical/GP visit card and PHI ('dual cover'); 30 per cent held a full medical card or GP visit card only, and 19 per cent had no full medical/GP visit card or PHI (Brick et al., 2010). See Chapter 2 for data on children.

Figure 1.1 illustrates the proportion of the population in Categories I and II over the period 1990-2015, with GP visit-card holders identified separately. The proportion of the population in Category I was around 35 per cent throughout the early to mid-1990s, but with more rapid economic growth, a steady decline in unemployment and annual increases in real incomes, the proportion of the population in Category I began to fall from the late 1990s (and fell to its lowest level of 28.0 per cent in 2005). From 2007, as the economy entered a severe and prolonged recession, the proportion with a full medical card increased steadily, before falling back somewhat as the economy began to recover. The large increase in GP visit-card cover in 2015 reflects the extension of free GP cover to all children under six and all adults over 70 in that year.

Figure 1.1: Public healthcare eligibility (% of the population), 1990-2015



Source: Adapted from Figure 4.1 in Evetovits et al. (2012), and updated.

Eligibility for a full medical or GP visit card entitles dependants (including children) to free GP services. Some additional primary care services are provided free of charge to children even if their parents do not have a full medical or GP visit card. These services are generally provided as part of maternity and infant welfare services (two free postnatal GP visits), health services for preschool children (home visits by public-health nurses, and a full developmental check at age nine months) and school health services (free vision and hearing examinations). Children are also entitled to vaccination and immunisation services free of charge.[9] Chapter 2 will provide further details on the proportion of children in the various eligibility categories.

For the purposes of analysing GP visiting patterns, the Irish population may be divided into five mutually exclusive categories of eligibility, which differ in the degree to which the patient faces user fees for GP visits:

Full medical-card holders GP visit-card holders	} 'public' patients
PHI with cover for GP expenses[10] PHI with no cover for GP expenses No full medical card, GP visit card or PHI ('no cover')	} 'private' patients

[9] See www.citizensinformation.ie/en/health/health_services/children_s_health/immunisations_for_children.html for further details [last accessed 18 August 2016].
[10] ***Growing Up in Ireland*** data does not include information on the particular details/name of the PHI plan, and so the net price of a GP visit for those with PHI and full/partial GP cover cannot be calculated.

While full medical-card and GP visit-card holders receive free GP visits, this report distinguishes between them as GP visit-card holders face the full cost of any associated prescription medicines (up to a monthly deductible of €144); if individuals consider the likelihood of receiving a prescription when deciding to visit their GP, it could be expected that GP visit-card holders would have fewer GP visits than full medical-card holders.[11] Similarly, this report distinguishes between those with PHI who have no cover for GP expenses, and those who have 'no cover' at all as it is possible that those with PHI may be able to substitute GP care with alternative services.[12] Finally, the report identifies those with (full or partial) cover for GP expenses as part of their PHI plan as, in addition to the price effect, there may be an effect from the type of reimbursement (in this case, retrospective).[13]

Table 1.1: Primary healthcare entitlements and GP reimbursement methods in Ireland[a]

	GP User Fee[b]	Prescription User Fee[b]	GP Reimbursement
Full medical card	Free	€2.50 per item up to a maximum of €25 per family per month[c]	Primarily capitation; fee-for-service for selected 'special items of service'
GP visit card	Free	Full cost up to €144 per family per month; free thereafter[d]	Primarily capitation; fee-for-service for selected 'special items of service'
PHI with GP cover	Full cost, with full or partial reimbursement by PHI company	Full cost up to €144 per family per month; free thereafter[d]	Fee-for-service
PHI without GP cover	Full cost	Full cost up to €144 per family per month; free thereafter[d]	Fee-for-service
No cover	Full cost	Full cost up to €144 per family per month; free thereafter[d]	Fee-for-service

Notes:
[a] Current as of February 2017
[b] In Ireland, tax relief at the standard rate (20 per cent) is available on certain medical expenses (including GP and prescription fees) that are not otherwise reimbursed by the State or PHI.
[c] The patient copayment for prescription medicines for full medical-card holders was introduced in October 2010 (at €0.50 per item, up to a maximum of €10 per family per month). It was increased to €1.50 from January 2013, and to €2.50 per item from December 2013.
[d] From 2008 to 2011 (the period in which the data used in this study were collected), the monthly deductible was €90 in 2008, €100 in 2009 and €120 in 2010 and 2011 (Gorecki et al., 2012; Brick et al., 2013).

This report is primarily interested in the effect of financial incentives facing the patient (in this case, the patient's parents), but GP visiting behaviour may also be influenced by the financial incentives facing the GP (Barros et al., 2008). GPs receive a capitation payment for full medical-card and GP visit-card holders (some additional services are reimbursed by means of a separate fee-for-service (FFS) payment, e.g. vaccinations), and an FFS payment from private patients. These different methods of provider payment incentivise different forms of provider behaviour. For example, while FFS payments promote productivity and access, they also provide a disincentive to engage in preventive care and score poorly in terms of cost containment. On the other hand, capitation payments discourage productivity, but (with appropriate risk adjustment) promote access and preventive care and can be effective in controlling costs (Brick et al., 2012). The financial incentives facing the patient and provider therefore work in opposite directions for all five eligibility groups identified in Table 1.1, with the possible exception of those with PHI with full/partial GP cover, where the combination of free/subsidised GP care and an FFS payment may lead to GP visits in excess of those predicted by need (Brick et al., 2012). While it is difficult to distinguish between the two effects here, it is worth noting that previous research on supplier-induced demand among Irish GPs found evidence both for and against the existence of supplier-induced demand (Madden et al., 2005; Tussing, 1983; Tussing, 1985).

[11] Data on prescription medicine use are not available in ***Growing Up in Ireland***; however, previous research based on adult data has demonstrated that full medical and GP visit cardholders differ with respect to their use of GP services, despite facing the same price for GP services (Nolan and Smith, 2012). Canadian evidence has also shown that individuals consider the cost of prescriptions when deciding to visit their GP (Allin and Hurley, 2009; Fast and Williamson, 1998).
[12] However, GPs act as gatekeepers for secondary care in Ireland. Information on the use of emergency department (ED) services, which may be used as a substitute for GP care by some groups, is not separately identifiable in the data from use of outpatient services. One of the largest private insurers (VHI Healthcare) operates a number of outpatient clinics that provide GP-like services to subscribers (albeit for a fee that is in excess of the average GP fee), and which have considerably longer opening hours (from 8am-10pm seven days a week).
[13] Zhong (2011) found that the effect of insurance on the probability of contact with outpatient services in China was greater for policies with immediate reimbursement (rather than policies with retrospective reimbursement). In the Irish case, all PHI policies that offer (full or partial) cover for GP expenses involve retrospective reimbursement.

1.2 PREVIOUS RESEARCH

As noted, the Irish system of eligibility for free GP care is unusual internationally (e.g. the UK NHS provides free GP care at the point of use to the entire population). Given this system, and current proposals for reform, it is vitally important to investigate the effect of the current system on GP visiting patterns. International research on the impact of different healthcare financing systems on GP use, and healthcare use more generally, is well developed, although it largely focuses on the adult population.

A key feature of healthcare markets is uncertainty – i.e. lack of information about the future. Ill-health is inherently unpredictable, both in terms of financial costs and physical and emotional suffering. This necessitates a role for insurance in offering the patient protection against uncertainty. Most developed countries therefore provide publicly financed insurance for many health services for most of the population, although there is considerable variation in the extent to which different population groups are covered (the 'breadth' of cover), what healthcare services are covered (the 'scope' of cover) and the extent of user fees (the 'height' of cover) (see also Evetovits et al., 2012). In this context, a large literature has developed around the issue of identifying the impact of insurance on healthcare use (usually termed the 'moral hazard' effect[14]). This is complicated by the potential existence of adverse selection; i.e. purchase/receipt of insurance is associated with characteristics that are in turn associated with use of healthcare (Buchmueller et al., 2004). Ignoring adverse selection may lead to an overestimation of the impact of insurance on the use of health services. Strategies for separately identifying the moral hazard effect of insurance depend largely on the data available to the researcher. Some studies use the instrumental variables approach – i.e. finding variables that are correlated with insurance but not with healthcare use. Since finding such variables can be challenging,[15] the more common solution to this problem is to include sufficient controls for health status, although this does not rule out the possibility of adverse selection based on unobservable characteristics (e.g. degree of risk aversion). In the context of PHI, another strategy is to contrast the effect of employer-provided insurance with insurance purchased by individuals, on the assumption that individuals do not choose their employer to gain insurance cover (Buchmueller et al., 2004; Ettner, 1997).

In the Irish context, no evidence for adverse selection in the purchase of PHI has been found. In fact, Harmon and Nolan (2001) found that those in better health were significantly more likely to purchase PHI, and similar results have also been found for the purchase of PHI in other countries; e.g. in France (Buchmueller et al., 2004); the US (Hurd and McGarry, 1997; Meer and Rosen, 2004), Australia (Cameron et al., 1998) and Ireland, Italy, Portugal, Spain and the UK (Jones et al., 2006).[16] In contrast, those with a full medical card in Ireland have been shown to be in significantly poorer health than those with PHI and/or 'no cover' (Nolan et al., 2007).

Other potential sources of bias in estimating the effect of insurance on healthcare use include health screening by insurance companies, and supplier-induced demand (SID) (Barros et al., 2008). The former would lead to an underestimation of the effect of insurance, the latter to an overestimation. The inducement of demand is likely to be stronger when insurance companies use FFS payments to reimburse providers. It is difficult to distinguish between the moral hazard and supplier-induced demand effects of insurance without detailed data on whether visits to the GP are initiated by the patient or by the provider. Van Dijk et al. (2013) used data with this information from the Netherlands and found no evidence for moral hazard but evidence of SID as a result of the introduction of the system of universal health insurance in 2006 (which abolished patient copayments for GP services, and changed GP remuneration from a

[14] Moral hazard refers to the concept whereby health insurance, by lowering the marginal cost of care to the individual, may increase use of healthcare services (Pauly, 1968). It can be either beneficial or undesirable under different conditions; for example, some moral hazard may be desirable when the quantity of healthcare consumed falls short of the optimum (Zhong, 2011). Jones et al. (2006) use the broader term 'insurance effect' to encompass the effects of moral hazard, risk reduction, income transfer and access that are all associated with insurance cover.

[15] Vera-Hernandez (1999) uses social class and occupation as instruments for duplicate insurance cover in his analysis of specialist use in Catalonia. He argues that these variables should be unrelated to use once income and education have been included in the model. Meer and Rosen (2004) use self-employment status.

[16] On the other hand, Schellhorn (2001) found that most of the observed lower number of doctor visits among those with insurance contracts with higher deductibles in Switzerland could be attributed to selection of low-risk individuals into such contracts; Vera-Hernandez (1999) found evidence of adverse selection (but only among heads of households) in the purchase of duplicate PHI in Catalonia, and Cameron et al. (1998) found that the positive effect of insurance on healthcare use in Australia was explained by both moral hazard and adverse selection.

capitation based system to a mixed system of capitation and FFS respectively).[17] In the Irish context, there is conflicting evidence on the existence of SID (Tussing, 1985; Tussing, 1983; Madden et al., 2005).[18]

Ideally, a natural experiment or quasi-experimental approach would be used to examine the causal effect of insurance on healthcare use. The first study to show the impact of insurance on the use of health services in a truly experimental setting was the RAND Health Insurance Experiment (HIE), carried out in six sites across four US states between 1974 and 1977. Families participating in the experiment were randomly assigned to one of 14 different insurance plans that differed in the degree of cost-sharing for health services. Significant effects of insurance on the use of a variety of healthcare services were observed (Newhouse and Insurance Experiment Group, 1993; Manning et al., 1987). Quasi-experimental approaches that exploit policy changes in insurance cover have been carried out by Busch and Duchovny (2005), Chiappori and Geoffard (1998), Grignon et al. (2008) and Chen et al. (2007), for the US, France and Taiwan respectively.

Despite differences in time periods, country contexts, data sources, methods and type of healthcare use (i.e. GP care, inpatient hospital care, etc), the findings on the effect of insurance are largely unambiguous; insurance, by lowering the cost of care, leads to an increase in healthcare use (Bago d'Uva, 2006; Hurd and McGarry, 1997; Busch and Duchovny, 2005; Sapelli and Vial, 2003; Sarma and Simpson, 2006; Grignon et al., 2008; Holly et al., 1998; Cameron et al., 1998; Jones et al., 2006; Anderson et al., 2012; Card et al., 2008; Card et al., 2009; Meer and Rosen, 2004).[19] Allin and Hurley (2009) also find that private insurance cover for complementary services such as prescription medicines also has a significant effect on the use of GP services (in Canada), as individuals with complementary cover for prescription medicine expenses are less deterred from seeking GP care by the expected cost of drugs that are often prescribed as a result of a GP visit. The literature on the broader question of whether insurance leads to increases in healthcare expenditure is less developed; Koch (2013) found significant effects of insurance on healthcare use among children in the US, but no significant effects on overall expenditure. Koch attributed this to the crowding-out of PHI induced by eligibility for a public health insurance programme.

In studies that focus on children, significant effects of insurance on healthcare use have also been found (Currie et al., 2008; Currie and Gruber, 1996; Dafny and Gruber, 2005; Boudreaux et al., 2016; Card and Shore-Sheppard, 2004; Palmer et al., 2015), although de la Mata (2012) found significant effects of Medicaid eligibility in the US on the use of preventive care for the sample of the poorest children only. The RAND HIE found the same outpatient response to insurance for children (aged less than 18 years) as for adults (Manning et al., 1987).

In the context of systems with largely free or heavily subsidised access to public healthcare services, the focus in the literature is on identifying horizontal inequities in healthcare use; i.e. differences in use that are not related to the need for care (Morris et al., 2005; Gerdtham et al., 1992). A large and well-developed literature examines the extent to which there is income-related inequity in healthcare use; i.e. differences in healthcare use across income groups that persist even when differences in need for healthcare have been taken into account. A number of cross-country comparative analyses of income-related inequity in the use of healthcare services among the adult population have been carried out, with Ireland as one of the featured countries (van Doorslaer et al., 2000; van Doorslaer et al., 2002; van Doorslaer and Masseria, 2004; van Doorslaer et al., 2004; van Doorslaer et al., 2006). Across all studies (using a variety of data sources covering different time periods), the distribution of GP visits has been found to be significantly 'pro-poor' in Ireland (i.e. even after controlling for the significant 'pro-poor' distribution of ill-health, lower-income individuals have a significantly higher number of GP visits). The most recent analysis of income-related inequity in the delivery of healthcare services in Ireland (using data on adults aged 18+ years

[17] Van de Voorde et al. (2001) found no evidence that Belgian doctors engaged in demand inducement as a response to reductions in use following a substantial increase in patient copayments.
[18] The standard approach to identifying SID is to examine the response of GP use to variables describing differences in GP income (e.g. different payment methods for different patients; differences in doctor density; a shock to doctor incomes, etc). For example, Sarma and Simpson (2006) find that GP visiting is significantly higher in areas with a higher density of GPs.
[19] Exceptions are van Dijk et al. (2013) who found no evidence for an effect of the abolition of a copayment in the Netherlands on patient-initiated GP visits, Bauhoff et al. (2011) who found an effect of insurance on the amount of out-of-pocket expenditure, but not use of outpatient services in Georgia, and Schellhorn et al. (2000) who found that supplementary insurance had an insignificant effect on the number of primary care visits among Swiss residents aged 75+ years. However, particular features of these systems may explain the insignificant results (e.g. low levels of the initial copayment in the Dutch study; insurance that does not cover the cost of primary care in the Swiss system).

from 2000) found a significant 'pro-poor' distribution in expenditure on GP services in Ireland (and also for prescription medicines) (Layte and Nolan, 2004).[20] As noted by all authors, this result is not surprising given the particular structure of entitlements to free GP care in the Irish system.

In contrast to the Irish evidence, that for other countries is more mixed. For the UK, some studies find evidence of a significant 'pro-poor' distribution of GP visits (van Doorslaer et al., 2004; van Doorslaer et al., 2000; van Doorslaer and Masseria, 2004) while others find no significant difference across income groups (van Doorslaer et al., 2002; van Doorslaer et al., 2006; Allin et al., 2011). Concerning children, the evidence for significant inequities in GP visiting is sparse; an exception is a recent study comparing Irish and Scottish children, which found a significant 'pro-poor' distribution of GP visits in Ireland, but no income-related inequity in GP visiting among Scottish children, a result consistent with the differing healthcare financing systems in the two countries (Layte and Nolan, 2015).

Finally, but less frequently due to data constraints, a growing literature has focused on identifying the causal impact of different systems of healthcare financing on health outcomes. The effects of insurance on health status or outcomes are ambiguous. In a study of over-60s in Taiwan, Chen et al. (2007) found no effect of the introduction of public health insurance in 1995 on mortality or self-assessed health (although the authors note that the four-year period over which data were available may have been too short to identify a significant effect on health outcomes).[21] On the other hand, Card et al. (2009) found a statistically significant decrease in mortality once individuals become eligible for Medicare in the US at age 65, and this effect persisted even up to nine months after admission to hospital.[22] A series of studies from the US has examined the causal impact of public health insurance on child health outcomes (Currie et al., 2008; Currie and Gruber, 1996; Currie, 1995). Currie and Gruber (1996) and Currie et al. (2008) adopted a quasi-experimental approach to the issue by exploiting differences in Medicaid expansion to children across US states and time periods to identify the effect of public health insurance on various health outcomes. Currie and Gruber (1996) found that expansions in Medicaid caused reductions in child mortality in children aged less than 15 years of age, and in particular in mortality from internal causes, while Currie et al. (2008) found that more generous insurance cover in early life was associated with better health status at older ages. A related paper by Lin (2009) attributed approximately 40 per cent of the narrowing gap in Apgar scores[23] in the US over the 1980s and 1990s to increases in access to healthcare. However, de la Mata (2012) found no evidence that Medicaid expansions had any significant effect on health outcomes among US children aged 5-18 years in the short and medium term (one and five years after becoming eligible for Medicaid respectively). A related debate has examined the extent to which socio-economic gradients in child health may be weaker in countries with universal access to free or heavily subsidised public healthcare. For example, Currie et al. (2007) and Propper et al. (2007) maintained that the absence of a socio-economic gradient in parental-assessed general health status in the UK (in contrast to the strong gradient found by Case et al. (2002) for the US) may be due to the differing healthcare financing structures in the two countries.[24]

Not surprisingly, the particular Irish system of eligibility for free GP care has been the focus of an extensive literature. While most international studies find that need factors such as age and health status are most important in determining GP visiting rates (Hoeck et al., 2011; Jiménez-Martín et al., 2004; Sarma and Simpson, 2006; Gerdtham, 1997; Jiménez-Martín et al., 2002), in Ireland, income and public health eligibility have been found to be highly significant factors (Layte et al., 2009; Layte and Nolan, 2004; Madden et al., 2005; Nolan, 2007; Nolan, 2008b; Nolan, 1991; Nolan, 1993; O'Reilly et al., 2007; Nolan, 2008a; Nolan and Smith, 2012). Findings such as these raise concerns about possible horizontal inequities in GP visiting rates between different population groups, and the extent to which stated health policy regarding access to healthcare is being achieved in practice. However, previous research on patterns of GP use in Ireland have largely concentrated on the adult population. With the exception of a study from the early 1980s (Tussing,

[20] A later paper focused on equity in the use of inpatient hospital services only (Layte, 2007).
[21] Bauhoff et al. (2011) also found no effect of an extension in insurance in Georgia on self-assessed health, use of preventive services and health-related behaviours, although, once again, the time-frame of the study was thought to be too short to identify significant effects.
[22] The study focused on individuals admitted to the emergency department (ED) for relatively severe illnesses, on the assumption that any extra services (or improvements in the quality of services) may be expected to have an effect on short-run mortality.
[23] The Apgar score is an overall measure of infant health at birth; it was designed to evaluate a newborn's physical condition after delivery and to determine any immediate need for extra medical or emergency care (Lin, 2009).
[24] However, a response by Case et al. (2008) to the Currie et al. (2007) study found that the differences between England and the US were reduced when data from the same time period were examined.

1985) and a later descriptive study (Fallon et al., 2007), there is a lack of evidence for children in Ireland, although two recent papers have examined GP visiting patterns, using the first wave of the Infant (nine-month) and Child (nine-year) Cohorts of ***Growing up in Ireland*** (Layte and Nolan, 2014; Layte and Nolan, 2015).

1.3 OBJECTIVES

In light of the findings that inequities in access to healthcare among children may have significant effects on child health status, and given the strong causal links that have been demonstrated between childhood health and later outcomes such as employment and health status (Case et al., 2005), it is particularly important to examine the extent to which the current Irish system of eligibility for free GP care leads to differences in the use of GP services that are not explained by the person's need for healthcare (i.e. horizontal inequities). Better Outcomes, Brighter Futures, the national policy framework for children and young people in Ireland, highlights the importance of early intervention and prevention for improving child health outcomes, noting that what happens early in life affects health and wellbeing in later life. A key commitment of Better Outcomes, Brighter Futures is the introduction of universal general practitioner (GP) care (Department of Children and Youth Affairs, 2014). ***Growing up in Ireland*** was established in 2006 with the objective of describing the lives of children in Ireland, identifying what is typical and normal, as well as what is atypical and problematic, in order to improve Irish policy and services (Greene et al., 2010). Child outcomes across three broad domains are considered:

- Physical health and development
- Social/emotional/behavioural wellbeing
- Educational achievement and intellectual capacity

Growing up in Ireland therefore offers an ideal source of evidence with which to evaluate the current system of public healthcare eligibility for children in Ireland, and current and future proposals for reform. The purpose of this report is to examine the determinants of GP visiting behaviour among young children in Ireland, using data from the Infant Cohort of ***Growing up in Ireland***. In addition to an examination of the impact of various factors (e.g. health, income, family composition, etc) on the patterns of GP visiting, the report focuses, in particular, on the impact of eligibility for free GP care. It exploits the availability of data from two waves of the ***Growing up in Ireland*** survey, thereby allowing the analysis to examine the possible impact of changes in health and other circumstances (e.g. medical card eligibility, falling household income, etc) on GP visiting.[25] The period between the first and second waves of the Infant Cohort survey was one in which the Irish economy entered a severe recession and this is reflected in substantial changes in child and family circumstances among the Infant Cohort. For example, from the first wave of the Infant Cohort in 2008 to the second wave in 2011, the proportion of children eligible for a full medical card increased from 26.5 per cent to 33.8 per cent.

Core questions to be examined in this report include:

- Does eligibility for free GP care affect children's use of GP services?
- Does type of PHI cover affect children's use of GP services?
- Are user fees for GP care a particular burden on children from low-income families without medical cards? Previous research on the adult population (Nolan, 2008b) found that the deterrent effect of user fees was also present for those at the top of the income distribution.
- As children depend on their parents for decision-making in relation to healthcare use, do parental characteristics (e.g. family structure, education, employment status, etc) affect children's use of GP services?

[25] Unfortunately, the availability of two waves is not sufficiently long to examine the impact of eligibility on child health, but this crucial question will be examined as further waves of the Infant Cohort become available.

1.4 DATA

To answer these questions the report uses micro-data from ***Growing Up in Ireland***. The survey consists of two cohorts of children but this report focuses on the Infant Cohort, which contains extensive details on 11,134 nine-month-old children and their families who were surveyed between September 2008 and April 2009 (Quail et al., 2011).[26] The sampling frame was the Child Benefit Register. From January to August 2011, the families were recontacted and 88 per cent agreed to participate in the second wave (n=9,793) of data collection. This study concentrates on singleton children. Non-singleton children are excluded as their health and GP usage patterns tend to be different from singletons, increasing the complexity of analyses. A small number of observations are excluded due to missing information on our variables of interest,[27] resulting in a final sample size for analysis of approximately 10,000 children for Wave 1 and 9,000 children for Wave 2.

GP visiting information refers to the number of GP visits in the previous 12 months, reported by the Primary Caregiver (the recall period is nine months for Wave 1).[28] The potential for measurement error in a variable recorded in this way is well-recognised (Jiménez-Martín et al., 2004; Hoeck et al., 2011), although an analysis of self-reported data compared to data from administrative records of healthcare use in the Netherlands found a high degree of correlation between the two measures. More importantly, differences between the two measures were not related to individual characteristics such as income, education or occupation (Reijneveld and Stronks, 2001). On the other hand, Cleary and Jette (1984) found that reporting error in outpatient healthcare use in the US was associated with certain individual characteristics such as age and health status, although the overall magnitude of the reporting error was very small. While this is a potential limitation of the dependent variable, surveys of this kind are the usual source of data for the kinds of analyses in this report. In any case, we also analyse the probability of having at least one GP visit in the previous year, an indicator for which recall bias should be less of an issue than the number of visits.

Our main independent variable of interest (eligibility for free GP care) is a five-category variable reflecting the categories of eligibility reported in Table 1.1. As noted above, a particular concern of analyses of this type is to ensure that the indicator of eligibility is exogenous; i.e. that the effect of eligibility for free care is not influenced by the person's need for medical care. Economists refer to this as 'adverse selection'. If there is adverse selection, then the analyses of the effect of eligibility for free care are more complex as there is a need to disentangle the relative importance of family income and health need on GP service use.

While full medical and GP visit-card holders are eligible for free GP care by virtue of their income, a small proportion are eligible precisely because of poor health status. More importantly, it is possible that those with greater health need may purchase PHI, and particularly PHI with GP cover. Previous Irish research has demonstrated that adverse selection into PHI is not a feature of the Irish market (Harmon and Nolan, 2001). However, to reduce the possibility that the eligibility effects are driven by adverse selection, we follow the convention used in previous literature and use a wide variety of health status measures in our models (Allin and Hurley, 2009).[29,30]

Both waves of the GUI Infant Cohort data contain detailed information on child health, household socio-economic characteristics and parental health and behaviours. Independent variables are grouped into those reflecting need for healthcare and those related to the socio-economic characteristics of the household. Child health status is represented by variables indicating parental-assessed child health status, the child's exposure to accidents, their birth-weight, gestation and mother's behaviour during pregnancy

[26] The Child Cohort represents 8,568 nine-year old children and their families surveyed between August 2007 and May 2008 (Murray et al., 2011).
[27] The vast majority of the missing observations occur for the household income variable. As household income is a key variable in the analyses, these observations are retained by including an indicator for observations with missing information on income.
[28] In most cases (99.9 per cent), the Primary Caregiver is the child's biological mother.
[29] As noted, an alternative approach is to use instrumental variables (i.e. variables associated with eligibility for free GP care, but unrelated to GP use). No such variables are available in the data.
[30] A number of studies use regression discontinuity approaches to model the effect of insurance on healthcare use (Bauhoff et al., 2011; de la Mata, 2012). However, in the Irish case, the assumption of random assignment to the population above and below the cut-off (i.e. the income cut-offs for a full medical/GP visit card) is not satisfied in this case as a number of full medical/GP visit-card holders are granted their card on a discretionary basis (it is not possible to identify these individuals in the data). In addition, the means-testing system is complex, with numerous allowances (e.g. for childcare expenses, rent, etc), which makes it difficult to identify the precise income cut-off for full medical/GP visit-card eligibility (see also Callan and Keane, 2008, and Nolan and Smith, 2012).

and in the child's early life (smoking and breastfeeding). Household socio-economic characteristics include income, location and childcare arrangements, and various characteristics of the mother (age, health status, education, employment status, marital status and ethnicity). In common with many other studies, the analysis of the Wave 2 data uses lagged values of the health-status variables to overcome potential endogeneity and reverse causality problems, i.e. the possibility that GP use is itself a determinant of health status (Schellhorn et al., 2000; Jiménez-Martín et al., 2002). Most indicators are available in both waves, although variables relating to pregnancy and birth are collected in Wave 1 only. A full list of the dependent and independent variables, their definitions and sample means is provided in Table A1.1 in the Appendix to this chapter.

While the data contain a rich set of information relating to children's use of healthcare services, their health, and the health and socio-economic characteristics of their parents, there are inevitably data limitations. First, it is possible that other indicators besides GP visiting are subject to recall bias (e.g. child's birth-weight). Second, information on some potentially important indicators is not available. For example, the data do not contain variables related to the supply side of the decision to attend the GP, such as GP or practice characteristics.[31] Third, the number of GP visits is not necessarily the only dimension of a GP visit that may be affected by healthcare eligibility. Unfortunately, there is no information on other aspects of GP visiting, such as the duration, reason for the visit, whether a follow-up visit was arranged, whether a prescription was received, whether a diagnostic test was ordered/carried out, etc. Such information would be useful as it is possible that eligibility affects not only the quantity but also the quality of visits (Barros et al., 2008).

1.5 METHODS

Count data econometric methodologies, which assume a skewed, discrete distribution and restrict predicted values to non-negative values, are usually employed in modelling healthcare use. As the Poisson distribution assumes that the conditional mean is equal to the conditional variance, the more flexible negative binomial model is generally preferred (Sarma and Simpson, 2006; Schellhorn et al., 2000).

Extensions to the basic negative binomial specification are also possible. It has been argued that a two-step or hurdle approach may be more appropriate in accounting for the nature of the decision-making process underlying the decision to visit a GP (Hurd and McGarry, 1997; Gerdtham et al., 1992; Pohlmeier and Ulrich, 1995; Winkelmann, 2004; Grignon et al., 2008; Zhong, 2011; Allin and Hurley, 2009; Yip and Berman, 2001; Gerdtham, 1997), allowing for different variables to affect the decision to visit a GP (contact decision) and the decision about the number of visits (frequency decision). The same variables may also affect the two decisions in different ways. The most common interpretation of the two-step model is in terms of a principal-agent framework whereby the patient initiates the visit to their GP, while the GP, sometimes in conjunction with the patient, decides on the frequency of treatment. However, the hurdle model has been criticised for its reliance on the 'single illness spell' assumption (Jiménez-Martín et al., 2002; Santos-Silva and Windmeijer, 2001; Deb and Trivedi, 2002; Gerdtham, 1997; Vera-Hernandez, 1999), and for the sharp distinction that is made between users and non-users (Bago d'Uva, 2006). Deb and Trivedi (2002) argue that the more appropriate distinction is between high and low users, modelled using finite mixture models. In empirical applications, there is no clear answer as to the most appropriate technique to use. Previous Irish analyses have used a variety of methods and found remarkably consistent results. In addition, mixture models are complex to estimate, and are found to perform poorly in the absence of detailed longitudinal data (Bago d'Uva, 2005). For these reasons, the focus in this research report is on the results from the one-step and two-step hurdle negative binomial models. Model selection tests favour the two-step hurdle models in all cases. All models are estimated using Stata 12.1 and results are presented in the form of marginal effects.[32]

[31] A variable indicating whether there is a GP clinic in the local area was included initially, but was insignificant in all models and therefore dropped from the analysis.
[32] A variety of robustness checks were undertaken and are detailed in the appendices to the relevant chapters.

As noted in Section 1.3, one of the objectives of this research is to examine the burden that user fees for GP services place on families that are above the income thresholds for a full medical card or GP visit card. To this end, the same models are estimated on the sub-sample of private patients only; i.e. those without a full medical card or GP visit card. Previous research for adults has demonstrated that the deterrent effect of user fees is found at all levels of income (Nolan, 2008b); the purpose of this analysis is to examine whether a similar effect is evident for children. Chapter 3 focuses on this sub-sample of children.

The analysis in Chapters 2 and 3 uses cross-sectional econometric techniques to analyse these issues. Chapter 4 exploits the longitudinal nature of the data (i.e. the availability of two waves of data on the same children) to analyse (a) the impact of healthcare eligibility from a longitudinal perspective and (b) the impact of changes in child and family circumstances on GP visiting (e.g. loss of a full medical card). To undertake the latter analysis, propensity score matching methods are used. These methods are a non-parametric estimation technique that analyses the impact of a treatment (e.g. loss of a full medical card) on an outcome of interest (e.g. GP visiting). Treatment and control observations are matched on observable characteristics (e.g. health, household income, etc), so that an estimate of the treatment effect can be made. As the method is non-parametric, it does not impose any functional form assumptions on the data. This method has previously been applied in analysing the impact of healthcare eligibility changes on GP visiting among the adult population in Ireland (Nolan, 2008a).

1.6 STRUCTURE OF THE REPORT

Chapter 2 analyses the determinants of GP visiting among children in Ireland, using Waves 1 and 2 of the Infant Cohort of ***Growing Up in Ireland***. Some comparisons with other international findings are made. Chapter 3 focuses on the sample of private patients; i.e. children that do not have eligibility for a full medical or GP visit card. Chapter 4 moves on to consider the impact of changes in child and household circumstances (e.g. loss of a medical card, onset of an illness, decline in household income, etc) that have occurred since the first wave of the survey was carried out. Chapter 5 summarises the key findings and draws out policy implications from the analysis.

1.7 APPENDIX

Table A1.1: Dependent and independent variable definitions and sample statistics[a]

Variable	Definition	Wave 1	Wave 2
Dependent variable			
GP visits[b]	Number of GP visits since birth (Wave 1)/in the previous year (Wave 2)	2.7	2.6
Independent variables			
Public healthcare entitlements			
Full medical card	=1 if child has a full medical card with/without private health insurance (PHI)	26.4	33.8
GP visit card	=1 if child has a GP visit card with/without PHI	2.8	4.5
PHI with GP cover	=1 if child has no medical card or GP visit card but has PHI with full or partial cover for GP expenses	29.1	25.6
PHI without GP cover	=1 if child has no medical card or GP visit card but has PHI without full or partial cover for GP expenses	23.1	20.1
No cover	=1 if child has no medical card, GP visit card or PHI	18.5	16.0
Child health and early-life characteristics			
Female	=1 if female child	48.6	48.6
Male	=1 if male child	51.4	51.4
Very healthy	=1 if child is very healthy, no problems	82.8	74.6
Healthy	=1 if child is healthy but a few minor problems	16.0	23.0
Ill	=1 if child is sometimes quite ill/almost always unwell	1.1	2.4
No accident	=1 if child has never had an accident	95.7	83.8
Accident	=1 if child has ever had an accident	4.3	16.2
Birth-weight*	Child birth-weight in kgs	3.5	3.5
Less than 37 weeks**	=1 if child was an early delivery (36 weeks or earlier)	5.3	5.3
37-41 weeks**	=1 if child was an on-time delivery (37-41 weeks)	82.6	82.6
42+ weeks**	=1 if child was a late birth (42+ weeks)	12.1	12.1
No smoking**	=1 if mother did not smoke during pregnancy	66.6	66.6
Smoking**	=1 if mother smoked daily or occasionally during pregnancy	33.4	33.4
Breastfeeding**	=1 if child was ever breastfed	43.9	43.9
No breastfeeding**	=1 if child was never breastfed	56.1	56.1
Mother's characteristics			
Age*	Mother's age in years	31.5	34.5
Excellent	=1 if mother has excellent self-assessed health	30.6	30.0
Very good	=1 if mother has very good self-assessed health	39.0	39.2
Good	=1 if mother has good self-assessed health	23.3	23.6

Variable	Definition	Wave 1	Wave 2
Fair/poor	=1 if mother has fair or poor self-assessed health	7.0	7.2
Chronic	=1 if mother has a chronic illness	12.0	14.7
No chronic	=1 if mother does not have a chronic illness	88.0	85.3
Primary	=1 if mother has no/primary education	3.6	2.1
Lower secondary	=1 if mother has lower secondary education	14.0	11.8
Upper secondary	=1 if mother has upper secondary education	33.2	32.6
Non-degree	=1 if mother has non-degree education	19.9	21.3
Degree	=1 if mother has degree education	17.6	17.8
Postgraduate	=1 if mother has postgraduate education	11.6	14.3
Employed	=1 if mother is employed (part-time or full-time)	52.3	42.9
Self-employed	=1 if mother is self-employed	4.2	4.8
Student	=1 if mother is a student	6.2	7.1
Unemployed	=1 if mother is unemployed	1.6	2.5
Home duties	=1 if mother is engaged in home duties	35.7	42.7
Single[c]	=1 if mother has never been married	27.6	23.8
Married	=1 if mother is married	69.9	72.8
Separated/divorced	=1 if mother is separated/divorced	2.5	3.4
White	=1 if mother is of white ethnicity	94.9	95.4
Non-white	=1 if mother is of non-white ethnicity	5.1	4.6
Household characteristics			
Care at home	=1 if child looked after by parent(s) at home	39.3	50.0
Care outside home	=1 if child looked after by other(s) at home/outside home	60.7	50.0
Siblings	=1 if child has siblings	57.6	79.4
No siblings	=1 if child is an only child	42.4	20.6
Income 6[d]	Missing income	7.3	5.5
Income 1[d]	Lowest quintile of annual equivalised net income	18.3	18.7
Income 2[d]	Second quintile of annual equivalised net income	18.5	19.0
Income 3[d]	Third quintile of annual equivalised net income	18.4	19.3
Income 4[d]	Fourth quintile of annual equivalised net income	20.3	18.4
Income 5[d]	Highest quintile of annual equivalised net income	17.2	19.1
Urban	=1 if household lives in an urban area	45.7	44.3
Rural	=1 if household lives in a rural area	54.3	55.7

Notes:
[a] Most summary statistics refer to the proportion of the sample in that category (and figures may not add up due to rounding). For variables marked with an *, the summary statistic is the sample mean. For some variables, the Wave 1 information is relevant only (these variables are marked by **). Data are weighted.
[b] The Wave 1 question is: 'Since <baby> was born, how many times have you seen, or talked on the telephone with any of the following about <baby's> physical health? (exclude at time of birth)', with the first of the five options being a GP or family physician. The Wave 2 question is: 'In the past 12 months, how many times have you seen or talked on the telephone with any of the following about <child's> physical or emotional health?', with the first of the seven options being a GP.
[c] Single refers to never married, i.e. includes cohabitation.
[d] Net income refers to income after deductions for tax and pay-related social insurance (PRSI). The equivalence scale used assigns a value of 1 to the first adult, 0.66 to all others aged 14 years and over, and 0.33 to all children aged 13 years and younger.

Chapter 2

GP VISITING PATTERNS

2.1 INTRODUCTION

This chapter examines the determinants of GP visiting among young children in Ireland, using data from the first and second waves of the Infant Cohort of ***Growing Up in Ireland*** . It first provides an overview of patterns of GP visiting among young children in Ireland, before moving on to discuss the results from cross-sectional models of GP visiting in each wave. Chapter 3 focuses on private patients only, i.e. children without a full medical or GP visit card, and examines whether lower-income private patients face particular barriers in accessing GP services. As noted in Chapter 1, Ireland's system of eligibility for free GP care is unusual internationally; of particular concern is the high proportion of the population that must pay the full cost of GP care at the point of use. The analysis in Chapter 3 therefore focuses on this group, and in particular examines whether children from low-income families without a full medical or GP visit card face particular barriers in accessing GP care. Chapter 4 extends these analyses to consider GP visiting patterns among young children in Ireland from a longitudinal perspective; i.e. exploiting the fact that there are repeated measures of GP visiting (and other characteristics) for these children. This allows us to study the impact of changes in child and household circumstances (e.g. loss of a full medical card) on GP visiting patterns.

As noted in Chapter 1, 88 per cent of those surveyed in Wave 1 (at the age of nine months) were followed up in Wave 2 (when they were aged three years on average). Data collection for Wave 1 took place between September 2008 and April 2009, while data collection for Wave 2 took place between January and August 2011. After exclusion of non-singletons and cases with missing information on key variables, final sample sizes of approximately 10,000 nine-month-olds (Wave 1) and 9,000 three-year-olds (Wave 2) are available for analysis.[33]

Section 2.2 begins the analysis of GP visiting patterns by first describing how GP visiting patterns vary according to various child and household characteristics. While variation in GP visiting patterns across the population due to 'need' factors such as age and health status is to be expected, examining the variation, if any, in visiting rates due to 'non-need' factors (such as household income) is useful for highlighting possible horizontal inequities in GP visiting rates across different population groups. However, many of these factors are highly correlated with each other (for example, medical-card eligibility is highly correlated with household income). Section 2.3, therefore, moves on to use multivariate regression techniques, which will help us gain a better understanding of the independent effects of each of the different variables on the use of GP services.

2.2 DESCRIPTIVE STATISTICS

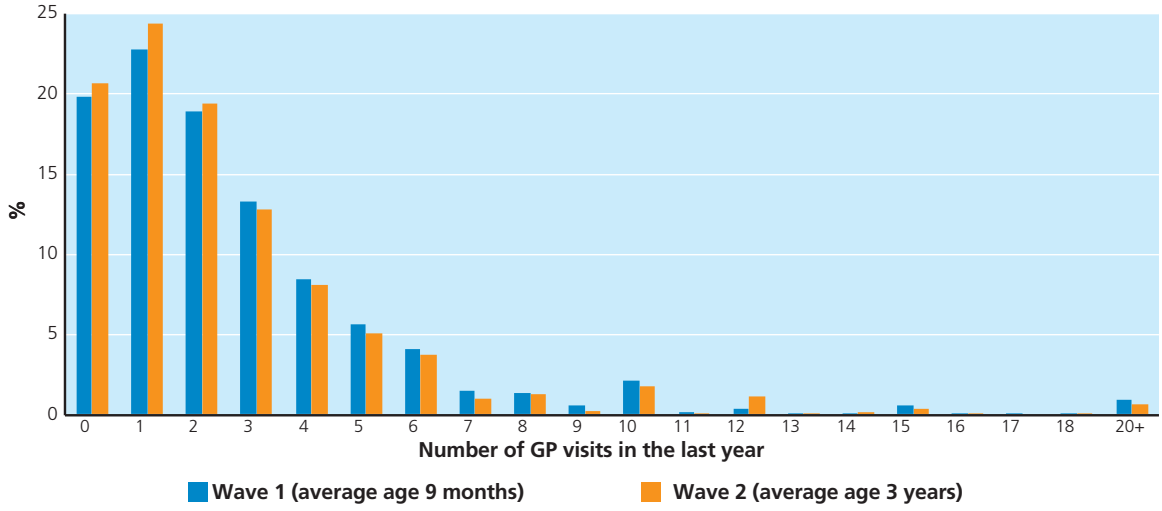
As noted in Chapter 1, the data on GP visiting in ***Growing Up in Ireland*** refer to the number of GP visits in the last nine months (Wave 1, at the age of nine months) / last 12 months (Wave 2, at the age of three years), recorded by the Primary Caregiver, usually the mother. Table 2.1 illustrates that the average number of GP visits was 2.7 (when the children were aged nine months) and 2.6 (when aged three years). Note that the sample of nine-month-olds includes some children who were not present in the second wave of data collection, at age three. The summary statistics indicate that the data on GP visits are highly skewed, and the patterns in Figure 2.1 confirm this finding. For both waves, approximately 20 per cent of the children had no GP visit over the reference period, while less than one per cent had 20+ visits. There is also some evidence of 'heaping' to easily recalled numbers (such as one visit per month, or one visit every two months, etc), a phenomenon noted in many international analyses of healthcare use (McLeod, 2011; Bruijnzeels et al., 1998; Schellhorn, 2001).

[33] A total of 341 observations on non-singleton children were excluded. The vast majority of the missing observations occur for the household income variable. Due to the importance of this variable in the analysis, an indicator is included for observations with missing information on household income in the analyses (see also Table A1.1).

Table 2.1: Number of GP visits, summary statistics

	Wave 1 (average age 9 months)	Wave 2 (average age 3 years)
Mean	2.7	2.6
Standard deviation	3.0	2.9
Median	2.0	2.0
Minimum	0.0	0.0
Maximum	20.0	20.0
N	10,658	9,397

Figure 2.1: Distribution of GP visits



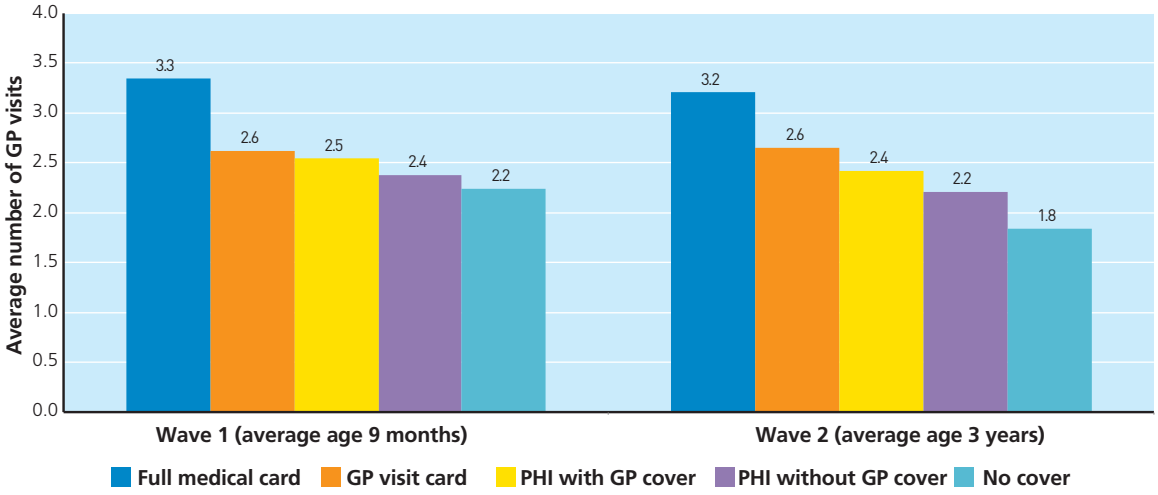
Notes: Sample weights are employed. GP visits are capped at 20.

Our main independent variable of interest is eligibility for free GP care. For the purposes of analysing GP visiting patterns, the Irish population may be divided into five mutually exclusive categories of eligibility, which differ in the degree to which the patient faces user fees for GP visits (see Table 1.1). Full medical-card and GP visit-card holders are entitled to free GP visits at the point of use,[34] while those with PHI with cover for GP expenses face a fee for each visit that is between zero and the full cost. Those with PHI but without GP cover and those with 'no cover' (i.e. without a full medical card, GP visit card or PHI) face the full user fee at the point of use. Table A1.1 shows how the Infant Cohort children at Wave 1 and Wave 2 were distributed across the five eligibility groups.

Figure 2.2 illustrates the differences in GP visiting patterns across the five eligibility groups. The patterns for both waves are consistent with expectations; the average number of GP visits per annum is highest for full medical-card holders, and lowest for those with 'no cover'. The differential in GP visiting between those with a full medical card and those with 'no cover' is slightly higher for Wave 2 (i.e. when the children were aged three years of age on average). For both waves of data, the average number of GP visits differs significantly between the various eligibility groups (the exception is an insignificant difference in the average number of GP visits between GP visit-card holders and those with PHI with some cover for GP expenses).[35] Of course, the five groups differ considerably with respect to other characteristics (e.g. health status), meaning that a full multivariate analysis is necessary to unpick the independent effect of the various eligibility groups on GP visiting (see Section 2.2).

[34] As noted in Chapter 1, the analyses distinguish between full medical-card and GP visit-card holders as the two groups differ in terms of prescription medicine fees (full medical-card holders pay a fixed €2.50 fee per prescription item, up to a maximum of €25 per family per month, while GP visit-card holders pay the full cost of prescriptions up to a deductible of €144 per family per month). See Table 1.1 for further details.
[35] Mean comparison tests are carried out to check for significant differences in the average number of GP visits across the five eligibility groups.

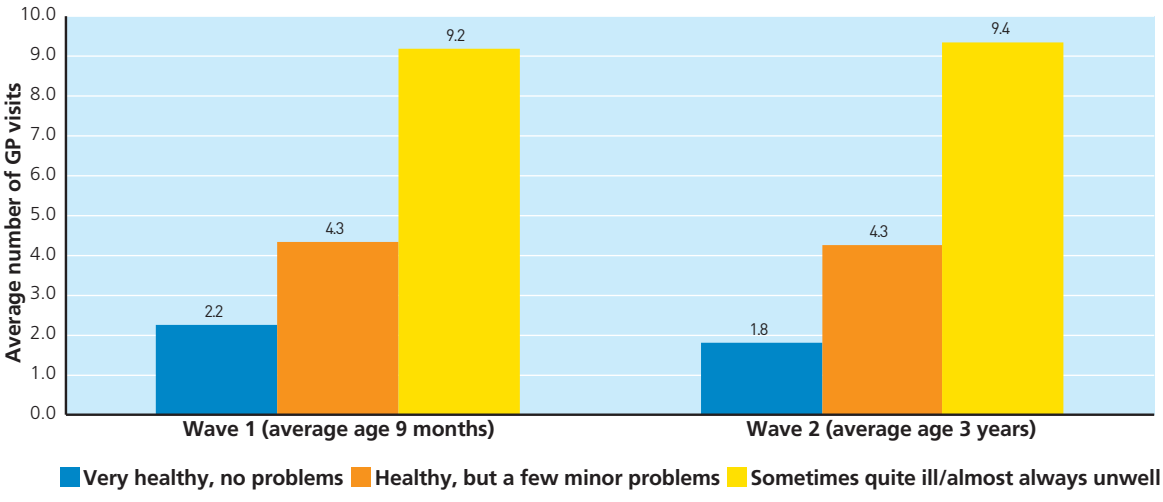
Figure 2.2: GP visits, by public healthcare eligibility



Notes: Sample weights are employed. GP visits are capped at 20.

In most international analyses of GP visiting behaviour, among both adults and children, the main determinant of GP visiting is health need (Hoeck et al., 2011; Jiménez-Martín et al., 2004; Sarma and Simpson, 2006; Gerdtham, 1997; Jiménez-Martín et al., 2002). Figure 2.3 illustrates the average number of GP visits by categories of parental-assessed child health. In international studies of adults, self-assessed health status has been found to be a good predictor of mortality and use of health care (Idler and Benyamini, 1997; Burstrom and Fredlund, 2001; van Doorslaer et al., 2000). As expected, the data indicate a clear gradient in GP visiting, with children in poorer health having a higher number of GP visits. For both waves of data, the average number of GP visits differs significantly between the various health status groups.

Figure 2.3: GP visits, by parental-assessed child health

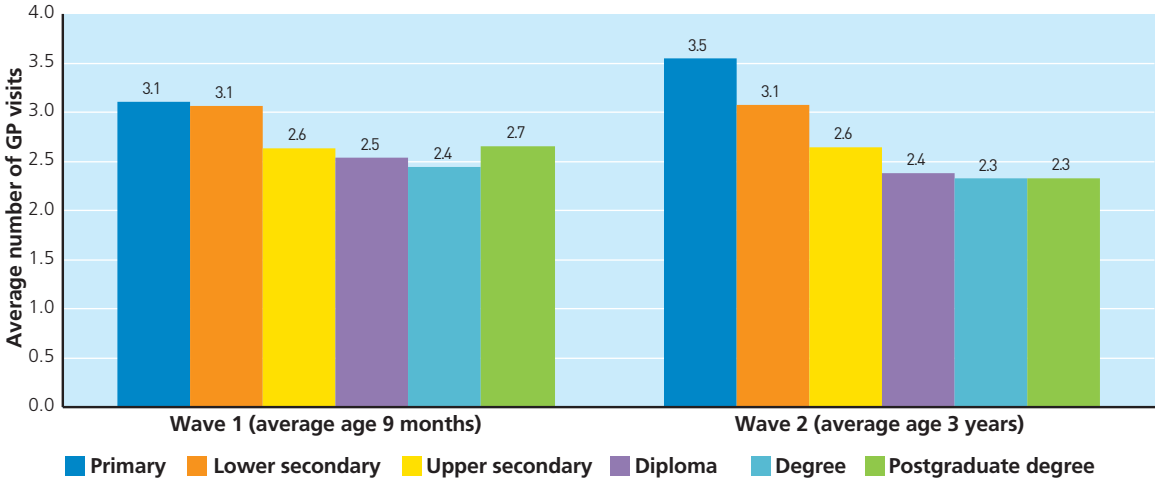


Notes: Sample weights are employed. GP visits are capped at 20.

A particular concern of this report is to identify horizontal inequities in GP visiting; i.e. differences in GP visiting patterns that are not related to need for healthcare. Apart from differences in GP visiting across the five eligibility groups identified above, it is important to understand the extent to which other characteristics of the child and family (such as mother's education, household location, household income, etc) determine GP visiting patterns. Figure 2.4 presents data on GP visiting patterns by mother's highest

level of education. The data reveal substantial differences. The children of mothers with lower levels of education have a higher number of GP visits (and the differences in GP visiting between those with the highest and the lowest level of education are statistically significant). There is considerable ambiguity about the effect of education on (adult) healthcare use. While individuals with higher levels of education may better understand the benefits of good health and be more willing to take preventive measures to secure future good health, they may also be more effective at protecting and promoting their own health and therefore may require less interaction with a healthcare professionals (Birch et al., 1993; McLeod, 2011; Sarma and Simpson, 2006). The international literature suggests that the children of more educated mothers are more likely to have higher healthcare use, controlling for other important determinants of such use (Currie et al., 2008; Currie and Gruber, 1996).

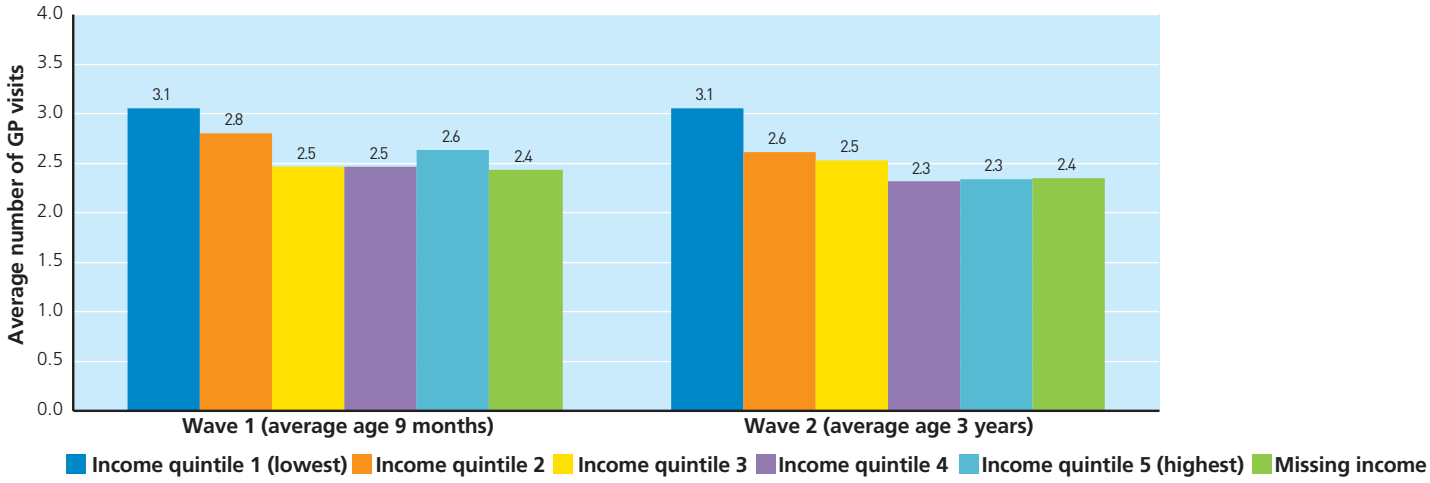
Figure 2.4: GP visits, by mother's highest level of education



Notes: Sample weights are employed. GP visits are capped at 20.

Figure 2.5 presents data on GP visiting patterns by household income quintile. As noted in Chapter 1, household income is adjusted to take account of household size and composition using equivalence scales, and a separate category for observations with missing information on household income is included in the analysis. Household income may reflect both the monetary and time costs of GP visiting on the part of the child's parents; those with higher incomes may be better able to afford the cost of a GP visit, but may also face a higher opportunity cost in terms of their use of time (McLeod, 2011). The data reveal a clear gradient in GP visiting by household income; those on the lowest incomes have the highest number of GP visits, in both waves. Statistical tests reveal that the difference in GP visiting between those on the lowest incomes verses those on the highest incomes is statistically significant. However, as full medical-card and GP visit-card eligibility is largely determined on the basis of an income means test, household income is highly correlated with public healthcare eligibility, meaning that a full multivariate analysis is necessary to disentangle the independent effect of household income.

Figure 2.5: GP visits, by household equivalised income quintile



Notes: Sample weights are employed. GP visits are capped at 20.

2.3 MULTIVARIATE MODELS

As noted in Chapter 1, the particular form of the GP visiting variable (non-zero, integer, highly skewed) necessitates the use of count data econometric modelling techniques. Table 2.2 presents the results of the one-step negative binomial model. Column (1) presents the results for the main independent variable of interest, i.e. public healthcare eligibility, while column (2) adds indicators of child health need, and column (3) add indicators of household income and other socio-economic characteristics. Healthcare use is often also modelled using two-part models, in which the contact and frequency decisions are modelled separately. Tables 2.3 and 2.4 present the results of the two-part model (i.e. contact and frequency decisions, separately).

Focusing first on column (1) in Table 2.2, the results confirm the patterns illustrated in Figure 2.2 – that, in both waves, those with a full medical card have a significantly higher number of GP visits than those without a full medical card, GP visit card or PHI (those with 'no cover'). The relative size of the effects is as expected. In Wave 1, those with a full medical card have one extra GP visit over the reference period compared to those with 'no cover', while the differential is 1.3 extra GP visits in Wave 2. In contrast, the effect for those with PHI with no cover is smaller (0.2 extra GP visits for Wave 1, and 0.4 extra visits for Wave 2), but still statistically significant. However, public healthcare eligibility is highly correlated with other determinants of GP visiting such as child health and household income. Column (2) adds indicators of child health and finds that the effects for the public healthcare eligibility variables remain statistically significant. As expected, child health is an important determinant of GP visiting; the effects for parental-assessed health status are particularly large and significant. Adding controls for mother and household characteristics in column (3) does not change the relative size and significance of the effects of public healthcare eligibility. In contrast to the bivariate relationships presented in Figure 2.4, mother's education is never significant in determining GP visiting among young children. The effects for all independent variables are largely consistent across the two waves of the ***Growing Up in Ireland*** survey; notable exceptions are the effects for type of childcare and household income, where the negative effects of being cared for in a crèche or having low household income are significant only in Wave 1. On the other hand, having siblings is associated with a higher level of GP visiting in Wave 2 only.

Table 2.2: Regression results (negative binomial model)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Public Healthcare Eligibility						
Full medical card	1.033 (0.092)***	0.921 (0.088)***	0.887 (0.094)***	1.308 (0.101)***	1.232 (0.100)***	1.082 (0.107)***
GP visit card	0.573 (0.213)***	0.467 (0.192)**	0.566 (0.196)***	0.799 (0.163)***	0.785 (0.163)***	0.799 (0.165)***
PHI with GP cover	0.392 (0.087)***	0.439 (0.083)***	0.418 (0.091)***	0.668 (0.099)***	0.680 (0.099)***	0.782 (0.103)***
PHI without GP cover	0.204 (0.092)**	0.262 (0.087)***	0.274 (0.093)***	0.387 (0.106)***	0.399 (0.105)***	0.569 (0.110)***
No cover	ref	ref	ref	ref	ref	ref
Child Sex						
Female		-0.350 (0.055)***	-0.357 (0.055)***		-0.142 (0.058)**	-0.153 (0.057)***
Male		ref	ref		ref	ref
Child Health						
Very healthy		ref	ref		ref	ref
Healthy		1.667 (0.068)***	1.597 (0.069)***		0.889 (0.079)***	0.808 (0.079)***
Ill		3.563 (0.191)***	3.376 (0.195)***		2.042 (0.212)***	2.057 (0.219)***
Child Had Accident Requiring Medical Attention?						
No accident		ref	ref		ref	ref
Accident		0.424 (0.130)***	0.381 (0.128)***		0.311 (0.132)**	0.262 (0.130)**
Birth-weight		0.067 (0.057)	0.083 (0.058)		-0.128 (0.062)**	-0.052 (0.062)
Gestation						
Less than 37 weeks		0.340 (0.134)**	0.324 (0.134)**		0.432 (0.134)***	0.426 (0.132)***
37-41 weeks		ref	ref		ref	ref
42+ weeks		0.014 (0.089)	-0.086 (0.089)		-0.006 (0.088)	-0.103 (0.087)
Maternal Smoking						
No smoking		ref	ref		ref	ref
Smoking		0.040 (0.062)	-0.023 (0.064)		-0.025 (0.064)	-0.137 (0.066)**
Was Child Breastfed?						
Breastfeeding		0.235 (0.057)***	0.161 (0.060)***		0.149 (0.060)**	0.075 (0.063)
No breastfeeding		ref	ref		ref	ref
Age (of mother)			-0.046 (0.007)***			-0.045 (0.007)***

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.219 (0.066)***			0.256 (0.070)***
Good			0.338 (0.077)***			0.489 (0.080)***
Fair			0.543 (0.123)***			0.531 (0.136)***
Maternal Chronic Illness						
Chronic			0.211 (0.084)**			0.405 (0.088)***
No chronic			ref			ref
Maternal Education						
Primary			0.119 (0.218)			-0.030 (0.311)
Lower secondary			0.016 (0.130)			0.143 (0.145)
Upper secondary			-0.124 (0.095)			0.051 (0.096)
Non-degree			-0.071 (0.093)			-0.016 (0.092)
Degree			-0.091 (0.089)			0.044 (0.088)
Postgraduate			ref			ref
Maternal Employment Status						
Employed			ref			ref
Self-employed			0.018 (0.125)			-0.388 (0.129)***
Student			-0.294 (0.183)			0.263 (0.170)
Unemployed			0.100 (0.145)			0.093 (0.122)
Home duties			0.020 (0.077)			-0.030 (0.070)
Marital Status						
Single			-0.182 (0.075)**			-0.209 (0.084)**
Married			ref			ref
Separated/divorced			0.001 (0.165)			0.248 (0.159)
Ethnic Group						
White			ref			ref
Non-white			0.430 (0.144)***			0.606 (0.132)***

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Childcare						
Care outside home			0.226 (0.069)***			0.081 (0.063)
Care at home			ref			ref
Has Child Siblings?						
Siblings			0.063 (0.063)			0.413 (0.073)***
No siblings			ref			ref
Household Income Quintile						
Missing Income Group			-0.423 (0.127)***			-0.152 (0.145)
Lowest Income Quintile			-0.232 (0.116)**			0.045 (0.122)
2nd Income Quintile			-0.239 (0.105)**			-0.210 (0.111)*
3rd Income Quintile			-0.308 (0.096)***			-0.059 (0.094)
4th Income Quintile			-0.253 (0.084)***			-0.061 (0.088)
Highest Income Quintile			ref			ref
Household Location						
Urban			ref			ref
Rural			0.055 (0.055)			-0.105 (0.058)*
N	10,658	10,294	10,092	9,397	9,075	8,891

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent
Robust standard errors are presented in parentheses.
See Table A1.1 for a full description of all variables.

Analysing the decision to visit a GP using a two-step process – i.e. separating the decision to contact a GP from the decision of how frequently to visit – suggests that there is little difference in the effect of public healthcare eligibility across the two decisions (see Tables 2.3 and 2.4). The exception is the effect for a GP visit card in Wave 1, where the results indicate that GP visit-card holders do not differ significantly from those with 'no cover' in terms of the probability of having at least one GP visit, but have a significantly higher number of GP visits to those with 'no cover' (for those with at least one GP visit). Assuming that adequate controls have been made for differences in health status and other socio-economic characteristics between GP visit-card holders and those with 'no cover', it is difficult to understand why GP visit-card holders would not differ significantly from those with 'no cover' in terms of the probability of a GP visit. There is evidence from Ireland (for adults) and from other countries (Canada) that individuals consider the likelihood of possible prescription medicine expenses when deciding to visit their GP (Stabile, 2001; Fast and Williamson, 1998; Nolan and Smith, 2012; Allin and Hurley, 2009). Allin and Hurley (2009) also found that individuals with prescription medicine insurance in Canada made significantly more physician visits than those without insurance, although they found that the effect on utilisation was stronger for the likelihood of a visit than the conditional number of visits. The significant and negative income effect observed for Wave 1 in the one-step model is apparent only for the contact decision in the two-part model, suggesting that household income does not determine the subsequent number of GP visits among those children with at least one GP visit in the reference period.

Table 2.3: Regression results (probit model, i.e. contact decision)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Public Healthcare Eligibility						
Full medical card	0.081	0.076	0.086	0.119	0.118	0.120
	(0.011)***	(0.012)***	(0.013)***	(0.012)***	(0.013)***	(0.014)***
GP visit card	-0.003	0.003	0.024	0.105	0.106	0.109
	(0.023)	(0.023)	(0.024)	(0.023)***	(0.023)***	(0.023)***
PHI with GP cover	0.072	0.074	0.057	0.094	0.093	0.097
	(0.011)***	(0.011)***	(0.012)***	(0.013)***	(0.013)***	(0.014)***
PHI without GP cover	0.043	0.045	0.031	0.056	0.057	0.072
	(0.012)***	(0.012)***	(0.013)**	(0.013)***	(0.013)***	(0.014)***
No cover	ref	ref	ref		ref	ref
Child Sex						
Female		-0.026	-0.024		-0.021	-0.019
		(0.008)***	(0.008)***		(0.008)**	(0.008)**
Male		ref	ref		ref	ref
Child Health						
Very healthy		ref	ref		ref	ref
Healthy		0.167	0.158		0.073	0.059
		(0.013)***	(0.013)***		(0.012)***	(0.012)***
Ill		0.256	0.223		0.170	0.174
		(0.055)***	(0.056)***		(0.050)***	(0.052)***
Child had accident requiring medical attention?						
No accident		ref	ref		ref	ref
Accident		0.056	0.053		0.004	0.003
		(0.021)***	(0.021)**		(0.021)	(0.021)
Birth-weight		0.010	0.012		-0.008	0.001
		(0.008)	(0.008)		(0.009)	(0.009)
Gestation						
Less than 37 weeks		0.009	0.008		0.043	0.044
		(0.019)	(0.020)		(0.022)*	(0.022)**
38-41 weeks		ref	ref		ref	ref
42+ weeks		0.002	-0.009		0.006	-0.001
		(0.012)	(0.012)		(0.013)	(0.013)
Maternal Smoking						
No smoking		ref	ref		ref	ref
Smoking		-0.008	-0.016		-0.003	-0.013
		(0.009)	(0.009)*		(0.010)	(0.010)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Was Child Breastfed?						
Breastfeeding		0.034	0.026		0.014	0.008
		(0.008)***	(0.009)***		(0.009)	(0.009)
No breastfeeding		ref	ref		ref	ref
Age (of mother)			-0.004			-0.005
			(0.001)***			(0.001)***
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.024			0.039
			(0.009)***			(0.010)***
Good			0.028			0.055
			(0.011)**			(0.012)***
Fair/poor			0.037			0.072
			(0.019)*			(0.021)***
Maternal Chronic Illness						
No chronic			ref			ref
Chronic			0.019			0.047
			(0.014)			(0.014)***
Maternal Education						
Primary			0.046			0.027
			(0.031)			(0.042)
Lower secondary			0.004			0.008
			(0.019)			(0.022)
Upper secondary			-0.010			0.001
			(0.014)			(0.014)
Non-degree			0.009			0.014
			(0.014)			(0.014)
Degree			-0.015			0.006
			(0.013)			(0.013)
Postgraduate			ref			ref
Maternal Employment Status						
Employed			ref			ref
Self-employed			0.005			-0.036
			(0.019)			(0.019)*
Student			-0.003			0.018
			(0.030)			(0.030)
Unemployed			-0.002			0.037
			(0.021)			(0.020)*

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Home duties			-0.013			0.002
			(0.010)			(0.010)
Marital Status						
Single			-0.018			-0.023
			(0.011)*			(0.012)*
Married			ref			ref
Separated/divorced			0.013			0.013
			(0.023)			(0.023)
Ethnic Group						
White			ref			ref
Non-white			0.075			0.029
			(0.017)***			(0.020)
Childcare						
Care outside home			-0.021			-0.010
			(0.010)**			(0.009)
Care at home			ref			ref
Has Child Siblings?						
Siblings			0.023			0.061
			(0.009)**			(0.012)***
No siblings			ref			ref
Household Income Quintile						
Missing Income Group			-0.054			-0.053
			(0.018)***			(0.021)**
Lowest Income Quintile			-0.048			-0.040
			(0.017)***			(0.018)**
2nd Income Quintile			-0.040			-0.033
			(0.015)***			(0.016)**
3rd Income Quintile			-0.048			-0.010
			(0.014)***			(0.015)
4th Income Quintile			-0.027			0.000
			(0.013)**			(0.014)
Highest Income Quintile			ref			ref
Household Location						
Urban			ref			ref
Rural			0.007			0.001
			(0.008)			(0.009)
N	10,658	10,294	10,092	9,397	9,075	8,891

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent
Robust standard errors are presented in parentheses.
See Table A1.1 for a full description of all variables.

Table 2.4: Regression results (truncated negative binomial model, i.e. frequency decision)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Public Healthcare Eligibility						
Full medical card	0.923	0.881	0.802	1.119	1.080	0.902
	(0.102)***	(0.105)***	(0.113)***	(0.119)***	(0.120)***	(0.129)***
GP visit card	0.729	0.618	0.637	0.557	0.563	0.584
	(0.229)***	(0.223)***	(0.230)***	(0.187)***	(0.194)***	(0.199)***
PHI with GP cover	0.176	0.249	0.300	0.433	0.473	0.602
	(0.099)*	(0.101)**	(0.111)***	(0.117)***	(0.120)***	(0.127)***
PHI without GP cover	0.054	0.130	0.210	0.227	0.250	0.421
	(0.105)	(0.107)	(0.114)*	(0.126)*	(0.128)**	(0.135)***
No cover	ref	ref	ref		ref	ref
Child Sex						
Female		-0.361	-0.383		-0.093	-0.123
		(0.066)***	(0.066)***		(0.066)	(0.067)*
Male		ref	ref		ref	ref
Child Health						
Very healthy		ref	ref		ref	ref
Healthy		1.593	1.545		0.847	0.820
		(0.078)***	(0.079)***		(0.087)***	(0.088)***
Ill		3.507	3.383		1.914	1.994
		(0.196)***	(0.200)***		(0.209)***	(0.221)***
Child Had an Accident Requiring Medical Attention?						
No accident		ref	ref		ref	ref
Accident		0.348	0.309		0.371	0.331
		(0.153)**	(0.153)**		(0.140)***	(0.143)**
Birth-weight		0.048	0.062		-0.129	-0.074
		(0.068)	(0.070)		(0.071)*	(0.072)
Gestation						
Less than 37 weeks		0.412	0.394		0.395	0.392
		(0.152)***	(0.154)**		(0.148)***	(0.149)***
38-41 weeks		ref	ref		ref	ref
42+ weeks		0.013	-0.074		-0.043	-0.137
		(0.108)	(0.109)		(0.101)	(0.101)
Maternal Smoking						
No smoking		ref	ref		ref	ref
Smoking		0.090	0.035		-0.028	-0.134
		(0.074)	(0.076)		(0.073)	(0.076)*

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Was Child Breastfed?						
Breastfeeding		0.163	0.105		0.138	0.068
		(0.068)**	(0.073)		(0.069)**	(0.073)
No breastfeeding		ref	ref		ref	ref
Age (of mother)			-0.046			-0.036
			(0.008)***			(0.008)***
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.194			0.169
			(0.081)**			(0.084)**
Good			0.343			0.418
			(0.092)***			(0.094)***
Fair/poor			0.560			0.408
			(0.142)***			(0.153)***
Maternal Chronic Illness						
Chronic			0.201			0.355
			(0.098)**			(0.099)***
No chronic			ref			ref
Maternal Education						
Primary			-0.025			-0.168
			(0.259)			(0.364)
Lower secondary			-0.001			0.148
			(0.155)			(0.163)
Upper secondary			-0.129			0.062
			(0.113)			(0.112)
Non-degree			-0.140			-0.078
			(0.112)			(0.108)
Degree			-0.061			0.025
			(0.106)			(0.103)
Postgraduate			ref			ref
Maternal Employment Status						
Employed			ref			ref
Self-employed			-0.002			-0.384
			(0.154)			(0.154)**
Student			-0.349			0.269
			(0.218)			(0.183)
Unemployed			0.146			-0.008
			(0.168)			(0.139)
Home duties			0.087			-0.052

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) public healthcare entitlements	(2) + child health and early life characteristics	(3) + mother and household characteristics	(1) public healthcare entitlements	(2) + child health and early-life characteristics	(3) + mother and household characteristics
Marital Status						
Single			-0.174			-0.180
			(0.089)*			(0.097)*
Married			ref			ref
Separated/divorced			-0.045			0.258
			(0.199)			(0.180)
Ethnic Group						
White			ref			ref
Non-white			0.179			0.695
			(0.172)			(0.158)***
Childcare						
Care outside home			-0.221			0.151
Care at home			(0.084)***			(0.073)**
			ref			ref
Has Child Siblings?						
Siblings			-0.016			0.319
			(0.076)			(0.083)***
No siblings			ref			ref
Household Income Quintile						
Missing Income Group			-0.344			0.023
			(0.157)**			(0.164)
Lowest Income Quintile			-0.114			0.231
			(0.139)			(0.141)
2nd Income Quintile			-0.151			-0.134
			(0.128)			(0.130)
3rd Income Quintile			-0.210			-0.037
			(0.117)*			(0.111)
4th Income Quintile			-0.240			-0.084
			(0.103)**			(0.105)
Highest Income Quintile			ref			ref
Household Location						
Urban			ref			ref
Rural			0.036			-0.142
			(0.066)			(0.068)**
N	8,559	8,279	8,131	7,466	7,209	7,065

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent
Robust standard errors are presented in parentheses.
See Table A1.1 for a full description of all variables.
1 The negative binomial model is 'truncated' in the sense that the sample is restricted to those who had attended their GP in the previous year.

2.4 DISCUSSION

The issue of healthcare entitlements is particularly pertinent for children given the strong causal links that have been demonstrated between healthcare access and child health (Currie, 1995; Currie et al., 2008; Currie and Gruber, 1996) and, in turn, the causal impact of child health on later health, education and labour market outcomes (Case et al., 2005). The results indicate that there is a significant relationship between eligibility for free GP care and GP visiting among children in Ireland; that the effects are consistent with the differing relative prices facing the various eligibility groups (e.g. full medical-card holders have a significantly higher number of GP visits than those who must pay the full price of GP care); that the effects are very similar for the two waves of data examined, and that the effects are consistent with previous analyses on the adult population in Ireland. These results highlight the importance of the financial incentives embodied in the Irish system of eligibility for free GP care in influencing GP visiting behaviour among children.

As noted, the Irish system of public healthcare eligibility is unusual internationally. The results of the econometric models confirm the important role that public healthcare eligibility plays in explaining differences in GP visiting rates across the population. Of particular concern in the Irish context is the extent to which non-need factors such as household income determine GP visiting rates, and whether this differs in comparison with other countries with free access to GP services at the point of use. Layte and Nolan (2014) have compared the findings from the second wave of the Infant Cohort of ***Growing Up in Ireland*** with data from the Growing up in Scotland survey. They found that overall GP visiting rates were higher in Ireland than in Scotland and that the variation in GP visiting rates between those on the lowest and highest household incomes was greater among the children in Ireland. No evidence of a significant income gradient in GP visiting was found among the Scottish children, whereas Layte and Nolan (2014) found that Irish children from higher-income families were significantly more likely to visit their GP at least once in a 12-month period. Patterns such as these raise concerns over the extent to which the Irish system of public healthcare eligibility is ensuring access to GP services on the basis of need, rather than ability to pay. The following chapter focuses in particular on the sub-sample of children in Ireland who face the full cost of GP care at the point of use, and examines the extent to which barriers to access are evident for those on low incomes.

While the analysis in this chapter highlights the association between eligibility for free GP care and GP visiting among children in Ireland, it cannot draw any conclusions about the causal mechanisms involved, nor about the possible impact of the system on child health. However, the availability of two waves of the Infant Cohort data from ***Growing Up in Ireland*** allows us to extend the analysis in this chapter to investigate the causal mechanisms, by analysing the extent to which changes in public healthcare eligibility lead to changes in GP visiting (in Chapter 4). Analysing the impact of the particular Irish system of public healthcare eligibility on child health requires data collection over a much longer timeframe than that currently available.

Chapter 3

GP VISITING PATTERNS (PRIVATE SAMPLE)

3.1 INTRODUCTION

As discussed in Chapter 1, a substantial proportion of the Irish population must pay the full cost of GP care at the point of use (although some may be eligible for full or partial reimbursement of the cost through their particular PHI plan). While most of the empirical work has concentrated on comparing the behaviour of medical-card (full medical and GP visit card) and private patients, there has been relatively little analysis of the role of income in determining differences in GP visiting among private patients.

The current net weekly income threshold for a GP visit card is €514 for a family of two adults and two children under the age of 16 years (HSE, 2015). An average GP fee of €50 for one family member, therefore, amounts to nearly 10 per cent of net weekly family income for a family just above this income threshold, a significant outlay before any associated prescription-medicine costs are taken into account. There are, therefore, real concerns that those on low (but not the lowest) incomes face particular hardship in accessing GP services. Indeed, a study of adults found that private patients with low or middle incomes in Ireland were four times more likely to forgo a GP consultation due to cost than private patients on higher incomes (and that no such disincentive existed in Northern Ireland, with free GP visits for all at the point of use under the UK NHS) (O'Reilly et al., 2007). Previous research on the adult population found little evidence of a significant income gradient in GP visiting among private patients over the period 1987 to 2001 in Ireland (Nolan, 2008b), although early research on the first wave of the Infant and Child Cohorts of ***Growing Up in Ireland*** found some evidence that nine-month-old children from higher-income families without a medical or GP visit card had a significantly higher number of GP visits than those on lower incomes without a medical or GP visit card (no significant income gradient was found for the nine-year-old children) (Layte and Nolan, 2014).

This chapter focuses on this segment of the population (i.e. 'private' patients). In particular, it seeks to examine whether user fees for GP care are a particular burden on children from low-income families without full medical or GP visit cards; i.e. whether there is a significant income effect in GP visiting, even after adjusting for health need and other determinants of GP visiting. If the cost of a GP consultation is indeed a substantial burden for private patients just above the income threshold for a GP visit card, it would be expected that GP visiting increases as one moves further up the income distribution, adjusting for all other influences on GP visiting such as health status. The analyses in this chapter are conducted on the 7,553 children in Wave 1 and the 5,984 children in Wave 2 without a full medical or GP visit card. The following section presents an overview of GP visiting patterns for this group of patients, while Section 3.3 presents and discusses the results of multivariate regression models of GP visiting. Section 3.4 draws out the policy implications from this chapter.

3.2 DESCRIPTIVE STATISTICS

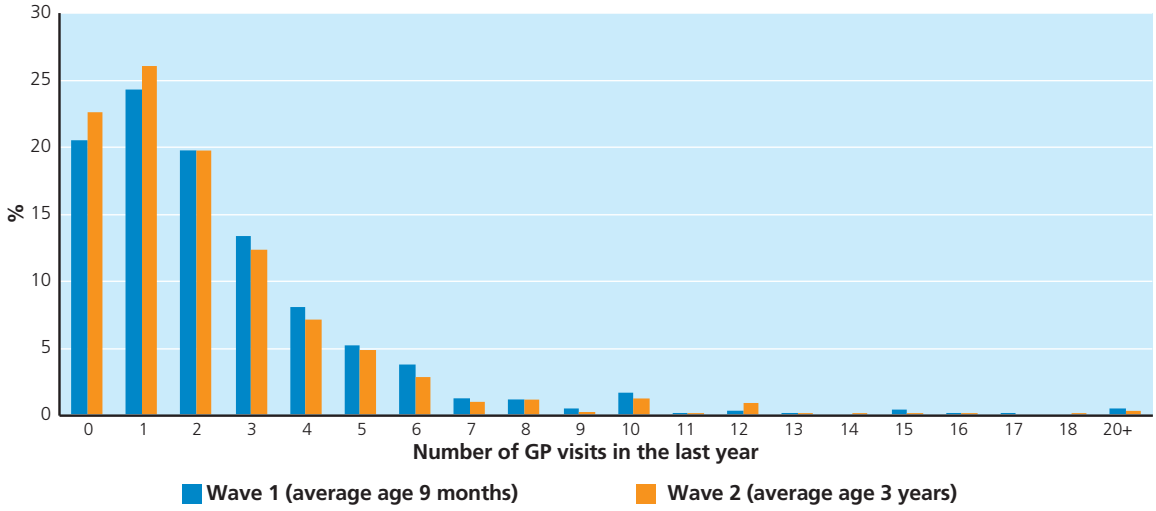
Table 3.1 shows that the average number of GP visits among private patients was 2.4 when the children were aged nine months and 2.2 when they were aged three years. As with the data on the full sample presented in Chapter 2, the summary statistics indicate that the data on GP visits are highly skewed. The patterns in Figure 3.1 confirm this finding. For both waves, just over 20 per cent of the children had no GP visit in the reference period, while less than 0.5 per cent had 20+ visits in the last year. Again, there is also some evidence of 'heaping' to easily recalled numbers (such as one visit per month, or one visit every two months, etc).

Table 3.1: Number of GP visits, private patients, summary statistics

	Wave 1 (average age 9 months)	Wave 2 (average age 3 years)
Mean	2.4	2.2
Standard deviation	2.6	2.5
Median	2.0	2.0
Minimum	0.0	0.0
Maximum	20.0	20.0
N	7,553	5,984

Notes: GP visits are capped at 20. The recall period is 9 months for Wave 1 and 12 months for Wave 2. Sample weights are employed.

Figure 3.1: Distribution of GP visits, private patients

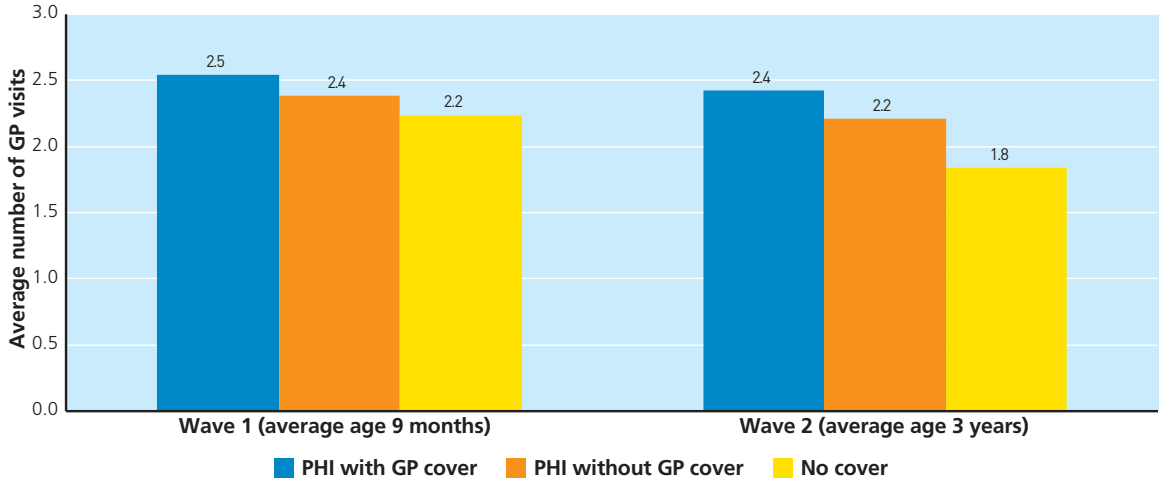


Notes: Sample weights are employed. GP visits are capped at 20.

Figure 3.2 illustrates the differences in GP visiting patterns across the three groups of private patients that may be identified (i.e. PHI with GP cover, PHI without GP cover, and 'no cover'). The patterns for both waves are consistent with expectations; the average number of GP visits is highest for those with PHI with GP cover, and lowest for those with 'no cover'. The differential in GP visiting between those with PHI with GP cover and those with 'no cover' is more marked for Wave 2 (i.e. when the children were aged three years of age on average). For both waves of data, the average number of GP visits differs significantly between the three groups of private patients.[36]

[36] Mean comparison tests are carried out to check for significant differences in the average number of GP visits across the three eligibility groups (PHI with GP cover, PHI without GP cover, no cover) examined in this chapter.

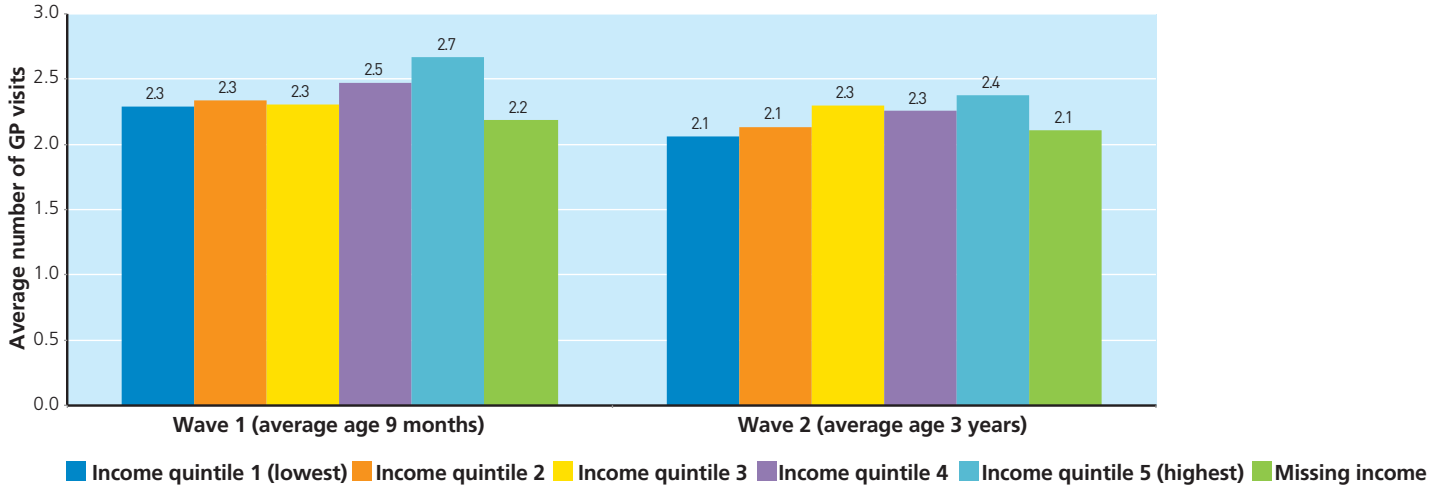
Figure 3.2: GP visits, by public healthcare eligibility, private sample



Notes: Sample weights are employed. GP visits are capped at 20.

Figure 3.3 presents the bivariate relationship between household equivalised income quintile (redefined for this sample) and GP visiting for those who must pay for GP care (i.e. 'private' patients). The data show that GP visiting rates are significantly higher among those in the highest income quintile than those in the lower income quintiles (although the difference in GP visiting is less significant for Wave 2). While a full multivariate analysis is needed to confirm these findings, patterns such as this are a concern as they suggest that those on lower incomes, without access to free GP care via a full medical card or GP visit card, face particular barriers to accessing GP care.

Figure 3.3: GP visits, by household equivalised income, private sample



Notes: Sample weights are employed. GP visits are capped at 20.

3.3 MULTIVARIATE MODELS

Turning to the multivariate analysis using a one-step model in Table 3.2, it can be seen that, consistent with the patterns presented in Figure 3.1, household income is a significant determinant of GP visiting behaviour among children without access to free GP care at the point of use. However, once all other controls have been added to the model, this effect remains significant for Wave 1 only. As noted above, patterns such as these are a concern as they suggest that children from lower-income families face barriers to accessing GP care. The results for public healthcare eligibility are as expected, as they suggest that, compared with those with 'no cover' (i.e. who face the full cost of GP care at the point of use), those with PHI that provides full or partial cover for GP expenses have a significantly higher number of GP visits. Even those with PHI with no cover for GP expenses have a significantly higher number of GP visits than those with 'no cover', despite the fact that both groups face the same cost for GP care. It is not possible to give a definitive explanation for this finding, but there would seem to be at least three alternatives. First, this effect may be a proxy for the higher incomes and other resources of families with PHI which is not already measured in the income variable used. Second, the purchase of PHI, conditional on income, may be an indirect measure of a greater propensity to consult the GP since it could indicate risk-adverse behaviour (i.e. the purchase of insurance). Third, the higher rate of GP attendance may reflect the better availability of referral to secondary care experienced by this group; those without the ability to move quickly to secondary care may hesitate to have medical conditions assessed.[37]

Consistent with the results for the full sample presented in Chapter 2, child health is an important determinant of GP visiting behaviour for the private sample, as are mother's characteristics such as ethnicity and health. The results for the two-step model in Tables 3.3 and 3.4 suggest that the significant negative effect of lower household income in Wave 1 applies only to the contact decision; household income has no significant effect on the frequency of GP visiting among those who must pay (some or all of) the full price of GP care.

Table 3.2: Regression results (negative binomial model, private sample)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Household Income Quintile						
Lowest Income Quintile	-0.335	-0.231	-0.242	-0.286	-0.069	-0.181
	(0.099)***	(0.107)**	(0.110)**	(0.107)***	(0.112)	(0.117)
2nd Income Quintile	-0.294	-0.237	-0.261	-0.299	-0.152	-0.208
	(0.099)***	(0.102)**	(0.101)***	(0.096)***	(0.099)	(0.102)**
3rd Income Quintile	-0.394	-0.366	-0.346	-0.191	-0.102	-0.122
	(0.100)***	(0.101)***	(0.097)***	(0.099)*	(0.100)	(0.101)
4th Income Quintile	-0.094	-0.090	-0.159	-0.149	-0.118	-0.188
	(0.093)	(0.093)	(0.091)*	(0.093)	(0.093)	(0.093)**
Highest Income Quintile	ref	ref	ref	ref	ref	ref
Missing Income Group	-0.521	-0.468	-0.482	-0.166	-0.077	-0.183
	(0.133)***	(0.135)***	(0.134)***	(0.151)	(0.155)	(0.156)

[37] On the other hand, it is possible that those on lower incomes without a medical or GP visit card may visit their GP to receive care for conditions while on a waiting list for secondary care for that condition.

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Public Healthcare Eligibility						
PHI with GP cover		0.297	0.349		0.566	0.654
		(0.085)***	(0.085)***		(0.090)***	(0.093)***
PHI without GP cover		0.122	0.212		0.325	0.466
		(0.089)	(0.087)**		(0.096)***	(0.098)***
No cover		ref	ref		ref	ref
Child Sex						
Female			-0.301			0.010
			(0.059)***			(0.063)
Male			ref			ref
Child Health						
Very healthy			ref			ref
Healthy			1.531			0.706
			(0.075)***			(0.086)***
Ill			2.941			1.759
			(0.270)***			(0.275)***
Child Had Accident Requiring Medical Attention?						
No accident			ref			ref
Accident			0.409			0.293
			(0.141)***			(0.140)**
Birth-weight			0.046			-0.066
			(0.063)			(0.070)
Gestation						
Less than 37 weeks			0.486			0.344
			(0.145)***			(0.161)**
38-41 weeks			ref			ref
42+ weeks			-0.095			-0.167
			(0.102)			(0.093)*
Maternal Smoking						
No smoking			ref			ref
Smoking			0.086			-0.130
			(0.071)			(0.077)*
Was Child Breastfed?						
Breastfeeding			0.121			0.029
			(0.065)*			(0.070)
No breastfeeding			ref			ref
Age (of mother)			-0.041			-0.054
			(0.008)***			(0.009)***

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.211			0.200
			(0.068)***			(0.074)***
Good			0.300			0.401
			(0.084)***			(0.089)***
Fair/poor			0.463			0.475
			(0.152)***			(0.183)***
Maternal Chronic Illness						
No chronic			ref			ref
Chronic			0.202			0.290
			(0.095)**			(0.100)***
Maternal Education						
Primary			-0.340			0.310
			(0.396)			(0.597)
Lower secondary			-0.040			0.153
			(0.168)			(0.233)
Upper secondary			-0.141			0.006
			(0.097)			(0.106)
Non-degree			-0.078			-0.019
			(0.091)			(0.093)
Degree			-0.085			0.040
			(0.085)			(0.084)
Postgraduate			ref			ref
Maternal Employment Status						
Employed			ref			ref
Self-employed			0.063			-0.462
			(0.120)			(0.123)***
Student			-0.148			0.298
			(0.332)			(0.401)
Unemployed			0.323			0.359
			(0.187)*			(0.172)**
Home duties			0.056			-0.072
			(0.084)			(0.075)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Marital Status						
Single			-0.203			-0.289
			(0.086)**			(0.108)***
Married			ref			ref
Separated/divorced			-0.289			0.155
			(0.215)			(0.238)
Ethnic Group						
White			ref			ref
Non-white			0.938			1.116
			(0.179)***			(0.174)***
Childcare						
Care outside home			0.230			0.128
			(0.071)***			(0.066)*
Care at home			ref			ref
Has Child Siblings?						
Siblings			0.039			0.328
			(0.067)			(0.082)***
No siblings			ref			ref
Household Location						
Urban			ref			ref
Rural			0.042			0.060
			(0.060)			(0.065)
N	7,553	7,499	7,190	5,984	5,950	5,683

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Standard errors are presented in parentheses.

Table 3.3: Regression results (probit model, private sample – contact decision)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Marital Status						
Lowest Income Quintile	-0.076	-0.054	-0.047	-0.076	-0.042	-0.058
	(0.015)***	(0.016)***	(0.018)***	(0.018)***	(0.019)**	(0.020)***
2nd Income Quintile	-0.073	-0.060	-0.053	-0.043	-0.018	-0.026
	(0.016)***	(0.016)***	(0.017)***	(0.018)**	(0.018)	(0.019)
3rd Income Quintile	-0.078	-0.071	-0.068	-0.024	-0.010	-0.012
	(0.016)***	(0.016)***	(0.016)***	(0.018)	(0.018)	(0.019)
4th Income Quintile	-0.007	-0.004	-0.012	-0.017	-0.013	-0.021
	(0.016)	(0.016)	(0.016)	(0.018)	(0.018)	(0.018)
Highest Income Quintile	ref	ref	ref	ref	ref	ref
Missing Income Group	-0.082	-0.070	-0.066	-0.054	-0.039	-0.051
	(0.020)***	(0.020)***	(0.021)***	(0.026)**	(0.026)	(0.027)*
Public Healthcare Eligibility						
PHI with GP cover		0.057	0.059		0.088	0.097
		(0.012)***	(0.013)***		(0.014)***	(0.015)***
PHI without GP cover		0.028	0.032		0.051	0.072
		(0.013)**	(0.013)**		(0.014)***	(0.016)***
No cover			ref		ref	ref
Child Sex						
Female			-0.028			-0.006
			(0.009)***			(0.011)
Male			ref			ref
Child Health						
Very healthy			ref			ref
Healthy			0.169			0.069
			(0.016)***			(0.016)***
Ill			0.191			0.109
			(0.068)***			(0.068)
Child Had Accident Requiring Medical Attention?						
No accident			ref			ref
Accident			0.044			0.023
			(0.025)*			(0.029)
Birth-weight			0.008			-0.008
			(0.010)			(0.012)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Gestation						
Less than 37 weeks			0.019			-0.007
			(0.025)			(0.029)
38-41 weeks			ref			ref
42+ weeks			-0.001			0.016
			(0.015)			(0.018)
Maternal Smoking						
No smoking			ref			ref
Smoking			-0.020			-0.014
			(0.011)*			(0.013)
Was Child Breastfed?						
Breastfeeding			0.026			0.011
			(0.010)**			(0.012)
No breastfeeding			ref			ref
Age (of mother)			-0.005			-0.008
			(0.001)***			(0.001)***
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.029			0.042
			(0.011)***			(0.012)***
Good			0.022			0.056
			(0.013)			(0.016)***
Fair/poor			0.042			0.055
			(0.025)*			(0.031)*
Maternal Chronic Illness						
No chronic			ref			ref
Chronic			0.031			0.062
			(0.017)*			(0.019)***
Maternal Education						
Primary			0.031			0.213
			(0.068)			(0.150)
Lower secondary			0.036			0.025
			(0.027)			(0.040)
Upper secondary			-0.024			-0.011
			(0.016)			(0.018)
Non-degree			0.002			0.008
			(0.016)			(0.017)
Degree			-0.023			0.006
			(0.015)			(0.015)
Postgraduate			ref			ref

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Maternal Employment Status						
Employed			ref			ref
Self-employed			0.007			-0.041
			(0.020)			(0.021)*
Student			0.078			-0.003
			(0.066)			(0.059)
Unemployed			-0.001			0.057
			(0.030)			(0.031)*
Home duties			0.005			0.001
			(0.013)			(0.013)
Marital Status						
Single			-0.028			-0.046
			(0.013)**			(0.018)**
Married			ref			ref
Separated/divorced			-0.028			0.015
			(0.032)			(0.040)
Ethnic Group						
White			ref			ref
Non-white			0.084			0.069
			(0.024)***			(0.030)**
Childcare						
Care outside home			0.032			0.001
			(0.011)***			(0.012)
Care at home			ref			ref
Has Child Siblings?						
No siblings			ref			ref
Siblings			0.015			0.073
			(0.011)			(0.016)***
Household Location						
Urban			ref			ref
Rural			0.005			0.019
			(0.010)			(0.011)*
N	7,553	7,499	7,190	5,984	5,950	5,683

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Standard errors are presented in parentheses.

Table 3.4: Regression results (truncated negative binomial model, private sample – frequency decision)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Household Income Quintile						
Lowest Income Quintile	-0.142	-0.102	-0.156	-0.082	0.069	-0.027
	(0.112)	(0.121)	(0.133)	(0.120)	(0.126)	(0.137)
2nd Income Quintile	-0.107	-0.084	-0.159	-0.234	-0.136	-0.194
	(0.112)	(0.114)	(0.123)	(0.106)**	(0.110)	(0.120)
3rd Income Quintile	-0.209	-0.203	-0.209	-0.163	-0.099	-0.128
	(0.113)*	(0.114)*	(0.117)*	(0.111)	(0.112)	(0.120)
4th Income Quintile	-0.097	-0.104	-0.180	-0.134	-0.110	-0.185
	(0.106)	(0.106)	(0.112)	(0.102)	(0.102)	(0.107)*
5th Income Quintile	ref	ref	ref	ref	ref	ref
Missing Income Group	-0.359	-0.339	-0.411	-0.021	0.041	-0.055
	(0.153)**	(0.156)**	(0.166)**	(0.164)	(0.169)	(0.177)
Public Healthcare Eligibility						
PHI with GP cover		0.143	0.221		0.393	0.496
		(0.095)	(0.104)**		(0.105)***	(0.112)***
PHI without GP cover		0.027	0.139		0.209	0.331
		(0.100)	(0.106)		(0.111)*	(0.118)***
No cover		ref	ref			ref
Child Sex						
Female			-0.306			0.037
			(0.072)***			(0.074)
Male			ref			ref
Child Health						
Very healthy			ref			ref
Healthy			1.489			0.694
			(0.086)***			(0.096)***
Ill			2.991			1.803
			(0.274)***			(0.262)***
Child Had Accident Requiring Medical Attention?						
No accident			ref			ref
Accident			0.382			0.321
			(0.167)**			(0.155)**
Birth-weight			0.025			-0.057
			(0.077)			(0.082)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Gestation						
Less than 37 weeks			0.566			0.468
			(0.164)***			(0.174)***
38-41 weeks			ref			ref
42+ weeks			-0.121			-0.285
			(0.128)			(0.112)**
Maternal Smoking						
No smoking			ref			ref
Smoking			0.204			-0.135
			(0.086)**			(0.090)
Was Child Breastfed?						
Breastfeeding			0.060			0.004
			(0.079)			(0.082)
No breastfeeding			ref			ref
Age (of mother)			-0.036			-0.040
			(0.009)***			(0.010)***
Maternal Self-Assessed Health						
Excellent			ref			ref
Very good			0.177			0.108
			(0.084)**			(0.088)
Good			0.328			0.321
			(0.101)***			(0.104)***
Fair/poor			0.462			0.414
			(0.179)***			(0.204)**
Maternal Chronic Illness						
No chronic			ref			ref
Chronic			0.149			0.193
			(0.111)			(0.116)*
Maternal Education						
Primary			-0.650			-0.085
			(0.512)			(0.811)
Lower secondary			-0.216			0.119
			(0.213)			(0.273)
Upper secondary			-0.095			0.051
			(0.117)			(0.124)
Non-degree			-0.116			-0.055
			(0.110)			(0.109)

	Wave 1 (average age 9 months)			Wave 2 (average age 3 years)		
	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics	(1) Household income	(2) + public healthcare entitlements	(3) + child health, early-life, mother and household characteristics
Degree			-0.030			0.021
			(0.102)			(0.097)
Postgraduate			ref			ref
Maternal Employment Status						
Employed			ref			ref
Self-employed			0.056			-0.483
			(0.145)			(0.150)***
Student			-0.460			0.389
			(0.442)			(0.424)
Unemployed			0.453			0.265
			(0.209)**			(0.195)
Home duties			0.055			-0.093
			(0.103)			(0.089)
Marital Status						
Single			-0.171			-0.211
			(0.103)*			(0.125)*
Married			ref			ref
Separated/divorced			-0.275			0.181
			(0.259)			(0.279)
Ethnic Group						
White			ref			ref
Non-white			0.919			1.308
			(0.228)***			(0.222)***
Childcare						
Care outside home			0.184			0.170
			(0.087)**			(0.077)**
Care at home			ref			ref
Has Child Siblings?						
Siblings			-0.014			0.200
			(0.082)			(0.095)**
No siblings			ref			ref
Household Location						
Urban			ref			ref
Rural			0.029			0.005
			(0.073)			(0.075)
N	5,995	5,959	5,728	4,620	4,596	4,389

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Standard errors are presented in parentheses.

3.4 DISCUSSION

This chapter has focused on the subsample of private patients only (i.e. those without a full medical card or GP visit card). Previous research on the adult population has found little evidence of a significant income gradient in GP visiting among private patients over the period 1987 to 2001 (Nolan, 2008b), although early research on the private samples from the first wave of the Infant and Child Cohorts of ***Growing Up in Ireland*** found some evidence that nine-month-old children from higher-income families had a significantly higher number of GP visits than those on lower incomes (no significant income gradient was found for the nine-year-old children) (Layte and Nolan, 2014). Using data from the first and second waves of the Infant Cohort, the analysis in this chapter found that, even after controlling for health status and other socio-economic characteristics, children from higher-income families had a significantly higher number of GP visits than those from lower-income families, although these effects are larger and more significant in Wave 1. This finding is a concern as it indicates the existence of income-related inequity in terms of access to GP services among children in Ireland with a full medical or GP visit card.

The lack of significant effects for the income variables on GP visiting among private patients in Wave 2 may be explained by the timing of the data collection for the two waves. The Wave 1 data were collected between September 2008 and April 2009 when the recession was just beginning, while the Wave 2 data were collected between January and August 2011, when the recession was in its fourth year. In Wave 1, 70.8 per cent of the sample consisted of private patients, while the corresponding proportion in Wave 2 was 61.8 per cent. It is, therefore, possible that enhanced access to the full medical and GP visit cards (as a result of falling household incomes and increased unemployment) during this period resulted in those who had previously faced particular barriers in accessing GP services becoming eligible for free GP care. Chapter 4 examines this issue, taking into account the longitudinal nature of the data, and the impact of transitions into and out of full medical- and GP visit-card eligibility on GP visiting patterns.

These patterns of GP visiting do not tell us anything about the extent to which patients are using alternative services that may act as a substitute for GP care. GPs act as gatekeepers for secondary care in Ireland, but it is possible that those on higher incomes may also be able to bypass the GP for ongoing care and use private outpatient care instead. One of the largest private insurers (VHI Healthcare) operates a number of outpatient clinics that provide GP-like services to subscribers (albeit for a fee that is in excess of the average GP fee), and which have considerably longer opening hours (from 8am-10pm seven days a week). Unfortunately, the data do not allow us to separately examine the use of outpatient services, but it is possible that this type of behaviour could explain the insignificance of income in Wave 2 (particularly for the frequency decision if higher-income individuals use the GP for a referral to private outpatient care).

On the other hand, previous research on the adult population has shown that private patients with 'no cover' were significantly more likely to self-refer to emergency department (ED) services, but less likely to be admitted to hospital than all other eligibility groups, suggesting use of ED services by this group for non-urgent reasons (Smith, 2007). While the current charge for private patients who access ED services without a GP referral is €100 (substantially above the average GP charge of €50), collection of the ED charge for private patients has traditionally been poor, and the ED charge is not as well understood as the GP charge (Smith, 2007). This phenomenon, if it is relevant for children, could explain the income gradient in GP visiting that was observed for Wave 1, all else being equal.

What do these results imply for current health policy in Ireland? As noted in Chapter 1, the current Programme for Government contains a commitment to extend free GP care to all children under 18 years of age (Government of Ireland, 2016), and free GP care has already been extended to all under-sixes since 2015. Prior to the economic crisis, government policy was focused on increasing the income thresholds for a full medical card. The substantial increase in income thresholds as well as the introduction of the 'GP only' medical card in October 2005 (with income thresholds 50 per cent higher than for the full medical card)

were consistent with this policy focus. However, the results (for Wave 1) suggest that, while the deterrent effect of GP user fees is most apparent for those just above the income threshold for a GP visit card, all private patients have significantly lower levels of GP visiting than full medical- or GP visit-card holders, even after adjusting for differences in health need and other socio-economic characteristics across the various eligibility groups. While it is difficult to determine the extent to which full medical- or GP visit-card holders may be 'over-consuming' GP services, or private patients 'under-consuming' GP services (with potentially negative effects on future healthcare use and health), previous research from other settings has highlighted the negative effects of user fees on healthcare access; i.e. user fees deter both 'necessary' as well as 'unnecessary' care (Manning et al., 1987; Newhouse and Insurance Experiment Group, 1993; Chernew and Newhouse, 2008; Robinson, 2002). In this context, large differences in GP visiting behaviour between different segments of the population and among private patients on different incomes are a concern, as they suggest that, for private patients, access is granted partly on the basis of ability to pay.

Chapter 4

GP VISITING PATTERNS (LONGITUDINAL ANALYSIS)

4.1 INTRODUCTION

As noted in Chapter 1, one of the main objectives of this report is to exploit the availability of data from two waves of the ***Growing Up in Ireland*** survey to further examine the impact of public healthcare eligibility on GP use. Longitudinal data offer a number of advantages over a single cross-section. First, they allow us to overcome the problem of simultaneity between healthcare use and health status that exists in cross-sectional analyses of healthcare use (Bago d'Uva, 2005). Second, one of the main disadvantages of cross-sectional analysis is the possibility that a significant association between two variables may be spurious, that is, due to differences between individuals on some unmeasured factor. With longitudinal data, the availability of repeated measures on the same individual allows us to adjust the standard errors for clustering at the individual level, and thus control for unobserved individual heterogeneity (characteristics of the individual that are time-invariant, such as genetic endowments, attitudes towards risk, etc). Given the reduced time span of the panel, in this case just two waves, two waves of data are pooled (an approach also used by Jiménez-Martín et al., 2002, and Jiménez-Martín et al., 2004), and adjustment is made to the standard errors to account for the availability of up to two observations per child.

Third, and most importantly, longitudinal data allow us to examine the causal impact of public healthcare eligibility, health and other variables on GP visiting by examining the impact of changes in these variables on GP visiting rates between waves. Ideally, data from more than two waves would be used to identify causal effects, but even with two waves of data, an attempt can be made to draw out some initial findings. The period between the first and second waves of the ***Growing Up in Ireland*** Infant Cohort survey was one in which the Irish economy entered a severe recession, and this is reflected in substantial changes in child and family circumstances among the Infant Cohort. For example, from the first wave of the Infant Cohort in 2008/2009 to the second wave in 2011, full medical-card cover increased from 26.4 per cent to 33.8 per cent (see Table A1.1). The analysis in this chapter uses propensity score matching methods which, in combination with longitudinal data, allow the researcher to determine the causal impact of a treatment (e.g. gaining a medical card) on an outcome of interest (e.g. GP use). Unfortunately, two waves of data do not provide a sufficiently long observation period to examine the impact of eligibility on child health, but this crucial question will be examined as further waves of the Infant Cohort become available.

Previous analyses of longitudinal data on GP visiting patterns among adults in Ireland have confirmed the findings from cross-sectional research (Nolan, 2007). Nolan (2008a) examined the impact of gaining or losing a full medical card, using eight waves of data on adults from the Living in Ireland study over the period 1995-2001. The research showed that, controlling for all other changes in circumstances (e.g. health status), gaining a full medical card led to a significant increase in GP visits (per annum) of between 0.9 and 1.3, while losing a full medical card led to a significant decline in annual GP visits of between 1.1 and 1.6. The research concluded that the change in the number of GP visits was larger and more significant for those losing a full medical card than for those gaining a medical card, suggesting an asymmetry in the effects; i.e. that the deterrent effect of charging for GP visits (for those who lost a full medical card) was greater than the incentive effect of free GP visits (for those who gained a full medical card).[38] To find out to what extent this finding also holds for GP visiting by children is one of the objectives of the analysis in this chapter.

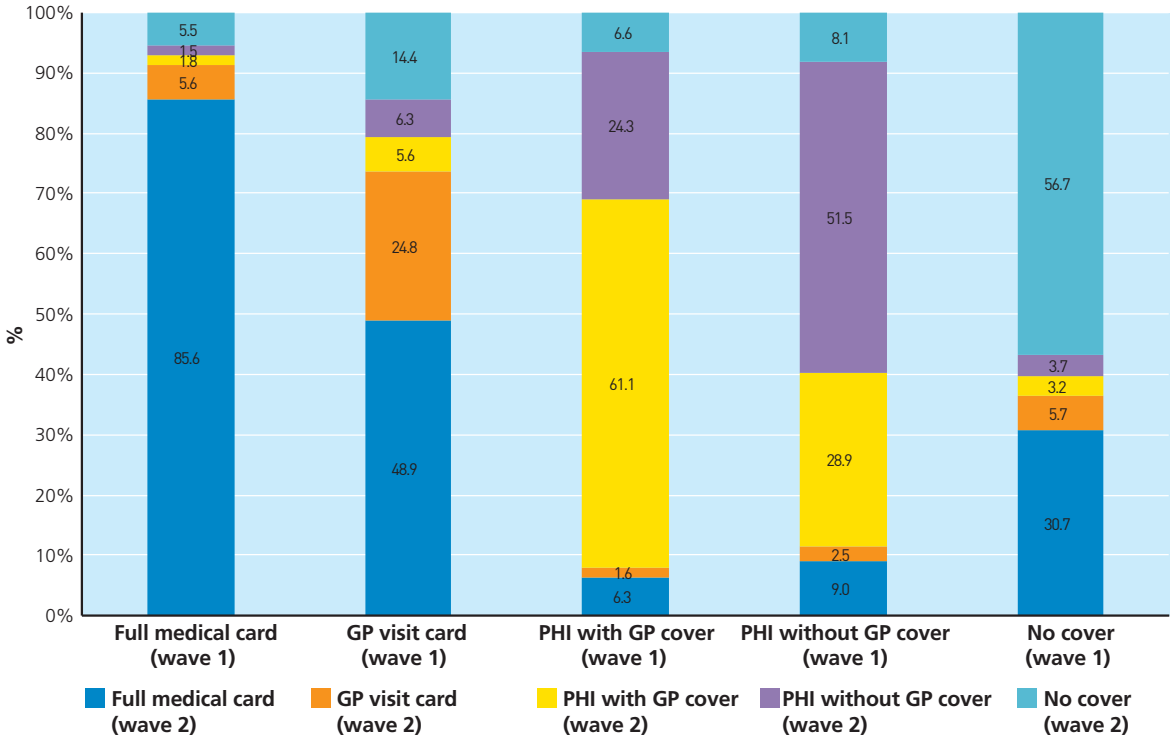
This chapter first presents some descriptive statistics on the sample in the two waves; e.g. outlining how certain characteristics have changed over time (such as medical-card eligibility) (Section 4.2). The robustness of the cross-sectional results outlined in Chapters 2 and 3 are then checked by repeating the analyses, but this time accounting for the longitudinal nature of the data (Section 4.3). Our central question is: do the cross-sectional findings hold when adjustment is made for the availability of two observations on the same child? Section 4.4 considers the impact of changes in public healthcare eligibility on GP visiting, while Section 4.5 discusses the findings.

[38] The data used in Nolan (2008a) covered the period 1995-2001, before the introduction of the GP visit card and the introduction of PHI plans with full or partial cover for GP expenses.

4.2 DESCRIPTIVE STATISTICS

Before describing the modelling approach and empirical results, it is useful to outline how the characteristics of the children and their families changed over the period between Wave 1 and Wave 2. This section focuses on the children surveyed in both Wave 1 and Wave 2, i.e. the balanced sample. Figure 4.1 shows that, while the majority of children in each public healthcare eligibility category in Wave 1 remained in the same category in Wave 2, there was also considerable movement between the categories. For example, the sharp rise in the numbers eligible for full medical-card eligibility is reflected in the fact that 48.9 per cent of those with a GP visit card in Wave 1 and 30.7 per cent of those with 'no cover' in Wave 1 had become eligible for a full medical card by Wave 2.

Figure 4.1: Changes in public healthcare eligibility, Wave 1 to Wave 2

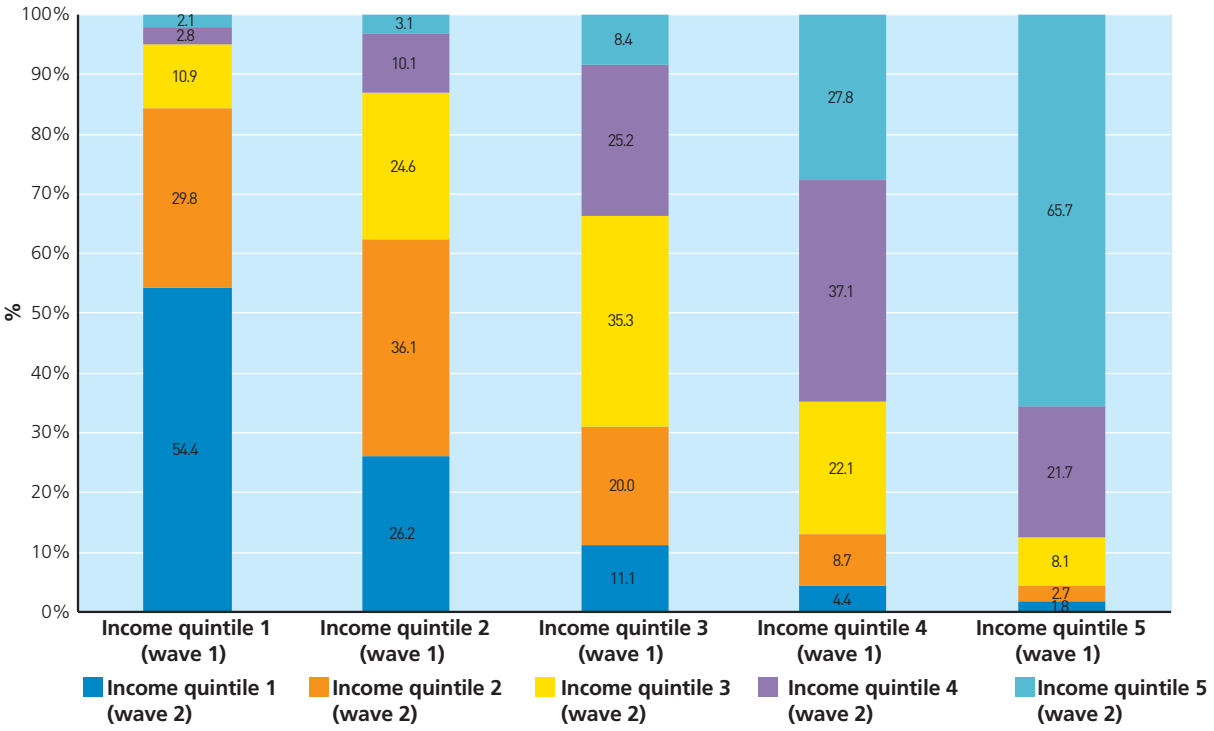


Note: The data are interpreted as follows: 85.6 per cent of those with a full medical card in Wave 1 had a full medical card in Wave 2; 5.6 per cent moved to a GP visit card; 1.8 per cent moved to PHI with GP cover; 1.5 per cent moved to PHI with no GP cover, and 5.5 per cent moved to 'no cover'. Totals add to 100.

See Table A4.1 in the Appendix to this chapter for the exact number of children accounted for by each transition.

In terms of household equivalised income, the data in Figure 4.2 indicate that there was considerable stability in relative household income position for those at the very top and the very bottom of the income distribution. For example, over 50 per cent of those in the lowest income quintile in Wave 1 remained in the lowest income quintile in Wave 2, and over 65 per cent of those in the highest income quintile in Wave 1 remained in the highest income quintile in Wave 2. Among the middle-income quintiles, there is more volatility (as expected, since observations can move up or down the distribution), although the majority of observations remain in the same income quintile between waves (approximately one-third remain in the same income quintile in Wave 2).

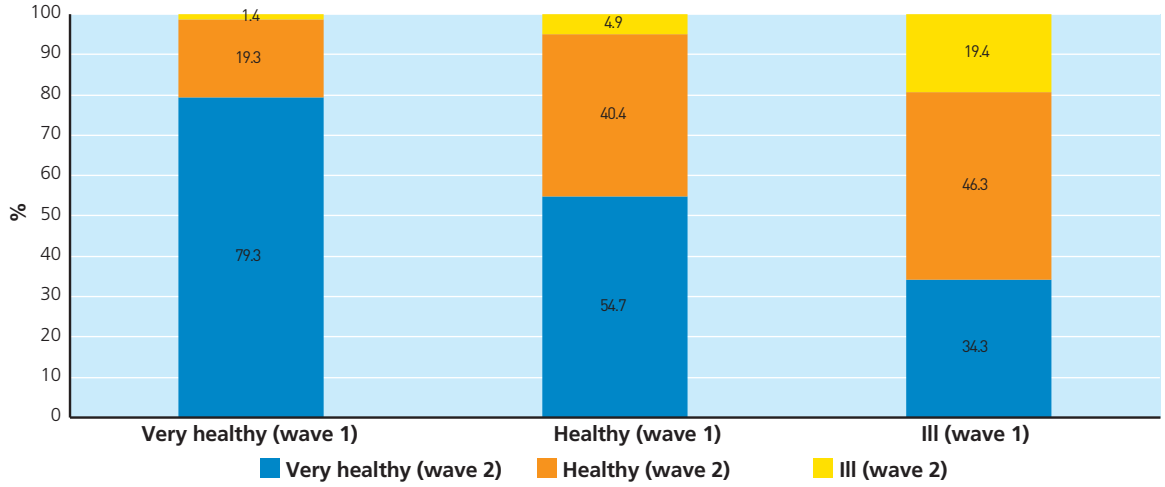
Figure 4.2: Changes in household equivalised income quintile, Wave 1 to Wave 2



Note: The data are interpreted as follows: 54.4 per cent of those in income quintile 1 (the lowest income quintile) in Wave 1 remained in the lowest income quintile in Wave 2; 29.8 per cent moved to the second income quintile; 10.9 per cent moved to the third income quintile; 2.8 per cent moved to the fourth income quintile, and 2.1 per cent moved to income quintile 5 (the highest income quintile). Totals add to 100.

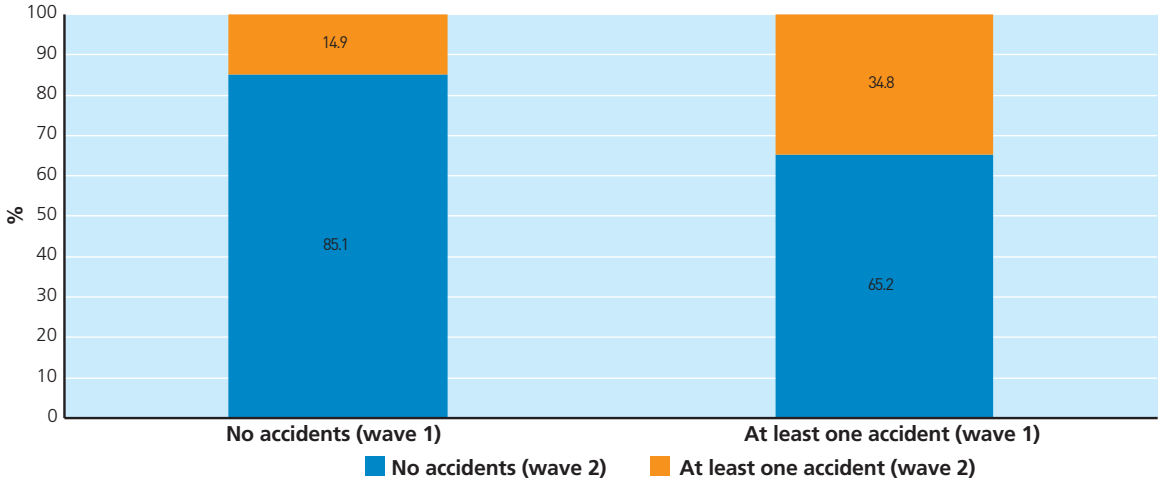
Figure 4.3 shows that only 20 per cent of children reported to be 'ill' in Wave 1 were still in that category in Wave 2, and over a third had transitioned to a state of being 'very healthy'. A similar positive trend is evident for exposure to accidents; the majority of children who had experienced an accident in Wave 1 reported no accident at Wave 2 (see Figure 4.4).

Figure 4.3: Changes in parental-assessed child health status, Wave 1 to Wave 2



Note: The data are interpreted as follows: 79.3 per cent of children who were classified as 'very healthy' at Wave 1 were also classified as 'very healthy' at Wave 2, 19.3 per cent moved to the 'healthy' category, and just 1.4 transitioned to the 'ill' category at Wave 2.

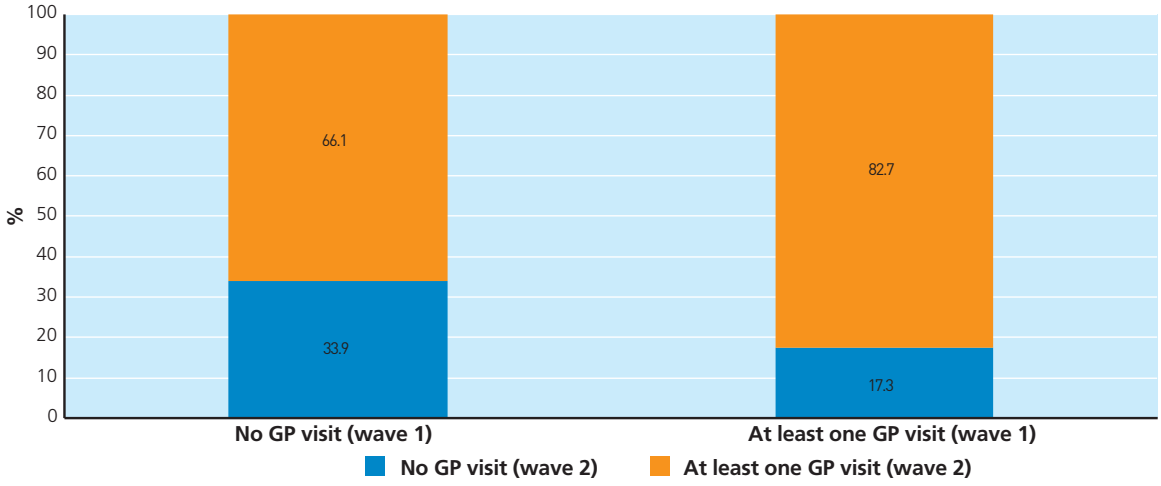
Figure 4.4: Changes in accidents, Wave 1 to Wave 2



Note: The data are interpreted as follows: 85.1 per cent of children who had no accidents at Wave 1 also had no accidents at Wave 2, while 14.9 per cent reported at least one accident in Wave 2.

In terms of GP visits, it is difficult to make accurate comparisons of changes as the recall period is different for the two waves. However, the data indicate that there was considerable mobility in GP visiting, with over two-thirds of those with no GP visit in Wave 1 having at least one GP visit in Wave 2, and 17.3 per cent of those with at least one GP visit in Wave 1 having no GP visits in Wave 2.

Figure 4.5: Change in GP visits (proportion with at least one GP visit), Wave 1 to Wave 2



Note: The data are interpreted as follows: 33.9 per cent of children who had no GP visit at Wave 1 also had no GP visit at Wave 2, while 66.1 per cent reported at least one GP visit in Wave 2.

Section 4.3 uses techniques from the treatment effects literature to evaluate the extent to which the changes in public healthcare eligibility observed in Figure 4.1 led to significant changes in GP visiting between waves.

4.3 MULTIVARIATE LONGITUDINAL ANALYSIS

As noted, longitudinal data analysis offers a number of advantages over cross-sectional analysis. In particular, the availability of repeated measures on the same individual allows us to adjust the standard errors for clustering at the individual level, and to control for unobserved individual heterogeneity (i.e. characteristics of the individual that are time-invariant). Given the reduced time span of the panel, in this case just two waves, the two waves of data are pooled (an approach also used by Jiménez-Martín et al. (2002) and Jiménez-Martín et al. (2004), and adjustment is made to the standard errors to account for the availability of up to two observations per child. Examining the results from the one-step negative binomial model in column (1) of Table 4.1, the results indicate that public healthcare eligibility remains a significant determinant of GP visiting, with the results in the directions expected. For example, in comparison with those with 'no cover', those with a full medical card have almost 0.9 extra GP visits, while those with PHI but with no GP cover have 0.3 extra GP visits. Consistent with the data presented in Table 2.1, the average number of GP visits falls as the children age. All other variables have effects that are consistent with the cross-sectional results, with child health remaining an important determinant of GP visiting even after adjusting for differences between the children for which there is no observable variable (using child-specific intercepts or random effects). The two-step results in columns (2) and (3) confirm that controlling for unobserved heterogeneity does not change the main conclusions from the cross-sectional results in Chapter 2; i.e. that public healthcare eligibility, child health and mother's health are large and significant determinants of GP visiting in Ireland.

Table 4.1: Regression results (full sample, pooled estimates)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e., contact decision	Truncated Negative Binomial, i.e. frequency decision
Wave 2	-0.486	-0.020	-0.604
	(0.037)***	(0.006)***	(0.046)***
Public Healthcare Eligibility			
Full medical card	0.949	0.102	0.855
	(0.067)***	(0.009)***	(0.082)***
GP visit card	0.693	0.069	0.646
	(0.122)***	(0.017)***	(0.150)***
PHI with GP cover	0.473	0.066	0.353
	(0.067)***	(0.009)***	(0.084)***
PHI without GP cover	0.284	0.041	0.191
	(0.068)***	(0.010)***	(0.085)**
No cover	ref	ref	ref
Child Sex			
Female	-0.214	-0.018	-0.221
	(0.041)***	(0.006)***	(0.049)***
Male	ref	ref	ref
Child Health			
Very healthy	ref	ref	ref
Healthy	1.851	0.183	1.872
	(0.048)***	(0.009)***	(0.056)***
Ill	3.727	0.259	3.848
	(0.114)***	(0.036)***	(0.119)***

	One-step model	Two-step models	
	Negative Binomial	Probit i.e., contact decision	Truncated Negative Binomial, i.e. frequency decision
Child Had Accident Requiring Medical Attention?			
No accidents	ref	ref	ref
Accidents	0.283	0.017	0.326
	(0.062)***	(0.010)*	(0.075)***
Birth-weight	0.045	0.009	0.017
	(0.045)	(0.007)	(0.054)
Gestation			
Less than 37 weeks	0.348	0.021	0.392
	(0.101)***	(0.015)	(0.117)***
38-41 weeks	ref	ref	ref
42+ weeks	-0.052	-0.003	-0.058
	(0.064)	(0.009)	(0.079)
Maternal Smoking			
No smoking	ref	ref	ref
Smoking	-0.031	-0.011	0.001
	(0.048)	(0.007)	(0.057)
Was Child Breastfed?			
Breastfeeding	0.154	0.020	0.128
	(0.045)***	(0.007)***	(0.054)**
No breastfeeding	ref	ref	ref
Maternal Self-Assessed Health			
Excellent	ref	ref	ref
Very good	0.161	0.027	0.106
	(0.047)***	(0.007)***	(0.058)*
Good	0.257	0.031	0.221
	(0.054)***	(0.008)***	(0.066)***
Fair/poor	0.308	0.038	0.256
	(0.089)***	(0.015)***	(0.106)**
Maternal Chronic Illness			
No chronic	ref	ref	ref
Chronic	0.177	0.023	0.157
	(0.059)***	(0.010)**	(0.070)**
Maternal Education			
Primary	0.184	0.050	0.046
	(0.175)	(0.025)**	(0.211)
Lower secondary	0.134	0.016	0.111
	(0.097)	(0.015)	(0.116)
Upper secondary	0.001	0.003	-0.012
	(0.068)	(0.010)	(0.082)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e., contact decision	Truncated Negative Binomial, i.e. frequency decision
Non-degree	-0.004	0.016	-0.078
	(0.067)	(0.010)	(0.081)
Degree	-0.023	-0.002	-0.029
	(0.063)	(0.010)	(0.077)
Postgraduate	ref	ref	ref
Maternal Employment Status			
Employed	ref	ref	ref
Self-employed	-0.170	-0.017	-0.182
	(0.091)*	(0.014)	(0.113)
Student	0.189	0.021	0.193
	(0.124)	(0.022)	(0.143)
Unemployed	0.097	0.023	0.053
	(0.086)	(0.015)	(0.105)
Home duties	0.021	-0.003	0.045
	(0.050)	(0.007)	(0.061)
Marital Status			
Single	-0.080	-0.008	-0.080
	(0.055)	(0.008)	(0.066)
Married	ref	ref	ref
Separated/divorced	-0.029	-0.000	-0.040
	(0.111)	(0.016)	(0.132)
Ethnic Group			
White	ref	ref	ref
Non-white	0.455	0.057	0.350
	(0.103)***	(0.013)***	(0.124)***
Childcare			
Care outside home	-0.143	-0.022	-0.102
	(0.046)***	(0.007)***	(0.056)*
Care at home	ref	ref	ref
Has Child Siblings?			
Siblings	0.329	0.049	0.257
	(0.045)***	(0.007)***	(0.055)***
No siblings	ref	ref	ref
Household Income Quintile			
Lowest Income Quintile	-0.051	-0.038	0.088
	(0.081)	(0.012)***	(0.099)
2nd Income Quintile	-0.150	-0.030	-0.072
	(0.075)**	(0.011)***	(0.093)
3rd Income Quintile	-0.136	-0.026	-0.073
	(0.066)**	(0.010)**	(0.082)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e., contact decision	Truncated Negative Binomial, i.e. frequency decision
4th Income Quintile	-0.141	-0.011	-0.152
	(0.059)**	(0.009)	(0.074)**
Highest Income Quintile	ref	ref	ref
Missing Income Group	-0.277	-0.050	-0.161
	(0.093)***	(0.014)***	(0.113)
Household Location			
Urban	ref	ref	ref
Rural	-0.024	0.004	-0.058
	(0.041)	(0.006)	(0.050)
N	18,990	18,990	15,201

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Robust standard errors are presented in parentheses.

Chapter 3 focused on the sub-sample of children who were private patients, i.e. without a full medical or GP visit card. The results indicated that private patients with lower incomes had a significantly lower number of GP visits (with the effects larger and more significant in Wave 1, and driven mainly by the reduced probability of having at least one GP visit among those with lower incomes, rather than a lower frequency of GP visiting). Table 4.2 replicates this analysis using the pooled data from Waves 1 and 2, and adjusts the standard errors of the estimates for the availability of up to two observations per child. Results from the one-step negative binomial model are presented in column (1), while results from the two-step probit and truncated negative binomial model are presented in columns (2) and (3). The results in column (1) indicate that PHI cover remains a significant determinant of GP visiting among private patients; for example, those with PHI with some cover for GP expenses have 0.4 extra GP visits compared to those with 'no cover'. Household income remains a significant determinant of GP visiting among children without a full medical or GP visit card, with those on lower incomes having significantly fewer GP visits than those on higher incomes. Consistent with the data presented in Table 3.1, the average number of GP visits falls as the children age. All other variables have effects that are consistent with the cross-sectional results; child health remains an important determinant of GP visiting even after adjusting for unobserved heterogeneity among the children. The results from the two-step model in columns (2) and (3) are again consistent with those from the cross-sectional model in Chapter 3.

Table 4.2: Regression results (private sample, pooled estimates)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e. contact decision	Truncated Negative Binomial, i.e. frequency decision
Wave 2	-0.464 (0.041)***	-0.028 (0.007)***	-0.563 (0.052)***
Public Healthcare Eligibility			
PHI with GP cover	0.376 (0.062)***	0.064 (0.010)***	0.267 (0.077)***
PHI without GP cover	0.203 (0.063)***	0.037 (0.010)***	0.119 (0.078)***
No cover	ref	ref	ref
Household Income Quintile			
Lowest Income Quintile	-0.153 (0.080)*	-0.041 (0.014)***	-0.059 (0.099)
2nd Income Quintile	-0.152 (0.071)**	-0.032 (0.013)**	-0.097 (0.088)
3rd Income Quintile	-0.181 (0.068)***	-0.035 (0.012)***	-0.125 (0.085)
4th Income Quintile	-0.119 (0.064)*	-0.009 (0.012)	-0.143 (0.079)*
Highest Income Quintile	ref	ref	ref
Missing Income Group	-0.336 (0.098)***	-0.056 (0.017)***	-0.259 (0.120)**
Child Sex			
Female	-0.150 (0.044)***	-0.017 (0.007)**	-0.148 (0.054)***
Male	ref	ref	ref
Child Health			
Very healthy	ref	ref	ref
Healthy	1.697 (0.053)***	0.188 (0.011)***	1.724 (0.062)***
Ill	3.463 (0.162)***	0.249 (0.048)***	3.599 (0.165)***
Child Had Accident Requiring Medical Attention?			
No accidents	ref	ref	ref
Accidents	0.237 (0.072)***	0.012 (0.013)	0.294 (0.087)***
Birth-weight	0.015 (0.049)	0.004 (0.008)	-0.001 (0.060)
Gestation			
Less than 37 weeks	0.401 (0.116)***	0.006 (0.020)	0.527 (0.133)***
	ref	ref	ref
38-41 weeks	-0.062 (0.072)	0.009 (0.012)	-0.125 (0.092)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e. contact decision	Truncated Negative Binomial, i.e. frequency decision
Maternal Smoking			
No smoking	ref	ref	ref
Smoking	0.026 (0.054)	-0.014 (0.009)	0.094 (0.066)
Was Child Breastfed?			
Breastfeeding	0.119 (0.049)**	0.021 (0.008)***	0.082 (0.060)
No breastfeeding	ref	ref	ref
Maternal Self-Assessed Health			
Excellent	ref	ref	ref
Very good	0.134 (0.048)***	0.030 (0.008)***	0.073 (0.061)
Good	0.210 (0.059)***	0.027 (0.010)***	0.184 (0.073)**
Fair/poor	0.293 (0.110)***	0.038 (0.020)*	0.260 (0.133)*
Maternal chronic Illness			
No chronic	ref	ref	ref
Chronic	0.133 (0.067)***	0.035 (0.013)	0.062 (0.081)
Maternal Education			
Primary	-0.069 (0.343)	0.072 (0.069)*	-0.394 (0.445)
Lower secondary	0.086 (0.137)	0.044 (0.023)	-0.064 (0.178)
Upper secondary	-0.046 (0.072)	-0.011 (0.012)	-0.019 (0.087)
Non-degree	-0.033 (0.066)	0.008 (0.012)	-0.081 (0.081)
Degree	-0.033 (0.061)	-0.008 (0.011)	-0.025 (0.074)
Postgraduate	ref	ref	ref
Maternal Employment Status			
Employed	ref	ref	ref
Self-employed	-0.170 (0.089)*	-0.019 (0.016)	-0.181 (0.110)*
Student	0.155 (0.241)	0.050 (0.044)	0.016 (0.291)
Unemployed	0.293 (0.114)**	0.026 (0.021)	0.309 (0.135)**
Home duties	0.021 (0.054)	0.007 (0.009)	0.008 (0.067)
Marital Status			
Single	-0.110 (0.065)*	-0.019 (0.011)*	-0.083 (0.080)
Married	ref	ref	ref
Separated/Divorced	-0.202 (0.160)	-0.022 (0.025)	-0.183 (0.196)

	One-step model	Two-step models	
	Negative Binomial	Probit i.e. contact decision	Truncated Negative Binomial, i.e. frequency decision
Ethnic Group			
White	ref	ref	ref
Non-white	0.935 (0.135)***	0.078 (0.019)***	1.016 (0.173)***
Childcare			
Care outside home	-0.143 (0.480)***	-0.026 (0.008)***	-0.094 (0.059)
Care at home	ref	ref	ref
Has Child Siblings?			
Siblings	0.239 (0.049)***	0.047 (0.009)***	0.157 (0.060)***
No siblings	ref	ref	ref
Household Location			
Urban	ref	ref	ref
Rural	0.048 (0.045)	0.010 (0.008)	0.020 (0.055)
N	12,870	12,870	10,114

Notes: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Robust standard errors are presented in parentheses.

4.4 IMPACT OF CHANGES IN PUBLIC HEALTHCARE ENTITLEMENTS ON GP VISITING

In this section we use the availability of longitudinal data on the child's pattern of GP visiting alongside information on their eligibility for free GP services at the point of delivery to get a more causal understanding of the relationship between these variables.

4.4.1 PROPENSITY SCORE MATCHING

Ideally, a randomised control experiment would be used to estimate the causal effect of eligibility for a medical card on use of GP care. Here, children would be randomly allocated to an intervention group (free care) or a control group (no free care). The random allocation would make sure that the two groups did not vary along any dimension other than the availability of free care. The experimenter would wait for a period and then compare GP use between the groups. However, the costs and ethical considerations surrounding experimental studies mean that they are rarely employed in health economics (an exception was the RAND Health Insurance Experiment in the USA in the 1970s where individuals were randomly assigned to a number of different health insurance plans, which differed in the degree of cost-sharing) (Manning et al., 1987; Keeler, 1992; Newhouse and Insurance Experiment Group, 1993).

Propensity score matching simulates the experimental conditions outlined above by matching treatment and control observations that are similar in terms of their observed characteristics. The method produces unbiased estimates of the effect of the treatment (in this application, public healthcare eligibility) on the outcome of interest (the number of GP visits). However, standard propensity score approaches cannot deal with the possibility that there may also be certain unobserved differences in characteristics between treatment and control observations (e.g. time preference rates, attitudes towards medical care, etc). The standard propensity score approach is extended to consider a difference-in-difference propensity score

estimator, which calculates the difference in the outcomes for the treated and control observations and thereby removes any variation in time-invariant unobserved characteristics between treatment and control observations. This assumes that treatment and control groups are affected in the same way by the same macro shocks between control and treatment periods, and that any unobserved differences in characteristics between treatment and control groups are constant over time and thus eliminated in the analysis. This approach was first developed by Heckman et al. (1997) in an application analysing the labour-market outcomes of participants in a training programme for disadvantaged workers, and subsequently applied in a number of different contexts (Blundell and Costa Dias, 2000; Aassve et al., 2007; Lechner and Vazquez-Alvarez, 2003; García Gómez and López Nicolás, 2006; Trujillo et al., 2005; Gorg and Strobl, 2006).

Essentially, applying this approach here compares the outcomes of children who are similar pre-treatment and who differ only in their exposure to the treatment (i.e. change in medical-card status). By calculating the difference in the outcome measure (GP visits), we control for time-invariant unobserved differences between treatment and control observations. This chapter estimates the treatment effect for two transitions:

- gaining a full medical or GP visit card (i.e. removing GP user fees), and
- losing a full medical or GP visit card (i.e. introducing GP user fees).[39]

The propensity score matching method involves two steps: first, the probability of treatment is estimated using a probit model to generate a 'propensity score' (i.e. the individual's predicted probability of treatment). Second, the number of GP visits of treated and control observations is compared, but only against those in the other group with a similar propensity score so as to obtain an estimate of the treatment effect. As the probability of two observations having exactly the same propensity score is zero (as the propensity score variable is continuous), the comparison observation or group of observations for each treated observation is chosen according to various alternative measures of proximity (e.g. nearest neighbour, radius, kernel weights etc). The essential difference between the various methods is the weight given to each control observation. The Appendix to this chapter contains further details on the propensity score matching method.

4.4.2 EMPIRICAL RESULTS

Before discussing estimation results, Table 4.3 presents the change in number of GP visits between Wave 1 and Wave 2 (the outcome measure) for both transitions that are considered (i.e. gaining or losing a full medical or GP visit card). Using the pooled data, the statistics indicate that, on average, the change in GP visiting is greater for treatment observations with little change in GP visiting patterns among control observations. In addition, the changes in GP visiting rates among treatment groups are in the direction expected. The propensity score method refines this comparison by only comparing outcomes for treatment and control observations that have similar propensity scores, using various proximity criteria (nearest neighbour, radius etc). This ensures that observations are compared that are similar in every observable respect except their exposure to the treatment.

Table 4.3: Number of GP visits, control and treatment groups (Wave 1, Wave 2 and difference between Wave 1 and Wave 2)

	Control Group			Treatment Group		
	w=1	w=2	Outcome (w=2) – (w=1)	w=1	w=2	Outcome (w=2) – (w=1)
Gaining a medical card	2.445	2.151	-0.289	2.396	2.767	0.372
Losing a medical card	3.241	3.154	-0.054	2.902	2.673	-0.232

Note: The outcome measure refers to the difference in the number of GP visits between Wave 1 (w=1) and Wave 2 (w=2).

[39] Unfortunately, the number of observations involved in other transitions is too small to generate meaningful results (e.g. there are only 53 children who transitioned from no cover in Wave 1 to PHI with some cover for GP expenses in Wave 2). Table A4.1 in the Appendix to this chapter provides data on the number of children transitioning between different eligibility categories in the period between Wave 1 and Wave 2. Further waves of the data are necessary in order to broaden the analysis to consider these and other transitions in public healthcare eligibility.

The estimates from the probit model (not shown), which are used to calculate the propensity score, suggest that participation in the treatment (i.e. gaining a medical card) is significantly associated with a variety of pre-treatment characteristics, including lower household income and lower levels of mother's education. Table 4.4 shows that the estimates suggest that the effect of gaining a full medical or GP visit card is to increase the average number of GP visits by 0.6, and all estimates are significant (see column 1 of Table 4.4). The pre-treatment average number of GP visits for treated observations was approximately 2.4 GP visits; this means that the effect of gaining a full medical or GP visit card is to increase the number of GP visits by approximately 25 per cent.

Table 4.4: Propensity score matching estimates, effect on number of GP visits

	(1) Gaining a medical card	(2) Losing a medical card
Nearest neighbour (k=1)	0.550	0.145
	(0.129)***	(0.476)
Nearest neighbour (k=5)	0.577	-0.106
	(0.144)***	(0.387)
Nearest neighbour (k=10)	0.540	-0.199
	(0.137)***	(0.365)
Nearest neighbour (k=20)	0.583	-0.222
	(0.133)***	(0.318)
Nearest neighbour (k=1, δ=0.001)	0.566	0.113
	(0.166)***	(0.563)
Nearest neighbour (k=5, δ=0.001)	0.592	-0.249
	(0.141)***	(0.445)
Nearest neighbour (k=10, δ=0.001)	0.560	-0.229
	(0.146)***	(0.445)
Nearest neighbour (k=20, δ=0.001)	0.572	-0.288
	(0.143)***	(0.392)
Radius	0.636	-0.206
	(0.115)***	(0.274)
Kernel	0.550	0.145
	(0.129)***	(0.476)
N	6,443	2,443
N Control	5,429	2,183
N Treatment	1,014	260

Notes:
*** significant at 1 per cent level; ** significant at 5 per cent level; * significant at 10 per cent level.
k refers to the number of nearest neighbour matches involved.
δ refers to the size of the calliper (the default is no restriction).
All matching is with replacement and on the common support.

For those losing a full medical or GP visit card, the same procedure is followed in estimating the treatment effect. The binary probit model of losing a full medical or GP visit card shows that this is associated with higher household income and maternal education. Table 4.4 (column 2) shows that all the estimates of the effect of losing a full medical or GP visit card are statistically insignificant. At face value this would suggest that losing a card does not decrease the child's use of GP services, but caution should be exercised as the number of treated observations used in this analysis was small (260 cases).

The estimated effects of gaining a full medical or GP visit card are somewhat smaller than the effects found when using the pooled cross-sectional data reported in Table 4.1. However, the sample used to estimate the propensity score matching results is confined to those who were private patients in Wave 1, and either remained as private patients in Wave 2 (control group), or became eligible for a full medical GP visit card in Wave 2 (treatment group). The marginal effects for full medical- and GP visit-card eligibility in Table 4.1 are based on a comparison with those with 'no cover' as the reference group.

A number of additional analyses are carried out to check the robustness of the results. First, the effect of gaining or losing a full medical or GP visit card, for the sample of children who did not change their health status, was also investigated. Unfortunately, for those losing a full medical or GP visit card, the number of treatment observations is small, meaning that the results are not well defined. For those gaining a full medical or GP visit card, the estimated treatment effects are slightly smaller (average 0.5 extra GP visits), but remain statistically significant. Second, the analysis in Table 4.4 is repeated but those who gained/lost a full medical card are distinguished from those who gained/lost a GP visit card. As expected, the numbers gaining/losing a GP visit card were too small to generate significant effects, but the results for gaining/losing a full medical card are consistent with the aggregated effects (0.8 and -0.4 respectively, although the effect of losing a full medical card was again insignificant). Finally, examination was made of the effect of gaining/losing PHI with cover for GP expenses, but the number of treatment observations was too small to undertake a meaningful analysis.

The added value of the analyses based on propensity score matching methods is that it is possible to distinguish between those gaining and losing a full medical or GP visit card, and more accurately follow the same individuals through time. Based on the data available, the results indicate that the change in GP visiting behaviour is larger and more significant for those gaining a full medical or GP visit card than for those losing a full medical or GP visit card, in direct contrast to the results for the adult population found by Nolan (2008a). The results for children also suggest an asymmetry in the effects: the deterrent effect of charging for GP visits (which faces those who lose a full medical or GP visit card) is less than the incentive effect of free GP visits (which faces those who gain a full medical or GP visit card). However, it must be remembered that the numbers losing a card between Waves 1 and 2 were small and the estimated effects were statistically insignificant. Further waves of the data are necessary to confirm these initial findings.

4.5 DISCUSSION

This chapter has built on the preceding three by using the longitudinal nature of ***Growing Up in Ireland*** to examine use of GP services. Longitudinal data and analyses provide two main advantages over cross-sectional approaches: first, having repeated measures of healthcare use for the same individuals allows us to adjust for characteristics that do not change for each individual over time but may influence differences in use of GP services between individuals (so-called time-invariant characteristics, which are often unobserved). Second, it is possible to examine the causal impact of public healthcare eligibility by leveraging change in eligibility over time whilst adjusting for all other characteristics.

The results from this chapter confirm the findings from Chapter 2 that use of GP services falls as children age, and that child health, mother's health and eligibility for free or subsidised care are important determinants. Comparison with the results from the models in Chapter 2 also suggests that the longitudinal estimates of mean frequency of GP use are very similar to those estimated using the cross-sectional approach.

The use of the propensity score matching approach in this chapter for the causal analysis of changes in eligibility for free or subsidised care is important, particularly in the context of recent policy changes in relation to free GP care for children. The propensity score matching analyses here suggest that children

whose families gain access to a full medical or GP visit card increase their use by approximately 0.6 of a GP visit more per year on average. This represents a 25% increase on the 2.4 average for non-card holders. This result, coupled with the fact that GP visit-card holders visit less frequently due to the absence of prescription medicine cover, suggests that the overall increase in use after the establishment of a scheme giving free care to the under-sixes would be moderate. In addition, this analysis would suggest that children receiving a GP visit card would still attend less frequently than children currently in receipt of a full medical card, largely because of differences in underlying health status and other characteristics that influence attendance.

4.6 APPENDIX

4.6.1 TRANSITIONS IN ELIGIBILITY GROUPS

Table A4.1: Transitions in eligibility groups, Wave 1 – Wave 2

		Wave 2				
		Full medical card	GP visit card	PHI with GP cover	PHI without GP cover	No cover
Wave 1	Full medical card	2,037	134	42	36	130
	GP visit card	132	67	15	17	39
	PHI with GP cover	181	47	1,752	696	190
	PHI without GP cover	196	54	637	1,135	179
	No cover	507	94	53	62	939

Note: The data are interpreted as follows: for those with a full medical card in Wave 1, 2,037 remained with a full medical card in Wave 2, while 134 had a GP visit card, 42 had PHI with GP cover, 36 had PHI with no GP cover and 130 had 'no cover' by Wave 2.

4.6.2 PROPENSITY SCORE MATCHING

In Chapter 4, propensity score matching techniques are used to evaluate the impact of a change in public healthcare eligibility status on GP visiting rates. As noted, two transitions are considered in this report:

- gaining a full medical or GP visit card (i.e. removing GP user fees), and
- losing a full medical or GP visit card (i.e. introducing GP user fees).

In carrying out analyses such as these, the problem is essentially one of missing data; individuals are in either the treatment group or the control group, but never both. Constructing the counterfactual is thus the central problem facing those involved in the evaluation of a particular treatment; i.e. how would an individual behave if they had not received the treatment? Ideally, experimental data would be available whereby individuals are randomly assigned to the treatment and control groups. Then averaging over the full sample would give an unbiased estimate of the effect of the treatment. However, the costs and ethical considerations surrounding experimental studies mean that they are rarely employed.[40]

The standard means of isolating the independent effect of treatment is to control for observable differences between treated and control observations using regression methods. However, the imposition of functional form assumptions, as well as the possibility of insufficient common support (i.e. for any set of values of the independent variables, there may be insufficient numbers of both treated and control observations) means that such methods are not without problems (LaLonde, 1986). Alternative solutions to

[40] An exception was the RAND Health Insurance Experiment in the USA in the 1970s where individuals were randomly assigned to a number of different health insurance plans, which differed in the degree to which copayments were levied on the use of various health services; see Manning et al. (1987), Newhouse and Insurance Experiment Group (1993) and Keeler (1992).

the sample selection problem, such as the Heckman sample selection estimator or the use of instrumental variables estimation, rely heavily on the identification of suitable instruments; i.e. variables that affect the probability of receiving the treatment, but not the subsequent outcome of interest. In the application, it is difficult to identify a factor that would be correlated with public healthcare eligibility, but unrelated to the use of GP services.[41] For this reason, this report concentrated on the application of matching methods to the evaluation of the effect of public healthcare eligibility status on GP visiting patterns.

Matching methods match treatment and control observations on the basis of observable characteristics only; i.e. it is assumed that there are no unobservable differences in characteristics between treatment and control observations. This report exploits the fact that there are two observations per child by combining matching methods with a difference-in-difference estimator (Heckman et al., 1997; Aassve et al., 2007; Gorg and Strobl, 2006). Such an approach controls for unobserved time-invariant differences in characteristics between treatment and control observations, and thus provides a more reliable estimate of the effect of the treatment on the outcome of interest. This approach compares the outcomes of individuals who are similar pre-treatment and differ only in their exposure to the treatment. By first computing the difference in the value between periods to create a new outcome measure, control is made for time-invariant unobservable differences between treatment and control observations.

Assume that each individual i has two potential outcomes, Y_{i1} (treatment, e.g. medical or GP visit card) and Y_{i0} (control, e.g. no medical or GP visit card). The average effect of the treatment is given by $E(Y_{i1} - Y_{i0})$. However, since it is not possible to observe the same person in both states (Y_{i0} and Y_{i1}), the average treatment effect on the 'treated' population alone is used (ATET):

$$E(Y_{i1} \mid D_i = 1) - E(Y_{i0} \mid D_i = 1) \tag{1}$$

where D_i is the dichotomous indicator of treatment, with 1 indicating that individual i receives the treatment, and 0 otherwise. Of course, identification of the second part of expression is necessary (1). Assuming conditional independence between treatment and outcomes – i.e. given a set of observable characteristics x_i, the outcomes of the non-treated group are what the treated outcomes would have been had they not been treated (selection occurs only on observable characteristics) – the following also holds:

$$E(Y_{i0} \mid X_i, D_i = 1) - E(Y_{i0} \mid X_i, D_i = 0) = 0 \tag{2}$$

and an unbiased estimate of the ATET can be obtained from:

$$E(Y_{i1} \mid X_i, D_i = 1) - E(Y_{i0} \mid X_i, D_i = 0) \tag{3}$$

Due to the practical difficulties involved in matching observations when there are a large number of covariates, Rosenbaum and Rubin (1983) showed that summarising the observed characteristics of each observation into a single index (the propensity score, i.e. the predicted probability of participation in the treatment) makes matching feasible (Becker and Ichino, 2002). The probability of receiving the treatment is estimated, conditional on a vector of pre-treatment characteristics x:

$$P(D_i = 1) = F(X) \tag{4}$$

where $F(.)$ is usually the cumulative standard normal distribution function (i.e. a probit model). Propensity score matching entails modelling the probability of participation, calculating the predicted probability of participation for each individual (the propensity score) and matching individuals with similar propensity scores.

[41] A number of papers from the US have used differences in the rate of expansion of Medicaid across states and time as an instrument for public health insurance in analyses on the impact of insurance on the use of health services by US children (Currie and Gruber, 1996; Currie et al., 2008). See also Chapter 1.

Since the probability of two observations having exactly the same propensity score is zero (as the propensity score variable is continuous), the comparison observation or group of observations for each treated observation is chosen according to various alternative measures of proximity (e.g. nearest neighbour, radius, kernel weights, etc). The essential difference between the various methods is the weight given to each control observation. Nearest-neighbour matching entails finding a control observation with the closest propensity score for each treated observation. Once each treated observation is matched with a control observation, the difference in outcomes between the treated and control observations is computed, and averaged over all observations to gain an estimate of the average treatment effect. However, a disadvantage of the nearest neighbour method is that while some matches may be poor (i.e. dissimilar propensity scores), they still contribute to the calculation of the average treatment effect. A variant of nearest-neighbour matching is calliper matching, whereby a control observation with a propensity score falling within a specified range of the propensity score of a treated observation is considered a match. Hence, in moving from the nearest-neighbour to the calliper method, the quality of the matches is improved, but at a cost of fewer observations (Bryson et al., 2002). Nearest-neighbour and calliper matching can be extended to allow for multiple matches for each treated observation, thus considering matches of a slightly poorer quality. Radius matching extends the calliper matching technique to consider all possible matches (i.e. not just nearest-neighbour matches) within the specified range of the propensity score. The smaller the dimension of the radius, the stronger the possibility that some treated observations will not be treated, but the better is the quality of the matches. With kernel matching, treated observations are matched with a weighted average of all controls, with weights that are inversely proportional to the distance between propensity scores of treated and controls. This means that exact matches get a large weight and poorer matches a smaller weight (Becker and Ichino, 2002).

While there are no clear criteria for choosing one method of propensity score matching over another (see also Bryson et al., 2002), it is clear that the different methods involve trade-offs between the quality and quantity of the matches. For example, when matching within a defined calliper, the estimates from the nearest-neighbour methods become more significant. Even when the number of possible matches is increased (i.e. increase k), the calliper method produces very similar results. The kernel estimate is the same as that for the one-to-one nearest-neighbour estimate within calliper, and this is consistent with the fact that all possible matches are considered but are weighted in accordance with the difference in propensity scores (i.e. exact matches are given a large weight, and poor matches a small weight). In effect, by increasing k and matching within calliper or by using the kernel method, a wider range of possible matches can be considered, yet the quality of those matches can be controlled. For this reason, the estimates of the ATET from the nearest neighbour within calliper and kernel methods are regarded as most accurate.

As there are two observations per child, it is possible to extend the standard analysis of treatment effects (e.g. in the application, the effect of having a full medical or GP visit card on GP visiting rates) by following the same individuals through time and analysing the effect of changing public healthcare eligibility on the change in GP visiting patterns. This report, therefore, estimates the ATET for two transitions: gaining a full medical or GP visit card (i.e. removing GP user fees), and losing a full medical or GP visit card (i.e. introducing GP user fees). To estimate the propensity score, a binary probit model is estimated of the probability of treatment, with various pre-treatment individual and household characteristics as explanatory variables (see Section 4.4). Nearest-neighbour, radius and kernel matching methods are used to estimate the treatment effects for both transitions. For the nearest-neighbour method, one-to-one matching (with and without calliper) is used, and multiple matches are permissible (again, with and without calliper). In all cases, the common support condition is imposed, as this may improve the quality of the matches used to estimate the average treatment effect (Becker and Ichino, 2002), although in practice very few observations do not satisfy this condition. Matching with replacement is used, meaning that a control observation can be a match for more than one treated unit. Standard errors are obtained by bootstrapping, with 50 iterations found to produce stable results. The models are all estimated using the psmatch2 command in Stata Version 9.0.

Chapter 5

SUMMARY AND POLICY IMPLICATIONS

5.1 SUMMARY

The provision of safe and effective healthcare on the basis of individual need rather than ability to pay has been an objective of successive Irish health strategies and continues into the current strategy document for the improvement of population health in Ireland. However, the current system of health financing for primary care in Ireland raises concerns about whether primary care is actually available to all on the basis of need rather than ability to pay. This concern partly motivated political commitments for free GP care at the point of delivery for all in the 2011 Programme for Government (Government of Ireland, 2011). More pertinently, the Irish Government also made a commitment to make GP care for all children aged under six free in Budget 2014. Registration of children under six for free GP care began in 2015. Free GP care for all children from age six to 17 is a commitment under the current Programme for Government (Government of Ireland, 2016). In this context, analyses such as those included in this report provide important evidence on the impact of different healthcare entitlement structures on GP visiting behaviour among children.

The introduction to this report set out four key questions that this study was to address:

- Does eligibility for free GP care affect children's use of GP services?
- Does type of PHI cover affect children's use of GP services?
- Are user fees for GP care a particular burden on children from low-income families without medical cards? Previous research on the adult population (Nolan, 2008b) found that the deterrent effect of user fees was also present for those at the top of the income distribution.
- As children depend on their parents for decision-making in relation to healthcare use, do parental characteristics (e.g. family structure, education, employment status, etc) affect children's use of GP services?

5.2 DOES ELIGIBILITY FOR FREE GP CARE AFFECT CHILDREN'S USE OF GP SERVICES?

The answer to the first question appears to be yes. Using a variety of different approaches and techniques, the analyses contained in this report (in Chapters 2 and 4 in particular) strongly suggest that eligibility for free care via a full medical or GP visit card is associated with a higher propensity to seek care and a higher frequency of attendance even adjusting for a range of other factors such as the child's health status. This raises concerns that some children may not be receiving the health care that they require because of financial constraints for their parents. This issue is particularly marked for children whose developmental trajectory may be altered for the worse, leading to poorer health and wellbeing over the life-course.

While these effects persist even after controlling for a wide variety of child and parental health and socio-economic characteristics, the obvious question to ask is whether the results for eligibility are affected by possible adverse selection into the various eligibility groups. A small proportion of full medical cards and GP visit cards are granted on a discretionary basis (i.e. on the basis of particular health needs, rather than low income), and those with private health insurance with GP cover choose their particular health plan. In this case, it is important to include a comprehensive set of indicators to control for need and other variables that may influence eligibility status (Deb and Trivedi, 1997).

It is also possible that the increased GP visiting among the GP visit-card group is due to 'pent-up' demand/selection effects. If so, this would suggest that the current level of use among those with a GP visit card would decline over time as their reservoir of needs was met. US research on the effects of becoming eligible for Medicare insurance at the age of 65 has demonstrated evidence for pent-up demand (McWilliams et al., 2003), while it is also possible that those with greatest need for GP care are more likely to apply for and take up the GP visit card. Previous analysis of the adult population has found some evidence that there

are pent-up demand/selection effects associated with GP visit-card eligibility in Ireland (Nolan and Smith, 2012).

5.3 DOES TYPE OF PHI COVER AFFECT CHILDREN'S USE OF GP SERVICES?

Once again, the evidence suggests that access to private health insurance (PHI) which has GP cover has a significant impact on the average number of visits that the child will make to the GP, after adjusting for many other factors, including the child's health needs (see Chapters 2 and 4). Interestingly, despite facing the same price for GP care, those with PHI with no GP cover had significantly more GP visits than those with 'no cover'. It is of course possible that the variable for those with PHI with no GP cover may also be a proxy for the higher incomes and other resources of families with PHI, which is not already measured in the income and other socio-economic variables used in our analyses. It is also possible that the purchase of PHI, conditional on income, may be an indirect measure of a greater propensity to consult the GP since it could indicate risk-averse behaviour (i.e. the purchase of insurance).

5.4 ARE USER FEES FOR GP CARE A PARTICULAR BURDEN ON CHILDREN FROM LOW-INCOME FAMILIES WITHOUT MEDICAL CARDS?

A GP visit for patients without a medical card costs €50 on average, before any associated prescription medicine costs. This clearly gives rise to concerns that paying for medical care may be a burden on families, with consequences for their propensity to use medical care. Chapter 3 examined this question by looking at whether poorer families without a full medical or GP visit card were less likely to visit their GP than more affluent families without a full medical or GP visit card. Using the first and second waves of the Infant Cohort of ***Growing Up in Ireland***, results showed that children from higher-income families without a full medical or GP visit card did have a significantly higher number of GP visits than those from lower-income families without a full medical or GP visit card, but that this only appeared to be so in the first wave of the study. As explained in Chapter 3, this pattern may reflect the timing of the data collection in that some of the poorer members of the cohort would have received full medical or GP visit cards by the time the Wave 2 fieldwork was carried out.

5.5 HOW DO PARENTAL CHARACTERISTICS INFLUENCE THE USE OF GP SERVICES AMONG CHILDREN?

GP visiting behaviour among children is different to that of adults in that the primary decision-maker is generally the mother (Case and Paxson, 2001) rather than the child, and this clearly had an influence on the results. Adjusting for other characteristics, it was found that mother's health status is a significant determinant of her child's use of GP services, with other characteristics of the mother (e.g. employment status, marital status) largely insignificant (Chapters 2 and 4). In addition, in contrast to the descriptive statistics and findings from the international literature, it was also clear that mother's education had very limited effects.

5.6 POLICY IMPLICATIONS

This report has provided evidence of the complex relationship between the characteristics of the child and family, and the child's use of GP care. The primary determinant of the number of GP visits is the child's level of health need, and other research has shown that this is strongly influenced by the characteristics of the household. It was clear that the health of both the mother and child was strongly related to the income

of the family. Family income therefore has an indirect impact on GP use through the child's health status. However, this report also provides evidence that the income of the family has a further indirect effect on GP use through the eligibility of the family for free GP care. For families without free GP care, there was also some evidence that children from lower-income backgrounds faced barriers to accessing GP care (primarily at Wave 1). Whilst the report did not have the evidence available to assess whether lack of care had a detrimental effect on the child's health and wellbeing, evidence was presented from other countries that such a relationship can and often does exist.

These findings have important policy implications. Aside from the question of equity involved in the financial rationing of healthcare, it may also be that timely treatment in primary care may be more cost-effective in the long-run if lack of treatment leads to worse health and more expensive (possibly hospital) treatment at a later date. For children, lack of early intervention may also mean a lifetime of subsequent treatment as well as a lower quality of life and other adverse educational and labour-market consequences in later life. While the data do not allow us to assess the extent to which those without a full medical or GP visit card in the Irish context are forgoing 'necessary' care,[42] evidence from other settings suggests that removing financial barriers to access to healthcare among children has significant impacts on child health, and later-life outcomes.

Notwithstanding current policy proposals on universal GP care for the under-18s, this report also showed that income was an important determinant of GP visiting for private patients – i.e. those without a full medical or GP visit card, particularly at age nine months. By age three however, this effect was largely absent, suggesting that wider eligibility for a full medical or GP visit card during the recession protected those who had previously been above the threshold.

Finally, the estimates from the propensity score matching analysis are directly relevant to current policy proposals. These showed that those children who became eligible for a full medical or GP visit card between the age of nine months and three years increased their number of GP visits by approximately 0.6 visits per annum, or approximately 25 per cent. This estimate does not distinguish between gaining a full medical and a GP visit card, and does not take into account possible changes in health need that also occurred. However, the analysis provides additional information for policymakers currently tasked with extending free GP care to other groups of children, and may aid them in costing future proposals and assessing the capacity implications of this increased demand.

5.7 STUDY LIMITATIONS

A number of criticisms could be made of the data and methodology used in this report. First, the recall period for GP visits – one year – is long when compared to the period of the last month used in the European Health Interview Survey and the Healthy Ireland Survey. Such a long recall period could give rise to concerns that the numbers given are not accurate and that bias may result (Behan et al., 2014). However, although absolute frequencies of GP attendance may differ between approaches depending on the recall period, data-collection methods and population coverage, comparison of results shows that the relativities between groups defined by their eligibility for free care are actually relatively stable.

Second, the long recall period may also reduce the extent to which it is possible to safely assume that the 'single illness spell' assumption underlying the two-part model is valid (see also Gerdtham, 1997; Jiménez-Martín et al., 2002). This is a more difficult issue to examine empirically but examination of the pattern of findings from the one- and two-part models reveals relatively stable findings.

Third, the analyses in Chapters 2 and 4 use cross-sectional data, and indicate associations between eligibility

[42] This is a difficult question to assess empirically. It is not possible to answer the question without more detailed information on GP consultations (reason, length, etc), although there is plenty of international evidence that user fees deter both necessary as well as unnecessary healthcare use (Robinson, 2002).

and GP use, rather than causal relationships. While the use of longitudinal data-analysis techniques in Chapter 4 allows us to further control for time-invariant characteristics that may be important in determining healthcare use (e.g. attitudes to risk), we cannot account for differences in time-varying characteristics between waves that might also (partly) explain the change in GP use. For example, a child could gain a full medical or GP visit card because they became ill and/or their parent(s) could no longer work; the increase in GP visiting observed could therefore be due partly to their poorer health status and greater health needs rather than solely the incentive effects of gaining a full medical or GP visit card. Therefore, the estimated effects are likely to be upper bounds on the true effects of gaining/losing a full medical or GP visit card.

Finally, although the patterning of healthcare use is interesting from an equity perspective, the ultimate question is whether the current system of healthcare entitlements has an impact on health outcomes. Some studies have looked at this (by first looking at the effect of eligibility on use, and then examining the effect of use on health) (for example, see Card et al., 2009, and Currie and Gruber, 1996), and results suggest that the differentials in healthcare access may indeed be important for outcomes. Such research is supported by research for Ireland on the population of older people which showed that the higher rate of GP visits that followed the introduction of automatic entitlement to a full medical card for all over-70s in 2001, coupled with improved guidelines on prescribing among GPs, significantly altered the pattern of mortality for those aged 65+ in the period to 2005 (Layte et al., 2011). Such results suggest that the concerns of this report about the impact of access to care on child health may be well founded.

REFERENCES

AASSVE, A., BETTI, G., MAZZUCO, S. & MENCARINI, L. (2007) Marital disruption and economic well-being: a comparative analysis. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 170, 781-799.

ALLIN, S. & HURLEY, J. (2009) Inequity in publicly-funded physician care: what is the role of private prescription drug coverage? *Health Economics*, 18, 1218-1232.

ALLIN, S., MASSERIA, C. & MOSSIALOS, E. (2011) Equity in health care use among older people in the UK: an analysis of panel data. *Applied Economics*, 43, 2229-2239.

ANDERSON, M., DOBKIN, C. & GROSS, T. (2012) The Effect of Health Insurance Coverage on the Use of Medical Services. *American Economic Journal: Economic Policy*, 4, 1-27.

BAGO D'UVA, T. (2005) Latent Class Models for Use of Primary Care: Evidence from a British Panel. *Health Economics*, 14, 873-892.

BAGO D'UVA, T. (2006) Latent class models for utilisation of health care. *Health Economics*, 15, 329-343.

BARROS, P., MACHADO, M. & SANZ-DE-GALDEANO, A. (2008) Moral hazard and the demand for health services: a matching estimator approach. *Journal of Health Economics*, 27, 1006-1025.

BAUHOFF, S., HOTCHKISS, D. & SMITH, O. (2011) The impact of medical insurance for the poor in Georgia: a regression discontinuity approach. *Health Economics*, 20, 1362-1378.

BECKER, G. & ICHINO, A. (2002) Estimation of average treatment effects based on propensity scores. *The Stata Journal*, 2, 358-377.

BEHAN, W., MALONEY, D., BEAME, C. & CULLEN, W. (2014) Does Eliminating Fees at Point of Access Affect Irish General Practice Attendance Rates in the Under 6 Years Old Population? A Cross Sectional Study at Six General Practices. *Irish Medical Journal*, 107, 2.

BIRCH, S., EYLES, J. & NEWBOLD, K. (1993) Equitable access to health care: Methodological extensions to the analysis of physician utilization in Canada. *Health Economics*, 2, 87-101.

BLUNDELL, R. & COSTA DIAS, M. (2000) Evaluation Methods for Non-Experimental Data. *Fiscal Studies*, 21, 427-468.

BOUDREAUX, M., GOLBERSTEIN, E. & MCALPINE, D. (2016) The long-term impacts of Medicaid exposure in early childhood: Evidence from the program's origin. *Journal of Health Economics*, 45, 161-175.

BRICK, A., GORECKI, P. & NOLAN, A. (2013) Ireland: Pharmaceutical Prices, Prescribing Practices and Usage of Generics in a Comparative Context. *ESRI Research Series No. 32*. Dublin, Economic and Social Research Institute.

BRICK, A., NOLAN, A., O'REILLY, J. & SMITH, S. (2010) Resource Allocation, Financing and Sustainability in Health Care. Evidence for the *Expert Group on Resource Allocation and Financing in the Health Sector*. Dublin, Department of Health and Children and Economic and Social Research Institute.

BRICK, A., NOLAN, A., O'REILLY, J. & SMITH, S. (2012) Conflicting Financial Incentives in the Irish Health-Care System. *The Economic and Social Review*, 43, 273-301.

BRUIJNZEELS, M., VAN DER WOUDEN, J., FOETS, M., PRINS, A. & VAN DEN HEUVEL, W. (1998) Validity and accuracy of interview and diary data on children's medical utilisation in the Netherlands. *Journal of Epidemiology and Community Health*, 52, 65-69.

BRYSON, A., DORSETT, R. & PURDON, S. (2002) The use of propensity score matching in the evaluation of active labour market policies. *Department for Work and Pensions Working Paper No.4*. London, Department for Work and Pensions.

BUCHMUELLER, T., COUFFINHAL, A., GRIGNON, M. & PERONNIN, M. (2004) Access to Physician Services: Does Supplemental Insurance Matter? Evidence from France. *Health Economics*, 13, 669-687.

BURSTROM, B. & FREDLUND, P. (2001) Self rated health: is it as good a predictor of subsequent mortality among adults in lower as well as in higher social classes? *Journal of Epidemiology and Community Health*, 55, 836-840.

BUSCH, S. & DUCHOVNY, N. (2005) Family coverage expansions: Impact on insurance coverage and health care utilization of parents. *Journal of Health Economics*, 24, 876-890.

CALLAN, T. & KEANE, C. (2008) Non-take-up of means-tested benefits: National Report for Ireland. *AIM-AP Project: Accurate Income Measurement for the Assessment of National Priorities.*

CAMERON, A., MILNE, F., TRIVEDI, P. & PIGGOTT, J. (1998) A Microeconometric Model of the Demand for Health Care and Health Insurance in Australia. *The Review of Economic Studies*, 55, 85-106.

CARD, D., DOBKIN, C. & MAESTAS, N. (2008) The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare. *American Economic Review*, 98, 2242-2258.

CARD, D., DOBKIN, C. & MAESTAS, N. (2009) Does Medicare Save Lives? *The Quarterly Journal of Economics*, 124, 597-636.

CARD, D. & SHORE-SHEPPARD, L. (2004) Using Discontinuous Eligibility Rules to Identify the Effects of the Federal Medicaid Expansions on Low-Income Children. *Review of Economics and Statistics*, 86, 752-766.

CASE, A., FERTIG, A. & PAXSON, C. (2005) The Lasting Impact of Childhood Health and Circumstance. *Journal of Health Economics*, 24, 365-389.

CASE, A., LEE, D. & PAXSON, C. (2008) The income gradient in children's health: a comment on Currie, Shields and Wheately Price. *Journal of Health Economics*, 27, 801-807.

CASE, A., LUBOTSKY, D. & PAXSON, C. (2002) Economic status and health in childhood: the origins of the gradient. *American Economic Review*, 92, 1308-1334.

CASE, A. & PAXSON, C. (2001) Mothers and others: who invests in children's health? *Journal of Health Economics*, 20, 301-328.

CHEN, L., YIP, W., CHANG, M., LIN, H., LEE, S., CHIU, Y. & LIN, Y. (2007) The effects of Taiwan's National Health Insurance on access and health status of the elderly. *Health Economics*, 16, 223-242.

CHERNEW, M. & NEWHOUSE, J. (2008) What does the RAND Health Insurance Experiment tell us about the impact of patient cost-sharing on health outcomes? *American Journal of Managed Care*, 14.

CHIAPPORI, P., DURAND F & GEOFFARD, P. (1998) Moral Hazard and the Demand for Physician Services: First Lessons from a French Natural Experiment. *European Economic Review*, 42, 499-511.

CLEARY, P. & JETTE, A. (1984) The Validity of Self-Reported Physician Utilization Measures. *Medical Care*, 22, 796-803.

CURRIE, J. (1995) Socio-Economic Status and Child Health: Does Public Insurance Narrow the Gap? *Scandinavian Journal of Economics*, 97, 603-620.

CURRIE, J., DECKER, S. & LIN, W. (2008) Has public insurance for older children reduced disparities in access to care and health outcomes? *Journal of Health Economics*, 27, 1567-1581.

CURRIE, J. & GRUBER, J. (1996) Health Insurance Eligibility, Utilization of Medical Care, and Child Health. *The Quarterly Journal of Economics*, 111, 431-466.

CURRIE, J., SHIELDS, M. & WHEATLEY PRICE, S. (2007) The child health/family income gradient: evidence from England. *Journal of Health Economics*, 26, 213-232.

DAFNY, L. & GRUBER, J. (2005) Public Insurance and Child Hospitalizations: Access and Efficiency Effects. *Journal of Public Economics*, 89, 109-129.

DE LA MATA, D. (2012) The Effect of Medicaid Eligibility on Coverage, Utilization and Children's Health. *Health Economics*, 21, 1061-1079.

DEB, P. & TRIVEDI, P. (1997) Demand for Medical Care by the Elderly: A Finite Mixture Approach. *Journal of Applied Econometrics*, 12, 313-336.

DEB, P. & TRIVEDI, P. (2002) The structure of demand for health care: latent class versus two-part models. *Journal of Health Economics*, 21, 601-625.

DEPARTMENT OF CHILDREN AND YOUTH AFFAIRS (2014) *Better Outcomes, Brighter Futures. The National Policy Framework for Children and Young People*. Dublin, Stationery Office.

ETTNER, S. (1997) Adverse selection and the purchase of Medigap insurance by the elderly. *Journal of Health Economics*, 16, 543-562.

EVETOVITS, T., FIGUERAS, J., JOWETT, M., MLADOVSKY, P., NOLAN, A., NORMAND, C. & THOMSON, S. (2012) Health system responses to financial pressures in Ireland: policy options in an international context. Brussels, European Observatory on Health Systems and Policies.

FALLON, U., MURPHY, A., O'RIORDAN, C., BURY, G., O'MAHONY, D. & KELLEHER, C. (2007) Primary Care Utilisation Rates in Pre-School Children. *Irish Medical Journal*, 100, 23-27.

FAST, J. & WILLIAMSON, D. (1998) Poverty and medical treatment: when public policy compromises accessibility. *Canadian Journal of Public Health*, 89, 120-124.

GARCÍA GÓMEZ, P. & LÓPEZ NICOLÁS, A. (2006) Health shocks, employment and income in the Spanish labour market. *Health Economics*, 15, 997-1009.

GERDTHAM, U. (1997) Equity in Health Care Utilization: Further Tests Based on Hurdle Models and Swedish Micro Data. *Health Economics*, 6, 303-319.

GERDTHAM, U. G., SOGAARD, J., ANDERSSON, F. & JONSSON, B. (1992) An econometric analysis of health care expenditure: a cross-section study of the OECD countries. *Journal of Health Economics*, 11, 63-84.

GORECKI, P., NOLAN, A., BRICK, A. & LYONS, S. (2012) Delivery of Pharmaceuticals in Ireland: Getting a Bigger Bang for the Buck. *ESRI Research Series No. 24*. Dublin, Economic and Social Research Institute.

GORG, H. & STROBL, E. (2006) Do Government Subsidies Stimulate Training Expenditure? Microeconometric Evidence from Plant-Level Data. *Southern Economic Journal*, 72, 860-876.

GOVERNMENT OF IRELAND (2001) Health (Miscellaneous Provisions) Act 2001.

GOVERNMENT OF IRELAND (2008) Health Act 2008.

GOVERNMENT OF IRELAND (2011) Government for National Recovery 2011-2016. Dublin, Stationery Office.

GOVERNMENT OF IRELAND (2013) *Healthy Ireland. A Framework for Improved Health and Wellbeing 2013-2025*. Dublin, Stationery Office.

GOVERNMENT OF IRELAND (2016) *A Programme for a Partnership Government*. Dublin, Stationery Office.

GREENE, S., WILLIAMS, J., LAYTE, R., DOYLE, E., HARRIS, E., MCCRORY, C., MURRAY, A., O'DOWD, T., QUAIL, A., SWORDS, L., THORNTON, M. & WHELAN, C. (2010) Growing up in Ireland National Longitudinal Study of Children. *Background and Conceptual Framework.* Dublin, Office of the Minister for Children and Youth Affairs.

GRIGNON, M., PERRONNIN, M. & LAVIS, J. (2008) Does free complementary health insurance help the poor to access health care? Evidence from France. *Health Economics*, 17, 203-219.

HARMON, C. & NOLAN, B. (2001) Health Insurance and Health Services Utilisation in Ireland. *Health Economics*, 10, 135-146.

HECKMAN, J., ICHIMURA, H. & TODD, P. (1997) Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme. *The Review of Economic Studies*, 64, 605-654.

HOECK, S., FRANÇOIS, G., VAN DER HEYDEN, J., GEERTS, J. & VAN HAL, G. (2011) Healthcare utilisation among the Belgian elderly in relation to their socio-economic status. *Health Policy*, 99, 174-182.

HOLLY, A., GARDIOL, L., DOMENGHETTI, G. & BISIG, B. (1998) An Econometric Model of Health Care Utilisation and Health Insurance in Switzerland. *European Economic Review*, 42, 513-522.

HSE (2013) Supplementary Report, *April 2013*.

HSE (2015) 2015 Medical Card and GP Visit Card Income Guidelines. Dublin, HSE.

HURD, M. & MCGARRY, K. (1997) Medical Insurance and the Use of Health Care Services by the Elderly. *Journal of Health Economics*, 16, 129-154.

IDLER, E. & BENYAMINI, Y. (1997) Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behaviour*, 38, 21-37.

JIMÉNEZ-MARTÍN, S., LABEAGA, J. & MARTÍNEZ-GRANADO, M. (2002) Latent class versus two-part models in the demand for physician services across the European Union. *Health Economics*, 11, 301-321.

JIMÉNEZ-MARTÍN, S., LABEAGA, J. & MARTÍNEZ-GRANADO, M. (2004) An empirical analysis of the demand for physician services across the European Union. *The European Journal of Health Economics*, formerly: HEPAC, 5, 150-165.

JONES, A., KOOLMAN, X. & DOORSLAER, E. (2006) The Impact of Having Supplementary Private Health Insurance on the Use of Specialists. *Annals of Economics and Statistics / Annales d'Économie et de Statistique*, 251-275.

KEELER, E. (1992) Effect of Cost Sharing on Use of Medical Services and Health. Santa Monica, RAND Corporation.

KOCH, T. (2013) Using RD design to understand heterogeneity in health insurance crowd-out. *Journal of Health Economics*, 32, 599-611.

LALONDE, R. (1986) Evaluating the Econometric Evaluations of Training Programs with Experimental Data. *American Economic Review*, 76, 604-620.

LAYTE, R. (2007) Equity in the Utilisation of Hospital Inpatient Services in Ireland? An Improved Approach to the Measurement of Health Need. *Economic and Social Review*, 38, 191-210.

LAYTE, R. & NOLAN, A. (2014) Eligibility for free GP care and the utilisation of GP services by children in Ireland. *International Journal of Health Economics and Management*, 1-25.

LAYTE, R. & NOLAN, A. (2015) Income-Related Inequity in the Use of GP Services: A Comparison of Ireland and Scotland. *European Journal of Health Economics*, 16, 489-506.

LAYTE, R., NOLAN, A., MCGEE, H. & O'HANLON, A. (2009) Do Consultation Charges Deter General Practitioner Use Among Older People? A Natural Experiment. *Social Science and Medicine*, 68, 1432-1438.

LAYTE, R. & NOLAN, B. (2004) Equity in the Utilisation of Healthcare in Ireland. *Economic and Social Review*, 35, 111-134.

LAYTE, R., O'HARA, S. & BENNETT, K. (2011) Explaining Structural Change in Cardiovascular Mortality in Ireland 1995-2005: A Time Series Analysis. *The European Journal of Public Health*, 21, 597-602.

LECHNER, M. & VAZQUEZ-ALVAREZ, R. (2003) The effect of disability on labour market outcomes in Germany: evidence from matching. *IZA DP No. 967.* Bonn, IZA.

LIN, W. (2009) Why has the health inequality among infants in the US declined? Accounting for the shrinking gap. *Health Economics*, 18, 823-841.

MADDEN, D., NOLAN, A. & NOLAN, B. (2005) GP Reimbursement and Visiting Behaviour in Ireland. *Health Economics*, 14, 1047-1060.

MANNING, W., NEWHOUSE, J., DUAN, N., KEELER, E., LEIBOWITZ, A. & MARQUIS, S. (1987) Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment. *American Economic Review*, 77, 251-277.

MCLEOD, L. (2011) A nonparametric vs. latent class model of general practitioner utilization: Evidence from Canada. *Journal of Health Economics*, 30, 1261-1279.

MCWILLIAMS, J., ZAVLASKY, A., MEARA, E. & AYANIAN, J. (2003) Impact of Medicare coverage on basic services for previously uninsured adults. *Journal of the American Medical Association*, 290, 757-764.

MEER, J. & ROSEN, H. (2004) Insurance and the utilization of medical services. *Social Science & Medicine*, 58, 1623-1632.

MORRIS, S., SUTTON, M. & GRAVELLE, H. (2005) Inequity and Inequality in the Use of Health Care in England: An Empirical Investigation. *Social Science & Medicine*, 60, 1251-1266.

MURRAY, A., MCCRORY, C., THORNTON, M., WILLIAMS, J., QUAIL, A., SWORDS, L., DOYLE, E. & HARRIS, E. (2011) Growing up in Ireland National Longitudinal Study of Children. *Design, Instrumentation and Procedures for the Child Cohort*. Dublin, Office of the Minister for Children and Youth Affairs.

NATIONAL CONSUMER AGENCY (2010) Doctor and Dentists Survey. *May 2010*. Dublin, National Consumer Agency.

NEWHOUSE, J. & INSURANCE EXPERIMENT GROUP (1993) *Free for All? Lessons from the RAND Health Insurance Experiment*, Cambridge, MA, Harvard University Press.

NOLAN, A. (2007) A Dynamic Analysis of the Utilisation of GP Services in Ireland: 1995-2001. *Health Economics*, 16, 129-143.

NOLAN, A. (2008a) Evaluating the Impact of Free Care on the Use of GP Services: A Difference-in-Difference Matching Approach. *Social Science and Medicine*, 67, 1164-1172.

NOLAN, A. (2008b) The Impact of Income on Private Patients' Access to GP Services in Ireland. *Journal of Health Services Research and Policy*, 13, 222-226.

NOLAN, A. & SMITH, S. (2012) The effect of differential eligibility for free GP services on GP utilisation in Ireland. *Social Science & Medicine*, 74, 1644-1651.

NOLAN, B. (1991) *The Utilisation and Financing of Health Services in Ireland*, Dublin, Economic and Social Research Institute.

NOLAN, B. (1993) Economic Incentives, Health Status and Health Services Utilisation. *Journal of Health Economics*, 12, 151-169.

NOLAN, B. E., GANNON, B., LAYTE, R., MCGREGOR, P., MADDEN, D., NOLAN, A., O'NEILL, C. & SMITH, S. (2007) *The Provision and Use of Health Services, Health Inequalities and Health and Social Gain*, Dublin, Economic and Social Research Institute.

O'REILLY, D., O'DOWD, T., GALWAY, K., MURPHY, A., O'NEILL, C., SHRYANE, E., STEELE, K., BURY, G., GILLILAND, A. & KELLY, A. (2007) Consultation charges in Ireland deter a large proportion of patients from seeing the GP: results of a cross-sectional study. *European Journal of General Practice*, 13, 231-236.

PALMER, M., MITRA, S., MONT, D. & GROCE, N. (2015) The impact of health insurance for children under age 6 in Vietnam: A regression discontinuity approach. *Social Science & Medicine*, 145, 217-226.

PAULY, M. (1968) The Economics of Moral Hazard: A Comment. *American Economic Review*, 58, 531-537.

POHLMEIER, W. & ULRICH, V. (1995) An Econometric Model of the Two-Part Decisionmaking Process in the Demand for Health Care. *Journal of Human Resources*, 30, 339-361.

PROPPER, C., RIGG, J. & BURGESS, S. (2007) Child health: evidence on the roles of family income and maternal mental health from a UK birth cohort. *Health Economics*, 16, 1245-1269.

QUAIL, A., WILLIAMS, J., MCCRORY, C., MURRAY, A. & THORNTON, M. (2011) A Summary Guide to Wave 1 of the Infant Cohort (at 9 months) of Growing up in Ireland. Dublin, Economic and Social Research Institute.

REIJNEVELD, S. & STRONKS, K. (2001) The validity of self-reported use of health care across socioeconomic strata: a comparison of survey and registration data. *International Journal of Epidemiology*, 30, 1407-1414.

ROBINSON, R. (2002) User charges for health care. In MOSSIALOS, E., DIXON, A., FIGUERAS, J. & KUTZIN, J. (Eds.) *Funding Health Care: Options for Europe.* Buckingham, Open University Press.

ROSENBAUM, P. & RUBIN, D. (1983) The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70, 41-55.

RUANE, F. (2010) Report of the Expert Group on Resource Allocation and Financing in the Health Sector. Dublin, Department of Health and Children.

SANTOS-SILVA, J. & WINDMEIJER, F. (2001) Two-part multiple spell models for health care demand. *Journal of Econometrics*, 104, 67-89.

SAPELLI, C. & VIAL, B. (2003) Self-selection and moral hazard in Chilean health insurance. *Journal of Health Economics*, 22, 459-476.

SARMA, S. & SIMPSON, W. (2006) A microeconometric analysis of Canadian health care utilization. *Health Economics*, 15, 219-239.

SCHELLHORN, M. (2001) The Effect of Variable Health Insurance Deductibles on the Demand for Physician Visits. *Health Economics*, 10, 441-456.

SCHELLHORN, M., STUCK, A., MINDER, C. & BECK, J. (2000) Health services utilization of elderly Swiss: evidence from panel data. *Health Economics*, 9, 533-545.

SMITH, S. (2007) Patterns of Emergency Department Utilisation in Ireland: findings from four large teaching hospitals in Dublin. In NOLAN, B. (Ed.) *The Provision and Use of Health Services, Health Inequalities and Health and Social Gain*. Dublin, Economic and Social Research Institute.

SMITH, S. (2010) The Irish health basket: a basket case? *The European Journal of Health Economics*, 11, 343-350.

STABILE, M. (2001) Private Insurance Subsidies and Public Health Care Markets: Evidence from Canada. *Canadian Journal of Economics*, 34, 921-942.

THOMSON, S. & MOSSIALOS, E. (2009) Private Health Insurance in the European Union. In Final Report Prepared for the European Commission, DGFE, Social Affairs and Equal Opportunities (Ed.). London, LSE Health and Social Care.

TRUJILLO, A., PORTILLO, J. & VERNON, J. (2005) The Impact of Subsidized Health Insurance for the Poor: Evaluating the Colombian Experience Using Propensity Score Matching. *International Journal of Health Care Finance and Economics*, 5, 211-239.

TUSSING, D. (1983) Physician-Induced Demand for Medical Care: Irish General Practitioners. *Economic and Social Review*, 14, 225-247.

TUSSING, D. (1985) *Irish Medical Care Resources: An Economic Analysis*, Dublin, Economic and Social Research Institute.

VAN DE VOORDE, C., VAN DOORSLAER, E. & SCHOKKAERT, E. (2001) Effects of cost sharing on physician utilization under favourable conditions for supplier-induced demand. *Health Economics*, 10, 457-471.

VAN DIJK, C., VAN DEN BERG, B., VERHEIJ, R., SPREEUWENBERG, P., GROENEWEGEN, P. & DE BAKKER, D. (2013) Moral Hazard and Supplier-Induced Demand: Empirical Evidence in General Practice. *Health Economics*, 22, 340-352.

VAN DOORSLAER, E., KOOLMAN, X. & JONES, A. (2004) Explaining income-related inequalities in doctor utilisation in Europe. *Health Economics*, 13, 629-647.

VAN DOORSLAER, E., KOOLMAN, X. & PUFFER, F. (2002) Equity in the Use of Physician Visits in OECD Countries: has equal treatment for equal need been achieved? *Measuring Up: Improving Health System Performance in OECD Countries*. Paris, OECD.

VAN DOORSLAER, E. & MASSERIA, C. (2004) Income-Related Inequality in the Use of Medical Care in 21 OECD Countries. *OECD Health Working Papers No. 14*. Paris, OECD.

VAN DOORSLAER, E., MASSERIA, C. & KOOLMAN, X. (2006) Inequalities in access to medical care by income in developed countries. *Canadian Medical Association Journal*, 174, 177-183.

VAN DOORSLAER, E., WAGSTAFF, A., VAN DER BURG, H., CHRISTIANSEN, T., DE GRAEVE, D., DUCHESNE, I., GERDTHAM, U.-G., GERFIN, M., GEURTS, J., GROSS, L., HÄKKINEN, U., JOHN, J., KLAVUS, J., LEU, R. E., NOLAN, B., O'DONNELL, O., PROPPER, C., PUFFER, F., SCHELLHORN, M., SUNDBERG, G. & WINKELHAKE, O. (2000) Equity in the delivery of health care in Europe and the US. *Journal of Health Economics*, 19, 553-583.

VERA-HERNANDEZ, A. (1999) Duplicate Coverage and the Demand for Health Care: The Case of Catalonia. *Health Economics*, 8, 579-598.

WINKELMANN, R. (2004) Health Care Reform and the Number of Doctor Visits -- An Econometric Analysis. *Journal of Applied Econometrics*, 19, 455-472.

WREN, M. & CONNOLLY, S. (2016) Challenges in Achieving Universal Healthcare in Ireland. *Budget Perspectives 2017*. Dublin, Economic and Social Research Institute.

WREN, M., CONNOLLY, S. & CUNNINGHAM, N. (2015) An Examination of the Potential Costs of Universal Health Insurance in Ireland. *Research Series Number 45*. Dublin, Economic and Social Research Institute.

YIP, W. & BERMAN, P. (2001) Targeted health insurance in a low income country and its impact on access and equity in access: Egypt's school health insurance. *Health Economics*, 10, 207-220.

ZHONG, H. (2011) Effect of patient reimbursement method on health-care utilization: evidence from China. *Health Economics*, 20, 1312-1329.

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