THE PROVISION AND USE OF HEALTH SERVICES, HEALTH INEQUALITIES AND HEALTH AND SOCIAL GAIN

Brian Nolan (ed.)
Brenda Gannon, Richard Layte, Pat McGregor, David Madden, Anne Nolan, Ciaran O'Neill, Samantha Smith

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PREFACE

Brian Nolan

A major collaborative programme of research on *The Provision and Use of Health Services, Health Inequalities and Health and Social Gain* has been underway since 2002, involving researchers at The Economic and Social Research Institute, University College Dublin and the University of Ulster, with financial support from the Health Research Board via a five-year programme grant. The aim of the research programme has been to bring the perspectives of health economics and sociology to bear on the provision and use of health services and on health inequalities in Ireland, in order to identify key causal mechanisms and priority areas for intervention. The programme comprised three distinct (though inter-related) elements:

- The provision and use of general practitioner services and prescription medicines;
- Access, incentives and efficiency in acute hospital care, and
- The relationship between patterns of health care use and "need".

The research involved the study of a broad range of topics, including patterns of GP visiting in the Republic and in Northern Ireland; variations in efficiency levels across hospitals; the impact of medical card cover and private health insurance on access to care; patterns of Emergency Department utilisation; equity in the provision and use of health services; and the economics of health-related behaviours. The core of the programme has been an analysis of data from Irish household surveys and administrative sources applying the most up-to-date analytical methods and approaches. A series of working papers has already been produced presenting the results, and several papers have appeared already or are forthcoming in peer-reviewed academic journals. As the programme reaches the end of its five-year life, we are bringing together the key findings in this single publication aimed at interested researchers and those involved in policy analysis and design, as well as those with a more general interest in the way Ireland's health services are developing.

As Principal Investigator on this research programme my thanks go first to the researchers who worked together so harmoniously and productively on the programme – Richard Layte, Jacqueline O'Reilly and Anne Nolan in the ESRI; Brenda Gannon in the ESRI and now in NUI Galway; David Madden and Carol Laffan in UCD; Pat McGregor in the University of Ulster and Ciaran O'Neill in Queen's University Belfast. The benefits of cross-discipline, cross-institutional and indeed cross-border collaboration have been evident to us all. I would also like to thank those who provided administrative support to the programme and worked on the preparation of this publication in the ESRI: Mary Dowling, Mary Cleary, Regina Moore and Deirdre Whitaker. Finally, the financial support of the Health Research Board, which made the programme possible, is gratefully acknowledged.

1. THE FINANCING AND DELIVERY OF GP SERVICES IN IRELAND

Anne Nolan

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1.1 Introduction

In this chapter we provide some details on the organisation and delivery of general practitioner (GP) services in Ireland. We begin by describing the structure of eligibility for free GP (and other public health services) in Ireland, before discussing the current organisation of the GP service in terms of the role of the GP; qualifications and entry requirements; practice characteristics; income sources; and relationship with the pharmacy and secondary care sectors. Finally, we compare the operation of the GP service in Ireland with those of other developed countries. The following chapter, Chapter 2, deals in more detail with the economics of GP services utilisation in Ireland, concentrating on the incentives faced by both providers and patients. Chapters 3, 4 and 5 analyse patterns of GP visiting in Ireland, the factors influencing variation in GP visiting rates across the population and in particular the role of incentives facing both providers and patients.

1.2 Eligibility for Free Public Health Services

1.2.1 ELIGIBILITY CATEGORIES

There are two categories of eligibility to public health services in Ireland: Category I or full eligibility and Category II or limited eligibility. All individuals who are ordinarily resident in Ireland have either full or limited eligibility for public health services. Individuals with full eligibility, termed 'medical card' patients, are those who are *…unable, without undue hardship, to arrange general practitioner, medical and surgical services for themselves and their dependents and all persons aged 70 years and over* (General Medical Services Payments Board[1], 2005). In 2004, 28.4 per cent of the population were eligible for a medical card

[1] As part of the large-scale reform of the organisational structure of the Irish health services in January 2005, the General Medical Services Payments Board was

(General Medical Services Payments Board, 2005), and were entitled to all public health services free of charge. The remainder of the population ('private' patients) are granted limited eligibility and are entitled to limited free public health services. Table 1.1 sets out the various free public health services that each category of eligibility is entitled to receive.

Table 1.1: Eligibility for Free Public Health Services in Ireland[2]

Category I (Medical Card Patients)

- GP services
- prescribed drugs and medicines
- dental, ophthalmic and aural services
- maternity and infant care services
- out-patient public hospital services
- in-patient public hospital services
- medical appliances
- community care services (e.g., public health nursing service, physiotherapy etc.)

Category II (Private Patients)

- public maternity and infant care services
- in-patient public hospital services (subject to a €65 charge per day)
- out-patient public hospital services (subject to a €65 charge per day)
- assistance towards the cost of prescribed medicines over a monthly limit (Drugs Payment Scheme)[3]
- assistance towards the cost of prescribed medicines for certain chronic conditions (Long-Term Illness Scheme) or high cost treatments (High-Tech Drugs Scheme)[4]

While private patients are entitled to free public hospital services and prescription medicines over a monthly limit, they must in general pay in full for all GP, dental, ophthalmic and aural services. Private patients are entitled to tax relief on certain medical expenses at their marginal rate of tax (they must, however, pay the first €125 per annum) and many are also eligible for reduced prices for certain dental and ophthalmic treatments under the Treatment Benefit Scheme administered by the Department of Social and Family Affairs, provided they have the necessary PRSI (social insurance) contributions. In addition, the three main private insurers (VHI,

renamed the Primary Care Reimbursement Service, and is now part of the Shared Services Directive of the Health Service Executive.

[2] See also www.oasis.gov.ie/health/

[3] Under the Drugs Payment Scheme (DPS), an individual or family only has to pay a maximum of €85 per month for all prescribed drugs, medicines or appliances for use by that person or a member of the family for that month.

[4] Under the Long-Term Illness (LTI) Scheme, individuals who suffer from certain conditions such as a mental handicap, epilepsy and cystic fibrosis and who are not already medical card patients may obtain, without charge, the drugs, medicines and surgical appliances for the treatment of that condition. Under the High-Tech Drugs (HTD) Scheme, individuals in need of high cost pharmaceuticals (e.g. anti-rejection drugs in the case of transplant patients) receive free pharmaceuticals. Individuals must register with their local Health Service Executive (HSE) Area in order to participate in these schemes.

BUPA and VIVAS) have recently introduced new plans that provide limited cover for primary care expenses (see Section 1.2.5 below). The Irish healthcare system has, therefore, a mixture of a universal public health service and a fee-based private system.

1.2.2 ELIGIBILITY CRITERIA

While the majority of those who are granted a medical card qualify on the basis of an income means test, individuals may also qualify on the basis of age, particular health needs and participation in approved Government training and employment schemes. From 1 July 2001, all individuals aged 70 years and over were granted automatic eligibility for a medical card, regardless of income. The income thresholds for a medical card are set nationally and updated annually by the Health Service Executive (HSE). The intention is that the decision to seek medical care should not be dependent on economic resources/ability to pay. Each individual must apply to their local Health Service Executive Area (of which there are currently ten) for a medical card. Currently (as at 31 December 2006), the (gross) weekly income thresholds are €184.00 for a single person living alone, €266.50 for a married couple and €342.50 for a married couple with two children. The limits increase for those aged 66 years and over (e.g. for a married couple the limit increases to €298.00). To put the thresholds in context, the average gross weekly industrial wage in Ireland in June 2006 was €602.35 (Central Statistics Office, 2006). The medical card covers the individual and their dependents, except where the individual is 70 years or older. For example, for a married couple in which one partner is aged 68 years and the other 71 years, the 71 year old is automatically entitled to a medical card but the 68 year old will only be entitled to a medical card if the income of the couple falls below the income threshold for a married couple aged 66-69 years.

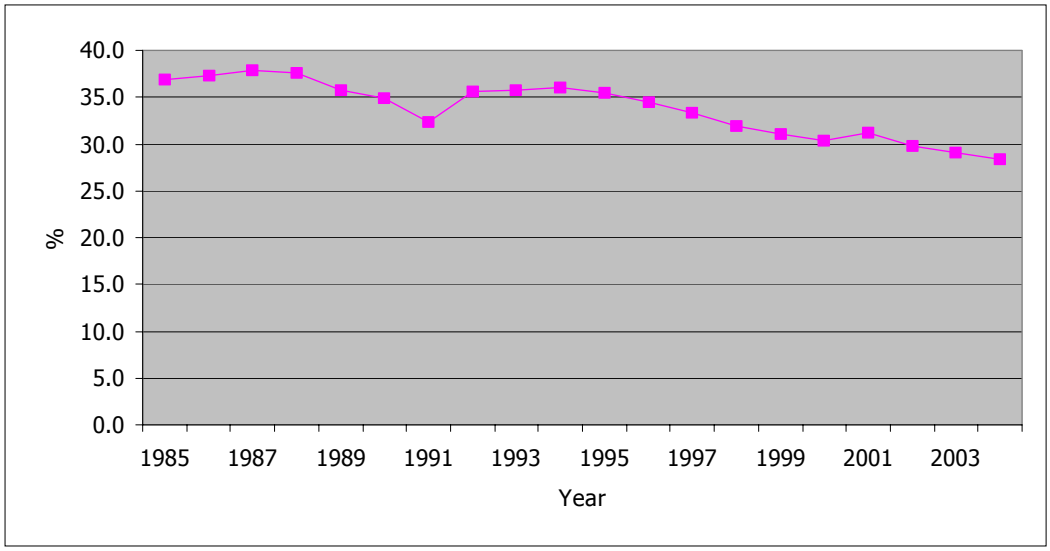
Individuals whose only source of income is from various social welfare programmes (e.g. old age non-contributory pension, disability allowance, unemployment assistance) are also automatically entitled to a medical card. Individuals who previously held a medical card but who participate in various Government approved training and employment schemes (designed to encourage the long-term employed and economically inactive to enter into employment) are allowed to retain their medical card for a period following their entry onto these schemes (the maximum period is four years). Finally, individuals whose income is above the threshold for a medical card but who are faced with particular hardship (e.g., high medical expenses) may be granted a medical card (Comhairle, 2004). However, there are no clear guidelines governing the granting of such 'discretionary' medical cards and consequently, there is no information available on the proportion of medical card patients granted a card on grounds other than income (Comhairle, 2004). A recent report highlighted this confusion, noting that the Department of Health and Children estimated the number of discretionary medical cards at 20,000 in 2001 (1.6 per cent of the total medical

card population in that year) but 75,000 in 2002 (approximately 6.4 per cent of the total medical card population in that year), while the HSE estimate that the number of discretionary medical cards is likely to be between 65,000 and 68,000 and the number currently recorded on the Primary Care Reimbursement Service database is 36,000 (Comptroller and Auditor General, 2006).

1.2.3 TRENDS IN MEDICAL CARD COVER

While the income thresholds for a medical card have increased in line with inflation since 1995, the income guidelines have lagged considerably behind the growth in average incomes. Combined with increasing employment over the period since 1990, this has meant that while medical card coverage stayed relatively stable at approximately 38 per cent of the population over the late 1980s, it fell steadily throughout the 1990s and early 2000s to reach 28.4 per cent of the population in 2004. There was a slight increase from 2000 to 2001 with the extension of eligibility to all those over 70 years in July 2001 but coverage has since fallen back again (see Figure 1.1).

Figure 1.1: Medical Card Cover, 1985-2004



Sources: General Medical Services Payments Board, various issues.

1.2.4 ADDITIONAL ELIGIBILITY CATEGORIES

There are a number of additional schemes that provide free GP services to certain population groups. For example, individuals who contracted Hepatitis C through the use of contaminated blood products administered by the State in the 1970s are entitled to a Health Amendment card. This entitles the holder to free GP services, but the GP does not have to enter into a contract with the HSE to provide such services. In addition, the Maternity and Infant Care scheme provides limited free GP care to all mothers during pregnancy and to all mothers and children for a short period following birth.

In October 2005, a new 'doctor-only' medical card was introduced, the GP Visit card. The income limits are 50 per cent higher than for a standard medical card (e.g., for a single individual aged 66 years or younger, the weekly income threshold is €276.00). However, eligible individuals receive free GP consultations only (i.e., they must pay for their own prescription medicines). This followed much commentary that highlighted the significant difficulties faced by those just above the threshold for a medical card in affording GP services and prescription medicines (see Section 4.3.1 for further analysis of this issue). While the government has suggested that an additional 200,000 individuals are now eligible for free GP visits under the GP Visit card scheme, by December 2006 only 25 per cent of the available cards had been taken up (*The Irish Times*, 12 December, 2006).

1.2.5 PRIVATE HEALTH INSURANCE

Many of those without medical cards purchase private health insurance. Private health insurance in Ireland covers the full or partial cost of treatment and care services provided in private hospitals and by medical consultants in private beds in public hospitals but in general does not cover the cost of GP services, prescribed medicines or dental, ophthalmic and aural services unless a large deductible is reached. However, in recent years, the three main insurers have introduced additional plans that provide limited cover for some of the cost of a GP visit.[5] Tax relief at source (at the standard rate of tax, i.e., 20 per cent) is available for private health insurance premiums. A small proportion of the population (2.1 per cent in 2001) hold both a medical card and private health insurance, probably to ensure speed of access to hospital care as these

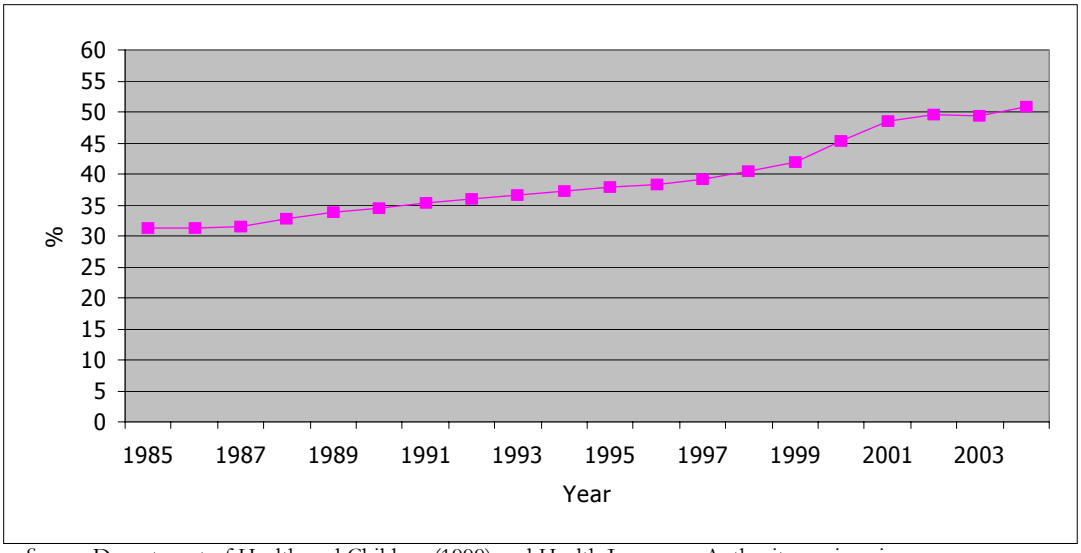
[5] Under some health insurance plans, part of the cost of GP services is reimbursed once a large deductible has been exceeded. In addition, the three main health insurers have recently introduced partial coverage for GP expenses, either as a fixed refund per consultation (e.g., €20 under some VHI plans) or as a percentage of the cost (e.g., 50 per cent under some BUPA plans). Despite the extension of private medical insurance to partial coverage of GP expenses, a 2003 survey found that only 9 per cent of individuals had private insurance that partly covered the cost of GP consultations (National General Practice Information Technology Group, 2003).

individuals are on average older and suffer from various health conditions in greater proportions than those without such 'dual' coverage (Central Statistics Office, 2002).

1.2.6 TRENDS IN PRIVATE HEALTH INSURANCE COVER

The proportion of the population covered by private health insurance has increased steadily since 1985, to reach a point where just over half the population are covered (see Figure 1.2). This is despite increases in premiums in excess of inflation over the period, the reduction in tax relief on private health insurance premiums from the marginal to the standard rate of tax in 1994 and the extension of free public hospital care to the entire population in 1991 (prior to 1991 there was an additional category of eligibility, i.e., those in the top 15 per cent of the income distribution who had to pay for the costs of their treatment in a public hospital).

Figure 1.2: Private Health Insurance Cover, 1985-2004



Sources: Department of Health and Children (1999) and Health Insurance Authority, various issues.

1.3 Delivery of GP Services

1.3.1 THE ROLE OF THE GP

GPs are independent professionals who provide a variety of diagnostic services and medical treatments in a community setting. *Medical practitioners diagnose physical and mental illnesses, disorders and injuries, and prescribe medications and treatment to promote or restore general health* (Indecon Economic Consultants, 2003, p. 325). GPs also provide certain additional services such as immunisation; family planning; insurance and pre-employment medicals; and minor surgery. With the exception of accident and emergency (A&E) visits, GPs are the individual's first point of contact with the health services, with GPs acting as gatekeepers for access to secondary care services in Ireland.

1.3.2 ENTRY REQUIREMENTS

To practice as a GP in Ireland, individuals must gain entry to a university medical school (TCD, UCD, UCC, NUIG and RCSI), and undertake a minimum of six years study, and then complete a 12-month internship in hospital. Upon completion of their internship, the individual is eligible to apply for registration on the General Register of Medical Practitioners. The Medical Council (the regulatory body for the medical profession in Ireland) maintains the General Register of Medical Practitioners and the Register of Medical Specialists. All EU-trained doctors are eligible to practice in Ireland, and there are reciprocity agreements in place between Ireland and Australia, New Zealand and South Africa, which allow doctors to transfer to practice in Ireland. For individuals who trained in non-EU countries, the Medical Council must authenticate the individual's qualification, and in addition, the individual must sit further examinations in clinical and language studies (Indecon Economic Consultants, 2003).

Of the 15,600 individuals who are currently registered on the General Register, the Medical Council estimates that approximately 11,000 are practising (Office of the Revenue Commissioners, 2005). Indecon Economic Consultants estimate that of the 8,952 practising medical practitioners in 2001, 2,691 or 30.1 per cent were GPs, with consultants, non-consultant hospital doctors and others (e.g. doctors in academic posts, public health medicine etc.) accounting for 23.1 per cent, 39.6 per cent and 23.1 per cent respectively. A recent survey by O'Dowd *et al.* (2006) estimated that there were 2,477 GPs in Ireland in 2005, a 28 per cent increase over the 1,937 estimated for 1992.

1.3.3 SUPPLY OF GPs, AND PRACTICE CHARACTERISTICS

In 2003, there were an estimated 2,700 GPs practising in Ireland (Indecon Economic Consultants, 2003), which is equivalent to approximately 0.7 GPs per 1,000 population. The corresponding average for thirteen EU countries in 2002 was 1.0 GP per 1,000 population (OECD, 2005). Table 1.2 shows the results from a 2003 survey of over 1,000 GPs. It highlights that about a third[6] of GPs operated as solo practices (in many cases from a surgery attached to their own home), nearly half employed a practice nurse and nearly two-thirds had one or more administrative staff. On the other hand, only 6 per cent of practices employed an additional health professional such as a physiotherapist, counsellor or social worker. The same survey also found that that 67 per cent of GPs were male, 13 per cent were aged 26-35 years, 29 per cent were aged 36-45

[6] The corresponding figure from a 1988 survey for over 100 GPs was 59 per cent.

years, 37 per cent were aged 46-55 years, 18 per cent were aged 56-65 years and 3 per cent aged 66+ years.[7]

Table 1.2: GP Practice Characteristics, 2003 (Percentages)

	GP	Practice Nurse	Practice Manager	Administrator	Other Professional
None*	3	34	72	10	89
One	32	46	28**	33	6
Two	29	15		27	3
Three or more	36	5		30	2

Source: National General Practice Information Technology Group (2003).[8]
* also includes not stated.
** includes 0.4 per cent who had two or more.

A 1996 survey of GPs found that 72.4 per cent of GP practices found it either "extremely difficult" or "very difficult" to recruit GPs over the last three years; 23.5 per cent found it "difficult" and only 4.1 per cent reported that they had no difficulty in recruiting GPs. *The difficulties prevailing in relation to recruitment may reflect restrictions on the supply of doctors in Ireland, including in relation to the number of medical graduates from the schools of medicine* (Indecon Economic Consultants, 2003, p. 359). In addition, there are concerns over the supply of GPs in certain areas based on claims that medical card lists are increasingly difficult to allocate in rural and certain deprived urban areas (FÁS, 2005).

1.3.4 GENERAL MEDICAL SERVICES (GMS) SCHEME

GPs may enter into a contract with the HSE to provide services to medical card patients (under the GMS scheme), in addition to services provided to private patients. A 2003 survey of GPs found that 84 per cent held GMS contracts (National General Practice Information Technology Group, 2003), while a 2005 survey found that 96 per cent of GP practices had a GMS list, leaving just 4 per cent engaged only in private practice, in comparison with 91 per cent and 9 per cent respectively in 1992 (O'Dowd *et al.*, 2006). The operation of the GMS scheme is such that an individual GP is generally permitted to have a maximum of 2,000 GMS patients (Indecon Economic Consultants, 2003). In addition, GPs also provide services to certain population sub-groups covered under State schemes such as the Maternity and Infant Care Scheme, the Primary Childhood Immunisation Scheme and the Methadone Treatment Scheme. Even GPs who do not hold a GMS list are likely

[7] A more recent survey of over 500 GPs in 2005 finds broadly similar results (O'Dowd *et al.*, 2006).
[8] A 1996 ICGP survey found that 42 per cent of GP practices were single-handed; 28 per cent were comprised of two GPs; 15 per cent were comprised of three GPs and 14 per cent were comprised of four or more GPs. The average number of doctors per practice remained constant at around 1.7 between 1999 and 2001 (Indecon Economic Consultants, 2003).

to provide services under the latter schemes. Individual GPs acquire a GMS list through one of three channels:

- By national competition for an advertised GMS list in a defined area for a vacancy arising or a post created.
- By national competition to post of assistant with a view to partnership with an established GMS contract holder principal.
- Under special regulations introduced in 1999 that permit the right of application for a GMS contract, conditional on the doctor having been engaged in full-time general practice for a specified period of time (Indecon Economic Consultants, 2003).

Medical card patients register with a GP of their choice from a list of GPs who participate in the GMS scheme. Under the terms of the GMS contract, a GP cannot discriminate between public and private patients in terms of the quality and quantity of treatment. The organisation of this system ensures that public and private patients receive the same standard of care, a situation that did not exist prior to the establishment of the GMS scheme in 1972. The introduction of the GMS (or 'choice-of-doctor') scheme in 1972 allayed concerns at the time that public and private patients received differential treatment from their GPs. Under the previous system, private patients attended the private surgery of the doctor of their choice while public patients were required to attend the surgery of the nominated 'dispensing' doctor in their area (Hensey, 1979).

The current contractual commitment to public patients is for 40 hours per week on five days or more. Suitable arrangements must also be made to enable contact to be made with him/her or his/her locum/deputy outside normal hours for urgent cases. In general a GP with a GMS contract is expected to accept all eligible patients on to his/her list when so requested, provided the individual lives within seven miles of the surgery. The latter does not apply where there is no participating GP within seven miles of the patient.[9]

1.3.5 SOURCES OF GP INCOME

GP income comes from three main sources: private fees, State schemes (primarily the GMS scheme) and other fees (such as locum or rota fees where GPs are obliged to provide an out-of-hours service for their locality, fees from the provision of medical reports for insurance purposes or court cases and from clinical testing).[10] Individual GPs set their own private fees. Neither the Medical

[9] However, where the GP does not wish to accept a particular patient(s), the HSE may request that a confidential explanation be provided by the GP explaining his/her reasons. At any time after the inclusion of a patient on a GP's list, the GP may request the HSE to remove the patient from his/her panel. The GP may be requested to provide, in confidence, reasons for the request. The HSE may assign an eligible patient to a GP where the patient has been unsuccessful in applying to all medical practitioners in an area or to at least three of them, whichever is less. Where a GP has a patient assigned to him/her the assignment will be reviewed after six months has lapsed (Irish Medical Organisation, 2002).

[10] See also Office of the Revenue Commissioners (2005).

Council nor the Irish Medical Organisation (the trade union which represents GP interests) has any influence over the fees charged. Table 1.3 sets out recent estimates of the average cost of a standard GP consultation, which range from €33 to €36. The Revenue Commissioners report noted that higher rates are charged for out-of-hours consultations and for non-standard procedures (e.g. vaccinations) while repeat and family visits may be charged a reduced rate (Office of the Revenue Commissioners, 2005).

Table 1.3: Average GP Private Fees (€)

	Indecon (2003)	GPIT (2003)	Revenue (2005)
Average	33	36	
Median	33		
Minimum			35
Maximum			50
Standard Deviation	5		
Home Visit	42		

Source: Indecon Economic Consultants (2003); National General Practice Information Technology Group (2003); Office of the Revenue Commissioners (2005).

The Indecon survey also sought the views of the general public, the major health insurance companies and medical practitioners themselves on the extent of price competition among medical practitioners in Ireland (remembering that this refers to medical practitioners more broadly rather than GPs). Of the general public 59 per cent felt that there was "virtually no" or "very little" price competition among medical practitioners in Ireland, with only 18 per cent believing that there was "significant" price competition. Not surprisingly, medical practitioners were more positive about the perceived levels of price competition in the market, although only 18 per cent still believed that there was "significant" price competition among medical practitioners in Ireland.[11]

In terms of government sources of GP income, the largest proportion of income from government sources is from the GMS. Additional State funding comes from the Maternity and Infant Care Scheme; the Primary Childhood Immunisation Scheme; the Health Amendment Act (1996) Scheme; the Methadone Treatment Scheme; the Indicative Drug Targeting Scheme (see Section 1.3.7) and from various government departments for the provision of certain services (e.g., medical examinations in suspected drink driving cases for the Department of Justice, Equality and Law Reform). In 2006, government expenditure on the GMS scheme (including GP and pharmacy fees, cost of medication etc.) accounted for 13.6 per cent of total government expenditure on health, an increase from 12.8 per cent in 2005 (Department of Finance, 2006).[12]

[11] See Table 9.19 in Indecon Economic Consultants (2003).

[12] However, expenditure on the hospitals programme still accounts for the majority of expenditure on health in Ireland, accounting for 39.7 per cent in 2006 (and 40.3 per cent in 2005) (Department of Finance, 2006).

The Primary Care Reimbursement Service (previously the General Medical Services Payments Board) undertakes the reimbursement of providers for GP, dental, optical and pharmaceutical services supplied to patients under the GMS scheme as well as the reimbursement of pharmacists for services provided to non-GMS patients under the various drugs schemes (DPS, LTI and HTD Schemes). At present, GPs providing services to medical card patients (i.e., participating in the GMS scheme) are reimbursed on a capitation basis.[13] This payment is weighted for the age, sex and distance from the doctor's surgery of the patient, and is paid monthly. There are some additional fee-for-service payments for procedures such as suturing and for out-of-hours consultations. In 2004, 66.5 per cent of all fees paid to GPs participating in the GMS scheme were capitation-derived, with fees for out-of-hours services and special services (e.g., influenza vaccine) accounting for the next largest proportions (10.7 per cent and 9.9 per cent of total fees respectively) (General Medical Services Payments Board, 2005). GPs are not obliged to provide certain services free of charge to medical card patients (e.g., eye tests for driving license applications or medical examinations for life assurance). Prior to 1989, GPs were also remunerated on a fee-for-service basis for their public patients. However, in part as a result of evidence presented by Tussing (1985) in favour of demand inducement by GPs under a fee-for-service system, this system was changed to capitation in 1989 (see also Section 2.4.2).

Capitation-based payments mean that the risk of overuse is borne by the provider, but on the other hand, the provider benefits from infrequent consultation by their patients. From the government's point of view, a capitation system is attractive in that expenditure is known in advance. However, there are concerns that a capitation payment system encourages providers to maximise the size of their patient list, but to avoid registering certain high usage groups such as the elderly or those with chronic illnesses; to spend as little time as possible with patients; to discourage repeat visits; and to refer patients to secondary care or other practitioners as soon as possible. With fee-for-service reimbursement on the other hand, providers are given an incentive to encourage repeat visits, to carry out expensive treatments and to retain the patient rather than referring to secondary care. However, for the government or financier there is considerable uncertainty with exact levels of expenditure only know retrospectively (Society of Actuaries in Ireland, 2000).

[13] However, 18 GPs are still reimbursed under a fee-for-service arrangement, which was the arrangement that existed prior to the change to capitation in 1989 (Office of the Revenue Commissioners, 2005).

1.3.6 GP WORKLOAD

A 1988/1989 survey of 119 GPs found that the average GP had a practice of 1,818 patients, and 43 per cent of these were GMS patients. Interestingly, there was little or no relationship between GMS and private list size; those with small GMS lists did not correspondingly have large private practice lists, and those with large GMS lists were just as likely to have large private lists as small. Doctors saw an average of 150 patients per week, which equates to 4.5 consultations per person per annum (with GMS consultations at 6.2 per annum and private consultations at 3.2). The average duration of a consultation was twelve minutes. 57 per cent of repeat consultations were initiated by the patient. The survey found no relationship between the number of repeat consultations and the practice list size. Of all consultations 86 per cent took place in the surgery, and 11 per cent in the patient's home. Excluding consultations described as being for repeat prescriptions, the prescribing rate was 63 per cent for GMS patients and 49 per cent for private patients (Irish College of General Practitioners, 1992). In 2005, approximately two-thirds of GMS lists contained under 1,000 patients, and only 5 per cent contained 2,000 patients or more. In contrast, approximately 26 per cent of practices had fewer than 1,000 private patients, with approximately 40 per cent having 2,000 private patients or more (O'Dowd *et al.*, 2006).

1.3.7 RELATIONSHIP WITH PHARMACIES

The majority of GPs do not undertake dispensing duties; a network of privately owned and operated pharmacies provides this service. Pharmacists who dispense medicines to public patients are reimbursed by the Primary Care Reimbursement Service on the basis of the ingredient cost plus a flat-rate dispensing fee. Private patients pay out-of-pocket for prescribed medicines but are assisted with the cost of prescribed medicines by the State via the DPS, LTI and HTD Schemes. Claims under these schemes are also processed and paid for by the Primary Care Reimbursement Service (but reimbursed as ingredient cost plus 50 per cent mark-up).[14]

[14] The recent Department of Health and Children (2003) report on financial management and control of the health service recommends that the procedure for reimbursing pharmacists under the GMS scheme be extended to that for the other drugs schemes (DPS, LTI and HTD) to remove the incentive for GPs to prescribe more expensive drugs to private patients, thereby increasing the profit margins of pharmacies.

There has been much discussion about the escalating costs of prescribing by GPs.[15] In 1993, the Indicative Drug Targeting Scheme (IDTS), which is also administered by the Primary Care Reimbursement Service, was established in an attempt to make GPs more aware of the costs of their prescribing decisions.[16] Each GP is set a prescribing target (in money terms), which is adjusted for the age and gender of their medical card patients. GPs who prescribe less than this target are allowed to invest 50 per cent of their savings in practice development, e.g. upgrading or replacing equipment. Before the introduction of the scheme, a GP's revenue was not affected by the amount or the cost of the drugs they prescribed with the result that they had no financial incentive to reduce this cost. However, questions have been raised regarding whether the IDTS causes a deterioration in the quality of treatment for public patients. It has been shown that the IDTS has had a negative effect on prescribing patterns of new drugs to GMS patients, compared to private patients, which reversed the pattern that existed prior to the establishment of the scheme (Durkan, 2002). GPs are given an incentive to prescribe fewer drugs and to prescribe cheaper drugs for their medical card patients. While the immediate cost savings are apparent, this type of action could potentially increase the long-term cost to the State of treating the person, for example through secondary care. In addition, the scheme is voluntary; GPs retain the right to prescribe as they see fit and there are no sanctions in place for those who fail to meet their target (Comptroller and Auditor General, 1997).

[15] Over the period 1990-2002, the cost of prescribed medicines under the GMS scheme increased by 177.5 per cent in real terms (General Medical Services Payments Board, various issues). Tilson *et al.*, 2002 states that in addition to such factors as an ageing population, the early diagnosis of chronic illness with subsequent early introduction of long-term drug therapy and the increased expectations of patients regarding the range of treatments and quality of services available to them, the two main drivers of increasing expenditure on medicines include the product mix, i.e., prescribing of newer more expensive medications and the volume effect, i.e., the prescribing of a greater number of medicines for patients. They subsequently found that 11 of the top 30 drugs, of highest cost to the GMS scheme, had a generic equivalent, which, if substituted, could produce savings in the region of €5.65 million per annum.

[16] Durkan (2002) describes the background to the establishment of the IDTS. A review of the GMS by the Department of Health and the Irish Medical Organisation was carried out in 1990/1991, against a backdrop of very significant increases in the cost of prescribing in the previous four years. This increase was attributed to increased use of more expensive drugs and an increased volume of drugs, rather than price increases, as prices tend to be frozen for established prescription drugs. As a consequence of this review, the IDTS was established on 1 January, 1993. A review group was established in 2003 to further review the operation of the system, as it is felt that the current calculation of targets based on age and sex is too simplistic and that some allowance for medical need of patients is necessary (Department of Health and Children, 2005).

1.3.8 RELATIONSHIP WITH SECONDARY CARE

GPs act as gatekeepers for secondary care in Ireland, and with the exception of attendance at A&E departments, are the first point of contact with the health services for the majority of individuals. There are two main sources of admission to hospital as an in-patient: as an emergency case through A&E, or as an elective case referred by a GP or another hospital doctor for specialised treatment. In 2001, 48 per cent of in-patient admissions to St. James's Hospital in Dublin were from A&E, 30 per cent were elective admissions and 16 per cent were emergency admissions from the out-patient department (see www.stjames.ie). There is much discussion that many A&E attendances would be more appropriately dealt with in a primary care setting. The cost of attending an A&E department without a letter of referral from a GP is now greater than the average cost of a GP consultation, removing the previous incentive to use the A&E service in preference to a GP visit. However, the lack of a comprehensive out-of-hours GP service in certain areas may still mean that for many, an A&E visit is their only option.

The financing of primary and secondary care in Ireland encourages a shift away from primary care towards more expensive secondary care services, and is …*exactly the opposite of the way an efficient financing system would work* (Society of Actuaries in Ireland, 2000). For medical card patients, the incentive to refer the patient to secondary care rests with the GP, who is paid a capitation payment for each medical card patient. For private patients (with and without insurance), the incentive to seek treatment in a secondary rather than a primary care setting rests with the patient who must pay out-of-pocket for GP care, but receives free or heavily subsidised public hospital care (and in the case of those with private medical insurance, faster access to hospital).

1.4 Comparative Perspective

1.4.1 ELIGIBILITY FOR FREE GP SERVICES

Despite their focus on general practice as the cornerstone of the health system, most European countries differ considerably in the major characteristics of primary/GP care such as employment levels, eligibility criteria for free GP services; method of payment; gate-keeping function; practice organisation etc. and the patterns of use and incentive structures that result from these underlying institutional arrangements. Table 1.4 summarises some of the main characteristics of the system of general practice in a selection of developed OECD countries. The majority of developed OECD countries provide universal access to free or heavily subsidised GP services. As in Ireland, the Netherlands, New Zealand and USA only provides free GP care to certain population groups such as those

Table 1.4: GP System Characteristics in EU-15 and Australia, Canada, New Zealand, Norway and USA

COUNTRY	Exceptions to Eligibility for Free or Heavily Subsidised GP Services	Patient Contribution to GP Services	GP Reimbursement	Gatekeeper Role for GP
Australia		Co-insurance (where GP engages in 'balance-billing', otherwise none)	Mixed, mainly fee-for-service	Yes
Austria		Co-insurance	Mixed	Yes
Belgium	'Minor Risks' for Self-Employed	Co-insurance	Fee-for-service	No
Canada		No	Fee-for-service	Yes
Denmark	2 per cent who reserve the right to choose their GP (group II)	Balance-billing for group II	Mixed	Yes, for majority (98 per cent)
Finland		Co-payment	Mixed	Yes
France		Co-insurance	Fee-for-Service	No
Germany	High income earners who decide to opt-out of State health insurance scheme (private: 10 per cent)	No	Mixed (public) Fee-for-service (private)	No
Greece		No	Salary	No
Ireland	70 per cent above an income threshold (non-medical card)	No (medical card) Full cost (non-medical card)	Mixed, mainly capitation (medical card) Fee-for-service (non-medical card)	Yes
Italy		No	Capitation	Yes
Luxembourg		Co-insurance	Fee-for-service	No
Netherlands	Normal medical risks such as GP visits for individuals above an income threshold (private: 40 per cent)		Capitation (public) Fee-for-service (private)	Yes
New Zealand	Those above an income threshold (non-community service card)	Co-payment (community service card) Full cost (non-community service card)	Mixed	Yes
Norway		Co-payment	Salary for majority who hold State contracts; remainder are paid fee-for-service	Yes
Portugal		Co-payment	Salary	Yes
Spain	High income self-employed and civil servants who decide to opt out of State scheme	None	Salary	Yes
Sweden		Co-payment	Mixed	No
UK		None	Mixed	Yes
USA	Those who do not quality for Medicare (elderly) and Medicaid (low income and disabled)	Co-insurance for private patients with private insurance, otherwise full cost	Mainly fee-for-service	No

Sources: Bindman and Majeed (2003); Commonwealth Department of Health and Aged Care (1999a), (1999b), (2002); Dixon and Mossialos (2002); European Commission (2002); *European Observatory on Health Care Systems*, various issues; European Union of General Practitioners (2003); Green (2004); Jepson (2001); Ministry of Health (2001); Mossialos *et al.* (2002); Oxley *et al.* (1994); Van Doorslaer *et al.* (2002).

Co-insurance refers to a fixed percentage of the total cost of a consultation whereas co-payment refers to a flat fee.
Mixed refers to a mixture of reimbursement methods: salary, capitation, fee-for-service and allowances. Most rely on a sub-set (e.g. Australia relies mainly on fee-for-service with some allowances, Spain relies on salary and capitation and the UK relies on capitation, fee-for-service and allowances).

with incomes below a certain threshold, the older population or young children. Even when individuals are entitled to cover for GP services under State schemes, certain population groups may be subject to co-payments (a fixed fee) or co-insurance (a fixed percentage) on the cost of a GP visit. In order to ensure that intensive users of health services or those on low incomes are not discouraged from seeking care, many countries exclude certain categories from co-payments or co-insurance (e.g., children and old-age pensioners in Austria) or impose an annual ceiling (e.g., Finland, Norway and Sweden). Ireland, the Netherlands, New Zealand and the USA have a similar distinction between different sections of the population (based on economic status) but are unusual in the substantial proportions of the population that must pay the full fee-for-service each time they visit their GP. The principal rational behind user charges is to reduce unnecessary or excessive use of services. However, it is felt that user charges may deter necessary as well as unnecessary treatments. A key issue is the extent to which the deterring of necessary treatments impacts on the future consumption of services and long-run health status (OECD, 1987).

While the main reason for taking out private medical insurance in Ireland is to ensure speed of access to hospital and to guard against large hospital bills (Harmon and Nolan, 2001), in many European countries, private insurance is taken out to assist in costs associated with out-patient care such as GP services. For example, in the Netherlands, the 40 per cent of the population ineligible for free GP and other out-patient services are expected to take out private medical insurance to cover such costs while in Austria, Belgium and France, many private insurance plans cover co-insurance for GP visits (i.e., complementary cover).

1.4.2 THE ROLE OF THE GP

In the majority of countries, GPs are independent operators, as in Ireland. However, in Finland and Sweden, the majority of GPs are employees of the local county council or community, meaning that integration with other primary care services is consequently much stronger than in countries where GPs are organised as independent operators. As discussed above, the potential role for the primary care sector in controlling access to more expensive secondary care is well recognised. Amongst EU countries, Austria, Denmark, Finland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain and the UK require a referral from a GP before visiting a hospital specialist (except in emergency cases) while the residents of Belgium, France, Germany, Greece, Luxembourg and Sweden are free to consult a specialist without a referral from a GP (see Table 1.4).

1.4.3 SUPPLY OF GPS

In comparison with the other countries of the old EU-15, Ireland has a relatively small supply of GPs per 1,000 population (see Table 1.5). At the other end of the scale are countries such as France and

Finland who have 1.64 and 1.66 GPs per 1,000 population respectively.

Table 1.5: Number of GPs per 1,000 Population (EU-15), 2003

COUNTRY	2003
Austria	1.42
Belgium	1.35
Denmark	0.71
Finland	1.66
France	1.64
Germany	1.04
Greece	
Ireland	*0.59*
Italy	0.95
Luxembourg	0.89
Netherlands	0.51
Portugal	0.56
Spain	
Sweden	0.56
United Kingdom	0.65

Source: WHO Regional Office for Europe (2006).
Data for Belgium refer to 2001 and for Sweden to 2002.

1.4.4 GP REIMBURSEMENT

Much recent attention has focused on the extent to which the incentive structures underlying the reimbursement of GPs lead to an equitable and efficient distribution of resources, both between different sectors of the population and between different levels of care (see also Section 2.3.3). Pure fee-for-service reimbursement systems exist in a number of OECD countries such as Belgium, Canada and Luxembourg (see also Table 1.4). However, there are concerns that such systems encourage GPs to engage in "demand inducement" (see Tussing, 1985). Capitation payments, where GPs are paid a fixed amount per patient, usually adjusted for age, sex and other relevant factors, remove the incentive to arrange unnecessary return visits but may encourage the GP to discourage necessary as well as unnecessary return visits, to shorten consultation periods and to refer patients to secondary care as early as possible. Many countries (Australia, Austria, Denmark, Finland, Germany, Ireland, New Zealand, Sweden and the UK) combine the various methods of payment by using a mixture of salary, capitation payments, fee-for-service payments for 'extra' services such as suturing or vaccinations and allowances for extra expenses such as a practice nurse. In some countries, different categories of individual imply a different reimbursement system (as in Ireland). For example, in Germany, the majority of the population (90 per cent) receive free GP services and GPs are reimbursed by a mixture of fee-for-service, capitation and salary for these patients, while the remaining 10 per cent on high incomes pay a fee-for-service to their GP (which is subsequently reimbursed by private insurance).

1.4.5 GP VISITING RATES

In terms of variation in the number of doctors' consultations across the OECD, Table 1.6 indicates that the number of doctors' visits per capita in 2001 varied from a low of 2.9 in Sweden to a high of 9.0 in the USA. Due to difficulties in making accurate comparisons across different countries using OECD data, which suffer from differences in definitions, data sources etc. (see notes to Table 1.4), data from the European Community Household Panel (ECHP), which includes health data for twelve European countries from 1994 to 2001 inclusive, based on a standardised questionnaire, are also presented in Table 1.6. Unlike OECD data, doctors' consultations are differentiated into visits to GPs, specialists, dentists etc. (from 1995 onwards). They indicate much more similarities in GP consultations across Europe with countries such as Germany and Italy with (near) universal access to free GP consultations having a higher average number of GP consultations than Ireland and The Netherlands, where certain sectors of the population must pay out-of-pocket for GP consultations. These data also indicate the possible influence that institutional arrangements have on the utilisation of GP services. For example, Italy, with a gatekeeping role for GPs and no user charges, has a high average number of GP consultations per annum while Sweden, similarly with no gatekeeping role but with some user charges, has a much smaller number of GP consultations per annum.

Table 1.6: Average Number of Visits to the Doctor and GP Per Annum (EU-15 and Australia, Canada, New Zealand, Norway and USA), 2001

	Doctor	GP
Australia	6.4	
Austria	6.7	4.7
Belgium	7.8	4.8
Canada	6.2	
Denmark	7.0	3.0
Finland	4.3	2.1
France	6.9	
Germany	7.3*	
Greece	2.5*	1.9
Ireland		3.5
Italy	6.1	4.6
Luxembourg	6.2	
Netherlands	5.8	2.8
New Zealand	4.4	
Norway		
Portugal	3.6	2.9
Spain	8.7	4.1
Sweden	2.9	
UK	4.9	3.2
USA	9.0	

Sources: OECD (2005); European Community Household Panel Survey (2001).
*Data for doctors' consultations for Germany refer to 2000 and for Greece to 1998.

1.5 Summary and Conclusions

This chapter began by detailing the current structure of eligibility for free GP services in Ireland, distinguishing between those with full eligibility (medical card patients) who receive free GP services and prescription medicines and those with limited eligibility (private patients) who must pay in full for all GP services and receive free prescription medicines above a monthly deductible. The organisation of GP services reflects to a large part this distinction, particularly in terms of GP reimbursement where GPs receive a capitation payment for their medical card patients and a fee-for-service from their private patients. This combination of eligibility structure and reimbursement system obviously impacts on the incentives faced by both patients and GPs in terms of GP care, and this issue will be returned to in more depth in the next chapter.

The chapter also detailed the current organisation of GP services in Ireland, focusing on entry criteria and qualifications; practice characteristics; income sources; workload and relationship with the pharmacy and secondary care services. GPs act as gatekeepers in Ireland and as such, are the first point of contact with the health services for the majority of individuals. The GP service, therefore, has a crucial role in reducing reliance on more costly secondary care services and to this end, it is important to ensure that the GP service is properly equipped, staffed and incentivised to treat patients in this setting in the first instance. We also revisit this issue in the following chapter. Finally, this chapter provided a brief overview of the operation of the GP service in other developed OECD countries. While Ireland shares many characteristics with other countries, Ireland is largely unique in the extent to which only a minority of the population are entitled to free GP services. The next chapter will analyse in more detail the economics of GP services utilisation, in particular the structure of incentives, from both a patient and provider perspective, while the following chapters review the empirical evidence on GP and patient behaviour in the Irish setting.

2. THE ECONOMICS OF GP UTILISATION

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2.1 Introduction

This purpose of this chapter is to outline the economics of GP utilisation in Ireland, with a particular emphasis on the incentives faced by both providers and patients. With the exception of accident and emergency visits, the GP is generally the individual's first point of contact with the health services in Ireland, with GPs acting as gatekeepers for access to secondary care services. In this regard, GPs in Ireland play a pivotal role in providing health services to the population, and by extension, reducing reliance on more costly acute hospital services. It is, therefore, vital that we understand the process of how GPs and patients interact, with a view to informing public policy as to how best to organise the financing and delivery of GP services in Ireland.

In any discussion of GP and patient interaction, the financial incentives facing both doctor and patient are crucial. In the Irish setting, the distinction between medical card patients, who receive free GP visits, and private patients, who must pay out-of-pocket for each visit, is the key to understanding how GPs and patients behave and interact. In terms of GP behaviour, the fact that GPs are reimbursed differently for medical card and private patients (capitation and fee-for-service respectively) creates differential incentives towards treatment on the part of GPs (and there is much international research that confirms that doctors in general respond to differences in payment method; see also Section 2.4.1). In terms of patient behaviour, this system obviously creates differential incentives for the two groups, and an extensive body of research has confirmed that medical card patients do indeed use more GP services than private patients, even after controlling for a variety of socio-economic and health status differences (see the discussion in Section 2.5.2).

In this chapter, we outline the incentives that face both patients and providers in terms of the utilisation of GP services in Ireland. We first discuss the particular features of health care in Section 2.2, which imply that health care markets do not function in the manner predicted by standard economic theory. One of the most distinctive characteristics of health care markets is the presence of asymmetric

information between doctor and patient, and this inevitably means that suppliers of health services may also influence the demand for these health services. In Section 2.3, we discuss the economics of GP behaviour, focusing in particular on the agency role of the doctor, which seeks to explain the interaction between doctor and patient in a world of imperfect, asymmetric information. This section also discusses the importance of payment method in influencing doctors' behaviour, and the particular incentives facing GPs operating in the Irish market. Section 2.4 presents empirical evidence on doctor behaviour, focusing on the international literature, while also briefly introducing the Irish literature, which is returned to again in Chapter 3. Section 2.5 moves on to examine the patient side of the transaction, and outlines the various incentives facing patients with regard to the utilisation of health care services, while also focussing on the particular incentives in the Irish case. Section 2.6 discusses the empirical evidence on patient behaviour and incentives, and briefly introduces the Irish literature, which is discussed more fully in Chapter 3. Section 2.7 summarises and concludes.

2.2 Market Failure in Health Care

2.2.1 ASYMMETRIC INFORMATION

One of the most crucial ways in which the market for health care differs from that for other commodities is the presence of asymmetric information between providers and consumers of health services. While many other services are characterised by a reliance on seller-provided information, the inability of the consumer to gather information simply from observing the product or previous experience distinguishes health care from other commodities (Pauly, 1988). Information acquisition on the part of the patient is particularly difficult in health care, due to the nature of the product (heterogeneous and unpredictable) as well as the information itself (technically complex). The relationship has often been characterised as a principal-agent one; due to the high costs of acquiring information, the patient must rely on the doctor to act in their best interests in terms of decisions about diagnosis and treatment. This necessarily creates incentives for doctors to act in their own best interests, rather than those of their patients (the conflict between the agency and self-interest motivations of doctors is discussed further in Section 2.3.1).

2.2.2 OTHER SOURCES OF MARKET FAILURE

Health care markets are also characterised by uncertainty, i.e., lack of information about the future. This necessitates a role for insurance in offering patients protection against uncertainty. However, there are concerns over the ability of the private market to provide efficient and equitable insurance cover, as adverse selection, moral hazard and cream skimming behaviours must be absent. Insurance in turn distorts the price mechanism, and the effect of low or zero marginal costs for health care on GP and

patient behaviour is also discussed below. Finally, the health care sector is also frequently characterised by the presence of externalities, whereby private costs or benefits are incompatible with social costs or benefits (see Arrow, 1963).

While asymmetric information, uncertainty and externalities are the most readily identifiable indicators of market failure in the market for health care, health care markets also suffer from imperfect competition in the sense that many of the conditions for perfectly competitive markets are absent or deficient. For example, many services, such as hospital services, are subject to economies of scale, producers can often influence the level of demand and/or price, and price signals are often absent, particularly where third party reimbursement systems are in operation. In addition, restrictions on supply (due to licensing requirements), irregular and unpredictable demand and the absence of the profit motive on the part of many producers mean that supply and demand do not interact in the manner predicted by standard microeconomic theory (see Arrow, 1963).

2.2.3 GOVERNMENT INTERVENTION IN HEALTH CARE MARKETS

Most importantly however, the assumptions of perfectly informed consumers, the absence of uncertainty and the absence of externalities are violated in health care markets. Efficiency concerns relating to these three features, as well as equity or distributional considerations motivate government involvement in health care. While government may not necessarily involve itself in the direct provision of certain health care services (e.g., GP services), it often has a role in terms of financing, regulation, pricing (e.g. subsidies for those on low incomes) and information provision. Of course, government intervention that is designed to correct market failure may itself lead to efficiency or equity failings (e.g. regulatory capture by vested interests).

2.3 The Economics of GP Behaviour

2.3.1 MODELS OF GP BEHAVIOUR

GPs make, or influence, many resource-using decisions in health care, and in particular when they must act as gatekeepers for access to secondary care services (as in Ireland). In this regard, GPs in Ireland play a pivotal role in providing health services to the population, and by extension, reducing reliance on more costly acute hospital services. GPs are motivated by numerous factors, including financial self-interest, concern for their patients and concern for the social good. There are essentially three models of doctor behaviour (Tussing, 1985):

- self-interest model,
- agency model,
- medical ethics model.

In the self-interest model, the doctor maximises his or her own welfare or utility in making decisions about patient health care

utilisation. In the agency model, which is most frequently employed in describing the doctor-patient relationship, the doctor acts on behalf of the patient by making decisions that are consistent with how the patient would act if he or she had the same information as the doctor, i.e., the doctor maximises the welfare or utility of the patient. However, the necessity for patients to reveal all relevant information to their doctor diminishes the potential for perfect agency. Indeed, the doctor may not have enough information about the utility function of the patient in order to be a perfect agent (Dionne and Contrandriopoulos, 1985 and Scott and Vick, 1999).

While doctors obviously care about their income and respond to financial incentives, their decisions are also influenced by general behavioural norms as well as norms peculiar to the medical profession. The less frequently employed medical ethics model has been developed in this framework, and assumes that doctors maximise the health of the patient, regardless of cost (Tussing, 1985). In other words, doctors are strongly influenced by ethical codes, to which members often swear oaths, to treat patients regardless of economic considerations. However, there is little information on the relative importance of the different theories of doctor behaviour, or how different influences (doctor incomes, patient health etc.) might be traded-off against one another in practice (Hausman and LeGrand, 1999).

2.3.2 SUPPLIER-INDUCED DEMAND

A key focus of the theoretical and empirical literature has been, in the context of the self-interest model of doctor behaviour, the extent to which doctors are willing and able to influence demand for their services, and by extension, stimulate demand for their services beyond a point deemed economically efficient. In effect, the key characteristic of demand inducement is not that the doctor influences demand, but rather that the doctor exerts *undue* influence on demand (McGuire, 2001). Most versions of the self-interest model deal with compensatory demand inducement in the context of a system where doctors receive a fee for each service provided (see Section 4 below), i.e., when the ratio of doctors to patients is high, doctors can compensate for the reduction in income by stimulating increased demand for their own services, resulting in utilisation levels and/or fee levels that are higher than would have prevailed if demand was not induced (Tussing, 1985).

However, this theory cannot explain why there seems to be a limit to the extent to which doctors induce demand under such a scenario. The target income hypothesis has been developed to deal with this anomaly: doctors satisfice rather than maximise profits by seeking targets in terms of income and workload that are consistent with experience in other professional markets. Another explanation for the observed limit to self-interested behaviour is that doctors derive disutility from demand inducement, either from guilt, negative responses of patients to inaccurate or inappropriate information and the possibility of peer review and outside scrutiny (see Tussing and Wojtowycz, 1986a and Pauly, 1988). Indeed, Van

Doorslaer and Guerts (1987) argue that doctors trade-off utility from real income with utility from some sort of 'ethical behaviour', so that for example, when income is reduced exogenously, the marginal utility of income is raised so that doctors are willing to suffer the marginal disutility of increased demand inducement. In addition, the fact that doctor-patient relationships are often long-term and characterised by repeated transactions may reduce the potential for inefficient behaviour. Over time, the doctor may make more informed decisions on the basis of increased and better knowledge of the patient, their medical history, social situation etc. (Scott, 2001). Rossiter and Wilensky (1984) similarly introduce the patient's financial burden as a limiting factor on demand inducement. Doctors run the risk of patients resenting increases in induced demand, particularly when out-of-pocket expenses are high. Essentially, however, the major catalyst for potential demand inducement behaviour is a change in doctor income, whether that occurs as a result of a changing physician/population ratio or a change in reimbursement method. Section 2.5 reviews the empirical literature on the identification of supplier-induced demand.

2.3.3 GP REIMBURSEMENT

In order to understand how economic incentives may influence a doctor's decision making, it is necessary to know how doctors' incomes are determined (Tussing, 1985). There are three primary means of reimbursing doctors: capitation, fee-for-service and salary (with the mixed method involving some combination of the three). Under capitation, the doctor is paid a fixed fee for each patient registered on his or her list. The payment is usually weighted by various characteristics that determine utilisation such as age and gender, and is generally paid prospectively. However, the risk factors used in calculating capitation payments usually only explain a small proportion of variance in health care utilisation, and as such are an imperfect proxy for patient heterogeneity (Lurås, 2004). Capitation payments give doctors an incentive to attract and compete for patients but it may also encourage doctors to engage in 'cream-skimming' by selecting only those patients who are expected to generate a low workload (Scott, 2001). They also provide incentives for doctors to reduce workload by minimising time spent with patients, reducing return consultations and referring patients on to secondary care as early as possible. In addition, capitation systems are costly to administer, not least because payments are often tailored to the risk status of the patient and a system of patient registration is essential.

Under fee-for-service, doctors receive a payment for each service rendered. The fee is usually predetermined, with additional fees added for home or out-of-hours consultations, or additional services such as suturing or eye tests. Fee-for-service payments are tied directly to the amount of services provided, which clearly creates incentives towards demand inducement on the part of doctors (either in terms of return visits or ancillary services such as extra tests). On the other hand, fee-for-service promotes

'productivity' in that doctors are encouraged to increase activity (Kristiansen and Mooney, 1993). The administrative costs of fee-for-service schemes depend on who bears the cost, with the costs much higher if the State is reimbursing doctors in comparison with direct out-of-pocket payments by patients. As fee-for-service payments are retrospectively administered, the uncertainty associated can generate considerable costs for the payer. In general, salary payments involve a fixed amount of money for a time period. Salary payments are administratively easy, and encourage the provider to contain costs (Gosden *et al.*, 2006). However, they do provide incentives for doctors to reduce workload in the same manner predicted by capitation payments.

In many systems, a mixture of all three methods is employed, partly in recognition of the trade-offs involved in relying on one system only. For example, fee-for-service may be more costly because of income-motivated behaviour among doctors, while capitation may provide incentives for doctors to engage in 'cream-skimming'. In addition, the relative size of the different components of the payment has implications not just for how particular health care services are delivered, but also how the different components interact, e.g., how the GP service interacts with other secondary care services. However, while much of the literature recommends a mixed system of doctor reimbursement (see for example, Ellis and McGuire, 1991), the optimal mix between capitation, fee-for-service and salary is still open to question. In addition, the extent to which doctors are influenced by the way in which they are paid is dependent on the particular theory which governs their behaviour; if we believe that doctors are motivated purely by medical ethics, then the method of reimbursement should have no impact on doctor behaviour. However, it is possible that no one theory describes doctor behaviour, with doctors' behaviour influenced by all three factors (self-interest, agency and medical ethics) and as such, the method of reimbursement should influence doctor behaviour. In addition, while much empirical work focuses on the quantity of care provided (see the following section), it is just as likely that the method of reimbursement also affects patterns and types of care (Gosden *et al.*, 2006).

2.3.4 GP INCENTIVES IN IRELAND

In Ireland, GPs' incentives with regard to the provision of services are influenced not only by the reimbursement method, but also more importantly by the fact that the reimbursement method differs between medical card and private patients. For medical card patients, for whom they receive a capitation payment weighted for the age, sex and distance from the doctor's surgery of the patient, they have an incentive to maximise the size of their patient list, yet to minimise the time spent with these patients, to minimise the services provided to these patients (except for certain "special items of service" such as suturing and vaccinations for which they receive a separate fee-for-service payment), to discourage repeat consultations and to refer such patients to secondary care as soon as

possible. For private patients on the other hand, the GP has an incentive to maximise the amount of services provided, including encouraging repeat consultations and discouraging referral to other practitioners and secondary care. In theory, GPs cannot refuse to accept an eligible medical card patient onto their GMS list, and as such there should be no 'cream-skimming' behaviour by GPs in Ireland. However, it is possible that GPs may choose to locate in areas with more favourable health and social profiles, and there is some evidence for this based on claims that GMS appointments are increasingly difficult to fill in rural and certain deprived urban areas (FÁS, 2005).

With the extension of medical card cover to all those aged over 70 in July 2001, a further distortion was introduced into the market. GPs are reimbursed in two different ways for the over 70s, depending on whether the individual previously held a medical card. GPs receive a capitation payment for 'new' over age 70 medical card patients that is between 2.6 and 4.6 times higher than that received for 'old' over age 70 medical card patients (based on 2004 data; see General Medical Services Payments Board, 2005). As the 'old' over 70s are on average on lower incomes and in poorer health than the 'new' over 70s, this creates an incentive for GPs to minimise workload for a very vulnerable section of the population (see also Section 4.5).

2.4 Empirical Evidence on Doctor Behaviour and Incentives

2.4.1 INTERNATIONAL EVIDENCE

Empirical studies of doctor behaviour have primarily concentrated on identifying supplier-induced demand in the context of the self-interest model of doctor behaviour. Empirical evidence for supplier-induced demand has concentrated on two different features of the market that potentially lead to self-interested behaviour on the part of doctors: the supply of doctors as represented by the doctor-population ratio, and the method of reimbursing doctors. The majority of studies attempt to test for supplier-induced demand by analysing the effect of doctor supply or reimbursement on the utilisation of health services (although some studies also examine expenditure). However, health services utilisation or expenditure is an imperfect proxy for doctor behaviour, and a number of studies attempt to refine the identification of supplier-induced demand by distinguishing between visits that are initiated by the patient and those that are initiated by the doctor (see Wilensky and Rossiter, 1983, Rossiter and Wilensky, 1984) or by concentrating on return visits only, which are assumed to be primarily initiated by the doctor (see Tussing and Wojtowycz, 1986a, 1986b).

Studies that attempt to identify supplier-induced demand on the basis of an examination of the doctor-population ratio essentially test the impact of an exogenous income shock on demand (Scott, 2001). The idea is that an increase in the supply of doctors depresses doctor income, and therefore encourages demand inducement behaviour. Among the empirical literature, there is no clear-cut evidence in favour of demand inducing behaviour in this

context, and even where a significant effect is reported, the magnitude of the effect is often very small (Rossiter and Wilensky, 1984 and Gruber and Owings, 1996). The divergence in results highlights the many methodological and data problems that plague studies of this kind, with researchers relying on imperfect data that must proxy doctor behaviour and incentives. In particular, there are concerns over potential multi-collinearity between the doctor-population ratio and other location-specific factors such as income, insurance coverage or time and access costs that influence demand, and over the direction of causality in studies of this type, i.e., do doctors induce demand in areas with high doctor-population ratios, or do doctors locate in areas with high need for their services? (see in particular, Evans, 1974, Fuchs and Newhouse, 1978, Cromwell and Mitchell, 1986, Birch, 1988, Rice and Labelle, 1989, Grytten *et al.*, 2001 and Scott, 2001).

In part in response to the many criticisms of the empirical literature examining the impact of doctor/population ratio on the behaviour of doctors, more recent research has concentrated on the identification of supplier-induced demand in the context of the method of reimbursing doctors. Grytten and Sørensen, 2001 examine demand inducement in the context of the Norwegian system of GP care where there are two different systems of reimbursement for GPs; approximately 75 per cent of Norwegian GPs are contract GPs and receive a fixed fee-for-service payment from their local municipality for every visit and for any additional laboratory tests that they provide, while the remaining 25 per cent of GPs receive a fixed salary. However, they find no significant difference in the mean number of laboratory tests between contract and salaried doctors or in the proportion of visits lasting longer than twenty minutes (for which contract doctors receive additional payments over an above their fixed fee). In a survey of twenty-three empirical studies on the effect of different payment methods on doctor behaviour, Gosden *et al.*, 1999 find that salary and capitation methods reduced activity (tests, referrals etc.) compared with the fee-for-service payment method. On the other hand, Kristiansen and Mooney (1993) find that both the length of a GP consultation and the probability of a repeat consultation are not significantly associated with the method of remunerating GPs (comparing salary and fee-for-service methods).

Essentially, the empirical literature has attempted to examine the reaction of doctors to a negative income shock, whether that is represented by an increase in the doctor/population ratio, a change in reimbursement or another exogenous shock. For example, Gruber and Owings (1996) found that declines in fertility in the US over the period 1970-1982 (representing a negative income shock for obstetricians/gynaecologists) were significantly associated with an increase in caesarean section deliveries. Given that caesarean section deliveries are more favourably reimbursed, they interpret this as evidence in favour of demand inducement behaviour. Tussing (1998) undertook a similar analysis, and found the exactly opposite result, i.e., that in 1986 the relationship between the

caesarean section delivery rate and the county ratio of obstetricians to fertile females was significantly negative (suggesting that time constraints on busy obstetricians forced them to recommend the quicker caesarean section method).

Rather than attempting to infer GP decision-making from analyses of utilisation behaviour, McKinlay *et al.* (1996) designed an experiment that involved presenting a random sample of doctors with various videotaped scenarios, in an attempt to ascertain whether non-medical factors such as age, sex, race, coverage by health insurance and socio-economic status impacted on medical decision making. Examining diagnosis, treatment and prognosis decisions, the authors found little or no significant effects of non-medical factors. While there has been some attempt to distinguish between visits that are initiated by the doctor and initiated by the patient, the fact remains that demand inducement behaviour may take more subtle forms that a simple increase in visits (see also Hay and Leahy, 1982). Rice and Labelle (1989) state that demand inducement may more accurately be identified in terms of increased complexity of treatment or the ordering of ancillary services, aspects of care that are typically not quantified in the data employed in empirical research. In addition, it may be the case that much supplier-induced demand is due to uncertainty in diagnosis and treatment, rather than economically motivated (Tussing and Wojtowycz, 1986b). Nonetheless, while clear-cut evidence of supplier-induced demand has been difficult to obtain, there is ample evidence that doctors (including GPs) do respond to financial incentives. Croxson *et al.* (2001) show how GPs in the UK responded to the introduction of the GP fundholder scheme, while Dusheiko *et al.* (2003) show how they responded to its abolition.

Consistent with the view that there is some limit on the extent of demand inducement that doctors can engage in, Rossiter and Wilensky (1984) find that the most important determinant of doctor-initiated expenditures is the health insurance status of the patient, with those on Medicare or with private health insurance having significantly higher doctor-initiated expenditures than those without any health insurance. This reinforces the notion that doctors consider their patients' financial burden in making decisions about their care. In addition, even doctors with no regard for ethical or altruistic concerns face a limit to their demand inducement behaviour due to the effort involved in the activity (Dranove, 1988). Of course, the incentives towards demand inducement may also be affected by other factors, such as the degree to which the patient must bear the full cost of care (see Rossiter and Wilensky, 1984 and Tussing, 1985); the source of payment (see Sandier, 1990); the type of service (see Gruber and Owings, 1996 and Cromwell and Mitchell, 1986); the degree of monopoly power exerted by the

physician (see Stano, 1987a, 1987b);[1] the relative diagnostic skills of the physician and patient (see Dranove, 1988 and Hay and Leahy, 1982); and the expected duration of the relationship between the physician and patient (see Dranove, 1988). However, Hay and Leahy (1983) find that individuals with a medical professional in the family have significantly higher levels of physician office visits and hospital visits, contradicting the expected result that those with medical professionals in the family should have significantly lower levels of utilisation (if demand inducement behaviour is in evidence).

2.4.2 IRISH EVIDENCE

As explained above, the Irish system of reimbursing GPs differently for medical card and private patients creates incentives for GPs to treat the two categories of patients differently, and it is this feature of the market that has motivated empirical work in the area. Prior to 1989, GPs were reimbursed on a fee-for-service basis for both medical card and private patients, the former being paid by the State. Focusing specifically on the behaviour of GPs under this system, Tussing and Wojtowycz (1986a) and (1986b) and Tussing (1983) and (1985) examined the influence of three possible indicators of supplier-induced demand (doctor-population ratio, medical card status and per capita income) on the probability of a return visit being arranged. The studies focused on return visits, as these are deemed to be primarily a result of doctor, rather than patient, decisions. All studies find significant differences in the probability of a return visit being arranged for all three of their indicators of supplier-induced demand (doctor-population ratio, medical card status and per capita income). While the studies do not include any controls for health status, the significant positive effect for medical card status suggests that demand inducement is significantly more likely for individuals who do not have to pay the cost of a GP visit. In part in response to these findings, the method of reimbursing doctors for medical card patients was changed from fee-for-service to capitation in 1989.

A study by Madden *et al.* (2005) focused on this change in reimbursement policy in 1989, and analyses whether the change in reimbursement method had any effect on differences in GP visiting rates between medical card and private patients. If GPs in Ireland were engaging in demand inducement on the part of their medical card patients prior to 1989, the expectation would be that the difference in GP visiting between medical card and private patients would fall after the change in reimbursement for medical card patients from fee-for-service to capitation. This study is discussed more fully in Section 4.4.1, but the authors find no significant change in the difference in GP visiting between medical card and

[1] Indeed, Stano (1987a) argues that if increases in the supply of physicians increase physician competition, then individual physicians' level of demand inducement will likely diminish.

private patients before and after the change in reimbursement method. So the available evidence on the extent, if any, of demand inducing behaviour on the part of Irish GPs is mixed. On the other hand, a recent study by Fadden (2003) examined the prescribing behaviour of GPs before and after the extension of medical card eligibility to all over 70s in 2001, and found that GPs prescribed fewer generics and more expensive drugs for previously private patients, i.e., the 'new' over 70 year olds.

2.5 The Economics of Patient Behaviour

2.5.1 PRICE AND THE DEMAND FOR HEALTH CARE

On the demand side, patients' incentives with regard to the utilisation of health services are primarily affected by the price that they face. For equity or distributional reasons, universal access to free or heavily subsidised public health services is a widely accepted principle of European health systems. However, the prevalence of universal entitlement to free public health services, as well as private health insurance for services not covered by the public system, results in monetary costs for health care services that are effectively zero. From the patient's perspective, therefore, usual price signals are absent, with the result that there is little incentive to control utilisation to an efficient level. Moral hazard is the term used to describe changes in behaviour that result from low or zero marginal prices (usually in the context of insurance; see Pauly, 1968). To encourage patients to become more aware of the resource-using implications of their behaviour (although other objectives such as raising revenue, controlling spending and enhancing equity may be more important influencing factors), most systems now involve some form of cost-sharing, either through co-payments, co-insurance or deductibles. However, other objectives such as raising revenue, controlling spending or enhancing equity may be more important influencing factors (Nolan, 1993b). In the light of the possible trade off between cost sharing and equity of access, protection for lower income groups or those who are chronically sick in terms of exemptions from, or reduced, charges is common. In the wider context, different prices for different services are often implemented in an attempt to re-direct demand towards more appropriate or efficient levels of care.

However, even if charging regimes are carefully designed to ensure that low income or vulnerable sections of the population are not disproportionately affected, cost sharing may have a limited impact given that doctors, rather than patients, make most resource-using decisions in health care. In addition, there are concerns that while charges seek to make patients more aware of the cost implications of their health care decisions, they may reduce 'necessary' as well as 'unnecessary' consultations,[2] thus increasing the tendency to incur higher costs at a later stage of illness. Different pricing regimes for different types of service also need to be carefully designed, to prevent the possible creation of perverse incentives and inefficient behaviour.

2.5.2 PATIENT INCENTIVES IN IRELAND

In Ireland, the two groups of patient face differing incentives with regard to the utilisation of GP services. Medical card patients face only the time and transport costs of a consultation, and while health care in general, and GP services in particular, are a means to an end, rather than a source of utility in their own right, this obviously creates incentives for medical card patients to utilise more GP services than is economically efficient. Private patients on the other hand face the full monetary cost. The availability of private health insurance in Ireland acts to further distort private patients' incentives with respect to the utilisation of primary and secondary care services. The majority of private patients also hold private health insurance, which primarily covers the cost of private hospital care, provided in both public and private hospitals. While GPs act as gatekeepers for secondary care services in Ireland, the fact that private patients must pay in full for a GP consultation, yet receive free or heavily subsidised acute hospital services creates an incentive on the part of private patients to favour more costly secondary care services. In addition, the new 'GP visit' medical card will create perverse incentives for individuals to favour GP services over other more appropriate primary care services such as physiotherapy or counselling (Irish College of General Practitioners, 2005).

[2] Distinguishing between 'necessary' and 'unnecessary' consultations is difficult; it is difficult for medical experts to make a judgement on the value of a consultation after it has taken place and it is even more difficult for a patient to do so when deciding whether to visit or not (since the objective is often to see whether subsequent medical treatment is necessary) (see also Nolan and Nolan, 2006).

2.6 Empirical Evidence on Patient Behaviour and Incentives

2.6.1 INTERNATIONAL EVIDENCE

An extensive literature has analysed the impact of differing degrees of cost sharing on the utilisation of health services, and has confirmed that higher charges are associated with lower levels of health services utilisation. One of the most extensive studies of the impact of charging on the utilisation of health services is the RAND Health Insurance Experiment (HIE), which began in 1972 and lasted until 1981. Individuals were randomly assigned to a number of different insurance plans, which differed in the degree of cost sharing for health services. The study assessed the impact of these differing levels of cost sharing on the use of health services, health status and patient satisfaction. The study found that the larger the degree of cost sharing, the larger the reduction in use, although paradoxically, the overall effect on health outcomes was small (see Manning *et al.*, 1987 and Keeler, 1992). Much of the recent literature has attempted to identify a moral hazard effect of insurance on the utilisation of various health services, and to distinguish this effect from the possibility that those with insurance are likely to be in poorer health than those without (see Buchmueller *et al.*, 2002; Cameron *et al.*, 1988; Chiappori *et al.*, 1998; Harmon and Nolan, 2001; Holly *et al.*, 1998; Hurd and McGarry, 1997; Jones *et al.*, 2002; Schellhorn, 2001; Vera-Hernandez, 1999; and Waters, 1999). While the majority of these studies examine the influence of insurance on the demand for GP services, Jones *et al.* (2002) and Harmon and Nolan (2001) examine the role of private insurance on the demand for specialist visits. Waters (1999) does not distinguish between different health care providers and Holly *et al.* (1998) analyses in-patient stays in hospital.

In New Zealand, the community services card (CSC) operates in a similar manner to the Irish medical card, except that it covers a larger proportion of the population (approximately 50 per cent) and cardholders receive a subsidy from the government for each GP visit (equivalent to approximately one-third of the full cost), rather than free GP visits in the Irish case. Examining the utilisation of GP services, Scott *et al.* (2003) found that even after controlling for need (age, gender and various measures of health status) and other socio-economic characteristics, cardholders were significantly more likely to visit their GP, and those on low incomes were significantly less likely to visit their GP. They interpret the latter result as evidence that even with subsidised GP visiting, those on low incomes still face significant financial barriers to accessing GP services.

2.6.2 IRISH EVIDENCE

In Ireland, previous empirical research has concentrated on the role of differential prices for GP services between medical card patients and private patients in influencing differences in GP visiting behaviour between the two groups. Such research has confirmed that even after controlling for a variety of socio-economic and health status differences across the two groups, medical card patients have significantly higher GP visiting rates than private

patients (see Tussing, 1983 and 1985; Nolan, 1991 and 1993a; Madden *et al.*, 2005; Nolan and Nolan, 2003 and 2006; and Nolan, 2006a and 2006b).

While most analyses of demand side incentives have been concerned with the effect of price on the number of GP visits, there has been little analysis of the effect of incentives on the full sequence of patients' decisions, namely, which practice to register with/join, when to seek medical care and from whom, which doctor to choose within the practice, what treatment to undergo, whether to return for a repeat consultation etc. (Scott, 2001). In addition, patients are also affected by time and access costs, as well as purely financial costs. For example, those that are employed (and who consequently face higher opportunity costs of time) are often observed to have fewer health care consultations than those that are economically inactive (Nolan, 2006b). Patients may also be influenced by the relative costs of different forms of care. For example, in Ireland up to the late 1990s, the cost of an A&E visit was substantially less than a GP visit, providing an incentive for private patients to substitute relatively cheaper A&E services for more costly GP visits.

The starting point for research summarised in Chapters 3 and 4 is a comprehensive study of various aspects of the Irish health care system, primarily GP services, by Tussing (1985). While this study was the first attempt to explain variations in GP utilisation patterns in Ireland, the nature of the data meant that important influences on demand such as income and health status could not be quantified. However, Tussing did present some evidence in favour of demand inducement by GPs in terms of arranging return visits[3] and this influenced the change in the policy for reimbursing GPs for their medical card patients from fee-for-service to capitation in 1989. The research by Nolan (1991) and (1993a) represented an important addition to this body of research in Ireland by examining the determinants of GP utilisation rates using a more detailed data set, which allowed the influences of variables not available to Tussing such as income, social class and various measures of health status to be quantified. The results confirmed the findings of Tussing that those with medical cards consume significantly more GP services than those without, although the magnitude of the effects was somewhat reduced due to the inclusion of detailed health status variables. A more recent study by Kelleher and McElroy (2002) specifically focuses on the determinants of the number of GP visits per household among those households with at least one member with a medical card. The objective of this research was to identify

[3] Tussing (1985) presented evidence for demand inducement by GPs on the basis of the results of logistic regressions of the probability that the most recent GP visit resulted in a return visit being arranged. The coefficients on GP density of area of residence (positive), medical card ratio of area of residence (negative) and medical card eligibility of the individual (positive) were all statistically significant at the one per cent level, which are all consistent with evidence in favour of demand inducement by GPs.

the influence of factors other than age and sex that are used to calculate the (weighted) capitation payment that GPs receive from the General Medical Services Payments Board. They find that additional variables such as location, social class, education and health status are also highly significant and recommend that these be incorporated into the weighted capitation formula used to remunerate GPs for their medical card patients (see also Section 4.5 of Chapter 4).

An interesting avenue of research on the impact of economic incentives is offered by a comparison of GP visiting in Northern Ireland and the Republic of Ireland. All residents of Northern Ireland are entitled to free GP services, while only the 30 per cent of the population of the Republic on low incomes are entitled to free GP services. Given the similarity in the population structure in Northern Ireland and the Republic of Ireland, but the difference in patient incentives with regard to the utilisation of GP services, recent research has found that private patients in the Republic (particularly those in the middle of the income distribution) have significantly fewer GP visits than their counterparts in Northern Ireland (see McGregor *et al.*, 2006 and further discussion in Chapter 5).

2.7 Summary and Conclusions

The purpose of this chapter was to outline the financial incentives facing both patients and doctors as a result of the current system of eligibility for free GP care in Ireland. One of the most distinctive features of health care markets is the presence of asymmetric information between patient and doctor, and much theoretical and empirical research has examined the influence of the doctor reimbursement method in influencing doctor behaviour in such a context. In Ireland, GPs' incentives towards the treatment of medical card and private patients differ as GPs receive a capitation payment for the former and fee-for-service payments for the latter. Empirical evidence from the 1980s, when GPs received a fee-for-service payment for the two groups of patient, confirms that such financial incentives do influence GPs' behaviour. In terms of patient behaviour, the difference in relative prices facing medical card and private patients is key, and research from the 1980s and early 1990s (which we build on subsequently in Chapters 3 and 4) once again confirms that such incentives do influence the behaviour of patients. Before focusing on the impact of the current system of eligibility for GP care on the behaviour of patients and GPs in the Irish setting in Chapter 4, the following chapter (Chapter 3) presents a descriptive analysis of GP visiting in Ireland, as well as a more detailed analysis of the determinants (such as age; gender; health status; income; medical card eligibility etc.) of differences in GP visiting rates across the population.

3. THE UTILISATION OF GP SERVICES

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3.1 Introduction

Chapters 1 and 2 outlined how GP services in Ireland are financed and delivered, and how the interaction between the public and private systems impacts on the behaviour of both doctors and patients. In this chapter, we move on to detail patterns of GP visiting across the population. In Section 3.2 we describe the data-sets used in this analysis, and in the analyses in the following chapter, namely the 1995-2001 Living in Ireland Surveys, the 2001 Quarterly National Household Survey and the 2004 EU-Statistics on Income and Living Conditions. In Section 3.3, we begin the analysis of GP visiting patterns by firstly describing how GP visiting patterns vary according to various individual and household socio-economic characteristics. We relate GP visiting by the individual to his or her 'need' for health care (as proxied by their age, gender and health status), 'non-need' factors such as education level, labour force status, household location etc. and finally, the financial incentives facing both the individual and the doctor (i.e., eligibility for free care and household income). 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 is useful for highlighting possible horizontal inequities in GP visiting rates across different population groups (see Morris *et al.*, 2005).

However, many of these individual and household characteristics are highly correlated with each other (for example, medical card eligibility is highly correlated with health status). In Section 3.4, we therefore move on to use multivariate regression techniques, which help in gaining a better understanding of the independent effects of each of the different variables on the utilisation of GP services. Section 3.5 analyses new data on GP visiting in the 2004 EU-SILC. Section 3.6 presents some international comparisons, including a brief comparison of GP visiting in Northern Ireland and the Republic of Ireland (an issue dealt with more fully in Chapter 5). Section 3.7 summarises and concludes.

3.2 Data Sources

3.2.1 LIVING IN IRELAND SURVEYS (LIIS)

The LIIS constitutes the Irish component of the European Community Household Panel (ECHP), which began in 1994 and ended in 2001. The ECHP involved an annual survey of a representative sample of private households and individuals aged 16 years and over in most of the then EU-15 member states, and was based on a standardised questionnaire. Where possible, the same households were followed through time. Each adult (16+ years) completed a personal questionnaire, which collected a wide range of information on individual socio-economic characteristics, including various aspects of health status (both physical and psychological) and health services utilisation. A household questionnaire was also completed, containing information on housing, income and financial situation and household size and composition.

For the purposes of this study, we use data from the 1995 to 2001 surveys (as GP, dentist and optician visits are not separately identified in 1994). While the rate of sample attrition in the LIIS is quite high with only 37.5 per cent of those interviewed in 1995 still participating in the survey in 2001, the 2000 survey added a substantial new random sample which comprised about half the households interviewed. To further reduce bias due to selective attrition, the sample for analysis was re-weighted to ensure representativeness in terms of a variety of demographic and socio-economic characteristics (see Russell *et al.*, 2004 for further details). In 1995, the sample size was approximately 8,500 individuals, and this had fallen to just under 5,400 individuals by 2001. For the presentation of GP visiting patterns and multivariate estimation results in this chapter, we concentrate on data from 1995 and 2001 only, but in Section 4.2.2 of Chapter 4 we use the full longitudinal data-set (i.e., 1995-2001 inclusive).

3.2.2 QUARTERLY NATIONAL HOUSEHOLD SURVEY (QNHS)

The QNHS is carried out each quarter with the primary purpose of gathering information on participation in the labour force, and approximately 40,000 adults (18+ years) are surveyed each quarter. Each survey also contains an add-on survey relating to special social topics of interest, and in the third quarter of 2001 (June-August), over 40,000 individuals provided information on various aspects of their health status and use of health services, as well as their labour force characteristics. While the sample of individuals is much larger than for the LIIS, the range of socio-economic characteristics collected in the QNHS is much smaller, and much of the information is often not directly comparable with that from the LIIS (e.g., whereas GP utilisation is collected in terms of the number of visits in the previous year in the LIIS, it is collected in terms of whether or not the individual had at least one visit in the last two weeks in the QNHS).

3.2.3 EU STATISTICS ON INCOME AND LIVING CONDITIONS (EU-SILC)

EU-SILC is the successor to the ECHP, and the first such survey in Ireland was carried out by the Central Statistics Office (CSO) in the second half of 2003, making Ireland only one of six member states to participate in the pilot survey (see Maitre *et al.*, 2006). The second round of EU-SILC in 2004 included thirteen of the old EU-15 and most of the new member states, as well as Iceland. In 2005, EU-SILC reached its full scale with the involvement of all EU member states plus Iceland and Norway. Like the LIIS, EU-SILC collects a wide range of information on the socio-economic characteristics of both individuals (16+ years) and households, with the health information following closely that collected in the LIIS. However, information on the utilisation of GP services is only asked of those with medical cards, and in addition, the reference period is different again, referring to the number of free GP visits in the previous four weeks. On the other hand, EU-SILC does contain limited information on foregone visits to doctors and dentists, and the reasons (including cost) underlying this decision. We use the first complete wave of data (i.e., for 2004), which contains approximately 10,500 individual observations. Appendix I provides exact descriptions for each of the health and socio-economic variables used in this study for all three data sources.

3.3 GP Visiting in the 1995 and 2001 Living in Ireland Surveys

3.3.1 DESCRIPTIVE STATISTICS ON GP VISITING PATTERNS

Tables 3.1-3.12 present GP visiting patterns from the 1995 and 2001 LIIS by age, sex and various indicators of health status (i.e., so-called 'need' variables) and then by level of education; employment status; marital status; household location; household income and medical card eligibility (i.e., so-called 'non-need' variables). All data are weighted to ensure that statistics are representative of the national population, and observations with GP visits in excess of 104 per annum are excluded from the analyses.

From Table 3.1 we can see that the average number of GP visits per annum was 3.5 in 1995 and 3.3 in 2001. Just over 70 per cent of the adult population had at least one GP visit in the previous year in 1995, and this proportion had risen to nearly 74 per cent in 2001. Of those visiting at least once, the average number of GP visits was 5.0 in 1995 and 4.7 in 2001, which suggests that while more individuals are visiting their GP at least once, they visit less frequently now than in earlier years.

Table 3.1: Aggregate GP Visiting Patterns

	1995	2001
Average number of GP visits	3.5	3.3
Proportion with at least one GP visit in previous twelve months	70.4	73.8
Average for those with at least one GP visit	5.0	4.7

Table 3.2 presents GP visiting patterns by age and sex. Overall, GP visiting is an increasing function of age, with those aged 75 years having over three times as many GP visits as those aged 16-24 years. The proportion visiting their GP at least once a year also increases with age, with nearly 95 per cent of those aged 75+ visiting their GP at least once a year, in comparison with approximately 60 per cent of those aged 16-24 years. Females have both a higher average number of GP visits per annum, and also visit their GP at least once a year in higher proportions than males. However, the age gradient is steeper for males than for females, possibly due to GP visits as a result of pregnancy and childbirth for younger females. For example, men aged 75+ have approximately four times as many GP visits as men aged 16-24 years, while the corresponding figure for women is approximately three times as many GP visits.

Table 3.2: GP Visiting Patterns by Age and Sex

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Males				
16-24	1.6	1.4	51.0	52.5
25-34	1.7	2.1	59.4	60.0
35-44	2.4	1.7	60.1	61.5
45-54	2.8	2.5	61.7	66.9
55-64	4.2	3.5	72.6	77.3
65-74	5.0	5.1	82.1	92.1
75+	6.6	6.3	93.8	94.2
Total	2.8	2.6	63.1	66.5
Females				
16-24	2.8	3.0	67.4	73.4
25-34	4.2	3.4	76.4	82.6
35-44	3.7	3.3	74.5	74.0
45-54	3.7	4.1	77.5	79.8
55-64	4.9	4.1	80.9	82.5
65-74	6.3	6.0	89.5	92.7
75+	8.3	7.4	95.2	96.2
Total	4.3	4.0	77.6	80.9
All				
16-24	2.1	2.2	58.7	62.9
25-34	3.0	2.7	68.1	71.0
35-44	3.1	2.5	67.3	67.9
45-54	3.2	3.3	69.4	73.3
55-64	4.5	3.8	76.8	79.9
65-74	5.7	5.6	86.1	92.4
75+	7.6	7.0	94.7	95.4
Total	3.5	3.3	70.4	73.8

In Tables 3.3 to 3.6 we present GP visiting patterns by various indicators of physical and psychological health status, namely, the individual's self-assessment of their own health status, whether the individual has a chronic condition, the individual's perception of the severity of this condition and levels of psychological distress. There is a clearly increasing relationship between the average number of GP visits per annum and worsening levels of self-assessed health status, with those in very bad health reporting 6.8 times more GP visits than those aged 16-24 years in 1995; by 2001, this differential had increased to 8.9 times more visits (Table 3.3). Similarly, nearly all

of those in very bad health have a least one GP visit per annum, in comparison with approximately 60 per cent of those in very good health. The patterns by chronic illness tell a similar story; those who report that they suffer from "a chronic physical or mental health problem, illness or disability" have a higher total number of GP visits per annum and visit their GP in greater proportions than those without such conditions in both years (Table 3.4). Focusing on those who report a chronic illness, Table 3.5 presents GP visiting patterns by the individual's self-assessment of the severity of their condition. Those who report that they are severely limited in their daily activities have approximately twice as many GP visits per annum as those who are not hampered in their daily activities, although there is less variation in the proportions visiting their GP at least once as the severity of the illness increases (suggesting that the frequency of visits for those who visit at least once is much higher for those who are slightly or severely hampered in their daily activities). From Table 3.6, we can see that those who are deemed to be in psychological distress[1] have over twice as many GP visits as those who are not regarded as psychologically distressed, and nearly 90 per cent of such individuals visit their GP at least once a year, in comparison with approximately 70 per cent of individuals who are not classified as psychologically distressed.

Table 3.3: Visiting Patterns by Self-Assessed Health Status

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Very good	1.8	1.7	58.8	63.5
Good	3.1	3.0	73.2	76.0
Fair	7.5	7.6	92.6	95.8
Bad	12.7	10.5	93.5	99.8
Very bad	12.3	15.2	97.8	98.7
All	3.5	3.5	70.4	73.8

Table 3.4: GP Visiting Patterns by Chronic Illness

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
No chronic illness	2.2	2.2	65.1	67.8
Chronic illness	8.8	7.4	92.3	95.6
All	3.5	3.5	70.4	73.8

[1] Scores from the General Health Questionnaire (GHQ) are used to construct a variable indicating psychological health status. The GHQ contains twelve questions relating to psychological health status. For the six positive statements, a person scores one if they answer "less than usual" or "much less than usual" while for the six negative statements, a person scores one if they answer "more than usual" or "much more than usual". An example of a positive statement is "have you recently been able to concentrate on whatever you're doing?" while an example of a negative statement is "have you recently lost much sleep over worry?" These scores are added up and constitute an ordinal variable indicating the degree of psychological distress; anyone scoring above the conventional threshold of two is considered to be in psychological distress (see also Nolan, 1993a).

Table 3.5: GP Visiting Patterns by Severity of Chronic Illness (for those Reporting a Chronic Illness)

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Not Hampered	5.9	5.0	85.9	92.3
Slightly Hampered	8.5	7.0	94.0	96.1
Severely Hampered	11.6	11.2	92.3	98.0
All	8.8	7.4	92.2	95.5

Table 3.6: GP Visiting Patterns by Psychological Health Status

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
No psychological stress	2.9	2.9	69.3	72.3
Psychological stress	6.9	6.7	84.8	87.2
All	3.6	3.4	72.0	74.5

Note: The measure of psychological health status is not available for questionnaires completed by proxy (which account for 13.9 per cent of observations in 1995 and 14.5 per cent of observations in 2001).

We now move on to detail GP visiting patterns by so-called 'non-need' factors, i.e., factors other than age, sex and health status. While differences in GP visiting rates due to need factors such as age and health status is to be expected, examining the variation, if any, in GP visiting rates due to 'non-need' factors such as household location, income or medical card eligibility may highlight possible horizontal inequities in GP visiting across different population groups. Of course, some 'non-need' factors may be highly correlated with 'need' factors (e.g., medical card eligibility is highly correlated with age and health status), and therefore a multivariate analysis of GP visiting is necessary to determine whether GP visiting still varies significantly by such 'non-need' factors, even after controlling for age, sex and health status (see Section 3.3.2). Table 3.7 shows that while the average number of GP visits per annum declines as the level of education increases, the proportions visiting their GP at least once are highest for those with a primary education, followed by those with a third level education, and lowest for those with lower or upper secondary levels of education. This would suggest that while those with a third level education visit their GP in high proportions, they do not visit very frequently (unlike their counterparts with a primary level of education only). GP visiting also shows distinct patterns by individual marital status, with single individuals having both the lowest proportion visiting their GP at least once and average number of GP visits per annum, and widowed persons the highest (Table 3.8).[2] Table 3.9 confirms the expectation that time costs are an important determinant of GP visiting, with those that are employed having a smaller average number of GP visits and visiting their GPs in smaller proportions, than those that are either

[2] GP visiting refers to personal visits only (i.e., visits accompanying children are not included).

unemployed or economically inactive. Examining GP visiting patterns by household location in Table 3.10 suggests that while there was no difference in the average number of GP visits per annum for urban and rural residents in 1995, by 2001, rural residents had a higher average number of GP visits per annum, despite the fact that urban residents visit their GP in greater proportions in both years. When we look in more detail at GP visiting patterns by household location, there is no clear pattern across different areas of the country in GP visiting, except that Galway city has the lowest proportion visiting their GP and the lowest number of GP visits in both years.

Table 3.7: GP Visiting Patterns by Highest Level of Education Completed

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Primary	5.3	5.4	78.0	83.5
Lower Secondary	2.6	3.0	64.3	70.3
Upper Secondary	2.7	2.5	66.5	69.6
Third Level	2.2	2.3	69.2	71.6
All	3.5	3.3	70.4	73.8

Table 3.8: GP Visiting Patterns by Marital Status

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Never married	2.7	2.7	62.8	68.6
Married	3.5	3.4	72.0	75.1
Separated/divorced	3.6	4.1	80.9	78.2
Widowed	7.7	6.0	92.4	91.5
All	3.5	3.3	70.4	73.8

Table 3.9: GP Visiting Patterns by Labour Force Status

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Employed	2.1	2.1	63.5	67.4
Unemployed	2.8	4.1	63.1	72.7
Inactive	5.1	4.9	78.9	82.8
All	3.5	3.3	70.4	73.8

Table 3.10: GP Visiting Patterns by Household Location

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Rural	3.5	3.6	67.6	70.2
Urban	3.5	3.2	72.3	76.3
Open Country	3.4	3.4	66.8	68.5
Village (200-1,499)	4.0	4.6	71.3	78.7
Town (1,500-2,999)	4.4	4.6	69.6	82.8
Town (3,000-4,999)	4.6	4.2	78.6	72.5
Town (5,000-9,999)	3.7	4.8	67.4	78.4
Town (10,000 or more)	3.9	3.5	75.8	74.3
Waterford City	2.5	4.3	59.0	80.4
Galway City	2.2	1.4	63.8	64.6
Limerick City	4.2	3.8	77.6	72.2
Cork City	3.8	3.7	76.4	75.3

Finally, we examine how GP visiting patterns vary by household income and medical card eligibility. Given the unusual system of eligibility for free GP care in Ireland (see Chapters 1 and 2), particular attention in this, and the subsequent chapter, will be devoted to examining how GP visiting varies by income and medical card eligibility. From Table 3.11, we can see that the average number of GP visits per annum declines with increasing income (although the relationship is not linear, with the highest average number of GP visits per annum observed for those in the third income decile in 1995 and second in 2001). GP visiting rates fall sharply after the second/third income decile, reflecting the sharp decline in medical card coverage as we move up the income distribution. In terms of the proportion of the sample in each decile who visit their GP at least once a year, for 1995, there is evidence of a clear U-shaped pattern in the proportion with at least one GP visit per annum; by 2001 however, while the proportions visiting their GP at least once a year does increase for the ninth and tenth (highest) income deciles, the proportions do not reach the levels of those in the bottom three deciles.

Table 3.11: GP Visiting Patterns by Household Income

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
Decile 1 (lowest)	3.9	5.6	71.1	80.2
Decile 2	4.7	5.8	74.5	84.1
Decile 3	5.2	3.7	76.1	76.6
Decile 4	4.2	3.2	68.4	67.9
Decile 5	3.5	3.1	67.1	71.8
Decile 6	3.2	2.6	70.6	71.4
Decile 7	2.9	2.0	65.8	67.7
Decile 8	2.8	2.7	69.3	68.4
Decile 9	2.7	2.2	71.4	76.1
Decile 10 (highest)	2.3	2.3	70.1	73.9
All	3.5	3.3	70.4	73.8

Household income is the primary criterion by which eligibility for a medical card is assessed, and therefore much of the variation in GP visiting between those in the bottom deciles and those at the top

could simply reflect a medical card availability effect. In addition, the widening gap between the top and bottom of the income distribution in GP visiting patterns over the period 1995-2001 is not surprising, given the fall in the proportion of the population eligible for a medical card over the period, and the consequent concentration of medical card patients among the poorer sections of the population. Table 3.12 confirms that GP visiting patterns differ considerably by medical card eligibility status, with those holding a medical card having approximately 2.5 times more GP visits per annum and visiting their GPs in greater proportions than those without a medical card.

Table 3.12: GP Visiting Patterns by Medical Card Eligibility

	Average Number of GP Visits		Proportion Visiting at Least Once	
	1995	2001	1995	2001
No Medical Card	2.3	2.3	65.1	67.7
Medical Card	5.7	6.0	80.1	86.9
All	3.5	3.5	70.4	73.8

3.3.2 MULTIVARIATE ANALYSIS OF GP VISITING

While the above tables suggest that GP visiting patterns vary considerably across different sections of the population, many household and individual characteristics are highly correlated with each other. For example, while there is a clear relationship between medical card eligibility and GP visiting, much of the variation in GP visiting across the two groups could simply be due to the fact that medical card patients are, on average, older, on lower incomes and in poorer health than those without medical cards (e.g., while 40.7 per cent of medical card patients report a chronic illness, only 11.5 per cent of non-medical card patients do). We need, therefore, to construct multivariate models that will indicate whether such differences remain when all other possible influences on GP visiting have been controlled for. This necessitates the use of multivariate regression techniques in order to untangle the independent effects of each of the different variables.

As detailed in Appendix I to this chapter, we estimate two separate models of GP visiting; the one-step model examines the determinants of the total number of GP visits per annum, while the two-step model examines the determinants of the contact (the decision to visit the GP) and frequency (the subsequent number of GP visits) decisions separately. In the literature on the utilisation of health services, two-step approaches, which are motivated in terms of a principal-agent view of the decision-making process, are increasingly common. It is a useful approach in that different variables may affect the decision to visit a GP and second, the decision about the number of visits. In addition, the same variables may affect the two stages of the decision in different ways. For example, Hurd and McGarry (1997) find that while income has a positive and significant effect on the contact decision, it is insignificant in determining the frequency of GP visits. They

interpret this effect as consistent with a principal-agent view of the decision-making structure with the GP determining the frequency of GP visits at the second stage. Unfortunately, our data do not allow us to include variables describing the characteristics and incentives of the GP, which are often argued to be important in determining the frequency of GP visits (see Pohlmeier and Ulrich, 1995 and Jimenez-Martin *et al.*, 2001).

Table 3.13 presents estimation results for the one-step model of GP visiting, using LIIS data for 1995 and 2001. The results are presented in terms of marginal effects (i.e., the predicted extra number of GP visits per annum). As expected, health status emerges as the strongest predictor of GP visiting rates in both years. For example, in comparison with those in very good health, those who

Table 3.13: Marginal Effects from One-Step Model of GP Visiting

	1995	2001
Age 25-34 years	0.19	0.28 *
Age 35-44 years	-0.09	-0.29 *
Age 45-54 years	-0.54 ***	-0.14
Age 55-64 years	-0.35 **	-0.10
Age 65-74 years	-0.15	0.20
Age 75+ years	0.38 *	0.21
Female	0.82 ***	1.00 ***
Good	1.02 ***	0.98 ***
Fair	2.85 ***	2.79 ***
Bad or very bad	4.49 ***	4.95 ***
Chronic illness	2.23 ***	1.81 ***
Stress	0.82 ***	0.67 ***
Lower secondary	-0.24 **	-0.21 *
Upper secondary	-0.28 ***	-0.30 **
Third level	-0.09	-0.25 *
Married	0.51 ***	0.52 ***
Separated/divorced	0.69 **	0.67 **
Widowed	0.60 ***	0.49 **
Employed	-0.30 ***	-0.30 ***
Unemployed	-0.43 ***	-0.42 *
Rural	-0.12 *	-0.02
Income 3	0.30 **	-0.18
Income 4	-0.00	-0.25 *
Income 5	0.14	0.59 ***
Income 6	0.56 ***	-0.06
Income 7	0.39 **	-0.36 **
Income 8	0.50 ***	0.15
Income 9	0.62 ***	-0.16
Income 10 (highest)	0.71 ***	0.22
Medical Card	1.20 ***	1.06 ***
N	7,218	5,309
Log-Likelihood	-15,337.3	-11,512.8

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.

assess their own health as bad or very bad had nearly five extra GP visits per annum in 2001. Those with a chronic illness and in psychological distress also have a significantly higher number of GP visits per annum. Age is largely insignificant in 2001, and while those aged 75+ years have significantly more GP visits than those aged 16-24 years in 1995, the effects are surprisingly negative for some of the middle age groups. Females visit significantly more often than males.

Examining the remainder of the socio-economic characteristics, the results indicate that the number of GP visits per annum is significantly lower for those with higher levels of education (although there is little significant difference between those with primary level education and those with a third level qualification in both years). In comparison with being single, being married, separated, divorced or widowed increases significantly the average number of GP visits per annum. In comparison with those that are economically inactive, those that are employed or unemployed have significantly fewer GP visits per annum, a pattern consistent with the descriptive statistics presented in Table 3.9. Household location is largely insignificant.

The number of GP visits is an increasing function of income in 1995, although there is little consistent pattern in 2001, except that those in the highest income decile have significantly more GP visits per annum than those in the lower income deciles. As expected, medical card patients have a significantly higher number of GP visits per annum than private patients, even when income and health status have been taken into account. While we have tried to control as comprehensively as possible for differences in health status between those with and without medical cards, some differences in need may not be fully captured by our need variables, and may indeed be correlated with medical card eligibility or other factors that we are labelling 'non-need'. For example, if medical card patients differ from private patients in aspects of health status not captured by our range of health status variables, then medical card eligibility may to some extent reflect a difference in the need for a GP visit. However, the relatively large size of the effect (between 1.0 and 1.2 extra GP visits per annum) and its significance suggest that the effect would not entirely disappear, even with enhanced measures of health status (see Section 4.2.1 of Chapter 4 for further analysis of this issue). We also tested the addition of an interaction term between a continuous form of the income variable and medical card eligibility, as we might expect the income effect to be more pronounced for those without medical cards. However, the interaction term is insignificant in both 1995 and 2001.

Moving on to the two-step model, Table 3.14 presents the results for the contact decision (i.e., examining the probability of visiting a GP at least once in the previous year), and Table 3.15 presents the results for the frequency decision (i.e., examining the number of GP visits for those visiting at least once per annum). Age is significant in explaining the decision to contact a GP, particularly at the older ages. The remaining need factors (gender and the various measures of health status) are all highly significant in explaining the probability of

visiting a GP, with the exception of psychological distress in 2001. While education and employment status are largely insignificant in determining the probability of visiting a GP in both years, marital status has an effect in the direction expected (but only for 1995). Rural residents are significantly less likely to contact their GP in both years. Income exerts a positive and significant effect, as does medical card eligibility.

Table 3.14: Marginal Effects from Contact Decision of Two-Step Model of GP Visiting

	1995	2001
Age 25-34 years	-0.02	0.01
Age 35-44 years	-0.07 ***	-0.01
Age 45-54 years	-0.08 ***	0.00
Age 55-64 years	-0.06 **	0.05 *
Age 65-74 years	0.02	0.11 ***
Age 75+ years	0.12 ***	0.15 ***
Female	0.11 ***	0.11 ***
Good	0.09 ***	0.07 ***
Fair	0.19 ***	0.17 ***
Bad or very bad	0.21 ***	0.19 ***
Chronic illness	0.16 ***	0.15 ***
Stress	0.07 ***	0.03
Lower secondary	-0.01	0.02
Upper secondary	0.00	0.02
Third level	0.05 **	-0.00
Married	0.11 ***	0.02
Separated/divorced	0.12 ***	0.03
Widowed	0.08 **	0.06 *
Employed	0.00	-0.01
Unemployed	-0.03	-0.03
Rural	-0.04 ***	-0.04 ***
Income 3	0.03	0.02
Income 4	-0.02	-0.01
Income 5	0.02	0.06 **
Income 6	0.07 ***	0.01
Income 7	0.05 **	0.05 *
Income 8	0.08 ***	0.05 *
Income 9	0.10 ***	0.07 ***
Income 10 (highest)	0.10 ***	0.07 ***
Medical Card	0.13 ***	0.07 ***
N	7,218	5,309
Log-Likelihood	-3,871.5	-2,616.4

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.

Table 3.15: Marginal Effects from Frequency Decision of Two-Step Model of GP Visiting

	1995	2001
Age 25-34 years	0.42 **	0.42 *
Age 35-44 years	0.15	-0.41 *
Age 45-54 years	-0.58 ***	-0.32
Age 55-64 years	-0.41 *	-0.48 *
Age 65-74 years	-0.43 *	-0.32
Age 75+ years	0.07	-0.39
Female	0.69 ***	0.89 ***
Good	1.04 ***	1.02 ***
Fair	2.89 ***	2.73 ***
Bad or very bad	4.99 ***	5.00 ***
Chronic illness	2.33 ***	1.86 ***
Stress	0.93 ***	0.81 ***
Lower secondary	-0.35 **	-0.35 **
Upper secondary	-0.45 ***	-0.51 ***
Third level	-0.46 **	-0.30
Married	0.23	0.68 ***
Separated/divorced	0.27	0.83 **
Widowed	0.48**	0.62 **
Employed	-0.50 ***	-0.38 ***
Unemployed	-0.57 ***	-0.53 *
Rural	0.04	0.25 **
Income 3	0.39 **	-0.32 *
Income 4	0.15	-0.31 *
Income 5	0.15	0.58 **
Income 6	0.38 *	-0.07
Income 7	0.27	-0.83 ***
Income 8	0.24	-0.02
Income 9	0.24	-0.74 ***
Income 10 (highest)	0.41 *	-0.14
Medical Card	1.09***	1.17 ***
N	5,033	3,930
Log-Likelihood	-11,365.2	-8,805.0

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.

Examining the frequency decision (see Table 3.15), age is only marginally significant, with gender and health status being the main 'need' determinants of the frequency of GP visits. Rising levels of education are associated with fewer GP visits (although the relationship is not as clear-cut in 2001), being married, separated, divorced or widowed are associated with more GP visits and in comparison with being economically inactive, being in the labour force (i.e., either employed or unemployed) is associated with fewer GP visits per annum. Household location is only significant in 2001, and indicates that rural residents visit significantly more frequently than urban residents. The results from the two-step model for 2001 therefore suggest that while rural residents are significantly less likely to visit their GP, they visit significantly more frequently when they do. The income results for 1995 suggest that while income is

significant in determining the probability of visiting a GP, it is insignificant in determining the number of GP visits once that decision has been made. This is consistent with a principal-agent view of the decision-making process underlying GP visiting, whereby the patient decides to make the initial contact with the GP, and the GP (and his characteristics) are more important in determining the frequency of treatment. Medical card eligibility is once again positive and highly significant.

3.4 GP Visiting in the 2001 Quarterly National Household Survey

3.4.1 DESCRIPTIVE STATISTICS ON GP VISITING PATTERNS

Tables 3.16 to 3.22 present descriptive statistics on GP visiting (the proportion of the sample with at least one GP visit in the previous two weeks) using data from the 2001 QNHS. Unfortunately, the data do not record the actual number of visits in the previous two weeks, but even with the different reference period, the patterns are largely consistent with those using LIIS data. Table 3.16 shows that 19.1 per cent of the adult (18 years and older) population had at least one GP visit in the previous two weeks. As found in the LIIS, GP visiting is an increasing function of age, with nearly three times as many of those aged 65+ years having at least one GP visit in the previous two weeks compared to those aged 18-24 years. Once again, the proportion of those visiting at least once in the last two weeks is higher for females than for males, and females at all age groups visit their GP in greater proportions than males, and the differential is larger for the younger age groups. While the categories for the self-assessed health variable are different to those in the LIIS, Table 3.17 illustrates that GP visiting is, once again, an increasing function of worsening self-assessed health status with just under 9 per cent of those reporting excellent self-assessed health having at least one GP visit in the previous two weeks, in comparison with nearly 63 per cent of those with poor self-assessed health. For those who report that they suffer, or have suffered, from one or more of the eighteen specified health conditions (e.g., angina, heart attack etc.), 37.3 per cent had at least one GP visit in the previous two weeks, in comparison with only 11.1 per cent of those without any of the conditions who had visited their GP (Table 3.18).

Table 3.16: GP Visiting Patterns by Age and Sex (Proportion Visiting a GP in Last Two Weeks)

	Male	Female	All
18-24 years	8.0	16.2	12.1
25-34 years	8.4	22.4	15.4
35-44 years	11.5	21.3	16.5
45-54 years	14.8	19.4	17.1
55-64 years	20.7	24.2	22.4
65+ years	32.0	36.8	34.7
All	14.6	23.4	19.1

Table 3.17: GP Visiting Patterns by Self-Assessed Health Status

	Proportion Visiting GP in Last Two Weeks
Excellent	8.9
Very good	13.9
Good	24.0
Fair	47.9
Poor	62.6
All	19.1

Table 3.18: GP Visiting Patterns by Chronic Illness

	Proportion Visiting GP in Last Two Weeks
No health conditions	11.1
One or more health conditions	37.3
All	19.1

Examining variation in GP visiting patterns by 'non-need' factors, the QNHS has no information on highest level of education completed or household income. The patterns of GP visiting by employment status found in the QNHS are similar to those reported for the LIIS, with the economically inactive visiting a GP in higher proportions than either the employed or unemployed (Table 3.19). While the recall period is different, the patterns by marital status are also similar to those for the LIIS, where widowed and separated/divorced individuals have more contact with their GPs than married individuals, or in particular, single individuals (Table 3.20). The categories for household location are different to those recorded in the LIIS, and as in the LIIS, are a level that is too aggregated to say anything about the regional distribution of GP services, and indeed, the patterns in Table 3.21 indicate that there was little variation in GP visiting rates across the country, ranging from a low of 17.9 per cent of the population with at least one GP visit in the previous two weeks in Dublin to 21.7 per cent of the population in the Mid-West. The substantial difference in GP visiting behaviour between medical card patients and private patients is evident from Table 3.22, where only 13.2 per cent of those without a medical card had visited their GP in the previous two weeks, in comparison with over 34 per cent of those with a medical card.

Table 3.19: GP Visiting Patterns by Employment Status

	Proportion Visiting GP in Last Two Weeks
Employed	12.6
Unemployed	17.1
Inactive	29.9
All	19.1

Table 3.20: GP Visiting Patterns by Marital Status

	Proportion Visiting GP in Last Two Weeks
Single	14.7
Married	19.6
Separated/Divorced	25.3
Widowed	34.2
All	19.1

Table 3.21: GP Visiting Patterns by Location

	Proportion Visiting GP in Last Two Weeks
Border	19.5
Midlands	19.8
West	18.5
Dublin	17.9
Mid-East	19.1
Mid-West	21.7
South-East	18.9
South-West	19.8
All	19.1

Table 3.22: GP Visiting Patterns by Medical Card Eligibility

	Proportion Visiting GP in Last Two Weeks
No Medical Card	13.2
Medical Card	34.1
All	19.1

3.4.2 MULTIVARIATE ANALYSIS OF GP VISITING

As our dependent variable is the proportion visiting a GP at least once in the previous two weeks, the marginal effects in Table 3.23 refer to the change in the predicted probability of contacting a GP. While the reference period is different, and information on income is missing, the results are very similar to those for contact decision for the LIIS presented in Table 3.15. However, age is negative and significant at the higher ages, suggesting that the probability of having at least one GP visit in the previous two weeks declines as individuals age (in direct contrast to the aggregate GP visiting patterns by age presented in Table 3.16). The remainder of the health status and socio-economic characteristic variables have results that are in line with expectations and with the results in Table 3.15. However, there is little systematic pattern in GP visiting across different regions of the country, with those living in the Mid-East and Mid-West being significantly more likely to visit their GP than residents of Dublin, and those living in the West significantly less likely.

Table 3.23: Marginal Effects from Model of Contact Decision of GP Visiting

	2001
Age 25-34 years	0.03 ***
Age 35-44 years	0.00
Age 45-54 years	-0.05 ***
Age 55-64 years	-0.05 ***
Age 65+ years	-0.04 ***
Female	0.06 ***
Very good	0.05 ***
Good	0.10 ***
Fair	0.26 ***
Poor	0.39 ***
At least one health condition	0.15 ***
Married	0.04 ***
Separated/divorced	0.05 ***
Widowed	0.02 ***
Employed	-0.03 ***
Unemployed	-0.02 *
Medical card	0.09 ***
Border	-0.01
Midlands	0.01
West	-0.02 ***
Mid-East	0.01 **
Mid-West	0.04 ***
South-East	-0.01
South-West	0.01
N	44,844
Log-likelihood	-19,767.9

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.

3.5 GP Visiting in the 2004 EU-SILC

3.5.1 DESCRIPTIVE STATISTICS ON GP VISITING

As mentioned in Section 3.2.3, the data in EU-SILC on GP visiting are more limited than those available in either the LIIS or QNHS, as the number of GP visits is only asked of those with medical card eligibility. In addition, the reference period is different again, referring to the last four weeks. The absence of comparable information on private patients, as well as the different reference period for GP visits, means that we are unable to make any comparison between the following descriptive statistics and those for either the QNHS or LIIS. Nonetheless, Table 3.24 shows that the average number of *free* GP visits in the previous four weeks was 0.82, with this figure generally increasing with age. Male medical card patients tend to have fewer GP visits than female medical card patients, and the differential between the youngest and oldest age groups is again wider for males than for females. Even though these patterns are for those with *free* GP visits, GP visiting for medical card patients shows a clear relationship with health status (Tables 3.25, 3.26 and 3.27), with those in very bad health having over four times

as many GP visits in the last month as those with very good self-assessed health status. Examining utilisation by household location in Table 3.28 reveals little systematic pattern in GP visiting across the broad regional areas defined.

Table 3.24: GP Visiting Patterns by Age and Gender (Average Number of GP Visits in Last Four Weeks for Medical Card Patients Only)

	Male	Female	All
Age 18-24 years	0.43	0.54	0.50
Age 25-34 years	0.67	0.92	0.82
Age 35-44 years	0.70	0.90	0.82
Age 45-54 years	0.85	0.73	0.78
Age 55-64 years	0.77	0.90	0.84
Age 65-74 years	0.75	0.90	0.83
Age 75+ years	1.01	1.03	1.02
All	0.76	0.86	0.82

Table 3.25: GP Visiting Patterns by Chronic Illness

	Average Number of GP Visits in Last Four Weeks
No chronic illness	1.14
Chronic illness	0.56
All	0.82

Table 3.26: GP Visiting Patterns by Self-Assessed Health Status

	Average Number of GP Visits in Last Four Weeks
Very good	0.45
Good	0.62
Fair	1.11
Bad	1.49
Very bad	2.20
All	0.82

Table 3.27: GP Visiting Patterns by Severity of Limiting Activity

	Average Number of GP Visits in Last Four Weeks
Severe limitation	1.52
Some limitation	0.96
No limitation	0.55
All	0.82

Table 3.28: GP Visiting Patterns by Household Location

	Average Number of GP Visits in Last Four Weeks
Border	0.71
Midlands	0.96
West	0.80
Dublin	0.80
Mid-East	0.84
Mid-West	0.97
South-East	0.73
South-West	0.88
All	0.82

3.5.2 MULTIVARIATE ANALYSIS OF GP VISITING

Table 3.29 presents the marginal effects from a simple one-step model of GP visiting, for the sample of medical card patients (i.e., those entitled to *free* GP visits). As expected, health status is the most important determinant of differences in the number of GP visits in the previous four weeks among medical card patients, with those who assess their own health status as bad or very bad having approximately 1.2 extra GP visits per month than those who assess heir own health as very good. The remainder of the socio-economic variables are insignificant, and this is consistent with the fact that

Table 3.29: Marginal Effects for One-Step Model of GP Visiting (Medical Card Patients Only)

	2004
Age 25-34 years	0.29 ***
Age 35-44 years	0.09
Age 45-54 years	-0.03
Age 55-64 years	-0.04
Age 65-74 years	0.03
Age 75+ years	0.11
Female	0.11 ***
Good	0.21 ***
Fair	0.61 ***
Bad or very bad	1.24 ***
Chronic illness	0.26
Lower secondary	-0.01
Upper secondary	0.02
Third level	-0.07
Married	0.04
Separated/divorced	0.10
Widowed	0.05
Employed	-0.05
Unemployed	-0.13 **
Border	0.05
Midlands	0.12
West	-0.04
Mid-east	0.03
Mid-west	0.16 **
South-east	-0.03
South-west	0.06
Income 3	0.09
Income 4	-0.06
Income 5	-0.11 **
Income 6	-0.02
Income 7	-0.08
Income 8	-0.09
Income 9	-0.01
Income 10	-0.14 **
N	4,012
Log-likelihood	-4,784.6

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.

medical card patients are a particularly vulnerable group of the population and are, therefore, concentrated in certain population sub-groups such as the old and unemployed. However, there is some evidence to suggest that medical card patients on higher incomes have a significantly lower number of GP visits per month than medical card patients on lower incomes, although this is likely picking up a further effect of 'need', given the strong empirical correlation between socio-economic status and health status.

3.6 International Comparisons

3.6.1 DESCRIPTIVE STATISTICS ON GP VISITING PATTERNS

We use EHCP data (see Section 3.2.1) to compare GP visiting rates across 11 of the old EU-15 countries in 2001 (see also Nolan and Nolan, 2004). Table 3.30 illustrates that the average number of GP visits per annum ranged from a low of 1.9 GP visits per annum in Greece to a high of 4.9 GP visits per annum in Belgium, while the Irish level of GP visiting is in the middle of the range for the 11 countries examined.

Table 3.30: Average Number of GP Visits Per Annum, 2001

	2001
Austria	4.7
Belgium	4.9
Denmark	2.9
Finland	2.1
Greece	1.9
Ireland	*3.6*
Italy	4.9
Netherlands	2.8
Portugal	3.1
Spain	3.9

Data are unavailable for France, Germany, Luxembourg, Sweden and UK.
See Nolan and Nolan (2004).

Given the existence of universal eligibility for free GP care in most European countries, it is useful to examine how GP visiting rates vary across the income distribution across Europe. From Table 3.31, we can see that in almost all countries the average number of GP visits per annum is higher towards the bottom of the income distribution and lower towards the top (Finland being the exception with a very flat pattern across the income deciles). However, the gap between the top and bottom of the income distribution varies a great deal. In Ireland, the average number of GP visits per annum is about twice as high in the lower income deciles compared with the higher deciles, whereas in most of the other countries the ratio is lower, at approximately 1.5 times greater towards the bottom. The striking feature of the Irish patterns however, is the very sharp fall in the GP visiting rate as we move from the second to the third income decile, where the average number of GP visits per annum falls from 6.6 to

3.6.[3] No other country sees such a sharp decline; the obvious question to ask is whether this reflects the impact of medical card eligibility on the cost of GP visits, given the concentration of medical card patients in the lower income deciles.

Table 3.31: GP Visiting Rates by Household Income Decile, 2001

	1	2	3	4	5	6	7	8	9	10	All
Austria	5.8	6.4	5.1	4.8	5.0	4.7	3.7	4.1	4.3	3.8	4.7
Belgium	7.6	6.9	6.2	4.8	5.0	4.7	3.8	3.5	3.5	3.6	4.9
Denmark	3.4	3.6	3.6	4.1	2.8	2.7	2.1	2.0	2.3	2.0	2.9
Finland	1.8	2.6	2.4	2.4	2.0	1.9	2.0	1.9	2.3	1.8	2.1
Greece	2.5	2.4	2.1	1.9	2.1	1.8	1.6	1.4	1.6	1.2	1.9
Ireland	*4.8*	*6.6*	*3.6*	*3.0*	*3.1*	*4.1*	*3.7*	*2.3*	*2.6*	*2.4*	*3.6*
Italy	5.0	5.7	5.0	5.6	5.8	4.9	4.3	4.3	4.3	3.9	4.9
Netherlands	3.4	3.2	3.2	3.1	2.8	2.9	2.6	2.3	2.4	2.4	2.8
Portugal	3.8	3.6	4.1	2.8	3.0	3.0	3.0	2.6	2.5	2.6	3.1
Spain	4.5	5.6	4.2	4.4	4.3	3.6	4.0	3.5	3.0	1.9	3.9

Note: 1 refers to the bottom 10 per cent of the income distribution, and 10 to the top 10 per cent.
See Nolan and Nolan (2004).

3.6.2 EMPIRICAL EVIDENCE

Van Doorslaer *et al.* (2000) undertook a large-scale comparative analysis of inequities in the delivery of health services in ten European countries and the US, using a variety of micro-data sources (including the ECHP). Examining GP visits (as well as visits to medical specialists and in-patient days in hospital), they find little evidence for significant differences in the utilisation of GP services across the income distribution (except in Belgium and Ireland where the distribution of GP visits is pro-poor, i.e., after controlling for 'need', those towards the bottom of the income distribution consume significantly more GP services than suggested by their 'need').[4] On the other hand, the distribution of specialist visits was significantly pro-rich in most countries examined, and there was no clear pattern across countries with a similar organisation of health services (in terms of GP gatekeeper role, universal coverage for health care expenses etc.).

The above analysis was later extended to include fourteen OECD countries (twelve EU member states, Canada and the USA), and once again, the objective was to examine the extent to which the distribution of GP and specialist visits in inequitable after controlling for 'need' (Van Doorslaer *et al.*, 2002). Using data from 1996 (including the ECHP), the authors find that Ireland is once again an exception, with a significant pro-poor distribution of GP visits, which is explained by preferential treatment of low income groups via the medical card. In most of the other countries examined, there

[3] The GP visiting rate in the Irish case also increases again in the sixth decile and falls again in the eighth, but the gap between the second and third decile is considerably wider.

[4] See Layte and Nolan (2004) and Chapter 8 for a fuller discussion of the methodology underlying this research.

is no significant difference in the distribution of GP visits across the income distribution. The analysis was further extended in 2004 to 21 OECD countries (14 EU members, Australia, Canada, Hungary, Mexico, Norway, Switzerland and the USA), using data for 2000 (Van Doorslaer and Masseria, 2004). The results confirm the earlier findings that GP visits are distributed equitably across the income distribution in most countries examined, although once again, the distribution of GP visits in Ireland is significantly pro-poor.

Jimenez-Martin *et al.* (2004) undertake a similar analysis using ECHP data for twelve European countries for the period 1994-1996. They find that between a third and a half of the variability in the demand for health services (GP and specialist visits) across EU countries can be explained by differences in the effect of age, income and the role of GPs (e.g., gatekeeper role, reimbursement method), with income particularly important for Ireland (where the effect is significantly negative). Finally, Layte *et al.* (2005), while primarily concerned with the differential effect of age on the use of GP services and hospital nights across the EU, also examined patterns of utilisation according to other socio-economic characteristics and found that age and health status were consistently most important in determining differences in utilisation, with income in general insignificant once 'need' had been controlled for.

3.6.3 COMPARISON OF GP VISITING IN NORTHERN IRELAND AND THE REPUBLIC OF IRELAND

The discussion in Section 3.6.1 confirms that while the overall number of GP visits in Ireland is comparable with GP visiting rates in other European countries, the extent to which Irish GP visiting rates vary across the income distribution is unusual in a European context. In this regard, it is particularly useful to compare GP visiting in Northern Ireland and the Republic of Ireland, two jurisdictions with very similar population health characteristics and a similar institutional structure in terms of the GP service, but with one crucial difference: while all residents of Northern Ireland are entitled to free GP visits, only the 30 per cent of the population in the Republic on lower incomes are entitled to free GP visits. This allows us to investigate the effect of charges on the utilisation of GP services.

Chapter 5 presents a fuller comparison of the utilisation of health services in Northern Ireland and the Republic of Ireland (see also McGregor *et al.*, 2006), but to put Irish GP visiting rates in context, we present here some descriptive statistics on GP visiting rates in 2001 for Northern Ireland and the Republic of Ireland. From Table 3.32 we can see that the average number of GP visits per annum was 3.8 in Northern Ireland, in comparison with 3.2 in the Republic of Ireland. Examining the descriptive patterns by age; gender; education level; employment status; marital status and household income reveals that there is much less variation across the different values of each characteristic in Northern Ireland than there is in the Republic. For example, those aged 65+ years have 1.7 times more GP visits per annum than those aged 16-24 years in Northern Ireland; the

corresponding figure for the Republic of Ireland is three times more GP visits among the over 65s. Most importantly however, the descriptive patterns reveal that while GP visiting rates do fall as we move up the income distribution in Northern Ireland, the fall is not as dramatic as that which occurs in the Republic, and where the most dramatic fall-off in GP visiting rates occurs at the lower part of the income distribution (rather than at the higher end for Northern Ireland). Once again, as medical card eligibility falls sharply as we move up the income distribution in the Republic, this would suggest that charging for GP services has a substantial impact on GP visiting rates, and a further examination of this issue will be carried out in Chapter 5.

Table 3.32: Average Number of GP Visits by Various Socio-Economic Characteristics, 2001

	Northern Ireland	Republic of Ireland
Age 16-24 years	2.9	1.9
Age 25-34 years	3.5	2.5
Age 35-44 years	3.3	2.5
Age 45-54 years	3.8	2.9
Age 55-64 years	4.5	3.6
Age 65+	4.8	5.7
Male	3.3	2.7
Female	4.1	3.7
Primary	4.6	4.8
Lower secondary	3.6	2.8
Upper secondary	3.4	2.4
Third level	2.7	2.3
Employed	2.6	2.1
Unemployed	3.9	3.1
Economically inactive	5.0	4.5
Never married	3.2	2.4
Married	3.7	3.3
Separated/divorced	4.9	4.2
Widowed	4.9	6.0
Income 1 (lowest)	4.2	5.0
Income 2	4.4	3.4
Income 3	4.1	2.9
Income 4	3.6	2.4
Income 5 (highest)	2.6	2.3
Medical card		5.3
Private		2.2
All	3.8	3.2

See McGregor *et al.* (2006).

3.7 Summary and Conclusions

The purpose of this chapter was to detail patterns of GP visiting across the Irish population, and to examine how they vary by various individual and household socio-economic characteristics. Using micro-data from a variety of sources, the descriptive patterns described how GP visiting rates vary by 'need' factors such as age, sex and health status, but also by 'non-need' factors such as

education level, employment status, marital status and household location. In the context of the discussion in Chapter 2 on the importance of financial incentives in influencing doctor and patient behaviour, this chapter also examined the role of income and medical card eligibility on patterns of GP visiting. As many of these 'need' and 'non-need' characteristics are highly correlated with each other, multivariate analyses were also undertaken and confirmed that 'need' factors such as age and health status, as well as medical card eligibility were found to be consistently most important in determining differences in GP visiting rates across the population.

This chapter also described Irish GP visiting rates in a European context, and found that while the overall average number of GP visits is comparable with many other European countries, the variation across the income distribution (reflecting largely a medical card effect) is unusual in a European context. Similarly, a comparison of GP visiting rates in Northern Ireland and the Republic of Ireland confirmed the greater variation in GP visiting rates across the income distribution in the Republic, and the subsequent chapter will further examine this issue. Given the consistent importance of medical card eligibility in determining differences in GP visiting rates across the population, the following chapter concentrates on the role of income and medical card eligibility in influencing GP utilisation decisions in Ireland.

APPENDIX 1: VARIABLE DEFINITIONS

	LIIS	QNHS	EU-SILC
GP visits	Number of GP visits in the previous twelve months	=1 if visited a GP at least once in the previous two weeks, =0 otherwise	Number of *free* GP visits in the previous four weeks
Dentist visits	Number of dentist visits in the previous twelve months		Number of *free or subsidised* dental, ophthalmic or aural treatments in the previous twelve months
Optician visits	Number of optician visits in the previous twelve months		
Age	Seven categories (16-24, 25-34, 35-44, 45-54, 55-64, 65-74 and 75+ years)	Six categories (18-24, 25-34, 35-44, 45-54, 55-64 and 65+ years)	Six categories (18-24, 25-34, 35-44, 45-54, 55-64 and 65+ years)
Gender*	=1 if female, =0 otherwise		
Chronic illness	=1 if suffers from any physical or mental health problem, illness or disability, =0 otherwise	=1 if suffers, or has suffered, from one or more of eighteen specified health conditions (e.g., angina, asthma etc.,), =0 otherwise	=1 if suffers from any chronic (long-standing) illness or condition (health problem), =0 otherwise
Self-assessed health	Five categories (very good, good, fair, bad and very bad)	Five categories (excellent, very good, good, fair and poor)	Five categories (very good, good, fair, bad and very bad)
Stress	=1 if in psychological distress (i.e., scoring 3 or more on GHQ), =0 otherwise		
Smoker	=1 if the individual is a daily smoker, =0 otherwise (2001 only)		

* Indicates variables with the same definition across all three data sources.

VARIABLE DEFINITIONS (Continued)

	LIIS	QNHS	EU-SILC
Body mass index	Four categories (obese, overweight, ideal weight and underweight) (2001 only)		
Marital status*	Four categories (never married, married, separated/divorced and widowed)		
Employment status*	Three categories (employed, unemployed and economically inactive)		
Highest education level*	Four categories (primary, upper secondary, lower secondary, third level)		
Household income	Ten categories representing decile of equivalised weekly household income		Ten categories representing decile of equivalised annual household income
Medical card*	=1 if has a medical card, =0 otherwise		
Household location	Eleven categories (open country or village (200-1,499 inhabitants), town (1,500-2,999 inhabitants), town (3,000-4,999 inhabitants), town (5,000-9,999 inhabitants), town (10,000 or more inhabitants), Waterford, Galway, Limerick and Cork cities, Dublin city and Dublin county)	Eight categories (Border, Midlands, West, Dublin, Mid-east, Mid-west, South-east and South-west)	
Disadvantage	=1 if score 2 or more on index of disadvantage, =0 otherwise		

* Indicates variables with the same definition across all three data sources.

APPENDIX II: ECONOMETRIC METHODOLOGIES

1995 AND 2001 LIVING IN IRELAND SURVEYS

We begin by specifying a very simple one-step model of GP visiting, which relates the number of GP visits in the previous year to various individual and household socio-economic characteristics as follows:

$$y_i = \beta_0 + X_i'\beta_1 + \varepsilon_i \quad (1)$$

where y_i is the dependent variable (number of GP visits in the previous year), X_i is the vector of independent variables (e.g. age, gender, education level etc.), β are the estimated coefficients and ε_i is the error term. In this case, the dependent variable (the number of visits to a GP in the previous twelve months) is a variable that can only take on non-negative integer values. The distribution of GP visits is also highly skewed with a large proportion of observations clustered at zero and only a small proportion of individuals recording frequent visits. Count data models, which assume a skewed, discrete distribution and restrict predicted values to non-negative values, are necessary. For the one-step model (1), we therefore use a negative binomial methodology (further details are available in Madden *et al.*, 2005).

We also estimate a two-step model of GP visiting, which consists of a first part that estimates the probability that the individual had at least one GP visit in the previous year, and a second part that models the frequency of GP visits for those with at least one GP visit in the previous year, i.e.,

$$Pr(y_i > 0) = \beta_0 + X_i'\beta_1 + \varepsilon_i \quad (2)$$

and

$$y_i = \beta_0 + X_i'\beta_1 + \varepsilon_i, \text{ for } y_i > 0 \quad (3)$$

Many argue that such an approach is more appropriate in describing the nature of the decision-making process underlying the decision to visit a GP, whereby the patient initiates the visit to their GP but the GP decides on the frequency of treatment. Such a model

can accommodate the fact that different variables may affect the decision to visit a GP (contact decision) and second, the decision about the number of visits (frequency decision), as well as the fact that the same variables may affect the two decisions in different ways. For the first part of the two-step model (2), we use a binary probit methodology and for the second part (3), we use a truncated (i.e., including only positive observations) negative binomial methodology. Again, further details on these techniques are presented in Madden *et al.* (2005).

2001 QNHS

For the analysis using QNHS data, the dependent variable is a binary variable indicating whether or not the individual visited their GP in the previous two weeks, and so we use the binary probit methodology to estimate a model similar to that specified in (2) above.

2004 EU-SILC

For the analysis using EU-SILC data, the dependent variable is a continuous variable indicating the number of free GP visits in the previous four weeks, and so we use the one-step negative binomial methodology to estimate a model similar to that specified in (1) above.

4. Income, Medical Card Eligibility and Access to GP Services in Ireland

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4.1 Introduction

The purpose of this chapter is to focus on the role of financial incentives, as reflected by income and medical card eligibility, in facilitating access to GP services across different sections of the Irish population. Chapter 2 discussed the importance of the incentives arising from the current system of eligibility for free GP services on the behaviour of GPs and patients alike, and Chapter 3 confirmed the importance of income and medical card eligibility in explaining differences in GP visiting rates across the population. From a patient perspective, much recent commentary has focused on the affordability of GP services. With rapid increases in employment and average income, and with income guidelines being increased only in line with inflation, fewer individuals are now eligible for medical cards than in the past. The recent substantial increase in income thresholds, along with the creation of new 'GP visit' card, reflects widespread public concern over the affordability of GP services, particularly for those just above the income threshold for a medical card.

While the difference in relative prices faced by medical card and private patients obviously impacts on patient behaviour, the difference in reimbursement method for GPs for medical card and private patients also impacts on the behaviour of GPs. In addition, the recent extension of the medical card to all over 70 year olds , and more importantly, the difference in the level of capitation fee depending on whether the individual is an 'old' medical card patient or a 'new' medical card patient creates a further distortion in the market. GPs receive a capitation payment for 'new' over 70 year old

medical card patients that is between 2.6 and 4.6 times higher than that received for 'old' over 70 year old medical card patients (based on 2004 data; see General Medical Services Payments Board, 2005). The current system, therefore, incentivises GPs to treat medical card and private patients differently.

In this chapter, therefore, we examine in greater detail the role of these incentives. Section 4.2 focuses on the effect of medical card eligibility on patient behaviour, while Section 4.3 examines the behaviour of private patients, and in particular, those just above the income threshold for a medical card. Section 4.4 moves on to consider the effect of the incentives embodied in the current system of eligibility for free care on the behaviour of GPs, while Section 4.5 discusses the policy implications arising from our findings. Section 4.6 summarises and concludes.

4.2 The Effect of Medical Card Eligibility on GP Visiting

4.2.1 MEDICAL CARD ELIGIBILITY AND 'NEED'

The empirical results in Sections 3.3.2 and 3.4.3 of Chapter 3, based on both the LIIS and QNHS micro-data, show clearly that GP visiting is significantly influenced by the medical card status of the individual, with the one-step model using LIIS data suggesting that medical card patients have on average between 1.1 and 1.2 extra GP visits per annum, even after controlling for all other available influences on visiting. This confirms earlier findings on the effect of medical card eligibility on GP visiting in Ireland using a variety of different micro-data sources (e.g., Tussing, 1983 and 1985 and Nolan, 1991 and 1993a). These results also confirm research undertaken in other countries on the effect of differential prices for health care on the utilisation of health care services, i.e., that financial incentives do matter, and contribute significantly to differences in the utilisation of health services across the population (see Section 2.6.1 of Chapter 2 for further discussion of studies primarily analysing the effect of private health insurance on the utilisation of various health services).

However, we must consider the possibility that the medical card effect is also picking up more subtle differences in 'need' between the two groups that we have been to unable to capture. While the measures of health status available in the LIIS and QNHS are comprehensive, it is possible that they do not sufficiently control for the full extent of differences in 'need' between medical card and private patients. Essentially, with our current measures of health status, some of the medical card effect may reflect unmeasured differences in 'need' between the two groups, with the result that our current estimate of the effect is overstated. To test this proposition, we investigate the effect of broadening the range of controls for health status, in an attempt to see whether some of the medical card effect could in fact reflect a genuine need for care. From 1998 onwards, the LIIS included information on height, weight and smoking behaviour. For 2001, we therefore include two additional

Table 4.1: Marginal Effects for Models of GP Visiting with Improved Health status (2001 LIIS)

	One-Step	Two-Step	
		Contact	Frequency
Age 25-34 years	0.27	0.00	0.42 *
Age 35-44 years	-0.34 *	-0.02	-0.44 *
Age 45-54 years	-0.19	-0.01	-0.36
Age 55-64 years	-0.15	0.03	-0.51 *
Age 65-74 years	0.17	0.09 ***	-0.32
Age 75+ years	0.20	0.13 ***	-0.38
Female	1.03 ***	0.11 ***	0.93 ***
Good	1.00 ***	0.07 ***	1.04 ***
Fair	2.80 ***	0.17 ***	2.73 ***
Bad or very bad	5.08 ***	0.19 ***	5.12 ***
Disease	3.22 ***	0.17 **	3.37 ***
System	2.94 ***	0.16 ***	3.11 ***
Mental	2.74 ***	0.14 **	2.81 ***
Nervous	1.47 ***	0.18 **	1.34 **
Circulatory	2.07 ***	0.20 ***	2.11 ***
Respiratory	1.82 ***	0.13 ***	1.79 ***
Digestive	0.85 *	0.05	0.88
Headache	1.70	0.12	1.75
Musculo-skeletal	1.42 ***	0.07 **	1.64 ***
Accident	2.25 ***	0.17 **	1.85 **
Other health condition	1.00 **	0.03	1.18 **
Stress	0.70 ***	0.03	0.84 ***
Smoker	-0.07	-0.03 **	0.01
Underweight	0.21	-0.04	0.55 **
Overweight	0.27 ***	0.03 **	0.27 **
Obese	0.36 **	0.03	0.38 *
Lower secondary	-0.17	0.02	-0.30 *
Upper secondary	-0.29 **	0.02	-0.49 ***
Third level	-0.22	-0.00	-0.26
Married	0.51 ***	0.02	0.68 ***
Separated/divorced	0.70 **	0.03	0.85 **
Widowed	0.50 **	0.06 *	0.65 **
Employed	-0.30 ***	-0.01	-0.37 ***
Unemployed	-0.39 *	-0.02	-0.51 *
Rural	-0.02	-0.04 ***	0.26 **
Income 3	-0.14	0.02	-0.27
Income 4	-0.22 *	-0.00	-0.29
Income 5	0.61 ***	0.05 **	0.59 **
Income 6	-0.07	0.01	-0.08
Income 7	-0.32 **	0.05 *	-0.78 ***
Income 8	0.15	0.04 *	-0.01
Income 9	-0.16	0.07 ***	-0.72 ***
Income 10 (highest)	0.21	0.07 ***	-0.14
Medical card	1.04 ***	0.07 ***	1.15 ***
'Old' medical card effect (i.e., from Tables 3.13, 3.14, 3.15)	1.06 ***	0.07 ***	1.17 ***
N	5,309	5,309	3,930
Log-Likelihood	-11,497.7	-2,597.6	-8,793.6

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent. See Nolan and Nolan (2006) for further details.

indicators of health status: whether the individual is a daily smoker and body mass index (with individuals grouped into four categories indicating underweight, ideal weight, overweight or obese). We also broaden the measure of chronic illness by replacing it with an eleven-category variable reflecting the nature of the type of condition that the individual suffers from (see Appendix I to Chapter 3 for further details).

Results are presented in Table 4.1 for both the one- and two-step models (with the 'old' medical card effect from Tables 3.13, 3.14 and 3.15 also included for comparison). The results indicate that the extended measures of health status add significantly to the explanatory power of the model, with the effects in the directions expected. However, the reduction in the size of the medical card effect is small. This suggests that (i) there is a strong independent effect of medical card eligibility on GP visiting, or alternatively (ii) there still remain subtle differences in health status between medical card patients and private patients that are not captured by the extensive range of health controls available to us. However, given the size and significance of the differential in GP visiting between medical card and private patients, it is unlikely that further refinements of the health status measures would eliminate this difference.

4.2.2 LONGITUDINAL ANALYSIS OF THE MEDICAL CARD EFFECT

The analyses in Chapter 3 have examined GP visiting from a cross-sectional perspective, i.e., focusing on patterns of GP visiting at a fixed point in time. However, the LIIS is a longitudinal survey following the same individuals through time. This allows us to improve on our earlier estimates by controlling for unmeasured differences in characteristics across the population that are constant over time (e.g., ability, genetic factors, attitudes etc.), and which could account for some of differences between different population groups in GP visiting patterns. In addition, the use of longitudinal data allows us to control for habit or persistence in GP visiting behaviour over time, thereby refining our estimates of the various effects, including that of medical card eligibility.

In Table 4.2, we present the results of an exercise (see Nolan, 2006a for further details) that uses 1995-2001 LIIS data to estimate the effect of changing medical card status on GP visiting, while also controlling for other changes in characteristics over time (most notably, health and employment status), as well as unmeasured characteristics that are constant over time. Instead of the simple dichotomous indicator of whether an individual is a medical card or private patient, we introduce a variable with four categories: *medical card retain* for those who retained their medical card from one year to the next, *no medical card* for those who remain with no medical card from one year to the next (the reference category), *medical card lose* for those who lose a medical card from one year to the next and *medical card gain* for those who gain a medical card from one year to the next.

Table 4.2: Marginal Effects for Medical Card Transitions (1995-2001 LIIS)

	Marginal Effects
Medical card retain	1.0 ***
Medical card lose	0.3 ***
Medical card gain	0.8 ***
NT	26,432
Log-Likelihood	-58,097

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.
The reference category is an individual who remains a private patient.
Marginal effects for other variables (year dummies; age; sex; health; education; marital status; employment status; household location) are not presented here.
Controlling for changes in employment and health status does not change the estimated results.
See Nolan (2006a) for further details.

To ensure that changes in other characteristics such as health status or employment status are not contributing towards the medical card results (e.g., those who gain a medical card may have done so because of unemployment and/or ill-health), we also control for changes in health or employment status. The results indicate that, in comparison with those who remain private patients from one year to the next, those who lose a medical card have on average 0.3 extra GP visits per annum. Those who retain their medical cards have 1.0 extra GP visits per annum and those who gain a medical card have 0.8 extra GP visits per annum, and all of these effects are significant. As we have also controlled for other possible changes in characteristics that could affect GP visiting over time, we can, therefore, conclude that higher GP visiting among those who retain, lose or gain a medical card is due mainly to the incentives embodied in having a medical card (in comparison with those who never have one).

Focusing in particular on those who gain or lose a medical card, further analysis was undertaken using the 1995-2001 LIIS data. However, this time we use techniques from the treatment evaluation literature, which attempt to estimate the effect of a treatment (gaining or losing a medical card) on a particular outcome (GP visits). We compare the outcomes of treated and control observations, but focus only on individuals who are similar in terms of pre-treatment characteristics such as age, gender or health status, and who differ only in their experience of changing medical card status. We exploit the availability of longitudinal data by comparing the *change* in GP visiting between those who gain (lose) a medical card, and those who remain without (with) a medical card. Again, this allows us to control for unmeasured differences in characteristics between treated and control groups over time.

The results in Table 4.3, which are discussed further in Nolan, 2006b, indicate that those who gain a medical card have on average 1.3 extra GP visits per annum (in comparison with those who remain private patients) while those who lose a medical card have on average 1.6 fewer GP visits per annum (in comparison with those

who remain medical card patients). However, when we further confine our attention to individuals who do not change their employment or health status over the period, the results are insignificant, although this is likely due to the small numbers of individuals who change their medical card status over the period examined (see Nolan, 2006b for a fuller discussion). While insignificant, the signs of the results are in the directions expected.

Table 4.3: Matching Estimates of Medical Card Changes (1995-2001 LIIS)

		Extra GP visits		
		No Change in Health Status	No Change in Employment Status	No Change in Employment or Health Status
Gaining a medical card (vs. remaining a private patient)	1.3 *	0.2	1.1 *	0.4
Losing a medical card (vs. remaining a medical card patient)	-1.6 **	-0.7 *	-1.4 **	-0.9

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.
Individuals are matched with individuals who are similar in terms of pre-medical card change characteristics, but who differ only in their experience of medical card status change.
See Nolan (2006b) for further details.

4.3 Affordability of GP Services

4.3.1 EFFECT OF CHARGES FOR GP SERVICES ON PRIVATE PATIENTS

The results of the analyses described above confirm that the incentives embodied in the medical card significantly influence patient behaviour. While most of the empirical work has concentrated on comparing the behaviour of medical card and private patients, there has been relatively little analysis of private patients, and specifically, differences in the behaviour of private patients on different incomes. An important policy question is whether the significant gap in GP visiting between those with and without medical cards is more pronounced for those just above the income threshold for a medical card (e.g., at present, a GP fee of €45 amounts to approximately 22.5 per cent of the weekly income of an individual earning €200, i.e., just above the income threshold for a medical card). The recent introduction of the 'GP visit' medical card, with income thresholds that are 50 per cent higher than those for the standard medical card, was in part a response to widespread public concern over the disadvantages facing those just above the income threshold for a medical card.

To test whether proximity to the income threshold makes any difference to GP visiting rates for those without medical cards, we estimate both the one-step and two-step models for the sample of private patients in 2001, controlling for the usual set of independent variables such as age, gender, health status, employment status etc. Income enters as a categorical variable with ten categories representing income decile. Income deciles are defined for the sample of private patients only. We regard the first and second income deciles as the reference category, as there are concerns over

the reliability of the income measure for those in the very lowest income decile (see Nolan and Nolan, 2006 for further details).

Table 4.4 presents the results for the one- and two-step models for the sample of private patients. There is little significant difference in GP visiting rates, in terms of either the overall number of GP visits or in the number of visits for those visiting at least once, among private patients on different incomes. However, the significance of the top three income deciles for the contact decision lends some support to the hypothesis that those in the higher deciles have a significantly higher probability of visiting their GP at least once than those in the lower deciles. While increasing the income guidelines for medical card eligibility is a frequently articulated component of government policy, and has recently been implemented (Department of Health and Children, undated, 2003 and 2005), these results suggest that the major difference in utilisation is between medical card patients and private patients, rather than among private patients of differing income levels. In other words, if private patients are prevented from accessing GP care due to cost, this is as much an issue for those at the top of the income distribution as for those at the bottom.

Table 4.4: Income Effects for Private Patients (2001 LIIS)

	One-Step	Two-Step	
		Contact	Frequency
Income 3	-0.17	0.02	-0.33 *
Income 4	0.51 ***	0.06 *	0.52 **
Income 5	-0.20	0.00	-0.28
Income 6	-0.23	0.03	-0.47 **
Income 7	0.00	0.05 *	-0.20
Income 8	0.24	0.07 **	0.05
Income 9	0.03	0.08 **	-0.29
Income 10 (highest)	0.26	0.09 ***	0.00
N	3,648	3,648	2,475
Log-Likelihood	-6,917.8	-2,091.2	-4,780.0

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.
Marginal effects for other variables (age; sex; health; education; marital status; employment status; household location) are not presented here.
See Nolan and Nolan (2006) for further details.

This is largely consistent with comparative work on GP utilisation in Northern Ireland (where GP visits are free for all) and the Republic of Ireland, which found that when comparing within income quintiles North and South, the levels of utilisation were significantly lower in the Republic in the third, fourth and fifth income quintiles (where the majority of those in the Republic have to pay in full for GP visits). However, there is some evidence to suggest that the effect of being resident in the Republic was less significant and negative for the top income quintile (see McGregor *et al.*, 2006).

4.3.2 UNMET NEED FOR GP SERVICES

The available evidence for Ireland, therefore, confirms the findings from numerous international studies that incentives do matter and that charging for health services reduces utilisation. A crucial issue is the extent to which such charges deter 'necessary' as well as 'unnecessary' consultations, and the difficulty in distinguishing between such consultations without precise information on the costs and benefits involved. Similarly, it is difficult to say whether the above results indicate that medical card patients 'over-consume' GP services, or private patients 'under-consume', or both. However, new information in the 2004 EU-SILC does provide some indication on the extent to which individuals forego medical consultations (unfortunately not differentiated between GP visits and visits to medical specialists), and their reasons for doing so, including cost. Surprisingly, approximately 2.5 per cent of adults in 2004 responded that they …*at any time during the last twelve months*…*in your opinion*….*needed a medical examination or treatment for a health problem but did not receive it*. Table 4.5 presents summary statistics on the proportion of the population who did not visit their doctor in the last year even though they felt they should have, by various individual characteristics. The proportions are higher in the middle age groups, and for women than for men. The patterns for health status are consistent; a higher proportion of those with a chronic illness did not visit their doctor, and the proportion not visiting their doctor increases as the level of self-assessed health decreases. The pattern by household equivalised income is clearly decreasing, with those in the lower income deciles having a higher proportion of individuals who reported not receiving treatment. There is no difference between medical card patients and private patients.

Table 4.6 looks in more detail at these individuals, and their reasons for not seeking medical advice. Over 50 per cent of individuals who went without a medical consultation even though they felt they needed to, cited cost as their reason, with waiting list and wanting to see if the problem improved on its own the next most popular reasons. This translates into 1.2 per cent of the adult population in 2004 deferring a medical consultation due to cost in the previous year. This figure contrasts sharply with that found in a cross-border study of GP patients in Ireland undertaken in 2003, where 18.9 per cent of patients in the Republic had a medical problem during the year but did not consult their GP due to cost (O'Reilly *et al*., 2006). However, the latter study focused primarily on GP services, and the question asked was different, not least in its focus on cost.

Table 4.5: Proportion who 'During the Last Twelve Months Needed a Medical Examination or Treatment but did not Receive it', by Various Individual Characteristics

	Per Cent of Total Population
Age 18-24 years	1.8
Age 25-34 years	3.4
Age 35-44 years	2.7
Age 45-54 years	2.6
Age 55-64 years	2.5
Age 65+ years	1.8
Male	2.2
Female	2.7
No chronic illness	1.6
Chronic illness	4.9
Very good self-assessed health status	1.2
Good	2.4
Fair	4.3
Bad	7.8
Very bad	10.8
Income 1 (lowest)	2.8
Income 2	3.4
Income 3	3.3
Income 4	3.3
Income 5	2.7
Income 6	2.8
Income 7	1.7
Income 8	1.8
Income 9	1.7
Income 10 (highest)	1.2
Medical card	2.5
No medical card	2.5
All	2.5

Table 4.6: Reasons for Not Visiting a Doctor (as a Proportion of Those Who Did Not Visit a Doctor in the Last Year, Even Though they Felt they Needed to)

	All	Medical Card	Private
Could not afford to (too expensive)	50.7	20.4	66.7
Waiting list	23.0	39.8	14.2
Could not take time off (work, caring *etc.*)	5.5	4.5	6.1
Too far to travel/no means of transport	1.7	5.1	
Fear of doctor/ hospital/examination treatment	1.9	4.3	0.6
Wanted to wait to see if problem improved on own	9.2	12.6	7.4
Didn't know any good doctor/specialist	0.4	1.2	
Other reason	7.5	12.1	5.0
N	255	88	167

Returning to the patterns in EU-SILC and differentiating the population on the basis of medical card status shows that, not surprisingly, a higher proportion of private patients cited cost as their primary reason for not seeking medical care (over two-thirds of private patients in comparison with one-fifth of medical card

patients), a pattern also found in O'Reilly *et al.* (2006). Not surprisingly then, Table, 4.7 indicates that among private patients foregoing a medical consultation in the previous year, the proportion citing cost as a reason declines as income increases (although the numbers in each category are small). However, the figures from EU-SILC are in sharp contrast to those from the O'Reilly *et al.*, 2006 study and suggest that the question in EU-SILC was not framed correctly to identify individuals with unmet need for medical care.

Table 4.7: *Could Not Afford to (Too Expensive*) by Equivalised Household Income Decile for Private Patients (as a Proportion of All Private Patients Who Did Not Visit Their Doctor in the Last Year, for All Reasons)

	% of Those Who Did Not Visit a Doctor In The Last Year, Even Though They Felt They Needed To
Income 1 (lowest)	84.6
Income 2	55.3
Income 3	71.5
Income 4	92.0
Income 5	80.7
Income 6	68.5
Income 7	31.0
Income 8	18.6
Income 9	48.8
Income 10 (highest)	47.2
All	66.7

4.4 Medical Card Eligibility and GP Behaviour

4.4.1 THE EFFECT OF THE 1989 CHANGE IN GP REIMBURSEMENT

Prior to 1989, GPs received a fee-for-service payment for medical card and private patients (with the State paying for medical card patients and private patients paying out-of-pocket). The system, therefore, incentivised GPs to encourage repeat or return consultations on the part of medical card patients (who would be less likely to resist such consultations), and a series of studies (Tussing, 1983 and 1985 and Tussing and Wojtowycz, 1986a and 1986b) provided evidence to show that the probability of a repeat consultation was significantly more likely for medical card patients. In part in response to these findings and to concerns that GPs were engaging in demand inducement behaviour on the part of their medical card patients, the reimbursement method for medical card patients was changed to capitation in 1989.

This provides us with an opportunity to examine the behaviour of GPs, as the behaviour of patients should be completely unaffected by the change in reimbursement method for GPs. As such, any observed change in GP visiting behaviour can be attributed to changes in GP behaviour, and specifically, their response to changing incentives. The change to capitation payments for medical card patients in 1989 removed the incentive for GPs to engage in demand inducement behaviour on the part of their medical card patients. We would, therefore, expect that the

differential in GP visiting rates between medical card patients and private patients would lessen after the change to capitation in 1989.

Madden *et al.* (2005) examined whether the change in reimbursement led to any significant change in the difference in GP visiting rates between medical card and private patients (if GPs were encouraging their medical card patients to return more frequently than necessary prior to 1989, the difference in GP visiting rates between medical card and private patients should have fallen after 1989). Table 4.8 presents descriptive statistics on GP visiting rates for the two groups before and after the policy change, while Table 4.9 presents estimation results from the models which additionally control for other differences in characteristics between medical card and private patients (comparable micro-data from 1987, 1995 and 2000 are used in the analysis). The descriptive patterns in Table 4.8 illustrate that while the average number of GP visits per annum did indeed fall for medical card patients between 1987 and 1995/2000, GP visiting by private patients also fell, and by a greater amount.

Table 4.8: GP Visiting Patterns for Medical Card and Private Patients, Before and After the Change in Reimbursement in 1989

	MEDICAL CARD				PRIVATE			
	1987	1995	2000	1995/ 2000	1987	1995	2000	1995/ 2000
Average number of GP visits	6.5	5.6	6.4	6.0	2.8	2.3	2.3	2.3
Percentage with at least one GP visit	70.9	80.9	85.6	83.1	52.9	64.2	66.9	65.5
Average number of GP visits for those with at least one GP visit	9.1	7.0	7.4	7.2	5.2	3.6	3.5	3.5

These descriptive patterns are broadly supported by the estimation results in Table 4.9. They indicate that, for the one-step model, medical card patients have a significantly higher number of GP visits per annum than private patients and that the average number of GP visits for both groups was significantly lower in 1995 than in 2000. Most importantly however, the results indicate that, contrary to the predictions from a model highlighting supplier-induced demand, there is a negative and insignificant difference-in-differences effect. In other words, the difference between medical card visits in 1987 and 1995/2000 was significantly less than the difference between private patients' visits in 1987 and 1995/2000. While both groups visited their GP less in 1995/2000 than in 1987, the regression results confirm that the reduction was actually larger for private patients than for medical card patients. The results from the two-step model, while very similar to those for the one-step model, suggest a significantly negative difference-in-difference effect, i.e., that the change in GP visiting among medical card patients between 1987 and 1995/2000 was significantly less than the change in GP visiting rates among private patients over the same period.

Table 4.9: Difference-in-Difference Estimation Results, 1987-2000

	One-Step	Two-Step	
		Contact	Frequency
Medical Card	1.48 ***	0.14 ***	0.40 ***
Year87	0.06	-0.10 ***	0.83 ***
Year95	-0.31 ***	-0.01	-0.02
Med87	-0.17	-0.04 *	-0.17 **
N	20,466	20,466	13,735
Log-Likelihood	-44,048.8	-11,282.4	-32,786.0

*** significant at 1 per cent level; ** significant at 5 per cent level; * significant at 10 per cent level.

See Madden *et al.* (2005) for further details.

Unfortunately, these data do not distinguish between patient-initiated and GP-initiated visits and thus it is difficult to make direct inferences about GP behaviour. In addition, it is possible that a GP might induce demand by means other than repeat visits, such as increasing the complexity of the consultation or ordering additional services that attract an additional fee (see Rice and Labelle, 1989). Nonetheless, these results do suggest that demand inducement behaviour in the form of extra GP visits was not a feature of the Irish system prior to 1989. The driver of this unexpected result was the significantly larger fall in GP visiting rates among private patients, which could be the result of substitution of other health-care services by those who have to pay for GP visits. However, the fact that GPs act as gatekeepers for secondary health services in Ireland, as well as the high charges for accessing A&E services without a GP referral reduces the plausibility of this as an explanation.

4.4.2 GP FEES AFTER THE 1989 CHANGE IN GP REIMBURSEMENT

A further explanation for the proportionately greater fall in private patients' GP visiting could be GPs' attempts to compensate for their financial circumstances by increasing the fees they charged to private patients.

4.4.3 SUPPLY OF GP SERVICES

Up to now we have primarily concentrated on the role of financial incentives facing GPs in terms of their behaviour with regard to the utilisation of GP services at the patient level. However, in the wider context, such financial incentives may influence a GP's decision about where to locate his/her practice, or where to join a practice. As it stands, the current system encourages GPs to locate in areas with more favourable health and social profiles (and the extension of the medical card to all over 70 year olds and the difference in reimbursement method for 'new' and 'old' over 70s has exacerbated this effect). Indeed, there is some evidence for this based on claims that medical card lists are increasingly difficult to allocate in rural and certain deprived urban areas (FÁS, 2005). Ideally, in analysing the effect of location on access to GP services, we would like to be able

to compare the supply of GPs at a detailed regional level with an index of regional 'need'. However, in the absence of data on the supply of GPs at a regional level, here we instead focus on whether differences in GP visiting by location persist when all other possible influences on visiting have been controlled for, such as age, gender, income, medical card eligibility etc.

Using data from the 1995 and 2001 LIIS, Table 4.10 presents the results from the one-step multivariate models of GP visiting, using a more detailed specification of the household location variable (i.e., based on the population size of household location), and combining it with information on the individual's satisfaction with the 'quality'

Table 4.10: Marginal Effects From One-Step Model of GP Visiting, 1995 and 2001 LIIS

	1995	2001
County * not disadvantaged	0.3	0.3
Country * disadvantaged	1.0 ***	0.9 **
Town 1 * not disadvantaged	1.2 ***	0.6
Town 1 * disadvantaged	0.8	0.0
Town 2 * not disadvantaged	1.0 ***	1.1 **
Town 2 * disadvantaged	-0.0	1.8 **
Town 3 * not disadvantaged	0.7 ***	0.9 **
Town 3 * disadvantaged	0.6	1.0 **
Town 4 * not disadvantaged	0.3	0.4
Town 4* disadvantaged	1.3 ***	0.3
Waterford * not disadvantaged	-0.7	1.2
Waterford * disadvantaged	0.5	-0.7
Galway * not disadvantaged	0.2	-0.4
Galway * disadvantaged	0.4	1.0
Limerick * not disadvantaged	1.3 **	-0.1
Limerick * disadvantaged	0.2	0.2
Cork * not disadvantaged	0.7 **	1.8 ***
Cork * disadvantaged	0.3	1.0 *
Dublin city * not disadvantaged	-0.1	0.2
Dublin city * disadvantaged	Reference	Reference
Dublin county * not disadvantaged	0.5 **	0.0
Dublin county * disadvantaged	0.9 ***	0.9 **
N	7,104	5,154
Log-Likelihood	-15,060.2	-11,148.9

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.
Marginal effects for other variables (year dummies, age, sex, health, education, marital status, employment status, household income, medical card status are not presented here.

of their neighbourhood.[1] The 'old' urban/rural dichotomous results (from Table 3.13 in Chapter 3) suggest that rural residents have significantly fewer GP visits per annum in 1995, and this is largely borne out by the results in Table 4.10 where, in comparison with residents of 'disadvantaged' areas of Dublin city, all other areas (with the exception of Waterford and Galway cities) have significantly higher numbers of GP visits per annum. In addition, we can see that while not all effects are significant, in general, the 'not disadvantaged' areas have generally more significant effects. The results are similar, but less significant, in 2001. The key issue is whether this reflects a GP availability effect (or indeed the availability of alternatives such as A&E departments, pharmacies etc.) rather than a population composition effect. The fact that we have controlled as comprehensively as possible for other individual and household characteristics lessens the possibility for the latter explanation. However, recent commentary has highlighted the inadequate supply of GPs in deprived urban areas (see Irish College of General Practitioners, 2005 and FÁS, 2005 for example), and while our indicator of disadvantage is necessarily crude, these results do suggest that areas outside disadvantaged areas of Dublin city have significantly higher numbers of GP consultations.

4.5 Policy Implications

A key distinguishing feature of the GP service in Ireland is the distinction between those who are eligible for free GP services (medical card patients) and those who must pay the full cost (private patients). This structure, which is unusual in a European context, influences the financial incentives of both patients and providers, and the examination of the extent and magnitude of these effects has been a central focus of this research programme. The key issue for policymakers, is whether and to what extent the current system of eligibility for free GP care in Ireland influences the behaviour of

[1] While none of our data sources include any information on area deprivation, let alone, GP supply, we proxy area deprivation or disadvantage using responses to a question in the LIIS, which asks households …*how common would you say that each of the things listed on this card is in your neighbourhood? For each item listed, please say whether or not you think it is very common, fairly common, not very common or not at all common,* for six items: graffiti on walls or buildings; teenagers hanging around on the streets; rubbish and litter lying about; homes and gardens in bad condition; vandalism and deliberate damage to property; people being drunk in public. Households who answer 'very common' or 'fairly common' on each item are given the value one and these values are added up to form the index (minimum value is zero and maximum is six). Households who score two or more on this index are regarded as living in a disadvantaged area. We then combine this dichotomous indicator of disadvantage with the size of location variable to come up with a 22-category variable indicating area of residence and whether disadvantaged or not. In 1995, 15.7 per cent of individuals lived in households which scored two or more on the 'disadvantage' index (ranging from 3.7 per cent of households in rural areas to 40.8 per cent of households in Dublin county), and this proportion had dropped slightly, to 14.6 per cent of the population by 2001.

GPs and patients and leads to differences in the utilisation of GP services that are not predicted by 'need' for such services.

In terms of patient behaviour, does the current system encourage desirable behaviour? The results from Chapters 3 and 4 confirmed that, compared to private patients, medical card patients have both a significantly higher probability of visiting a GP, and a higher average number of GP visits. The size of the gap in GP visiting between medical card and private patients suggests that neither level of visiting is optimal, i.e., that medical card patients are to some extent 'over-consuming' GP services, and private patients 'under-consuming' services. Unfortunately, it is very difficult to test this proposition without precise information on the various medical and economic costs and benefits involved in GP visiting. Ideally, we would like to be able to examine the extent to which private patients are deferring 'necessary' GP visits and/or substituting other health services for GP services. A recent study by O'Reilly *et al.* (2006) found that 18.9 per cent of private patients in Ireland decided to forego a self-perceived 'necessary' GP visit due to cost,[2] although we have no information on the subsequent effects of such behaviour in terms of health status or use of more costly secondary care services. GPs act as gatekeepers for secondary care services in Ireland, so the potential for private patients to directly access such services (for which much of the cost will be covered for those with private health insurance), is limited.

Current government policy favours increasing the income thresholds for medical card eligibility, and the recent introduction of the 'GP visit' card, with income thresholds 50 per cent higher than those for the standard medical card, follows this pattern. However, our examination of the behaviour of private patients suggests that the deterrent effect of charging for GP services persists right up the income distribution. Of course, the extent to which those on higher incomes are able to bypass the GP and access private out-patient care may also influence this pattern (again, the potential for this type of behaviour is limited as GPs act as gatekeepers for secondary care in Ireland). On the basis of these results, however, the argument that there is some form of U-shaped relationship between income and GP visiting (with those on the very lowest and very highest incomes having no significant difference in GP visiting compared with those in the middle of the distribution) is discounted. The policy implications of a stronger effect for those just above the income threshold for a medical card are clearly quite different to those if the effect persists right up through the income distribution.

In terms of GP behaviour, does the current system of eligibility for free GP care encourage desirable behaviour? An examination of the current structure of incentives with regard to the difference in reimbursement method for medical card and private patients (see

[2] Although information from the 2004 EU-SILC suggests that the extent of foregone visiting is much smaller (see Section 4.3.2).

Chapter 2) would suggest that GPs may treat medical card and private patients differently, although a lack of observable data on GP behaviour prevents us from assessing this directly. Ideally, we would like practice-level information, which would record time spent with patients, services provided, patient characteristics etc. Then we could assess the extent, if any, to which medical card and private patients are treated differently, and whether this difference persists when differences in 'need' between medical card and private patients is taken into account.

However, the change in reimbursement for medical card patients in 1989 (from fee-for-service to capitation) did allow us to examine the extent to which the previous system incentivised GPs to engage in demand inducement on the part of their medical card patients. The results of this analysis (described above in Section 4.4.1) provide little definitive evidence in favour of demand inducement behaviour on the part of GPs. GP visiting rates by medical card patients did fall, which is consistent with what would have happened if GPs were engaging in demand inducement prior to 1989, but crucially, the GP visiting rates of private patients fell by a greater proportion. Further analysis of GP fee-setting behaviour around this time provides little evidence that GPs increased their fees to compensate for the reduction in income as a result of the change to capitation for medical card patients.

Without a more detailed analysis of GP behaviour, it is difficult to assess the appropriateness or otherwise of the current reimbursement system. While GPs receive fee-for-service payments for 'extra' services provided to medical card patients, such as immunisations and suturing, it has been argued that the current weighting scheme for the capitation formula (using age, sex and distance from doctor's surgery) is insufficient to adequately compensate for differences in need across medical card patients (see in particular Kelleher and McElroy, 2002). Combining capitation payments with targeted payments for particular objectives (e.g., influenza immunisation) are increasingly common. In 2004, the UK introduced the "Quality and Outcomes Framework", under which GPs receive financial rewards for the achievements of targets covering 146 indicators (see Guthrie *et al.*, 2006 for a critique of this system). While GPs in Ireland are obliged to accept all eligible medical card patients onto their list (subject to capacity), in an attempt to prevent selection of lower-risk medical card patients, at a more macro level, the current structure of incentives may encourage GPs to locate in areas with more favourable health and social profiles. A recent study of skills needs in the health sector suggests that medical card lists are increasingly difficult to allocate in certain rural and deprived urban areas (FÁS, 2005), and the Irish College of General Practitioners has called for additional payments to GPs practising in deprived areas (Irish College of General Practitioners, 2005). Our limited analysis of the effect of household location on GP visiting behaviour suggests that residents of 'disadvantaged' areas of Dublin city have significantly fewer GP visits per annum than residents of all other areas, although this could reflect the effect

of increased availability of alternative health services such as A&E, rather than a GP availability effect.

The extension of medical card cover to all over 70 year olds in 2001 regardless of income, further distorted the incentives facing GPs with regard to the treatment of different patient groups. Unfortunately, we do not have adequate data to assess the impact of this change on GP behaviour with regard to the utilisation of GP services by the 'new' and 'old' over 70 year olds,[3] although a recent study of prescribing behaviour by GPs (Fadden, 2003) found that 'old' over 70s were prescribed more generics and fewer new and expensive drugs than the 'new' over 70s. Whatever about the effects on GP behaviour, the key lesson from this experience is that comprehensive economic evaluation of new proposals is vital; the extension of medical card cover to all over 70s in 2001 was introduced on the assumption that 39,000 additional individuals would become eligible for a medical card, at a annual cost of €19 million, but subsequent analysis concluded that the number of additional individuals was in fact 70,000, and that the annual cost was actually €51 million (Comptroller and Auditor General, 2002).

4.6 Summary and Conclusions

The purpose of this chapter was to focus on the behaviour of patients and GPs as a result of the current system of eligibility for free GP care in Ireland. In Ireland, GP services are only free of charge for the approximately 30 per cent of the population who qualify for a medical card under an income means test. Since July 2001, all over 70 year olds are also eligible for a medical card. The remaining 70 per cent pay the full cost out of pocket, albeit with tax relief available for large medical expenses, and GPs are free to set the level of the fees they charge to private patients. This distinctive pricing structure creates differential incentives on the part of both patients and providers with regard to the utilisation of GP services. The key issue therefore, is whether the current system of eligibility for free care in Ireland results in differences in the utilisation of primary care services that are not predicted by 'need' for such services.

The descriptive patterns in Chapter 3 suggest substantial differences in GP visiting behaviour across different sections of the population, and further multivariate modelling of these relationships confirmed the importance of 'need' factors such as age, gender and health status, as well as income and medical card eligibility. The analyses in this chapter focused on the latter effects, in the context of both patient and GP behaviour, and found that the major

[3] The LIIS ended in 2001, and the successor, EU-SILC, the first full wave of which was collected in 2004, does not currently ask private patients about their GP visiting rates, so a key counterfactual is missing from an analysis of differences in GP visiting between 'new' and 'old' (i.e., high and low income) over 70 year olds before and after the change in policy in 2001.

difference in GP visiting is between medical card and private patients, rather than between private patients on differing incomes. This finding has obvious implications for policy with regard to the setting of medical card thresholds. However, alternative proposals such as extending medical card cover to the full population or to particular population groups (e.g., children) need to be properly evaluated to prevent a repetition of the cost overruns and uncertainty that plagued the extension of medical card cover to all over 70 year olds in July 2001. While limited by the nature of the data available to us, this chapter also analysed the effects of incentives on GP behaviour. While an analysis of GPs' responses to the change in reimbursement for medical card patients from fee-for-service to capitation in 1989 provided little evidence in favour of demand inducement behaviour on the part of GPs, the effects of the current system of incentives with regard to the over 70s extension needs to be examined further. The manner in which the current system may also distort incentives with regard to GPs' location decisions was also discussed. A number of recent reports have highlighted the difficulty in recruiting GPs to practise in rural or urban deprived areas (FÁS, 2005 and Irish College of General Practitioners, 2005) and our analysis, while relying on a crude categorisation of area disadvantage, provides some support for the view that the utilisation of GP services is significantly higher in areas outside of disadvantaged areas of Dublin city.

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5. COMPARING UTILISATION OF HEALTH SERVICES ON THE ISLAND OF IRELAND

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5.1 Introduction

Although the separation of Ireland into two states has led to considerable political pressures one result has been that there has evolved two quite distinctive health care systems. In Northern Ireland the system developed as part of the UK National Health Service where the philosophy was one of universal access with access based on need. The system in the Republic is mixed. A service similar to that of the NHS is provided to those eligible to hold a Medical Card – eligibility being essentially means tested. For those with a Medical Card, access to a GP is free as is referral to a medical specialist at a public hospital together with any associated inpatient stays. Like in the NHS treatment is on the basis of need and the patient might face considerable waiting lists. For those without a Medical Card, visits to GPs entail a charge, though secondary care at public hospitals is free of medical costs. What makes the Republic distinctive from the North is the existence of a much more considerable private health sector access to which is on the basis of payment, either direct or through insurance.

This chapter investigates the consequences that the different institutional arrangements North and South have upon the utilisation of health care services. The approach is to separately model North

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and South the three principal services, that is, general practice and hospital outpatient and inpatient services. Comparison of the results gives some insight into the impact of different institutional structures. By modelling the three sectors together it is possible to gain a view of how the system as a whole functions which is not possible when a sector is viewed in isolation.

The remainder of the chapter is developed in four parts. In Section 5.2 we provide a brief overview of the structure of the two health care systems as they existed in 2001 and a description of the health and care contexts within which they operated. (In the interests of brevity we do not dwell on material covered in other chapters in respect of the role of medical cards in the Republic of Ireland or the structure of GP services there.) In Section 5.3 the methods used in the analysis are discussed and in Section 5.4 the data, together with descriptive statistics on these, are presented. In Section 5.5 the results of the analysis are presented and discussed. Finally, in Section 5.6 conclusions and areas for further research are identified.

5.2 The Context

In Northern Ireland health and social care are delivered and commissioned through a complex network of Boards, Trusts, Councils and Agencies as well as independent contractors (general practitioners) and central government (the Department of Health of Social Services and Public Safety). At the time of writing the key bodies in the system are the Department of Health (DHSSPS) – responsible for the formulation and overall implementation of policy; four health and social services boards – who act as agents of the Department in the planning, commissioning and monitoring of services for the residents in their geographic areas; 18 health and social care trusts (7 acute hospital trusts, 6 community and 5 integrated hospital and community trusts) – who provide hospital and personal social services and GPs who are the principal providers of primary care. In 2001, there were roughly 1,000 GPs working in 359 practices (HSC Comparative Data, 2004). The majority (60 per cent) of GPs operated under what were known as fundholding arrangements (Appleby, 2005)[1] whereby the GP practice was allocated a budget from which it funded the delivery or procurement of care. The budget covered practice staff, certain hospital referrals, drug costs, community nursing services and management costs.

[1] Under a recent review of structures the various bodies identified will be replaced over the next two years by a smaller Department responsible for the development of strategic policy and management, a newly created Health and Social Services Authority (HSSA) – replacing the 4 health and social services boards and responsible for commissioning of services and performance management of the system; 5 new integrated health and social services trusts – replacing the current 18 and responsible for the delivery of acute and community care services and 7 local commissioning bodies acting as local offices of the HSSA and working alongside GPs in the commissioning of services from trusts on behalf of the populations they serve.

Although a small private sector existed in Northern Ireland (principally in specialist outpatient and minor elective surgery services) the vast majority of services are publicly owned and financed. Access to all services (with the exception of a small co-pay in respect of prescribed medicines) is free at the point of use to the patient.

In the Republic of Ireland the Department of Health and Children are responsible for the formulation (together with the minister) and evaluation of health policy. They allocate funds to the Health Service Executive (HSE) which in turn allocates these across its four areas for the delivery and commissioning of care on behalf of their resident populations. (In 2001 ten health boards provided this intermediate level between providers and the HSE.) Hospital care is provided through a combination of HSE owned facilities, those owned by the voluntary sector (e.g. church organisations) from whom the HSE commissions care and private hospitals. Both HSE and voluntary hospitals treat public and private patients. The structure of GP services has been discussed earlier.

Details of selected health and care statistics in the two systems are provided in Table 5.1. As can be seen North and South record broadly similar measures of health status at a population level. Life expectancy at age 65 is roughly comparable for men and women – the Republic being one year less in both instances; the percentage that rate their health as excellent, very good or good/fairly good is broadly the same[2] at over 80 per cent, and mortality rates associated with the leading causes of death – cancer, circulatory and respiratory – are broadly similar.

Looking at levels of provision, Northern Ireland is seen to have more available beds, (almost 5 compared to 3.12 per thousand of the population), a longer average length of stay and more outpatient and A&E attendances than the Republic of Ireland. By contrast, the Republic of Ireland has more GPs per head of population and more day cases than is the case in Northern Ireland. The number of GPs in single-handed practices is much higher in the Republic compared with Northern Ireland.

As noted in Chapter 1, those with medical cards in the Republic of Ireland are entitled to free GP consultations, others paying a charge for these services. Everyone living in the Republic of Ireland and certain visitors are entitled to free maintenance and treatment in public beds in Health Service Executive and voluntary hospitals. Outpatient services in public hospitals are also free though there may be an initial charge if the person has not been referred by a GP.

[2] Care is warranted here, health in the Republic of Ireland is reported on a five point scale excellent, very good, good, fair, poor; in Northern Ireland it is reported on a three point scale good, fairly good, not good. The percentage reporting health as poor in the Republic was 2 per cent for both male and female. The percentages reporting health as not good in Northern Ireland were for males and female respectively 15 per cent and 18 per cent. It is acknowledged that if one equates poor with not good this would put a different complexion on the relative health of the two populations.

Similarly, A&E services provide care free at the point of use if the individual is referred by a GP, otherwise again an initial charge is levied for these.

Table 5.1: Comparison of Republic of Ireland and Northern Ireland on Health and Health Care Variables

	Republic of Ireland		Northern Ireland	
Population (millions)	3.85		1.69	
Expected additional years of life at age 65 in 1995/97	Male	14	Male	15
	Female	17	Female	18
Average number of available hospital beds (per 1,000 of population)	12,004 (3.12)		8,419 (4.98)	
Per cent occupancy rate	85.2		83.3	
Average length of stay	6.5		7.8	
Number of day cases (per 1,000 of population)	357,676 (92.90)		130,068 (76.96)	
Accident and emergency attendances (per 1,000 of population)	1,228,406 (319.07)		672,782 (398.10)	
GPs (per 1,000 of population)	2,700† (0.70)		980†† (0.58)	
Percentage of GP practices that were single-handed	42Ŧ		17ŦŦ	
Outpatient attendances per 1,000 population	571.8*		862.84**	
Deaths due to cancer (per 1,000 of population)	7,632 (1.98)		3,696 (2.19)	
Deaths due to circulatory problems (per 1,000 of population)	11,886 (3.09)		5,829 (3.45)	
Deaths due to respiratory problems (per 1,000 of population)	4,472 (1.16)		1,975 (1.17)	
Percentage of persons visiting a GP in the last 2 weeks	Male	15	Male	13
	Female	23	Female	20
Percentage rating their health as excellent, very good or good/fairly good	Male	89	Male	85
	Female	88	Female	81

†Figures taken from Indecon Economic Consultants, 2003.
††Figures taken from Health and Social Services Comparative Data for Northern Ireland and Other Countries, 2004.
ŦIndecon (2003).
ŦŦHansard (2006).
*Figures taken from Jameson *et al.* (2006).
**Figures taken from Northern Ireland Hospital Statistics 1998-2004.
All other figures taken from Chapter 3 Ireland North and South – A Statistical Profile -2003 Edition.

Not surprisingly possessing a medical card has a considerable impact on utilisation of GP services and through the GP on other services. As is seen in Table 5.2 for example, 20 per cent more of those who hold medical cards see the GP than among those who do not hold medical cards. Similarly, approximately 10 per cent more of those with medical cards see a medical specialist and receive hospital

inpatient care compared with those who do not hold a medical card. Holding insurance on the other hand, seems only to increase the likelihood of seeing a medical specialist, by 5 per cent though given the potential use of deductibles, co-pays as well as the potential role of other confounding variables this is not perhaps surprising. The table also clearly shows the danger of making simple headline comparisons between the North and the Republic. While, for example, 73 per cent, 25 per cent and 12 per cent of RoI residents used GP, outpatient and inpatient services respectively which compares with 81 per cent, 45 per cent and 13 per cent in the North, as can be seen distinct patterns also exist between those with and without medical cards.

Table 5.2: Health Service Utilisation for Holders of Medical Cards and Insurance

	NI	RoI	Medcard = 1	Medcard = 0	Ins = 1	Ins = 0
GP	81	73	86	67	72	74
HOP	45	25	32	22	28	22
HIP	13	12	18	9	11	12

5.3 Methods

The objective of this chapter is to compare the utilisation of health services in the two systems so as to establish the effects of different structural factors, such as funding of the service, upon utilisation functions. We do this using a series of simple utilisation functions, essentially explaining whether the individual used the service at all, rather than, as in Chapter 3, accounting for the particular level of use.

Consider first a particular utilisation function, say that for GP services. The data are binary, GP = 1 if the individual attends a GP in the previous year and = 0 otherwise. This is the observed counterpart of the unobserved latent index GP* that is the propensity of the individual to use the GP. It is assumed that GP* is a linear function of a series of variables, notably a set describing the health status of the individual, *HEALTH*, and another of socio-economic characteristics, *SOCECON*, reflecting, for example, the opportunity cost associated with a GP visit for the individual. The latent index has the form:

$$GP^*_i = \alpha_0 + \alpha_H HEALTH_i + \alpha_S SOCECON_i + \varepsilon_i^{GP}$$

where a_H and a_S are vectors and ε_i^{GP} is a random error term. An individual will visit the GP if the latent index is greater than zero, $GP^* > 0$ and so the probability of this, conditional upon the characteristics of the individual, will depend upon the distribution of the error term. If this is assumed to be normally distributed then it can be shown that (see Greene, 2000, Chapter 19):

$$P\left(GP_i = 1\right) = \Phi\left(\alpha_0 + \alpha_H HEALTH + \alpha_S SOCECON\right)$$

where Φ is the cumulative normal distribution function; the coefficients of the index function can be estimated by maximum likelihood.

Similar utilisation functions with dependent variables will exist for outpatient/specialist services *HOP* and inpatient services *HIP*. Each will have its associated error term, ε_i^{HOP} and ε_i^{HIP}.

That these error terms may be related is possible. For example, two individuals with identical health status and socioeconomic characteristics, could exist, one of whom visits the GP because s/he is more anxious about her/his health, while the other, more relaxed individual, does not. Anxiety, however, is not observed in our function. Thus the estimated probit would generate the same predicted probability of seeing the GP in the two cases, since by assumption the characteristics (with anxiety excluded) are the same. The error ε^{GP} will thus be positive for the anxious patient and negative for the other. However, as is evident from the discussion above in both health care systems the GP occupies a pivotal role in the individual's access to outpatient/specialist and inpatient services.

If the GP acts as a gatekeeper to hospital services – referring on only those individuals whose health state warrants specialist investigation or treatment – then the anxious individual gets no further than the GP surgery. Although $\varepsilon^{GP} > 0$ in this case, utilisation at the secondary level is not granted so the probability of access is low given the (good) health status. Thus it would be anticipated that $\varepsilon^{HOP}, \varepsilon^{HIP} = 0$ so that the unobserved variable has no effect; errors in the three functions would not be correlated. If, however, the GP does not function effectively as a gatekeeper, errors from the GP utilisation equation would be correlated with those from the other sectors. More generally differences in the correlation of the errors in the two health care systems could provide useful insights into differences in the operation of the two health care systems and what factors lie behind these.

Where relationships between errors of the type posited are expected in a linear model then the seemingly unrelated regression model (SUR) provides an appropriate estimation technique. (Zellner, 1962). In essence we employ the probit analogue to this.

5.4 Data

For the Republic of Ireland, we use the Living in Ireland Survey (LIIS). As discussed in Chapter 3 the LIIS, is the Irish component of the European Community Household Panel (ECHP) and involved an annual survey of a representative sample of individuals in private households aged 16 years and over in each EU member state, based on a standardised questionnaire. A more detailed description of the design and conduct of the survey as well as response rates and the representativeness of the survey have been discussed earlier. Health information on medical card eligibility; insurance coverage; number of visits to GPs; number of nights in hospital; visits to outpatients/medical specialists as well as information on self reported health; labour force status; income and age etc. are gathered for all adults in the household. The survey ran from 1994 to 2001.

To allow comparisons with Northern Ireland we use data from the 2001 survey. The sample includes almost 6,500 (6,372) usable observation.

For Northern Ireland we use the Northern Ireland Household Panel Survey (NIHPS). This began in 2001, is an extension of the long-running British Household Panel Survey (BHPS), and uses an identical questionnaire. It too involves an annual survey of a random sample of households, and collects information on a variety of individual and household demographic and socio-economic characteristics. The full list of variables is provided in Freed Taylor *et al.* (2003). The NIHPS contains 3,458 individuals. Excluding cases with missing observations, a usable sample of 3,217 is available for estimation purposes.

Differences in the wording of questions limits the extent to which direct comparisons can be made between the two surveys. While the LIIS records the actual number of GP visits made, for example, in the NIHPS responses are coded into five categories (as in the BHPS), namely, 0, 1-2, 3-5, 6-10 and 11+ visits per annum. To permit comparability of the data across the two surveys, we have made appropriate adjustments. In respect of education highest level of education achieved is represented by a variable with four categories: third level, upper secondary, lower secondary and primary level or lower, with the latter also regarded as the reference category.[3] Age and gender are measured in a similar fashion across the two surveys. In respect of other variables direct comparisons are not made.

5.5 Results

Given that the health services utilisation functions are being estimated simultaneously, it is instructive to begin by examining the pattern of service use. If we look as in Table 5.3 across permutations of the three services accessed by individuals there are eight alternative outcomes for the three binary dependent variables and the proportions of the sample in each are reported. Here a zero indicates that the person did not use the service in question and a 1 that they did (so for example, a column of three zeros refers to people who used none of the three services whereas GP=0, HOP=1, HIP=0 indicates people who did not visit the GP or use inpatient care but did use outpatient services).

Examination of Table 5.3 reveals a different pattern of service use across the two systems. While 26 per cent of the sample in the Republic did not access any of the three health services this

[3]In Northern Ireland, third level corresponds to higher degree, first degree, teaching qualification, nursing qualification; upper secondary to other higher qualification and A levels; lower secondary to O levels; commercial qualification, GSCEs and apprenticeships and primary to other qualification or no qualification. In the Republic, third level corresponds to higher degree, primary degree or diploma; upper secondary to Leaving Certificate or vocational qualification; lower secondary to Group, Intermediate or Junior Certificates and primary to no education, primary level or some secondary education. See also Freed Taylor *et al.* (2003).

compares with 16 per cent in the North. In the Republic 46 per cent see only the GP whereas in the North the figure is smaller at 37 per cent. There are major differences in the utilisation of outpatient services between the two systems: in the North the proportions of those that see only a GP is just slightly higher than that who see a GP and visit outpatients (37 per cent to 31 per cent) whereas in the South outpatient visits are dramatically lower (46 per cent to 15 per cent). The GP it appears plays a greater role in health care in the South while in the North the GP is supplemented much more by outpatients. While the proportions using all three services are similar, 11 per cent in the North compared to 9 per cent in the Republic it is noted again though that the North has a higher utilisation rate.

Table 5.3: Proportion of Respondents Using Combinations of Services

GP	0	0	0	0	1	1	1	1	N
HOP	0	0	1	1	0	0	1	1	
HIP	0	1	0	1	0	1	0	1	
RoI	0.258	0.002	0.010	0.001	0.464	0.026	0.149	0.087	6,372
NI	0.160	0.002	0.025	0.004	0.368	0.017	0.312	0.112	3,217

The percentages accessing outpatient/specialist and inpatient services without visiting the GP is negligible in both health care systems which suggests that it is reasonable to infer that the GP plays a major role in accessing these services in both systems (though it does not necessarily follow that that role is the same). The sharpest contrast between the two systems is in the use of out-patients; in all permutations this is considerably greater in the North.

In Table 5.4 the means of some explanatory variables have been presented so as to highlight the potential pitfalls in the comparison of coefficient estimates between the North and the Republic. Across several of the variables care is warranted in making comparisons. For example, it is difficult to establish the extent to which differences in the educational variables are due to different resource allocations in the two countries or to the different types of qualification offered. Similarly, the wording of the health questions in the two surveys is different and it is not surprising that the proportions of the self assessed health variables differ substantially.

Given these differences it is important to be clear how the results of the probit analysis between the Republic and the North are to be compared. Evidently, there is little to be gained from simply comparing the magnitudes of coefficients in the two cases. However, while the utilisation functions are conditioned on health, the precise measures of health are not of intrinsic interest, provided that coefficient estimates are not directly compared. As long as the health variables collectively provide a comprehensive ordering of health states, the fact that the number of variables or their definition differs across the two countries is not fatal. This is similarly the case in respect of income.

Table 5.4: The Means of Some Explanatory Variables

Variable	RoI	NI
Education		
ED1	0.294	0.346
ED2	0.226	0.228
ED3	0.311	0.266
ED4	0.169	0.160
Demographic		
HHOLDSIZE	3.781	3.005
SINGLE	0.342	0.244
AGE	45.070	45.875
Economic		
EMP	0.540	0.507
INACTIVE	0.426	0.376
Health		
VGOOD	0.453	0.278
GOOD	0.361	0.391
FAIR	0.157	0.213
BAD	0.024	0.092
VBAD	0.006	0.025
N	6,372	3,217

In respect of demographic variables direct comparisons between the two data sets are less problematic. As seen in Table 5.4 although average age is virtually the same, the proportion of single person households is much greater in the Republic, 34 per cent compared to 24 per cent in the North. Despite this household size is considerably greater in the Republic (3.8 to 3.0 persons).

It has been noted above that the philosophy of the NHS is based upon the proposition that access to health services should be based on need. In the first instance it would be anticipated, therefore, that utilisation in the North should be explained solely by the health variables. It is important initially to establish the extent to which the evidence is congruent with this and thus whether a comparison between the determinants of utilisation North and South reflects the impact of the medical card system together with insurance based health care.

The results of the multivariate probit analysis of primary and secondary care are presented in Table 5.5. The estimated utilisation functions are reported by sector with the results for the Republic and the North side by side to facilitate comparison. It is important to note that results relate to the estimated index function and are not the marginal effects. In this case there are eight possible outcomes and it is not obvious how useful reporting the marginal effect of say, an increase in age, upon the pattern of utilisation (GP=1, HOP=0, HIP=1) really is. Given the considerable computational effort required, attention is limited to the estimated latent index.

As anticipated the health variables perform strongly both North and South with on the whole the correct signs and relative

magnitudes – the coefficients increasing in magnitude as health state deteriorates. An exception to this is the insignificance in the North of Bad and Vbad in the GP function. This can be explained by the strength of self assessed health in the HOP case. Here all the variables are strongly significant and increase from –0.75 for Vgood to +0.88 for Vbad. So what seems to happen in the North is that very sick patients are dealt with through outpatients as opposed to GPs.

What is also clear from Table 5.5 is that non-health variables play a relatively minor role in explaining utilisation in the North. In the GP function 3 non-health variables are significant in the North compared to 6 in the South; with HOP the respective figures are 5 and 10 and with HIP 1 and 3.

In the North 5 of the 9 significant non-health variables across the 3 functions relate to education. With respect to hospital services this can be readily interpreted in terms of the ability of a better informed and more articulate patient to secure access to hospital care. No consistent pattern can readily be discerned in respect of the remaining significant variables though the significance of non-health variables (such as income in HOP) together with the role of education suggests that access even in the North is substantially but not purely on the basis of need.

Holding insurance is only rational if it improves access to services. The significant positive coefficient on holding insurance in the three regressions for the South clearly suggest that this is indeed the case, given that health has been controlled for (albeit perhaps imperfectly). While out of pocket expenses may be reduced by holding insurance, it is unlikely that this would be a prime factor in explaining its significance in the GP regression. More likely its significance relates to the role of the GP in providing advice and organising access to specialist or hospital care. However, in the HOP and HIP regressions for the South the positive and significant coefficients for insurance can only be interpreted as insurance securing differential utilisation. (This contrasts sharply with the North where in the HIP regression the only non-health variable that was significant was a single education variable). This supports the findings of van Doorslaer and Jones (2004). Clearly this will have implications for equity especially as Harmon and Nolan (2001) show for the Republic that only 15 per cent of adults with health insurance are in the bottom half of the household income distribution, while almost half are in the top 20 per cent.

It was in response to such potential inequities that the government introduced the medical card scheme. As can be seen from Table 5.5 those holding a medical card are more likely to use GP and outpatient services compared to those with neither medical cards nor insurance (the base category in all three regressions for the South). The coefficient for medical card, however, is less than half of that for insurance in the HOP regression, almost the mirror image of the GP case. This suggests a different relationship in the provision of specialist care for the two groups, something reinforced by the

HIP result, where holding a medical card is seen to have no influence on utilisation in contrast to insurance.

Table 5.5: The Multivariate Probit Results for Utilisation

	GP		HOP		HIP	
Gppos	**South**	**North**	**South**	**North**	**South**	**North**
Zhsize	-0.0368**	-0.0343	-0.0261*	-0.0360 *	-0.0026	-0.0451
	(-3.02)	(-1.66)	(-2.05)	(-1.99)	(-0.16)	(-1.76)
Single	-0.1119	-0.1892 *	-0.2821**	-0.0904	-0.1158	-0.0099
	(-1.80)	(-2.29)	(-4.39)	(-1.26)	(-1.43)	(-0.10)
Sepdiv	0.0269	-0.0571	-0.0697	0.1164	0.2086	-0.0108
	(0.21)	(-0.47)	(-0.59)	(1.18)	(1.54)	(-0.09)
Widow	0.0953	-0.1416	-0.2156**	-0.1227	-0.0183	0.1204
	(0.86)	(-1.08)	(-2.71)	(-1.22)	(-0.21)	(0.99)
Age	-2.4475*	-0.7630	-3.8179**	-0.8266	-3.8847**	2.7449
	(-2.45)	(-0.51)	(-3.83)	(-0.66)	(-3.26)	(1.6)
Agesq	2.1242*	0.2135	3.5400**	0.7856	3.1424**	-2.7331
	(2.18)	(0.15)	(3.83)	(0.68)	(2.89)	(-1.75)
Agecub	-0.4729	0.0940	-0.9983**	-0.1658	-0.7241*	0.8614
	(-1.59)	(0.22)	(-3.71)	(-0.49)	(-2.33)	(1.95)
Female	0.4162**	0.3579 **	0.1037**	-0.0210	0.0576	-0.1251
	(10.52)	(6.28)	(2.6)	(-0.43)	(1.17)	(-1.89)
Eqinc	0.2347**	0.0876	0.1929**	0.1612 **	0.0495	0.0192
	(3.47)	(1.5)	(2.82)	(2.62)	(0.57)	(0.21)
Eqincsq	-0.0251*	-0.0069	-0.0200	-0.0163	-0.0063	-0.0130
	(-1.98)	(-1.58)	(-1.56)	(-1.64)	(-0.39)	(-0.77)
ed2	0.0311	0.1248	0.1495**	0.1376 *	-0.0277	0.0739
	(0.53)	(1.52)	(2.65)	(1.96)	(-0.4)	(0.75)
ed3	0.0151	0.1598 *	0.1052	0.2086 **	-0.1295	0.3294 **
	(0.25)	(2.09)	(1.77)	(3.24)	(-1.77)	(3.95)
ed4	-0.0075	0.1106	0.1961**	0.1682 *	-0.0182	0.1706
	(-0.11)	(1.18)	(2.84)	(2.03)	(-0.21)	(1.42)
Emp	0.0312	-0.1438	0.0296	-0.1187	-0.1037	-0.1493
	(0.31)	(-1.4)	(0.27)	(-1.32)	(-0.8)	(-1.19)
Inactive	0.0414	-0.0165	0.0644	-0.0586	-0.0715	-0.0552
	(0.39)	(-0.14)	(0.58)	(-0.59)	(-0.55)	(-0.42)
dahampsev	0.4939**	0.3750 **	0.6276**	0.3693 **	0.4263**	0.1569
	(2.65)	(3.37)	(6.43)	(5)	(4.23)	(1.75)
dahampsom	0.6128**		0.6105**		0.3059**	
	(6.26)		(9.94)		(4.45)	
Vgood	-0.8790**	-1.0540 **	-0.8726**	-0.7527 **	-0.8119**	-0.6622 **
	(-10.53)	(-10.85)	(-13.81)	(-10.15)	(-10.8)	(-6.22)
Good	-0.5839**	-0.5832 **	-0.5088**	-0.4255 **	-0.5286**	-0.4842 **
	(-7.13)	(-6.25)	(-8.88)	(-6.44)	(-8.11)	(-5.49)
bad	0.5922	0.0120	0.1893	0.2909 **	0.3305**	0.6863 **
	(1.56)	(0.07)	(1.6)	(2.95)	(2.83)	(6.77)
Vbad	0.0242	-0.0565	0.4482*	0.8822 **	0.8451**	0.9015 **
	(0.06)	(-0.21)	(1.97)	(4.31)	(3.96)	(5.7)
Birth	0.9657**	0.8887 **	1.4567**	1.3958 **	6.9907	7.5791
	(4.29)	(3.03)	(9.49)	(7.47)	(0.06)	(0.07)
Medcard	0.3565**		0.1421**		0.0589	
	(6.43)		(2.59)		(0.88)	
Ins	0.2038**		0.3412**		0.2173**	
	(4.61)		(7.32)		(3.7)	
_cons	1.4552**	1.6864 **	0.5308	0.2276	0.3712	-1.8357 **
	(3.88)	(3.37)	(1.4)	(0.54)	(0.81)	(-3.08)

Note: One (two) star(s) indicates that the variable is significant at the 5 per cent (1 per cent) level.

While health status and holding a medical card or insurance are important determinants of service utilisation in the South, the pattern of utilisation that results is complex. This is illustrated in the HOP case where in addition to these variables demographic, income and education variables (10 in all) are significant. This suggests that

any success the introduction of medical cards has achieved in reducing the inequity associated with a private insurance system has been partial and achieved at the cost of greater complexity in the allocation process.

As noted in Section 5.3 the estimates produced by the utilisation functions may be limited by errors in measurement (in health status) and omitted variables (such as anxiety). Also noted was the potential for correlations to exist between these errors across services. In Table 5.6 the estimated correlations between the errors for the North and the South are presented. Following the approach taken with the results in Table 5.5, those from the North are considered to arise from an essentially needs based system. The observed correlations are taken to be due to errors in measurement and omitted variables. Interest thus should be focused upon differences between the two matrices North and South.

The sharpest contrast between the two is the correlation of errors between GP and HIP. That for the North is 0.21 while for the South it is 0.42, twice as much. This may be substantially explained by the role of insurance. Insurance in the model is measured as a dummy variable due to data limitations. In reality considerable variation exists in the entitlements (and costs) associated with different policies (see Columbo and Tapay (2004), Table 10). Among the insured entitlements would vary but this would not be captured by the predicted utilisation (modelled on a dummy variable); it would be anticipated that such errors would be present in the other functions and would serve to amplify the correlations found in the North. This is indeed the result we find, as noted most dramatically between GP and HIP.

Table 5.6: The Correlation Matrices of the Error Terms

	South		North	
	HOP	**HIP**	**HOP**	**HIP**
GP	0.45	0.42	0.40	0.21
Z	(18.92)	(11.78)	(12.69)	(3.97)
HOP		0.63		0.47
Z		(30.02)		(13.10)

5.6 Conclusion

This chapter has demonstrated that in the North where access to care is based on need, utilisation is wider and largely determined by health variables. Given the similarities between the two populations the North provides a useful comparator by which the impact of different institutional arrangements in the South can be assessed. Here the existence of a much more substantial private health insurance system increases utilisation by those with insurance. While possible inequities from this are mitigated by the medical card system, this is not at all levels of health care and is at a cost that patterns of use are much more complicated and have less emphasis purely on need. The impact of insurance pervades the entire system

increasing utilisation for those that possess it at each level while strengthening relationships between different levels of the system.

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6. EFFICIENCY OF HOSPITALS IN IRELAND

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6.1 Introduction

In the production of health care, hospitals would ideally act efficiently in terms of using their inputs to obtain the maximum output. In reality this may not occur and the hospital sector in Ireland has a number of characteristics that may raise questions concerning efficiency. The Brennan Commission, for example, noted that there were inherent weaknesses impeding the full application of general principals of financial accounting by clinicians. Furthermore, funding in public hospitals is only partially based on case mix – 20 per cent of the annual budget is determined by their relative efficiency in the previous year. It is also critical to be able to assess whether the extent of variation in efficiency has been changing over time, given the scale of expenditure involved; Wiley (2005) notes that between 1990 and 2002, current spending increased by 285 per cent and salary costs formed a large component. The analysis of efficiency in hospitals is, therefore, of critical relevance to health policy in Ireland and can make a major contribution to improving health services. The aim of such analysis is to identify poorly performing hospitals, and try to understand why the observed variation in efficiency levels comes about. This chapter begins with a discussion of what efficiency means and how it can be measured in a hospital context, and then presents and discusses results from the application of these methods to available data for the Irish acute hospital sector.

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6.1.1 WHAT IS EFFICIENCY?

Farrell (1957) defined a simple measure of firm efficiency that could account for multiple inputs, stating that technical efficiency is the ability of a firm to obtain maximal output for a given set of inputs. His definition of technical efficiency led to the development of methods for estimating technical efficiencies/inefficiencies in the context of a firm – this type of inefficiency is also know as x-inefficiency. To get a complete picture of efficiency one would also look at allocative efficiency, relating the production of output to the prices of inputs involved, but this would require data from each firm (here hospital) in terms of expenditure on different inputs and allocated resources. This data is not readily available in the hospital context, certainly not in Ireland, so we concentrate here on technical efficiency.

6.1.2 WHY WOULD INEFFICIENCY OCCUR?

There are a number of reasons why technical inefficiency may be present in some hospitals. First, the market structure of hospitals in Ireland may not be conducive to efficient production. Second, environmental factors such as location etc. could affect the extent to which some hospitals come close to best practice efficiency levels. Key characteristics of a perfectly competitive structure do not exist in the hospital sector in Ireland. Most hospitals are located at quite a distance apart (with the exception of Dublin), so this would imply that the characteristics of a perfect competition market might not be applicable within the hospital sector. Furthermore, hospitals are not generally perfect substitutes for one another – particularly where emergency admission is concerned. Perfect competition also assumes perfect information, and clearly this is not true for the hospital sector. Patients have little idea of the ranking of hospitals in terms of efficiency or quality – hence market failure occurs. Propper *et al.* (2004) have demonstrated that hospitals in the UK reflect a monopolistic competition structure, but the driving characteristic is that most hospitals have a competitor within 30-minute travel distance. It is not clear that a similar structure exists in Ireland, but at the same time, individual hospitals do not have a pure monopoly as price is given and is the same for each hospital. Within the sector it may be more accurate to label each hospital as a monopolistic competitor. Furthermore, monopolistic industries exhibit product differentiation – in the hospital sector this is reflected in specialities. The relevant point here is that this market structure provides little opportunity for economies of scale – hospitals are not penalised for inefficiency (except in the case of the 20 per cent of funding due to case mix). For the remainder of their funding, there is no incentive to produce in a technically efficient manner, much less at a socially optimal level. There could be many reasons for this. Misallocation of resources may be a consequence of uncertainty over what inputs would improve the quality of hospital production. For example,

should hospitals reduce waiting lists by reducing the length of stay, or would they benefit more from investment in quality control? Furthermore, market power could influence the decisions of hospital managers, and in a less than competitive environment incentives do not exist to reach maximum efficiency (either technically or socially).

6.2 Measurement of Efficiency

6.2.1 HOW IS EFFICIENCY MEASURED?

Since the early 1990s, the Department of Health and Children has provided annual evidence of variation in efficiency among hospitals. Each year, hospitals are either rewarded or penalised based on their previous year's performance, as measured by case mix. The policy is budget neutral, rewarding efficiency by rebalancing funding based on a case mix review of the actual patient workload of the hospital – overall acute hospital funding nationally is not affected. For example, at year end 2005, 15 hospitals had their budget increased but the budget of 22 hospitals was decreased by case mix based adjustment. We start by presenting some simple ratios, focusing first of all on ones that are calculated from published data allowing us to present an indicator for each hospital by name (when we come to using unpublished data hospitals will not be identified). The chapter focuses on regional/general hospitals, and uses both published data from Health Statistics and unpublished data from HIPE, for the most recent year available.

6.2.2 SIMPLE INDICATORS

A range of simple indicators that allow us to assess the performance of hospitals over time are defined in Table 6.1. For example, in health policy terms, Length of Stay (LOS) is an easily measurable index of "efficiency" and is quoted as such in one of the most recent publications of the UK Department of Health NHS performance indicators. In this publication the percentage "improvement" or percentage reduction in LOS compared with the previous year is plotted for each local area. The clear message from the UK Department of Health is that reductions in LOS are expected to be achieved year on year and represent "efficiency" of local health services.

Table 6.1: Definition of Simple Indicators

Indicator	Definition	Data available
Average LOS	Average length of stay per patient measured over 1 year	1992-2003
Inpatients treated/Beds	Inpatients/number of beds for inpatients	1995-2003
DRG adjusted Inpatients treated/Beds	Inpatients (adjusted for Case mix)/number of beds for inpatients	1995-2002
Inpatients/medical Staff	Inpatients treated/number medical staff	1995-2003
Per cent medical staff	Per cent of medical staff compared to all staff	1995-2002
Per cent day cases	Per cent of all patients treated as day case	1995-2003
Day patients/Day Beds	Day cases/number of beds for day cases	1995-2003
DRG adjusted Day patients/Day Beds	Day cases (adjusted for case mix)/number of beds for day cases	1995-2002

Data on our first indicator, average length of stay is presented in Table 6.2. This shows substantial variation in the length of stay across regional and general hospitals, ranging from 5.4 to 11.9 days per patient. Average length of stay for this group of hospitals is approximately 7.7 days. A hospital is often perceived to be more efficient the lower the length of stay but on the other hand a longer length of stay may be necessary for some conditions and may reflect good quality care. Additionally, the type of treatment may warrant a necessary longer length of stay, and it is likely that larger specialised hospitals may deal with cases that require longer lengths of stay. Therefore, this indicator cannot be viewed in isolation given that a short length of stay may be associated with poor quality of treatment. For these reasons, it is better to consider the length of stay among a set of indicators, rather than as an absolute measure of efficiency.

Table 6.2: Average Length of Stay 2003

	2003
St. James's	11.9
Mater	11.5
St. Vincent's	10.4
Beaumont	10.3
Merlin Park	7.2
Cork University	7.0
Mercy, Cork	7.0
Waterford Regional	6.1
Limerick Regional	5.9
University Hospital Galway	5.8
South Infirmary/Victoria	5.8
Portiuncla Ballinasloe	5.5
Sligo	5.4

Source:: Health Statistics.

Our next set of indicators relates outputs to inputs, e.g., the relationship between the numbers of inpatients treated per inpatient bed. The expectation is that hospitals with higher levels of technical efficiency will treat more patients per bed. In Table 6.3 we show the number of inpatients treated per inpatient bed across hospitals in 2003 and this ranges from 55.9 to 28.1. As expected, those with lower levels of inpatients per bed also have longer length of stay per patient as shown in the previous table.

Table 6.3: Number of Inpatients Treated Per Inpatient Bed 2003

	2003
Limerick Regional	55.9
University Hospital Galway	55.4
Sligo	54.3
Portiuncla Ballinasloe	53.9
Waterford Regional	50.1
South Infirmary/Victoria	49.0
Cork University	47.2
Merlin Park	39.5
Mercy, Cork	39.1
Beaumont	33.8
St. Vincent's	32.6
Mater	30.9
St. James's	28.1

Source: Inpatient Numbers and Beds taken from *Health Statistics*.

The disadvantage of the numbers shown above in Tables 6.2 and 6.3 is that the number of treated cases may not accurately reflect differences across hospitals in terms of the type of treatment received by patients. It could be that some hospitals are treating patients with more severe illnesses and that require longer lengths of stay. If so, then by simply looking at data that has not been adjusted for differences in severity of illness, we cannot accurately compare the number of treated cases per bed between hospitals. Data on the number of inpatients adjusted for case mix has been made available to us by HIPE. This is invaluable data as it now allows us to repeat the ratio in Table 6.3 above, but now adjusting the number of inpatients for case mix. Each individual is assigned to a Diagnostic Related Group (DRG) – there were over 500 of these categories up to 2002 and each group has a relative value that indicates the relative cost of that DRG compared to the average cost over all DRGs. The number of patients in each DRG is weighted by this relative value; giving us an overall DRG adjusted number of inpatients treated. Due to data confidentiality we cannot present the results for each hospital, but we find that the ranking of hospitals has now changed – hospitals that had longer lengths of stay are now ranked much higher, possibly because they are treating patients with more severe illnesses and at a higher cost.

The relationship between number of beds and output from hospitals is only one indicator of efficiency, and we also need to take account of staff numbers. There is a possibility that hospitals with a higher ratio of output/beds are the same hospitals that have a higher

ratio of output/staff. This may be further associated with the proportion of medical staff/all staff available for each inpatient. In Tables 6.4 and 6.5 we show that this is true for a number of hospitals.

Table 6.4: Inpatient/Medical Staff

	2002
Portiuncla Ballinasloe	30.4
South Infirmary/Victoria	27.7
Waterford Regional	27.5
University Hospital Galway	26.2
Merlin Park	26.0
Limerick Regional	24.8
Sligo	23.8
Mercy, Cork	23.1
Cork University	22.3
St. Vincent's	15.9
Beaumont	15.9
St. James's	13.7
Mater	12.6

Source: *Health Statistics*.

Table 6.5: Per Cent Medical Staff/Staff

	2002
Mater	0.55
University Hospital Galway	0.54
Sligo	0.53
Waterford Regional	0.53
Portiuncla Ballinasloe	0.52
Limerick Regional	0.52
South Infirmary/Victoria	0.52
Merlin Park	0.50
Cork University	0.50
Mercy, Cork	0.49
St. Vincent's	0.49
St. James's	0.48
Beaumont	0.48

Source: Personnel Census, Department of Health and Children.

Table 6.6: Number of Inpatients Treated Per Staff

	2002
Portiuncla Ballinasloe	15.8
Waterford Regional	14.5
South Infirmary/Victoria	14.3
University Hospital Galway	14.2
Merlin Park	12.9
Limerick Regional	12.9
Sligo	12.7
Mercy, Cork	11.3
Cork University	11.0
St. Vincent's	7.8
Beaumont	7.7
Mater	6.9
St. James's	6.6

Source: Inpatients from *Health Statistics*, Number of Staff from Department of Health and Children.

Our next indicator relates the output of treated cases to the number of staff (labour) in each hospital. Table 6.6 shows that this ratio ranges between 15.8 and 6.6 inpatients per member of staff.

When we adjust the inpatients data for case mix, we find that the range becomes 8.7 to 16.2, and in some hospitals there is a higher level of staff, in particular for the more specialised hospitals. Again, due to data confidentiality we do not publish these figures.

Another relevant indicator is the proportion of day cases in each hospital. The more day patients treated, the higher the output per hospital. Across all of the hospitals in Ireland day cases accounted for 13 per cent of all cases in 1990. By 1999 day cases accounted for one-third of all discharges from acute hospitals. Table 6.7 sets out the percentage of all patients that are treated as day cases, and shows that there is substantial variation across the hospitals. The highest rates are found for the larger hospitals.

Table 6.7: Per Cent of Day Cases

	2003
St. James's	71.1
Mater	64.8
Beaumont	58.4
Mercy, Cork	57.2
South Infirmary/Victoria	55.4
St. Vincent's	55.3
Cork University	54.2
Sligo	49.0
Waterford Regional	48.2
Limerick Regional	44.7
University Hospital Galway	44.1
Portiuncla Ballinasloe	32.7
Merlin Park	32.1

Source: Day-cases and inpatients taken from *Health Statistics.*

Of course, the treatment of day-cases depends on the number of day beds available, so we now look in Table 6.8 at the ratio of day cases to day beds. Again, there is much variation and generally higher rates are found in Dublin.

Table 6.8: Number of Day Cases/Day Beds

	2003
Beaumont	1,191.4
South Infirmary/Victoria	1,129.0
St. Vincent's	1,112.9
St. James's	1,039.3
University Hospital Galway	821.4
Limerick Regional	787.0
Cork University	658.4
Mater	518.0
Sligo	468.3
Portiuncla Ballinasloe	420.2
Waterford Regional	349.5
Mercy, Cork	314.0

Source: Day cases and day beds taken from *Health Statistics.*

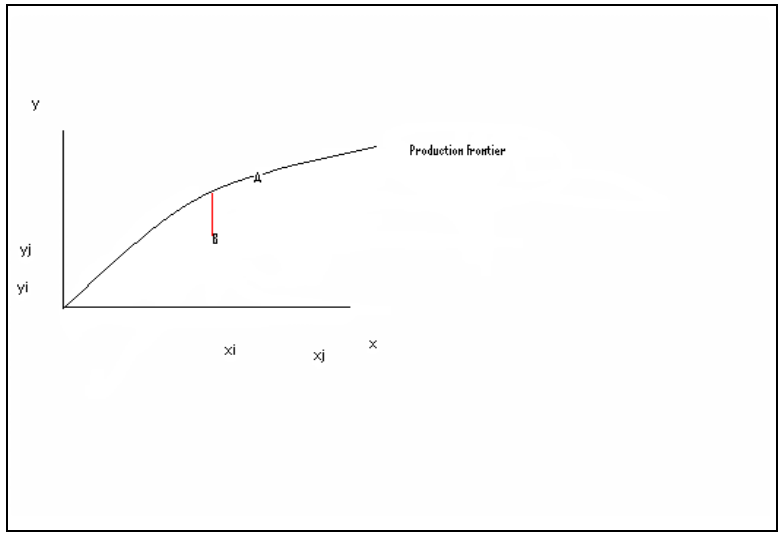
The above table does not account for differences in case mix, and when we look at the number of day-cases adjusted for DRG per day bed we find that this changes the ranking of hospitals and the range is narrower.

All of these simple indicators are looked at in isolation, whereas it is preferable to look at multiple inputs and outputs together. One way of doing this is by measuring the level of technical efficiency i.e., the level of multiple outputs per multiple inputs.

6.2.3 TECHNICAL EFFICIENCY

Technical efficiency may be best explained by illustrating the best practice production frontier of all hospitals, and if a hospital deviates from this frontier, the distance represents technical inefficiency. Figure 6.1 illustrates the production frontier for all hospitals and defines the relationship between outputs (patients treated) and inputs (beds and staff). It represents the maximum output attainable from each input level and the average best practice. Hospitals producing on this frontier are technically efficient, for example hospital A. If above or below the frontier, hospitals are inefficient and the distance from the frontier represents inefficiency compared to best practice, for example hospital B.

Figure 6.1: Production Frontier and Technical Inefficiency



The level of technical efficiency may be measured using standard procedures known as Data Envelopment Analysis (DEA) or Stochastic Frontier Analysis (SFA). These techniques deliver benchmarks that reflect industry best practice and efficiency scores that reflect deviations between observed and potential performance. In contrast, simple ratios benchmark hospitals against average industry behaviour. Simple ratios take account of only two summary

decisions, whereas DEA and SFA evaluate performance over multiple dimensions.

Farrell's (1957) definition of technical efficiency led to the development of methods for estimating technical efficiencies in the context of a firm. Data Envelopment Analysis (DEA) is a non-parametric linear programming approach and was first introduced by Charnes, Cooper, and Rhodes in 1978 and further formalised by Banker, Charnes and Cooper in 1984. The technique was first used to study hospital production in 1986 (Banker, Conrad and Strauss) using data from a sample of hospitals in the US, followed by Grosskopf and Valdmanis in 1987. A number of more recent studies have also employed DEA to measure hospital efficiency, Magnussen (1996); Hollingsworth and Parkin (1995); Ferrier and Valdmanis (1996); Parkin and Hollingsworth (1997) and Rosenman, Siddharthan and Ahern (1997). In Norway, Biorn, Hagen, Iversen and Magnussen (2002) measure technical efficiency of hospitals to test the hypothesis that hospital efficiency is expected to be greater with activity based funding of hospitals than with fixed budgets. In Northern Ireland, McKillop *et al.* (1999) estimated the technical efficiency of all hospitals from 1986 to 1992. All acute hospitals were categorised into small, medium and large (based on total number of inpatients and outpatients).

An alternative approach to studying efficiency is based on the use of econometric models, in particular the development of the stochastic frontier model first proposed by Aigner, Lovell and Schmidt (1977). Webster, Kennedy and Johnson (1998) used this approach to estimate a Cobb-Douglas production function and obtained the mean efficiency score for 301 hospitals in Australia between 1991 and 1995. They find that the efficiency scores under Stochastic Frontier Analysis (SFA) are lower than those using Data Envelopment Analysis.

Both of these approaches have been used to estimate technical efficiency of hospitals in Ireland.[1] Inputs include number of beds, medical staff and non-medical staff. Outputs consist of inpatients treated, outpatients and day-cases. In Table 6.9, we present DEA scores based on published data. Inputs consist of number of inpatient beds, number of day beds, number of medical staff and non-medical staff. Outputs include number of inpatients, day-cases and outpatients. The average DEA efficiency score across all of the hospitals is 0.99, indicating that between 2000 and 2002, these hospitals could reduce inputs by 1 per cent and still achieve the same output. Most importantly, this table shows that there is variation between hospitals in the level of technical efficiency, ranging from 1 down to 0.95. Any hospital with a score of 1 is deemed to be as efficient as their best practice peers.

[1] See Gannon (2004; 2005) for a full description of the methodology and results.

Table 6.9: Unadjusted DEA Scores

	2000-2002
Beaumont	1.00
Limerick Regional	1.00
Mater	1.00
Merlin Park	1.00
St. James's	1.00
South Infirmary/Victoria	1.00
St. Vincent's	1.00
Sligo	1.00
Waterford Regional	0.99
Cork University	0.99
University Hospital Galway	0.98
Portiuncla Ballinasloe	0.97
Mercy, Cork	0.95
Average	0.99

Source: DEA modelled by author in EMS.

Using DRG adjusted data, we performed the same analysis as above but where inpatients and day cases are adjusted for the relative value of their DRG. This lowers the overall average by 1 percentage point. Efficiency for some hospitals is now slightly lower – these hospitals are producing less output than their peers using the same level of inputs, after case mix is taken into account. In general though, the ranking of the hospitals is quite similar. The results indicate mean efficiency levels within the group, but we also know that there is substantial variation with the lowest relative efficiency score estimated at 0.81. Apart from noting the proportional reduction required in inputs, the DEA analysis also shows that these hospitals operate under increasing returns to scale. Furthermore, the analysis shows that some hospitals could increase efficiency by further reducing one or more inputs.

The technical differences between DEA and SFA are described Gannon (2005), but in summary DEA will attribute all deviation from best practice as inefficiency whereas SFA will count some of the deviation as either measurement error or environmental factors. The ranking of hospitals in terms of efficiency is different using DEA compared to SFA. With DEA, scores are higher, indicating that random noise was included in DEA scores. This suggests that DEA does not control for other factors such as type of production process or other environmental factors that are not included in the model. There could be institutional differences across hospitals that may help to explain variation in efficiency. So far, we have applied models that assume a similar environment or catchment area from which the hospital draws its patients – nonetheless, this may not be the case in reality, and environmental differences are most probable. There is little that a hospital can do to rectify this 'environmental' inefficiency, but to recognise that it may exist is important when comparing hospitals. In Section 6.5, we determine how environmental factors (e.g. location or factors beyond the control of managers) may influence DEA efficiency scores.

The results from the DEA and SFA approaches to measuring the production frontier and efficiency suggest that measured efficiency of hospitals may vary, depending on whether or not a parametric approach is employed. The DEA scores are higher, indicating that inefficiency (deviation from the frontier) is lower than inefficiency measured by SFA. The advantage of SFA though is that we can disentangle any random error from the inefficiency effect. Focusing on the DEA efficiency scores, these results are in the same range as those obtained by McKillop *et al.* (1999) for hospitals in Northern Ireland. For example, larger hospitals showed an average score of 0.93 for the years 1989-1992, assuming constant returns to scale, and 0.99 with variable returns to scale. These results are in the same region as the efficiency scores for regional hospitals. Likewise, in Finland, Linna and Hakkinen (1999) found that the average level of technical efficiency for all hospitals was 0.95 with variable returns to scale, and 0.91 when assuming constant returns to scale. In terms of DEA versus SFA, other research has shown differences of up to 0.11 efficiency points at low levels of measurement error and up to 0.40 efficiency points with high levels of measurement error (Banker, Gadh and Gorr, 1993).

If we look at all indicators, both the simple ratios and technical efficiency scores, we find that the top few hospitals are different for each indicator of efficiency. This is probably due to viewing the simple ratios in isolation from each other, whereas the DEA scores takes into account all inputs and outputs together. Nonetheless, the simple ratios are useful in determining how the separate inputs influence each level of output.

6.3 Is Efficiency Changing Over Time?

When we looked at data from 1995 to 2000, the results suggested that regional and general hospitals became more efficient over time, although the variation in efficiency across hospitals was substantial in all years (see Gannon, 2005). We now look at each of the indicators reported in Section 6.2, and see if they are any clear patterns emerging in terms of changes in efficiency between 1995 and 2002. The main questions we wish to address are (1) is the dispersion widening or narrowing over time and (2) does the ranking of hospitals change over time? We follow the same indicators from the previous section but for each year since 1995 (all tables are provided in the Appendix).

6.3.1 SIMPLE RATIOS

Our first indicator is length of stay. On average, the ranking in 2003 was similar over the years, varying slightly between 1995 and 1998. The top three ranked hospitals (based on 2003) appear to have increased their length of stay over the years, while other hospitals remained more stable, or even reduced their length of stay. With some hospitals increasing length of stay and others reducing this changes the variation. Hence, the variation in length of stay has

increased over the years – the difference between lowest and highest length of stay was 5.1 days in 1995, increased to 5.7 days in 1998 and was 6.5 days by 2003. It is important to realise though that these length of stay figures are not adjusted for case mix. The next indicator is the number of inpatients treated per bed. These changes over time do not show any apparent trend, and the rate of inpatients per bed fluctuates up and down between 1995 and 2003. The majority of hospitals appear to be treating less per bed in 2003 compared to 1995. Again, this does not, however, take case mix into account.

When we adjust for case mix, for the majority of hospitals more patients are treated per bed in 2002 compared to 1995. The ranking of hospitals is quite different, as we have seen, but in terms of changes in efficiency over time the adjusted ratio fluctuates up and down over the years, like the unadjusted one.

Before we discuss the ratio of inpatients to staff, we note first of all that the proportion of medical staff decreased in most regional/general hospitals between 1995 and 2002. This could have implications for the number of inpatients treated per staff member – i.e., fewer patients may be treated. Indeed, the ratio of inpatients per bed appears to have decreased significantly over the years – while employment in hospitals has increased significantly the number of patients treated has also risen, meaning that overall this ratio is getting lower. We must bear in mind though, that this output has not yet been adjusted for case-mix. Once we adjust for case mix we find that some hospitals that ranked high are now ranked at the lower end of the distribution. The dispersion is lower, for example in 2002 the difference in number of patients treated per staff member is 10.3 patients, and by using the case mix adjusted data the difference is now 7.5 patients. The difference in dispersion in 1995 was 14.5 patients for unadjusted data and 8.2 days using the case mix adjusted data. In many hospitals, the ratio of inpatients to staff increased up to 1997/1998, but decreased in the years up to 2002. A similar pattern was noted for the number of patients treated per bed.

Across all of the hospitals in Ireland day cases were 13 per cent of all cases in 1990, by 1999 day cases accounted for one-third of all discharges from acute hospitals. While the number of discharges per 1,000 population increased by 19 per cent between 1995 and 1999, the discharge rate for day patients increased by 47 per cent over the same period (HIPE, 2002). There was a steady increase in the proportion of day cases over the period 1995 to 2003.

We now discuss the growth in the number of day cases per day bed for regional and general hospitals – first using published data between 1995 and 2003. In most hospitals, there has been a steady increase in the number of day cases per day bed. There was substantial variation in the rate among these hospitals, with the larger hospitals treating more day patients per day bed. By 2003, the variation among hospitals had decreased to 877 day patients per bed from 1,352 day patients per bed in 1995, but had increased slightly in

2000. When we adjust for case mix, the pattern is less clear. The dispersion (difference between lowest and highest) increases in 1998, reduces again the following year, but increases again in 2002.

6.3.2 DEA AND SFA EFFICIENCY SCORES

As outlined in Section 6.2, the problem with the simple ratios is first that they relate to averages only, and second they only allow us to view the contribution of capital (beds) and labour (staff) in isolation. If we follow the average DEA efficiency scores, we find a slight increase in the scores over time. Ideally, we would like to test this hypothesis statistically. Some approaches for testing time invariant inefficiency in a panel model are outlined in Gannon (2005). Using advanced econometric analysis for SFA scores, we find that for most of the hospitals there are some changes in efficiency over time. This paper showed that between 1995 and 2000, in regional and general hospitals, there were time varying inefficiency effects. These hospitals became more efficient over the years, although there was still substantial variation compared to best practice. We next look at some explanations for variation in technical efficiency.

6.4 What Factors are Associated with Variation in Efficiency?

6.4.1 MAIN FACTORS

This section looks at some factors that may be associated with variation in efficiency. It is possible that the proportion of public versus private patients would influence measured technical efficiency. Using HIPE data we mapped out the proportion of patients with a medical card and related this to technical efficiency levels. This simple analysis showed no clear pattern – in some hospitals with high technical efficiency the proportion of medical card holders was low but at the other extreme, some with low levels of technical efficiency treated a low proportion of medical card holders. To provide a more accurate analysis, we would need to factor in length of stay and condition of the patient. A second likely factor could be the proportion of patients aged 65+. Hospitals with more elderly patients may have lower technical efficiency due to longer lengths of stay per patient. Again, no clear pattern emerged.

Higher occupancy rates in some hospitals may mean higher patient admissions and discharges, which in turn would lead to higher technical efficiency. On average, this appears to be the case, i.e., hospitals with higher efficiency levels have higher occupancy rates. Hospitals that treat more day cases may also have higher levels of technical efficiency. When patients are kept in hospital for longer, we would expect less patient turnover and hence lower levels of technical efficiency. By looking at summary statistics there is no clear pattern – some hospitals with low length of stay are also technically inefficient. Of course, this could be due to the interaction of a range of other factors, including the age range of patients. In terms of labour inputs, the more staff per beds, the higher we could expect in

technical efficiency levels. Detailed investigation of the data shows evidence of this for some hospitals. Another labour factor is the number of medical staff per non-medical staff. Again, the data shows no clear pattern.

In order to provide evidence of the exact relationship between these factors and technical efficiency, a regression model is required. The main difficulty with this model revolves around the factors that should be included. For example, the DEA scores are already adjusted to reflect the inputs used, so it would not be appropriate to include the bed/staff ratio or medical/non-medical staff ratio. Another difficulty is the sample size and the small number of hospitals in Ireland overall. For these reasons, we do not provide results from a full regression model.

6.4.2 PRODUCTIVITY GROWTH OF HOSPITALS – TECHNOLOGICAL OR EFFICIENCY?

A second paper in this programme of research analysed productivity growth of hospitals over time (Gannon, 2007). The purpose of this paper was to analyse the development of productivity and efficiency in the production of hospital care in Ireland between 1995 and 1998. This provided information on the types of hospitals that have increased or decreased productivity during this time frame, and whether the productivity change was due to pure technical or scale efficiency, or technological change. Pure technical inefficiency occurs when more of an input is used than should be required to produce a given level of output, sometimes known as managerial inefficiency. If a hospital is scale inefficient, then efficiency gains could be achieved by expanding or reducing production levels, if there are increasing or decreasing returns to scale respectively. Technological inefficiency results in failure to keep up with best practice, due to increased knowledge, better productions techniques, new innovations, financial reasons or greater competition.

As mentioned earlier, in DEA, measuring efficiency at a point in time is simply obtained by measuring the distance function from the best practice frontier. However, a hospital may have a change in productivity but this could imprecisely be attributed to an increase in technical inefficiency. On the contrary, due to technology advancement, the best practice frontier may shift from one year to the next, implying that changes in productivity are more likely to result from technological change rather than efficiency change. The aim of Malmquist indices is to differentiate between changes in the frontier due to technological change and changes in deviations from the frontier due to inefficiency.[2]

The results show that the average total factor productivity change is 2.8 per cent in regional hospitals between 1995 and 1998. Perhaps this is due to increased health expenditure at this time. In larger

[2] A full account of these models is provided in Gannon (2007).

(regional and general) hospitals the main contributor to the improvement in productivity resulted from technological progress, as opposed to efficiency change. However, the contribution of these components of productivity varies over time.

While the more complex output measures used in this paper incorporate the nature of the treatment provided, they will not capture any differences in quality in hospital outcomes. To understand whether or not productivity has led to quality improvements would require knowledge of a range of indicators concerning patients' health status following treatment. We currently do not have this data; this chapter uses reliable data to assess productivity changes in the number of treated cases per hospital, and in future work we hope to address the issue of quality in greater detail. We next discuss some of the issues involved in the efficiency/quality trade-off.

6.5 Efficiency and Quality Trade-Off

Even if hospitals are technically efficient as conventionally measured, in terms of numbers of patients treated etc., the quality of that production may fall short of what could be achieved with the inputs used. Possible approaches to improve quality in hospitals (e.g., reduce the mortality rate) include (1) setting standards for hospital performance (2) and/or assessing the factors associated with low quality of hospital outcomes and propose solutions for increasing quality. There are however difficulties with these approaches. The introduction of standards or targets among hospitals is complicated by heterogeneity among hospital managers or health authorities – poor performing hospitals could stretch their resources too far in an attempt to reach standards, and better performing hospitals may invest sub-optimally. The second approach, assessing factors associated with quality of hospital outcomes, has related difficulties. If standards are to be assessed we need to measure the success rate in attainment of these targets. When measuring quality, we are faced with the added problems of the characteristics of the hospital sector. De Pouvourille and Minvielle (2002) have briefly discussed these characteristics. First, hospitals are a multi-service provider so we therefore require rigorous measures for each product. A hospital could perform well in some activities and less so in others. This means we would need data to cover all hospitals' potential activities. Second, hospital care is a complex personal service and in comparing hospitals the patients' characteristics must be taken into account. This adds to our data requirements, a detailed description of each patient. Third, we would need to account for the stochastic nature of hospital care – failure of treatment may be due to random factors beyond the control of the hospital. Consequences in measuring hospital care quality include aggregation of specialties masking the hospitals overall performance, and therefore non-aggregated results should be

published. Even still, the results are inaccessible to the public resulting in imperfect information to the consumer.

The measurement of quality of hospital care consists of analysing both outcome and process indicators. Outcomes indicators are both 'intermediate', i.e. numbers treated in hospitals, treatment complications (e.g. infection), and 'final', i.e. patients' health or mortality. The process indicators are used to describe the process of providing care. The final outcome of hospital care is patient health status and the main indicators that have been used in research in other countries include the mortality rate. However, death may occur out of hospital or after transfer so it is more common, therefore, to estimate the mortality within 30 days of discharge. The problem with this approach is that patients must, therefore, be monitored after they leave so the data requirements are large. The mortality rate between different pathologies between hospitals could be estimated but this would require a large sample. Furthermore, the mortality rates should be risk adjusted for age, sex and health status, in order to more accurately assess performance between hospitals. If we wish to rank hospitals in terms of performance, we could estimate the observed/expected rate of mortality. If the observed rate is higher, this signals a quality problem. Given that the expected rate must be estimated the accuracy of expected rates is only a relative measure. In general, mortality rates should be viewed with caution but are still useful. Overall the best indicators of mortality would include case mix adjusted mortality, and mortality following different treatments/events.

Another important measure of quality of care is patient satisfaction. Very often, the general public may be more interested in indicators that look at the interpersonal relationship dimension in the caring process and patient satisfaction (De Pouvourille and Minvielle, 2002). The Joint Commission of Accreditation for Health Care Organisations has recognised patient satisfaction as a valid indicator of quality of care. Research on patient satisfaction, (see Sofaer *et al.*, 2005) on a study of hospitals in the US has found that patients were most interested in the service provided by doctors and nurses. They were particularly concerned with hospital cleanliness. These findings were consistent across various patient characteristics.

There has been little research carried out on factors associated with quality of hospital care, mainly because of the absence of easily accessible data on the quality of care. Much of the research has been carried out in the US. In the UK the only parallel research is by Propper *et al.* (2004) and their paper analysed the effect of competition on quality of care, using the 30-day death rate following emergency admission.

In Ireland, the National Health Strategy 2001 stated one of their policies as delivering high quality services that are based on evidence-supported best practice. In 2003, the approval of the establishment of the Health Information and Quality Authority (HIQA) was a step in this direction. The National Health

Information Strategy was launched in 2004 and the HIQA will play a pivotal role in the implementation of this strategy. The objective and functions of the HIQA were to be published in 2005. They will promote delivery of services based on practices that evidence has shown produce high quality and efficient results. This will be achieved by ensuring services meet nationally agreed standards at clinical and managerial level, and assessing whether services are managed to ensure best possible outcomes within available resources. An interim authority was established in March 2005 to prepare administrative and organisational plans for the HIQA.

Would national targets be a solution to inefficiency? The evidence from the UK suggests that quality may still be compromised. Although the move towards quality will be an important contributor towards the production of quality hospital care, the focus on nationally agreed standards may not be the most appropriate format to ensure improved quality of care nationally. While certain targets for example, waiting lists, may be met, this could have negative consequences for the quality of care. However, given the nature of the types of hospitals in Ireland – many county hospitals are quite similar for example – nationally agreed standards at a disaggregated level may be somewhat beneficial.

Progress towards targeting certain areas of the hospital sector in Ireland has been made more recently, with the publication of the National Hygiene Audit. This gives a detailed account of hygiene within hospitals and data on each hospital is available to the public. The pitfalls of the methodology in this research include spot-checks – this makes it more difficult to assess some of the areas of hygiene. Furthermore, the spot-checks were not unannounced. Nonetheless, it will serve as a baseline for further checks within hospitals, but we should bear these methodological problems in mind. Further audits are promised on a bi-annual basis, and it will be interesting to see if quality in terms of hygiene has improved over time.

Measurement of patient satisfaction received some attention in Ireland since the Health Strategy 2001 made particular reference to the inclusion of patients and the acknowledgement of their experiences of health care. Feedback from patients can influence the whole quality improvement agenda and provides crucial information on how patients perceive quality of care. The development of the Irish National Patient Perception of the Quality of Healthcare Survey was the first system-wide assessment of patient's views of quality of care. Results from the initial survey in 2000 (Sweeney *et al.*, 2003) were obtained over eight dimensions of satisfaction. The majority of respondents (92.6 per cent) said they would return to the same hospital (although this could be due to lack of alternatives). The survey highlighted specific national quality improvements, including information and communication about discharge planning, treatment and hospital routines. Similar levels of patient satisfaction results have been found for the UK and France (Bruster *et al.*, 1994, Labarere *et al.*, 2001).

As part of the implementation process of the 2001 Health Strategy, a set of guidelines on the measurement of patient satisfaction were drawn up and documented in 2003. A study by the Irish Society for Quality and Safety in Healthcare showed that there was no structured method for assessing patient satisfaction. The purpose of the 2003 document was to propose methods for evaluating patient satisfaction. There appears however, to be no documentation on how this has progressed. In 2004, the Department of Health and Children published *Quality and Fairness: A Health System For You* – action plan progress report 2003'. This document proposed the introduction of a national standardised approach to measuring patient satisfaction. The only progress made at the time of that report, was the publication of the guidelines and the 2003 study mentioned above. In 2005, the Department of Health and Children outlined in their business plan, that there should be a nationally agreed set of performance indicators, and that this development should be on-going. The department have re-stated their commitment to quality of service in the Quality Service Customer Action Plan 2005-2007. So, while several attempts have been made to document a strategy for measuring performance and quality, there is yet no standardised method or analysis.

6.6 Conclusion

The analysis of efficiency can make a major contribution to improving health services. Ideally this should be measured in terms of prices, output and quality. But given data limitations and measurement issues, we focused in this chapter on technical efficiency, defined as the number of treated patients per inputs of labour and bed numbers. This is an important contribution towards the analysis of overall efficiency in the hospital sector. The evidence suggests that regional hospitals on average are inefficient in comparison to their peers. Nonetheless, we do not have an estimate of absolute efficiency for the best hospitals, so can only relate the efficiency of a hospital to its peer group. The results suggest that regional hospitals may have become more efficient over time, although the variation between hospitals remains substantial.

Several factors, including the profile of patients, number of day-cases and staff, can impact on technical efficiency levels. A precise relationship among these interrelated factors is difficult to establish. In this chapter, we showed that productivity changes over time are due to technological progress more so than efficiency changes. While efficiency may improve, it is important to follow progress in quality of care. In Ireland, currently we do not have data to measure quality of care. It is hoped that this will improve in the near future – the establishment of the Health Information and Quality Authority is the first step in this process. Future research of efficiency in hospitals would benefit from improved data on quality indicators.

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APPENDIX TABLES

Table A6.1: Average Length of Stay in Days

	1995	1996	1997	1998	1999	2000	2001	2002	2003
St. James's	10.0	9.7	10.1	10.4	10.4	10.5	11.0	11.6	11.9
Mater	9.9	10.2	10.6	11.0	10.2	9.9	10.7	10.6	11.5
St. Vincent's	8.5	8.2	8.4	8.7	9.0	8.6	9.0	9.7	10.4
Beaumont	10.5	10.1	10.5	10.6	9.8	9.3	9.9	10.2	10.3
Merlin Park	9.3	8.6	8.2	7.6	7.7	7.6	7.5	7.2	7.2
Cork University	6.4	6.2	6.7	6.3	6.5	6.7	6.8	7.1	7.0
Mercy, Cork	5.0	5.0	5.1	5.2	5.6	5.9	6.2	6.7	7.0
Waterford Regional	5.8	5.7	5.9	5.9	6.0	5.9	5.9	6.2	6.1
Limerick Regional	5.5	5.7	5.6	5.7	5.8	5.9	6.0	6.1	5.9
University Hospital Galway	7.0	6.6	6.5	6.8	6.9	6.3	6.3	6.0	5.8
South Infirmary/Victoria	5.4	5.3	5.4	5.1	5.7	5.5	5.8	5.9	5.8
Portiuncla Ballinasloe	5.5	6.0	5.6	5.3	5.2	5.1	5.6	5.5	5.5
Sligo	4.9	4.9	4.5	4.7	4.8	4.8	5.6	5.6	5.4

Source: *Health Statistics*.

Table A6.2: Number of Inpatients Treated Per Inpatient Bed

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Limerick Regional	56.4	57.4	60.8	62.6	58.2	61.1	57.2	54.8	55.9
University Hospital Galway	45.6	47.5	48.2	46.9	46.1	50.3	48.6	52.8	55.4
Sligo	59.2	58.1	61.4	62.2	58.2	57.4	50.4	54.1	54.3
Portiuncla Ballinalsoe	49.3	46.9	52.6	51.6	51.9	52.1	51.9	52.9	53.9
Waterford Regional	50.0	53.0	53.1	54.0	50.4	49.7	50.6	47.0	50.1
South Infirmary/Victoria	55.0	57.3	56.9	56.2	51.1	55.2	52.3	49.7	49.0
Cork University	54.3	53.9	51.5	51.0	47.7	48.1	49.1	45.6	47.2
Merlin Park	30.1	31.5	32.4	35.1	33.7	36.5	37.6	38.1	39.5
Mercy, Cork	56.0	57.1	54.8	54.7	50.9	47.7	43.4	41.4	39.1
Beaumont	32.0	33.4	31.8	32.0	34.9	36.4	34.9	33.0	33.8
St. Vincent's	37.9	38.9	38.0	37.7	35.9	37.4	36.5	34.2	32.6
Mater	34.0	32.6	31.7	30.7	32.5	34.2	33.0	32.4	30.9
St. James's	33.7	33.9	33.7	33.2	32.6	33.0	32.2	29.8	28.1

Source: Inpatient Numbers and Beds taken from *Health Statistics*.

Table A6.3: Per Cent of Medical Staff

	1995	1996	1997	1998	1999	2000	2001	2002
Cork University	57.2	55.5	53.9	50.2	51.9	53.1	51.1	49.5
Limerick Regional	64.0	57.4	56.3	55.4	52.1	53.9	52.3	52.0
Sligo	55.4	53.4	52.0	50.4	50.2	50.8	50.5	53.4
Mercy, Cork	62.5	61.9	60.6	54.3	55.2	55.8	50.5	49.1
Portiuncla Ballinalsoe	60.0	58.7	57.0	55.0	53.7	56.0	55.5	52.2
St. Vincent's	60.0	59.1	56.7	51.7	49.8	48.9	46.7	49.0
Waterford Regional	56.8	56.7	54.3	54.2	52.5	54.5	53.8	52.8
University Hospital Galway	59.3	57.1	55.9	56.4	55.2	56.1	54.5	54.4
Beaumont	56.8	53.0	51.1	48.8	48.0	48.8	46.7	48.1
South Infirmary/Victoria	64.4	62.5	59.6	55.1	54.3	52.9	52.1	51.7
Merlin Park	47.4	48.0	51.0	49.2	49.3	47.9	47.8	49.8
Mater	60.4	58.2	59.7	53.3	53.1	58.2	50.8	54.7
St. James's	48.7	48.2	47.4	44.4	44.4	48.9	42.8	48.2

Source: Medical (medical and nursing) and non-medical (general, management, health and social care, other patient and client care) obtained from Department of Health and Children Personnel Census.

Table A6.4: Number of Inpatients Treated Per Staff

	1995	1996	1997	1998	1999	2000	2001	2002
Portiuncla Ballinalsoe	23.4	21.5	23.9	22.6	22.6	20.4	17.7	15.8
Waterford Regional	15.9	19.4	18.7	18.8	17.2	16.9	15.4	14.5
South Infirmary/Victoria	20.8	22.8	22.4	22.8	18.3	19.1	16.5	14.3
University Hospital Galway	16.0	17.0	16.8	15.6	14.9	14.3	13.1	14.2
Merlin Park	11.7	12.2	12.9	13.6	13.2	13.4	13.0	12.9
Limerick Regional	22.1	22.7	22.7	19.1	18.0	14.8	13.9	12.9
Sligo	19.4	19.7	20.1	20.3	18.8	16.4	12.1	12.7
Mercy, Cork	22.8	22.0	19.8	19.3	17.3	15.7	11.9	11.3
Cork University	17.1	17.1	16.1	16.1	14.0	13.3	12.1	11.0
St. Vincent's	10.7	11.1	10.5	11.1	10.3	11.0	9.3	7.8
Beaumont	9.5	10.0	8.9	9.1	9.5	9.0	8.4	7.7
Mater	9.5	9.2	8.2	8.8	9.0	7.7	7.5	6.9
St. James's	8.9	9.3	9.4	9.8	8.4	8.0	7.4	6.6

Source: Inpatients from *Health Statistics*, Number of Staff from Department of Health and Children.

Table A6.5: Per Cent of Day Cases

	1995	1996	1997	1998	1999	2000	2001	2002	2003
St. James's	46.7	47.2	48.1	50.7	50.8	55.0	58.0	69.0	71.1
Mater	47.9	50.0	52.2	56.2	55.1	54.5	57.7	60.1	64.8
Beaumont	49.4	40.8	44.3	47.1	49.1	50.6	54.4	57.0	58.4
Mercy, Cork	27.6	27.9	28.5	28.2	30.1	37.2	43.8	50.4	57.2
South Infirmary/Victoria	22.1	23.2	23.9	25.8	29.9	32.3	35.0	37.8	55.4
St. Vincent's	33.3	35.2	36.6	39.4	42.3	43.2	45.3	51.6	55.3
Cork University	13.3	35.2	39.0	42.6	47.4	47.9	50.6	51.9	54.2
Sligo	29.1	27.7	28.1	28.0	32.4	35.6	45.1	45.7	49.0
Waterford Regional	23.5	24.7	27.9	30.4	37.4	40.1	41.6	43.8	48.2
Limerick Regional	21.1	23.1	24.8	28.8	33.8	36.4	40.3	43.6	44.7
University Hospital Galway	19.9	24.6	32.0	35.8	40.7	43.7	45.9	45.3	44.1
Portiuncla Ballinalsoe	21.3	23.1	21.3	23.2	23.4	25.9	30.3	29.9	32.7
Merlin Park	9.5	4.5	6.4	7.9	33.7	32.4	33.5	33.6	32.1

Source: Day-cases and Inpatients taken from *Health Statistics*.

Table A6.6: Number of Day-Cases/Day Beds

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Beaumont	1,620.7	1,185.8	1,292.3	1,412.2	1,413.3	1,036.5	1,057.3	1,111.1	1,191.4
South Infirmary/Victoria	262.1	330.3	300.3	368.6	371.4	453.0	499.2	543.9	1,129.0
St. Vincent's	534.9	596.1	619.4	686.9	742.6	818.1	858.9	1,015.0	1,112.9
St. James's	433.3	453.3	453.7	486.8	487.5	598.0	666.3	1,070.7	1,039.3
University Hospital Galway	334.7	422.9	609.4	651.2	521.4	847.3	801.9	807.2	821.4
Limerick Regional	375.3	419.0	297.3	355.1	422.3	495.8	599.9	699.4	787.0
Cork University	283.6	1,056.9	463.0	520.6	550.8	521.5	597.7	581.1	658.4
Mater	602.5	615.5	707.9	627.7	510.5	593.2	454.8	490.6	518.0
Sligo	1,017.6	940.1	992.0	1,003.9	1,209.9	1,605.8	2,096.5	2,311.2	468.3
Portiuncla Ballinasloe	340.6	353.9	336.6	391.8	509.3	374.4	357.6	360.1	420.2
Waterford Regional	984.0	384.2	413.5	481.7	638.5	734.5	793.3	507.3	349.5
Mercy, Cork	268.8	301.2	320.4	343.1	375.2	426.4	331.3	261.9	314.0

Source: Day cases and day beds taken from *Health Statistics*.

Table A6.7: DEA Scores

	1995-1997	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002
Beaumont	1.00	0.99	1.00	1.00	0.99	1.00
Limerick Regional	1.00	1.00	1.00	1.00	1.00	1.00
Mater	1.00	1.00	1.00	1.00	1.00	1.00
Merlin Park	1.00	1.00	1.00	1.00	1.00	1.00
St. James's	0.99	1.00	1.00	0.99	0.99	1.00
South Infirmary/Victoria	1.00	1.00	1.00	1.00	1.00	1.00
St. Vincent's (V)	0.89	0.91	0.95	0.95	0.99	1.00
Sligo	1.00	1.00	1.00	1.00	1.00	1.00
Waterford Regional	0.99	0.97	0.99	1.00	1.00	0.99
Cork University	1.00	0.99	1.00	1.00	1.00	0.99
University Hospital Galway	0.89	0.91	0.98	0.95	0.97	0.98
Portiuncla Ballinalsoe	1.00	1.00	0.99	0.98	0.98	0.97
Mercy, Cork	1.00	0.97	0.95	0.93	0.95	0.95
Average	0.98	0.98	0.99	0.98	0.99	0.99

Source: DEA (using published data) by author using EMS.

Table A6.8: Occupancy Rate

	1995	1996	1997	1998	1999	2000	2001	2002
Merlin Park	76.2	74.5	72.3	73.3	71.4	76.1	77.1	75.3
Mercy, Cork	77.3	78.9	77.3	77.8	78.0	77.5	74.1	76.2
Portiuncla Ballinasloe	74.6	77.0	80.5	75.5	74.5	73.1	80.0	80.0
Waterford Regional	79.9	82.8	85.9	87.1	83.0	80.8	80.2	80.2
South Infirmary/Victoria	81.9	83.5	84.2	79.0	79.1	83.5	80.3	80.3
Sligo	79.8	77.1	76.1	80.9	77.1	75.6	76.8	83.2
University Hospital Galway	87.1	86.1	86.2	87.8	86.9	85.9	86.2	86.2
Cork University	95.0	90.6	94.5	88.4	85.8	87.8	92.0	88.2
St. Vincent's	88.3	87.5	87.9	89.6	88.5	88.4	90.3	90.7
Limerick Regional	85.0	89.3	93.4	97.8	92.9	97.8	93.5	91.1
Beaumont	91.9	92.2	91.2	93.4	93.5	92.4	94.9	92.3
Mater	92.3	90.7	92.4	92.3	90.9	92.3	96.6	94.4
St. James's	91.9	90.2	93.1	94.8	93.3	94.8	96.8	94.6

Source: *Health Statistics*.

7. PATTERNS OF EMERGENCY DEPARTMENT UTILISATION IN IRELAND:

FINDINGS FROM FOUR LARGE TEACHING HOSPITALS IN DUBLIN

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7.1 Introduction

The focus of this chapter is on emergency department utilisation in four large teaching hospitals in the Dublin area. The objectives are to investigate key factors influencing the decisions that are made at different stages of an episode of emergency care from initial contact through to discharge.

There are a number of reasons for analysing emergency department utilisation in Ireland. In recent years overcrowding at emergency departments throughout the country has received widespread media and popular attention. There is also concern with the increasing proportion of inpatient admissions originating from the emergency department. This has implications for elective procedures in acute hospitals. There is evidence that elective procedures for surgical patients are being cancelled to make room for emergency medical patients (Department of Health and Children 2002). The factors causing the increase in emergency admissions are complex. There is anecdotal evidence that the emergency department is seen as the main route through which a patient can secure an inpatient bed. Thus, GPs and other health professionals may choose to refer a patient to the emergency department who should otherwise have been admitted electively (Department of Health and Children, 2002).

Inter-linkages between emergency and primary care are attracting more attention, particularly in the context of the national primary

care strategy (Department of Health and Children, 2001) and developments in out-of-hours general practitioner (GP) services. General practitioners (GPs) and emergency departments (EDs) are the two main gateways into the Irish health service. Access to consultant specialists and other health specialists, and from there to elective procedures, typically involve referral from a GP or from the ED. Admission to an inpatient bed requires referral via the elective route, or via the emergency route. There are thus similarities in the definitions of emergency and primary care services. For both services, in the majority of cases, patients choose what to present for and when to present, based on their own perceptions of what they need and what the services provide.[1] There is much focus in the literature on cases where the patient 'gets it wrong' by attending an ED where in fact they would be more appropriately treated by a GP. Availability of alternative services can influence patients' decisions on where to present for treatment. It is, therefore, more sensible to assess utilisation patterns of ED services in the context of availability of alternative sources of care. This study links ED utilisation patterns with local contextual factors, including availability of GP services.

There are thus important reasons for focusing attention on ED utilisation in the Irish context. However, before some of the more complex issues can be investigated (e.g., use of ED as a route to an inpatient bed), there is need for baseline assessment of who is using emergency services and in what ways. This type of assessment has been limited. The urgent need for baseline data was recognised in a national report on emergency care in Ireland as a priority for improving decision making processes in emergency services (Comhairle na nOspidéal, 2002).

Factors influencing attendance at an ED can be interpreted as the first step in a sequential process of health care utilisation (Cunningham *et al.*, 1995). The first step involves a decision on whether or not to seek medical care (a contact decision). Conditional on this first step, the second involves a decision on where to go to receive the care required (a location decision). The level of urgency of the presenting complaint can also vary. In the ED, there are a number of ways in which a patient can be treated and discharged. This choice may be made on behalf of the patient (e.g. admission) or by the patient (e.g. self-discharge). The patient can also choose how many times to visit for health care.

Ideally this process could be modelled as a set of sequential choices, from the initial choice of health care provider (emergency versus primary care) through to discharge destination. There are many examples in the literature of analyses using this type of sequential decision making process. Cunningham *et al.* (1995) estimated the probability of having any non-urgent outpatient visit as a first step, and second estimated the probability of that visit taking

[1] In the case of immediate emergencies such as cardiac arrest there is little/no scope for any deliberate choices by the patient on where to present for care.

place in an ED. In the Irish setting, Nolan and Nolan (2004) have modelled demand for GP care using a two-step process, estimating first the factors influencing the likelihood of seeking primary care, and second the factors influencing the number of GP visits once a first visit has been made. This approach requires a set of equations where at least one independent covariate is unique to each equation. In the data available for this study the number of covariates is limited and this sort of structural analysis is not feasible.

As the next best alternative, some of these decisions can be analysed separately and tentative linkages between the steps can be investigated. The main focus in this chapter is at the initial contact stage, identifying key characteristics of those who make contact with emergency services in Ireland. To ensure a more robust profile of these patients, data from four hospital sites in Dublin are analysed. These data are linked with local catchment population data to generate estimates of ED utilisation rates for different population groups in the Dublin area. The groups of interest are defined in terms of demographic and socio-economic characteristics including gender, age, employment status and health care entitlement status.

The chapter also discusses results from analysis on some of the other decision steps in the process including source of referral, level of urgency, discharge patterns and frequency of attendance.

Section 7.2 provides background information on the delivery of emergency services in Ireland and on how emergency department care has been modelled in the literature. Entitlement to health services in Ireland is not uniform. Section 7.3 outlines the financial incentives facing the different entitlement categories to inform discussion of the role of entitlement status in ED utilisation. Section 7.4 introduces the data and results are presented in Sections 7.5. Discussion and conclusions are given in Sections 7.6 and 7.7.

7.2 Background

7.2.1 EMERGENCY MEDICINE MODELS

Procedures to deal with patients presenting with emergency health care needs have been in place for many generations. In Ireland, emergency medicine is defined as …*a field of practice based on the knowledge and skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of undifferentiated physical and behavioural disorders*… (Comhairle na nOspidéal, 2002, p. 26).

At the international level, two distinct models of emergency care have emerged. The Anglo-American model is practiced in countries including the UK; USA; the Netherlands; Australia; New Zealand; Canada; Japan; Taiwan; South Korea and Israel. In this model, patients are transported to the hospital in order to receive a higher level of care. There is a specific emergency department where specially trained hospital doctors deliver a wide range of services to patients presenting to the department. Emergency medicine is a recognised independent specialty and specialised training is provided.

The alternative, Franco-German model, is practiced in countries including Germany; France; Austria; Finland; Norway; Portugal; Russia; Sweden and others. This model brings the hospital to the patient rather than the other way round. Emergency doctors provide emergency care (usually resuscitation and pain control) exclusively in the pre-hospital setting. Patients are triaged and admitted directly to inpatient services. In this model, emergency medicine is not treated as an independent specialty. Doctors practicing emergency procedures come from other specialties (e.g. anaesthesia, surgery, medicine). Initial resuscitation is delivered by an anaesthetist, followed by direct triage to a specialty.

The Irish system follows the Anglo-American model. In 2000 there were 40 emergency departments in the country, all located in public acute hospitals,[2] (Comhairle na nOspidéal, 2002).

7.2.2 TRENDS IN UTILISATION

In health systems around the world, utilisation of emergency services has been increasing. Several studies note the concern with this growing demand and the consequent problems of overcrowding in EDs (e.g. Padgett and Brodsky, 1992; Grumbach *et al.*, 1993; Williams, 1996; Murphy, 1998b; Northington *et al.,* 2005; Weber *et al.*, 2005). In the US, the number of visits to EDs increased by 312 per cent from 1955 to 1970, compared with a 50 per cent growth in outpatient visits over the same period (Padgett and Brodsky, 1992). From 1992 to 2002, ED use increased by a further 23 per cent from 89.8 million to 110 million visits per year (Weber *et al.*, 2005). In Europe, a similar pattern of growth in ED demand has been experienced (Padgett and Brodsky, 1992; Lang *et al.*, 1997; Shah *et al.*, 1996). As in the US, this growth dates back to the middle of the last century.

In Ireland, the total number of new ED attendances increased by 28 per cent from 1994 to 2004 relative to population growth of less than 14 per cent over the same period (Department of Health and Children, various years; Central Statistics Office, 2007). There are a number of factors influencing this increased demand and it is also noted that the case mix of emergency cases is changing. A higher proportion of patients are attending with serious medical conditions than with serious injury, and with increasing expectations for the standard of care (Sakr and Wardrope, 2000). These trends have important implications for the functioning of the EDs and for their linkages with the rest of the health care system.

By 2005, overcrowding in EDs reached 'crisis' levels and utilisation did not abate even during the traditionally quieter summer months. Problems of overcrowding at the ED are well-recognised to be directly linked to bottlenecks elsewhere in the public hospital system. In 2005, the Minister for Health and Children announced a

[2] More recently, VHI Healthcare opened the first private minor injury unit in Dublin and others are in the pipeline.

€70 million package for emergency services. Some of the steps are aimed at minimising the need for people to go to the ED and others are designed to free up inpatient beds for people awaiting admission. Measures include: additional acute hospital beds; new medical assessment units; increases in nursing home places; expanded home care packages; extended out-of-hours GP services and measures to enhance direct access for GPs to diagnostic services.

7.2.3 LITERATURE

Contact Decision

In response to the unending growth in demand for emergency services, much of the international literature in this area focuses on the characteristics of ED patients and on the factors that influence decisions to attend EDs. Factors considered to influence patients' utilisation of EDs include demographics (i.e. age, gender etc.), availability and accessibility of alternative sources of care, cost issues (e.g. cost of care, insurance coverage etc.) and health status. Weber *et al.* (2005) identified key factors associated with ED use in the US setting. These include poor physical health, high utilisation of other outpatient services, and poor socioeconomic status. In a small case study of the paediatric ED at Temple Street Children's Hospital in Dublin, parents of the attending children were more likely to be unemployed, single and medical card holders (Cullen *et al.*, 1997).

Walsh *et al.* (2004) provide the first available in-depth investigation into the characteristics of local catchment populations and their likely implications for ED utilisation in Ireland. Using 1996 Census data, the authors focus on the demographic and socio-economic profiles of the elderly populations living in six Dublin hospital catchment areas. The impact of older age groups on admission rates from emergency departments is noted. High levels of deprivation amongst the elderly population in the inner city areas are identified. Given the linkage between deprivation and ill health, these levels are expected to create increasing workload for emergency services and recommendations are made for improving community support services and long stay care. This study aims to go one step further to more explicitly link catchment population data with hospital level data to generate utilisation rates.

Urgency and Frequency

The decision to seek medical attention and the choice of health care provider is linked with the level of urgency of the complaint. Cases where there is little or no scope for choice refer to serious emergencies where immediate care is required (e.g. cardiac arrest). For less immediate needs, there may be more time to choose. Patients attending an ED for minor, non-urgent visits attract considerable attention in the literature (e.g. see Lowy *et al.*, 1994; Cunningham *et al.*, 1995). Such visits are considered inappropriate for emergency care leading to unnecessary overcrowding and

inefficient use of resources. Frequent attenders also attract attention where a small number of patients are often found to account for a high proportion of ED attendances.

The relatively small Irish literature on emergency care has mainly concentrated on these areas, using data from the mid to late 1990s. In a series of papers, Murphy *et al.* focused on non-urgent utilisation of emergency care and investigated the implications of employing a GP within an urban emergency department (Murphy *et al.*, 1996; Murphy, 1998a; Murphy, 1998b; Murphy *et al.*, 2000). Results showed that GPs attending to non-urgent cases within an ED used fewer resources than did the regular ED staff. Murphy (1998b) outlines three strategies used by health services around the world to respond to the perceived problems of inappropriate ED attendances. These include strategies to decrease the number of patients attending EDs (e.g. introducing co-payments); measures to refer inappropriate patients to other health care providers; and improvements in triage to provide care more appropriate to the needs of the patients attending. Murphy concludes that the first strategy has not worked, as the demand for emergency care has continued to expand and efforts to refer inappropriate patients have been shown to be unsafe. The third strategy offers more potential for improving the match between patients and services. *Rather than vainly attempting to make the patients more appropriate to the service, future initiatives should concentrate on making the A&E [Accident and Emergency] service more appropriate to the patient* (Murphy, 1998b, p. 36).

Other studies have used single site cases (Murphy *et al.*, 1999; Byrne *et al.*, 2003) to investigate characteristics of frequent attenders to emergency departments. In line with international findings, frequent attenders tend to be males from poor socio-economic backgrounds with marked psychosocial problems. In the Irish context however, Byrne *et al.* (2003) further observed that these frequent attenders are also likely to be relatively intensive users of other alternative sources of health care. The authors concluded that it is not the case that these patients are using the ED because of lack of access to alternative primary care services.

7.3 Entitlement to Irish Health Services

Results on the role of medical insurance in emergency care have been mixed in the international literature. Some studies have found that individuals without insurance are more likely to use the ED for non-urgent care, others have found the opposite, and others have found no difference (Weber *et al.*, 2005). In Ireland, private health insurance does not provide the full picture of medical coverage for the population and it is more appropriate to focus on entitlement.

There are two broad categories of eligibility for public health services. Category One are eligible for free access to public health services, including primary care, public hospital inpatient and outpatient care, and other community health services. Category Two are eligible to receive public hospital services at nominal charges and

are provided with assistance towards the cost of medicines[3] but are required to pay privately for primary care. Eligibility for the two categories is determined primarily on the basis of income. Category One eligibility is granted to persons earning an income below a specified threshold level. A medical card is issued to these persons, covering the individuals and their dependents. Since 2001, all people aged 70 years and over are also entitled to a medical card, regardless of income (Government of Ireland, 2001).

Many people in Category Two purchase supplementary private health insurance and a small proportion in Category One also hold private health insurance as well as a medical card. Private health insurance secures consultant provided care and other hospital benefits (e.g. private or semi-private room) in the acute hospital system. An increasing range of insurance schemes also provide assistance towards primary care.

Thus the population can be categorised into four entitlement groups: medical card holders; privately insured; individuals with both medical card and private health insurance ('duplicate cover'); individuals with neither medical card nor private health insurance ('no additional cover').[4] In 2004, over 28 per cent of the population held a medical card, 50 per cent had private health insurance and just over 24 per cent had no additional cover. A small proportion (3 per cent) held duplicate cover from private health insurance and a medical card (NESF, 2002; Amárach Consulting, 2003; Insight Statistical Consulting, 2005; PCRS, 2005; Central Statistics Office, 2007).

There are a priori reasons why entitlement might influence the ways in which individuals make use of emergency services in Ireland. Table 7.1 outlines the financial incentive structures facing each of the four entitlement categories for accessing health services in the Irish system.

Table 7.1: Financial Costs of Key Health Services by Entitlement Category

		Alternatives		
Entitlement	**Emergency Dept.**	**GP**	**Private[a] Specialists**	**Inpatient Care**
Medical card	FREE unconditional	FREE	CHARGE	FREE unconditional
Privately insured	CHARGE conditional, fixed[b]	CHARGE[c] variable	CHARGE partially covered	FREE unconditional
Duplicate cover	FREE unconditional	FREE	CHARGE partially covered	FREE unconditional
No additional cover	CHARGE conditional, fixed	CHARGE variable	CHARGE	CHARGE variable (public or private)

[a]Access to public specialists is based on a referral process.

[b]The terms fixed and variable in the table refer to fixed/variable across providers.

[c]Assumes that private health insurance does not cover primary care. This applies to the majority of private insurance policies although would need to be revised in future years.

[3] The Drug Refund scheme reimburses payments above €85 per month. The Long Term Illness Scheme fully reimburses drug payments for specified long term illnesses.

[4] For ease of presentation the four groups are referred to in the text as follows: medical card holders, privately insured, duplicate cover (or med card/privately insured), no additional cover (or non-covered).

In the initial choice to seek care, medical card holders (with and without private health insurance) face no charges except in the case of private specialist care, where referral is usually required. Controlling for all other factors (i.e., health status, socio-economic status etc.), the financial incentives are in favour of higher health care utilisation by medical card holders relative to non medical card holders.[5]

Individuals with private health insurance face fewer charges for secondary health care (specialist and inpatient care) relative to those with no additional cover. As these sources of care usually require referral, *cetaris paribus*, the financial incentives suggest very little difference between the privately insured and those with no additional cover in the initial choice to seek care.

If the decision is made to seek care, financial incentives may also influence the next choice on where to go. The focus of this discussion is on the choice between emergency and primary care.[6] This first assumes that there is time for choice (i.e. not an immediate emergency), and that there are alternative sources of care in the area.

Medical card holders (with and without private health insurance) are financially indifferent between emergency and GP care as both are free. For the non-medical card holders (privately insured and non-covered), attendance at an ED is charged at a fixed rate (currently €60) for anyone presenting without a medical card. This fee is waived if the patient has a referral letter from a GP, or if the patient is subsequently admitted (whereupon they become liable for inpatient fees where applicable). GP fees are charged for all non-medical card holders at a market rate.

If the GP charge is equal to or close to that of the ED, in financial terms, the non-medical card holders will be indifferent between the two. Where the GP charge is lower than €60, the financial incentives favour attending the GP first and vice versa. Published estimates of GP charges range from €35 to €36 (Indecon, 2003). However, anecdotal estimates are much higher than these. GP out-of-hours co-operatives in the Dublin area charge €50 per visit suggesting this is closer to the average GP charge for Dublin. This indicates that the gap between GP charges and the ED charge is not large. Controlling for all other factors, individuals with private health insurance or with no additional cover are likely to be financially indifferent between emergency and primary care.

[5] Individuals who hold duplicate cover from private health insurance and a medical card tend to be from the group aged 70 years and older who became eligible for a medical card in 2001 without means testing. Thus these individuals have seen an effective reduction in the cost of health services. Dynamic analysis might show an increase in health care utilisation by this group since 2001.

[6] Individuals may refer themselves directly to private consultant specialists. The financial incentives for choosing between primary care and private consultant care, or between emergency care and private consultant care, vary by entitlement group. However, direct referral to consultant care is not understood to be common practice in Ireland and is not the focus of this chapter.

7.4 Data

Two sets of data have been compiled for this analysis: emergency department attendances and local area data.

Data on ED attendances have been collected from four hospitals located in Dublin, labelled Hospitals 1, 2, 3 and 4. These are large teaching hospitals[7] whose inpatient bed capacity ranges from 471 to 753 (Health Service Executive, 2007). The four hospitals were purposively chosen to ensure representation of the different demographic and socio-economic profiles of local areas within Dublin. The ED dataset includes all attendances to the emergency departments during the calendar year 2004. Demographic, administrative and clinical variables were available for each observation[8] (see Smith, 2007b for further details). Two levels of ED data are identified. Patient level data identify the demographic and socio-economic characteristics of the patients attending the EDs during the year by removing duplicate cases where a patient has attended more than once. Attendance level data allows identification of the clinical and administrative details of each ED visit.

Local area data have been collected for the catchment areas in which the hospitals are located. Consistent with Walsh *et al.* (2004), the catchment areas for the four hospitals were defined in terms of electoral divisions, based on information provided by the Department of Health and Children[9] and the Dublin Fire Brigade.[10] Demographic and socio-economic profiles of the included electoral divisions were compiled from census and other available data[11] (e.g. Small Area Population Statistics, Central Statistics Office, 2002; deprivation index, Kelly and Teljeur, 2004). To proxy the availability of primary care services, the number of GPs in each catchment area was estimated based on contact data collected by the Irish College of General Practitioners (ICGP) (see Smith, 2007b). These provide the first estimates of GP availability by local area in the Dublin region. However, cross checks with smaller individual registers of GP contact details highlight some inaccuracies in the records on the ICGP website. Thus these are rough estimates and are to be interpreted with caution.

[7] Each adult emergency department in these hospitals receives more than 30,000 new attendances per year and mainly cater for patients aged 15 years and over.

[8] There are some variations in availability of specific variables. Entitlement was routinely collected in 2004 in two out of the four hospitals. Marital status was collected in three out of the four hospitals.

[9] DOHC Electoral Divisions in Hospital Catchment Areas. Health Information Unit at Dr. Steeven's Hospital, Dublin.

[10] The boundaries to the catchment areas are currently being revised in line with the revision of the electoral divisions which could alter the characteristics of the catchment profiles.

[11] Small area population statistics and the deprivation index are based on Census 2002 results. Results from the 2006 Census are *in press* and are not available at the disaggregated level of electoral divisions.

7.5 Results

Part (A) outlines the key characteristics of the population residing in the four hospital catchment areas. Part (B) presents the profile of the patients attending the EDs within those catchments and estimates the utilisation rates for key groups of interest. Part (C) presents key characteristics that influence some of the decision choices within an episode of emergency care.

7.5.1 (A) HOSPITAL CATCHMENT PROFILES

The catchment populations range from 185,000 to 222,000. The average time required to reach the catchment ED ranges from 5.07 to 7.57 minutes across the four catchments. Demographic and socio-economic characteristics of the four areas are compared with national and Dublin baselines and presented in Tables 7.2 and 7.3.[12]

Demographic and Socio-Economic Profile

Nationally the population is divided almost equally, with a slightly higher proportion of females (51 per cent) than males (49 per cent). In Dublin, the proportion of females (52 per cent) is higher relative to the national baseline. The catchment areas for Hospitals 1 and 2 have similar gender proportions to the Dublin population while those for Hospitals 3 and 4 have higher proportions of females (52.5 per cent – 53.6 per cent).

The national age distribution in Ireland is positively skewed with a high proportion of people in the younger age groups. Of the population 74 per cent are aged between 15 and 55 years. The Dublin population has a higher proportion of younger age groups relative to the national distribution. Of the four catchment areas, the age distribution for Hospital 2 is most closely aligned with that of the Dublin population. The age profile for the area around Hospital 1 is younger with over 80 per cent aged between 15 and 55 years. The populations around Hospitals 3 and 4 are older with more than 15 per cent aged 65 years and older. This is higher than in the populations surrounding Hospitals 1 and 2 (<12 per cent aged 65 years and older), and higher than the national baseline (14 per cent aged 65 years and above). However, in the area around Hospital 3, there is a local peak at the bottom end of the age distribution.[13]

[12] The profiles of the catchment populations refer to the population aged 15 years and above for compatibility with the patient level data from the adult emergency departments.

[13] In all four catchments, the age profile of females is older than that of males. In the areas around Hospitals 3 and 4, 17-18 per cent of the female population are aged 65 years and above compared with 12-13 per cent of the male population. The correlation between females and older ages provides explanation for the relatively higher proportions of females in the catchment populations around Hospitals 3 and 4.

Table 7.2: Demographic Profile of National, Dublin and Hospital Catchment Populations

	National Population (2004 data) % (Age 15+)	Dublin Population (2004 data) % (Age 15+)	Hospital 1 Catchment (2002 data) % (Age 15+)	Hospital 2 Catchment (2002 data) % (Age 15+)	Hospital 3 Catchment (2002 data) % (Age 15+)	Hospital 4 Catchment (2002 data) % (Age 15+)
Gender						
Male	49.3	48.0	48.5	48.3	47.5	46.4
Female	50.7	52.0	51.5	51.7	52.5	53.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Age Group Years						
0-14						
15-24	20.0	20.6	25.0	21.2	21.5	20.6
25-34	20.3	23.7	21.0	20.9	24.6	20.7
35-44	18.2	17.5	17.7	18.6	15.9	17.7
45-54	15.5	14.4	17.5	14.9	12.9	14.5
55-64	11.9	11.0	10.6	12.7	9.7	11.4
65-69	4.3	4.1	3.2	4.3	4.3	4.5
70-74	3.6	3.3	2.3	3.2	4.1	3.9
75-79	2.8	2.5	1.5	2.1	3.3	3.0
80+	3.4	2.8	1.4	2.1	3.6	3.8
Males Age Group Years						
0-14						
15-24	20.5	21.3	26.2	22.3	21.8	21.7
25-34	20.6	24.5	21.3	21.1	25.9	21.4
35-44	18.4	17.8	17.3	18.7	16.7	18.0
45-54	15.7	14.4	16.9	14.8	13.4	14.9
55-64	12.2	11.1	10.8	12.6	10.0	11.4
65-69	4.3	3.9	3.2	4.3	4.0	4.4
70-74	3.4	3.1	2.1	2.9	3.5	3.5
75-79	2.4	2.1	1.3	1.7	2.6	2.5
80+	2.4	1.8	0.9	1.5	2.3	2.3
Females Age Group Years						
0-14						
15-24	19.4	20.0	23.9	20.1	21.3	19.6
25-34	20.0	22.9	20.6	20.7	23.5	20.1
35-44	18.0	17.2	18.0	18.6	15.1	17.4
45-54	15.3	14.4	18.0	14.9	12.5	14.2
55-64	11.6	11.0	10.4	12.7	9.5	11.4
65-69	4.3	4.2	3.2	4.4	4.6	4.6
70-74	3.8	3.6	2.4	3.4	4.6	4.2
75-79	3.2	3.0	1.7	2.5	4.0	3.5
80+	4.3	3.8	1.8	2.7	4.8	5.0

Table 7.3: Socio-Economic Profile of National, Dublin and Hospital Catchment Populations

	National Population (2004 Data) % (Age 15+)	Dublin Population (2002 Data) % (Age 15+)	Hospital 1 Catchment (2002 Data) % (Age 15+)	Hospital 2 Catchment (2002 Data) % (Age 15+)	Hospital 3 Catchment (2002 Data) % (Age 15+)	Hospital 4 Catchment (2002 Data) % (Age 15+)
Employment Status						
At work (including 1st job seekers)	55.3	56.7	58.8	57.8	54.2	54.7
Unemployment (including unable to work)	3.5	8.1	8.5	7.5	9.7	5.4
Student	11.8	11.6	11.4	10.6	11.3	13.9
Home duties	17.4	12.2	13.4	13.4	10.9	12.7
Retired	8.7	10.2	7.0	9.8	12.3	12.1
Other	3.3	1.2	0.9	0.9	1.7	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Males						
Employment Status						
At work (including 1st job seekers)	65.8	65.7	68.9	67.6	61.3	65.0
Unemployed (including unable to work)	5.1	9.1	9.2	8.2	11.4	6.0
Student	11.3	11.6	11.4	10.8	11.3	14.3
Home Duties	0.3	1.3	1.7	1.4	1.3	0.9
Retired	13.1	11.1	8.1	11.5	12.7	12.9
Other	4.4	1.1	0.7	0.6	2.0	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Females						
Employment Status						
At work (including 1st job seekers)	45.1	48.4	49.2	48.6	47.7	45.9
Unemployed (including unable to work)	1.9	7.2	7.9	6.9	8.1	4.8
Student	12.2	11.5	11.4	10.5	11.3	13.6
Home duties	34.0	22.2	24.4	24.6	19.5	22.9
Retired	4.3	9.4	6.0	8.2	11.9	11.4
Other	2.3	1.3	1.1	1.1	1.4	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Socio-economic Status						
A Employers and managers		17.0	17.7	19.8	13.7	25.2
B Higher professional		7.3	4.5	5.2	7.5	13.6
C Lower professional		10.9	8.8	10.4	10.0	12.8
D Non-manual		20.5	21.5	21.8	18.4	16.3
E Manual skilled		9.2	11.8	10.4	8.5	4.7
F Semi-skilled		6.9	8.0	7.4	7.2	3.7
G Unskilled		4.2	4.0	3.8	5.5	2.4
H Own account workers		3.9	5.4	4.8	3.3	3.7
I Farmers		0.3	0.2	0.5	0.1	0.1
J Agricultural workers		0.1	0.1	0.3	0.1	0.1
Z All others gainfully occupied and unknown		19.6	18.2	15.6	25.7	17.4
Total		100.0	100.0	100.0	100.0	100.0
Social Class						
1 Professional workers		7.6	4.7	5.4	7.8	13.7
2 Managerial and technical		27.3	24.9	27.9	23.1	35.4

Table 7.3: Socio-Economic Profile of National, Dublin and Hospital Catchment Populations (Continued)

	National Population (2004 Data) % (Age 15+)	Dublin Population (2002 Data) % (Age 15+)	Hospital 1 Catchment (2002 Data) % (Age 15+)	Hospital 2 Catchment (2002 Data) % (Age 15+)	Hospital 3 Catchment (2002 Data) % (Age 15+)	Hospital 4 Catchment (2002 Data) % (Age 15+)
3 Non-manual		17.6	19.5	19.8	15.4	15.9
4 Skilled manual		14.7	19.5	17.2	13.2	9.2
5 Semi-skilled		9.2	10.8	10.2	9.8	5.6
6 Unskilled		4.4	4.3	4.4	5.7	2.6
7 All others gainfully occupied and unknown		19.3	16.3	15.0	24.9	17.6
Total		100.0	100.0	100.0	100.0	100.0
Deprivation Index						
1 (least deprived)	15.0	22.0	23.6	21.5	15.4	50.0
2	8.6	10.0	7.3	6.6	-	14.6
3	8.8	10.9	7.6	13.0	1.9	5.1
4	6.3	6.1	5.0	11.5	1.9	4.1
5	6.6	3.3	1.2	3.3	5.0	5.5
6	7.4	5.2	10.0	6.1	2.6	4.5
7	7.4	5.4	2.3	9.5	5.2	1.2
8	10.1	5.5	8.2	9.9	3.3	1.5
9	12.1	7.8	4.2	8.5	12.1	1.6
10 (most deprived)	17.7	23.8	30.5	10.1	52.5	12.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

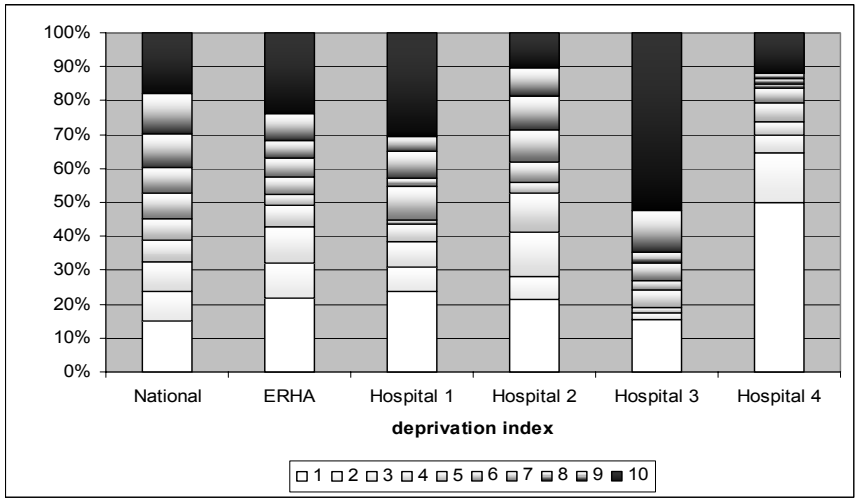
Notes: 1. National unemployment data are not directly comparable with Dublin and hospital data, the latter include 'unable to work' categories.

2. Socio-economic and social class data are not available for the national population for 2004.

3. Socio-economic status in the hospital catchments data includes age group 0-14 years.

Four different measures of socio-economic status can be identified from the data, including employment status, social class, socio-economic group, and deprivation. These four measures are consistent in describing the variations in socio-economic status across the hospital catchment areas. These variations are best summarised by the measure of deprivation, in Figure 7.1. The deprivation index is based on weighted combinations of indicators of unemployment; social class; housing tenure; car ownership and overcrowding (Kelly and Teljeur, 2004). The index is a ten point scale from least deprived (1) to most deprived (10). Figure 7.1 indicates the proportion of the populations in each catchment area that falls at each point of the scale. Baselines for the national level and for the former Eastern Regional Health Authority (ERHA) in which the four catchment areas are located are also included.

Figure 7.1: Proportion of Population by Deprivation Index for Hospital Catchment Areas



The area around Hospital 4 has the highest socio-economic status and this is high even relative to the national baselines (e.g. over 64 per cent of this population have a deprivation rating of 1-2). This is followed by the catchment areas around Hospitals 2 and 1. The catchment area for Hospital 3 is at the other extreme with a much lower socio-economic status in terms of higher levels of unemployment, higher proportions of the population falling in lower social classes and higher overall deprivation (e.g. over 52 per cent of this population have an index rating of 10 (most deprived)).

Health Status/Need

Health status is largely measured on a national and regional basis in Ireland. It is thus difficult to identify health status indicators for individual hospital catchment areas. There are well established linkages in the literature between socio-economic factors and health status. The most recently available estimates of inequalities in mortality in Ireland indicate that the mortality rate in the lowest occupation class is 100-200 per cent higher than in the highest occupational class (Balanda and Wilde, 2003). Similar socio-economic gradients in health status have been identified in smaller case studies on morbidity and mortality (e.g. Johnson and Lyons, 1993; Lyons *et al.*, 1996).

The socio-economic profiles of the hospital catchment areas suggest that, controlling for age and gender, health indicators for the population living around Hospital 3 are likely to be worse than those for populations in the other catchment areas and there is case study evidence to support this (e.g. Bury and Breen, 2000).

Medical Entitlement

Table 7.4 gives the national breakdown of the entitlement categories for the year 2004. Survey data highlight important variations in the

demographic and socio-economic profiles of the different entitlement groups (Watson and Williams, 2001; ESRI, 2001; Central Statistics Office, 2001; Central Statistics Office, 2005). The age profile of the medical card holders is older than the other groups. In turn the privately insured have a higher proportion of middle-aged individuals relative to the non-covered group, and the non-covered group are more likely to be under the age of 30 relative to the other groups. Medical card holders tend to have lower education attainment rates, lower incomes, and are much less likely to be in full time employment relative to the other groups. The employment characteristics of the privately insured and non-covered groups are similar with the majority in full-time employment. However, the educational attainment and income profiles of the non-covered group are lower relative to the privately insured. The health status of the medical card group is lower than the other groups, consistent with their older age profile and poorer socio-economic profile.

Table 7.4: Health Care Entitlement Profile of National, Dublin and Hospital Catchment Populations

Entitlement Status	National Population (2004 Data) % (Age 15+)	Dublin Population (2005 Data) % (Age 15+)	Hospital 3 Catchment % (Age 15+)	Hospital 4 Catchment % (Age 15+)
Medical card only	25.4	15.5	24.5	11.0
Privately insured only	47.3	50.8	40.2	69.1
Med card/private insurance	3.0	5.3	5.7	8.6
No additional cover	24.3	28.4	29.5	11.3
Total	100.0	100.0	100.0	100.0

Sources: NESF (2002); Amárach Consulting (2003); Insight Statistical Consulting (2005); Central Statistics Office (2005); PCRS (2005); Central Statistics Office (2007).

Given the variations in the profiles of these entitlement groups, the proportional representation of each group is expected to vary across the catchment populations. Data on entitlement status are not easily available on a regional or sub-regional basis. Local level data on medical card coverage provided by the Primary Care Reimbursement Service (previously the General Medical Service) have been combined with survey data from the European Survey on Income and Living Conditions (Central Statistics Office, 2005) to generate estimates of the entitlement profiles for the catchment populations of Hospitals 3 and 4.[14] These are also presented in Table 7.4.

Almost 70 per cent of the population in the area around Hospital 4 are estimated to hold private health insurance (plus 8.6 per cent with duplicate cover) relative to 40.2 per cent for the area around Hospital 3. The proportion of medical card holders and individuals with no cover is higher in the catchment for Hospital 3 relative to Hospital 4. These are reasonable estimates in light of the socio-economic differences between the two catchment areas. Although

[14]Data on entitlement status of ED patients is available for Hospitals 3 and 4 only.

the proportion with medical card in the catchment around Hospital 3 might still be too low as in some of the GP practices in the area over 75 per cent of the patient list are medical card holders.

Health Services

The total number of GPs practicing in Ireland is estimated to be 2,477[15] (O'Dowd *et al.*, 2006), based on a combined assessment of records from the ICGP and the Primary Care Reimbursement Service.[16] This translates to approximately 0.61 GPs per 1,000 population in Ireland in the year 2004. This is low compared with some other European countries (e.g. 1.7 per 1,000 in France) but is close to the UK level of 0.7 GPs per 1,000 population (OECD, 2006).

Table 7.5 provides the estimated number of GPs per 1,000 population in each of the four catchment areas. The number of GPs is higher in the catchment areas for Hospitals 3 and 4 relative to the other catchments, and to the national baseline. The number of GPs in the catchment areas for Hospitals 1 and 2 are lower relative even to the national baseline.

Table 7.5: Observed and Expected Number of GPs per 1,000 Population

	Hospital 1	Hospital 2	Hospital 3	Hospital 4
Expected No. of GPs	74	93	80	98
Observed No. of GPs	79	92	134	156
Expected No. of GPs per 1,000	0.51	0.53	0.51	0.53
Observed No. of GPs per 1,000	0.43	0.42	0.73	0.70

If the supply of GP care were determined by need for health care, more GPs would be located in areas of greater need. Thus the observed distribution of GPs by catchment could be an indicator of variations in need. In reality, a range of factors influences the location decision for a GP (e.g. cost of premises, ability to attract wealthier patients, availability of medical card patient list etc.). Table 7.5 includes an estimate of the expected supply of GPs per 1,000 persons in each catchment area if the supply were determined by the need for health care alone. Need for health care is proxied by age and gender. Survey data on GP visiting rates disaggregated by age and gender are used to approximate the expected number of annual GP visits in each catchment area. These are divided by the average

[15] In the year 2005.

[16] This is lower than an estimate by an independent consultancy of 2,700 for the year 2003 (INDECON (2003) *Indecon's Assessment of Restrictions in the Supply of Professional Services*, Indecon International Economic Consultants - London Economics.), and higher than the OECD estimate of 2,101 practicing GPs for the year 2004 (OECD 2006, *OECD Health Data 2006, Statistics and Indicators for 30 countries*, Organisation for Economic Co-operation and Development). However, the latter does not include the small proportion of doctors who are not registered with the ICGP and is by definition an underestimation.

number of annual consultations per GP to give an estimate of the total number of GPs required to attend to the expected number of consultations in each catchment.

Comparing the observed number of GPs with this crude estimate of the expected number of GPs, the areas in Hospitals 1 and 2 look under-supplied relative to need while the areas in Hospitals 3 and 4 look over-supplied. However, these are crude estimates and would need to be further adjusted for socio-economic status. The expected number of GPs in the catchment areas of Hospitals 3 and 1 are likely to increase with this adjustment. The supply of GPs in the catchment areas of Hospitals 1 and 2 would continue to look under-supplied with this adjustment and that for Hospital 4 would continue to look over-supplied. The supply in the catchment for Hospital 3 would be more likely to look under-supplied/adequate following the adjustment for deprivation in the area.

Out-of-hours GP co-operatives are also developing in the country. In Dublin in 2004 there were three co-ops in operation,[17] and a fourth opened recently. In relation to the four hospital catchment areas, GP co-operatives were operating within the catchments of Hospitals 3 and 4 in 2004. GP out-of-hours services were not available in the catchment area of Hospital 2. There is no co-op located within the boundary of the catchment area for Hospital 1 although there are co-ops located near the boundaries. The Dublin co-ops all operate under the same model, opening from 6 p.m. to 10 p.m. during weekdays and from 10am to 6pm at weekends and on public holidays[18]. The cost of a visit to the co-op is €50 for all non-medical card holders.

7.5.2 (B) EMERGENCY DEPARTMENT PATIENTS

Patient level data are used to analyse the characteristics of patients attending the four emergency departments. The sample for analysis is restricted to the subset of patients who reside within the hospitals' catchments.[19] This subset is further refined to include only 'new' patients, omitting patients making a 'return' visit (e.g. for a dressing) and this is consistent with the approach adopted in the literature.

[17] Dub-Doc (operates from St. James's Hospital); East Doc (serves east Dublin city); DL Doc (operates from Dun Laoghaire); D Doc (to serve north Dublin).

[18] The new Dublin based co-op, D-Doc, will operate in line with the non-Dublin co-ops, from 6pm to 8am during weekdays and 24 hours at weekends and on bank holidays.

[19] The data allow identification of each patient's area of residence and this is used to select patients living within the catchment areas. Area of residence codes (e.g. Dublin 2, 4, 6, 6W etc.) do not correspond directly to the electoral divisions that define the catchments and thus the alignment is not perfect. The subset of patients analysed is a close approximation of the population of patients living within the hospital catchment area and are likely to involve some incorrect inclusions and omissions.

Demographic Profile

The demographic profile of the ED patients is consistent across the four hospitals (Figures 7.2 and 7.3). There are a higher proportion of male patients in all hospitals, with the exception of Hospital 4 where the gender breakdown is almost 50-50. The age distribution of the patients peaks at the younger age groups (age 15-24 years) and declines quite sharply over the middle age groups (age 35-55 years) and rises again in the older age groups, particularly above 70 years in Hospitals 3 and 4.

Figure 7.2: Emergency Department Patients by Gender (Percentage)

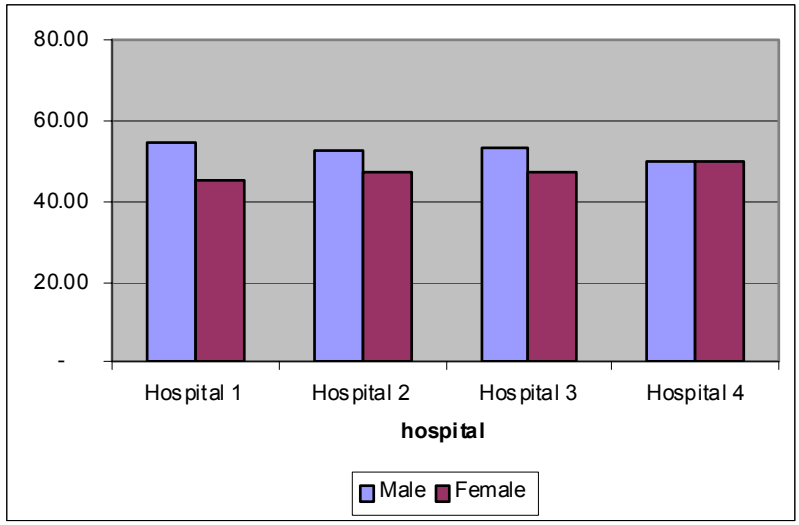
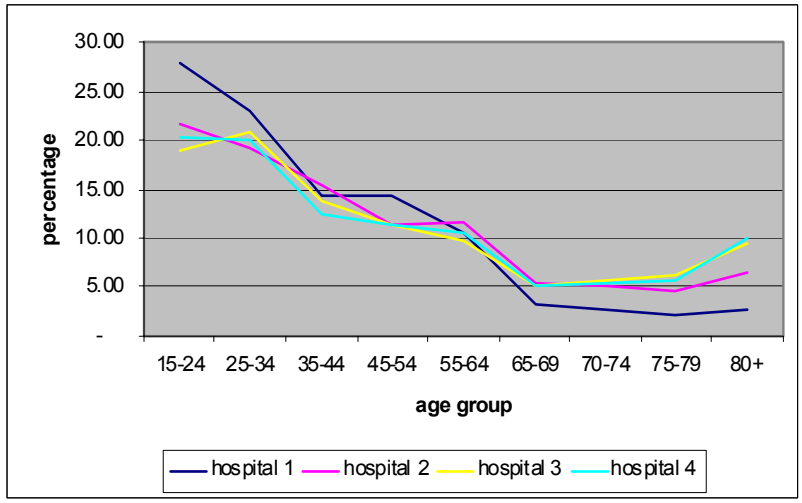


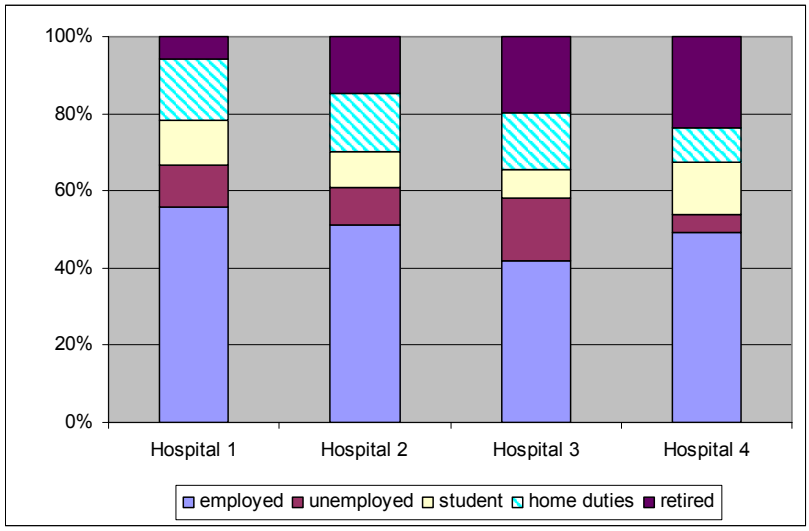
Figure 7.3: Emergency Department Patients by Age Group (Percentage)



Socio-Economic Profile

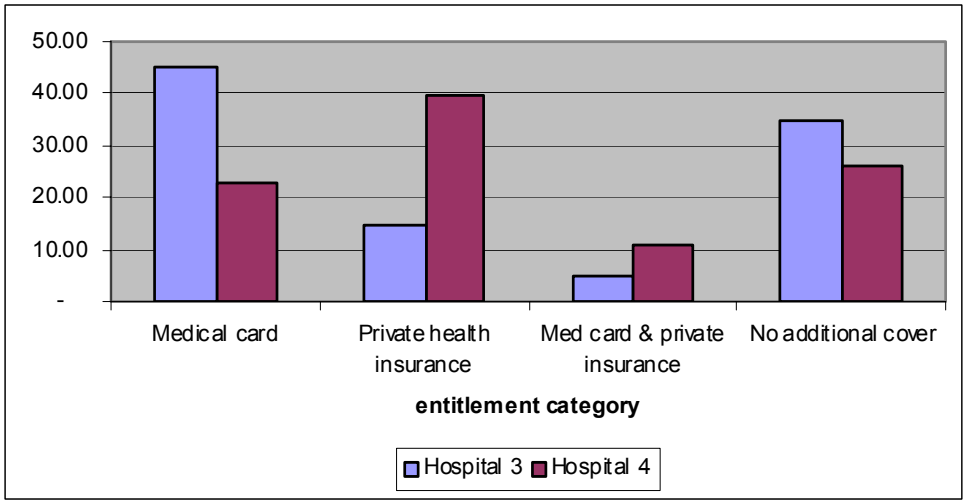
Socio-economic profile (Figure 7.4) is proxied by employment status and by entitlement category. There are important variations in the employment status of patients across the hospitals. In Hospitals 1 and 2 more than 51 per cent of the patients are employed. This compares with 49 per cent in Hospital 4 and 42 per cent in Hospital 1. In Hospitals 3 and 4 over 19 per cent of the patients are retired, compared with less than 15 per cent in Hospital 2 and less than 6 per cent in Hospital 1. Over 16 per cent of patients in Hospital 3 are unemployed and this is higher than in the other three Hospitals.

Figure 7.4: Emergency Department Patients by Occupation Group (Percentage)



Entitlement category (Figure 7.5) is available for Hospitals 3 and 4. In Hospital 3, the majority of the patients are medical card holders (45.2 per cent) or have no additional cover (35.2 per cent). Less than 15 per cent hold private health insurance and less than 5 per cent have duplicate cover. The patterns are different for Hospital 4. The largest group of patients are privately insured (almost 40 per cent) while medical card holders and patients with no additional cover make up 23.2 per cent and 26.2 per cent of the patients, respectively. Of patients in Hospital 4, 11 per cent hold both a medical card and private health insurance.

Figure 7.5: Emergency Department Patients by Entitlement Category (Percentage)



Utilisation Rates (Un-Standardised)

Variations in the profile of patients across the four emergency departments are driven to some extent by variations in the characteristics of the respective catchment populations. To permit comparisons across the hospitals and across different groups of interest (e.g. young versus old, males versus females etc.), utilisation rates (per 1,000 persons) are used to control for the different catchment profiles.[20]

Figure 7.6 shows that the utilisation rate for males is higher than for females in each of the hospital areas although in Hospital 4 the gender difference is smaller than in the other areas. The gender gap is not consistent across the age distribution. In all four hospital areas, young males have higher utilisation rates than young females. For middle and older age groups (age 45 years and older), the gender difference declines. Figure 7.7 illustrates this with an example from Hospital 4. The area around Hospital 3 differs from this pattern with higher male utilisation rates at all age groups.

[20] Utilisation rates are calculated by dividing the number of patients observed by the catchment population. Note that one patient can have more than one visit during the year. The utilisation rates indicate the number of patients per 1,000 persons having *at least one* visit to an emergency department in that year.

Figure 7.6: Emergency Department Attenders by Gender (Number Per 1,000 Population)

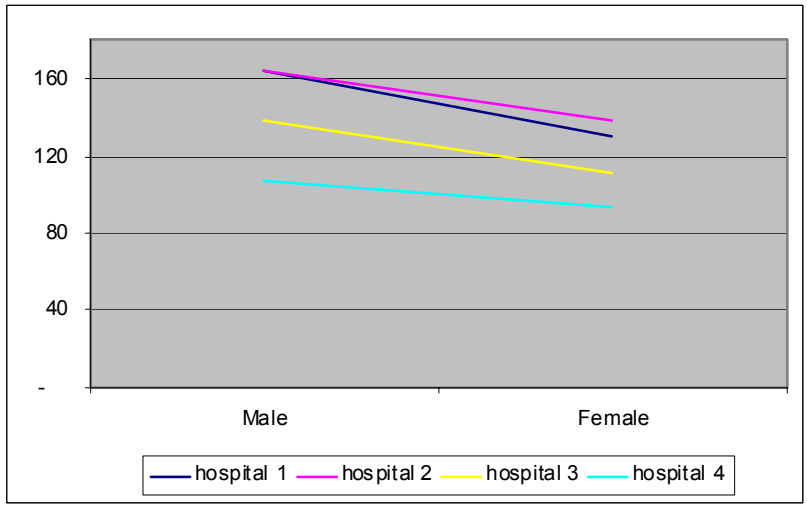


Figure 7.7: Emergency Department Attenders by Age Group – Hospital 4 (Number Per 1,000 Population)

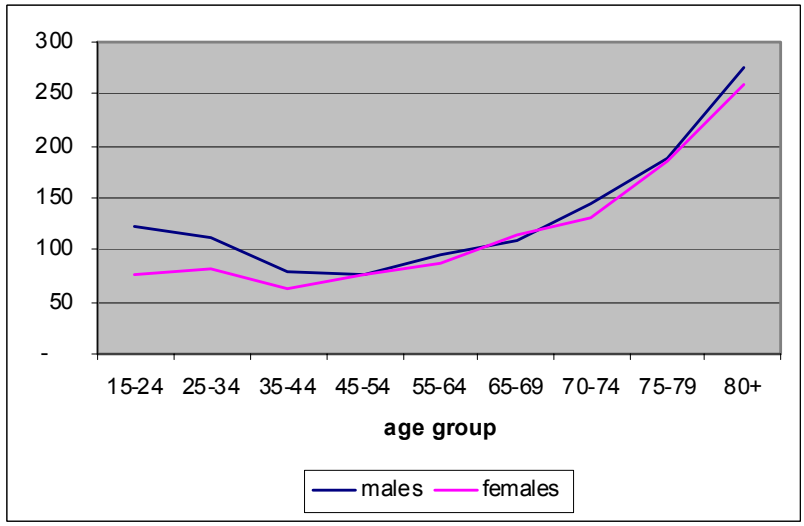


Figure 7.8 gives the utilisation rates by age group for all hospital areas. Utilisation steadily increases from age 55 years upwards, although for Hospital 1, the increase is not as steep as in the other areas. For Hospitals 2, 3 and 4, the rates of utilisation for individuals aged 80 years and older are 3-4 times the rates for younger age groups. For example, in Hospital 2, the rate of utilisation for individuals aged 80 years and above is 443 visits per 1,000 persons, compared with 154 visits for the 15-24 year age group. The curves are slightly convex and the utilisation rates for individuals aged 15-24 years are higher than for middle age groups. Individuals aged 25-54 years have the lowest rates of utilisation, with less than 130 visits per 1,000 persons across all areas.

Figure 7.8: Emergency Department Attenders by Age Group – All Hospitals (Number Per 1,000 Population)

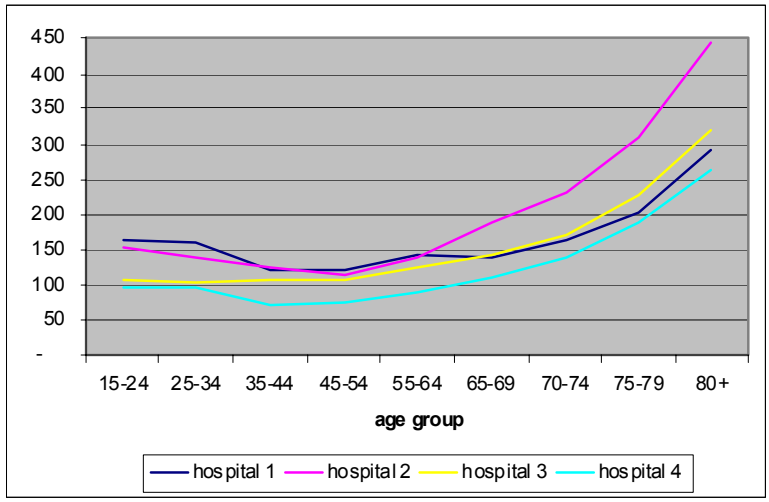
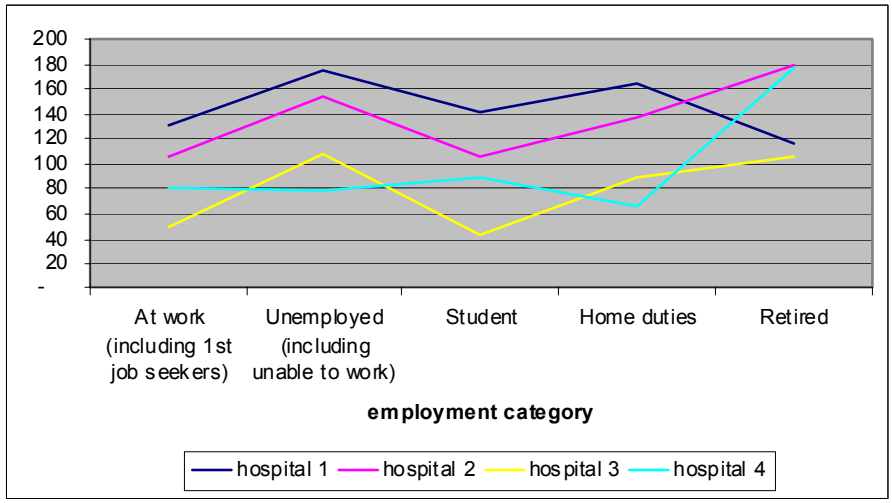


Figure 7.9 presents the utilisation rates for employment status. These should be interpreted with caution as there were a large number of missing observations on this variable in the data for two out of the four hospitals. Utilisation rates are highest for individuals who are retired, engaged in home duties, or unemployed (although Hospital 4 shows some variations to this pattern). There are gender differences in these utilisation rates. For males, the highest utilisation rates are observed for the retired and unemployed categories. For females, individuals engaged in home duties and the retired have the highest utilisation rates.

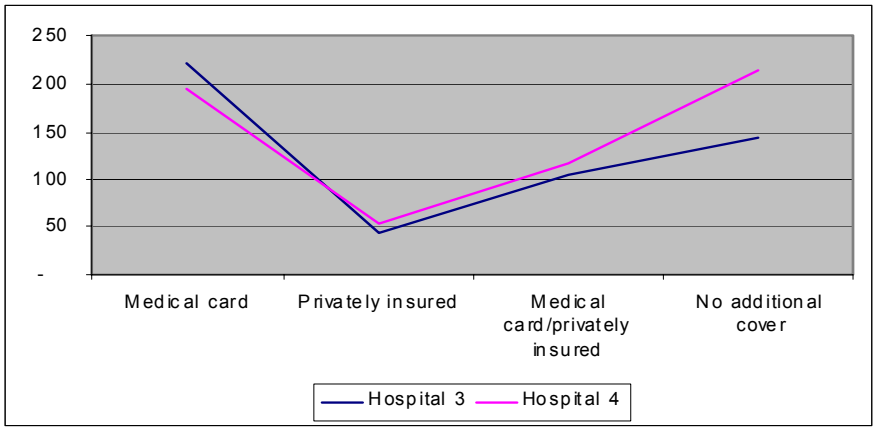
Figure 7.9: Emergency Department Attenders by Occupation (Number Per 1,000 Population)



The utilisation rates for the entitlement categories for Hospitals 3 and 4 are presented in Figure 7.10. The denominators for these rates

are based on the estimates of entitlement profiles of the underlying catchment populations.

Figure 7.10: Emergency Department Attenders by Entitlement Status (Number Per 1,000 Population)



The utilisation rates are estimated to be highest for individuals with a medical card (without additional cover from private health insurance) and for those with no additional cover, followed by those with duplicate cover. The lowest utilisation rates are observed for the privately insured. This is consistent with the higher socio-economic profile of this group and with its age patterns (a high proportion of privately insured are in the middle age groups).

The utilisation rates provide a neat way of relating the profile of emergency department patients to their local catchment areas. The rates indicate that young males are more likely to make emergency department visits than young females. Overall, older people have higher utilisation rates relative to younger people. Consistent with this age profile, retired individuals have relatively high utilisation rates. Unemployed individuals and those engaged in home duties also show high utilisation rates. Tentative results on entitlement indicate that utilisation of emergency services is higher for medical card holders and individuals with no additional cover.

Utilisation Rates (Standardised)

To compare overall utilisation levels across hospitals, Tables 7.6 and 7.7 present standardised utilisation ratios (together with their confidence intervals). The indirect standardised methodology has been applied, using Hospital 4[21] as the reference point.

[21] The raw utilisation rates for Hospital 4 are an underestimation of the true rates for this area. There is another emergency department operating within the boundary of the catchment area for Hospital 4. Disaggregated data on this other hospital are not available but the total number of patients attending its emergency department is approximately. 42 per cent of the total number attending Hospital 4. The raw utilisation rates are increased by 42 per cent pro-rata before standardisation.

Table 7.6: Age Standardised Utilisation Ratios

Age Standardised Ratios	Hospital 1	Hospital 2	Hospital 3	Hospital 4
Observed Utilisation	21,192	26,480	19,381	25,933
Expected Utilisation	19,014	23,761	22,332	25,933
Standardised Utilisation Ratio	111	111	87	100
Upper limit	110	110	86	99
Lower limit	113	113	88	101

Table 7.7: Employment Standardised Utilisation Ratios

Employment Standardised Ratios	Hospital 1	Hospital 2	Hospital 3	Hospital 4
Observed Utilisation	20,040	21,127	10,191	23,734
Expected Utilisation	17,637	22,133	20,179	23,734
Standardised Utilisation Ratio	114	95	51	100
Upper limit	112	94	50	99
Lower limit	115	97	51	101

The first set of ratios are standardised for age across the four hospital areas.[22] The standardised utilisation ratios are the same for Hospitals 1 and 2 (111). These ratios are higher relative to the reference of Hospital 4 (100) and also relative to Hospital 3 (87) with no overlap in the confidence intervals. The second set of ratios are standardised for employment status.[23] The ratio for Hospital 1 remains above those of Hospitals 3 and 4, while the ratio for Hospital 2 falls below the reference point. The ratio for Hospital 3 is even lower (51) relative to the reference point than when standardised for age. The results suggest that the utilisation in the populations around Hospitals 2 and 3 is driven to a large extent by the level of deprivation in these areas.[24]

7.5.3 (C) RESULTS PART THREE – REGRESSION ANALYSIS

Attendance level data provide details on the passage of a patient through the emergency department, from referral through to discharge. The factors influencing decisions made at different stages in the episode have been analysed using logit regression analysis. Summary findings are presented here (see Smith, 2007a for details). The analysis investigated choices on source of referral, level of urgency, discharge destination, and frequency of attendance.

[22] Results are the same for males and females and are thus not presented separately.

[23] It was not possible to standardise for age and employment status in the one ratio. Catchment population data are disaggregated by age alone and by employment status alone and are not available for age and employment together.

[24] The same caution on over-interpreting rates based on employment status is applied here, with a large number of missing observations on employment status in the emergency department data.

Mode of Referral

Overall, the majority of cases in an ED are self referrals. For the full sample including all four hospitals, almost 79 per cent of attendances are self-referrals. Factors influencing the likelihood of being referred by a GP rather than self-referring to the ED were analysed. The odds of being referred by a GP are higher for females relative to males. The odds of GP referral increase with age. Patients aged 55 years and older are significantly more likely to be GP referrals relative to younger age groups. Socio-economic factors also have some influence on referral choice. The odds of GP referral are significantly higher for retired individuals relative to employed individuals. Individuals with no additional cover are significantly less likely to be referred by a GP relative to each of the other entitlement groups (i.e. medical card holders, privately insured, duplicate cover). The urgency of the complaint was used to proxy need in the analysis. Patients with urgent and very urgent complaints are more likely to be GP referrals than those with less urgent complaints.

Level of Urgency

The urgency of patients' presenting complaints was assessed in terms of triage. Following registration at reception, patients (including those who are referred by a GP) are assessed by a triage nurse and treated thereafter in accordance with the level of urgency of the complaint. The four hospitals operate the Manchester Triage Scale which rates the urgency of a case on a five-point likert scale from 1 (immediate) to five (non urgent) (Manchester Triage Group, 1997).

In the full sample with all four hospitals, over 60 per cent of attendances are urgent cases. Analysis focuses on the probability of being a non-urgent case (Triage 4 and 5) relative to being an urgent case (Triage 2 and 3). The odds of being a non-urgent case are significantly lower for females relative to males, and are progressively lower as age increases. Individuals who are unemployed, engaged in home duties, or retired are significantly less likely to attend for non-urgent complaints relative to those who are employed. The odds of non-urgent triage are lower for medical card holders relative to each of the other entitlement categories.

Discharge Destination

Patients can be discharged from an ED through a number of routes. Some are admitted, others are discharged home, or to a GP or other health professional. A proportion of patients discharge themselves before completion of the health care episode. Analysis has focused on admissions and self-discharges.

In the full sample of all four hospitals almost 24 per cent of ED attendances are admitted. Controlling for all other covariates in the model, females are less likely to be admitted relative to males. Older people are more likely to be admitted. The odds of admission are higher for unemployed, retired and individuals engaged in home duties, relative to employed individuals. Privately insured patients

and individuals with no additional cover are significantly less likely to be admitted relative to medical card holders (with and without private health insurance). The odds on admission are much smaller for less urgent cases. GP referrals are more likely to be admitted relative to self-referred patients.

Factors influencing the likelihood of self-discharge include being male, younger (under 65 years of age), unemployed, medical card eligibility. GP referrals are less likely to self-discharge.

Frequent Attendance

Over 12 per cent of total attendances are by patients attending more than 3 times during the year. In the relevant literature, patients with more than 3 visits per year are often termed frequent attenders. Controlling for all other covariates in the model, females are less likely than males to be frequent attenders. Unemployed, retired and patients engaged in home duties are significantly more likely to have more than 3 visits relative to employed patients. The odds on frequent attendance are greater for medical card holders (with and without private health insurance) relative to the privately insured or those with no additional cover. Patients who are referred by their GP are less likely to be frequent attenders. Discharge status also has some important linkages with frequency of attendance. The odds on frequent attendance are larger for individuals who self-discharge relative to those who are admitted.

7.6 Discussion

Details on the demographic, socio-economic and health related characteristics of the different hospital catchment areas can make important contributions to health policy decision processes. Decisions on where to locate services that are more appropriate to the needs of the elderly, or to the needs of young families, can be informed by these data. Information on variations in deprivation across the areas can also help to shape the response of the health services to the specific needs of the local populations. The relatively high level of deprivation in the area around Hospital 3 highlights the importance of providing services that are tailored to tackling health issues that are directly linked to poor living conditions (e.g. high drug use; poor diet etc.). This finding is consistent with studies in the literature that have focused on this area (e.g. Bury and Breen, 2000). Gaps in service provision can also be identified from these data. The areas around Hospitals 1, 2 and possibly 3 may be under-served by primary care services.

The patient level data identify key demographic and socio-economic characteristics of patients attending four large emergency departments in Dublin. A high proportion of the emergency department patients are male and relatively young (over 50 per cent of patients are aged between 15 and 45 years). This is consistent with findings in the national and international literature (Murphy *et al.*, 1999; Comhairle na nOspidéal, 2002). However, Ireland has a relatively young population and the high proportion of relatively

young patients is therefore expected. To generate greater understanding of the characteristics associated with emergency department utilisation, the features of the underlying local populations are controlled for.

The analysis has combined the demographic and socio-economic characteristics of the local catchment populations with those of the patients attending the emergency departments. This yields utilisation rates which can be compared across hospitals and across groups of interest. It is interesting that despite wide variations in the characteristics of the different catchment populations, the results for the utilisation rates are consistent across the hospitals. Utilisation rates are particularly high for young males but overall older individuals have much higher utilisation rates relative to younger age groups. Consistent with these age patterns, the utilisation rates for retired individuals are higher than for employed individuals. The unemployed and those engaged in home duties also have relatively high utilisation rates.

The results for entitlement status are tentative but suggest that utilisation rates are highest for those with a medical card and for those with no cover, and lowest for those who hold private health insurance. This is observed in both Hospital 3 and 4 despite large differences in the entitlement profile of the underlying catchment populations for these two areas.

The absolute values of the non-standardised utilisation rates in this study are lower bound estimates. Individuals living within the catchment area of one hospital who attend an emergency department elsewhere are not captured in the utilisation rates for the area of interest. This needs to be kept in mind when making comparisons with other sources of data. National and international utilisation rates are not readily available in the literature. Where they are reported (e.g. Acute Hospitals Review Group, 2001), they are crude rates based on attendance level data rather than patient level data and are not adjusted for area of residence or attendance type (new/return) and are thus higher than the rates observed in this analysis.

These results shed light on factors associated with the initial contact step where a patient decides whether or not to seek emergency health care. Regression analysis of the attendance level data shows that these factors are also linked to other steps in the process from source of referral through to discharge.

Controlling for all other factors, older aged individuals are more likely to be referred by their GP, to present with relatively urgent complaints, and to be admitted. Concerns with the burden of older age groups on emergency services have already been noted in the Irish literature (Walsh *et al.*, 2004). These concerns are supported by this analysis and emphasises the need to expand facilities appropriate to the needs of the elderly and to examine further the referral patterns by GPs.

Unemployed individuals are more likely to refer to the emergency department with urgent complaints relative to employed individuals. These individuals are also more likely than employed individuals to

be admitted. Relative to all other occupation categories, the unemployed are more likely to discharge themselves from the department and to attend frequently during the year. These patterns hold when all other covariates are controlled in the models. This group of individuals clearly have high health needs and are attending the ED with conditions that are urgent and require admission. However, the strong associations of this group with frequency of attendance and self-discharging suggest that their needs are not being met in the most effective and efficient way.

Medical card holders are more likely to be referred by their GP, to present with more urgent complaints, and to be admitted. However they are also more likely than the other entitlement groups to self-discharge and to attend frequently.[25] The relative intensity with which medical card holders make use of primary care in Ireland has been well documented. This analysis shows that this intensive use extends to the emergency department also, although health status has not been controlled for as comprehensively as in the primary care literature.

Individuals with no additional cover also have high ED utilisation rates but the results indicate that these individuals are using the emergency department in different ways to the medical card holders. The non-covered attend for less urgent complaints, are less likely to be admitted and attend less frequently relative to medical card holders. They are also less likely to self-discharge relative to medical card holders. These patterns suggest that while the health needs of this group are clearly lower relative to medical card holders, their access to primary care is restricted leading to relatively high utilisation of emergency services for non-urgent reasons.

The results for entitlement are interesting in light of the financial incentives in the system. For the initial contact decision, the incentives suggest that, *ceteris paribus*, medical card holders (with and without private health insurance) will have higher health care utilisation rates relative to non-medical card holders. Within the non-medical card holders, privately insured and non-covered individuals are not expected to show differences in utilisation rates. Results are not consistent with these financial incentives.

However, this is a univariate analysis and differences in health, demographic and socio-economic factors have not been controlled for. The higher utilisation by medical card holders relative to those with duplicate cover may be explained in terms of higher deprivation (and hence greater health need) in the former group. The relatively high utilisation by the non-covered is more difficult to explain.

First, survey data indicate that the non-covered group is younger and has a higher proportion of males. Thus the high utilisation rates that have been identified for young males could be disproportionately represented in this entitlement category. Analysis

[25] The similarities in the results for the unemployed and the medical card categories are likely to reflect common socio-economic and health status indicating a degree of multicollinearity in the models.

of the ED attendances shows that the age distribution of the non-covered patients is concentrated in younger age groups.

Second, although the non-covered and the privately insured face the same set of charges for primary and emergency care, these charges pose more of a deterrent for the non-covered group because of a lower socio-economic status. The non-covered may be more likely to delay seeking care until absolutely necessary, at which point emergency services are more appropriate to their needs. However, analysis of the ED attendances does not indicate significant difference in the urgency of the complaints between these two groups.

Third, the non-covered and the privately insured may be responding to perceived rather than actual costs of care. The costs associated with GP care are well established in the public mind. There is anecdotal evidence that the charges for ED care are not as well established (e.g. Red C, 2004). The non-covered may be more sensitive than the privately insured to these perceived cost differences (especially if more than one GP visit is anticipated) and thus choose emergency rather than primary care as the first port of call when health care is sought. This is supported by the observation that the non-covered are significantly less likely to be referred to the ED by a GP relative to privately insured patients.

There is increasing interest at the policy level in the interaction between primary and emergency care in Ireland, particularly with the development of GP out-of-hours services in recent years. The factors associated with ED utilisation can be compared with those associated with the demand for primary care. This draws on the extensive analysis (Nolan and Nolan, 2004; Nolan and Nolan, 2005) using Living in Ireland and other household survey data. Some important similarities and differences can be identified in the utilisation of these two services.

For both emergency and primary care, older age groups have higher levels of utilisation. In primary care, older people are more likely to visit a GP more frequently even after controlling for health status and medical card eligibility. Also for both services, medical cards have strong positive effects on utilisation. Medical card eligibility has a positive and significant influence on the probability of visiting a GP and on the number of visits following initial contact (Nolan and Nolan, 2004). In both primary and emergency care, retired individuals and those engaged in home duties show high utilisation rates relative to those who are employed.

There are differences in the influence of gender across these services. In emergency care, males have higher utilisation rates, particularly amongst the younger age groups (and in some cases at all ages). In primary care, females visit their GP more frequently than males. In emergency care, the unemployed show relatively high rates of utilisation while this is not the case in primary care. A third difference is observed in entitlement status. Emergency utilisation rates for privately insured individuals are relatively low. Yet in primary care, private health insurance has a positive and significant impact on the decision to attend a GP and this result holds even

after controlling for demographic, socio-economic and health status characteristics (Nolan and Nolan, 2004).

The utilisation rates for emergency care are univariate and are not directly comparable with the results for primary care where regression analysis has been used to control for multiple covariates. However, the comparisons indicate that males are more likely to use emergency services than primary care services, especially amongst the younger age groups. There is also a tendency for less well-off groups (e.g. unemployed; individuals with neither medical card nor private insurance) to have higher utilisation rates for emergency services while this is not observed for primary care. In contrast, private health insurance (and income) has a positive influence on primary care utilisation and this is not observed for emergency department care.

These are tentative comparisons and would require more detailed emergency department data collection and analysis to be able to control for multiple covariates. However, initial indications are that individuals with lower socio-economic status (e.g. no private health insurance, unemployed) are more likely to use emergency department services than they are to use primary care services.

The four catchment areas differ in terms of availability of primary care services. Thus the use of four hospital sites permits further investigation of interactions between primary and emergency care in terms of utilisation patterns. The relatively high utilisation rates observed for the catchments around Hospitals 1 and 2 could be linked to poor availability of alternative health services. The number of GPs per 1,000 persons in these catchments is lower than in the catchments for Hospitals 3 and 4. The numbers are low relative to estimates of the number of GPs needed in the areas. The areas are also under served in terms of GP out-of-hours services. In contrast, the number of GPs available in the area around Hospital 4 is higher relative to the needs-adjusted number. The estimated over-supply of GPs in this area is presumably linked to the wealthy socio-economic profile of this catchment relative to the other areas. Given the level of deprivation observed for the catchment area around Hospital 3, it is possibly surprising that the emergency department utilisation rates are not even higher than they are.

In further support of the link between high ED utilisation rates for Hospitals 1 and 2 and availability of alternative sources of care, the level of urgency of the attendances is identified. If individuals are attending the emergency departments in these areas because of limited supply of alternative GP services, the nature of the presenting complaints would thus be expected to have relatively low levels of urgency (i.e. suitable for GP attention). Attendance level data for Hospitals 1 and 2 show that there are higher proportions of attendances in the two least urgent triage categories (53.8 per cent and 39.2 per cent respectively) relative to Hospitals 3 and 4 (27.3 per cent and 33.3 per cent respectively), although the difference is most stark for Hospital 1 attendances.

However, to more accurately compare the overall utilisation rates across the catchments, standardised utilisation rates were calculated

using Hospital 4 as the reference category. In terms of absolute magnitudes, variations in the standardised utilisation ratios across the catchments are not as large as the variations in the raw utilisation rates. This confirms the importance of taking into account the profile of the underlying catchment area when assessing factors influencing ED utilisation.

Age standardised utilisation rates are higher for the catchments around Hospitals 1 and 2 relative to Hospitals 3 and 4, consistent with the hypothesised link between utilisation and GP availability. Yet while the rate for Hospital 1 remains high when employment status is standardised instead of age, the rate for Hospital 2 is lower relative to the reference point (Hospital 4). The rate for the catchment population around Hospital 3 is lower relative to Hospital 4 for both age and employment standardisation. These patterns indicate that any hypothesised linkages between GP availability and emergency department utilisation rates need to be more rigorously tested. The results also suggest that the levels of ED utilisation observed in the area around Hospital 3 in particular are driven to a large extent by the degree of deprivation in this area.

7.7 Conclusions

To conclude, emergency department utilisation is attracting much attention in the Irish health system, consistent with wider international concerns with increasing demands for emergency services throughout the world. However, despite this widespread interest, there is an important lack of baseline information on the characteristics of patients who use emergency department services in the country. In response, this study has combined hospital level data with local population data to provide an up to date profile of who is making use of emergency department services in the Dublin area, and in what ways. The use of four different hospital sites permits a more robust picture of the characteristics of the patients. This contributes to the Irish literature where the main focus to date has been on single site case studies based largely on data from the 1990s and earlier.

Demand for emergency care can be analysed within a framework of sequential decisions. The main focus of this chapter has been at the initial contact stage, identifying patient level characteristics influencing the decision on whether or not to seek emergency care. Factors associated with emergency department utilisation include: males; older age groups; retirement; home duties; unemployment; medical card status and no cover.

Analysis has also looked at subsequent choices in the emergency care process, from source of referral and level of urgency of complaint, through to discharge destination and frequency of attendance. Results indicate that the above factors associated with relatively high use of emergency services are also linked with particular patterns of use within an emergency department.

Entitlement to health services varies in the Irish system and this has implications for how emergency department services are used.

Further investigation into these implications can benefit from more rigorous control of health status/health need factors.

Comparisons with primary care indicate that higher socio-economic status and private health insurance have important positive impacts on primary care utilisation which are not apparent in emergency care utilisation. Comparisons across hospitals suggest that lack of available alternative sources of care may be inducing higher than otherwise predicted levels of emergency department utilisation and this is an area that requires more detailed analysis.

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8. EQUITY IN THE USE OF HEALTH CARE IN IRELAND?

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8.1 Introduction

Health care tends not to be regarded like other commodities. Surveys across OECD counties consistently show (Wagstaff *et al.,* 1992) that health care is seen as a basic entitlement and ought to be distributed according to need rather than ability to pay.[1] Just how accepted this principle is can be judged from recent health policy documents in Ireland such as the Commission on Health Funding (1989), the 1994 and 2001 health strategies and the primary care strategy (2001), all of which have stated that equity of access to and use of health care services should be a central principle. Yet this concern with equity seems to sit uneasily with the large proportion of care in Ireland delivered through private provision. For example, although those with a medical card (around 30 per cent of the population) receive free dental, aural, optician and GP care, the rest of the population must pay at the point of delivery. Similarly, although public hospital care is available to the whole population subject to relatively small fees for those without medical cards, almost half of the population now have medical insurance which can be used in both private and public hospitals with hospital consultants catering for both public and private patients in public hospitals as well as private patients in private hospitals. The importance of private care and the extent of fee paying in Irish health care has led many to argue that the system is not available to all on the basis of need alone, but instead that personal circumstances may well determine the availability, extent of and speed of treatment.-

This chapter assesses whether there is in fact equity in the utilisation of health care in Ireland across those with different levels

[1] European countries may diverge significantly from the US in this respect. In the latter there is far less support for solidarity in the funding of healthcare across population groups.

of income. Other dimensions of equity in the health sector such as expenditure and access in different geographical locations is just as important, but here we seek only to address the issue of equity across those with different levels of income. Although most policy documents treat the concept of equity as unproblematic, in fact there has been a substantial debate in the health economics literature as to how 'equity' should be defined and the implications this has for the methodology adopted. We address what exactly we mean by 'equity' in the next section of the paper before turning to the data to be used in Section 8.3. In Section 8.4 we embark on a descriptive analysis of the distribution of health care use across the population. As will become apparent, our definition of 'equity' in the use of health care is prefaced on equal levels of treatment for equal need so Section 8.5 examines the distribution of health in Irish society and in particular, how health varies across different income groups. In Section 8.6 of this chapter we derive a measure of the equity of health care that takes into account the balance between need and use before deriving some conclusions from our work in the final section.

8.2 How Do We Define and Measure Equity?

In health and health care as in many other areas of policy, 'equity' is often stated as an overarching concern that guides policy and practice.[2] In the health economics literature, however, there has been a long running debate about what aspect of equity in health care is important and how this should be measured. On the one hand some researchers (Le Grand, 1982; Mooney, 1983; Mooney *et al.,* 1991; Mooney *et al.*, 1992) have maintained that equity should be defined in terms of equal *access* to treatment whereas others (Culyer, van Doorslaer and Wagstaff 1992; O'Donnell and Propper, 1991) hold that health economists should be analysing equity in the actual utilisation of healthcare itself. From the early 1980s Mooney (1983) and Le Grand (1982) have maintained that equity in most policy statements refers to equity of access to health care services in the sense that those with an equal need for treatment have equal opportunity to get it, or to put it another way face an equal cost of utilisation. The main argument put forward by the advocates of the access approach is that an individual's level of health care utilisation is determined by a range of factors that often have little to do with health care services per se and more to do with factors that shape the individual's demand for health care. One of these may be the 'need' for treatment, but even individuals with equal need may end up consuming different amounts of care if preferences differ (perhaps in the individuals' perception of the benefits of treatment) and if their marginal utilities of income differ. From this perspective, to attempt to measure the equity of utilisation is to focus on the

[2] For instance, the Irish Health Strategy – *Quality and Fairness: A Health System for You'* (Department of Health and Children, 2001) states that 'equity and fairness' is one of the four guiding principles by which the health care system will be shaped.

wrong subject (hence the subtitle of Mooney *et al's.,* 1991 paper: 'weighing heat?').

Culyer, van Doorslaer and Wagstaff (1992) on the other hand have argued that although it is self evident that persons in equal need may end up consuming different levels of health care because their demand curves differ, we still need to know why the curves differ and whether the difference may in fact be due to differences in income. They use the example of differences in education between the rich and poor (Culyer, van Doorslaer and Wagstaff, 1992, p. 94). If the poor have the same opportunities to receive care as the rich but have a lower take up rate simply because they are not as well informed, surely this would be a concern to policy makers and analysts alike? If so, simply examining the extent of and costs of access for the rich and poor would not be the optimal research strategy. Using a measure of utilisation on the other hand, we would also be able to analyse the factors that explain the lack of take up of care among the poor. Given this, we would do well to study equity in the utilisation of health care as well as the costs and problems of accessing health care to discover the true source of the inequalities between groups. In this chapter we largely adopt the former approach. Our overall question is whether the utilisation of health care is 'horizontally' equitable in the sense that those in equal need receive the same level of treatment irrespective of their income. To put the question another way – do those with a higher level of income consume greater levels of health care for the same level of health need?[3]

In Ireland charges for general practitioner, dental, aural and optician visits (at the point of delivery) may be an important influence on seeking care, with the greatest impact on those on low income but without medical card cover, since a fixed charge will have a greater impact on foregone utility for poorer consumers. Although public hospital care is subject to only relatively small or no charges at the point of delivery in Ireland, waiting lists for most forms of treatment mean that one's ability to pay for treatment directly, or having access to medical insurance which can pay will allow individuals to access treatment more quickly and may influence the individual's decision to seek treatment initially. Around 50 per cent of the Irish population are currently medically insured either with VHI or BUPA.

Provider behaviour can also be influenced by the method of payment within the Irish system. The capitation method of payment used to refund GPs treating patients with medical card cover means that GPs have an incentive to see more private patients. Similarly, in the hospital context, the fact that hospitals receive a fee for private patients rather than the prospective budget allotted to them from State funding may well influence their behaviour in allocating

[3] We will not address the issue of 'vertical equity', i.e. that higher income groups should contribute proportionately more to the funding of health services irrespective of their utilisation of it.

resources. Together these mechanisms mean that there may well be large differences between the utilisation and delivery of health care services to those in different parts of the income distribution.

In assessing 'horizontal equity' in Irish health care it should be underlined that we are making the assumption that all instances of care are of equal quality. This means that whether a GP sees a patient for free through the medical card scheme or privately, we assume that the quality of the consultation is equal. Similarly, for hospital care we assume that the total 'utility' that the individual derives from their treatment is the same whether they are treated as a public or private patient. Given that the latter can avail of costlier and more comfortable 'hotel' services such as a private room, better food etc., within hospitals, this seems unlikely, but we are more interested in the clinical outcomes of treatment. There is very little evidence that these differ significantly between public and private patients although Fadden (2003) in a pharmacy study of the over 70 year olds before and after the extension of the medical card to this group, has shown some difference in prescribing behaviour between GMS and non-GMS patients. The rate of prescribed generic drugs among GMS patients was roughly twice that among private patients. This is usually good practice since generic drugs are cheaper and on the whole, just as effective, but specific proprietary drugs can offer less side effects and a better interaction profile for particular patient types. She also notes that some patients complained of an inferior service after the change with GPs restricting GMS patients to certain hours of the day and not seeing GMS patients for regular check-ups. Wren (2003) has also argued that hospital care for public patients is also less effective than among private patients, the latter being given more time in hospital, more attention and a greater range of tests.

8.3 Data Sources

In this chapter we use data from the Living in Ireland Survey (LIIS) 2001. Although other surveys have been carried out since 2001 such as the Survey of Income and Living Conditions (EU-SILC), no survey since the last LII Survey in 2001 includes all the information necessary to carry out an analysis of the equity of health care utilisation in Ireland. The LII Surveys form the Irish component of the European Community Household Panel (ECHP): an EU-wide project, co-ordinated by Eurostat, to conduct harmonised longitudinal surveys dealing with household income and labour situation in the member states. As well as extremely detailed information on income levels and sources, the LII data also includes information on other important topics of relevance to this chapter including several self-assessed health status measures, health care utilisation and a wide range of socio-demographic characteristics. The objective of the sample design was to obtain a representative sample of private households in Ireland. Those living in institutions such as hospitals; nursing homes; convents; monasteries and prisons; are excluded from the target population, in line with the harmonised guidelines set down by Eurostat and standard practice adopted in surveys of this kind (such as the Household Budget Survey

conducted by the Central Statistics Office). The data collected in 2001 were the final round of surveying (the first was in 1994) and data was collected from 2,865 households and 6,521 individuals.

8.4 Health Care Utilisation by Income

In this section we examine the pattern of health care utilisation across a range of services across the income distribution. The LII Survey included questions (given to all survey respondents) on their use of health care services including consultations on their own behalf with GPs (including home visits), medical specialists (including outpatient services), dentists and opticians in the last twelve months. The survey also asked about nights spent in hospital over the same period.

Table 8.1: Use of Specific Health Care Services in 12 Months Previous to Interview in 2001

Service	% Visiting N Times							For Those with 1+ Visits
	0	1-5	6-10	11-20	21-50	50+	Mean	Median
Inpatient Nights	88.0	6.2	2.9	1.6	1.0	0.3	9.68	5
Doctor Visits	26.2	55.8	9.2	7.6	1.0	0.2	4.75	3
Dentist Visits	56.4	42.2	1.1	0.3	0.1	0.0	1.87	1
Optician Visits	71.0	28.9	0.1	0.0	0.0	0.0	1.27	1
Outpatient	75.4	22.0	1.8	0.6	0.1	0.1	2.87	2

Using this information we gain a relatively detailed picture of utilisation in the last year and give some descriptive statistics on utilisation in Table 8.1. This shows that the vast majority (88 per cent) of people did not have any in-patient care in hospital in the last year. Of those that did, the largest proportion had between 1 and 5 nights in hospital with the average for those who experienced 1 or more nights being just almost 10. This is pulled upward by the small proportion of respondents who experienced high numbers of nights in hospital as can be seen from the 'median' statistic (the number of visits for the person half way up the distribution) which is 5 nights.

For visits to the general practitioner, on the other hand, the 2001 data show that almost 74 per cent see a doctor at least once in the year, with 56 per cent attending between 1 and 5 times and a substantial 9 per cent attending more than 10 times in the last 12 months. The mean number of doctor visits for those attending at least once is almost 5 times with a median number of 3.

When we look at visits to dentists, opticians and outpatients we see substantially lower figures with a large 56 per cent not taking their dentists advice and staying away for the year and more than 70 per cent not seeing an optician or attending an outpatient clinic in the last year.

Our central concern is how this pattern of utilisation is distributed across the income distribution, and this can be illustrated by first categorising people in terms of their position by income quintile (i.e. ranking the population according to their income and then dividing the distribution into five equal size groups). With one-fifth of persons in each quintile, we can then look at the share of total utilisation for each service attributable to each. It is important

to control for the fact that some households may have more individuals than others thus all analyses using income in this chapter include an 'equivalisation' factor which divides the household income according to the number of adults and children in the household.[4]

Table 8.2 shows that the bottom 40 per cent, the two lowest income quintiles, have over half of all hospital nights and GP visits. The bottom one-fifth has over 35 per cent of in-patient nights and 36 per cent of all GP visits. When we look at the distribution of dentist and optician visits on the other hand we see the opposite pattern, with over 26 per cent of dentist visits and 30 per cent of optician visits occurring in the top income group. Table 8.2 also shows that the distribution of out-patient hospital services tends to be 'u-shaped' with high proportions in the top and bottom income groups and lower proportions in the middle income groups.

Table 8.2: Shares of Service Utilisation (Defined as Number of Visits in the Last Year) by Equivalised Income Quintile 2001

Income Quintile	Inpatient Nights	GP Visits	Dentist Visits	Optician Visits	Out Patient Visits
Lowest	35.3	36.4	15.8	17.5	22.6
2	21.7	21.3	17.2	16.9	20.1
3	15.4	16.0	19.1	15.9	18.3
4	18.5	13.3	21.8	19.5	14.9
Highest	9.1	13.0	26.1	30.2	24.1

The results in Table 8.2 show that services utilisation varies significantly over different income groups and varies according to which service we focus on. It is clear for instance that lower income groups have higher numbers of nights in hospital and are more likely to visit their GP. Higher income groups on the other hand are more likely to visit the dentist and optician. The distribution of outpatient visits is distributed in a more complex manner across groups. It would be convenient if we had a summary measure of the distribution of service utilisation across income and this is exactly what has been put forward by Adam Wagstaff and colleagues (Wagstaff, Paci, *et al.*, 1991) in the form of the concentration index (CI). When calculated, the CI ranges from –1 to +1 with –1 implying that all service use is among the most disadvantaged and +1 showing that all use is among the most advantaged. A coefficient of zero implies that the service is used equally by all income groups. Table 8.3 gives the CI coefficients for the five service areas examined so far, along with standard errors for the measures and level of significance (i.e. are the coefficients significantly different from zero?).

[4] Here we use the 'modified' OECD equivalence scale which weights the first adult (14+) by 1, all other adults by 0.5 and each child (<14) by 0.3.

Table 8.3: Concentration Indices for Different Utilisation Types (Defined by Number of Visits in the Last Year) 2001

	Inpatient Nights	GP Visits	Dentist Visits	Optician Visits	Outpatient Visits
CI	-0.200**	-0.216***	0.105***	0.128	-0.007
SE	0.058	0.023	0.025	0.081	0.047

Key: *=P<0.05;**=P<0.01;***=P<0.001

The results in Table 8.3 confirm the analyses from Table 8.2 with hospital and GP services distributed in a 'pro-poor' fashion, i.e., having significantly negative CI coefficients). The distribution of GP visits is however marginally more pro-poor than inpatient hospital nights. On the other hand, Table 8.3 shows that dental and optician services are distributed in a pro-rich fashion with strong positive CI coefficients. As expected, the result for outpatient services is almost neutral with a small negative and non-significant CI coefficient (reflecting the 'u-shaped' distribution of outpatient visits.

For primary care services, e.g. GP, dentist and optician services it is also useful to look at the distribution of the probability of any use in the last year, i.e., the extent to which having one or more visits in the last year varies across the income distribution. It could be for instance that whereas the probability of having any contact with primary care is dictated by the characteristics of the individual in question (e.g., their age, sex and preference for care), the number of visits will also be influenced by the judgements of the health professional.

Table 8.4: Concentration Indices for Different Utilisation Types (Defined by whether Visited in the Last Year) 2001

	GP Visits	Dentist Visits	Optician Visits
CI	-0.022***	0.141***	0.081***
SE	0.006	0.013	0.018

Key: *=P<0.05;**=P<0.01;***=P<0.001

Table 8.4 gives the CI coefficients for having one or more consultations with a GP, dentist or optician in the last year. This shows some significant differences to the results in Table 8.3. It is clear for instance that the probability of having any contact with the GP in the last year is not nearly as pro-poor as the number of visits. This suggests that higher income groups also see their GP, but do so less frequently. For dentist visits the new measure is actually more 'pro-rich' suggesting that the probability of any visit is higher among higher income groups. This could also suggest that although lower income groups are less likely to attend the dentist overall, when they do, they tend to have more visits. The new measure proves to be less pro-rich than the measure based on number of visits.

It is clear that health care is not distributed equally across the population, but inequality does not necessarily mean inequity if the level of health need varies across income groups. It could be for instance that the higher utilisation of GP services found among lower income groups results from worse health among these groups. The next section examines the distribution of health across income groups.

8.5 Measuring the Level of Health Need Across Income Groups

Blaxter (1989) has classified morbidity measures as falling into three main types depending on the underlying conceptual model: the *medical*, the *functional* and the *subjective*. The first defines health in terms of deviation from some physiological norm, the second defines ill health in terms of lack of ability to perform 'normal' tasks and roles and the last is defined in terms of the individual's perception. The LII 2000 data includes an example of all three of these different types of measures which we could use, although each has a slightly different relationship to the income distribution. In terms of the medical model, the LII Survey includes a variable on whether the person has chronic physical or mental health problem, illness or disability. It also includes a question which asks whether the respondent has 'cut down' or not done any of the things which they would normally have done due to a physical or mental health problem which allows us to construct a functional measure of limiting illness. The LII Survey also includes a measure based on the individual's subjective assessment in the form of a question asking "in general, how good would you say your health is?" with outcome measures from very good to very bad via fair. Whilst these measures are certainly simple, there is good evidence (for example in Blaxter) that such measures are close analogues of clinically assessed health status and good predictors of outcomes such as mortality.

It is possible to apply the same concentration index methodology to these measures of health as used to measure the distribution of health care utilisation. However, for simplicity we have collapsed some of the outcome categories for the limiting health and subjective health assessment questions. We now measure whether the respondent has any limiting health condition and whether they have "less than good health".

Table 8.5: Concentration Indices for Different Health Measures, 2001

	Chronic Illness	Limiting Health	Less than Good Health	Ill Health Index
CI	-0.223***	-0.218***	-0.727***	-0.028***
SE	0.025	0.043	0.052	0.003

Key: *=P<0.05;**=P<0.01;***=P<0.001

The results in Table 8.5 show that each of the three health measures are concentrated among lower income groups with significant negative CI coefficients. The most negative measure is that for having "less than good health" followed by the chronic illness measures. This suggests that lower income groups have a significantly worse health status than higher income groups and, by inference, a much higher need for health care. If so, this would partly explain why use of inpatient nights and GP care is more likely among lower income groups. However, it may be that each of our observed health variables is, in fact, a flawed measure of an underlying, latent dimension of ill health. If so, it would improve our analyses if we combined each of these 'flawed' measures into a single indicator that summarises health and distils from the three indicators their common component. Adda, Chandola and Marmot (2003)

have suggested a method through which different health indicators can be combined based upon factor analysis and this is the procedure we adopt here. This produces an 'ill health index' (IHI), the CI coefficient for which can be seen in the last column on the right in Table 8.5. The CI for the ill health index is significantly negative, like the other measures in Table 8.5, but less so, primarily because it is a continuous measure on which all income categories score rather than being dichotomous like the other measures in Table 8.5. We use the IHI in the next section of this chapter to standardise for 'health need' and thus to compute an index of the inequity for our different measures of health care. It should be said that the measures of health that we have available are more suited to measuring the need for general medical services than they are for measuring specific health needs such as the need for dentist or optician care. It would be preferable to have specific measures of need for these services, but unfortunately, these are not available in the LII data file. This may mean that our standardisation for health need in Section 8.6 is not as reliable an indictor of inequity in use of dentist and optician services as it is for use of inpatient, GP and outpatient services.

8.6 Measuring Inequity in the Utilisation of Health Care in Ireland

Having examined the distribution of both health care utilisation and health need in Ireland we are now in a position to move on to the measurement of the equity of health care utilisation. Wagstaff *et al.* (1991) have suggested that these concentration indices can be used to derive an overall summary measure of equity, or health inequality measure (HI) which is based on whether utilisation shares across income groups are in proportion to the health need of each income group. If HI is positive this implies that there is inequity favouring the better off and if negative, inequity favouring the worse off.

However, in analysing the impact on income on service use controlling for need, we also need to control for other factors that may confound the relationship. For example, older people are likely to have a worse health status than younger people and are likely to have a lower income than average because of their reliance on pension incomes. If we did not control for age this may artificially increase the association between low income and utilisation.

Given this, here we adopt a more analytical approach by standardising each of the measures of service use to take account of variations in the distribution of sex and age that may confound the relationship between income and usage. Technically we want to estimate the partial correlation of the confounding variables sex, and age on service utilisation conditional on health status. After the concentration index of utilisation has been standardised, the HI index is computed as the unstandardised CI minus the standardised CI. If after this procedure HI is still positive we will have evidence that the distribution of health expenditure is actually skewed toward the better off even when we have controlled for health status.

Table 8.6 gives the results of these analyses. This shows that hospital inpatient nights are distributed in an essentially neutral manner across the income distribution once we standardise for health need. Although the HI index is positive, it is not significantly different from zero. For GP visits on the other hand we see a significantly negative HI coefficient suggesting that lower income groups visit their GP significantly more for a given health status than higher income groups.

Table 8.6: Health Inequality Indices for Different Utilisation Types (Defined as Number of Visits in the Last Year) 2001

	Inpatient Nights	GP Visits	Dentist Visits	Optician Visits	Outpatient Visits
HI	0.07	-0.093***	0.071**	0.186*	0.12**
SE	0.057	0.021	0.024	0.082	0.046

Key: *=P<0.05;**=P<0.01;***=P<0.001

For dentist, optician and outpatient visits on the other hand we see significant positive HI coefficients suggesting that higher income groups have higher numbers of visits controlling for their health status. It is almost certainly true, as mentioned in the last section, that our measure of health need is not really suited to an analysis of dentist and optician services. However, Table 8.6 suggests that a specific measure of dental and optical need would have to be extremely skewed toward higher income groups if it were to counterbalance the higher levels of utilisation among these groups.

As in Section 8.4, it is important to examine the impact which changing the measure of utilisation has on the level of inequity. Table 8.7 gives the HI indices for GP, dentist and optician visits for those having one or more visits in the last year. Although the pro-rich inequity found in Table 8.6 for dental and optician visits remains using a measure of having visited one or more times in the last year, the result for GP visits changes profoundly. Table 8.7 shows that higher income groups are actually significantly more likely to visit their GP once or more than lower income groups for a given health status.

Table 8.7: Health Inequality Indices for Different Utilisation Types (Defined by Whether Visited in the Last Year) 2001

	GP Visits	Dentist Visits	Optician Visits
HI	0.012*	0.109***	0.125***
SE	0.006	0.012	0.018

Key: *=P<0.05;**=P<0.01;***=P<0.001

8.7 Conclusions and Discussion

The complex mix of public and private provision in Irish health care has raised concerns that a person's circumstances and their income in particular may have an influence on if and when they will get treatment. Given the ubiquity of payment in primary care in Ireland and the high levels of health insurance in the Irish population it would seem legitimate to ask whether income has a bearing on the equity of utilisation observed across social groups. As the second section of this chapter made clear, it is possible to define equity in different ways with each having different implications for

measurement. Here we adopted utilisation rather than access as our metric of measurement and 'horizontal equity' as our definition, i.e. equal utilisation of health care for equal levels of health 'need'.

Our results showed that utilisation patterns differ significantly across the income distribution and across different services with hospital inpatient nights and GP visits much more frequent among lower income groups. Dentist and optician visits on the other hand were more frequent among higher income groups. Outpatient services proved to have a more complex utilisation across income groups with higher usage both at the top and the bottom of the income distribution.

Our analysis of the distribution of health need on the other hand showed that lower income groups were significantly more likely to have a worse health status and by implication, a higher level of 'need' for health care services. Combining the level of utilisation with the level of need across the income distribution we found that the heavier use of inpatient services among lower income groups is largely counter-balanced by the higher level of need among lower income groups leading to an essentially neutral outcome. This result presents something of a paradox. It is clear that waiting lists for hospital treatment are a problem in Ireland and it is likely that it is lower income groups (i.e., those without medical insurance) who dominate these lists. It would be logical that the differential in waiting times would lead to higher utilisation among higher income groups, but this is not what we observe. It may be that the higher level of need among lower income groups leads to lower income groups making up a far higher proportion of the overall case load for Irish hospitals and this then leads to the patterns for equity we observe.

We also found higher levels of utilisation for lower income groups for GP visits, a pro-poor distribution which remained even once we standardised for higher levels of need among lower income groups. Interestingly however, a measure of use based on having one or more visits in the last year was not nearly as skewed toward lower income groups and the measure based on number of visits. Once we standardised for health the former measure yielded a significantly pro-rich distribution. This suggests that higher income groups are actually more likely to have visited at least once in the last year than lower income groups (for a given level of health), but that lower income groups visit more frequently when they are ill. Once again this presents a paradox. As we noted earlier, GPs have an incentive to promote visits among private patients (called 'supplier induced demand') because private patients pay per visit whereas GPs are paid a set amount per GMS patient on their register. Our results suggest that this incentive has no basis in reality with public patients actually more likely to visit.

However, one solution to this paradox is suggested by the results for the alternative measure of GP utilisation and for outpatient treatment. The patterning of use for these services may be related through differential waiting times for secondary care. It is now well established that public patients in Ireland wait far longer for care

than private patients (the waiting period is the primary reason given for purchasing medical insurance, c.f Nolan & Wiley 2000, and since lower income groups are far less likely to purchase medical insurance it is these groups that make up the waiting lists for public care. Longer waiting times for specialist care among public patients could mean that they end up having more visits to their GP to deal with chronic problems whilst private patients with lower waiting times simply see their GP once to get a referral to the specialist and so have fewer visits overall. This would explain the differential findings for different measures of GP utilisation and the higher level of utilisation for outpatient care among higher income groups.

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9. HEALTH INTERVENTIONS AND RISKY BEHAVIOUR

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9.1 Introduction

We are all familiar with health interventions designed to combat specific diseases or conditions which may arise. Typically an individual feels unwell, or notices something is amiss with their health. For simple and familiar conditions they may self-medicate, but for more complex conditions they will typically attend a General Practitioner (GP) who will recommend an intervention or else refer them to a specialist who in turn may recommend an intervention.

The situation we have just described refers to interventions designed to deal with specific conditions with the patient deciding upon the treatment or if they feel they do not have sufficient information, referring the treatment to someone with superior information. In these situations, governments may be involved in the provision or funding of GP and/or specialist services, but it is clear that in principle such services could also be provided by the private market (though of course there may be very important issues regarding affordability and access to services).

However, there are other areas where governments intervene in health issues and one of these is the extent to which they may attempt to dissuade individuals away from what is perceived as risky behaviour. Governments engage in a variety of interventions designed to reduce or eliminate certain actions and it is the analysis of these actions which forms the subject matter of this paper. We start off by attempting to motivate these interventions from the perspective that they arise owing to government attempts to correct market failures. Taking this perspective, we try to identify what can be regarded as first-best and second-best responses to such failures (the precise definition of first- and second-best will become clearer later in the paper). We then take a more detailed look at interventions in three specific areas of risky behaviour, smoking, drinking and diet. In so doing we will draw upon Irish and international evidence and also evidence arising from the project *The*

Provision and Use of Health Services, Health Inequalities and Social Gain. We start off, however, by describing first of all what exactly it is we mean by market failure in the context of risky behaviour.

9.2 Market Failure and Risky Behaviour

One of the most basic results in microeconomics, the First Fundamental Theorem of Welfare Economics (see Debreu, 1954), broadly states that, under certain conditions, there is no justification for government intervention in the economy and that firms and consumers, if left to their own devices, will bring about a competitive equilibrium with optimal (in a very restricted sense) properties. The specific conditions under which this result holds are mainly to do with all agents in the economy being too small to affect prices in any market (hence they are all price-takers), perfect information for all agents, and the provision of a full set of markets. The conditions under which the Theorem holds are highly unrealistic, but they serve to offer a reference point, which enable us to identify situations under which government intervention can lead to an improvement in welfare. In particular, it is the failure of the latter two conditions to hold (perfect information and a full set of markets) which typically provide the justification for intervention in the area of risky behaviour.

To motivate this intervention more fully, perhaps it is worth first of all considering the case of no intervention. Economics typically stresses the concept of sovereignty of the consumer. Thus in a world of perfect information and full markets, the optimum situation is where consumers weigh up the costs and benefits of all activities (including risky ones) and then participate in these activities or consume these commodities to the point where the marginal benefit just equals the marginal cost. In this world there is no justification for any intervention by government or any other agency.

For the consumption of some goods and for some activities, the real world may provide a close enough approximation to the mythical "no intervention" world described above and in this case the optimal outcome probably is that of little or no intervention. For example, it seems unlikely that there is a justification for much government intervention in the market for many household goods. Individuals make their choices with little or no regulation by government.

For the types of goods and services associated with risky behaviour however, market failure as broadly defined above may be more likely to arise. Let us examine first of all the issue of information. For some risky behaviour, information available will not be perfect. What is perhaps more important is that the consequence of lack of perfect information for risky behaviour may be far more severe than for other goods. The cost to a person of buying the wrong shirt or pair of trainers is somewhat less than that of say, an unwanted teenage pregnancy, or the cost of smoking for a prolonged period believing that it has no adverse health consequences.

Economic theory suggests that when a market failure is observed then the optimal intervention is to deal with that failure directly at source (this is sometimes referred to as the "first-best" intervention). Thus if there is a failure of information, the optimal response is to provide better information. Hence, the resources devoted to explaining the health consequences of such risky activities as smoking and drinking. Often these information campaigns are particularly directed at younger people, since younger people appear to be more prone to such risky activities (we return to the particular issues associated with younger people and risky behaviour below).

However, even when such information is made available, there may be another form of failure in that people may not be able to respond optimally to such information. This can most typically arise in the case of risky behaviour associated with addictive goods such as tobacco and alcohol. For example, there is evidence that people in general, and young people in particular, underestimate the addictive nature of tobacco and overestimate their ability to quit in the future. Gruber (2001) provides evidence from high school students in the US. When interviewed, 56 per cent of those who smoked said they would not be smoking in 5 years, but only 31 per cent in fact did quit. Also among those who smoked in excess of one pack a day, the smoking rate five years later among those who stated they would be smoking (72 per cent) was less than for those who stated they would not be smoking (74 per cent).

The implications of this type of market failure are that when assessing the costs and benefits of an activity such as smoking (over the medium to long term) consumers underestimate the costs (since they assume that they will quit smoking much earlier than in fact they do, if they manage to quit at all). The celebrated "rational addiction" model of Becker and Murphy (1988) assumes that consumers sit down at the beginning of their lives and rationally assess the costs and benefits of addiction. According to their model those who become addicts do so as a matter of choice and should they subsequently decide that the costs of addiction outweigh the benefits, then they will quit. The evidence cited above plus addicts' recourse to quitting aids such as nicotine patches for smokers and support groups such as Alcoholics Anonymous for drinkers, suggest that the Becker-Murphy model fails badly in terms of trying to explain quitting or controlling addictive behaviour, whatever about the insights it may offer into other aspects of addiction.

Another way in which the provision of better information may not work optimally is that individuals may differ in their response to such information. Thus, when information about the negative consequences of smoking became generally available around the mid-1960s (the landmark event here was probably the publication of the 1964 Surgeon General's Report in the US entitled *Smoking and Health*) smoking rates did decline. However, the decline was far from uniform across the population. It was observed that the bulk of the decline occurred among the better educated (see Farrell and Fuchs,

1982 and Townsend, 1987). The key point here is that even when what appears to be the optimal intervention is available, its efficacy may not be uniform across the population. In such a case it may be desirable to supplement this intervention with additional "second-best" interventions.

The other area where market failure may occur is where private costs/benefits of a good or activity may differ from the social costs/benefits. In general for most goods it is the case that private and social costs/benefits of consumption are approximately equal. For some goods, however, it may be the case that the social costs/benefits of consumption differ from the private costs/benefits. An example of a good where the social benefit may exceed the private benefit is vaccination against an infectious disease. Vaccination provides a private benefit to the person receiving the vaccine as it decreases the probability they will contract the disease. However, if the disease may be passed from person to person, there is also a further benefit to society in that the probability that other people will contract the disease has also fallen.

Similarly, it can be argued that the social costs of goods such as alcohol and tobacco exceed the private costs. Another way of expressing this is that when an individual, say, smokes a cigarette they incur private or *internal* costs. However, since smoking will also confer costs on non-smokers (these are known as *external* costs) there will be a divergence between private and social costs. Essentially what is happening here is a market failure, since the market on its own does not bring about the equality between social costs and benefits at the margin. The precise nature and magnitude of these external costs for smoking and alcohol can be difficult to ascertain but the implication is that since individuals will consume up to the point where private costs and benefits are equal at the margin, then, in the absence of any intervention, the privately optimal level of consumption will exceed the socially optimal level. Some form of intervention is thus needed to bring about the equality of private and social costs.

The first best intervention to correcting the divergence between private and social costs would involve some form of side-payment between the individual engaging in the risky activity and those who are bearing the external costs. Thus in the case of smoking, the smoker makes a payment to all those who incur external costs arising from his smoking and this brings about an equality between private and social costs of smoking (this type of solution is associated with the Nobel prize winning economist Ronald Coase). While attractive in principle, and possibly workable in the case of smoking with a small number of people where drawing up the "contract" would be feasible, it would be impossible to generalise this to cases where there would be a large number of passive smokers. In the case of other risky behaviours however, the external cost may be once-off and severe rather than incremental. Thus side-payments may be feasible when the external cost is in the form of

passive smoking, but not when it is in the form of a serious road accident arising from drink-driving.

An alternative approach would be to place limitations on where people can engage in the risky activity and thus minimise the external costs. Thus in the case of smoking we see workplace bans, bans on smoking in public places etc. One of the attractive aspects of such policies is they may involve only a limited curtailment of smokers' "rights". Thus there is no absolute ban on smoking, but smokers are confined to smoking in places where the external costs are minimised. The effect of such bans on overall smoking is unclear. If smokers compensate for the smoking they would have carried out in a public place by increasing their smoking in private places to the same degree, then overall smoking will be unchanged. However, if private and public smoking are not perfect substitutes then overall smoking is likely to fall. Anecdotal evidence regarding the initial impact of the workplace ban on smoking in Ireland introduced in 2004 suggests that overall smoking consumption will fall as a result of the ban. Bear in mind, however, that from a strictly economic perspective the only "gain" is in the form of the reduced external costs. While the public health perspective would no doubt welcome the fall in smoking, from the economic perspective, the "optimal" level of smoking is not zero, merely that rate which equates social costs and benefits.

Some people may find this last point unconvincing on the basis that for any level of smoking (or drinking or poor diet for that matter) there will be costs in terms of treatment arising from smoking-related diseases, costs which may be borne to some extent by the taxpayer. The counter to this argument is that since smokers typically die younger, there will be offsetting gains to taxpayers in terms of public pension payments and other medical care costs arising from old age. This is a contentious area, as it seems to suggest that in drawing up a form of balance sheet for the costs associated with smoking, the premature deaths of smokers appear as a public "benefit", particularly since smokers tend to be less productive workers and may well die just after retirement. It seems fair to say that many people would have grave ethical reservations about such an approach. The key point here is that regardless of how medical costs and savings for smokers balance out or not over the lifetime, the principal costs arising from smoking are the years of lost life of smokers. But are these costs internal or external, particularly if smokers are possessed of full information? This clearly is a thorny issue and the reader is referred to Madden (2002a) for a more detailed discussion.

An alternative approach to solving the market failure associated with external costs is to apply a tax, sometimes called the "Pigovian tax", the size of which is determined by the gap between private and social costs. Applying this tax will bring about an equality of private and social costs and hence the socially optimal level of consumption will be achieved. Formally, this is quite similar to the Coasian

solution outlined above, except that instead of paying the external costs directly to those people who bear them, now these costs are paid to the government. The Pigovian approach has little to say about what happens to the tax revenue thus collected. Thus while both approaches bring about the socially optimal level of smoking in the sense that the smoker pays the external costs, the difference lies in who actually receives these costs.

It is important to bear in mind that the reason for the application of a Pigovian tax is the market failure arising from the lack of equality between private and social costs. It does not arise from the private or internal risks associated with the consumption of alcohol or tobacco. As an illustration of this, we observe Pigovian type taxes on a good such as petrol. It seems fair to say that this does not arise owing to the private risks associated with driving (there are extensive information campaigns and road safety regulations to address these issues) but rather because of the social costs associated with pollution. Similarly, a risky area such as diet does not attract a Pigovian tax, though there have been suggestions of a so-called "fat-tax". This is because while there may be information issues regarding diet, it seems less plausible to suggest that the social costs of poor diet exceed the private costs. We discuss this in more detail below.

Before analysing the specific measures taken in Ireland to address risky behaviour, there are two other issues worthy of discussion. The first of these is the extent to which people truly take on board the internal costs of risky behaviour and second, whether risky behaviour amongst young people should be a cause of particular concern.

In the discussion so far it has been the maintained assumption that consumers are rational, even though they may not be fully informed. Market failures have generally focused on information failures and divergence between private and social costs. However, while consumers' preferences may be rational at any given point in time, they may not be *consistent* over time. This can have a crucial bearing on attempts to reduce or control risky behaviour and may have radical implications for the extent to which people engaging in such behaviour take full account of the internal costs of the behaviour. In turn this has radical implications for strategies to control such behaviour.

An activity such as smoking, drinking or eating fatty food involves an immediate pleasure which may have a health consequence in the future, and thus the degree to which current pleasures and future costs are traded-off is a key element in the decision to smoke/drink etc.[2] When agents engage in activity which has costs and benefits spread out over time, then the rate at which

[2] The situation with regard to drinking is somewhat complicated by the fact that moderate drinking appears to have health benefits. In the discussion which follows it will be assumed that we are dealing with excessive drinking.

costs/benefits in one period are traded off for costs/benefits in another period is crucial. The standard approach in economics has been to assume that agents are time-consistent in their preferences applying what Frederick *et al.* (2002) call the discounted utility (DU) model. Thus utility at future periods is discounted at a constant rate i.e., if utility tomorrow is worth only 99 per cent of utility today then utility 10 days from now will only be worth 99 per cent of utility 9 days from now.

However, there is substantial evidence that agents apply a *higher* discount rate to events in the very near future and are thus more present-orientated than the standard DU model would predict. This will give rise to time-inconsistency of preferences. Think of the child who in mid-August is relatively indifferent as to whether Christmas falls on December 25 or December 26. On the night of December 24 that child is likely to be far from indifferent as to whether Christmas falls in one or two days time. There is an extra impatience attached to the immediate event. A similar argument can be applied to decisions to quit an activity such as smoking. Well-meaning decisions to quit smoking say in the New Year or Lent may be made, but when the actual quitting day comes around, it may prove much more difficult to quit and quitting may be postponed until the next period, when the same arguments will apply again, implying that quitting may be postponed indefinitely. Thus my preferences are time-inconsistent in the sense that the original decision to quit is not followed through. As Gruber (2001) points out and casual evidence suggests, unrealised intentions to diet or quit smoking and drinking are a common feature of stated preferences. The use of self-control devices (such as making bets with friends or joining diet clubs etc.) are also indirect evidence of time inconsistency, since in the absence of such time inconsistency there would be no need for the self-control device. Note that in the case of smoking such self-control strategies are not to be confused with quitting aids such as nicotine patches.

So what relevance does this have for strategies to control risky behaviour? If preferences are time inconsistent, then another form of market failure has been introduced since not only do smokers impose external costs on non-smokers, they also impose *intrapersonal* externalities or "internalities" upon themselves. In other words smokers do not fully take account of the costs they are imposing upon themselves when they smoke and clearly the same could apply to heavy drinkers or eaters.

What form of control strategy should be adopted here? One possibility again is to use taxation to bring about equality between private costs and private costs taking account of these internalities. Another way of looking at this is that government tax policy is effectively acting as the self-control device which time-inconsistent agents need to help them control their habits. However, the implications for tobacco and alcohol taxation are potentially enormous. For example, in the case of tobacco Gruber and Koszegi

(2001) estimated the internal costs of smoking a packet of cigarettes to be $30. Adjusting for exchange rates and inflation, if taxation was to correct even 10 per cent of these internal costs then current tobacco taxes in Ireland would need to be doubled. It seems likely that the magnitude of tax increase with regard to alcohol would be similar. Regarding fatty foods, there would now be a clear justification for a "fat-tax" which might be quite substantial. Such dramatic tax increases are unlikely to be practical for most countries, so what other possible control strategies are there?

One possibility is to alter the *timing* as opposed to the level of taxation following the suggestion of O'Donoghue and Rabin (2000). Thus, continuing with the example of smoking, instead of increasing the price of cigarettes by, say, 50 cents, governments could instead leave the price unchanged but insist that to buy cigarettes a person must pay an upfront fee of €500 for a form of smoking licence. Since €500 is less than 50 cents per day over three years someone who is truly committed to being a long-term smoker would prefer the upfront fee.[3] However, someone who originally intends being a short-term smoker but who, via self-control problems becomes a long-run smoker, might be deterred from starting smoking. Since risky behaviour such as smoking involves short-term benefits and long-run costs, providing short-term rewards for good behaviour (or equivalently in this case a very costly short-term penalty for bad behaviour) may be effective.

Other possibilities, along similar lines, suggested by O'Donoghue and Rabin (2003) and Bhattacharya and Lakdawalla (2004), are that individuals can commit their future selves to different tax regimes. Thus someone who believes they will have a future self-control problem with cigarettes, alcohol or fatty foods can commit themselves to a high tax regime. The advent of smart cards and computer based purchasing makes such schemes more feasible but there could clearly be monitoring problems in terms of getting other people to buy on your behalf. However, such problems would be arguably no worse than is the case with under-age drinking/smoking.

One feature of the above schemes is that neither of them imposes any penalty upon those individuals *without* self-control problems who choose to become smokers (or burger addicts or whatever). There is no coercion involved whereby committed smokers are forced to pay more for their cigarettes. These are examples of what Thaler and Sunstein (2003) label *liberal paternalism* whereby it is recognised that in some cases …*individuals make inferior choices, choices which they would change if they had complete information, unlimited cognitive abilities and no lack of willpower* (Thaler and Sunstein,

[3] This approach is reflected in the decision to phase out cigarette packets containing only ten cigarettes. Since many young people who may be considering starting smoking may be income constrained, being forced to buy cigarettes in packs of twenty acts as a form of upfront fee or barrier.

2003). Another way of looking at this is that in the examples above, effectively the government, via the tax/licence regime, is creating a market in self-control, a market which was previously missing.

Another possibility is to return to a Coase type solution. Recall that the problem there was the practical difficulty of organising some form of binding contract between the smoker/drinker and those bearing the external costs. In the case of "internalities" the two parties to the contract are the same person! More accurately, they are the two different sides of the same person: the health-conscious individual who would prefer not to smoke and the smoker who is constantly trying to undermine these best-laid plans. Alternatively, they can be regarded as the long-run preferences of the individual and their short-run (and more impatient) preferences.

So what form of contract could be devised? In the case of smoking one possibility would be for the individual to post a bond of a reasonably substantial amount, say €1,000, with another party whereby if the individual smokes over a specified period the bond is forfeited. Periodic checks on smoking status could be carried out and after the period, say five years, has elapsed, the person receives back the bond. The third party service could in principle be provided by the private market, but once again there may be incentives for the market to provide a sub-optimal amount so government could provide the service. Interest could also be made payable on the bond. One criticism which could be made of that scheme is that those parties who would have most to gain, the young, would not have the financial resources to provide the bond. In this case there could be some argument that instead of the individual providing the bond, the government could undertake to make a payment to all individuals on their 25th birthday, providing they had not started smoking (recalling the "pledge" regarding alcohol which many Irish children make, or used make, at Confirmation!). The upper bound of the cost to the State of this scheme would be in the region of €60 million per annum (based on a payment of €1000, a steady state of 60,000 births per annum and no "default"). Given the potential benefits to the scheme it does not appear to be an overly expensive investment. For other examples of the use of financial incentives in smoking cessation see Donatelle *et al.* (2000) and Roll and Higgins (2000).

The scheme outlined above is probably more feasible in the case of smoking rather than drinking or eating fatty foods, as detection of nicotine in the body may be more feasible than for other substances. There could also be suggestions that the checking for the presence of such substances would be an infringement of civil liberties. If the posting of the bond was to be purely voluntary, then there may be a danger of a reverse adverse selection problem whereby only the good risks apply (i.e. those who would not smoke anyway) and the impact upon smoking would be negligible.

Before concluding this section it is worth pointing out that the schemes outlined above may have particular relevance for younger

people. In general it seems reasonable to suggest that on average younger people engage in more risky activities than do older people. Such risky activities may take the form of binge drinking, fast driving, unprotected sex, petty and/or serious crime and smoking (see Gruber, 2000). These behaviours may be accounted for by young people being in general more myopic i.e. they discount the future at a higher rate, or are more present-oriented. They are also more likely to be time-inconsistent in the sense outlined above and finally they may be less likely to be aware of these problems and hence try to avail of self-control devices. Curing these market failures once again may involve a combination of education and advice programmes and also the type of control strategies and contracts which encourage a greater congruence between short-term desires and long-run interests.

We now turn to examining in more detail some of the specific strategies adopted in Ireland and elsewhere to control risky behaviour in the three selected areas, smoking, drinking and diet.

9.3 Evaluation of Control Strategies for Specific Behaviours

In this section we examine and evaluate some of the specific control strategies adopted for the selected subset of risky behaviours, smoking drinking and diet. In this analysis it is useful to think in terms of what economists often refer to as the "full price" of any activity. Thus in the case of smoking the full price would include not just the monetary cost of smoking, but also the cost in terms of future health problems. In the case of excessive drinking the full price would also take account of factors such as the probability of detection and conviction for an activity such as drunk driving and the penalties associated with such convictions. We initially discuss the case of smoking.

9.3.1 SMOKING

As outlined in the previous section, specific interventions in the area of smoking may be directed at issues to do with information and also market failure. The situation regarding information may relate to either a lack of perfect information, or else perhaps an inability to act on such information. The first best solution is thus to provide the best possible quality information to potential smokers. Publicly provided information campaigns concerning the adverse health consequences of smoking have surely played a major role in bringing about long-term decline in smoking rates in many higher-income countries (Warner, 1977). Publicly provided research which expands knowledge concerning the effects of smoking would also be regarded as a first-best intervention. The argument for such research being publicly funded is that there are reasons to believe that the private market would provide a sub-optimal amount of such research (because the social benefits of such research outweigh the private benefits).

Other forms of regulation and control addressing the information issue, which are not perhaps first-best, might include

advertising bans. An advertising ban is arguably not a first-best solution since, rather than providing information about a product, it is preventing a supplier from providing information or awareness of their product. Only if a supplier were telling outright lies concerning their product could such an intervention be described as first-best.

As well as addressing the second form of market failure via the provision of the best quality information, tobacco cessation programmes might also be used. Since quitting smoking brings about private benefits, the private market will clearly provide this service up to a point. However, given that the social benefits of quitting outweigh the private benefits it can be argued that the private market will provide a socially sub-optimal degree of cessation and so intervention can be justified. The precise form of these programmes may vary. For example, quitting aids such as nicotine patches could be subsidised. Support services such as counselling could also be provided. In a review of smoking cessation therapies, Warner (1997) concluded that even the most expensive forms of therapy were highly cost-effective compared to the majority of medical practices which had been studied (for some recent evidence regarding the effectiveness of web-based smoking cessation therapies in Ireland see Strecher *et al.*, 2005).

In terms of perhaps the principal market failure associated with smoking, the divergence between private and social cost, assuming that the Coase solution is not practical, then the principal strategy to be adopted is taxation. As a method of tobacco control, taxation may be regarded as a "second-best" solution. In some cases it may be a rather blunt instrument e.g., it does not distinguish between different types of smokers even though the degree of market failure may differ. However, even while economic theory recommends first-best solutions where possible, it is very often the case that second-best solutions have to be adopted. In this regard taxation may perform an effective, though blunt, role in addressing the market failures we have outlined. For example, adolescents who may not fully take on board the health and/or addiction risks associated with smoking may be very susceptible to a high rate of tax (though this greater sensitivity of young people to tobacco taxes has been questioned by De Cicca *et al.*, 2002).

In general, higher taxes appear to be an effective strategy to reduce tobacco consumption. There is a substantial body of literature to testify that the demand for cigarettes clearly responds to changes in prices (see the comprehensive review by Chaloupka and Warner, 2000) with most estimates of the magnitude of this response being around about -0.4. Thus a 10 per cent increase in price gives rise to approximately a 4 per cent decrease in consumption, although depending upon the nature of the data available it is not always clear whether this decline represents fewer people smoking, or lower rates of smoking amongst smokers. To make this distinction it is necessary to have individual level (as

opposed to aggregate level) data on smoking and unfortunately such data is sometimes hard to find, especially for Ireland.

Evidence for Ireland is broadly in line with these findings. A variety of models of tobacco consumption have been estimated mostly using aggregate time-series data dating from O'Riordan (1969) to Madden (1993). These studies have produced broadly comparable results with a median estimate for the price elasticity of tobacco in the region of -0.5. However, the use of aggregate time-series data precludes distinguishing between the effect of price on the probability of smoking and on the demand for cigarettes conditional on smoking. Conniffe (1995) remedied this to some extent by combining analysis of aggregate time-series data with data on the proportion of the total population who are smokers. He found that the proportion of the population smoking is unaffected by price (or income) but exhibits a downward trend related to health concerns. Consumption by smokers does not exhibit such a downward trend but appears to have a significant price elasticity of around -0.3.

More recently, in a study associated with the project *The Provision and Use of Health Services, Health Inequalities and Social Gain*, Madden (2007) constructed a longitudinal data set based upon responses regarding starting and quitting dates for smoking for a sample of Irish women. He then matched these responses with tax data for the years in question and used duration analysis to examine the extent to which higher taxes delayed the transition to starting smoking and/or hastened the transition to quitting smoking. Probably the major innovation in the paper was that rather than using aggregate time series data which is unable to distinguish between the number of people who smoke and the number of cigarettes smoked conditional upon smoking, this study used individual level data. The results show a limited response to tax increases and also show some heterogeneity across the response by educational background.

One criticism which has been put forward regarding high rates of taxation on cigarettes is their regressivity. Analysis of household budget data indicates that consumption of cigarettes is concentrated mainly amongst lower-income groups and these is frequently put forward as an argument against high taxation of tobacco since it is argued that high taxes on cigarettes impose an unfair burden on the less well-off.

However, it can be argued that cigarette taxation is not necessarily as regressive as might be thought at first glance. Becker and Murphy (1988) make the distinction noted above between the money and health price of smoking (together these constitute the full price). Their model predicts that individuals who are very present oriented are more likely to be sensitive to the money price while people who are more future oriented will be relatively more sensitive to the health price. It is typically believed that the degree of future orientation is positively correlated with education levels, suggesting that lower-income groups, with less education, will be

more sensitive to the money price (i.e. tax on cigarettes). In that case, higher taxes are less likely to impact upon these groups since they will cut back on their smoking. The bulk of the burden will be borne by higher income groups. Evidence for the US indicates that demand elasticities for lower income groups may be up to four times greater than for high income groups (see Evans *et al.*, 1999) while Townsend *et al.* (1994), using UK data, found that men and women in lower socio-economic groups are more responsive than are those in higher socio-economic groups to changes in the price of cigarettes and less to publicity concerning the adverse health effects of smoking. Borren and Sutton (1992) find evidence of an "inverse-U" relationship in terms of price responsiveness, with a higher elasticity for middle-income men compared to lower and higher-income men. Their evidence for women, while less clear cut, appears to indicate that elasticity declines as income increases.

The evidence for Ireland on this issue is not entirely clear cut. In the study referred to above Madden (2007) found some evidence of an "inverse-U" effect of taxation on the probability of starting smoking. The strongest effect of taxation was observed on those with intermediate levels of education with weaker effects for those with the most and the least education. The evidence showed no clear relationship in terms of quitting smoking.

9.3.2 DRINKING

In examining specific interventions concerning the adverse effects of drinking, we once again review the choice between different second-best options. The costs of excessive alcohol consumption include health consequences such as cirrhosis of the liver and damage to other organs (though there is evidence that moderate alcohol consumption may have a protective effect for certain conditions). There are also costs relating to road accidents, industrial and personal accidents (e.g. drowning), violence and public order. There may also be losses associated with productivity (although the evidence is not entirely clear cut here, see Mullahy and Sindelar, 1996). As with smoking, the distinction between internal and external costs is important, and from a public policy point of view, it is arguably external costs which are of most relevance.

In terms of interventions which can be used to address these costs it may be useful to distinguish between direct and indirect interventions. Taking drink driving as an example, we can think of policies which directly influence the cost (price) of drink-driving and so can be expected to reduce the demand for drink-driving. These policies would address the probability of detection, the probability of conviction given detection and then the expected penalty, given conviction. In effect by increasing the full price of drink driving, the demand for drink-driving is reduced.

An alternative approach to reduce the demand for drink-driving is to reduce the demand for goods which are complementary to drink-driving (in this instance the good in question is alcohol itself,

since clearly there must be a demand for alcohol in order for there to be a demand for drink-driving). This principally involves alcohol control policies such as changes in the minimum age of drinking or increases in the price of alcohol. These policies do not directly affect the demand for drink-driving since not all young drinkers (those affected by the minimum age laws) will drink and drive, while not all drinkers (those affected by increased price of alcohol) will drink and drive.

Both approaches have benefits and costs. The benefits are clearly the reduced deaths and injuries arising from road accidents involving alcohol. The costs of the direct approach involve the resources required to detect, convict and then punish drink-drivers. The costs of the indirect approach are the deadweight losses associated with the higher price (tax) on alcohol above what standard tax considerations would warrant.

One problem with the use of taxation in this regard is that conventional alcohol taxes such as excise taxes do not discriminate with respect to "harmful" and "non-harmful" drinking. As Cook and Moore (2000) point out, a 21 year old man who drinks seven beers and then drives home pays the same tax as a 40 year old woman who drinks one beer with her dinner each night. Applying high tax rates to harmful drinking only would imply discrimination in tax rates according to the age of the consumer, where the product is consumed, the amount consumed per unit of time and other circumstances. Price discrimination is present for some goods (witness the different costs of insurance by age and gender). While it may be possible to conceive of some types of tax discrimination (in the same way that individuals could choose their own tax regime to impose a form of self-control), it is likely to be very difficult to apply such tax discrimination in practice.

There is some evidence on the relative costs of the direct and indirect approach for the US. Kenkel (1993) concludes that the direct approach may be slightly more cost-effective to achieve a given reduction in alcohol related road fatalities, but he acknowledges that given the degree of uncertainty surrounding the figures, this conclusion is tentative rather than definitive. It is also worth bearing in mind that the indirect approach of general alcohol control would also reduce other external costs arising from alcohol, such as public order offences.

Carpenter *et al.* (2007) also compare the effectiveness of policies using the Monitoring the Future dataset. They conclude that direct effects such as increases in the minimum drinking age and "zero-tolerance" approaches are effective in terms of reducing youth drink-driving. The effect of increases in alcohol price is more difficult to evaluate, mainly owing to the lack of sufficient variation in alcohol prices. Results tend to be sensitive to choice of time period and omitted state-level heterogeneity (i.e. those States which impose high alcohol taxes tend to be those which are "drinker-

unfriendly" in unobservable ways and it is not possible to distinguish the effect of alcohol prices from these unobserved effects).

Is there any evidence regarding the effect of interventions for Ireland? The literature concerning the effectiveness of alcohol control policies on alcohol related problems in Ireland is relatively scarce. Honourable exceptions include Walsh (1987, 1989) and McCoy (1992) and Conniffe and McCoy (1993). Perhaps the most relevant for this review is the paper by Walsh (1987) which examines the extent to which higher excise taxes (on alcohol) can save lives through reducing deaths from alcohol related causes. The conclusion is that a relatively small number of alcohol related deaths would be averted via higher excise taxes.

Other studies which have some relevance to this issue are those of Madden (1992, 1993), Thom (1984) and Eakins and Gallagher (2003) who study the impact of price on alcohol consumption in Ireland. Madden (1992) calculates a range of demand elasticities for alcohol from systems of demand equations (i.e., elasticities are calculated simultaneously for a range of goods taking account of cross dependencies of demand). The calculated elasticities show quite a wide range with median values of around -0.7, indicating that alcohol consumption is sensitive to change in price. Thom (1984) presents disaggregated demand elasticities for various categories of alcohol and reports a range of elasticities from -0.6 for beer to -1.3 for spirits and -1.6 for wine. More recently Eakins and Gallagher (2005) also report disaggregated elasticities for alcohol and distinguish between short and long-run response to price changes. Their results are very similar to Thom and Madden with long-run elasticities of -0.7 for beer and spirits and -1.6 for wine. Consistent with the Becker-Murphy model they find ling-run elasticities to exceed short run elasticities. Finally, Madden (1993) attempts to calculate the external costs implicit in the indirect tax system for three goods, tobacco, alcohol and petrol i.e., given the relatively high tax rates on these goods, what degree of external costs would render the existing tax system optimal. The study finds that such external costs do appear to be embodied in the Irish tax system but the imprecision of the estimates makes it very difficult to infer the exact level of these costs.

One feature of the above studies is that they all employ aggregate time-series data and so are unable to take account of the heterogeneity of factors affecting individual level consumption of alcohol. Madden (2002b) examined the factors affecting smoking and drinking for a sample of Irish women. Unfortunately, there was no price variation in the data so it was not possible to estimate demand elasticities using individual level data. The results did seem to suggest, however, that a qualitative distinction could be drawn between moderate and heavy drinkers in a way that cannot be done for smokers. Overall, evidence on demand response by level of drinking is mixed. Manning *et al.* (1995) found that moderate drinkers showed the greatest price response compared to "light" and

"heavy" drinkers who showed elasticities closer to zero. This contrasts, however, with the evidence from Kenkel (1993) and Saffer (1991) who appear to show higher price elasticities amongst heavier drinkers. The evidence for a greater response by heavy drinkers appears to be more conclusive in the case of young drinkers on the basis of the review by Grossman *et al.* (1994). It is also noteworthy that the harmful consequences associated with heavy drinking such as cirrhosis of the liver and drink driving and crime do appear to be sensitive to changes in the full price of alcohol (Pacula and Chaloupka, 2001).

Overall, the evidence for alcohol is similar enough to that for tobacco. Despite the addictive nature of both goods and the consequent possibility that they would be unresponsive to changes in price (whether monetary or full) there is ample evidence of significant demand responses.

9.3.3 DIET

The final aspect of behaviour which we examine with regard to health interventions is diet. In this regard we are primarily concerned with obesity and the possibility that economic interventions might be used to influence the level and composition of food intake. Ireland has shared in the growing international concern over obesity levels (for a European perspective see Lang and Rayner, 2005, while for a US perspective see Cutler *et al.*, 2003). Given the well-documented socio-economic gradient observed in obesity (see for example, Drewnowski and Darmon, 2005), it seems likely that economics may be able to make useful contributions in this area.

Before examining possible economic interventions in this area, it is worth pointing out also that economics has much to contribute to the measurement of obesity. Since the measure of obesity concerns both the identification of those who are obese (typically via having a body mass index in excess of a given threshold) and the aggregation of this information into a meaningful index, it shares much in common with the measurement of poverty. This is discussed in greater detail in Jolliffe (2004) and, in work directly associated with this project, Madden (2006a).

Turning now to possible economic interventions to influence diet, once again we concentrate on "second-best" interventions, bearing in mind that arguments concerning first best interventions such as the provision of optimal information apply with the same force in this case as with tobacco and alcohol. It is arguable that the justification for intervention in the instance of diet is less compelling than in the case of tobacco or alcohol. This is because it is external effects such as passive smoking or drink driving that are less easy to identify in the case of diet. However, if it is believed that issues of "internalities" and self-control apply in the case of diet, then a case for intervention can be made.

Probably the most celebrated intervention, which has been suggested in the case of diet is the use of taxation to change the

relative price of different foods, thus altering the composition of diets. Such a policy has often been described as a "fat-tax", which is somewhat misleading as formally the same effects could be obtained by subsidising goods which are low in fat as could be obtained by taxing goods high in fat. A case for such a fat-tax in the UK was put forward by Marshall (2000) who more accurately described it as a fiscal food policy. He identified those goods in the UK diet which most contributed to saturated fat and then examined the effect of imposing VAT at the full rate on these goods. On the basis of estimated elasticities and risk factors (associated with ischaemic heart disease) he then calculated the number of life years saved by the imposition of such a fat tax. His figures suggest that in the UK between 1,500 to 1,800 lives per year could be saved. Marshall's analysis has been questioned on the basis of the food elasticities employed and on the relationship assumed between fat consumption and heart disease (see Kennedy and Offut, 2000).

A more comprehensive analysis of a fat tax was provided by Leicester and Windmeijer (2004). They point out that a pure fat tax in the sense of taxing the fat content of foods could prove highly regressive, since such fat constitutes a greater proportion of the budget of poor families. They also point out some of the practical difficulties involved in implementing a fat tax, not least the degree of lobbying which might arise as different food interests campaign to have their food product excluded. They conclude that there may be scope for limited tax increases on certain goods which are considered unhealthy (e.g. snack foods or fizzy drinks) but that their acceptance might be conditional upon the revenue so raised being spent on other programmes to combat obesity.

The issue of the potential regressivity of a fat tax was taken up by Madden (2006b) in work associated with the project *The Provision and Use of Health Services, Health Inequalities and Social Gain*. He examined the effect upon conventionally measured poverty measures of a tax package consisting of a 10 per cent tax increase on certain "unhealthy" goods such as full-fat milk, take-away foods etc. combined with a subsidy of fresh fruit and vegetables. Preliminary analysis suggested that such a measure would increase poverty, but the income effects of such a measure could be offset to some degree by lump-sum transfers to the poor.

9.4 Conclusion

This paper has provided an overview of the scope for economic interventions to affect health behaviour, particularly in areas which might be regarded as "risky". It has suggested that the principal rationale behind such interventions is what can broadly be regarded as "market failure". Given the instance of such market failure, when first best policies are not available or cannot be implemented effectively, then classic second best policies such as taxes and subsidies may be used. The paper has reviewed the efficacy of such policies and concluded that even with regard to potentially addictive

behaviours such as smoking and drinking, such policies may be effective. The paper has also discussed other policies which can affect the "full price" of risky behaviours as well as examining the role of time consistency of preferences. Overall, the evidence presented here for Ireland and elsewhere has suggested that economic policies can play an extremely useful role in correcting the effects of market failure and in bringing about a greater congruence between social costs and benefits.

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