



The Effect of Private Health Insurance Coverage on Health Services Utilisation in New Zealand

Prepared by

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Linda Blumberg
Wellington, July 2006

EXECUTIVE SUMMARY

Introduction and Background

The New Zealand health care system is predominantly a publicly financed system, with the government funding 78 percent of national health care expenditures. Private health insurance payments account for only 6 percent of national health expenditures, with the remaining 16 percent paid out-of-pocket by individuals. Although the private health insurance share of national health expenditures is modest, about 40 percent of New Zealand adults have private health coverage so incentives created by the coverage can have a widespread impact. The intent of this study is to assess the impact of private health insurance coverage on the use of health services in New Zealand.

The approach for this study is based upon a body of research carried out on the American Medicare programme in the United States. Medicare is a publicly funded health insurance programme for those aged 65 and over. While virtually all elderly Americans are covered by this programme for hospital and physician care, it requires significant cost-sharing from beneficiaries. As a consequence many Medicare beneficiaries purchase private supplemental insurance policies to cover the out-of-pocket liability associated with the programme. A number of studies have shown that those who buy supplemental policies actually use more publicly financed services than those without private policies. Private insurance lowers the price for health services otherwise incurred by the beneficiaries, and they respond by buying more of those services. The result of the increased use of services is higher government costs. This study is designed to determine whether a similar dynamic could be occurring in New Zealand among those purchasing private health insurance policies that cover the out-of-pocket costs associated with the public health system.

Two general types of private health insurance are sold in New Zealand. Comprehensive policies, which accounted for 41 percent of coverage in 2005, cover some or all of the out-of-pocket costs associated with day-to-day care in the public system (e.g. GP visits, prescription medications, specialist visits) in addition to private hospitalisation for non-acute care. The second type, major medical insurance, provides coverage only for private hospitalisation for non-acute care.

The structure of private health insurance is thus oriented to covering out-of-pocket costs and filling in the gaps left by the public system, not to substituting for government services. As such, private insurance may lead to interactive effects with the public system. It is possible that care delivered under private health insurance is not replacing public spending so much as increasing total national spending on health care. And because comprehensive policies lower the out-of-pocket price for obtaining public services this type of coverage may increase the use of those services, thereby increasing public spending, as was found in the US Medicare studies.

Public Policy Issues Raised

Equity issues arise if private health insurance increases public spending on health care. Any increased government health care costs are borne by all New Zealand taxpayers, not just those purchasing private health insurance. It is a public policy

issue as to whether all taxpayers should fund increased usage of the public system by the 40 percent who have private insurance. This may be of particular concern if those buying private health insurance are typically higher income and/or healthier than those who do not buy insurance.

In addition the insurance industry has voiced concerns about recent public policies that may reduce demand for private health insurance. The industry contends that care provided under private health insurance offsets public programme spending, relieving pressures on the public system, and that purchasers should receive some credit for that. Consequently the industry proposes a government subsidy (in the form of a tax rebate) to support and encourage the purchase of private coverage. However, if private health insurance increases government costs and/or does not reduce the use of public services, then the justification for a subsidy for its purchase is diminished.

Data and Methodological Approach

This study relies upon the most recently released New Zealand Health Survey (NZHS), which was fielded in 2002/2003. The NZHS is a periodic survey funded by the Ministry of Health. The survey consists of face-to-face interviews with those aged 15 and above, and the sample is weighted to reflect the New Zealand population. The survey includes modules on chronic disease, health service use, risk and protective factors, self-reported health status, and socio-demographic characteristics. Importantly for this study, the survey asks each respondent if he/she is covered by private health insurance. The sample that I use is limited to adults aged 18 and above, and excludes those who answered “don’t know” or “refused” to any of the key questions of interest. These exclusions lead to an analytic sample of almost 12,000 people.

The descriptive analysis compares socio-demographic characteristics, health status, and utilisation for adults with and without private health insurance. Multivariate analyses are used to estimate the effect of private health insurance coverage on the use of particular types of health services, controlling for individual characteristics and health status. For each type of health service I estimate a probit model of the probability of any use in the preceding 12 months. For a small number of these services the NZHS provides information on the level of use, and I use negative binomial or interval regression to estimate the effect of private insurance coverage on the level of service use.

The price effect of private coverage on the use of day-to-day health services should be limited to those with comprehensive insurance, since major medical policies do not cover that type of care. Unfortunately the 2002/2003 NZHS does not differentiate between comprehensive and major medical policies. Therefore in order to identify the comprehensive insurance effect, I break the analytical sample into 3 income groups. I assume that the higher income insured are more likely than the lower income insured to have comprehensive policies, although, admittedly, there is only limited empirical data available from which to draw support for this assumption. All multivariate analyses are run separately on each income group, as well as on the combined adult population. The results obtained using the sample of the high-income population are presumed to best identify the effect of having comprehensive coverage on the use of health care services. These estimated effects should be interpreted as understating the

true effect of comprehensive coverage, however. This is because some significant percentage of even the high-income population with insurance purchases major medical policies, and so the effect being estimated here is an average of those with comprehensive and those with major medical coverage. Each model controls for socio-economic and health status characteristics.

Empirical Results

To summarise the descriptive evidence, the privately insured tend to be more highly educated, between the ages of 35 and 64 years of age, currently employed, higher income, and of European descent, as compared to the rest of the adult population. The privately insured also seem to be in better general health and to have fewer medical diagnoses and limitations. Compared to those without private insurance they appear to have slightly better access to medical services, and while they appear no less likely to use services at least once over a 12 month period, they do appear to have fewer visits to GPs and nurses and to use fewer prescription drugs. However, without estimating the effect of insurance on the use of services while simultaneously controlling for income, health status, and other characteristics that may affect use, we cannot draw definitive conclusions from the data. Without doing so, any differences between the groups cannot be directly attributed to having private health insurance coverage.

At least some of the out-of-pocket costs for day-to-day services – GP visits, specialist visits, nursing visits, and prescription drugs – are reimbursed through most private comprehensive insurance policies. The multivariate results indicate that those with private insurance and who are the most likely to have comprehensive coverage – high-income individuals – tend to use more of these services than their counterparts without coverage. These services are all subsidised by the government, so public costs increase as use increases. All privately insured individuals at least have coverage for services provided in the hospital (although levels of such coverage vary). Consequently we would not expect to see such stark variations in effects of having insurance on the use of hospital services across income groups. Indeed, that seems to be the case. Private coverage does not significantly affect this population's probability of using public hospital emergency departments, the probability of having a public hospital inpatient stay, or the likelihood of public hospital daypatient use. Having private health insurance does, however, decrease the likelihood that this group will use public hospital outpatient services.

The multivariate findings presented here lead naturally to the question of how large the private insurance effects are in terms of increased public dollars spent in the New Zealand public health system. Unfortunately, constraints inherent in the data make this an impossible question to answer conclusively. Rather, the available resources only permit us to generate a rough estimate. Using the multivariate results for the high-income population, an adjustment for the downward bias of the estimated marginal effects, an adjustment for under-reporting of health service use in individual surveys, and Ministry of Health data on the public cost of services, my calculations suggest that an annual public cost of \$75 to \$100 million is generated by the existence of comprehensive private health insurance. Using a significantly more conservative assumption of no under-reporting of service use, I calculate a range of \$40 to \$55 million per year. However, as noted above, these are rough calculations, and they

must be recognised as such.

Conclusions and Policy Implications

This analysis indicates significant interactive effects between private insurance and the use of health services. These effects are particularly pronounced with regard to care received outside of the hospital setting. Private insurance tends to increase the use of GP services, specialist services, and pharmaceuticals among those most likely to have comprehensive health insurance – high-income individuals. In addition it is safe to assume an increase in the use of ancillary services associated with GP and specialist visits, such as laboratory tests, x-rays, and other imaging services. There was no overall significant effect of private insurance on public hospital inpatient, daypatient, or emergency room care, although there was a modest but statistically significant decline in public hospital inpatient use for the low-income population with private coverage. If private inpatient care acts as a substitute for public inpatient care, one would have expected significant overall declines in public use.

The insurance industry has contended that a public rebate for the purchase of private health insurance policies is appropriate because such purchases reduce government costs under the public health system. However the results presented here indicate that the opposite is true. I find that those covered by comprehensive private health insurance tend to increase costs within the public system. While the estimated level of increased government costs is small relative to total public health care spending, the lack of significant declines in public hospital use and the increased use of non-hospital based services generally financed through the public system undermine the validity of claims by private insurers that those purchasing private coverage should receive rebates to compensate them for substituting private care for public care. While the privately insured are more likely to use private hospital services they do not appear to be decreasing their use of public services overall. Moreover, providing rebates for the purchase of private comprehensive coverage would most certainly increase the number of people purchasing it, thereby increasing the associated public costs beyond those estimated here.

The New Zealand government could recapture the marginal cost increases to the public system due to the purchase of private comprehensive policies or could regulate insurance in such a way as to prevent the increased costs from ever occurring. Increased costs could be recaptured by imposing a tax on the purchase of private comprehensive policies that cover out-of-pocket costs for publicly financed services. Alternatively the increased costs could be avoided entirely by passing legislation or regulations that prohibit private insurers from selling products that provide reimbursement for cost-sharing requirements associated with publicly financed medical services.

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1 INTRODUCTION

The health care system in New Zealand is predominantly financed with public funds. For the 12 month reporting period of 2002/2003 total national health expenditures were \$10.9 billion, with 78 percent of those expenditures (\$8.6 billion) covered by the New Zealand government.¹ While the public sector is clearly the dominant payer, approximately 6 percent of national expenditures are paid for through private health insurance, with the remaining 16 percent funded by out-of-pocket payments from individuals/families. Although the overall percentage of funding through private insurance is small, approximately 40 percent of the adult population of New Zealand is covered by some type of private insurance,² and this coverage has the potential to impact incentives with regard to use of the public system and the distribution of resources. This study assesses the impact of private health insurance coverage on the use of health services in New Zealand.

Private insurers sell two basic types of insurance coverage in New Zealand: major medical, which includes coverage for hospitalisation and surgical care; and comprehensive, which covers primary care costs such as physician visits and outpatient prescription drugs, in addition to hospitalisation and surgical care.³ Coverage under both types of policies is designed to “wrap around” the benefits provided by the public system. Private insurance coverage of primary care needs covers the amount that insured persons would otherwise be required to pay out-of-pocket, once the public system has paid its share to providers. Hospitalisation coverage only reimburses for care that is considered non-acute, as the public system is expected to provide for acute care needs. Private coverage also provides faster access to covered hospital and specialist care (given the existence of long waiting times for many such services within the public system) as well as access to better accommodations.

According to unpublished figures provided by the Health Funds Association, 59 percent of those covered by private policies in 2005 had major medical insurance, while the remaining 41 percent had comprehensive coverage. The share covered by comprehensive policies declined somewhat between 2003 and 2005, while the total number of persons covered by private policies increased.

The effect of private insurance in New Zealand seems to be perceived differently by different parties. Some credit private insurance with relieving pressure on the public system. If those with private coverage can substitute private providers for public ones in some situations, waiting times for public services may be reduced for the population as a whole. Others view private coverage as exacerbating inequities in the distribution of health care resources. If private insurance allows individuals to jump ahead in queues and obtain more quality-of-life enhancing services, those without the financial resources to purchase private insurance may be relegated to a lower level of care. As is evidenced by recent reforms that will lower individuals’ out-of-pocket liability for primary care and prescription drugs,⁴ the current government’s focus is on

¹ New Zealand Ministry of Health (2005), pp. 14-16

² Author’s calculations from the 2002/2003 New Zealand Health Survey

³ Health Funds Association of New Zealand (2004)

⁴ Cumming et al (2005), p. 1

making public coverage more comprehensive, with the potential for reducing the attractiveness of comprehensive private coverage.

Private insurance in New Zealand is structured primarily to fill the gaps in the public system, not to substitute for services provided through the government. As a consequence this system raises the possibility of interactive effects with the public system. Because private insurance primarily covers elective procedures (i.e. treatments that are not considered immediately necessary to sustain life), it is possible that care provided pursuant to private insurance is not replacing public spending so much as it is increasing total national spending on health care. In addition, because comprehensive coverage lowers the out-of-pocket price of a covered individual obtaining publicly funded services (e.g. general practitioner visits, pharmaceuticals), it may have the effect of increasing the use of these services and thereby increasing public spending relative to spending in the absence of private coverage. For example, as the out-of-pocket costs associated with GP visits go down, demand for those services should be expected to go up. As with most goods and services, if you lower the price facing the consumer more people will want to obtain GP services more frequently. In such a circumstance total spending (public and private) on GP services is likely to increase.

To the extent that private insurance coverage increases public spending on health care, those increased costs are borne by all New Zealand taxpayers. This raises issues of equity, particularly if those buying private coverage tend to be individuals with higher incomes than those who do not purchase it. This is because lower-income taxpayers would be forced to help finance the additional external costs associated with their higher-income counterparts' purchases of insurance.

In addition the insurance industry has raised concerns that expanding public primary care benefits will reduce demand for private insurance.⁵ The industry suggests that reduced demand for their product will have the effect of increasing pressure on the public system and lengthening existing queues for services. They propose a government subsidy for the purchase of health insurance to both support demand for private insurance and to compensate those who are substituting private services for public services. However the arguments being made by the industry may only be compelling if private insurance in fact reduces public spending on net, and this question is yet to be answered empirically.

This paper will do the following:

- Briefly describe the existing private insurance market in New Zealand and describe how it co-exists with the public health system;
- Review the literature from the United States (US) that describes the possible interactive effects between private insurance and the publicly funded Medicare system;
- Present data from the 2002/2003 New Zealand Health Survey (NZHS) to describe and compare residents with and without private health insurance;

⁵ See for example, Econtech Pty Ltd (2004)

- Present multivariate analyses of the NZHS which are used to estimate the effect of having private insurance on the use of health services;
- Draw general policy implications for New Zealand, with specific focus on the implications of a publicly funded rebate for the purchase of private insurance; and
- Discuss the ramifications of this analysis for the US should it expand publicly funded coverage of health insurance significantly.

2 BACKGROUND

Because I have hypothesised that private insurance coverage affects the use of health care services in New Zealand by changing the out-of-pocket requirements for accessing medical care, it is important to understand how the system works in that respect and how it is changing with recent reforms. In addition, some background on the structure of the private health insurance market and the role of private coverage in New Zealand will provide important context for the analytic work.

Out-of-Pocket Costs and Access to Care in the New Zealand Health Care System

The New Zealand public health system covers visits to primary care practitioners (e.g. GPs, nurses), specialist visits, prescription drugs, and hospital care. Access to a specialist is permitted only via referral from a GP. Different levels of patient cost sharing apply to the various covered services.

Certain services are available to all NZ residents without any cost sharing. These include accident and emergency care provided in a hospital emergency department, “well-child” care, laboratory tests, x-rays provided in public hospitals, maternity care, hospital care (including inpatient, daypatient, and outpatient services), specialist care in a public hospital, and dental care for children. Users pay some fees for primary health care provided by GPs and practice nurses, as well as for pharmaceuticals. A prescription filled at a community pharmacy currently requires a co-payment of \$15 per item, although certain pharmaceuticals are only partially subsidised by the public system and thus their purchase requires additional out-of-pocket payments.⁶

Primary care visits to GPs and practice nurses are subsidised but, as is the case with pharmaceuticals, these services also require some out-of-pocket payment from users.⁷ The actual out-of-pocket cost to the user will vary depending upon the physician, whether the user is enrolled in a particular type of Primary Health Organisation (PHO – discussed below), and the individual’s age. GPs are private entities, and as such are free to set their fees as they see fit. Subsidies from the NZ government for primary care are subtracted from the fee charged by the physician, and the remaining financial responsibility (if any) rests with the user of the service. The GP collects the appropriate subsidy directly from the government so the individual user does not have to pay the full fee and wait for reimbursement; the subsidy amount is automatically subtracted from the full physician fee at the time of service.

Until recently there have been three different programmes that subsidise the out-of-pocket requirements that health care service users would normally incur: Community Service Cards, High Use Health Cards, and Pharmaceutical Subsidy Cards.⁸ Recent reforms (discussed below) have reduced the number of people for whom these programmes are relevant, as lower out-of-pocket payment requirements for primary care services are being phased-in across the population. A Community Service Card

⁶ Under the reforms being phased-in and described below, prescription co-payments are being reduced to \$3.

⁷ *GP Visits* (n.d.)

⁸ *Community Service Cards* (n.d.); *High Use Health Cards* (n.d.); *Pharmaceutical Subsidy Cards* (n.d.)

(CSC) is available to all members of a family with an income that falls below the Ministry of Social Development's income thresholds.⁹ These thresholds vary by family size and may also vary depending upon whether an individual lives alone or shares accommodation. For example the 2006 threshold for a family of four is \$53,138 and \$22,157 for a single person living alone. The CSC provides a subsidy of \$15 for a physician visit for an adult, a \$20 subsidy for a physician visit for a child who is 6-18 years old (the subsidy is \$35 for younger children regardless of whether they have a CSC; children 6 to 18 without a CSC receive a \$15 subsidy), and reduces the co-payment for a prescription drug to \$3 per item.

A High Use Health Card (HUHC), as its name suggests, is available to those who are significant users of health care services. These cards entitle the carrier to reduced out-of-pocket costs for publicly covered services. The subsidies provided are the same as those under the CSC. There are no income tests for the HUHC. An individual can apply for an HUHC after visiting a GP 12 times within a preceding 12 month period.

Pharmaceutical Subsidy Cards (PSC) are available to those who face high prescription costs. There is no income testing for the card. A PSC is issued by a pharmacist once a family unit has paid for 20 prescriptions since the preceding February 1 at that pharmacy. A PSC reduces the out-of-pocket payment for prescription drugs to \$2 per item, regardless of whether any family member has a HUHC. For those families with both a CSC and a PSC, no further pharmaceutical co-payments are required for the remainder of the year.

Prior to recent changes, GPs were subsidised on a per-visit basis. It is important to note that it is the pre-July 2002 rules that are relevant to this work, since the data used were collected in 2002/2003.¹⁰ In 2001/2002, the Ministry of Health began implementation of the Primary Health Care Strategy. The objective of this strategy is to improve the health of New Zealanders through:¹¹

- placing a greater emphasis on population health, health promotion and preventative care;
- community involvement;
- involving a range of professionals and encouraging multidisciplinary approaches to decision making;
- improving accessibility, affordability and appropriateness of services;
- improving co-ordination and continuity of care;
- providing and funding services according to the population's needs, as opposed to fee for services when people are not well.

⁹ *Income Thresholds* (2006)

¹⁰ It is possible that the recent reforms have had some impact on this work, but if so it would be minimal. The NZHS asks respondents about their experience in the preceding year, and very few residents would have been enrolled in a Primary Health Organisation (PHO, described below) for even part of a year by July 2003.

¹¹ *Primary Health Care Strategy* (n.d.). Bullets on this page quote directly from the Ministry of Health web site.

One component of this initiative is lowering the out-of-pocket payment requirements for primary health care services across all income groups, thereby increasing financial access for everyone. The initiative is being phased in, beginning with those receiving care through medical practices that predominantly serve a low-income population followed by the rest of New Zealand's residents by age group. This initiative has also involved the introduction of Primary Health Organisations (PHOs). PHOs are non-profit entities structured to provide primary health care services to a defined population of individuals. PHOs generally include GPs, nurses, and community health care workers, and they receive payments from the Ministry of Health for each enrolled individual (generally referred to as "capitated payments"). Enrolment in a PHO constitutes a contractual agreement between the individual and the PHO that the individual will use the PHO's providers as his/her primary source of health care. However, there is no financial penalty on an individual for visiting other providers. PHO providers, on the other hand, see a reduction in their capitation payments by the government cost of any "external" visits.

Those not enrolled in a PHO continue to be subsidised based upon the pre-PHO subsidy schedule shown below:¹²

Table 1: Pre-PHO Subsidy Schedule

Age group	CSC or HUHC	No CSC or HUHC
Under six years	\$35	\$35
6 – 17 years	\$20	\$15
18 years and over	\$15	Nil

Annual government capitated payments for PHO enrollees are calculated by multiplying the expected number of annual visits for each individual by the subsidy levels shown below. The expected number of visits is calculated based upon the characteristics of the particular enrollee, including: age, gender, CSC and/or HUHC status, ethnicity, and deprivation quintile.¹³

Table 2: Government funding per consultation for PHOs (from July 2004 - July 2005)¹⁴

Age group	Interim PHO / practice	Access PHO / practice
Under six years	\$37.40	\$37.40
6 – 24 years	\$26.75	\$26.75
25 – 64 with a CSC or HUHC	\$15	\$26.75
25 – 64 without a CSC or HUHC	Nil	
65 years and over	\$26.75	\$26.75

Access PHOs are those identified as serving a predominantly low-income and health care access disadvantaged population. These PHOs receive the highest level of government subsidy for all enrolled patients regardless of age. Interim PHOs are

¹² *GP Visits* (n.d.). Table taken directly from New Zealand Ministry of Health web site.

¹³ New Zealand Ministry of Health (2004b), p. 19. Deprivation quintile refers to an area-based index of deprivation determined using a combination of Census variables including income, access to car, living space, home ownership, employment status, qualifications, support and access to a telephone.

¹⁴ *GP Visits* (n.d.). Table taken directly from New Zealand Ministry of Health web site.

those that do not predominantly serve a disadvantaged population, and they receive government subsidies based upon an aged-based phase-in schedule. The same Access PHO benefits currently provided to those between 6-24 years of age and those over 65 years of age are scheduled to be phased-in for 45-64 year olds, beginning on 1 July 2006. The 25-44 age group is scheduled to be included beginning 1 July 2007.

Services not included in the public programme's benefits include non-emergency adult dental care, glasses, and counselling for mental health. These services can be obtained only if the user of the service pays the full costs associated with the care.

Perhaps the most controversial component of the NZ public health insurance system concerns access to non-urgent specialist and surgical care, which can only be accessed through a GP referral. Once a GP determines that a patient should see a specialist he/she writes a letter referring the patient. Specialists review these referrals and schedule a first assessment for those patients that they agree should be seen. The target is to have referred patients seen for a first specialist assessment within six months, although this target is not universally met. A specialist who determines upon assessment that a patient should receive surgery, enters the patient into a booking system. The booking system is designed to prioritise those with the greatest medical need and potential to benefit from treatment.¹⁵ Clinical priority assessment criteria (CPAC) tools are now used throughout New Zealand in each specialty area in an effort to rationalise the scheduling of non-urgent surgical procedures. This is a potentially critical issue for the New Zealand system (as well as for many other publicly financed health care systems world-wide) because supply constraints arising from various sources prevent all of those who may benefit from a service from obtaining the service in the near term.

Specialists can participate in the public system and also accept private paying patients. Those persons with private insurance, those willing to pay for care completely out-of-pocket, and many of those receiving care through the New Zealand Accident Compensation Corporation (ACC) can schedule appointments with specialists who provide care outside of the public system and can undergo non-urgent medical procedures and surgeries performed in private hospitals. Obtaining such services through the private sector frequently diminishes waiting times to a significant extent. Because, for the most part, the same physicians are seeing both private paying and publicly funded patients, a higher volume of private paying patients can be expected to exacerbate supply constraints in the public sector beyond the level to which supply otherwise would have been constrained. And because specialists are substantially better compensated for care that is delivered privately compared to that delivered through the public system, financial incentives encourage specialists to focus a greater percentage of their available time on private patients when possible. This dynamic will tend to lengthen waiting times in the public sector, potentially increasing demand for private insurance and thus access to private services.

Scheduling and receiving publicly financed specialist and surgical procedures in a timely manner are highly visible and political issues within the NZ system. Regular stories and articles appear in the popular press documenting waiting times and

¹⁵ McLeod et al. (2004a), p. S2: 41; and McLeod et al. (2004b), p. 92

individual experiences within the system.¹⁶

Outside of the public system described above, New Zealand residents can also access medical care through the ACC. The ACC funds care for those suffering personal injury regardless of fault. Care received under the auspices of the ACC generally requires lower cost-sharing on the part of the individual than under the broader public health system. Some ACC care is provided in private hospitals through contracts between the ACC and the provider.

Private Health Insurance In New Zealand

The New Zealand private insurance industry is structured primarily to complement, as opposed to substitute for, services provided through the government funded system. In fact private policies explicitly exclude acute care (including maternity care) from coverage, leaving such care entirely to the purview of the public system. In addition the NZ government does very little to regulate the insurance industry, allowing benefits, restrictions, and prices to be defined almost entirely by the industry itself. These two facets of the system are the most important determinants of the character of the insurance market.

The private health insurance market is dominated by a single insurer, Southern Cross Healthcare. By its own estimates Southern Cross holds approximately 60 percent of the national market share.¹⁷ Tower is the second largest of the nation's insurers. The other companies each have very small shares of the market. The insurance industry representatives with whom I spoke explicitly stated that the industry was not interested in expanding the role of private insurers into the services provided through the public system. However the industry does have a strong interest in the government defining more explicitly the care that is and is not provided through the public system. Such definition would, they argue, make it easier for the private insurance industry to define their products as complements to the public system and allow the industry to more clearly and consistently define the interface between the private sector and the government financed system.

Private insurance in NZ is marketed and sold in two ways: via employers and directly to individuals. Employer plans may offer different benefits from those sold in the individual market and may be priced differently even for a given set of benefits. For example those purchasing through their employer may be offered discounted premiums for purchasing with the group. However, even products sold via employers are written as individual contracts with each enrollee who is then charged a premium applicable to her/his age and possibly also to her/his own health status profile. This is quite different from group insurance policies in the US where contracts are written with the employer and each employee typically pays the same premium, although with variations for those buying individual versus family policies.

Many NZ employers contribute nothing toward the insurance premiums of their workers; they simply allow the insurers to market the policies to the workers in the group context. This is another significant difference from the US, where those

¹⁶ See for example, MacDonald (2006)

¹⁷ Personal communication with Southern Cross staff, March 2006

employers who do offer coverage are typically required by the insurers to contribute at least 50 percent toward the premium for a single policy. US insurers rely upon employer contributions to decrease the likelihood of adverse selection, i.e. if employers contribute significantly toward coverage it increases the likelihood that the healthier employees will enrol. US workers also value the tax exemption for employer contributions to health insurance, which provides further incentives for employers to contribute. Among those employers offering a policy in 2003, the average employer contribution was 83 percent of a single policy.¹⁸ NZ employers may offer private insurance coverage only to certain workers, a practice which is more difficult in the US due to antidiscrimination laws.¹⁹

The NZ insurance market is characterised by a wide array of benefit packages. For example some policies provide very comprehensive coverage for both inpatient and outpatient medical and surgical care, while others provide only partial coverage for inpatient surgical care up to pre-determined dollar limits. Those policies that are limited to hospital-based care are known under the general rubric of “major medical” policies and those that also include at least some coverage for day-to-day expenses such as GP visits and prescription medications are referred to as “comprehensive” policies. Coverage for particular benefits can be partial or full depending upon the policy, but explicit dollar limits per occurrence are customarily delineated for each type of service. Explanations of a policy’s benefits generally itemise the levels of reimbursement and dollar caps for each type of covered surgical procedure (e.g. coronary angioplasty versus renal lithotripsy versus colonoscopy). This is quite different from insurance policy documents in the US, where the covered procedures would be too numerous to list separately. Consequently the value of the coverage being purchased in NZ is much clearer than is the case in the US market, where benefits are described in terms of a percentage of “allowable” fees, which may vary widely across insurers and is virtually always unknown a priori to policy holders.

Most private insurance companies in NZ, with the exception of Southern Cross, determine premium levels using 5-year age categories. Southern Cross groups together all people under age 19 and separately groups all people who are 65 and older. All other adults are grouped together only with other adults of the same age; i.e. single-year age categories. Premium discounts (e.g. 10 percent) may be offered for those with a low claims history. Any NZ insurer may also adjust premiums up for the presence of pre-existing conditions although this does not appear to be a frequent practice at the present time. Premiums in the NZ market also vary by family structure (single, couple, couple with children, and single parent family).

While insurers are required to issue insurance policies to all applicants regardless of health status (a situation which does not exist in most US states), they are given tremendous latitude in excluding medical expenses from the issued coverage. For example, pre-existing conditions can be excluded from coverage permanently. And while exclusions for such conditions have been limited to discrete periods of time in particular circumstances, insurers appear to be moving toward excluding them permanently. The practice of issuing policies with pre-existing condition exclusions

¹⁸ Agency for Healthcare Research and Quality (2003)

¹⁹ US employers can offer insurance to only certain classes of workers (e.g. full time but not part-time), but cannot offer coverage to highly paid executives while excluding lower paid administrative staff, for example.

appears to be quite widespread, with Southern Cross estimating that roughly 40 to 50 percent of its applicants are subject to some exclusion.

In addition, any chronic condition, even those developed *after* insurance has been purchased, can be permanently excluded from coverage. The chronic conditions that can be excluded are not limited in any way by regulation, with diabetes, HIV, and cystic fibrosis being only a few of the conditions that are routinely excluded from coverage. According to the insurers all chronic disease care appropriately falls under the purview of the public system, again highlighting the industry's desire to separate public from private insurance responsibilities.

The sole source of regulation over private insurance in New Zealand is the Human Rights Act (HRA) of 1993. In general the HRA does not allow insurers to discriminate by reason of age, sex, or disability.²⁰ However section 48 of the HRA does allow for premium variations on the basis of age, sex, or disability where there is actuarial data or other statistical evidence to justify such variations. In other words, if experience demonstrates that the costs for individuals of a certain age, gender, and disability status are higher than for other populations, those differences can be reflected in the costs of private health insurance premiums. In the absence of any reliable data insurers can rely upon the advice of recognised medical or actuarial experts. For these purposes "disability" is defined very broadly, and can mean.²¹

- physical disability or impairment;
- physical illness;
- psychiatric illness;
- intellectual or psychological disability or impairment;
- any other loss or abnormality of psychological, physiological, or anatomical structure or function;
- reliance on a guide dog, wheelchair, or other remedial means; or
- the presence in the body of organisms capable of causing illness.

This regulation allows insurers considerable flexibility in setting premiums by age, gender, and health status, using statistical expectation of variation in medical expenditures to do so. No individual can be refused issue of a private insurance policy although, as noted earlier, coverage for pre-existing conditions or chronic conditions (regardless of time of onset) can be permanently excluded. Ultimate responsibility for determining whether the requirements of the HRA are met is left to the Human Rights Review Tribunal and the Courts. The HRA does not speak to any other aspects of the private insurance industry, such as benefits offered, providers included, or marketing practices.

²⁰ Human Rights Commission (2003)

²¹ Human Rights Commission (2003), p.10

3 REVIEW OF LITERATURE

The primary source of health insurance coverage in the US for Americans aged 65 years and older is the government run and financed Medicare programme. Medicare coverage uses deductibles and co-payments/co-insurance as a mechanism for containing programme costs. Most Medicare beneficiaries however are also enrolled in some type of private supplemental insurance. This insurance, purchased individually or through an employer group, covers some or all of the cost-sharing requirements associated with Medicare benefits. A number of studies have analysed the effect of supplemental health insurance on the use of Medicare financed health care services. I review four of the most prominent of these studies here, in addition to one paper addressing similar issues within the Australian health system.

The first of these studies used Medicare claims data alongside copies of the actual supplemental insurance policies held by each of the roughly 2500 sampled individuals.²² Telephone interviews were conducted with 799 Medicare beneficiaries without supplemental coverage and household interviews were held with 1657 beneficiaries with supplemental coverage. All beneficiaries were over 65 years of age and none were dually eligible for the Medicaid programme.²³ Models were estimated for hospital and physician utilisation as a function of supplemental insurance coverage, health status, beneficiary characteristics, supply factors, and the price of other goods. The authors determined that supplemental insurance policy ownership could be considered exogenous for purposes of the modelling because persons in poor health were no more likely to purchase coverage than persons in good health. This finding is borne out in the current analysis.

The analysis showed that having supplemental coverage significantly increased the likelihood of a beneficiary using physician services, although policy ownership had no effect on the likelihood of hospital use. Having private coverage also increased the number of physician services used for those who used any at all; however this effect was only significant for those reporting that they were in fair or poor health. The number of inpatient days for those with any inpatient days was not affected by private coverage regardless of health status. The evidence suggests however that effects of having private insurance were largest for those reporting that they were in fair or poor health. In addition the researchers found that the largest effect was for Medicare beneficiaries who reported being in fair or poor health and for whom supplemental insurance provides first dollar coverage for physician and hospital services.

The second study, by Hurd and McGarry,²⁴ used the first wave of a nationally representative survey of the US population age 70 or over, the Asset and Health Dynamics Survey, to study similar questions. The data for this survey were collected in late 1993 and early 1994. The analysts first examined the probability of purchasing health insurance as a function of health status measures and other characteristics. They found that Medicare beneficiaries who purchased private insurance had greater wealth and higher income and were healthier than those without private insurance. They also found that after controlling for age, income and wealth, those in better

²² McCall, Rice, Boismier, and West (1991)

²³ Some low-income seniors are eligible for both Medicare and Medicaid, with Medicaid covering Medicare's out-of-pocket requirements.

²⁴ Hurd and McGarry (1997)

health were substantially more likely to have private insurance. Economic resources appear to be the most important determinant of private insurance purchase. They concluded that incentive effects are responsible for differences observed between the insured and the uninsured in the use of health care services, as opposed to differences in health status.

Hurd and McGarry estimated probit models of the probability of having a physician visit and the probability of having a hospital inpatient stay during the last 12 months. They then estimated ordinary least squares (OLS) models of the number of physician visits and the number of hospital days, each conditional on having any use. They found that having private insurance in addition to Medicare coverage significantly increased the probability of seeing a doctor. Private insurance did not however have a significant effect on the number of doctor visits, conditional on having at least one visit. The effect of private insurance on the probability of a hospital stay was positive, but not statistically significant. There was no effect of having private coverage on the number of days in hospital, given an admission.

Another study, by Khandker and McCormack, used the Medicare Current Beneficiary Survey (MCBS) and linked that data to Medicare claims data.²⁵ The data include an array of health status measures, activity limitations, and types of supplemental insurance held. They use a two-part model approach and control for individuals holding multiple types of supplemental coverage and the particular type of coverage held. The four categories were: private individually purchased supplemental insurance, private employer-sponsored supplemental policies, both of the preceding, and Medicaid. The authors pooled 3 years of panel data and employed a variance components model to account for individual-specific randomness in spending. Because the MCBS could be linked to actual Medicare claims the researchers were able to estimate their models on expenditures. The first part estimated the probability of any spending under the programme; the second part estimated the log of spending for those with positive spending.²⁶ They too found that adverse selection in insurance purchase was not a significant concern.

Khandker and McCormack found that those with individually purchased insurance policies were 13 percent more likely to incur any Medicare spending, and for those with spending their expenditures were 42 percent higher than the Medicare only group. Similar results held for those with supplemental coverage through an employer. Those with both types of coverage were 16 percent more likely to have any expenditures, and those with some spending had expenditure levels 62 percent higher than the Medicare only group. The largest effects of supplemental coverage were seen for spending under Medicare Part B, the physician services. Smaller but still significant positive effects of supplemental insurance were found on spending under Part A, hospital services, but only in the probability of any spending, not the level of spending conditional on use. This may be because hospital use is less discretionary and because hospitals are reimbursed by Medicare under a Diagnosis Related Group (DRG) system, where reimbursement and length of stay are generally unrelated.

The authors estimated expected government spending for the Medicare only group at US\$2,200 per person per year. For those with individually purchased supplemental

²⁵ Khandker and McCormack (1999)

²⁶ Their approach was consistent with that outlined by Duan et al. (1983)

coverage that estimate was US\$2,533, for those with employer-based supplemental coverage it was US\$2,697, and for those with both types of supplemental policies it was US\$2,909. The estimates for those with supplemental coverage were 15 to 32 percent higher than for those without it. Differences in spending levels persisted even when out-of-pocket costs were taken into account.

The fourth study also used the MCBS and explicitly adjusted for the potential endogeneity associated with the decision to purchase supplemental health insurance.²⁷ All studies of this type have raised concerns that unobserved individual characteristics could be related to both expected high use of medical services and the decision to purchase supplemental insurance. If this is in fact true approaches that do not adjust for such endogeneity may result in biased estimates of the effect of insurance. Properly adjusting for the potential endogeneity requires identifying variables that are related to the decision to purchase supplemental coverage but which are unrelated to the level of health expenditures incurred. This often presents a difficult challenge. In this study however, county level identifiers were available, and the researcher was able to use labour market characteristics to identify the decision to enrol in employer-based supplemental coverage and state level insurance market regulations to identify the decision to enrol in an individually purchased supplement.

The author estimated Medicare expenditures using a two-part model (the probability of positive expenditures and the level of those expenditures). Predictions were generated for Part A and Part B expenditures separately for those with and without four different types of coverage: individually purchased with prescription coverage, individually purchased without prescription coverage, employer-sponsored with prescription coverage and employer-sponsored without prescription coverage. While Atherly found that the insurance choice was in fact endogenous, he concluded that most policies experience favourable, rather than adverse, selection. His results indicate that supplemental private coverage cost the Medicare programme almost US\$12 billion in 1995, or almost 7 percent of total programme expenditures.

Finally, some insights may be gained from examining the implications of private insurance for health care service use in Australia. Australia introduced its tax-financed national health insurance programme, also called Medicare, in 1984. In 1999, the government implemented policies designed to increase private insurance. As of 2001 approximately 45 percent of the Australian population had private coverage for hospital treatment.²⁸ Brameld, Holman, and Moorin used the WA Data Linkage System to estimate the effect of having private insurance on hospital use in Western Australia over the period 1994 to 1999. The payment classification information was used to identify those who had private health insurance. All individuals with particular diagnoses were chosen. The authors controlled for socioeconomic status and demographic characteristics, locational disadvantage (i.e. accessibility/remoteness), number of co-morbidities, and aboriginality.

The results indicated some significant differences between privately insured and non-privately insured patients but results varied by diagnosis group. For 12 out of 22 diagnosis groups, non-insured patients had higher hospital admission rates; significant

²⁷ Atherly (2002)

²⁸ Brameld, Holman, and Moorin (2006)

differences existed for 20 of the 22 groups. The privately insured patients had higher rates of surgical admissions, while those without private coverage were more likely to be admitted for medical procedures. In the analysis of length of stay following admission 16 diagnosis groups showed significant differences, with privately insured patients having shorter lengths of stay than the non-insured for 11 groups. However, differences in length of stay were generally small.

This study builds on the lessons learned from the analyses summarised here. The analysis in this study focuses on the health care system in New Zealand and includes all adults age 18 and over. There are significant differences between the cost-sharing requirements under the New Zealand system of public insurance and cost-sharing requirements in the US and Australia. In addition the structure of the private insurance markets in the respective countries differs markedly. As a result we should expect the magnitude and nature of any interactive effects between public and private insurance in New Zealand to be different than those found in either the US or Australia.

4 DATA AND METHODS

Data

The New Zealand Health Survey (NZHS) is a periodic survey fielded by the Ministry of Health. This study uses the most recent NZHS conducted in 2002/2003. Previous surveys were carried out in 1992/1993 and 1996/1997. The next one will be fielded in 2006/2007. The NZHS is the central component of the New Zealand Health Monitor, a coordinated set of surveys used to monitor the health of, as well as access to and use of services by, New Zealand residents.²⁹ The survey is conducted using face-to-face interviews and the 2002/2003 NZHS includes almost 13,000 individuals. The final publicly released data file includes records from 12,529 respondents. The 2002/2003 NZHS includes a more extended set of information on health status, chronic medical conditions, and use of different types of providers than did preceding surveys.

Only one individual (age 15 or over) per household is interviewed. A separate survey, not used for this study, covers institutionalised persons. The most recent survey also booster samples ethnic populations. This allows for the generation of more reliable estimates for these particular subpopulations. The survey contains four health-related modules and one demographic module. The content of the questionnaire is summarised in Table 3 below, which is taken directly from a Ministry report.³⁰ Of particular interest for this study the survey also asks whether each respondent is covered by any health or medical insurance.

The target population for the survey is residents of permanent private dwellings. In other words those living in boats, caravans, cabins or tents in a motorcamp, hotels, motels, guest houses, boarding houses, homes for older people, hostels, motor camps, hospitals, barracks and prisons are excluded from the sampling frame. In addition respondents also have to be usually resident in the dwelling in order to be surveyed. The survey uses a complex sample design. The survey response rate is approximately 72 percent.

No proxy reporting is used in the household surveys, and there is no substitution of other household members in circumstances in which the chosen resident does not respond to the survey. The weighting strategy implicitly takes item non-response into account; no item imputation is used. The sample is weighted to be representative of the New Zealand national population. The weights are benchmarked to 2001 Census population data. The NZHS data file contains replicate survey weights.

²⁹ New Zealand Ministry of Health (2004a), pg. 1

³⁰ Ibid, page 2

Table 3: Content of 2002/03 New Zealand Health Survey

Module	Topics	Details
Chronic disease	Heart disease, stroke, diabetes, asthma, chronic obstructive pulmonary disease, arthritis, spinal disorders, osteoporosis, cancer, other long-term illnesses.	Prevalence, age at diagnosis, treatments.
Health service use	Māori health providers, Pacific health providers, general practitioners, medical specialists, nurses, pharmacists and prescriptions, complementary and alternative medicine providers, other health providers, telephone and internet helplines, hospitals.	Frequency of contact, reasons for visit, satisfaction levels and reasons for dissatisfaction, unmet need and barriers to access.
Risk and protective factors	High blood pressure, high blood cholesterol, overweight and obesity, physical activity, tobacco smoking, marijuana smoking, vegetable and fruit intake, alcohol use, gambling.	Prevalence.
Self-reported health status	General health, vision, hearing, digestion, breathing, pain, mental health, sleep, energy and vitality, understanding and remembering, communicating, physical functioning, self-care, usual activities, social functioning.	SF-36 Health Status Questionnaire embedded within the World Health Organization Long Form Health Status Questionnaire.
Socio-demographic	Age, sex, ethnicity and responses to ethnicity, country of birth, household characteristics, education, income support, employment, income, medical insurance, NZDep2001 (from meshblock).	

Methods

All descriptive and multivariate analyses presented in this report use the NZHS provided replicate weights and Stata's *svy jackknife* function to perform jackknife variance estimation.³¹ The approach taken here follows the Ministry of Health in calculating standard errors for survey estimates, a replicated method known as the Delete-a-Group Jackknife method.³² For this survey, 100 random groups are used ($G=100$).

The sample used for the analyses in this report is limited to adults aged 18 and above, thereby excluding survey respondents age 15 through 17. This sample limitation is used because the truncated age distribution of those included in the NZHS does not provide a representative sample of all children, and because the health care utilization responses for children are likely to be somewhat different than those of adults. Since a specific and representative child-only analysis is not possible using this survey, the small number of children included in the data are eliminated from the analytical data set, allowing for cleanly drawn conclusions about the adult population. Those individuals who responded "don't know" or who refused to answer one of the questions of interest to the study (i.e. those with missing values for the dependent or independent variables used in the analyses), were also excluded from both the descriptive and multivariate analyses. In this way, the samples used in the descriptive

³¹ StataCorp (2005)

³² New Zealand Ministry of Health (2004a), page 31

analyses are the same as those in the multivariate analyses. These restrictions produce an analytic sample of 11,824 people.³³

Key Variables

Household income is provided in the NZHS as a categorical variable (i.e. loss; zero; \$1-\$5000; \$5,001-10,000; 10,001-\$15,000; etc.). While the categorical variable is used in the descriptive analysis, the multivariate analyses use a measure of household income relative to household size in order to better reflect relative economic well-being in the household. The values of this variable are calculated by setting income equal to the midpoint of the relevant category and dividing by the number of people reported living in the household. For those reporting a loss for the year income is set to zero.

In a number of analyses samples are split into three income categories: low-income, middle-income, and high-income. These categories are constructed by splitting the income distribution, as closely as possible given the categorical income variable, into thirds. Thus, those reporting household incomes of \$25,000 or less are categorised as low-income, those reporting incomes between \$25,001 and \$50,000 are categorised as middle-income, and those reporting incomes in excess of \$50,000 are categorised as high-income.

The NZHS includes a set of four questions to ascertain whether the respondent has faced activity limitations in the preceding 4 weeks as the result of his/her physical health. These include limitations in the amount of time spent on work or other activities, whether the respondent has accomplished less than he/she would like, whether he/she was limited in the kind of work or other activities, and whether he/she had difficulty performing the work or other activities. I summarise these responses for analytical purpose into one variable (*physical_limits*), which is equal to 1 if the respondent answers “yes” to at least one of those four questions and is equal to 0 otherwise.

Likewise three questions are asked about limitations resulting from emotional problems during the preceding four weeks. These questions include whether the respondent has cut down on the amount of time spent on work or other activities, whether he/she has accomplished less than he/she would like, and whether he/she did not do work or other activities as carefully as usual. Responses to these three questions are summarised in one variable (*mental_limits*), which is equal to 1 if the respondent answers “yes” to at least one question and is equal to 0 otherwise.

The NZHS also asks respondents whether or not they have been diagnosed with particular chronic diseases. These diseases include: high blood pressure, high cholesterol, heart disease, stroke, diabetes, chronic bronchitis-emphysema, arthritis, osteoporosis, neck or back problems, cancer, asthma or “other long-term illnesses.” For my analytic purposes asthma, osteoporosis, and bronchitis-emphysema are grouped in with “other long term illnesses.” This is because the asthma question is asked only of specific respondents (those under 45 years of age), the bronchitis-emphysema question is only asked of those over age 45, and the osteoporosis response is so highly correlated with age that its independent inclusion causes age

³³ All of the analyses were also performed using a sample that excluded adults age 65 and over. The results were strikingly similar and are therefore not presented here.

variables to drop out in the multivariate analyses.

It is also worth noting that two health services utilisation variables are likely to include some overlap in responses. The NZHS question on the use of medical specialists defines specialist as “the kind of doctor that people go to for a particular condition, problem or service, not a GP. You may have seen the medical specialist as an inpatient or outpatient in a public hospital or in a private clinic or hospital.” The NZHS question on the use of public hospital outpatient services is defined as being a time in the preceding 12 months when “you yourself used an outpatient department, that is, a ward or clinic or specialist where you went as an outpatient.” In this way a single publicly financed visit to a medical specialist could lead to a “yes” response for both the specialist question and the public hospital outpatients department question. However it is also possible that a specialist visit occur outside of a public hospital environment, and use of a public hospital outpatients department may be for a reason other than a specialist visit.

Estimation Approaches

The descriptive analysis compares the socio-demographic characteristics, health status, and utilization of health services, for adults with and without private health insurance. Multivariate analyses are then used to estimate the effect of having private health insurance on the population’s use of particular types of health services, controlling for individual characteristics including health status.

For each type of health service included the NZHS provides information on whether the individual has had any use of that service within the preceding 12 months. For a smaller number of services the survey also provides the number of provider visits or service uses in the preceding 12 months. For each of the health care services of interest – general practitioner (GP) visit, specialist visit, nurse visit, prescription medication, public hospital emergency service, public hospital outpatient service, public hospital daypatient service, public hospital inpatient stay, private accident and emergency clinic services, private hospital daypatient service, and private hospital inpatient stay – I estimate probit equations of the probability that the individual would have any use of that service in the preceding 12 months.

The probit models take the following form:

Probability ($service_use_i$) = $\beta_0 + \beta_1(priv_ins_i) + \beta_2(socio_demog_i) + \beta_3(health_status_i)$;
where $service_use$ refers to a particular type of service (GP, specialist, nurse, prescription drugs, etc.) and takes on the value of 1 if the individual has had that particular type of health care service within the preceding 12 months, while taking on the value of 0 otherwise. $priv_ins$ is a binary variable equal to 1 if the individual reports having private health insurance coverage. $socio_demog$ is a vector of socio-demographic variables, including gender, ethnicity, household income divided by household size, level of education attained, and age. $health_status$ is a vector of binary variables, some indicating whether the individual has ever been diagnosed with a particular chronic illness (high blood pressure, high cholesterol, heart disease, stroke, diabetes, arthritis, neck or back problems, cancer, or other long term illness), and some indicating self-reported health status (fair/poor, good, very good, versus excellent) and presence of physical or mental limitations.

The NZHS reports number of provider visits in the preceding 12 months for GPs, specialists, and nurses.³⁴ For these services I estimate negative binomial models, with the dependent variable equal to the number of visits in the preceding 12 months. Different equations are estimated for each type of visit. Negative binomial regression is used to estimate models where the dependent variable is equal to a non-negative count (i.e. 0, 1, 2, etc.). While poisson estimation is another option for such dependent variables, poisson requires that the mean and variance of the dependent variable are equal. In cases where the variance is greater than the mean, poisson estimates are inefficient with downward biased standard errors. The condition of equal mean and variance is not usually satisfied, and is not in this case. For each of the dependent count variables, over-dispersion (variance greater than the mean) is present making the negative binomial regression appropriate. The same explanatory variables are used in the negative binomial regressions as in the probits.

In the case of prescription drugs the NZHS provides counts of medicines prescribed in the preceding 12 months in the forms of intervals (i.e. 0, 2-3, 3-4, 5-8, 10-14, 15 or more). For this dependent variable I use interval regression. Interval regression is a generalization of the tobit and censored-normal regressions.³⁵ It can be used to fit models where the dependent variable is interval data, left-censored data, right-censored data, or point data. Two dependent variables are used to mark the endpoints of each interval. Again the explanatory variables in these models are identical to those in the probit models.

Each model is estimated for all adults and then separately for the three income groups (low-income, middle-income, high-income) defined earlier. I do this to allow for differential responses for the income groups but also as a mechanism for proxying which individuals have comprehensive private insurance and which have major medical coverage only. The NZHS does not ask details about the type of coverage held, if any. Unfortunately, there is no representative data that provide information on the socio-demographic characteristics of those buying different types of coverage. However it is logical to presume that higher-income individuals are more likely to purchase more expensive coverage (comprehensive), and that lower-income individuals who buy coverage are more likely to purchase hospitalisation coverage (major medical) only. In addition there is some evidence from a cohort study of individuals likely to have surgical procedures that suggests that the higher-income insured are more likely than the lower-income insured to purchase comprehensive policies.³⁶ This evidence is suggestive as opposed to conclusive, given the non-representative nature of the sample, but it is the only currently available data on this issue.

Based on the logical presumption and available evidence I use the high-income group to proxy for the effect of comprehensive coverage on use of services. We would

³⁴ Both the dependent variable representing any nurse visits and that providing the number of nurse visits are aggregations of all of the types of nurse encounters that are asked about separately in the survey (practice nurse, Plunket nurse, district nurse, public health nurse, diabetes nurse, occupational health nurse, dental therapist/nurse, Maori health nurse, phlebotomist, mental health/psychiatric nurse, other).

³⁵ StataCorp (2005), reference manual A-J, pp. 506-516

³⁶ "Pathways: The Surgical Access Study," is currently in progress. Deborah McLeod of the Wellington School of Medicine and Health Sciences is the Principal Investigator.

expect the effects of private coverage on hospital use to be noticeable in regressions for all three income groups, since all private coverage provides hospitalisation benefits at least. It is important to note that any interpretation of estimates for the high-income group as indicative of the interactive effects of comprehensive coverage on outpatient care will understate that effect. This is because even in the case of high-income people, at least some of the insured will have major medical not comprehensive coverage. Therefore the estimates from the high-income-specific population will reflect an average effect of high-income people with both types of coverage, not the isolated affect of comprehensive coverage. Likewise some of the lower income populations will purchase comprehensive coverage, but the effects of their doing so are likely to be hidden in the estimated models due to an inability to identify them separately.

5 DESCRIPTIVE ANALYSIS OF INDIVIDUALS WITH AND WITHOUT PRIVATE HEALTH INSURANCE

Tables 4, 5, and 6 provide descriptive data on privately insured adults and those without private insurance. The data describe the share of individuals in each of those two groups with the characteristic of interest (i.e. column percents). The characteristics of those with and without private insurance are compared statistically. In each table one asterisk (*) denotes statistical difference between the two groups at the .05 level or better; two asterisks (**) denote statistical difference at the .01 level or better. Table 4 contains data on socio-demographic characteristics; table 5 contains data on health status measures; and table 6 contains data on utilization of health services and access to care.

Socio-Economic Characteristics

Table 4 shows that the privately insured are evenly split between men and women, while those without coverage are slightly more likely to be women (about 54 percent of those without private coverage are women). The privately insured tend to be more highly educated than those without private coverage. The privately insured are significantly more likely to have university qualifications (28 percent of the insured versus 19 percent of those without), and are half as likely to have no secondary school qualifications as those without (13 percent versus 26 percent).

The age distribution and the ethnic distribution of those with private insurance are also quite different from those without private insurance. The privately insured are significantly more likely to be between the ages of 35 and 64, while those without insurance are more likely to be 18 to 34 years old or 65 years and older. Only 14 percent of the insured population are members of an ethnic minority (Maori, Pacific Islander, Asian) compared to 25 percent of the population without coverage. Only 28 percent of Maori and 21 percent of Pacific Islanders are covered by private health insurance, compared to 43 percent of those of European descent (data not shown).

Individuals with private insurance are significantly more likely to be currently employed than those without private coverage (80 percent versus 57 percent), and this difference is also reflected in the higher annual incomes of those with private insurance. Average annual income per household member is roughly \$7,500 higher among those with private insurance than among those without it. Sixty-three percent of the privately insured live in households with annual incomes of more than \$50,000. Only 31 percent of individuals without insurance live in such high-income households. Interestingly, less than 2 percent of each group has the lowest household incomes – \$5,000 or less. Because the New Zealand government provides income support to its most impoverished citizens, it is very unusual for such low-income households to exist, and the majority of these citizens are students or immigrants. Students may continue to maintain private insurance through their parents while at University, and immigrants may not be reporting income from other countries and/or may be reporting private insurance that is maintained from their country of last residence.

Table 4
Comparison of Socio-Demographic Characteristics of Adults
With and Without Private Health Insurance

Characteristic	Privately Insured	Not Privately Insured
male	50.4% **	46.1%
<i>education</i>		
no secondary qualification	13.1% **	26.2%
secondary qualification only	28.3%	28.0%
secondary & prof., trade, technical qual.	23.6% **	18.5%
prof., trade, technical qualifications only	7.4%	8.5%
university qualification	27.6% **	18.7%
	100.0%	100.0%
<i>age</i>		
18 to 24 years	10.2% **	15.4%
25 to 34 years	17.6% **	20.3%
35 to 44 years	24.3% **	19.9%
45 to 54 years	23.1% **	15.0%
55 to 64 years	14.7% **	10.7%
65 years and above	10.1% **	18.8%
	100.0%	100.0%
<i>ethnicity</i>		
Maori	7.3% **	12.6%
Pacific Islander	2.3% **	5.5%
Asian	4.8% **	6.6%
European Descent & Other	85.6% **	75.3%
	100.0%	100.0%
currently working	79.6% **	56.8%
<i>annual household income</i>		
\$0 or less	0.5%	0.6%
\$1 to \$5000	1.2%	1.1%
\$5001 to \$10,000	0.9% **	3.5%
\$10,001 to \$15,000	3.3% **	11.2%
\$15,001 to \$20,000	2.8% **	9.6%
\$20,001 to \$25,000	4.3% **	9.7%
\$25,001 to \$30,000	4.4% **	9.5%
\$30,001 to \$40,000	9.1% **	13.4%
\$40,001 to \$50,000	10.6%	10.3%
\$50,001 to \$70,000	19.4% **	14.6%
\$70,001 or more	43.3% **	16.6%
	100.0%	100.0%
annual income/household size (1)	\$22,922 **	\$15,440
household size	3.08	3.13

Source: New Zealand Health Survey, 2002/03

* denotes means of variable for those with and without private insurance are significantly different from each other at the .05 level.

** denotes means of variable for those with and without private insurance are significantly different from each other at the .01 level or better.

(1) For this measure, annual income is computed using the mid-point of the appropriate interval. For the highest category, \$85,000 is used.

Health Status Measures

Table 5 compares those with and without private insurance in their self-reported health status, prevalence of medical diagnoses, and physical and mental limitations. Those with private coverage are significantly more likely to report being in excellent or very good health than are those without such coverage; those without coverage are significantly more likely to report being in good, fair, or poor health. Twenty-two percent of those with private insurance report being in excellent health, while only 16 percent of those without coverage do. Forty-four percent of the privately insured state that they are in very good health, compared with 38 percent of those without private coverage. Only 7 percent of the privately insured consider their health either fair or poor, while 13 percent of those without coverage rank themselves in this category.

When compared to those without private coverage, those with private insurance are also significantly less likely to have been diagnosed with most of the diseases asked about specifically in the NZHS. They are less likely to have high blood pressure (20 percent versus 23 percent), heart disease (7 percent versus 11 percent), to have had a stroke (1 percent versus 3 percent), to be diabetic (3 percent versus 5 percent), to have bronchitis-emphysema (4 percent versus 7 percent), to have arthritis (14 percent versus 18 percent), or to have other long-term illnesses (22 percent versus 25 percent). There was however no statistical difference between the portion of each group with high cholesterol or who had been diagnosed with cancer. And those with private insurance were more likely to report neck or back problems (27 percent) than those without such coverage (25 percent).

The privately insured are also significantly less likely to report having physical limitations of daily activities (24 percent versus 31 percent) or mental limitations (11 percent versus 17 percent). Taken together these findings suggest that the privately insured tend to be significantly healthier, and consider themselves to be in better health, than are those without private coverage.

Utilisation of Health Care Services

Table 6 provides measures of access to care, use of services provided by particular types of providers, and use of particular types of tests and preventive measures. Individuals with private health insurance are significantly more likely than those without coverage to report having a usual source for obtaining medical care, although both groups have very high rates (96 percent and 92 percent respectively). The privately insured were less likely to report having difficulty accessing GP services in the prior month (9 percent versus 14 percent); however this may also be related to the insured having higher income and/or fewer health care needs.

There was no statistical difference between the share of each group having at least one GP visit in the last 12 months, nor did they differ in the share having at least one nursing visit or having had one prescription filled for their own use. However the privately insured were 5 percentage points more likely than those without private coverage to report having had at least one specialist visit in the last 12 months. These are interesting findings in light of the previously discussed evidence that the privately insured have fewer diagnosed medical conditions, fewer activity limitations, and tend to report better general health.

Table 5
Comparison of Health Status Measures for Adults
With and Without Private Health Insurance

Characteristic	Privately Insured		Not Privately Insured
<i>self-reported health status</i>			
excellent	21.6%	**	16.2%
very good	43.5%	**	38.2%
good	27.9%	**	32.8%
fair or poor	7.0%	**	12.8%
	100.0%		100.0%
<i>medical diagnoses</i>			
high blood pressure	19.8%	*	22.7%
high cholesterol	17.2%		15.5%
heart disease	7.2%	**	10.8%
stroke	1.2%	**	2.7%
diabetes	2.7%	**	5.4%
bronchitis-emphysema	3.5%	**	7.0%
arthritis	14.2%	**	17.8%
neck or back problem	27.2%	*	24.9%
cancer	7.0%		7.4%
other long term illness	22.1%	*	24.8%
<i>self-reported limitations</i>			
physical limitations	24.4%	**	30.8%
mental limitations	10.9%	**	17.0%

Source: New Zealand Health Survey, 2002/03

* denotes means of variable for those with and without private insurance are significantly different from each other at the .05 level.

** denotes means of variable for those with and without private insurance are significantly different from each other at the .01 level or better.

Table 6
Comparison of Utilization of Health Services for Adults
With and Without Private Health Insurance

Characteristic	Privately Insured		Not Privately Insured
<i>access</i>			
usual source of care	95.5%	**	92.0%
difficulty accessing GP	9.3%	**	13.8%
<i>any use in preceding 12 months</i>			
general practitioner	82.2%		80.7%
specialist	35.2%	**	30.3%
nurse	44.6%		44.0%
Maori healthcare worker	1.3%	**	2.6%
Pacific healthcare worker	0.4%	*	0.6%
prescription drugs	72.1%		72.4%
public hospital emergency dept.	5.9%	**	7.9%
public hospital outpatient	7.5%	**	13.7%
public hospital inpatient	6.5%	**	10.9%
public hospital daypatient	2.3%	**	4.1%
private hospital emergency dept.	15.0%	**	11.9%
private hospital inpatient	3.8%	**	1.0%
private hospital daypatient	4.7%	**	1.1%
<i>average number preceding 12 months</i>			
general practitioner visits	2.9	**	3.5
specialist visits	0.9		1.0
nurse visits	1.5	**	2.2
prescriptions filled:			
none	28.0%		27.7%
1 to 2	22.0%	*	19.4%
3 to 4	13.9%		13.4%
5 to 9	13.2%	**	10.5%
10 to 14	8.4%		8.2%
15 plus	14.6%	**	20.9%
<i>tests, etc. in preceding 12 months</i>			
blood test for prostate cancer (1)	18.8%	**	12.4%
blood pressure test	55.8%	**	52.2%
immunisation (for anything)	5.2%		4.6%
flu injection	20.0%		21.0%
diabetes test	18.1%		18.5%
cholesterol test	28.9%	**	24.6%
discussed smoking	5.9%	**	9.6%

Source: New Zealand Health Survey, 2002/03

* denotes means of variable for those with and without private insurance are significantly different from each other at the .05 level.

** denotes means of variable for those with and without private insurance are significantly different from each other at the .01 level or better.

(1) Percentages computed over males only.

The privately insured report significantly lower rates of use of public hospital services of all types – emergency department, outpatient, inpatient, and daypatient – than those without private insurance. The likelihood of hospital use by the privately insured is about 55 to 60 percent of the likelihood of hospital use by those without private coverage. The one exception is emergency department services where use by the privately insured is somewhat closer to that of those without private coverage. Conversely, as one would expect, individuals with private insurance are significantly more likely to use all forms of private hospital services reported in the data (private accident and emergency clinics, inpatient, and daypatient). These differentials are not however clear evidence of any type of substitution of private for public services due to the differentials in health status across the two groups. Because the privately insured appear to have better health status, on average, than those without private insurance, their lower use of public hospital services may simply be a reflection of lower need for such services as opposed to evidence of their substituting private for public hospital services.

The NZHS also reports the number of visits each individual has had to GPs, specialists, and nurses in the prior 12 months. In addition it provides information on the number of prescriptions filled in that time period through categories of use. The average number of visits noted in Table 6 includes those who report no visits during the time period. The privately insured have a slightly lower but still statistically different mean number of GP visit in a year (2.9) than those without private insurance (3.5). There is no difference in the average number of specialist visits (whether privately or publicly funded), which is interesting given the significant difference between the two in the probability of having any visit at all. The specialist findings could reflect a greater severity of illness among those without private insurance compared to those with it who do access specialist care. The privately insured have a slightly lower average number of nursing visits (1.5 versus 2.2 for those with no private coverage). The privately insured are significantly less likely to have filled 15 or more prescriptions in the last year (15 percent versus 21 percent), while they are somewhat more likely to report having only one to two prescriptions or five to nine prescriptions filled.

Those with private coverage are significantly more likely than their counterparts without coverage to report having had a blood test for prostate cancer, a blood pressure test, and a cholesterol test, although the magnitudes of these differences are not particularly large. The insured are less likely to report having discussed smoking with a medical practitioner, but this may be related to a lower rate of smoking in this group. There were no differences between the groups in the share receiving immunisations, flu injections, or tests for diabetes.

To summarise the descriptive evidence the privately insured tend to be more highly educated, between the ages of 35 and 64 years of age, current workers, higher income, and of European descent, compared to the rest of the adult population. The privately insured also seem to be in better general health, and to have fewer medical diagnoses and limitations. They appear to have slightly better access to medical services, and while they appear no less likely to use services than those without private insurance, they do appear to have fewer visits to GPs and nurses and to use fewer prescription drugs. However until we estimate the effect of insurance on use of services while

simultaneously controlling for income, health status, and other characteristics that may affect use, we cannot draw definitive conclusions from this data.

6 MULTIVARIATE ANALYSES: THE EFFECT OF PRIVATE INSURANCE COVERAGE ON THE UTILISATION OF HEALTH SERVICES

This section describes results from two sets of multivariate analyses. The first set estimates the probability that an individual has used a particular health care service in the preceding 12 months. These results are presented in Tables 7 through 17. The second set estimates the level of use for services for which the NZHS provides such detail. These results are shown in Tables 18 through 21. For both sets of models the results are presented for the New Zealand adult population overall, and separately for adults within each of the three household income groups defined earlier – low, middle, and high. In each regression the key independent variable of interest is whether the individual is covered by private health insurance. The results in these tables are the marginal effects of each explanatory variable on the dependent variable. They represent percentage point changes in probabilities resulting from private insurance coverage in the probability of any use probits and changes in the number of visits or prescriptions in the levels of use (negative binomial and interval regressions).

Probability of Any Use

Table 7 presents result for the probability of any *GP visits* in the preceding 12 months. Column 1 contains results for the full adult population. Here we see that having private health insurance significantly affects the probability of having at least one GP visit, increasing the likelihood by 3.4 percentage points. Being male or ethnic Maori significantly decreases the likelihood of a recent GP visit, while having any of the listed diagnoses (besides stroke) increases the probability of a visit. The probability of a visit increases monotonically with decreasing health. Having a physical limitation increases the likelihood of a visit to the GP although, notably, having a mental limitation does not.

While the effect of having private insurance on the probability of having a GP visit is positive and significant, we can see from columns 2 through 4 of Table 7 that the effect is not uniform across the income groups. The marginal effect for the lowest income group is miniscule and completely insignificant. The effect for the middle-income group is about the same as that for the population as a whole, although it is marginally statistically insignificant. The effect for the highest income group is the greatest, increasing the likelihood of a visit by 4.7 percentage points, a statistically significant result.

A similar pattern holds for the probability of having at least one *specialist visit* in the preceding 12 months (Table 8). Having private insurance increases the probability of a visit by 7.9 percentage points, but the result is only significantly different from zero for the highest income group. For that group having coverage increases the probability of at least one visit by 10 percentage points. This effect is particularly large when considering that the probability of at least one specialist visit in the preceding 12 month period for adults overall is only about 32 percent (data not shown). The average probability of a specialist visit for an individual without private insurance is about 30 percent (see Table 6). Thus the effect of private insurance is equivalent to moving that probability from 30 percent to 40 percent, a marginal change equal to 30 percent of the base probability. Unfortunately however, the data

Table 7
Multivariate Probit Marginal Effects:
Probability of Having at Least One GP Visit in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.034 **	0.001	0.034	0.047 **
male	-0.070 **	-0.064 **	-0.054 **	-0.081 **
Maori ethnicity	-0.058 **	-0.037	-0.094 **	-0.024
Pacific Islander ethnicity	0.015	0.041 *	0.020	-0.040
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	-0.027	-0.008	-0.031	-0.033
university qualifications	-0.003	0.011	-0.002	-0.014
secondary & professional, trade, or technical qual.	0.021	0.017	0.026	0.011
prof., trade, or technical qualifications only	-0.001	0.025	0.024	-0.048
high blood pressure	0.057 **	0.032	0.111 **	0.037
high cholesterol	0.073 **	0.064 **	0.030	0.095 **
heart disease	0.060 **	0.028	0.077 **	0.078 *
stroke	0.062	0.097 **	-0.085	0.034
diabetes	0.087 **	0.041	0.114	0.097
arthritis	0.045 **	0.023	0.008	0.099 **
neck or back problems	0.032 **	0.011	0.013	0.054 **
cancer	0.070 **	0.042 *	0.094 **	0.070 *
other long term illness	0.069 **	0.057 **	0.068 **	0.078 **
age 18-24	0.036 *	0.053 **	0.028	0.070 **
age 25-34	0.035 **	0.053 **	0.018	0.047 *
age 45-54	0.001	0.066 **	0.002	-0.024
age 55-64	0.041 **	0.047 *	0.055 *	0.045
age 65 or higher	0.083 **	0.103 **	0.086 **	0.090 **
self-reported health status: very good	0.057 **	0.052 **	0.092 **	0.040
self-reported health status: good	0.075 **	0.067 **	0.086 **	0.079 **
self-reported health status: fair/poor	0.106 **	0.091 **	0.133 **	0.079 **
mental health limitations	-0.001	0.006	0.017	-0.018
physical health limitations	0.088 **	0.059 **	0.094 **	0.101 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 8
Multivariate Probit Marginal Effects:
Probability of Having at Least One Specialist Visit in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.079 **	0.061	0.039	0.102 **
male	-0.033 *	-0.023	-0.025	-0.047 *
Maori ethnicity	-0.075 **	-0.100 **	-0.073 *	-0.066
Pacific Islander ethnicity	-0.073 **	-0.085 *	-0.073	-0.066
HH income relative to HH size	0.000 *	0.000	0.000	0.000
no secondary school qualifications	-0.001	0.015	-0.025	0.023
university qualifications	0.030	0.034	0.017	0.030
secondary & professional, trade, or technical qual.	-0.006	0.060	-0.056	0.006
prof., trade, or technical qualifications only	0.017	0.035	0.035	-0.003
high blood pressure	-0.013	0.010	-0.011	-0.029
high cholesterol	0.045 *	0.050	-0.023	0.080 *
heart disease	0.082 **	0.090 *	0.062	0.101 *
stroke	0.043	0.048	0.019	0.071
diabetes	0.167 **	0.190 **	0.093	0.230 **
arthritis	0.076 **	0.005	0.092 **	0.145 **
neck or back problems	0.040 **	0.082 **	0.019	0.031
cancer	0.234 **	0.270 **	0.172 **	0.259 **
other long term illness	0.121 **	0.137 **	0.076 *	0.142 **
age 18-24	-0.033	-0.022	-0.024	-0.038
age 25-34	-0.032 *	-0.033	-0.025	-0.027
age 45-54	-0.034	0.075	-0.046	-0.053
age 55-64	-0.017	-0.068	0.033	-0.012
age 65 or higher	0.014	0.012	0.074	0.001
self-reported health status: very good	0.053 **	0.055	0.076 *	0.037
self-reported health status: good	0.077 **	0.106 **	0.107 **	0.044
self-reported health status: fair/poor	0.154 **	0.157 **	0.194 **	0.148 *
mental health limitations	0.032	0.005	0.035	0.059
physical health limitations	0.114 **	0.107 **	0.122 **	0.110 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

do not allow us to differentiate between specialist visits funded by the public system and those that fall within the private sector.

The same pattern also pertains to *nursing visits* (Table 9). The overall population effect of having private insurance is to increase the likelihood of a visit with a nurse by 3.4 percentage points. However only the high-income group shows a statistically meaningful effect; for them the probability of a visit increases by 7.2 percentage points. The same type of pattern emerges with results for *prescription drug use* during the preceding year (Table 10). The overall effect of having private insurance is to increase the probability of filling at least one prescription by 3.3 percentage points. But the effect is only significant for the high-income group, increasing the likelihood of their use of prescription drugs by 5.6 percentage points.

We would expect at least some of the out-of-pocket costs for these services – GP visits, specialist visits, nursing visits, and prescription drugs – to be reimbursed through most private comprehensive insurance policies. These results suggest that those with private insurance and who are most likely to have comprehensive coverage – the high-income – tend to use more of these services than do their counterparts without coverage. All privately insured individuals at least have coverage for services provided in the hospital (although levels of such coverage vary). Consequently we would not expect to see such stark variations in effects of having insurance on the use of hospital services across income groups. Indeed that seems to be the case.

Table 11 shows that having private insurance has no statistically significant effect on *emergency department use in public hospitals*. Those with private insurance do have a significantly lower probability of using *public hospital outpatient services* (4.6 percentage points over all adults), and this effect is relatively consistent across all three income groups (Table 12). If most public hospital outpatient services are attributable to specialist visits, this decline may help to explain at least some of the increase in specialist visits as a switch between public and private funding of specialist care. Because the data do not differentiate specialist visits by source of payment this relationship cannot be identified more clearly.

Notably, having private coverage does not have a statistically significant effect on *public hospital inpatient use* overall (Table 13). The only statistically significant effect is for the lowest income group where private insurance lowers the probability of at least one inpatient public hospital stay by 3.5 percentage points.³⁷ There is no significant effect for the higher income groups. Having private insurance lowers the probability of *public hospital daypatient use*, but the effect is very small (1 percentage point) and is only significant for the population taken together, not for any single income group (table 14).

³⁷ Incidentally, this was one area where the results for the non-elderly differed from those of the whole adult population. When the elderly (those age 65 and over) are excluded the statistically significant effect of private insurance in lowering the probability of public hospital inpatient stays among the low-income population disappears.

Table 9
Multivariate Probit Marginal Effects:
Probability of Having at Least One Nurse Visit in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.034 *	-0.013	-0.010	0.072 **
male	-0.105 **	-0.096 **	-0.124 **	-0.099 **
Maori ethnicity	-0.009	-0.045	-0.003	0.006
Pacific Islander ethnicity	-0.085 **	-0.036	-0.109 *	-0.116 *
HH income relative to HH size	0.000	0.000 *	0.000	0.000
no secondary school qualifications	0.015	-0.006	-0.002	0.081 *
university qualifications	0.010	-0.024	-0.037	0.050
secondary & professional, trade, or technical qual.	0.052 *	0.071	0.007	0.086 *
prof., trade, or technical qualifications only	0.053	0.111 *	0.008	0.045
high blood pressure	0.085 **	0.073 *	0.055	0.122 **
high cholesterol	0.112 **	0.122 **	0.081 *	0.117 **
heart disease	0.017	0.005	0.073	-0.003
stroke	0.028	0.122 *	-0.146	0.030
diabetes	0.175 **	0.168 **	0.151 *	0.229 **
arthritis	0.011	-0.022	0.001	0.071
neck or back problems	0.066 **	0.070 *	0.047	0.079 **
cancer	0.074 **	0.084 *	0.084	0.059
other long term illness	0.082 **	0.072 *	0.077 *	0.096 **
age 18-24	0.075 **	0.040	0.082	0.097
age 25-34	0.068 **	0.020	0.047	0.114 **
age 45-54	0.038	-0.019	0.058	0.043
age 55-64	0.033	-0.051	0.079	0.039
age 65 or higher	0.121 **	0.041	0.196 **	0.190 **
self-reported health status: very good	0.043 *	0.087 *	0.030	0.033
self-reported health status: good	0.038	0.066	0.042	0.024
self-reported health status: fair/poor	0.097 **	0.137 **	0.116 *	0.051
mental health limitations	0.035	0.062	0.002	0.048
physical health limitations	0.088 **	0.087 **	0.068 *	0.106 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 10
Multivariate Probit Marginal Effects:
Probability of Having Filled at Least One Prescription in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.033 *	0.008	0.019	0.056 **
male	-0.100 **	-0.069 **	-0.083 **	-0.124 **
Maori ethnicity	-0.049 **	-0.029	-0.081 **	-0.021
Pacific Islander ethnicity	0.044	0.045	0.068 *	-0.004
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	-0.037 *	-0.027	-0.063 *	-0.010
university qualifications	-0.021	-0.038	-0.011	-0.018
secondary & professional, trade, or technical qual.	0.009	0.000	0.001	0.015
prof., trade, or technical qualifications only	-0.030	0.012	-0.007	-0.080
high blood pressure	0.105 **	0.104 **	0.133 **	0.071 *
high cholesterol	0.086 **	0.074 **	0.080 **	0.098 **
heart disease	0.128 **	0.115 **	0.126 **	0.111 **
stroke	0.070	0.079 *	0.090	-0.060
diabetes	0.165 **	0.112 **	0.186 **	0.164 *
arthritis	0.084 **	0.038	0.058 *	0.150 **
neck or back problems	0.057 **	0.039	0.026	0.085 **
cancer	0.067 **	0.038	0.072	0.084
other long term illness	0.120 **	0.082 **	0.106 **	0.155 **
age 18-24	0.060 **	0.058 *	0.060	0.086 **
age 25-34	0.057 **	0.060 **	0.039	0.077 **
age 45-54	0.002	0.042	0.014	-0.015
age 55-64	0.064 **	0.014	0.089 **	0.088 **
age 65 or higher	0.112 **	0.093 **	0.116 **	0.047
self-reported health status: very good	0.076 **	0.083 **	0.082 **	0.070 *
self-reported health status: good	0.106 **	0.108 **	0.102 **	0.110 **
self-reported health status: fair/poor	0.141 **	0.107 **	0.162 **	0.157 **
mental health limitations	0.032	0.012	0.062 *	0.031
physical health limitations	0.096 **	0.086 **	0.086 **	0.099 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 11
Multivariate Probit Marginal Effects:
Probability of Having at Least One Visit to a Public Hospital's Emergency Room in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	-0.009	0.017	-0.020	-0.007
male	0.009	0.004	0.004	0.013
Maori ethnicity	-0.007	-0.005	-0.016	0.006
Pacific Islander ethnicity	-0.020 *	-0.016	-0.044 **	0.012
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	-0.004	0.002	-0.023	0.007
university qualifications	-0.002	0.000	-0.013	0.007
secondary & professional, trade, or technical qual.	-0.007	-0.015	-0.017	0.005
prof., trade, or technical qualifications only	0.017	0.004	0.011	0.035
high blood pressure	0.007	0.019	0.020	-0.016
high cholesterol	0.017	0.000	0.008	0.036 *
heart disease	0.036 **	0.045 *	0.030	0.032
stroke	0.055 *	0.031	0.023	0.193
diabetes	0.005	0.036	0.019	-0.037 **
arthritis	0.016	0.021	0.012	0.010
neck or back problems	0.005	0.003	0.001	0.006
cancer	0.019	-0.001	0.017	0.055
other long term illness	0.034 **	0.070 **	0.009	0.027 *
age 18-24	0.085 **	0.105 *	0.091 **	0.054
age 25-34	0.035 **	0.033	0.015	0.040 *
age 45-54	-0.022 *	-0.002	-0.024	-0.026 **
age 55-64	-0.011	-0.025	-0.007	-0.007
age 65 or higher	-0.028 **	-0.037	-0.023	-0.034 **
self-reported health status: very good	0.002	-0.009	-0.009	0.012
self-reported health status: good	0.017	0.013	0.000	0.030
self-reported health status: fair/poor	0.034 *	0.017	0.021	0.062
mental health limitations	0.025 *	0.026	0.023	0.019
physical health limitations	0.030 **	0.035 *	0.028	0.025

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 12
Multivariate Probit Marginal Effects:
Probability of Having at Least One Visit to a Public Hospital's Outpatient Department in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	-0.046 **	-0.068 **	-0.038 **	-0.035 **
male	-0.021 **	-0.020	-0.013	-0.027 *
Maori ethnicity	0.000	-0.017	0.004	0.019
Pacific Islander ethnicity	-0.040 **	-0.043	-0.051 **	-0.021
HH income relative to HH size	0.000 *	0.000	0.000	0.000
no secondary school qualifications	0.016	0.018	0.011	0.020
university qualifications	0.002	0.045	-0.033 *	0.012
secondary & professional, trade, or technical qual.	0.017	0.026	-0.015	0.038 *
prof., trade, or technical qualifications only	0.030	0.042	0.000	0.048
high blood pressure	0.002	-0.005	-0.004	0.014
high cholesterol	0.027 *	0.033	0.027	0.026
heart disease	0.032 *	0.021	0.065 *	0.019
stroke	0.034	0.031	-0.043	0.205 *
diabetes	0.019	0.042	-0.004	0.025
arthritis	0.020 *	0.028	0.015	0.022
neck or back problems	-0.004	-0.017	0.002	-0.002
cancer	0.067 **	0.062 *	0.082 *	0.066 *
other long term illness	0.059 **	0.079 **	0.028 *	0.067 **
age 18-24	0.007	0.000	-0.018	0.035
age 25-34	-0.003	-0.015	-0.027	0.018
age 45-54	-0.008	0.025	-0.022	-0.010
age 55-64	0.001	0.021	0.002	-0.016
age 65 or higher	0.001	0.007	0.005	-0.038 *
self-reported health status: very good	0.037 **	0.082 *	0.014	0.029
self-reported health status: good	0.047 **	0.081 *	0.025	0.042 *
self-reported health status: fair/poor	0.102 **	0.149 **	0.074	0.092 *
mental health limitations	0.027 *	0.043	0.011	0.035
physical health limitations	0.035 **	0.023	0.049 *	0.028

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 13
Multivariate Probit Marginal Effects:
Probability of Having at Least One Public Hospital Inpatient Stay in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	-0.012	-0.035 *	-0.013	-0.005
male	-0.029 **	-0.025	-0.033 **	-0.026 **
Maori ethnicity	0.012	0.044 *	0.001	-0.001
Pacific Islander ethnicity	0.038 *	0.058	0.028	0.034
HH income relative to HH size	0.000 *	0.000	0.000 **	0.000
no secondary school qualifications	-0.002	0.023	-0.015	-0.010
university qualifications	-0.011	-0.013	-0.032 *	-0.003
secondary & professional, trade, or technical qual.	-0.009	0.020	-0.029	-0.007
prof., trade, or technical qualifications only	-0.011	0.005	-0.009	-0.022
high blood pressure	0.009	0.015	0.016	-0.002
high cholesterol	-0.006	-0.018	0.007	-0.004
heart disease	0.084 **	0.123 **	0.051	0.075 **
stroke	0.063 **	0.057	0.027	0.131
diabetes	0.037 *	0.033	0.048	0.022
arthritis	0.005	0.007	0.005	0.001
neck or back problems	-0.021 **	-0.024	-0.042 **	-0.005
cancer	0.024	0.013	0.026	0.041
other long term illness	0.019 *	0.028	0.014	0.019
age 18-24	0.008	0.041	0.029	-0.014
age 25-34	0.029 *	0.033	0.030	0.024
age 45-54	-0.018	0.019	-0.016	-0.023 *
age 55-64	-0.012	-0.038	0.021	-0.009
age 65 or higher	-0.005	-0.010	0.013	0.019
self-reported health status: very good	0.026 *	0.003	0.032	0.028
self-reported health status: good	0.040 **	0.035	0.026	0.047 *
self-reported health status: fair/poor	0.110 **	0.076	0.094 *	0.172 **
mental health limitations	0.007	-0.005	-0.011	0.032 *
physical health limitations	0.046 **	0.083 **	0.055 **	0.015

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 14
Multivariate Probit Marginal Effects:
Probability of Having at Least One Public Hospital Daypatient Stay in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	-0.011 **	-0.019	-0.010	-0.005
male	-0.005	0.006	-0.002	-0.012 *
Maori ethnicity	-0.002	0.000	-0.013	0.007
Pacific Islander ethnicity	-0.013 *	-0.013	-0.019 **	-0.003
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	0.005	0.008	-0.008	0.025
university qualifications	0.001	0.014	-0.016	0.009
secondary & professional, trade, or technical qual.	0.003	0.011	-0.011	0.012
prof., trade, or technical qualifications only	0.009	-0.011	-0.011	0.046
high blood pressure	-0.003	0.003	-0.004	-0.005
high cholesterol	-0.001	-0.013	0.005	0.003
heart disease	0.013	0.022	0.018	0.000
stroke	-0.012	-0.010	-0.020	-0.006
diabetes	0.002	0.016	-0.014	0.003
arthritis	0.002	0.014	-0.005	-0.001
neck or back problems	0.007	0.000	0.009	0.010
cancer	0.054 **	0.078 **	0.050 *	0.030
other long term illness	0.012 *	0.021	0.010	0.006
age 18-24	0.007	0.018	-0.006	0.000
age 25-34	0.010	-0.004	0.014	0.008
age 45-54	-0.010	-0.023	-0.008	-0.006
age 55-64	0.000	-0.025 *	0.005	0.005
age 65 or higher	-0.005	-0.025	0.005	-0.007
self-reported health status: very good	0.010	0.027	-0.004	0.009
self-reported health status: good	0.024 **	0.024	0.015	0.029 *
self-reported health status: fair/poor	0.044 **	0.054	0.024	0.053
mental health limitations	0.004	0.005	-0.004	0.009
physical health limitations	0.010	0.010	0.003	0.011

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

The probability of using a *private accident and emergency clinic* increases significantly for those with private insurance (Table 15), even though there is no effect on public hospital emergency department use. Within the income group specific models the effect is only significant among those with the highest incomes. The marginal effect of private coverage on *private hospital inpatient use* is positive and statistically significant, increasing the probability of use by 2.6 percentage points. This effect is relatively constant across income groups (Table 16). Likewise for *private hospital daypatient use* having private coverage increases use by 3.1 percentage points overall, and the effect is statistically significant for each income group (Table 17).

Number of Visits

Table 18 presents results from the negative binomial regressions estimating the *number of GP visits* in the last 12 months. In the regression including adults of all incomes the number of visits is not significantly affected by whether the individual has private insurance coverage. The high-income group is the only income group for which there is a significant effect associated with having private insurance. For this group having private insurance increases the number of GP visits in a year by about one-third of a visit. This isolated effect among the high-income group is consistent with the probit results presented earlier and with the hypothesis that those with comprehensive coverage will increase their use of publicly funded GP services.

Table 19 shows the models estimating the *number of specialist visits* in the last 12 months. Again the only statistically significant effect is among the high-income group where those with private coverage have .23 more visits per year than those without. None of the income groups exhibits a statistically significant effect of private insurance on the *number of nursing visits* in a year (Table 20). Finally, having private insurance does have a significant effect on the *number of prescriptions filled* (Table 21), but again the effect only occurs for the high-income group who are presumed most likely to have comprehensive coverage. For the high-income having private insurance increases the number of prescriptions filled in the last 12 months by .75 of a prescription. The magnitude of this effect is on par with the effect of having physical health limitations.

Table 15
Multivariate Probit Marginal Effects:
Probability of Having at Least One Visit to a Private Accident and Emergency Clinic in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.035 **	0.021	0.022	0.044 **
male	0.000	-0.033 *	0.011	0.012
Maori ethnicity	0.007	0.025	0.008	0.007
Pacific Islander ethnicity	-0.009	0.038	-0.023	-0.025
HH income relative to HH size	0.000 *	0.000 **	0.000 *	0.000
no secondary school qualifications	-0.020	-0.007	-0.049 *	0.003
university qualifications	-0.005	0.018	-0.023	0.006
secondary & professional, trade, or technical qual.	0.011	0.016	-0.007	0.020
prof., trade, or technical qualifications only	-0.022	0.018	-0.068 **	0.002
high blood pressure	0.014	0.031 *	0.031	-0.004
high cholesterol	0.007	-0.028	-0.002	0.037
heart disease	0.001	0.003	-0.064 **	0.056
stroke	-0.006	-0.008	0.041	-0.021
diabetes	-0.024	-0.015	-0.007	-0.049
arthritis	-0.015	0.000	-0.017	-0.024
neck or back problems	0.014	-0.001	0.001	0.031
cancer	0.028	0.024	0.034	0.026
other long term illness	0.066 **	0.084 **	0.047 *	0.069 **
age 18-24	0.075 **	0.051	0.074 *	0.129 **
age 25-34	0.024	0.023	0.013	0.040
age 45-54	-0.032 *	-0.059 **	-0.008	-0.036
age 55-64	-0.033 *	-0.016	-0.032	-0.033
age 65 or higher	-0.042 **	-0.060 **	-0.029	-0.002
self-reported health status: very good	0.032 *	0.074	0.016	0.034
self-reported health status: good	0.041 **	0.108 *	0.011	0.035
self-reported health status: fair/poor	0.075 **	0.119	0.112 *	0.047
mental health limitations	0.030 *	0.034	0.035	0.026
physical health limitations	0.036 **	0.017	0.024	0.050 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 16
Multivariate Probit Marginal Effects:
Probability of Having at Least One Private Hospital Inpatient Stay in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.026 **	0.017 *	0.016 *	0.025 **
male	-0.004	-0.005	0.001	-0.006
Maori ethnicity	-0.004	-0.002	-0.007	-0.005
Pacific Islander ethnicity	-0.008	-0.005 *	-0.007	-0.011
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	0.004	0.004	0.009	0.002
university qualifications	0.003	0.008	0.014	-0.003
secondary & professional, trade, or technical qual.	-0.001	0.012	-0.003	-0.005
prof., trade, or technical qualifications only	0.004	0.002	0.003	0.006
high blood pressure	-0.007 **	-0.004	-0.005	-0.007
high cholesterol	-0.002	0.000	-0.004	-0.002
heart disease	0.004	0.013	0.000	-0.004
stroke	-0.003	-0.001	-0.013 **	0.012
diabetes	-0.006	-0.006 *	-0.009	0.001
arthritis	0.006	-0.001	0.006	0.011
neck or back problems	0.002	0.001	0.000	0.004
cancer	0.002	0.005	0.001	-0.002
other long term illness	0.006	0.001	-0.003	0.013
age 18-24	0.004	0.015	0.014	-0.009
age 25-34	-0.001	0.016	-0.001	-0.005
age 45-54	0.004	0.028	0.003	0.001
age 55-64	0.005	-0.004	0.001	0.012
age 65 or higher	0.007	0.005	0.013	0.021
self-reported health status: very good	0.009	0.002	0.005	0.010
self-reported health status: good	0.009	-0.001	0.008	0.012
self-reported health status: fair/poor	0.007	-0.002	0.015	0.005
mental health limitations	-0.004	-0.006 *	0.007	-0.006
physical health limitations	0.014 **	0.012 *	0.015	0.009

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 17
Multivariate Probit Marginal Effects:
Probability of Having at Least One Private Hospital Daypatient Stay in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.031 **	0.020 *	0.018 *	0.030 **
male	-0.003	-0.001	0.000	-0.008
Maori ethnicity	-0.006	0.001	-0.001	-0.011
Pacific Islander ethnicity	-0.006	0.003	-0.008 *	-0.002
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	0.003	-0.001	0.005	0.000
university qualifications	0.005	0.003	-0.004	0.008
secondary & professional, trade, or technical qual.	0.001	0.005	-0.005	0.003
prof., trade, or technical qualifications only	0.017	-0.007 **	0.018	0.027
high blood pressure	-0.001	0.000	0.010	-0.014 **
high cholesterol	0.000	-0.001	-0.004	0.011
heart disease	0.001	-0.004	-0.001	0.019
stroke	0.004	0.004	0.016	(1)
diabetes	0.005	0.008	-0.003	0.008
arthritis	0.005	0.002	-0.001	0.013
neck or back problems	-0.001	0.000	-0.001	-0.001
cancer	0.013	0.007	0.008	0.015
other long term illness	0.017 **	0.009	0.007	0.024 *
age 18-24	0.009	0.007	-0.001	0.012
age 25-34	0.009	0.000	0.007	0.015
age 45-54	0.019 *	0.002	0.014	0.024 *
age 55-64	0.012	-0.003	0.012	0.029
age 65 or higher	0.010	0.003	0.014	-0.005
self-reported health status: very good	0.003	0.002	0.011	-0.001
self-reported health status: good	0.003	0.003	0.010	-0.002
self-reported health status: fair/poor	0.000	-0.002	0.006	0.014
mental health limitations	-0.004	-0.003	0.009	-0.013 *
physical health limitations	0.009 *	0.006	0.001	0.013

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

(1) This variable dropped out of the estimation because no one in the population subsample reported this diagnosis.

Table 18
Multivariate Negative Binomial Regression Marginal Effects:
Number of GP Visits in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.144	-0.316	0.078	0.341 **
male	-0.714 **	-0.877 **	-0.633 **	-0.705 **
Maori ethnicity	0.111	0.687	-0.423 *	0.245
Pacific Islander ethnicity	0.517 **	0.832	0.375	0.503
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	0.103	0.170	-0.035	0.156
university qualifications	-0.145	-0.397	-0.080	-0.026
secondary & professional, trade, or technical qual.	-0.005	-0.434	0.163	0.094
prof., trade, or technical qualifications only	0.043	0.053	0.118	0.113
high blood pressure	0.758 **	0.935 **	1.038 **	0.444 **
high cholesterol	0.240 *	0.506 *	0.158	0.219
heart disease	0.597 **	0.713	0.377	0.711 **
stroke	0.534	0.289	0.364	1.490
diabetes	1.152 **	1.365 *	1.515 **	0.667 *
arthritis	0.311 **	0.003	0.282	0.622 **
neck or back problems	0.335 **	0.220	0.142	0.474 **
cancer	0.760 **	0.975 **	0.779 *	0.668 *
other long term illness	1.014 **	1.477 **	0.636 **	1.015 **
age 18-24	0.740 **	1.241	0.545	0.719 **
age 25-34	0.294 *	0.483	0.115	0.376 *
age 45-54	0.022	1.038	0.240	-0.244
age 55-64	0.225	0.102	0.512	0.109
age 65 or higher	0.619 **	0.635	0.825 *	0.981 *
self-reported health status: very good	0.447 **	0.400	0.699 **	0.289 *
self-reported health status: good	0.896 **	0.858	0.885 **	0.898 **
self-reported health status: fair/poor	2.351 **	2.514 **	2.850 **	1.623 **
mental health limitations	0.416 **	0.515	0.613 *	0.244
physical health limitations	1.179 **	1.375 **	1.427 **	0.838 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 19
Multivariate Negative Binomial Regression Marginal Effects:
Number of Specialist Visits in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.103	0.122	-0.058	0.233 **
male	-0.126 *	-0.157	-0.020	-0.183
Maori ethnicity	-0.123	-0.181	-0.118	-0.028
Pacific Islander ethnicity	-0.055	-0.179	0.111	-0.259
HH income relative to HH size	0.000	0.000	0.000	0.000
no secondary school qualifications	-0.025	-0.129	-0.003	0.035
university qualifications	0.004	-0.178	0.122	0.006
secondary & professional, trade, or technical qual.	-0.121	0.030	-0.098	-0.145
prof., trade, or technical qualifications only	0.111	-0.140	0.375	0.059
high blood pressure	-0.049	0.100	0.034	-0.169 *
high cholesterol	0.098	0.119	-0.013	0.132
heart disease	0.318 **	0.334 *	0.425	0.143
stroke	0.093	0.171	-0.204	0.171
diabetes	0.248 *	0.278 *	0.128	0.346
arthritis	0.218 **	0.067	0.198	0.407 **
neck or back problems	0.066	0.099	0.007	0.084
cancer	0.836 **	1.024 **	0.562 **	0.941 **
other long term illness	0.624 **	0.757 **	0.403	0.561 **
age 18-24	-0.056	-0.170	-0.056	0.068
age 25-34	-0.043	-0.140	-0.006	-0.060
age 45-54	-0.231 **	0.053	-0.234 *	-0.257 **
age 55-64	-0.181 *	-0.445 **	-0.075	-0.073
age 65 or higher	-0.212 **	-0.382 *	-0.051	-0.124
self-reported health status: very good	0.073	0.276	0.078	0.028
self-reported health status: good	0.095	0.449 **	0.105	-0.034
self-reported health status: fair/poor	0.549 *	0.772 **	0.485	0.736
mental health limitations	0.121	0.110	0.102	0.131
physical health limitations	0.437 **	0.312 **	0.568 **	0.384 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 20
Multivariate Negative Binomial Regression Marginal Effects:
Number of Nurse Visits in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.011	-0.499	-0.051	0.195
male	-0.499 **	-0.728 **	-0.750 **	-0.278 *
Maori ethnicity	0.217	0.241	0.271	0.230
Pacific Islander ethnicity	0.350	0.448	0.156	0.599
HH income relative to HH size	0.000	0.000 **	0.000	0.000
no secondary school qualifications	0.408 *	0.264	0.302	0.843
university qualifications	-0.120	-0.423	-0.259	0.214
secondary & professional, trade, or technical qual.	0.070	-0.572 **	0.117	0.350
prof., trade, or technical qualifications only	-0.005	0.572	-0.272	-0.001
high blood pressure	0.606 **	0.740 **	0.441	0.682 **
high cholesterol	0.107	0.055	0.098	0.189
heart disease	0.513 *	0.948 *	0.356	0.533
stroke	0.728	0.890	0.256	1.223
diabetes	1.632 **	2.706	1.637	0.843
arthritis	0.294	0.283	0.310	0.400
neck or back problems	0.000	-0.289	0.025	0.151
cancer	0.820 **	0.554	0.740	0.883 *
other long term illness	0.922 **	0.927 **	0.538	1.163 **
age 18-24	0.208	-0.332	0.817	0.111
age 25-34	0.330	-0.386	0.714 *	0.434 *
age 45-54	-0.155	-0.716 *	0.240	-0.193
age 55-64	-0.353 *	-0.938 **	0.191	-0.347 *
age 65 or higher	0.434	-0.625	1.779 *	0.557
self-reported health status: very good	0.251	0.144	0.218	0.168
self-reported health status: good	0.416 *	0.231	0.328	0.278
self-reported health status: fair/poor	1.191 **	1.087	1.041	1.150
mental health limitations	0.227	0.858 *	0.339	-0.145
physical health limitations	0.646 **	0.751 *	0.969 *	0.358 *

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Table 21
Multivariate Interval Regression Marginal Effects:
Number of Prescriptions Filled in Preceding 12 Months

Explanatory Variable	All Adults	Low-Income	Middle-Income	High-Income
private insurance coverage	0.254	-0.564	-0.008	0.746 **
male	-1.343 **	-1.178 **	-1.146 **	-1.463 **
Maori ethnicity	-0.673 **	-1.018 **	-0.741 *	-0.311
Pacific Islander ethnicity	0.263	0.335	0.494	-0.020
HH income relative to HH size	0.000	0.000 *	0.000	0.000
no secondary school qualifications	0.480 **	0.565	0.165	0.556
university qualifications	-0.048	-0.613	-0.136	0.224
secondary & professional, trade, or technical qual.	-0.071	-0.415	0.032	0.066
prof., trade, or technical qualifications only	0.095	-0.468	0.264	0.382
high blood pressure	2.516 **	3.241 **	2.097 **	2.221 **
high cholesterol	1.113 **	1.068 *	1.137 *	1.175 **
heart disease	3.976 **	5.507 **	3.667 **	3.164 **
stroke	3.403 **	4.772 **	3.925 **	0.438
diabetes	4.355 **	4.034 **	4.357 **	4.575 **
arthritis	1.699 **	1.093 *	1.650 **	2.317 **
neck or back problems	0.847 **	1.290 **	0.466	0.857 **
cancer	1.516 **	0.581	2.274 **	1.711 **
other long term illness	2.565 **	2.765 **	1.948 **	2.868 **
age 18-24	0.790 **	1.005	0.684	1.015 *
age 25-34	0.571 **	0.819	0.018	0.981 **
age 45-54	0.182	0.472	0.638	-0.066
age 55-64	1.307 **	0.499	1.483 *	1.553 **
age 65 or higher	3.492 **	2.934 **	3.737 **	2.277 **
self-reported health status: very good	0.670 **	1.475 **	0.718 **	0.385
self-reported health status: good	1.711 **	2.464 **	1.543 **	1.572 **
self-reported health status: fair/poor	3.307 **	4.189 **	3.683 **	2.577 **
mental health limitations	0.478 *	0.009	0.569	0.687
physical health limitations	1.419 **	1.900 **	1.813 **	0.776 **

Source: Author's analysis of the New Zealand Health Survey, 2002/03

* denotes statistical significance at the .05 level or better.

** denotes statistical significance at the .01 level or better.

Financial Implications of the Findings

The multivariate analyses therefore indicate that, among those most likely to have comprehensive private health insurance (the high-income), private coverage significantly increases the number of GP visits, the number of specialist visits, and the number of prescriptions filled in a 12 month period. Private coverage does not significantly affect this population's probability of using public hospital emergency departments, the probability of having a public hospital inpatient stay, or the likelihood of public hospital daypatient use. Having private health insurance does however decrease the likelihood that this group will use public hospital outpatient services

The multivariate findings presented here lead naturally to the question of how large the private insurance effects are in terms of increased public dollars spent in the New Zealand public health system. Unfortunately, constraints of the data make this an impossible question to answer conclusively. Rather, the available resources only permit us to generate a rough estimate.

The first constraint is the consequence of all private health insurance being grouped together in the NZHS. Because the survey does not identify those who have comprehensive as opposed to those who have major medical coverage, our analytic attention is most intensely focused on those most likely to have comprehensive coverage – high-income individuals. Therefore the marginal effects estimated from the high-income population will be used as a proxy for the effect of having private comprehensive insurance on those of all income levels. However even among the high-income group some will have comprehensive coverage and some will have major medical. Consequently the estimated effects shown here for the high-income population cannot be considered “clean” estimates of the effect of having private comprehensive insurance, but instead an average effect of those having either type of coverage. Thus the estimated effects shown here should be considered biased downward compared to the true effect of having comprehensive insurance. Because we do not know what percentage of the high-income privately insured have comprehensive coverage, any adjustment intended to compensate for the comprehensive/major-medical mix must be considered rough. Here I suggest a doubling of the estimated marginal effect for each service category, as we know that over all those with private insurance (regardless of income) roughly 40 percent have comprehensive insurance.³⁸

In addition while the NZHS contains a great deal of helpful detail on use of various

³⁸ I am assuming that the marginal effects estimated in the multivariate analyses are actually an average of those with comprehensive coverage and those with major medical coverage. Those with major medical coverage are presumed to have no private health insurance utilisation effect for day-to-day services such as GP visits, prescription medications, etc. Because I presume that a larger share of the high-income privately insured have comprehensive coverage than the overall privately insured population (for whom we know that 40 percent have comprehensive coverage), I assume that approximately 50 percent of the high-income insured have comprehensive coverage. Therefore the implicit calculation is as follows:

marginal effect estimated here $\approx 50\%*(0) + 50\%*(\text{true marginal effect of having comp. coverage})$
Therefore the true marginal effect of having comprehensive is roughly equal to two times the marginal effect estimated using the NZHS data.

different providers and services, the categories of service use are quite broad. This is of necessity in a survey such as the NZHS which is trying to capture such a breadth of information. Response rates decline with the length of a survey, and recall of finer detail will tend to be quite inaccurate when respondents are asked to look back over the preceding 12 months. Consequently while the NZHS provides data on whether respondents had any use of hospital-based services, there is no information on the number of days associated with a hospital admission, the number of outpatient hospital visits, or the intensity of services used during a hospital based encounter. One can apply overall averages to construct an estimate but doing so necessitates the possibly erroneous assumption that the services used by the privately insured are, on average, no different than services used by others. Also, the survey data do not differentiate between public and private specialist visits and do not specifically identify private hospital use that might be financed through the public insurance system (for example, through the ACC).

Finally, research evidence suggests that survey respondents tend to recall fewer health care services than they actually receive.³⁹ Consequently general adjustments based on typical levels of under-reporting will be necessary without detailed claims data that would better enable us to account for actual use. Such adjustments are not completely straightforward because the literature identifies the problem, but does not provide estimates of the level of under-reporting under the particular circumstances of an in-person, nationally representative, annual survey such as the NZHS.

Given these caveats a precise estimate of the financial impact of private insurance on the public system is not possible. However even an admittedly rough estimate enables us to translate these findings in a manner that provides a general sense of their policy relevance. By focusing exclusively on the estimates associated with the high-income population – those most likely to have comprehensive private health insurance – and applying estimates of this population’s increased use to the total number of New Zealand residents who have private comprehensive health insurance, I endeavour to produce policy-relevant findings.

A summary of the findings of this study relevant to the computation follows. All of these findings relate to average health service usage effects for high-income individuals over a 12 month period. Having private insurance: increases individuals’ number of GP visits during a year by .341 visits; increases the number of specialist visits by .233 visits; increases the number of nursing visits by .195 visits (although this result was not statistically significant); and increases the number of prescription medications by .746 of a prescription. The only significant effect on the use of public hospital services is to decrease the probability of having at least one outpatient visit by 3.5 percentage points.

According to insurance industry estimates 551,573 people had private comprehensive insurance in 2005.⁴⁰ Ministry of Health estimates indicate that the average governmental cost associated with a GP visit is \$26 and the average governmental

³⁹ Green and Cumming (2005); Evans and Crawford (2000); Petrou et al. (2002); Richards et al. (2003)

⁴⁰ Unpublished data, Health Funds Association of New Zealand, Inc. (2006)

cost of a pharmaceutical drug prescription is \$34.⁴¹ Each GP visit is associated with 1.2 lab tests, on average, with an average governmental cost of \$9.45 per test. Ministry estimates also indicate that the average governmental cost of a public hospital outpatient visit is approximately \$159.

The most applicable estimate of the under-reporting of GP visits indicate that adults report only 57.8 percent of the GP visits that can be documented in the GPs' database of services provided. Consequently for cost estimation purposes we can multiply the reported number of GP visits by 1.73 (1/.578) to adjust for under-reporting. The 57.8 percent estimate was computed comparing a GP database with monthly diary entries kept by respondents over the course of 12 months. Because the recall period for NZHS respondents is considerably longer (NZHS is an in-person interview with questions requiring a 12 month recall, no monthly diaries used), this upward adjustment is probably smaller than the true adjustment needed. I use the same relative adjustment for the number of prescriptions filled, due to the lack of a specific pharmaceutical-related estimate in the available literature.

Another study compared the health care utilisation reporting accuracy in recalling GP visits and hospital outpatient attendances.⁴² The results of this British analysis suggest a much higher rate of reporting accuracy for hospital outpatient attendances (86.2 percent) as opposed to GP visits (29.4 percent). While 58 percent of study participants asked to recall use over a long period of time (five to 12 months) under-reported GP visits, only 7.7 percent under-reported hospital outpatient attendances. While four-fifths of the misreporting of GP visits was attributable to under-reporting (as opposed to over-reporting), only slightly over half of the misreporting of hospital outpatient attendances was due to under-reporting. The authors note that "the differential between medically recorded and self-reported use of outpatient, accident and emergency, and inpatient hospital services was negligible, with no evidence of variation by recall period." Consequently, I do not impose any adjustment for under-reporting of use of outpatient hospital services here.

Using all of this information and the multivariate results, we can make the following rough calculations:

1. The increased annual government cost of GP visits associated with private comprehensive insurance is equal to the number with that coverage multiplied by the increased number of visits associated with the coverage multiplied by the government cost per visit multiplied by an adjustment for under-reporting of GP visits multiplied by an adjustment accounting for the fact that the estimated effect from the multivariate analysis is biased downward, or:
 $551,573 * .341 * \$23 * 1.73 * 2 = \15.0 million

⁴¹ Unpublished New Zealand Ministry of Health estimates, excluding GST (2006). Private comprehensive insurance does not offset the public subsidy for any service; it offsets out-of-pocket payments by those with the coverage.

⁴² Petrou et al. (2002)

2. The increased annual government cost of lab tests associated with private comprehensive insurance follows on the calculation in 1. above, but substituting the cost per lab test for the cost per GP visit and multiplying the calculation by the average number of lab tests per visit (1.2), or:

$$551,573 * .341 * \$9.34 * .93 * 1.73 * 2 = \$5.7 \text{ million}$$

3. The increased annual government cost of prescription medications associated with private comprehensive insurance equals the number with that coverage multiplied by the increased number of prescriptions associated with the coverage multiplied by the government cost per prescription multiplied by an adjustment for under-reporting of prescriptions filled (assumed to be the same relative under-reporting as GP visits) multiplied by the adjustment to account for the downward bias of the estimates, or:

$$551,573 * .75 * \$40 * 1.73 * 2 = \$57.8 \text{ million}$$

4. The decreased government cost associated with the decline in public hospital outpatient services is calculated as the number with that coverage multiplied by the decreased probability of having at least one outpatient encounter multiplied by the government cost per encounter multiplied by the adjustment to account for the downward bias of the estimates. Note, this calculation is less satisfying than the others, in that the NZHS data do not report the number of outpatient visits for those who have at least one. For want of a better approach I implicitly assume here that each person who has an outpatient visit has only one visit, undoubtedly leading to somewhat of an underestimate in this calculation:

$$551,573 * .035 * \$159.39 * 2 = \$6.2 \text{ million}$$

Unfortunately the NZHS data do not allow us to differentiate between public and privately financed specialist visits. Thus while private insurance has a positive and significant effect on the number of specialist visits for the high-income group, I cannot identify how much of that effect pertains to government-financed care. Also increased numbers of specialists visits (either publicly or privately funded) will lead to increased laboratory, x-ray, and other ancillary services which are also financed at least in part by the public sector. In addition private insurance has a positive though statistically insignificant effect on nursing visits. Ministry of Health data were not available on the government costs associated with nursing visits independent of GP visits. Data on the use of other types of health care services, such as x-rays and other imaging technologies, were not included in the NZHS, and those costs are likely to increase with increased use of GP and specialist services as well. Consequently, it is reasonable to presume that the annual costs computed above (\$15.0 million + \$5.7 million + \$57.8 million – \$6.2 million = \$72.3 million) underestimate the increased annual government expenditures associated with private insurance. Therefore I suggest considering a range of \$75 to \$100 million annually as more appropriate. Obviously this is a rough calculation and must be recognised as such. It is worth noting that if one were uncomfortable with the adjustments suggested here for taking into account presumed under-reporting of health services utilisation, one could eliminate that adjustment, leading to a total dollar figure of \$39.2 million per year instead of the \$72.3 million shown above. Taking the other sources of missing information into account, one might then use an estimated cost impact range of \$40 to \$55 million per year, as opposed to \$75 to \$100 million.

The annual dollar impact of private comprehensive health insurance might be considered relatively modest in relation to annual government health expenditures of \$8.6 billion dollars. The estimated effect is not of the same magnitude as those seen in the US under the Medicare system, most likely because the out-of-pocket requirements under the NZ system were much smaller to begin with. However the overall effect is one that can be expected to increase government costs, not reduce them.

Limitations of the Analysis

As already noted the lack of data on whether each individual reporting private coverage had comprehensive or major medical policies produces some limitations. First, the multivariate estimates presented in this report will tend to be biased downward, with the estimated effect being an average effect of those with comprehensive and those with major medical, rather than the more desirable pure estimate of only those with comprehensive insurance.

I have used the high-income population as the focus of this analysis, presuming that group to be most likely among the privately insured population to have comprehensive coverage. This presumption is based on the income effect (comprehensive coverage is more expensive; thus, those with high incomes are more likely to purchase it) and on the limited understanding of insurance purchase decisions gleaned from “Pathways: The Surgical Access Study”, currently being conducted. Fortunately the Ministry of Health is currently considering including more detail on policy type in the next round of the NZHS. Meanwhile, if my presumption is incorrect and the high-income insured are not more likely to have comprehensive than are the lower income insured, then the results here are counter-intuitive. In that case the differential utilisation response of the high-income insured population compared to the lower income populations would however still be of interest and worth exploring further.

Another analytical issue of import is that I was not able to identify an appropriate instrument to use for purposes of explicitly adjusting for the endogeneity of the health insurance purchase decision. However all available evidence from the NZHS and other research indicates that those purchasing health insurance are healthier than those who do not. In addition the unregulated nature of the NZ private insurance market that allows insurers to permanently exclude pre-existing conditions as well as any chronic conditions that develop before or after the purchase of coverage, suggests that insurance is less valuable to those who anticipate high levels of use. However it is always preferable to be able to adjust for any possible unmeasured differences in the proclivity for individuals to use health care services. While that was not possible here, it might be feasible to do so with identifiers for geographic area of residence, information concerning whether employers offered health insurance to their workers (either with or without an employer paid contribution), information concerning attitudes toward medical interventions, and details on the type of coverage purchased (e.g. with and without prescription drug coverage, and the inclusion of other day-to-day type of service benefits).

In addition, the variable associated with the respondent’s private health insurance coverage status refers to the respondent’s situation at the time of the survey, while the

“use of services” variables reflect utilization during the prior 12 months. This differential may introduce some degree of measurement error, as an individual may have had private coverage only for a portion of that time period, while the analysis implicitly assumes coverage during the full 12 months.

Another variable definition issue should be mentioned. The NZHS income variable includes income from all of those living in the household, not only for the respondent’s family. The survey also asks for the number of people living in the household, not the number of people in the respondent’s family. It is unclear whether use of health care services is most responsive to household, family, or nuclear family (i.e. parents and their dependent children alone) income and size. In fact the most appropriate measure may differ by ethnic group and by household type. This is an issue that is worth studying further in order to identify appropriate income and size questions for future NZ surveys.

Finally, and significantly, since the time that the 2002/2003 NZHS data were collected the Ministry of Health has begun to phase in the Primary Health Care Strategy, discussed previously in the background section of this report. Under that initiative the incentive to purchase comprehensive coverage will decline, as out-of-pocket costs for GP visits and pharmaceuticals decline. As out-of-pocket requirements decline the effect of private insurance on the use of GP, pharmaceutical services, and other services provided outside of the hospital inpatient setting will lessen relative to what I have found here. It is worth noting however that increased public subsidies for these services will lead to similar utilisation responses as private insurance coverage of such out-of-pocket requirements. In other words publicly funded reductions in out-of-pocket requirements can be expected to increase the use of publicly funded health care services in a manner similar to that seen with private insurance coverage. This is an effect that can be tracked with primary care utilisation data using deprivation level as a proxy for income.

7 CONCLUSIONS AND POLICY IMPLICATIONS

New Zealand

This analysis indicates significant interactive effects between private insurance and the use of health services. These effects are particularly pronounced with regard to care received outside of the hospital setting. Private insurance tends to increase the use of GP services, specialist services, and pharmaceuticals among those most likely to have comprehensive health insurance – high-income individuals. In addition it is safe to assume (although it was not possible to explicitly estimate the effect) that the use of ancillary services associated with GP and specialist visits, such as laboratory tests, x-rays, and other imaging services increase as well.

Those with private coverage, regardless of income, experience lower rates of public hospital outpatient use, all else being equal. If as some suggest, public hospital outpatient care is often publicly financed specialist visits, this finding is consistent with the notion that private insurance allows individuals to substitute private for public specialist care, possibly with shorter waiting times. There was no overall significant effect of private insurance on public hospital inpatient, daypatient, or emergency room care, although there was a modest yet significant decline in public hospital inpatient use for the low-income population with private coverage. If private inpatient care acts as a substitute for public in-patient care, one would have expected significant overall declines in public inpatient use.

The insurance industry has suggested that a public rebate for the purchase of private health insurance policies is appropriate, given that such purchases reduce costs incurred by the public health system. However the research results presented here indicate that the opposite is in fact true. I find that those covered by comprehensive private health insurance will tend to increase costs within the public system. It is fair to say however that even a roughly estimated increase in government costs of \$100 million per year is modest in relation to a public budget of \$8.6 billion annually for health care services. But the lack of significant declines in public hospital use and the increased use of outpatient and non-hospital based services generally financed through the public system call into question the validity of claims by private insurers that those purchasing private coverage should receive rebates to compensate them for substituting private care for public care. While the privately insured are more likely to use private hospital services, they do not appear to be decreasing their use of public services overall.⁴³ Further, providing rebates for the purchase of private comprehensive coverage would most certainly increase the number of people purchasing it, thereby increasing the associated public costs estimated here.

There may indeed be a significant value for those receiving increased services obtained through private hospitals, e.g. faster access to care and access to services one otherwise might not obtain due to the public system's supply constraints. However the relevant question for policy makers is not whether private benefits accrue to those purchasing insurance coverage, but rather the magnitude (if any) of the public costs associated with private insurance, and whether this is the mechanism through which

⁴³ The data do not however allow us to discern whether there are differences in the intensity of public hospital services related to private insurance coverage.

public dollars are most effectively or most appropriately distributed.

While it may be politically unpalatable in New Zealand, the public sector could re-capture the marginal cost increases to the public system due to the purchase of private comprehensive policies or could regulate insurance in such a way as to prevent the increased costs from ever occurring. The increased costs can be re-captured by imposing a tax on the purchase of private comprehensive policies that cover out-of-pocket costs for publicly financed services. In order to calculate a premium tax rate that would counteract those privately imposed costs more precisely one would need data derived from a survey like the NZHS which explicitly asks questions about the type of insurance coverage held, as well as utilisation data beyond that available from the NZHS (e.g. provider visit counts by whether they were publicly funded visits or privately financed, numbers of hospital days and intensity of services received, utilisation of ancillary services). Alternatively, the increased costs could be avoided entirely by passing legislation or regulations that prohibit private insurers from selling products that provide reimbursement for cost-sharing requirements associated with publicly financed medical services. This is the approach taken by the Canadian system.

This study can also be interpreted to suggest that as cost-sharing requirements go down under the Primary Health Care Strategy, individuals at all income levels will increase their use of publicly financed services as a consequence. Studies in the US have found that the increased use of services resulting from lower out-of-pocket requirements will tend to increase the use of both necessary and unnecessary care.⁴⁴ It seems that individuals are not capable of effectively discriminating between necessary and unnecessary care, at least in the US, and presumably such abilities do not differ markedly between Americans and New Zealanders. Consequently, while the NZ Strategy will undoubtedly lead to greater equity of access to primary care services, it can also be expected to increase overall national health care spending and to produce some inefficiencies, particularly among those with higher incomes and less significant health care needs. These inefficiencies may to some extent be counter-balanced by longer-term savings that could accrue if better patient management in the primary care setting results from better access for those who currently face financial barriers to care.

United States

Allowing supplemental coverage in conjunction with a largely government-funded health insurance system can have significant effects on the use of public services, as shown in this analysis of the NZ health care system. Because the US system has been dominated by private coverage for so long, discussions of significant publicly financed expansions of coverage tend to be centred on subsidies for coverage in the private insurance market. If such reforms are undertaken it is important for policymakers in the US to heed the lessons of the NZ experience, as well as those of the Medicare experience with the elderly US population.

For example, the US government (or a state government in the US) could provide subsidies set at such a level as to allow all individuals to enrol in an insurance policy

⁴⁴ Newhouse et al. (1993), and Newhouse (2004)

that provides a minimum set of benefits, while allowing those who wish (and who can afford it) to purchase additional supplementary benefits. While it may be most consistent with the US cultural ethic to allow for the purchase of additional benefits, it is important to recognise that the private purchase of supplemental benefits generates costs for the government. And these costs are likely to be financed by both the low- and high-income through general revenues collected through the tax system. Consequently if high-income individuals are increasing government costs through the purchase of supplemental coverage, those costs are likely to be financed in a relatively regressive way. While these costs to the US Treasury can be re-captured (through premium taxes for example), careful thought and analysis would be required to both collect the appropriate amount of money and to then redistribute the revenue in an equitable manner.

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