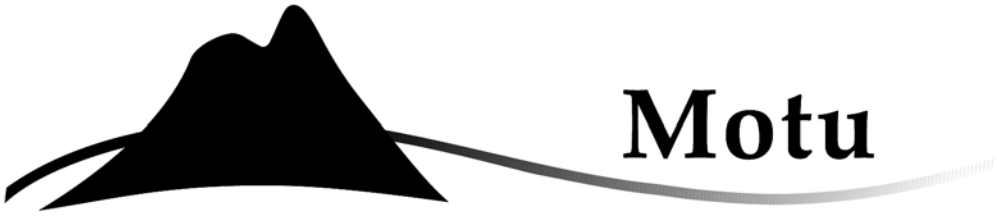

Who Pays What for Primary Health Care? Patterns and Determinants of the Fees Paid by Patients in a Mixed Public-Private Financing Model

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Abstract

The New Zealand government introduced a Primary Health Care Strategy (PHCS) in 2001 aimed at improving access to primary health care, improving health, and reducing inequalities in health. The Strategy represented a substantive increase in health funding by government and a move from a targeted to a universal funding model. This paper uses representative national survey data to examine the distribution of fees paid for primary health care by different individuals under the mixed public-private financing model in place prior to the introduction of PHCS. Using multivariate regression analysis, we find that fees do vary, with people who might be expected to have greater needs paying less. However, apart from people with diabetes, there is no direct link between self-reported health status and fees paid. The findings indicate that a mixed public-private financing model can result in a fee structure which recognises differences across different population groups. The findings also provide a baseline against which changes in funding brought about by the PHCS can be evaluated.

JEL classification
I11, I18, H51

Keywords
General Practitioner, Primary Health Care, Doctor Fees, Health User-Charge, New Zealand

Contents

1 Introduction

The impact of patient co-payments on access to care, utilisation of services and health outcomes, and the implications for public policy of patient co-payments, have been the focus of much attention in the international health policy literature over many years (Scitovsky and Sneider, 1972; Rice and Morrison, 1994; Sepehri and Chernomas, 2001). The issue is of particular salience in New Zealand, where primary health care traditionally has been only partially subsidised by government, resulting in individual New Zealanders co-funding their access to primary health care through significant out-of-pocket payments, with the level of co-payments traditionally set by general practitioners (GPs), in an unregulated market setting.

Concerns have long been expressed that these arrangements have resulted in significant barriers to access to primary health care for many New Zealanders, particularly amongst Māori, Pacific, low income and high needs populations (Crengle, 1999; Cumming and Mays, 1999; Ministry of Health, 1999; Tukiotonga, 1999; Raymont, 2004). Such barriers to access are likely to have resulted in poorer health status and higher than appropriate use of secondary care services for those affected. As a result, the New Zealand government introduced in 2001 a Primary Health Care Strategy (PHCS) aimed at improving access to primary health care, improving health, and reducing inequalities in health. The PHCS represents a move from targeted to universal funding of primary health care.

The purpose of this paper is to examine the distribution of fees paid for primary health care by different individuals prior to the introduction of PHCS. It uses data from two national health surveys – the 1996/97 and 2002/03 New Zealand Health Surveys – to explore the levels of fees paid by patients using primary health care services in these two years, to analyse the determinants of differing fee levels across a range of economic, socio-demographic and health characteristics, and to consider the financial implications arising from the use of a mixed public-private financing model. This model allows us to examine the extent that New Zealanders with different health needs are paying different prices in the unregulated markets for GP services.

We begin by describing the current institutional environment in New Zealand and how it changed with the introduction of the PHCS. We then compare the financing model used in New Zealand to those used in the United States, Canada, the United Kingdom and Australia and discuss previous research on primary health care fees in these countries. We next describe the data used in this study and discuss the difference in fees paid by different individuals in each of the two years, using bivariate analysis. In order to assess these differences more thoroughly, we then derive a multivariate model for variation in fees paid

and use the data to estimate the relationship between various socio-economic and health characteristics and the GP fees paid by individuals. The results are then presented and discussed.

2 Background

The New Zealand government originally introduced policies to finance primary health care for the population in the mid-1930s. Initially, it was hoped to introduce free primary health care for all New Zealanders, with providers to be funded on a capitation basis. However, protracted negotiations with the British Medical Association (which represented New Zealand GPs at that time) resulted instead in the introduction of government fee-for-service partial subsidies for GP care, with GPs retaining the right to charge patients fees directly (except for maternity care). The government paid GPs directly on a claims basis, and the subsidies originally covered about 66 percent of the total fee charged by GPs for their services (Government White Paper, 1974).

By the 1970s, however, the government subsidy represented only around 33 percent of the fees GPs charged, and concerns were being raised about the impact of these charges on New Zealanders' access to services, particularly for those with poorer health, for those who use services regularly and for those on lower incomes (Government White Paper, 1974). In the early 1990s, the funding arrangements were altered, with government subsidies increased but targeted through the use of entitlement cards. The Community Services Card (CSC) was made available for household on a low income and the High Use Health Card (HUHC) was made available for those regularly using primary health care services. Both cards represented entitlement to subsidies. About 50 percent of the population were entitled to the CSC (Gribben, 1996) and an estimated five percent were eligible for the HUHC. Take-up for both these cards, however, was thought to be lower than expected (Foley, unpublished).

In 1997, universal subsidies were introduced for children, with the aim of free care provision for those aged less than six years of age, although in practice some fees continued to be charged by some practices. At this stage, adult New Zealanders without a CSC or HUHC were not receiving any government subsidies towards the cost of their primary health care (Davis et al, 1994). In 2001, the New Zealand government introduced a Primary Health Care Strategy (PHCS) aimed at improving access to primary health care, improving health and reducing inequalities in health.

Implementation has proceeded extremely quickly, with Primary Health Organisations (PHOs) developed to put the new policies into practice. By September 2008,

some four million New Zealanders were enrolled with 80 PHOs. Part of the PHCS involves moving from a targeted to a universal financing model, so that all New Zealanders are now eligible for subsidised primary health care services. The government has committed more than $2.2 billion over seven years from 2002/03 for implementation of the Strategy (Hodgson, 2006). New funding was provided first to Access PHOs, with high need populations, to reduce user charges for all their enrolees. New funding for Interim PHOs (with a lower proportion of enrolees with higher needs) was rolled out by age group over the past few years, again with much of the new funding aimed at reducing the fees that New Zealanders pay when they use services. Additional funding has also been provided to offer further financial support to PHOs committed to ensuring very low cost access by maintaining low fees (Hodgson, 2007). All PHOs have also received funding for management support services, for health promotion and for 'services to increase access', and PHOs are able also to access Care Plus funding, aimed at improving the care provided to individuals with chronic illnesses (Ministry of Health, 2004).

Beyond the primary health care sector, New Zealand has a universal public health insurance scheme. This includes universal accident insurance managed by the Accident Compensation Corporation (ACC). District Health Boards (DHBs) are responsible for ensuring the provision of health and disability services in New Zealand. There are 21 DHBs located throughout New Zealand. The Ministry of Health is a central government organisation which oversees the DHBs, providing them with support, funding, and national policy advice (Ministry of Health, 2003). Public hospitals are fully subsidised by the government, while dentists and pharmaceuticals are partially subsidised. Private hospitals are also available for those who are willing to pay for the immediate treatment of non-urgent health problems. In 2005, 78 percent of total health expenditure was funded by the government, four percent through private health insurance, and 17 percent through user-charges (OECD, 2007).

3 International Comparisons

The financing of primary health care differs greatly between countries. In this section, we review the financing models used in the United States, Canada, the United Kingdom, and Australia and discuss previous research on GP fees in each of these countries.[1] Compared to these countries, the institutional situation in New Zealand is unique in the sense that a universal health care system is in place (and secondary services are free), but the market for GP services is essentially unregulated in the price domain. Thus, it is an

[1] Unless otherwise stated, the information in section on health systems is taken from OECD (2007) and refers to the situation in each country in 2005.

ideal country in which to examine the characteristics correlated with GP fees, as individuals have complete freedom to choose different providers but providers are constrained by the fact that individuals can use secondary facilities as an alternative provider of services.

3.1 United States

There are two main public insurance programmes in the United States which, in total, cover 27 percent of the population. These are Medicare, which provides insurance cover for the elderly population and some of those with disabilities, and Medicaid, which provides cover for a segment of the poor population. Approximately 59 percent of the population have private health insurance. The extent to which this coverage includes different health services depends on the specifics of each insurance policy. Private insurance makes up 37 percent of total expenditures on health, while public insurance makes up 45 percent of total health expenditure. User-charges make up 13 percent of health expenditure. Hospitals and physicians are paid in a variety of ways, including through charges, capitation and discounted fees.

Steinwald and Stone (1974) is one of the only papers that has investigated determinants of GP fees. The authors used data reported by GPs to estimate the importance of physician characteristics, practice characteristics, patient characteristics and insurance types on the prices charged by GPs. They found that patient characteristics and insurance type were more important in explaining variations in fees between GPs than the GP or practice characteristics. Fees had a weak but significant positive association with patient income. The income effect was twice as strong for the more highly skilled internists as for GPs. They also found a positive relationship between the number of physicians in other fields relative to the population and a negative relationship between the numbers of physicians in the same field relative to the population.

Other research on this topic in the United States has focused on modelling the market for GP services, particularly with regard to determining whether the market is perfectly competitive or monopolistic (Newhouse, 1970), determining whether physician induced demand maintains GP income levels when fees are fixed (Hadley and Reschovsky, 2006), and attempting to explain the faster rate of growth in health expenditure in the United States relative to other countries (Anderson et al. 2005). Research has also raised concerns regarding the health and wellbeing of the 14 percent of the population that is not covered by any type of insurance (Ayanian et al, 2000).

3.2 Canada

Canada has a universal, comprehensive, public health insurance scheme. All "medically necessary" care is provided by hospitals and physicians and is fully funded by the provinces and the Federal Government (Barer et al 1988). Patients face no user charges for these services. Private insurance is available for services not covered by the public insurance system, such as dental care, rehabilitation and prescription drugs.

Public funding comprises about 70 percent of total health expenditure, with private insurance making up 12 percent and user charges (for those services not covered by the federal/provincial plans) 15 percent. Physicians are mainly paid on a fee-for-service basis, with the fees negotiated annually between the provincial medical association and provincial ministries. If physicians wish to charge patients fees for services covered by the federal/provincial plans, they cannot be included in the public system. Hospitals are mainly funded on a budgetary basis.

Research has shown that the comprehensive, universal insurance system has reduced barriers to access for those with low socio-economic status (Beck, 1978; Eyles et al, 1995). Concerns, however, are still expressed that there are other barriers to health care. While Dunlop et al (2000) found that income was not significantly associated with GP visits, education was significant, and income was significantly associated with visits to specialists. As a referral is required from a GP for a specialist visit this has health implications for those on low-incomes.

3.3 United Kingdom

The United Kingdom (UK) has a fairly comprehensive, universal public health insurance system with the health care provided by the National Health Service. The public insurance covers "medically necessary" health care as well as dental care, rehabilitation and some prescription drugs. Twelve percent of the population have private insurance to cover private medical care. Public funding comprises of 87 percent of total health expenditure. The remaining 13 percent is privately funded through user-charges and private health insurance. GPs belong to Primary Care Trusts which receive funding for their enrolees. Hospitals are usually also funded through the Primary Care Trusts.

Dixon et al (2003) reviewed the literature on the equity of the British National Health Service (NHS). They discuss research which examines overall health status, as well as research which focuses on particular types of health problem, such as cardiac care or preventative services. They report that the literature finds a weak link between socioeconomic status and overall health status, but that for specific health problems,

individuals with lower socioeconomic status obtain lower levels of health care relative to need. The authors conclude that barriers to access to health care exist for those with lower socioeconomic status, even though the fee barrier present in some other countries has, in the United Kingdom, been removed. They provide evidence to support the following barriers to access for those on a low income: longer travel time, greater travel cost, lower car ownership, fewer networks within the medical profession, less confidence in communicating with a GP, different health beliefs, and lower health literacy skills.

3.4 Australia

Australia has a universal public health insurance scheme (Medicare). This insurance covers most medical services, although GPs are able to impose user-charges if they wish. Total health expenditure consists of 67 percent public funds, 20 percent user charges, and seven percent to private insurers. Private insurance is held by 43 percent of the population and covers GP user charges and private hospitals. Since 1996 the Australian government has encouraged uptake of private insurance through subsidies and tax incentives (Van Doorslaer et al, 2008).

Like New Zealand, there has been a strong research focus on the equity of user charges. Jones et al. (2008) investigated healthcare fee payments as a proportion of household expenditure for those with concessionary cards (entitlement to government subsidies) and those without. They found that those with concessionary cards paid lower GP fees than non-card holders. However this was not the case for all areas of healthcare. Other research has reviewed the equity of the mixed public-private financing model. Lairson et al (1995) found that those on higher incomes were more likely to receive health care from a GP or specialist while those on lower incomes were more likely to receive care as a hospital out-patient. More recently, Van Doorslaer et al (2008) have produced similar finding based on comparisons between those who have private health insurance and those who do not. They find that access to health care is equitable, however the mix of services received is not. Higher income patients are more likely to see a specialist rather than a GP and are more likely to be a private patient in a hospital than a public patient.

4 Data

This paper analyses data from the New Zealand Health Survey (NZHS), which is a national, representative survey of population health. The NZHS collects cross-sectional data on the health status of New Zealanders, the prevalence of risk and protective factors associated with these health conditions, and the use of health services, including satisfaction with health services and barriers to accessing health services. The NZHS was undertaken in

1992/93, 1996/97, and 2002/03. This paper examines data from the 1996/97 and 2002/03 surveys.[2]

The sample design of the survey differed in each wave. Both waves involved face-to-face interviews with New Zealanders aged 15 years and over. The 1996/97 survey collected data from 7,862 adults (one per sample dwelling) on their health, as well as on the health of at most one eligible child per sample dwelling. Respondents were asked to fill in a General Health Questionnaire (GHQ), which included questions on self-reported health status, limitations to daily activities and alcohol consumption. They were then interviewed, with the interviewer collecting data on chronic disease, health service use, risk and protective factors, and socio-demographic characteristics, in that order. The 2002/03 survey collected data from 12,529 adults (one per sample dwelling). Unlike the 1996/97 survey, it did not collect data on the health of children. All questions were asked in an interview, with data collected on chronic disease, health service use, risk and protective factors, self-reported health status, and socio-demographic characteristics, in that order.

This analysis focuses on the adult respondents from both surveys. Data from a small number of individuals who reported that they were in the armed forces at the time and individuals with missing data on key variables are dropped from all analyses.[3] The resultant analysis sample consisted of 7,269 adults from the 1996/97 survey and 12,237 adults from the 2002/03 survey. Both surveys were designed as stratified random samples with certain ethnic and geographic groups over-sampled to provide more reliable estimates. All results in this paper are calculated using the appropriate sample weights, which are designed to produce estimates for a representative sample of adult New Zealanders.

The key variable of interest in this paper is the fees paid by adult New Zealanders for primary health care. Individuals in each survey were asked whether they had visited a general practitioner (GP) in the last 12 months.[4] If they answered 'yes' to this question, they were then asked what the doctor charged them for their last visit. Responses to this question

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[2] Data from 1992/93 were not examined owing to significant differences in the data collected.

[3] For example, for the 1996/97 survey, we drop 213 individuals with missing data on alcohol consumption, 138 with missing data on self-reported health status, 108 with missing or incomplete data on employment status, 69 with missing data on health insurance, 68 with missing data on asthma, and a smaller number of individuals missing data on other questions. For the 2002/03 survey, we drop 142 individual with missing data on health insurance, 45 with missing data on high blood pressure, 23 with missing or incomplete data on employment status, and a smaller number of individuals missing data on other questions.

[4] In the 1996/97 survey this question reads, "In the last 12 months, have you seen a doctor or been visited by a doctor about your own health? By 'doctor' I mean any GP or family doctor, but not a specialist." In the 2002/03 survey this question reads, "In the last 12 months, have you seen a doctor, or been visited by a doctor, about your own health? By health, we include your mental and emotional health as well as your physical health."

are coded in $10 ranges (e.g. $10 or less, $11-20, and so forth), with top-coding at 'more than $40' in the 1996/97 survey and at 'more than $50' in the 2002/03 survey. Other valid responses include, 'free', 'other arrangements', or 'don't know'.[5]

Table 1 examines primary health care utilisation and fees paid by age-group for respondents in each survey.[6] In 1996/97, 79 percent of New Zealanders visited a GP in the last year. Of these, 12 percent paid nothing for their visit, 41 percent paid $20 or less, 43 percent paid $21-40, and four percent paid more than $40. Primary health care utilisation was at similar levels in 2002/03, with 81 percent of New Zealanders having visited a GP in the last year. Nominal fees paid for these visits increased, with nine percent paying nothing for their visit, 19 percent paying $20 or less, 47 percent paying $21-40, and 25 percent paying more than $40. Given that there was a general increase in prices (inflation) between 1996/97 and 2002/03, it is not clear whether or not this represents an increase in fees in real terms.[7] This will be examined more closely later in this section.

Table 1 also shows differences in utilisation and fees across age groups. We find that primary health care utilisation increases considerably with age. In 1996/97, 76 percent of 15-44 year olds visited a GP in the previous 12 months, compared to 80 percent of 45-64 year olds and 93 percent of individuals aged 65 years and over. In 2002/03, the pattern was the same with 76 percent of 15-44 year-olds visiting a GP in the last year, compared with 83 percent of 45-64 year olds and 94 percent of individuals aged 65 years and over. Fees paid also vary by age, with cheaper visits (less than $10 or free) being less common for older individuals. For example, in 1996/97, 40 percent of 15-24 year-olds, 27 percent of 25-44 year olds, 17 percent of 45-79 year-olds, and 13 percent of 80+ year-olds paid less than $10 for their last visit (including those whose visit was free). The pattern is the same in 2002/03 although the gradient was less steep with only 26 percent of 15-24 year-olds paying less than $10 (or nothing) for their last visit. Visits that cost $11-30 were more common for older New Zealanders, while visits that cost over $30 were most common for 25-64 year-olds.

[5] Individuals are asked to fill in the arrangement when responding, 'other arrangements'. This has been coded in our data for the 1996/97 survey. The most common responses are 'paid by ACC', 'paid by insurance' or 'paid by my employer'. We include these individuals in the 'free' category in all tables. Less than one percent of respondents in each survey report 'other arrangements'.

[6] All individuals are placed into one of the following groups according to their age at the interview: 15-24, 25-44, 45-64, 65-79 and 80+. These groups correspond to the groups used to determine age-specific health policies by the central government, except we group 15-17 year-olds with 18-24 year-olds because of the sample size and separate 80+ year-olds from 65-79 year-olds because of their different health needs.

[7] The general price level, as measured by the Consumer Price Index (CPI) increased 11 percent between the second quarter of 1996 and the second quarter of 2002.

Table 2 examines primary health care utilisation and fees paid for these visits by age-group and gender, pooling data from both surveys. In this table, we can see that women are more likely to visit the GP than men for all age-groups except the oldest. Overall 85 percent of women had seen a GP in the last year compared to 75 percent of men. These differences are larger in the younger age-groups. Eighty-six percent of 15-24 year-old women had visited a GP in the last year compared with 68 percent of 15-24 year-old men, while 94 percent of 65-79 year-old women visited a GP compared to 92 percent of 65-79 year old men. On the other hand, the distribution of fees paid is quite similar for both men and women in each age-group.

Table 3 stratifies these results by age-group and ethnicity.[8] We combine the two oldest age-groups for this table because of the small numbers of people in the 80+ age-group when the data are analysed by ethnicity. The table shows that primary health care utilisation varied a great deal by ethnicity. For example, 82 percent of Pākehā/Europeans visited a GP in the last 12 months compared to 78 percent of Pacific Islanders, 75 percent of Māori, and only 60 percent of Asians. Looking at the experiences of people in different age groups, we find that these differences are particularly large for young people, with 83 percent of 15-24 year-old Pākehā/Europeans visiting a GP compared to 74 percent of Pacific Islanders, 71 percent of Māori, and only 48 percent of Asians in this age-group. On the other hand, less ethnic variation in utilisation is found among individuals aged 65 or more, with 94 percent of Pākehā/Europeans visiting a GP compared to 93 percent of Pacific Islanders and Asians.

In terms of fees paid, on average, Pākehā/Europeans and Asians paid more for GP visits than Māori and Pacific Islanders across all age-groups. For example, 17 percent of Pākehā/Europeans and 18 percent of Asians paid $10 or less (or the visit was free). Meanwhile 33 percent of Māori and 40 percent of Pacific Islanders paid $10 or less (or the visit was free). At the other end of the scale, 15 percent of Pākehā/Europeans and 20 percent of Asians paid more than $40 for their visit, while eight percent of Māori and five percent of Pacific Islanders paid more than $40.

Table 4 examines primary health care utilisation and fees paid for these visits by local New Zealand Deprivation (NZDep) quintile in each survey. NZDep is a small area deprivation index that ranks New Zealand areas by deprivation level. NZDep1996 is used

[8] Ethnicity is self-defined in the NZHSs, and individuals can choose more than one ethnicity. Individuals are assigned to one category using the Statistics New Zealand prioritisation scheme, which works as follows: any individual who answers Māori in any choice is Māori, any individual who answers Pacific Islander in any choice but not Māori is a Pacific Islander, any individual who answers Asian in any choice but not Māori or Pacific Islander is Asian, any individual who answers Other in any choice but not Māori, Pacific Islander, or Asian is Other, and all remaining individuals are Pākehā/European.

for the 1996/97 data and NZDep2001 is used for the 2002/03 data. The values for the indices are summarised from variables taken from the 1996 and 2001 New Zealand Census' respectively. Variables that are included in the summary are the proportion of the population who receive a means tested government benefit, have a low income, are unemployed, do not have telephone access, do not have access to a car, are within single parent families, have no qualifications, crowded living space, and lack of home ownership.[9] Quintile 1 represents the 20 percent of areas in New Zealand with the least deprived NZDep scores and quintile 5 represents the 20 percent of areas with the most deprived NZDep scores. Although there is a substantial degree of clustering, not all people with high degrees of deprivation live in areas with high deprivation scores and vice-versa.

The likelihood of visiting a GP did not appear to vary by NZDep score in either survey year. However, there was a large variation in the fees paid for GP visits for individuals living in different communities. In both survey years, individuals living in communities with more deprived NZDep scores paid less, on average, for visits than those living in communities with less deprived NZDep scores. These differences are substantial, for example, in 1996/97, 46 percent of individuals living in quintile 1 paid more than $30 for their last GP visit, while only 14 percent of individuals living quintile 5 paid this amount in 1996/97. In 2002/03, 69 percent of individuals living in quintile 1 paid more than $30 for their last GP visit, while only 26 percent of individuals living in quintile 5 paid this amount.

Table 5 examines the average real fee paid (i.e. inflation adjusted) by individuals with different demographic and community characteristics in each survey year. Standard errors for each cell are also presented to allow the reader to identify whether a particular difference is likely to be statistically significant. We create a continuous measure of nominal fees by assigning the approximate mid-point of each bracketed fee range to each observation. For example, individuals reporting the cost of their last GP visit as between $11-20 are assumed to have paid $15. The top category of more than $40 in the 1996/97 survey and more than $50 in the 2002/03 survey are assumed to have paid $45 and $55, respectively. These values are then converted to real 2003 dollars using the CPI for the appropriate year.

As hinted at in the previous tables, average real fees varied a good deal across demographic groups, except by gender. For example, individuals aged 15-24 paid the lowest fees, on average $9-$10 less than 45-64 year-olds who paid the highest fees, followed by 80+ year-olds ($6-$7 less), 65-79 year-olds ($5 less), and 25-44 year-olds ($2-$3 less). Differences are also found across ethnic groups, with, on average, Māori paying $5-$7 less and Pacific

[9] The weighting given to each of these variables differs slightly between the two indices with a lower weighting being placed on access to a telephone in NZDep2001 than in NZDep1996.

Islanders $8-$11 less in GP fees than Pākehā/Europeans, and Asians paying similar fees as Pākehā/Europeans. There were also large variations in the fees paid across communities, with individuals in the most deprived communities paying, on average, $10-$12 less in GP fees than individuals in the least deprived communities.

Table 5 also shows that, controlling for inflation, GP fees have increased significantly over time for all groups, except Asians.[10] Between 1996/97 and 2002/03, fees increased by $5-$6 for each age-group, by $7 for Pākehā/Europeans, $4 for Pacific Islanders, $3 for Māori, $6-$8 for NZDep quintiles 1-4, and $4 for NZDep quintiles 5 (the most deprived population group). Overall, on average, fees increased in real terms by $5.80 between the two surveys, an increase of 26 percent.

5 Regression Analysis

We next use regression analysis to examine the factors that are associated with paying different fees for GP visits in a multivariate framework. This allows us to determine which characteristics have the strongest association with GP fees and to establish whether there is a statistically significant relationship between each characteristic and the level of GP fees paid. The fee paid by an individual for a GP visit reflects both the underlying cost of those services and the quality of services purchased. Thus, while the fee is partially determined by the local supply of and demand for GPs, as well as local and central government price setting policies, ultimately it is a choice variable of the individual.

As a result, if the regression analysis shows that a particular characteristic is associated with paying higher GP fees (for example, gender), we cannot determine whether this occurs because women seek out higher cost GP services (e.g. higher quality services), there is a limited supply of local doctors specialising in GP services targeted towards women, women are charged higher prices because they have a greater demand for GP services, or because government policy is influencing fees along this dimension.[11]

Each regression model we estimate takes the form:

$$Fee_{it} = \alpha + \beta X_{it} + \delta Z_{it} + \gamma C_{it} + \alpha_t + \varepsilon_{it} \qquad (1)$$

[10] Although fees stayed the same across time for Asians, this result is treated with caution owing to the large standard error in the 1996/97 estimate.

[11] In this example, it would be unlikely that government policy affects GP fees paid since these policies are not gender specific. However, government policy has targeted price reductions for

where i indexes individuals, t indexes time, Fee_{it} is the real fee paid by individual i for their last GP visit in year t, X_{it} is a vector of individual i's characteristics, Z_{it} is a vector of characteristics for individual i's household, C_{it} is a vector of characteristics for individual i's community, a is the overall model intercept, a_t is an indicator variable for the survey year of each record, which controls for aggregate changes in GP fees over time, and ε_{it} is a normal white noise error-term. We estimate these models using Ordinary Least Squares (OLS) after converting the fee paid for each individual's last GP visit to a continuous variable by assigning the approximate mid-point of each bracketed fee range to each observation.[12]

We estimate regression model (1) using data from all respondents who visited a GP in the last 12 months and reported the cost of their last GP visit. We ignore any sample selection issues and assume that the fees paid by these individuals (80 percent of the sample) are representative of the fees that would have been paid by those who did not visit a GP in the last year (if they had done so). That is, we assume that the fees paid by individuals depend on their observed characteristics and not on unobserved characteristics that are correlated with the likelihood of an individual visiting the GP.[13]

We estimate five specifications of regression model (1) on the pooled data from both surveys. The first specification, which we refer to as the 'baseline' model, only controls for individual demographics, community characteristics, and the survey year.[14] The second specification adds control variables for household composition to the first specification.[15] The third specification adds control variables for real household income to the second specification.[16] The fourth specification adds control variables for employment status and

different age, ethnic and socioeconomic groups and the impact of these policies are likely reflected in our regression findings.

[12] We also estimated our regression models using Maximum Likelihood Interval Regression, which is a technique designed for models where the dependent variable is reported in brackets. Our results were qualitatively similar and thus we present results from the more commonly used OLS approach.

[13] For example, if individuals who did not visit the GP are all predisposed to choosing GPs with low fees this could bias our estimates. Intuition suggests that this type of selection is unlikely to be a serious concern.

[14] Specifically, we include an indicator variable for whether the respondent is female; four indicator variables for their age-group, with being aged 25-44 the omitted default group; three indicator variables for the prioritised ethnic groups, with being Pākehā/European or Other the omitted default group; three indicator variables for an individual's highest qualification, with the omitted default group being having no qualifications; an indicator variable for whether the individual reports currently being legally married or living in a de-facto marriage; an indicator variable for whether the community is rural; and a series of indicator variables for each NZDep decile, with decile 1 (e.g. the least deprived communities) the omitted default group.

[15] Specifically, we include two indicator variables for whether the household is a 'single parent household' or a 'couple with children household' versus the default omitted group of 'households with no children'. We also control for the number of people living in the household (top-coded at 8).

[16] Approximately 20 percent of households do not report their income in both survey rounds. Given their numbers, we do not exclude these households and instead include an indicator variable for whether the household has not reported their income.

occupation to the third specification.[17] Finally, the fifth specification adds controls for access to health insurance, self-reported health status, chronic health conditions and health behaviours.[18]

We take this approach of estimating increasingly comprehensive specifications for two reasons. First, it allows us to examine whether particular variables explain some of the variation we see in the simple descriptive tables. For example, we are able to identify the particular variables that explain much of the variation observed in fees paid by different age-groups. Second, one important concern is that some of our explanatory variables may be endogenously determined with GP fees. This is particularly relevant for the health variables included in the final specification. For example, the likelihood of reporting health problems will depend on how frequently an individual sees a GP which is directly related to the fees charged for those services. Another example is that the decision to get individual health insurance is quite likely closely related to the fees charged by GPs. Economic variables such as employment can also be endogenously determined if, for example, lower available GP fees encourage people to go to the doctor more frequently and these time costs lead them to reduce their employment intensity. We can alleviate these concerns by examining whether the coefficients on socio-demographic characteristics change when we add subsequent variables to the model. If they do not change, then it is unlikely that endogeneity bias is a serious concern.

6 Results

Table 6 presents the results from estimating the five specifications of regression model (1). In the baseline specification, we find that, controlling for demographics, younger and older people pay less for GP visits. Compared to 25-44 year olds, on average, 45-65 year olds pay $2.10 more per visit, while 65-79 year-olds pay $2.40 less per visit, 80+ year olds pay $3.20 less per visit and 15-24 year-olds pay $5.30 less per visit. On average, women pay the same GP fees as men. Māori pay $3.40 less and Pacific Islanders $5.50 less per visit on average than other ethnic groups. People with higher qualifications pay more for GP visits

[17] We include two indicator variables for whether an individual is employed full-time or employed part-time, with the default omitted group being individuals who are not employed; and eight indicator variables for the individual's occupation, with the default omitted group being individuals who are legislators or managers.

[18] We include an indicator variable for whether an individual report being covered by a health or medical insurance scheme; four indicator variables for an individual reports their health status as being 'very good', 'good', 'fair' or 'poor', with the default omitted group those who report it being 'excellent'; three indicator variables for whether an individual reports ever having been told by a doctor that they have asthma, diabetes, or high blood pressure; an indicator variable for whether an individual is currently a regular smoker; and an indicator variable for whether an individual had a drink containing alcohol in the last 12 months.

(for example, individuals with university qualification pay, on average, $3.90 more per visit than individuals with no qualification). Married individuals pay, on average, $2.11 more than non-married individuals for GP visits. Individuals living in rural areas pay $3.60 less per visit, than those who live in urban areas.

There is a large price gradient across communities, with individuals living in areas with the most deprived NZDep scores paying $10.31 less, on average, for a GP visit than those in areas with the least deprived NZDep scores. This occurs at all points in the NZDep scale, with even the average individual in a decile 3 community paying significantly less ($2.01) to visit a GP than the average individual in a decile 1 community. We also find that GP prices have increased by $5.70-$6.00 in 2002/03 compared with 1996/97, even after controlling for general price increases across the economy.

Turning to the second specification, we find that adding controls for household composition has little qualitative effect on the baseline findings, but that individuals in larger households pay less for GP visits ($0.60 less for each household member) and that individuals in single parent families pay, on average, $3.60 less for GP visits. Adding real household income in the third specification leads to a reduction in the gradient on qualifications (for example, now individuals with university qualification are found to pay, on average, $2.10 more per visit than individuals with no qualification compared with the $3.90 difference found with the baseline analysis) and a reduction in the gradient on NZDep, with individuals living in areas with the most deprived NZDep scores now found to be paying $7.90 less, on average, for a GP visit than those in areas with the least deprived NZDep scores.[19] Household income itself is positively related to GP fees, but this is a weak relationship, with a $10,000 increase in household income associated with a $0.70 increase in fees. However, households that do not report their income pay, on average, $3.40 more for a GP visit, leading one to suspect that these are wealthier households. Thus, these results indicate that some of the relationship between qualifications, community characteristics and GP fees occurs because individuals in higher income households both pay more for GP visits, are more likely to have higher qualifications and are more likely to live in less deprived communities. However, differences in household income explain only about a third of the variation in fees for these characteristics.

Examining the fourth specification, we find that adding controls for employment status has a large impact on a number of results. First, women are now found to spend $1.10 more on average than men for GP visits. Second, much of the age gradient in fees

[19] The difference in fees paid for married individuals in also reduced to $1.10 from $2.10 in the baseline specification and Asians are now found to spend more than Pākehā/Europeans on fees.

disappears, with only 15-24 year-olds paying less than 25-44 year-olds for visits ($4.70) and both 45-64 year-olds and 65-79 year-olds paying $1.20-$1.70 more per visit. Third, Asians now pay $2.35 more than Pākehā/Europeans per visit. Fourth, most of the qualification gradient in fees disappears, with individuals with school and vocational qualifications paying $0.90-$1.20 more per GP visit than those with no qualifications, but no significant difference found for individuals with university qualifications. Interestingly, adding the employment controls has little impact on the NZDep-fees gradient.

The coefficients on the employment variables indicate that people in employment pay substantially more for GP visits than those who are not employed (those in full-time employment pay $8.60 more and those in part-time employment pay $5.20 more than those who are not employed) and that individuals in lower skilled occupations pay less for GP visits than individuals in higher skilled occupations. These results are consistent with individual income being more important than household income in determining the price paid for GP services, with individuals with less available time paying more to visit the GP, and with non-employed individuals potentially paying lower fees because of government sponsored fee-reductions (for example, having a community service card). Overall, employment status and community deprivation have the largest impact on the variation in fees paid by individuals once we control for other socioeconomic variables.

Turning to the final specification, adding the health variables to the model has a limited impact on all the other coefficients.[20] This suggests that endogeneity bias caused by the inclusion of these variables is not a serious concern. Individuals with health insurance pay, on average, $3.20 more per GP visit than other individuals; perhaps indicating that these individuals choose higher priced care, or are charged a higher price, because the cost is shared with an insurance agency. There is no independent relationship between self-reported health status and the cost of a GP visit. Among individuals with chronic health conditions, only individuals with diabetes pay significantly different GP fees (they pay $1.80 less, on average). Interestingly, regular smokers pay less for GP visits ($0.75 less on average) whereas those who have had an alcoholic drink in the last 12 months pay more ($1.60 more on average).

Table 7 presents the results from estimating the last specification in the prior table separately by age-group and survey year.[21] This allows us to examine if the relationships

[20] The larger effect is on the NZDep-fees gradient, which becomes slightly less pronounced but is still large with individuals in decile 10 communities paying, on average, $6.30 more per GP visit than individuals in decile 1 communities.

[21] We estimate separate models for each age-group and survey year, except because of small sample sizes we pool the 65-79 year-old and 80+ age-groups.

found above are particular to certain age-groups and whether they have changed over time. Although we find that 45-64 year-old women paid higher GP fees in 2002/03, no other gender differences are found. Māori and Pacific Islanders in all but the 15-25 year-olds age-group paid significantly lower GP fees in 2002/03 than equivalent Pākehā/Europeans, but this was not the case in 1996/97. Asians in the 25-44 and 45-64 year-old age-groups in 1996/97 and those in the 15-24 year-old age-group in 2002/03, pay substantially higher GP fees ($5.70-$9.10 depending on the age-group/year) than equivalent Pākehā/Europeans.

Employment status was found to matter more in 1996/97 (but was still important in 2002/03) for all age-groups. For example, in 1996/97 the full-time employed aged less than 65 paid $8.30-$10.60 more than the non-employed, on average, for a GP visit, while, in 2002/03, this difference was $3.40-$8.90. Household income has a stronger positive relationship with GP fees for older individuals in both surveys (for example, a $10,000 increase in household income is associated with a $0.30-$1.00 increase in GP fees for 25-44 year-olds, but a $1.30-$1.60 increase for 65+ year-olds).

We also find that the relationship between community NZDep and individual GP fees varies significantly between age-groups and over-time. We found that for 15-24 year olds, fees are not related to NZDep in either survey year. In 1996/97, the difference in fees paid by individuals in the least deprived and those in the most deprived communities is largest for 24-44 year-olds, with individuals in this age-group in decile 10 areas paying $7.50 more, on average, than those in decile 1 areas, while for individuals aged 45+, those in decile 10 areas paid $4.90-5.60 more than those in decile 1 areas. This pattern was reversed in 2002/03, with individuals aged 45+ in decile 10 areas paying $8.50-$9.30 more, on average, than those in decile 1 areas, while individuals aged 24-44 year-olds in decile 10 areas paid $7.20 more than those in decile 1 areas. The difference in fees paid by individuals in the least deprived and those in the most deprived communities was greater in 2002/03 than in 1996/97.

Finally, comparing the model constants for each age-group over time allows us to examine how average fees have changed for the different age groups. This exercise shows that, on average, real fees increased by $6.00 for 15-24 year-olds, $2.00 for 25-44 year-olds, $3.60 for 45-64 year-olds, and by $7.10 for 65+ year-olds between the two survey years, holding all other characteristics constant.

7 Discussion

This paper reports on the fees paid by New Zealanders visiting GPs in 1996/97 and 2002/03. They pre-date the introduction of New Zealand's Primary Health Care Strategy

(PHCS), which began to be implemented from mid-2002 onwards, just as the 2002/03 New Zealand Health Survey was beginning to be undertaken. Given the slow take-up of new funding during 2002/03, the results here can be considered to provide baseline information about fees in New Zealand, prior to the full implementation of the PHCS and the roll-out of new funding.

A number of studies have been undertaken in other countries to explore the impact of user fees on primary health care utilisation. Cost sharing has been shown to discourage the use of appropriate and inappropriate care roughly equally (Lohr et al., 1986; Gruber, 2006), especially for primary and preventive services as opposed to more costly hospital services, and particularly amongst those on lower incomes (Rice and Morrison, 1994). Although the impact of lower charges on health status is less clear, there are indications that reduced charges can benefit health status by encouraging visits for preventive checks, for example, for high blood pressure, prevention of communicable diseases, and other disease screening, again especially for those on low incomes and those with poor health (Rice and Morrison, 1994).

These analyses show that in 1996/97 and 2002/03 fees varied across different population groups, even after controlling for a wide range of personal and household demographic, economic and health characteristics. We find that fees are lower on average for those who are likely to have lower incomes and/or an increased risk of health problems. These include those who are not employed, younger and older people, Pacific and Māori populations, those in single parent households, those in rural areas, those in larger households, and those in more deprived socio-economic areas. We also find lower fees on average for those who do not have health insurance, which may in part reflect higher prices paid for or charged for those with insurance. These results suggest that the mixed public-private financing model does allow for variations in the fees that people pay, and – after controlling for a range of factors – is in line with our expectation that those with lower incomes and those with higher health needs will pay less. As was stated earlier in this paper, the fees paid for a GP visit reflect both the underlying cost of those services and the quality of services purchased and it is not possible with this dataset to determine the mechanism through which lower fees are achieved.

Prior to the PHCS, most adult New Zealanders were paying the full cost of GP care themselves. Those eligible for a subsidy were people on low incomes and people who visited the doctor frequently. These people could access the subsidy by applying for a card to present to their GP. Concerns have been expressed that the cost of GPs in New Zealand resulted in significant barriers to access for many New Zealanders. In a study of five

countries in 2004, 28 percent of New Zealanders reported that they had previously forgone medical care because of the cost of a GP visit. This was comparable to the figures for the United States but much higher than that for Canada, the United Kingdom and Australia (Schoen et al, 2004). This figure is much higher than the six percent of respondents in the 2002/03 survey who reported that they did not go to the doctor when needed to because of cost. The New Zealand Health Survey had a sample size over ten times that of the New Zealand component of the Commonwealth International Health Policy Survey and was implemented through face-to-face interviews rather than by telephone. These differences in survey design may explain the difference in the magnitude of this figure.

In unreported results, we found that those who reported that they did not see a GP when needing to because of the cost, were those who we would expect to have greater difficulty paying – households with lower incomes, people without health insurance, people in poor health status, and those who live in urban areas. In addition, females, people aged under 44, Māori, and Pacific populations were more likely to report that they did not see a GP because of the cost. Although subsidies were targeted to those whose healthcare was most likely to be adversely affected by co-payments there are several possible explanations as to why these measures may not have been sufficient. Firstly, as we have shown in this paper, GP fees were rising by more than the rate of inflation (between 1996/97 and 2002/03, real fees rose by $5.70-$6), while the government subsidy remained the same (although income thresholds for eligibility to subsidies were inflation-adjusted). Second, there was not a full take-up of these subsidy cards. In 1996, about 80 percent of those eligible had a Community Services Card (CSC) and possibly as few as 20 percent of those eligible had a High Use Health Card (HUHC) (Foley, unpublished). Third, it is possible that even after the subsidy, GP fees were still high enough to present a barrier to access.

Given that subsidies were available for those on low incomes and those with high health needs, we would have expected to see these lower fees reflected in our results. This was not immediately obvious. A $10,000 increase in income led to a $0.40 increase in fees, and diabetes was the only chronic health problem where there were significantly different fees ($1.80 less on average). A closer look, however, at the results shows some differences in fees. Although there was not a strong relationship between household income and GP fees, there was a strong relationship between employment and fees paid. On average, those in full-time employment paid $8.60 more, and those in part-time employment $5.20 more, for GP fees, compared with those not in employment. Those who are not in employment are most likely to have a low income and therefore be entitled to a CSC. For example, all beneficiaries of government financial assistance programmes and superannuates who rely entirely on superannuation for financial support were entitled to the CSC.

It is more difficult to observe those with a HUHC within this data than those who might have a CSC. The finding that those in poor health, those with asthma, and those with high blood pressure paid the same amount as those without these conditions, may indicate that most of these individuals did not have access to the government subsidy or that the subsidy was not regarded as sufficient payment for providing care to those with chronic conditions.

A number of studies have been undertaken in other countries to explore the impact of user fees on primary health care utilisation. Cost sharing has been shown to discourage the use of appropriate and inappropriate care roughly equally (Lohr et al., 1986; Gruber, 2006), especially for primary and preventive services as opposed to more costly hospital services, and particularly amongst those on lower incomes (Rice and Morrison, 1994). Although the impact of lower charges on health status is less clear, there are indications that reduced charges can benefit health status by encouraging visits for preventive checks, for example, for high blood pressure, prevention of communicable diseases, and other disease screening, again especially for those on low incomes and those with poor health (Rice and Morrison, 1994).

The PHCS aims to resolve some of these issues by providing a more universal health subsidy for GP visits. As it is difficult to effectively target low income and high health need patients, universal subsidies can improve services for these individuals. As a result of these changes we would expect to see less fee variation in general, although it is likely that differences will remain, particularly in locations where GP costs are higher (eg. central city location, flexible opening hours, higher quality service). There are concerns, however, that although GP fees will be lower, the co-payments may still be high enough to remain a barrier to access for some individuals (Hefford et al, 2005). Furthermore it is important to recognise that fees are not the only barrier of access to GP services.

In terms of changes over time, utilisation changed very little between 1996/97 and 2002/03 (79 percent visited a GP in 1996/97 compared to 81 percent in 2002/03). This is in spite of increases in both nominal and inflation-adjusted fees over the two survey periods, with fewer adults receiving free visits in 2002/03 than in 1996/97 and more adults having to pay higher costs in 2002/03 than in 1996/97. This may suggest that demand for primary health care services is fairly inelastic, an issue we will return to in future analyses.

8 Conclusion

This paper uses representative national survey data to examine the distribution of fees paid for primary health care by different individuals under the mixed public-private

financing model in place prior to the introduction of New Zealand's Primary Health Care Strategy. We found that employment status, age, ethnicity, income and insurance status all had a significant relationship with the fees paid for GP visits. No direct link between fees and health status (other than diabetes where there is a lower than average fee) was found, even after controlling for differences in health needs. Thus, a mixed funding model may result in some desirable differences in fees charged, but in the New Zealand case, some key characteristics (in particular, health status) seemed to play no role in determining the fees patients paid when they used primary health care services.

New Zealand's PHCS, which began to be implemented in 2002, aims to provide more universal subsidies for primary health care. All New Zealanders are now eligible for subsidies for primary health care services, and fees have fallen over time as a result of the Strategy (Cumming and Gribben, 2007; Mays and Cumming, 2007). Our future research will explore how patterns of fees charged to patients have changed as a result of the PHCS, and how access to services has also changed as a result of the PHCS. A particular focus will be to identify which groups have benefited most from the move from a targeted to a universal funding model.

9 References

Anderson GF, Hussey PS, Frogner BK, Waters HR. Health spending in the United States and the rest of the industrialized world. Health Affairs 2005;24(4): 903-914.

Ayanian JZ, Weissman JS, Schneider IC, Ginsburg JA, Zaslavsky AM. Unmet health needs of uninsured adults in the United States. The Journal of the American Medical Association 2000;284(16): 2061-2069.

Barer ML, Evans RG, Labelle RJ. Fee controls as cost control: Tales from the frozen north. The Milbank Quarterly 1988;66(1): 1-64.

Beck RG. The effects of co-payment on the poor. The Journal of Human Resources 1978;9(1): 129-142.

Crengle S. Māori primary care services: Discussion papers on primary health care. Wellington: National Advisory Committee on Health and Disability, 1999.

Cumming J, Mays N. Shifting to capitation in primary care: What might the impact be in New Zealand? Australian Health Review 1999;22(4): 8-24.

Cumming J, Gribben B. Evaluation of the Primary Health Care Strategy: Practice Data Analysis 2001-2005. Wellington: Health Services Research Centre, 2007.

Davis P, Gribben B, Lee RL, McAvoy B. The impact of the new subsidy regime in general practise in New Zealand. Health Policy 1994; 29(1,2): 113-125.

Dixon A, Le Grand J, Henderson J, Murray R, Poteliakhoff E. Is the NHS equitable? A review of the evidence. LSE Health and Social Care Discussion Paper Number 11. London: LSE Health and Social Care, London School of Economics, 2003.

Dunlop S, Coyte P, McIsaac W. Socio-economic status and the utilisation of physicians' services: Results from the Canadian National Population Health Survey. Social Science and Medicine 2000;51: 123-133.

Eyles J, Birch S, Newbold KB. Delivering the goods? Access to family physician services in Canada: A comparison of 1985 and 1991. Journal of Health and Social Behavior, 1995; 36(4): 322-332.

Foley J. Community services card review. Wellington: Ministry of Health. Available at www.moh.govt.nz (last accessed 13 October 2008).

Government White Paper. A health service for New Zealand. Wellington: AR Shearer, Government Printer, 1974.

Gribben B. The community services card and utilisation of general practitioner services. New Zealand Medical Journal 1996;109: 103-105.

Gruber J. The role of consumer co-payments for health care: Lessons from the RAND Health Insurance Experiment and beyond. United States: The Henry J. Kaiser Family Foundation, 2006.

Hadley J, Reschovsky JD. Medicare fees and physicians' medicare service volume: Beneficiaries treated and services per beneficiary. International Journal of Health Care Finance and Economics 2006;6: 131–150.

Hefford M, Crampton P, Foley J. Reducing health disparities through primary care reform: The New Zealand experiment. Health Policy 2005;72: 9-23.

Hodgson P. Primary health - low fees are good but what next? Address to Dunedin School of Medicine, 2006.

Hodgson P. Media Release: More support for free doc's visits for under-6s, 2007.

Hopkins S, Speed N. The decline in 'free' general practitioner care in Australia: Reasons and repercussions. Health Policy 2005;73(3): 316-329

Jones G, Savage E, Van Gool K. The Distribution of Household Health Expenditures in Australia. The Economic Record 2008; 84: S99–S114

Lairson DR, Hindson P, Hauquitzc A. Equity of health care in Australia. Social Science & Medicine 1995;41(4): 475-482.

Lohr KN, Brook RH, Kamberg CJ, Goldberg GA, Leibowitz A, Keesey J, Reboussin D, Newhouse JP. Use of medical care in the RAND Health Insurance Experiment: Diagnosis- and service-specific analyses in a randomized controlled trial. Medical Care 1986;24(Supplement): S1-87.

Mays N, Cumming C. Performance of New Zealand's publicly financed health care system: A focus on performance under the New Zealand Public Health and Disability Act (2000). Report Number 10, Health Reforms 2001 Research Project. Wellington: Health Services Research Centre, Victoria University of Wellington, 2007

Ministry of Health. Taking the pulse: the 1996/97 New Zealand health survey. Wellington: Ministry of Health, 1999.

Ministry of Health. New Zealand health and disability sector overview. Wellington: Ministry of Health, 2003.

Ministry of Health. Care Plus: Frequently Asked Questions. Wellington: Ministry of Health, 2004.

Newhouse JP. A Model of Physician Pricing. Southern Economic Journal 1970;37(2): 174-183.

OECD. Health at a Glance 2007. Paris: Organisation for Economic Co-operation and Development, 2007.

Raymont A. Cost barriers to health care: provisional analysis from the New Zealand Health Survey 2002/03. Wellington: Ministry of Health, 2004.

Rice T, Morrison KR. Patient cost sharing for medical services: A review of the literature and implications for health care reforms. Medical Care Review 1994;51(3): 235-287.

Richardson JRJ, Peacock SJ, Mortimer D. Does an increase in the doctor supply reduce medical fees? An econometric analysis of medical fees across Australia. Applied Economics 2006;38(3): 253-266.

Schoen C, Osborn R, Trang Huynh P, Doty M, Davis K, Zapert K, Peugh J. Primary Care and Health System Performance: Adults' Experiences in Five Countries. Health Affairs Web Exclusive 2004; W4: 487-503.

Scitovsky A, Sneider N. Effects of co-insurance on use of physicians services. Social Security Bulletin 1972;35(6): 3-19.

Sepehri A, Chernomas R. Are user charges efficiency- and equity-enhancing? A critical review of economic literature with particular reference to experience from developing countries. Journal of International Development 2001;13: 183-209.

Steinwald B, Stone FA. Determinants of physicians' fees. The Journal of Business 1974;47(4): 493-511.

Tukiotonga C. Primary healthcare for Pacific people in New Zealand. Wellington: National Advisory Committee on Health and Disability, 1999.

Van Doorslaer E, Clarke P, Savage E, Hall, J. Horizontal inequities in Australia's mixed public/private health care system. Health Policy 2008;86(1): 97–108.

Table 1: Primary Healthcare Utilisation and Fees Paid by Age Group and Survey

Age Group	15-24	25-44	45-64	65-79	80+	Overall
			1996/97 Survey			
Visited GP in Last Year	78%	75%	80%	93%	95%	79%
Last Visit Was Free	23%	13%	5%	7%	7%	12%
Less Than 10 Dollars	17%	14%	12%	10%	6%	13%
11-20 Dollars	29%	20%	24%	47%	60%	28%
21-30 Dollars	18%	16%	17%	18%	18%	17%
31-40 Dollars	9%	31%	39%	15%	6%	26%
More than 40 Dollars	4%	6%	3%	3%	2%	4%
Number of Individuals	944	3,024	1,931	1,090	280	7,269
Number Reporting Fees	724	2,249	1,531	986	264	5,754
			2002/03 Survey			
Visited GP in Last Year	76%	76%	83%	94%	96%	81%
Last Visit Was Free	18%	11%	6%	5%	5%	9%
Less Than 10 Dollars	8%	5%	3%	4%	3%	5%
11-20 Dollars	19%	11%	12%	17%	20%	14%
21-30 Dollars	20%	17%	18%	42%	47%	22%
31-40 Dollars	19%	27%	30%	17%	16%	25%
41-50 Dollars	10%	23%	25%	13%	8%	20%
More than 50 Dollars	5%	6%	5%	3%	2%	5%
Number of Individuals	1,452	4,964	3,665	1,674	482	12,237
Number Reporting Fees	961	3,642	2,991	1,535	452	9,581

Note: Individuals who paid other arrangements (mostly <1%, in 1996/97 survey, this mostly referred to ACC, employer or insurance) are included in the Free category.

Table 2: Primary Healthcare Utilisation and Fees Paid by Age Group and Gender

Age Group	15-24	25-44	45-64	65-79	80+	Overall
			Male			
Visited GP in Last Year	68%	69%	79%	92%	96%	75%
Last Visit Was Free	19%	10%	6%	7%	6%	10%
Less Than 10 Dollars	14%	12%	7%	6%	4%	10%
11-20 Dollars	26%	15%	17%	32%	35%	21%
21-30 Dollars	18%	16%	19%	27%	35%	19%
31-40 Dollars	12%	29%	34%	18%	13%	26%
More than 40 Dollars	11%	18%	17%	10%	8%	15%
Number of Individuals	1,003	2,949	2,407	1,151	265	7,775
Number Reporting Fees	630	1,915	1,872	1,033	251	5,701
			Female			
Visited GP in Last Year	86%	81%	84%	94%	95%	85%
Last Visit Was Free	22%	14%	5%	5%	5%	11%
Less Than 10 Dollars	12%	8%	7%	7%	5%	8%
11-20 Dollars	23%	16%	18%	32%	37%	21%
21-30 Dollars	19%	16%	17%	33%	36%	20%
31-40 Dollars	15%	29%	35%	15%	12%	25%
More than 40 Dollars	8%	17%	18%	9%	5%	14%
Number of Individuals	1,393	5,039	3,189	1,613	497	11,731
Number Reporting Fees	1,055	3,976	2,650	1,488	465	9,634

Note: Individuals who paid other arrangements (mostly <1%, in 1996/97 survey, this mostly referred to ACC, employer or insurance) are included in the Free category.

Table 3: Primary Healthcare Utilisation and Fees Paid by Age Group and Ethnicity

Age Group	15-24	25-44	45-64	65+	Overall
		Pākehā/European			
Visited GP in Last Year	83%	78%	81%	94%	82%
Last Visit Was Free	20%	11%	5%	5%	9%
Less Than 10 Dollars	12%	9%	6%	6%	8%
11-20 Dollars	25%	15%	17%	32%	20%
21-30 Dollars	21%	15%	17%	32%	20%
31-40 Dollars	15%	32%	36%	16%	27%
More than 40 Dollars	8%	19%	19%	9%	15%
Number of Individuals	953	3,990	3,653	2,826	11,422
Number Reporting Fees	753	3,068	2,971	2,608	9,400
		Māori			
Visited GP in Last Year	71%	72%	82%	89%	75%
Last Visit Was Free	25%	17%	13%	14%	18%
Less Than 10 Dollars	19%	15%	11%	14%	15%
11-20 Dollars	22%	21%	27%	41%	24%
21-30 Dollars	15%	21%	20%	23%	19%
31-40 Dollars	10%	17%	24%	4%	16%
More than 40 Dollars	10%	10%	5%	3%	8%
Number of Individuals	855	2,454	1,353	540	5,202
Number Reporting Fees	565	1,753	1,068	482	3,868
		Pacific Islander			
Visited GP in Last Year	74%	75%	88%	93%	78%
Last Visit Was Free	25%	20%	9%	7%	18%
Less Than 10 Dollars	23%	19%	26%	22%	22%
11-20 Dollars	22%	23%	29%	49%	26%
21-30 Dollars	14%	22%	14%	15%	18%
31-40 Dollars	9%	14%	13%	3%	12%
More than 40 Dollars	7%	2%	10%	4%	5%
Number of Individuals	282	757	318	98	1,455
Number Reporting Fees	201	565	273	91	1,130
		Asian			
Visited GP in Last Year	48%	57%	76%	93%	60%
Last Visit Was Free	23%	10%	7%	3%	12%
Less Than 10 Dollars	5%	9%	2%	7%	6%
11-20 Dollars	32%	12%	11%	36%	18%
21-30 Dollars	6%	21%	22%	20%	18%
31-40 Dollars	15%	27%	37%	15%	26%
More than 40 Dollars	20%	21%	20%	19%	20%
Number of Individuals	296	723	249	55	1,323
Number Reporting Fees	161	458	191	49	859

Note: Individuals who paid other arrangements (mostly <1%, in 1996/97 survey, this mostly referred to ACC, employer or insurance) are included in the Free category.

Table 4: Primary Healthcare Utilisation and Fees Paid by NZDep Quintile and Survey

NZDep Quintile	1	2	3	4	5	Overall
1996/97 Survey						
Visited GP in Last Year	81%	77%	79%	80%	78%	79%
Last Visit Was Free	8%	10%	12%	13%	17%	12%
Less Than 10 Dollars	9%	13%	12%	16%	17%	13%
11-20 Dollars	20%	24%	30%	30%	36%	28%
21-30 Dollars	18%	20%	17%	14%	16%	17%
31-40 Dollars	39%	29%	25%	24%	12%	26%
More than 40 Dollars	7%	5%	3%	3%	2%	4%
Number of Individuals	971	1,187	1,313	1,579	2,219	7,269
Number Reporting Fees	793	938	1,032	1,270	1,721	5,754
2002/03 Survey						
Visited GP in Last Year	78%	83%	82%	82%	80%	81%
Last Visit Was Free	8%	8%	8%	10%	13%	9%
Less Than 10 Dollars	2%	2%	4%	5%	10%	5%
11-20 Dollars	7%	9%	13%	16%	23%	14%
21-30 Dollars	15%	21%	23%	25%	27%	22%
31-40 Dollars	30%	29%	26%	23%	16%	25%
41-50 Dollars	30%	24%	21%	16%	8%	20%
More than 50 Dollars	9%	7%	4%	4%	2%	5%
Number of Individuals	1,674	1,541	1,824	2,346	4,852	12,237
Number Reporting Fees	1,319	1,260	1,473	1,868	3,661	9,581

Note: Individuals who paid other arrangements (mostly <1%, in 1996/97 survey, this mostly referred to ACC, employer or insurance) are included in the Free category.

Table 5: Real GP Fees Paid by Age Group, Characteristics and Survey

	1996/1997 Survey		2002/2003 Survey	
	Mean	Standard Error	Mean	Standard Error
Overall	22.47	0.28	28.34	0.22
Aged 15-24	16.29	0.77	22.41	0.73
Aged 25-44	23.41	0.47	29.39	0.37
Aged 45-64	26.25	0.50	31.19	0.36
Aged 65-79	20.87	0.55	26.44	0.43
Aged 80+	18.98	0.79	25.03	0.61
Male	22.46	0.46	28.75	0.34
Female	22.47	0.36	28.01	0.29
European/Pākehā	23.25	0.32	29.77	0.25
Māori	17.85	0.83	21.17	0.60
Pacific Islander	14.80	0.75	18.50	0.84
Asian	26.51	1.76	27.90	0.92
NZDep Quintile 1	27.41	0.71	33.74	0.50
NZDep Quintile 2	23.95	0.63	31.60	0.50
NZDep Quintile 3	22.03	0.63	29.15	0.48
NZDep Quintile 4	20.66	0.56	26.61	0.46
NZDep Quintile 5	17.11	0.43	21.34	0.45
Number Reporting Fees	5,754		9,581	

Note: Real GP fees in 2003 dollars are calculated by converting the bracketed variable to a continuous variable by assigning the approximate mid-point of each bracket to each observation and then adjusting by the CPI for the appropriate year.

Table 6: OLS Regression of Real GP Fees Paid Pooling Both Surveys

Specification	Baseline	Hse Comp	Hse Inc	Employment	Health
Female	-0.07	0.18	0.33	1.09**	1.14**
	(0.34)	(0.35)	(0.35)	(0.36)	(0.36)
Aged 15-24	-5.32**	-5.60**	-5.45**	-4.71**	-4.86**
(default 25-44)	(0.63)	(0.70)	(0.71)	(0.69)	(0.68)
Aged 45-64	2.09**	1.56**	1.64**	1.86**	1.68**
	(0.41)	(0.44)	(0.44)	(0.44)	(0.43)
Aged 65-79	-2.38**	-3.50**	-2.03**	1.18*	1.23*
	(0.47)	(0.53)	(0.54)	(0.58)	(0.59)
Age 80+	-3.19**	-4.50**	-3.22**	0.22	0.86
	(0.59)	(0.63)	(0.63)	(0.69)	(0.71)
Prioritised Māori	-3.39**	-2.83**	-2.62**	-2.45**	-2.14**
(default Pr Pākehā)	(0.57)	(0.57)	(0.57)	(0.55)	(0.55)
Prioritised Pacifica	-5.48**	-4.25**	-3.91**	-3.70**	-2.78**
	(0.63)	(0.69)	(0.68)	(0.65)	(0.67)
Prioritised Asian	0.17	0.60	1.46+	2.35**	2.89**
	(0.87)	(0.88)	(0.87)	(0.88)	(0.88)
School Quals	2.10**	2.03**	1.62**	1.17*	0.92
(default No Quals)	(0.60)	(0.59)	(0.59)	(0.57)	(0.57)
Vocational Quals	2.32**	2.23**	1.71**	0.90*	0.54
	(0.38)	(0.38)	(0.38)	(0.38)	(0.37)
University Quals	3.91**	3.64**	2.08**	0.74	0.44
	(0.65)	(0.64)	(0.65)	(0.69)	(0.69)
Married	2.11**	1.72**	1.07*	0.86+	0.64
	(0.37)	(0.46)	(0.47)	(0.45)	(0.45)
Single Parent Household		-3.57**	-3.09**	-2.68**	-2.36**
(default No Children in Hse)		(0.62)	(0.62)	(0.60)	(0.59)
Couple w/ Children		0.07	0.25	0.17	0.21
		(0.56)	(0.56)	(0.55)	(0.54)
# People in Household		-0.62**	-0.85**	-0.61**	-0.56**
		(0.18)	(0.18)	(0.18)	(0.18)
Real Hse Income (thous)			0.07**	0.05**	0.04**
			(0.01)	(0.01)	(0.01)
Hse Income Unreported			3.43**	2.68**	2.37**
			(0.54)	(0.54)	(0.54)
Full-Time Employed				8.57**	7.74**
				(0.70)	(0.71)
Part-Time Employed				5.21**	4.43**
				(0.79)	(0.80)
Professionals				-2.16**	-1.97*
(default Legs & Managers)				(0.79)	(0.79)
Techs and Assoc. Profs				-1.33	-1.07
				(0.91)	(0.90)
Clerks				-1.64+	-1.49+
				(0.87)	(0.86)
Service and Sales				-2.61**	-2.28**
				(0.84)	(0.84)
Agriculture and Fishery				-4.17**	-3.92**
				(1.06)	(1.04)
Trades Workers				-3.23**	-2.70**
				(1.02)	(0.99)
Operators & Assemblers				-4.20**	-3.71**
				(0.99)	(0.98)
Elementary Occupations				-4.49**	-3.95**
				(0.98)	(0.99)
Has Insurance					3.18**
					(0.39)
Health = Vgood					0.12
(default = excellent)					(0.51)

Specification	Baseline	Hse Comp	Hse Inc	Employment	Health
Health = Good					0.67
					(0.53)
Health = Fair					0.31
					(0.63)
Health = Poor					0.20
					(1.09)
Has Asthma					0.69
					(0.44)
Has Diabetes					-1.84**
					(0.67)
Has High Blood Pressure					0.15
					(0.40)
Is a Smoker					-0.76+
					(0.40)
Is a Drinker					1.57**
					(0.41)
Lives in Rural Area	-3.56**	-3.57**	-3.30**	-3.06**	-2.93**
	(0.49)	(0.49)	(0.49)	(0.52)	(0.51)
NZDep Decile 2	-1.23	-1.30	-0.49	-0.51	-0.45
	(0.86)	(0.86)	(0.85)	(0.84)	(0.83)
NZDep Decile 3	-2.01*	-2.07*	-0.91	-0.90	-0.64
	(0.89)	(0.89)	(0.90)	(0.89)	(0.86)
NZDep Decile 4	-3.64**	-3.70**	-2.19*	-2.22**	-1.90*
	(0.86)	(0.87)	(0.86)	(0.85)	(0.83)
NZDep Decile 5	-3.79**	-3.91**	-2.32**	-2.37**	-1.91*
	(0.85)	(0.85)	(0.84)	(0.83)	(0.82)
NZDep Decile 6	-5.15**	-5.18**	-3.30**	-3.37**	-2.86**
	(0.87)	(0.87)	(0.86)	(0.84)	(0.82)
NZDep Decile 7	-5.55**	-5.69**	-3.86**	-3.88**	-3.17**
	(0.84)	(0.85)	(0.84)	(0.83)	(0.82)
NZDep Decile 8	-6.86**	-7.03**	-5.18**	-5.17**	-4.52**
	(0.84)	(0.85)	(0.84)	(0.82)	(0.81)
NZDep Decile 9	-8.37**	-8.41**	-6.40**	-6.07**	-5.25**
	(0.83)	(0.83)	(0.81)	(0.81)	(0.80)
NZDep Decile 10	-10.31**	-10.17**	-7.85**	-7.32**	-6.27**
	(0.85)	(0.86)	(0.85)	(0.83)	(0.82)
Year = 2002	6.00**	6.10**	6.53**	6.21**	6.21**
	(0.57)	(0.57)	(0.57)	(0.56)	(0.56)
Year = 2003	5.72**	5.84**	6.33**	5.96**	5.95**
	(0.35)	(0.35)	(0.34)	(0.34)	(0.34)
Constant	25.64**	28.24**	23.80**	20.60**	18.19**
	(0.90)	(0.95)	(0.94)	(0.95)	(1.07)
Observations	15335	15335	15335	15335	15335
R-squared	0.17	0.17	0.19	0.22	0.23

Note: Standard errors are in brackets. Significance: ** p<0.01, * p<0.05, + p<0.1. Fees are specified as a continuous variable using the bracket mid-point and five dollars above for the top bracket.

Table 7: OLS Regression of Real GP Fees Paid by Age Group and Survey

Survey Year	1996/97				2002/03			
Age Group	15-24	25-44	45-64	65+	15-24	25-44	45-64	65+
Female	2.01	1.44	0.42	0.49	-1.42	0.59	2.13**	0.77
	(1.30)	(0.99)	(0.93)	(0.91)	(1.44)	(0.87)	(0.70)	(0.73)
Age 80+				-1.13				-0.50
				(0.95)				(0.70)
Prioritised Māori	1.39	-1.49	0.24	-2.65+	-0.40	-3.57**	-6.08**	-6.10**
(default Pr Pākehā)	(2.21)	(1.02)	(1.34)	(1.51)	(2.04)	(1.01)	(1.09)	(1.22)
Prioritised Pacifica	-2.15	-1.54	-4.29*	0.09	3.88	-6.72**	-4.09*	-7.14**
	(2.11)	(1.38)	(1.96)	(2.38)	(2.81)	(1.44)	(1.72)	(1.78)
Prioritised Asian	-1.17	5.74**	9.10**	0.12	6.94*	-0.49	1.47	5.38
	(3.56)	(1.99)	(3.24)	(2.51)	(2.88)	(1.47)	(1.52)	(3.97)
School Quals		0.80	-2.18	-0.21		2.79*	0.36	2.26*
(default No Quals)		(1.39)	(1.91)	(1.80)		(1.34)	(1.19)	(1.07)
Vocational Quals		-0.13	-0.28	1.69+		2.19*	0.80	1.14
		(1.03)	(0.93)	(0.88)		(1.03)	(0.85)	(0.71)
University Quals		-1.10	-1.18	2.56		1.92	0.07	3.05*
		(1.80)	(2.10)	(2.82)		(1.40)	(1.23)	(1.54)
Married	0.61	0.90	0.43	-1.38	-0.49	-1.97	0.85	-0.83
	(2.33)	(1.29)	(1.08)	(1.16)	(2.23)	(1.36)	(0.94)	(0.95)
Full-Time Employed	8.34**	10.15**	10.60**	-4.37	8.95**	5.76**	3.42**	3.39+
	(1.68)	(1.81)	(1.72)	(3.33)	(1.73)	(1.37)	(1.19)	(2.01)
Part-Time Employed	-2.73	7.00**	7.67**	-1.19	2.04	3.77*	2.45+	0.90
	(1.69)	(2.03)	(2.05)	(2.67)	(1.84)	(1.54)	(1.34)	(1.27)
Professionals		-2.11	-5.88**			-2.11	0.61	
(default Legs & Managers)		(2.00)	(1.91)			(1.36)	(1.26)	
Techs and Assoc. Profs		-3.15	-3.28+			-0.27	-0.30	
		(2.05)	(1.78)			(1.71)	(1.85)	
Clerks		-1.79	-3.58+			-1.33	0.56	
		(1.96)	(1.91)			(1.64)	(1.54)	
Service and Sales		-1.49	0.07			-2.22	1.32	
		(1.95)	(1.83)			(1.52)	(1.36)	
Agriculture and Fishery		-4.74*	-6.11*			-5.45**	1.41	
		(2.24)	(2.41)			(1.88)	(1.55)	
Trades Workers		-6.80**	-4.80			-2.10	-0.70	
		(2.36)	(3.16)			(1.55)	(1.63)	
Operators & Assemblers		-6.00**	-6.36**			-4.54*	0.64	
		(2.14)	(2.09)			(1.92)	(1.80)	
Elementary Occupations		-7.16**	-6.23*			-1.09	-3.12+	
		(2.65)	(2.74)			(1.74)	(1.70)	
Single Parent Household	-1.80	-2.84*	-2.87	-2.55	-0.91	-2.04	-2.99+	-4.60*
(default No Children in Hse)	(2.37)	(1.39)	(1.82)	(2.25)	(2.25)	(1.27)	(1.54)	(1.86)
Couple w/ Children	-4.82+	1.38	-2.49+	2.03	1.60	1.03	-1.62	3.58+
	(2.70)	(1.35)	(1.47)	(3.14)	(3.50)	(1.30)	(1.08)	(2.15)
# People in Household	-0.33	-0.66+	-0.09	-0.48	-1.21*	-0.40	-0.02	-1.14
	(0.56)	(0.39)	(0.59)	(0.91)	(0.52)	(0.31)	(0.40)	(0.69)
Real Hse Income (thous)	0.02	0.03*	0.04*	0.13**	0.06	0.10**	0.08**	0.16**
	(0.03)	(0.01)	(0.01)	(0.03)	(0.04)	(0.02)	(0.02)	(0.03)
Hse Income Unreported	0.48	2.52+	3.96**	6.78**	2.40	4.27**	4.34**	5.00**
	(2.31)	(1.38)	(1.47)	(1.77)	(2.38)	(1.37)	(1.18)	(1.06)
Has Insurance	3.89*	3.91**	3.78**	1.38	2.78+	1.73*	2.88**	3.13**
	(1.61)	(0.95)	(1.12)	(1.13)	(1.65)	(0.77)	(0.73)	(0.82)
Health = Vgood	-0.48	0.62	-0.26	-0.19	2.62	-1.34	-0.27	0.21
(default = excellent)	(2.16)	(1.19)	(1.37)	(1.63)	(1.96)	(1.02)	(0.98)	(1.14)
Health = Good	-4.04+	0.48	1.55	0.51	3.37	0.58	1.02	1.19
	(2.42)	(1.25)	(1.38)	(1.61)	(2.08)	(1.06)	(1.00)	(1.17)

Survey Year	1996/97				2002/03			
Age Group	15-24	25-44	45-64	65+	15-24	25-44	45-64	65+
Health = Fair	-2.90	1.14	0.56	0.61	0.79	1.07	0.72	-0.60
	(2.60)	(1.63)	(1.85)	(1.71)	(2.66)	(1.46)	(1.30)	(1.31)
Health = Poor	-0.53	-1.13	-2.70	1.61	0.85	-0.90	0.42	1.06
	(2.98)	(2.71)	(2.84)	(2.54)	(6.08)	(2.32)	(1.84)	(2.06)
Has Asthma	2.35	1.30	-0.79	0.86	2.02	0.52	0.68	-0.33
	(1.95)	(1.06)	(1.05)	(0.95)	(1.53)	(0.89)	(1.02)	(1.10)
Has Diabetes	9.09*	-1.61	-1.64	-1.16	6.08	-1.51	-4.46**	-0.84
	(4.28)	(2.06)	(1.33)	(1.43)	(9.72)	(2.64)	(1.56)	(0.98)
Has High Blood Pressure	-3.46	-3.52+	0.19	0.45	-1.30	0.46	0.00	1.34*
	(5.85)	(1.98)	(1.11)	(0.86)	(2.98)	(1.03)	(0.69)	(0.65)
Is a Smoker	-1.57	-0.72	-2.53*	0.40	0.09	-0.74	-0.71	0.29
	(1.56)	(0.88)	(1.04)	(1.33)	(1.76)	(0.81)	(0.84)	(1.24)
Is a Drinker	-0.43	1.59	1.65	0.38	-1.88	2.44*	2.83**	1.62*
	(1.64)	(1.09)	(1.21)	(0.94)	(2.06)	(1.07)	(0.92)	(0.74)
Lives in Rural Area	-2.23	-4.22**	-3.57**	-3.64*	-0.89	-1.93+	-5.09**	-0.96
	(2.45)	(1.34)	(1.26)	(1.70)	(2.07)	(1.10)	(0.92)	(1.06)
NZDep Decile 2	3.72	-3.63+	-0.19	-1.62	4.58	0.03	-0.98	-2.45
	(3.50)	(1.85)	(1.93)	(2.61)	(3.87)	(1.60)	(1.35)	(1.54)
NZDep Decile 3	4.12	-4.25*	-1.59	-1.28	1.27	1.80	-0.08	-3.35*
	(4.62)	(2.03)	(1.94)	(2.07)	(3.82)	(1.69)	(1.48)	(1.60)
NZDep Decile 4	2.76	-5.03**	-3.18	-1.84	0.44	-0.76	-1.73	-3.34*
	(3.33)	(1.88)	(2.14)	(2.06)	(3.72)	(1.63)	(1.49)	(1.57)
NZDep Decile 5	-0.81	-4.22*	-1.41	0.91	1.29	-1.31	-2.26	-5.30**
	(3.29)	(1.82)	(1.90)	(2.24)	(3.78)	(1.76)	(1.42)	(1.57)
NZDep Decile 6	-1.08	-6.57**	-0.48	-1.75	2.44	-1.60	-3.62*	-6.80**
	(3.57)	(1.76)	(1.90)	(2.13)	(4.01)	(1.70)	(1.47)	(1.59)
NZDep Decile 7	1.84	-6.72**	-4.48*	-4.03*	-0.49	-0.02	-3.35*	-6.99**
	(3.10)	(1.88)	(1.98)	(2.00)	(3.64)	(1.63)	(1.47)	(1.58)
NZDep Decile 8	-2.24	-6.19**	-2.56	-3.88+	-1.63	-5.55**	-3.33*	-7.74**
	(3.27)	(1.89)	(1.93)	(2.00)	(3.64)	(1.73)	(1.43)	(1.47)
NZDep Decile 9	-0.24	-7.52**	-2.82	-5.58**	-1.68	-5.05**	-6.70**	-8.22**
	(2.94)	(1.72)	(1.91)	(1.85)	(3.75)	(1.63)	(1.72)	(1.52)
NZDep Decile 10	-1.50	-7.48**	-4.90*	-5.61**	-4.24	-7.17**	-8.43**	-9.30**
	(3.14)	(1.64)	(1.92)	(1.94)	(3.69)	(1.83)	(1.64)	(1.82)
Year = 2003					-1.26	0.02	0.55	-0.27
					(2.09)	(0.93)	(0.92)	(0.77)
Constant	13.69**	19.90**	19.75**	19.00**	19.68**	21.91**	23.36**	26.07**
	(3.81)	(2.55)	(2.46)	(2.65)	(5.03)	(2.63)	(2.20)	(2.29)
Observations	724	2249	1531	1250	961	3642	2991	1987
R-squared	0.21	0.22	0.24	0.15	0.14	0.19	0.24	0.23

Note: Standard errors are in brackets. Significance: ** p<0.01, * p<0.05, + p<0.1. Fees are specified as a continuous variable using the bracket mid-point and five dollars above for the top bracket.

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