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Equity in the use of health services in Canada and its provinces

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Abstract

Canada is a federal dominion of ten provinces and three territories. By 1972 all provinces and territories provided universal public insurance for hospital and physician care. Responsibility for the administration and delivery of most public health care services is devolved to the provinces and territories in Canada. There is variation across provinces and territories in the level and sources of health care financing, resource allocation and payment mechanisms, benefits packages, supply of health services and personnel, and level of further decentralization to regional and local level. This paper quantifies the extent of provincial/territorial variation in utilization by income and determines its impact on equity. Specifically, income-related inequity in utilization of any physician, GP, specialist, hospital (inpatient) and dentist visit is measured. Results support earlier analyses revealing pro-rich inequity in physician and dental care, and pro-poor inequity in inpatient care. The study goes beyond existing analyses of equity and identifies some variation across the country: lowest levels of inequity are seen in the smallest province, Prince Edward Island, and the highest in the territories (Yukon, Northwest Territories and Nunavut). Some explanations for the observed inequity and its variation across the country are discussed in the context of provincial characteristics.

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1. Introduction

The primary objective of Canadian health policy is to protect, promote and restore the physical and mental well-being of residents of Canada and to facilitate reasonable access to health services without financial or other barriers. Equity in health care is a concept of vital importance to Canadians (Romanow 2002) and 'reasonable' access to health care is legislated in the Canada Health Act of 1984.[1]

While unhindered utilization is a major objective of the Canadian health system as encapsulated in a number of pieces of national legislation, the actual enactment of this policy is at provincial level because responsibility for the planning, administration and delivery of most public health care services is devolved to the provincial, and to a lesser extent, territorial level. Differences in the level and sources of health care financing, resource allocation and payment mechanisms, benefits packages, supply of health services and personnel, and level of further decentralization to regional and local level may, thus, lead to differential degrees of inequity in access to health care.

Despite the fact that the introduction of universal coverage improved accessibility of health services, as demonstrated in some Canadian provinces such as Quebec (Enterline et al 1973; McDonald et al 1974; Siemiatycki et al 1980), Alberta (Greenhill and Hawthorne 1972), Ontario (Manga 1978; Barer et al 1982) and Saskatchewan (Beck 1974; Beck and Horne 1976), there is evidence that inequity persists. Recent studies support the claim that higher socioeconomic groups may be better able to navigate the health system by using their 'voice' to demand more extensive, or more complex services (Hirschman 1970), and that providers may be treating social groups differently (Alter et al 1998).

This study builds upon the existing evidence by assessing the extent to which equity in utilization of health services by income is achieved in the provinces and territories of Canada. The aim is to investigate and quantify the level of inequity in the use of publicly insured health care services at provincial level within Canada. The first section presents a discussion of the definition of equity used in this study as well as an overview of the Canadian health system as it relates to this definition. The following sections review the literature on equity in utilization of health care in Canada, present the

[1] Reasonable access is not defined in any policy documents, although the Canada Health Act states that 'insured persons must have reasonable and uniform access to insured health services, free of financial or other barriers. No one may be discriminated against on the basis of such factors as income, age, and health status'.

methodology used to quantify the definition of equity of utilization adopted in this study, the results and, finally, some points for discussion.

1.1 Equity definitions in the Canadian context

Although there is considerable emphasis on equity in health care in official policy statements in Canada, no clear definition has been documented. Moreover, the stated goal of the health system is to provide 'reasonable' access to 'medically necessary' health care, although what constitutes 'reasonable' and 'medically necessary' remains undefined.

There is a longstanding debate on the most appropriate definition of equity in health care. There are two related concepts of equity that can be studied: vertical equity, which implies individuals in different need for health care are treated differently, and horizontal equity, which suggests equals are treated equally. The former has almost exclusively been used in relation to financing[2], while the latter is the most widely used definition of equity in relation to health care use in the literature (Wagstaff and van Doorslaer 2000).

Three interpretations of horizontal equity related to health care that are most often debated in the literature are: equal access for equal need; equal utilization for equal need; and equitable health outcomes (Donabedian 1972; Oliver and Mossialos 2004). While the goal of equitable (or less inequitable) health outcomes may be desirable, the multiple and varied determinants of health that fall outside of the health system put this goal beyond the scope of health policy. Equal access is based on the assumption that individuals are given equal opportunities to access services, for example by not charging fees and distributing resources equally across the regions. However the goal of equal utilization for equal need implies a different set of conditions and depends upon a wide array of demand and supply side variables. Moreover, inequity in utilization may not solely reflect inappropriate or unfair differentials in service use, as utilization is affected by personal characteristics such as individual preferences, expectations and beliefs. Therefore, observed inequity in utilization may not be wholly unfair. However, consistent with Donabedian's assertion that 'the proof of access is use of service, not simply the presence of a facility', it is argued that utilization represents *realised* access (1972, pp. 111).

[2] One exception is Mooney, G. (1996). 'And now for vertical equity? Some concerns arising from Aboriginal health in Australia.' Health Economics **5**(2): 99-103.

Even if different indicators of access can be measured, such as waiting times, availability of resources, and presence of user charges, access itself can rarely be observed and measured. Utilization, on the other hand, which is both a function of supply and demand factors, can be directly observed. Thus, the principle of equity most commonly studied to date in the Canadian context is that of equal utilization for equal need, with need measured by health status, as commonly interpreted by federal and provincial governments (Birch and Abelson 1993; Birch et al 1993).

Patterns of health care utilization and related barriers to access are affected by, among other things, the manner in which the system plans, administers, and funds health care. Canada introduced a system of universal health care coverage over a period of 25 years (1947 to 1972) following a succession of province-led reforms aimed at distributing health services according to need and not ability to pay (Mhatre and Deber 1992; Marchildon 2005). There are currently 13 single-payer, universal systems of hospital and primary physician care in Canada defined as 'insured services' (Medicare) under the federal Canada Health Act (1984). Provinces must conform to the five principles of the Act (universality, public administration, comprehensiveness, portability, and accessibility) in order to receive federal cash transfers.

Administration of public health services in Canada is highly decentralized reflecting the provincial responsibility for the administration and delivery of most public health care services. The historic arm's-length relationship between government on the one hand and the hospital sector and physicians on the other and recent regionalization reforms in which sub-provincial organizations are now responsible for the allocation of resources for hospital and community health services further contribute to the decentralized nature of health care in Canada (Marchildon 2005).

Over the past decade, Canadian provinces and territories have experienced a sweeping reform to the administration of public health services, termed regionalization. Broadly speaking, this reform was associated with a devolution of managerial and partial budgetary authority from the provincial to the regional (i.e. sub-provincial) level in the form of regional health authorities (Casebeer et al 2006). The aims of regionalization were to: contain costs by rationalizing delivery; better coordinate/integrate health care between hospital services and other provincial public services; shift public resources from 'downstream' illness care to 'upstream' illness prevention and health promotion; improve responsiveness to local needs and increase public participation; and improve accountability from providers to patients and to government (Lewis and Kouri 2005; Marchildon

2005). Thus there is cross-provincial agreement to deliver health care in an efficient and equitable manner; but at the same time regionalization has devolved some administrative and managerial power to the 'regional' level. This allows not only discretion over the implementation of national policies across provinces, which may lead to different utilization patterns, but also *within* provinces.

In compliance with the Canada Health Act, the large part of physician and hospital services (Medicare) are free at the point of delivery. Private health insurance that attempts to provide a private alternative, or faster access, to medically necessary hospital and physician services is prohibited or discouraged by a complex set of provincial laws and regulations (Flood and Archibald 2001). To better ensure equitable access, services falling outside of Medicare are subsidized to various degrees by the provinces and territories. However, there is a significant private component to these sectors: currently 33.8% of all prescription drugs, 21.7% of all vision care, and 53.6% of all dental care are funded through private health insurance. Out-of-pocket payments make up the second most important source of funds for total health care expenditure after taxation and the single most important source of financing for private health goods and services, namely vision care, over-the-counter medication as well as complementary, alternative medicines and therapies, and about 20% of prescription drug costs (Marchildon 2005). Thus, while financial barriers to physician and hospital care are largely nonexistent, this is not the case for services closely related to the core Medicare services such as prescription drugs and rehabilitation.

The costs of non-Medicare services may thus represent a deterrent to seeking care for those who are poor, but not protected by social assistance or government insurance plans – i.e. the 'working poor'. Prescription drug costs are excluded from the provincial insurance plans, with the exception of individuals receiving social assistance, and older people in some provinces (Grootendorst 2002). This financial barrier may be a deterrent for filling a prescription, and also for seeking physician care because of the knowledge of potential costs, described as a 'bundling' effect of prescription with physician services (Stabile 2002; Tuohy et al 2004). Moreover, in recent years some provinces have slowly reduced the basket of services provided in the public system, for example for physiotherapy in Alberta and Ontario (Stabile and Ward 2005).

Although financial barriers have been largely removed for services that have remained in the public system – physician and hospital services – non-financial barriers in terms of timely access to health care are a significant challenge in Canada, namely regarding diagnostic tests and surgical procedures, specialist physicians and even family physicians in some parts of the country. International evidence

suggests that Canada fares particularly poorly in terms of waiting times relative to other OECD countries, with variation observed across the provinces with available waiting times data (Siciliani and Hurst 2004).

In sum, despite the broad similarities in values, historical and macroeconomic context, and national constraints on social policies, the ten provinces and three territories vary considerably in terms of the financing, administration, delivery modes and range of public health care services. While the federal equalization payments redistribute federal and provincial taxes from the wealthier to poorer provinces and territories to ensure they all have largely comparable resources for public services, there is still variation in spending per capita, the public/private mix of funding, supply and quality of care (see Table 1.1 in Appendix 1).

2. Equity in utilization of health services in Canada: a review of the literature

The study of equity in Canada's health system dates back to the introduction of Medicare. Research from that time points to significant improvements in accessibility of health services following the introduction of universal coverage for hospital and physician care. Later studies, which are discussed in detail below, attempt to measure equity in terms of equal utilization for equal need, with need largely measured by self-reported ill health. These studies reveal persistent differentials in health care utilization in some sectors and provinces, and the existence of barriers to access among poorer population groups despite the removal of cost barriers for the large part of services. This section first presents early Canada-level studies measuring the socioeconomic influences of utilization, followed by a discussion of some province-level, then service-specific, studies, and finally, the most recent and technically advanced study of income-related inequity in utilization.

An extensive set of studies have investigated whether socioeconomic factors affect the use of physician and hospital services in order to assess whether in the absence of financial barriers to access, service use is based on need, and not ability to pay. For instance, studies using Canada Health Survey data and General Social Survey data assessed the extent to which hospital and physician utilization is influenced by economic factors. These studies largely follow the model of health care utilization that separates the explanatory factors of utilization into three categories: 1) predisposing factors- family composition and social structure; 2) enabling factors- income, insurance status, and education; and 3) need factors (Aday and Andersen 1974).

Using 1978-79 data from the Canada Health Survey, a series of studies evaluate the relative importance of health needs and socioeconomic variables on utilization of hospital and physician care (Broyles et al 1983; Manga et al 1987). The authors find that, controlling for need (as measured by health status), economic variables (occupational status and income) are not significantly associated with hospital utilization, although they do find that poor and middle income groups consume more inpatient care than their wealthier counterparts (Manga et al 1987). With respect to physician care, health care need appears to be the most significant determinant of both the decision to seek care and the volume of services consumed (Broyles et al 1983). They thus conclude that national health insurance has reduced, or even eliminated, financial impediments to health care and resulted in an 'equitable distribution' of physician and hospital services (Broyles et al 1983).

A later study of physician care using the 1985 General Social Survey yields similar findings (Birch et al 1993). They find that income is not associated with the probability of having a physician visit nor with the volume of services conditional upon use. However they also find that holding need constant (defined by self-assessed general health), higher educated individuals in good health are using more physician services, which the authors suggest is due to greater tendency to seek preventive care among the better educated. Therefore, the authors conclude that while income does not appear to affect physician service utilization, other barriers may exist such as education and region of residence (Birch et al 1993).

However, a decade later, an analysis of 1994 National Population Health Survey of the relationship between socioeconomic status and utilization of physician services found a pro-rich inequity in specialist services (Dunlop et al 2000). Specifically, Canadians with lower incomes and fewer years of schooling visit specialists at a lower rate than those with higher incomes and higher education. With regard to primary care, the likelihood of a GP visit is independent of income, and frequency (having at least six visits) was greater among lower income individuals. Higher educated individuals were more likely to make use of GP services than those without post-secondary education. Region of residence is also significant: Quebec residents are less likely to visit a GP but more likely to make at least one specialist visit; and urban residents are more likely than rural ones to visit a physician. The study concludes that although access to primary health care seems to be independent of income, utilization of specialist services is greater for higher socioeconomic groups, despite the fact that they have fewer health care needs (Dunlop et al 2000).

Some province-level studies have been conducted in Ontario, Nova Scotia, Quebec and Manitoba, revealing evidence of inequity. Analysis of the 1990 Ontario Health Survey of hospital utilization patterns by gender reveals that socioeconomic factors are more important for women than for men (Iron and Goel 1998). Younger women on low income and older women not in the work force are more likely to be admitted to hospital, after controlling for need (number of health problems and self-assessed health). This pro-poor distribution of hospital care supports earlier evidence at the national level.

More recently in Ontario, GP visits were found to be equitably distributed across socioeconomic groups, whereas use of specialist services favours the financially better off (McIsaac et al 1997). Using Ontario data from the National Population Health Survey (NPHS), however, another study found income does not influence physician service use, and the authors concluded physician service use is based on need in this province (Finkelstein 2001), although the sample size was very small.

An analysis of physician service utilization in Nova Scotia using the 1990 Nova Scotia Nutrition Survey linked with 1990-1994 data from the Medical Services Insurance Physicians' Services database found that controlling for age, sex and region, lower income and lower educated individuals use more services (Kephart et al 1998). It is probable that this observed inverse relationship between socioeconomic status and service use is due to factors related to need, which were not included in this model. Others analysed survey data from Nova Scotia and found that individuals on lower incomes and with less education used more GP services but fewer specialist services than wealthier and more educated comparison groups (Veugelers and Yip 2003).

In Quebec, using administrative data from the Quebec Health Insurance Board from 1991, Rivest and colleagues found that income was not significantly associated with physician care, including GPs and specialists (as measured by costs incurred measured by the physician fee schedule), but regional inequalities were significant (Rivest et al 1999). However, need was not controlled for, rather they standardized for extent of previous hospitalization (as a proxy for ill health).

Several other studies have demonstrated that factors other than need influence utilization of health care. Administrative data and income divisions based on neighbourhood statistics were used in two studies in Winnipeg, Manitoba. One study investigated inequalities in hospital and physician

services, demonstrating that lower income groups had higher health care needs, as indicated by mortality rates (Roos and Mustard 1997). It was then shown that poorer income groups use significantly more GP and hospital inpatient care, whereas surgery and specialist physician consultation rates do not vary across income groups. The authors therefore conclude that the distribution of surgical and specialist care is inequitable and regressive favouring the richer population groups. In another analysis, Roos et al found a pro-rich inequality in physician services: residents of low-income neighbourhoods incurred comparable health expenditures to those from wealthier neighbourhoods, despite their greater health care needs (Roos et al 2004). This study relied on administrative data, which, despite the advantages of being able to measure expenditure based on claims, does not link individual-level health care needs and socioeconomic status with utilization.

Access to more specific services has also been studied in relation to socioeconomic status, in an attempt to measure equity. For instance, Alter et al linked Ontario hospital and physician administrative data from 1994-1997 with neighbourhood statistics to impute income and to assess the rates of use and waiting times for coronary angiography and revascularization procedures (Alter et al 1999). They found that socioeconomic status significantly affects access: there is a significant positive association between income and rate of use of the two cardiac surgeries, and waiting times are inversely correlated with neighbourhood income quintiles. Furthermore, the mortality rates demonstrate a similar socioeconomic gradient in favour of higher income individuals. A survey of physicians and hospital administrators also found that access to specialized cardiac care is influenced by factors other than clinical need such as social status (as indicated by employment type) (Alter et al 1998).

Use of diagnostics has also been shown to be related to income in Winnipeg, Manitoba. Administrative data for a 12-month period between 2001 and 2002 show that for six different diagnostic imaging categories, higher income is associated with higher uptake after controlling for morbidity level (based on three groupings using ICD-9) and age (Demeter et al 2005).

Only one study has investigated the impact of income and private insurance coverage on utilization of public health care services. Stabile (2001) found, using 1994 and 1996 NPHS data, that having private insurance increases the probability of using any doctors' services by 2%. Private insurance also increases the number of visits to a doctor by 4%. Moreover, higher-income families are more likely to use any doctors' services than lower-income families. This would suggest that part of the

income-related inequity may arise due to coverage by private insurance. However, for hospital visits, the probability of a visit is no higher among those with private insurance, and higher family income is associated with lower utilization rates, which may reflect higher health status among wealthier people.

Generally, the findings of the studies on equity of health care use in Canada suggest that hospital services are equitable, or pro-poor, general physician services are either equitable or pro-rich, and specialist and diagnostic services are pro-rich. However this literature exhibits three major limitations: (1) most studies rely on provincial, rather than national datasets, and do not permit comparisons across provinces; (2) studies employ simplistic statistical models that do not control adequately (if at all) for need variables and insurance status; and (3) they study one point in time, which does not permit investigation of changes over time.

The above studies were followed by a more recent, technically advanced study on income-related inequity which addresses some of the limitations of previous research. More specifically, this study controls for systematic variations in health care need by income in order to better evaluate the extent to which equal utilization for equal need is achieved (van Doorslaer and Masseria 2004; van Doorslaer et al 2006). In their recent OECD report on income-related inequalities in physician service use, van Doorslaer et al analyzed the 2001 Canadian Community Health Survey including 107,613 individuals aged 16 and over. After standardizing for need, income-related inequity in total doctor visits, was found to be non-significant; therefore, doctor visits appear to be distributed according to need. However, when examining the probability of any use (which is largely driven by patient demand) it appears the rich are significantly more likely to visit any doctor than the poor.

When doctor visits are separated into visits to GPs and specialists, the picture becomes clearer. The rich are slightly but significantly more likely to visit a GP, after standardizing for need. However, conditional upon one visit, the poor see the GP more than the rich. For specialist visits, after standardizing for need, the rich are significantly more likely to visit a specialist and do so more frequently than the poor. Similar to specialist visits, the probability and frequency of dental care appears to be considerably pro-rich. On the contrary, hospital care appears to be pro-poor both in terms of the probability of admission and total number of nights spent in hospital. The importance of this approach is that it not only measures the existence of inequity, but also quantifies the level of inequity. This enables comparison across service areas, countries, regions, and time periods.

3. Methodology

3.1 Description of data

Building on the approach used by van Doorslaer et al (van Doorslaer and Masseria 2004; van Doorslaer et al 2006) this study uses more recent data and has a different objective, namely to measure horizontal equity of health services utilization in Canada and its provinces. Thus, the aim is to investigate the extent of income-related inequity across five levels of health care utilization: any physician, GP, specialist, hospital (inpatient), and dentist. The study draws on the Canadian Community Health Survey (CCHS), which includes persons aged 12 years or older living in private dwellings in the ten provinces and three territories. Persons living on Indian Reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions are excluded from this survey. The CCHS is representative of approximately 98% of the Canadian population aged 12 or older. The most recent available CCHS data are from 2003 (cycle 2.1) and this study is based on the Public Use Microdata. Individuals under age 15 are excluded from the analysis, in addition to individuals with missing data for any of the variables included in the models. Weights included in the public dataset are used for all analyses.

Health service utilization is measured by the following questions, each transformed into a dichotomous variable: 'no visits' or '1 or more visits':

- In the past 12 months, have you been a patient overnight in a hospital, nursing home or convalescent home? *[hospital visit]*
- [Not counting when you were an overnight patient], in the past 12 months, how many times have you seen, or talked on the telephone, about your physical, emotional or mental health with…
    - a family doctor or general practitioner? *[GP visit]*
    - an eye specialist or any other medical doctor (such as a surgeon, allergist, orthopedist, gynaecologist or psychiatrist)? *[specialist visit]*
    - a dentist or orthodontist? *[dentist visit]*

Indicators of health care need include age, sex, self-assessed health in five categories (excellent, very good, good, fair and poor), and the presence of a chronic condition and activity limitations. For dental care, different needs variables are included in the model: age and self-assessed oral health in five categories (as above).

Additional variables include educational attainment, employment status, and health region of residence within the province. Private insurance coverage is also included as a confounding variable in the five models: private insurance for prescription drugs in the three physician models; for hospital costs (i.e. hotel amenities) in the model of hospital care; and for dental care in the dental visit model.

Total household income is measured in quartiles and adjusted for the number of people living in the household to represent individual income, according to the following classification:
1) <CAD (Canadian dollars) 10,000 if one to four people; <CAD 15,000 if five+ people;
2) CAD 10,000 to 14 999 if one or two; CAD 10,000 to 19,999 if three or four; CAD 15,000 to 29,999 if five+;
3) CAD 15,000 to 29 999 if one or two; CAD 20,000 to 39,999 if three or four; CAD 30,000 to 59,999 if five+;
4) CAD 30,000 to 59 999 if one or two; CAD 40,000 to 79,999 if three or four; CAD 60,000 to 79,999 if five+;
5) >CAD 60,000 if one or two; >CAD 80,000 if three+.

3.2 Data analysis

In order to measure equity in the use of health services the indirect standardization approach to measuring horizontal equity was employed (Wagstaff and van Doorslaer 2000) first at the country level, then at provincial/territorial level. This method is based on the assumption that horizontal equity in health care is achieved when resources are allocated according to need, irrespective of personal characteristics unrelated to need, such as income, wealth, and education (van Doorslaer et al 1993). For the first step of the analysis, the probability of at least one visit to any physician, GP, specialist, hospital and dentist was estimated using logistic regression on the full set of explanatory variables, where the dichotomous dependent variable y_i equals one if the individual used health care or zero otherwise [equation 1]. The same model was run first at Canada level, and then separately for each province/territory.

y = 1 if y* > 0
y = 0 otherwise

where,

(1) $$y_i^* = \alpha + X'_i \beta + Z'_i \delta + \varepsilon_i$$

X and *Z* are the vectors of need and non-need variables, respectively, and the error term is represented by ε_i.

For the second step of the analysis, the horizontal inequity (HI) index is calculated; HI is defined as the difference between the degree of income-related inequality in actual health care use and the income-related inequality in need-expected use. The HI is calculated as predicted probabilities from a logistic regression on need indicators. Combining estimates of the coefficients in equation (2) with actual values of the need (*X*) variables and sample mean values of the non-need (*Z*) variables, the need-predicted values of utilization, $\hat{y}_i^x$ are:

(2) $\hat{y}_i^x = \hat{\alpha} + X'_i \hat{\beta} + Z_i^m{}_i \delta$

As the need for health care tends to be associated with income, it is necessary to adjust for differences in the distribution of need by income in order to determine the inequality in use that remains. Using the indirect standardization approach (Wagstaff and van Doorslaer 2000), it is possible to generate the predicted value of health care for each individual that depends only on need. The predicted value indicates the amount of health care that each individual would have received if she/he had been treated, on average, by the system, as others with the same need characteristics. Estimates of the need-standardized utilization, $\hat{y}_i^S$, are obtained as the difference between actual and need-expected utilization, plus the sample mean (y^m),

(3) $\hat{y}_i^S = y_i - \hat{y}_i^x + y^m$

In order to test for significance, confidence intervals and standard error for the concentration indices are generated by running a convenient regression of *y* on relative rank (R), calculated following the method of (Wagstaff and van Doorslaer 2000) for categorical variables where:

(4) $\frac{2\sigma_R^2}{y^m} y_i = \sigma_1 + C_1 R_1 + \varepsilon_{ij}$

A zero HI index implies that after controlling for differences in need across income groups, all individuals have equal probability of using health services, regardless of income. After adjusting for need, when service use is more concentrated among the better-off (worse-off), the horizontal inequity index is positive (negative). Thus, a positive index implies that individuals on higher income are more like to visit a physician than one would expect on the basis of their reported need and vice versa.

4. Results

This section first presents descriptive statistics of health services utilization at provincial/territorial level, then the results of the Canada-level analysis identifying significant provincial/territorial variation in utilization [equation 1], followed by the provincial/territorial level analyses [equation 1], and finally the income-related horizontal inequity results [equation 4].

Provincial descriptive statistics

There is some degree of variation in reported utilization of health services across the country (Table 1). Between 82% (in Yukon/Northwest Territories (NWT)/Nunavut) and 89% (Prince Edward Island; PEI) of the population report having visited any doctor in the past year. A slightly wider range is seen with GP visits, again with the lowest proportion in the territories (72%) and the highest in PEI and Nova Scotia (85%). About half of the population reported a specialist visit in the past year, ranging from 47% in the territories to 57% in Quebec. Not including eye doctors among the specialists, the proportion of the population who visited any specialist ranges from 19% in the territories to 32% in Quebec. The probability of hospitalization ranges from less than 8% in Ontario and British Columbia to about 11% in PEI, New Brunswick and the territories. Finally, likelihood of dentist visit in the past year ranges from 52% in New Brunswick to 70% in Ontario.

Table 1. Descriptive statistics for health service utilization and income

	n	Any visit	GP	Specialist	Specialist (without eye doctors)	Inpatient	Dentist	Income: ratio of poorest to richest quartile
Newfoundland	3,067	88.26	83.04	51.13	26.65	9.84	46.38	0.16
PEI	1,530	89.63	84.14	53.82	26.84	10.94	63.31	0.11
Nova Scotia	3,821	89.21	84.53	52.78	27.67	9.28	60.92	0.12
New Brunswick	3,827	86.98	80.24	51.77	27.68	11.33	52.3	0.17
Quebec	21,552	83.23	69.69	56.67	32.48	8.88	56.22	0.10
Ontario	34,419	87.1	79.76	55.4	27.99	7.52	69.61	0.05
Manitoba	5,827	84.51	77	51.16	25.26	8.77	60.24	0.08
Saskatchewan	5,716	88.08	80.63	54.59	24.31	9.62	54.73	0.10
Alberta	10,377	86.96	80.33	52.17	22.81	8.22	62.57	0.05
BC	12,367	87.19	82.24	49.26	25.44	7.78	67.43	0.10
Yukon/NWT	2,007	81.61	71.91	47.24	18.87	10.49	59.15	0.14
CANADA	104,510	86.19	77.85	54.18	27.98	8.26	63.69	0.08

Equity in Canada – aggregate level

Evidence of differential utilization across provinces and territories is observed from the results of the logistic regressions at aggregate (national) level (see Table 2.1 in Appendix 2). For any physician visit, using Ontario as a reference category, the provinces with lower likelihood of visit are: Quebec, Manitoba, and the Yukon and Northwest Territories; the provinces with significantly higher utilization probabilities are the four Maritime provinces (New Brunswick, Newfoundland, Nova Scotia and PEI) and British Columbia. Similar patterns are seen for GP visits: PEI, Newfoundland, Nova Scotia, Alberta and British Columbia have higher probabilities of GP utilization than Ontario, with lower levels seen in Quebec and the territories. Ontario has the highest probability of specialist service use, and significantly lower use of specialists (when including eye doctors) is found in Newfoundland, Nova Scotia, Manitoba, Alberta, British Columbia and the territories. Not including eye doctors, PEI and Quebec have higher likelihood of specialist utilization than Ontario, with the remaining provinces being lower. Finally, analyses of horizontal equity at Canada-level indicate that while the distribution of GP, specialist and dental care appears to be largely pro-rich, inpatient hospital care is pro-poor (i.e. the probability of hospitalization is higher for those on lower incomes, even after standardizing for differences in need).

Equity in the provinces and territories

There are some differences across the provinces in the extent of inequity observed. The results of the logistic regressions at provincial/territorial level on the binary utilization variables demonstrate the

importance of the needs variables in all areas but dental care (full results of the models are not listed here; only the adjusted odds ratios for the income quartiles are displayed in Table 2) [equation 1]. For health care visits, including physician and hospital care, worse self-reported health and presence of a chronic condition and activity limitations were associated with higher likelihood of reporting a visit in most provinces. For dental care, better self-reported oral health and younger age is generally associated with a greater probability of reporting a dental visit across the provinces and territories, possibly reflecting a greater emphasis on preventative rather than curative medicine for this specific type of care.

Overall the results indicate an independent and significant relationship between income and health and dental care use in most provinces (see Table 2). In the case of GP, specialist and dental care, the higher income groups appear more likely to report a visit than those on lower incomes, with the exception of PEI, Nova Scotia for GP visits. For hospital inpatient care, the reverse relationship is seen in all provinces: lower income groups are more likely to report staying at least one night in hospital, with the exception of British Columbia.

Other non-needs confounding variables are related with health service use (results are not reported here). For instance, higher education is associated with significantly increased probability of visiting a GP, specialist and dentist (but not hospital) in Alberta, Manitoba, Nova Scotia, Quebec, and Ontario. Higher education is associated with just specialist and dentist visits in Newfoundland, British Columbia and PEI; GP and specialist visits in the territories; specialist care in New Brunswick; and GP and dentist visits in Saskatchewan.

Private insurance for prescription drugs is associated with increased probability of seeking GP and specialist care in all provinces except Newfoundland, New Brunswick and the territories (where it is only associated with specialist care) and Manitoba and PEI (only significant for GP visits). Private insurance for dental care increases the probability of a dental visit in all provinces. Private insurance covering hospital costs is not significantly related to an inpatient stay in any province.

Table 2. Adjusted odds ratios for income groups (reference category is poorest) for GP, specialist, hospital and dental care (bold indicates significance at p<0.05)

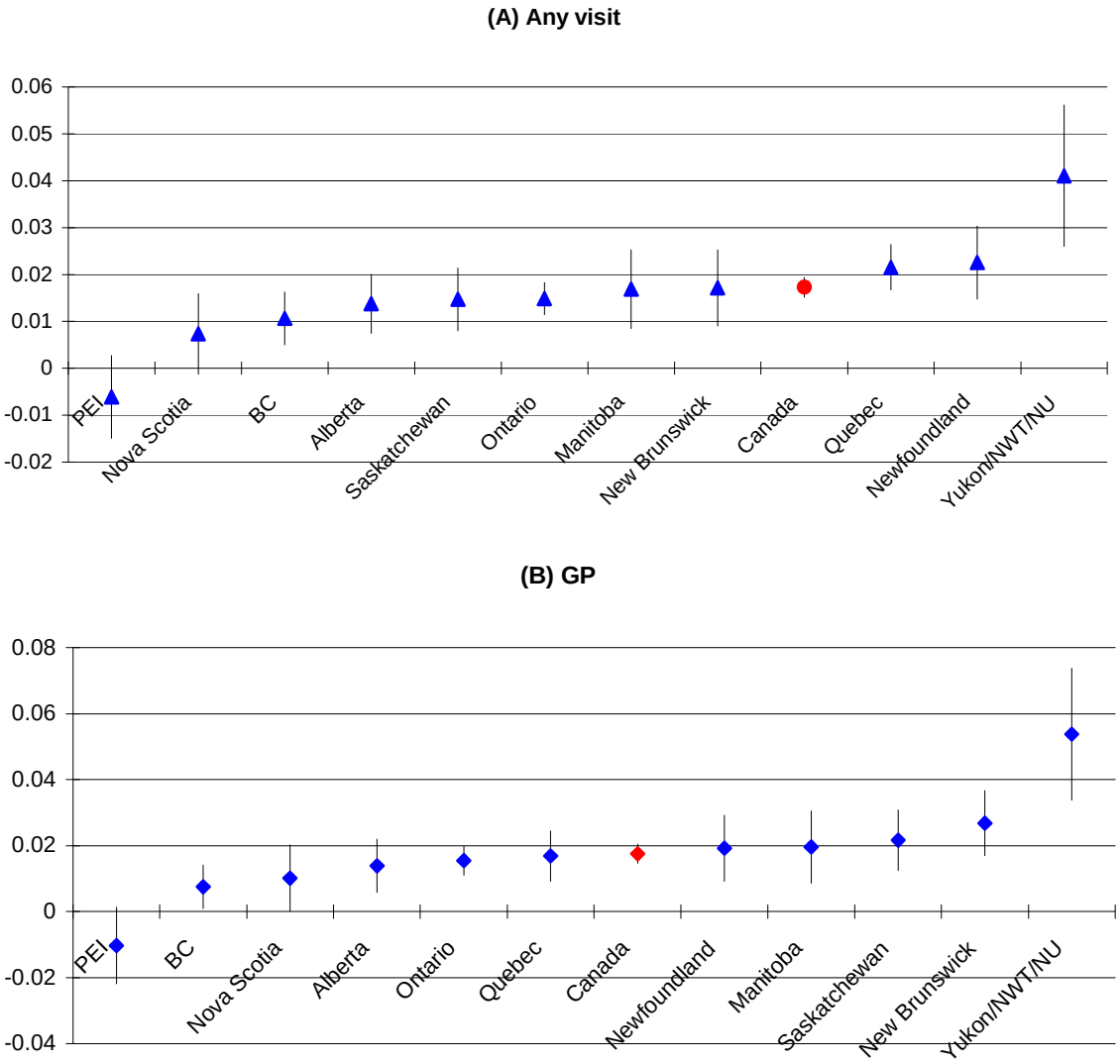
	GP				**Specialist**			
	Income quartile				**Income quartile**			
	2	**3**	**4**	**Highest**	**2**	**3**	**4**	**Highest**
Newfoundland	1.50	1.43	**2.04**	**2.25**	1.04	0.955	1.058	**1.714**
PEI	0.918	0.602	0.552	0.380	1.695	1.989	**2.854**	**2.347**
Nova Scotia	0.618	0.782	0.765	0.833	1.121	0.989	1.402	1.676
New Brunswick	0.968	1.169	1.818	**2.322**	0.89	1.020	1.031	1.336
Quebec	0.865	0.967	1.084	1.147	0.998	1.096	**1.348**	**1.717**
Ontario	1.135	1.287	1.305	**1.642**	1.042	1.177	**1.391**	**1.813**
Manitoba	0.848	0.855	.8290	1.236	0.775	0.954	1.315	*1.568*
Saskatchewan	0.993	1.372	**1.588**	**1.848**	0.767	0.919	1.038	1.191
Alberta	0.644	0.797	1.039	1.073	1.034	1.124	1.187	1.365
BC	1.43	**1.50**	**1.50**	**1.61**	1.15	1.05	1.31	**1.51**
Yukon/NWT	0.80	0.92	1.65	1.72	1.61	1.08	1.22	1.40
CANADA	0.99	1.13	**1.22**	**1.40**	1.03	1.10	**1.33**	**1.65**

	Hospital				**Dentist**			
	Income quartile				**Income quartile**			
	2	**3**	**4**	**Highest**	**2**	**3**	**4**	**Highest**
Newfoundland	0.55	**0.49**	0.52	0.44	1.13	1.54	**2.37**	**3.97**
PEI	0.45	**0.25**	**0.31**	0.39	0.80	1.28	1.84	1.96
Nova Scotia	0.92	0.71	0.74	**0.37**	0.93	0.96	**1.76**	**2.76**
New Brunswick	1.50	1.32	0.93	0.89	1.18	1.57	**2.17**	**3.75**
Quebec	0.96	0.93	0.77	**0.68**	1.09	**1.37**	**1.96**	**2.83**
Ontario	0.84	0.83	0.79	0.79	0.94	1.15	**1.74**	**2.84**
Manitoba	0.71	0.64	0.60	**0.43**	0.75	0.87	1.42	**2.62**
Saskatchewan	0.69	0.66	0.64	**0.51**	0.87	1.00	1.30	1.71
Alberta	0.43	0.40	0.48	*0.39*	1.07	1.18	1.58	**2.20**
BC	**1.81**	**1.63**	**1.86**	*1.54*	1.20	**1.66**	**2.07**	**2.73**
Yukon/NWT	1.32	0.78	1.10	0.58	1.25	1.08	1.17	1.75
CANADA	0.93	0.87	0.82	**0.74**	1.02	**1.28**	**1.86**	**2.78**

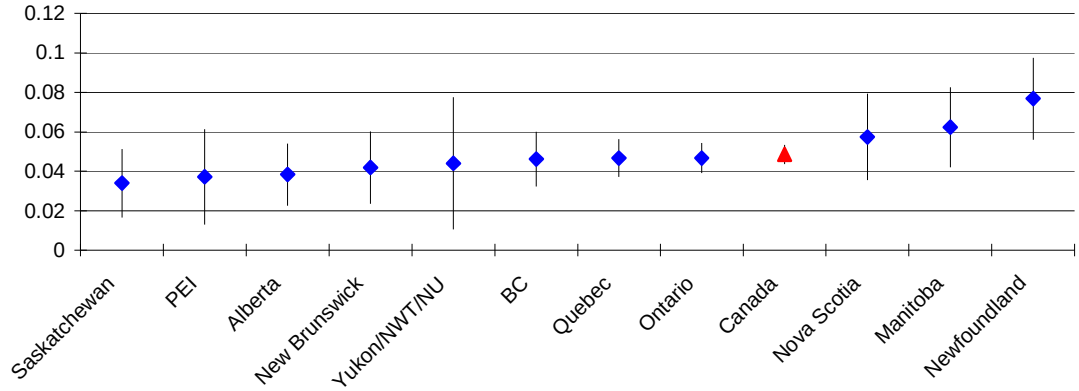
The probability analyses are supported and strengthened by the income-related inequity indices, as shown in the figures below [equation 4]. Physician visits are significantly pro-rich in all provinces with the exception of PEI and Nova Scotia; and the most inequitable region appears to be the territories. Similarly, the probability of visiting a GP is significantly greater for higher income groups, again with the exception of PEI. In all provinces, there is a significant pro-rich inequity in specialist care, with the highest seen in Nova Scotia, Manitoba and Newfoundland, and little variation across the remaining provinces and territories. For hospital care, there appears to be a significant pro-poor inequity in all provinces with the exception of Newfoundland, Alberta, Ontario, British Columbia and PEI. As with specialist care, there is evidence of significant pro-rich inequity in

dental care in all provinces and territories, in particular in three Maritime provinces – Nova Scotia, New Brunswick and Newfoundland.

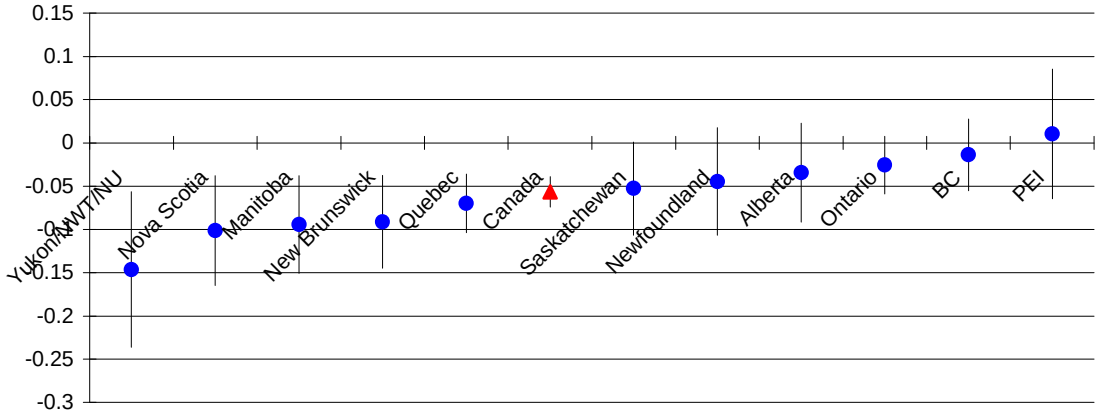
Figure 1. Income-related inequity in utilization of health services in Canada



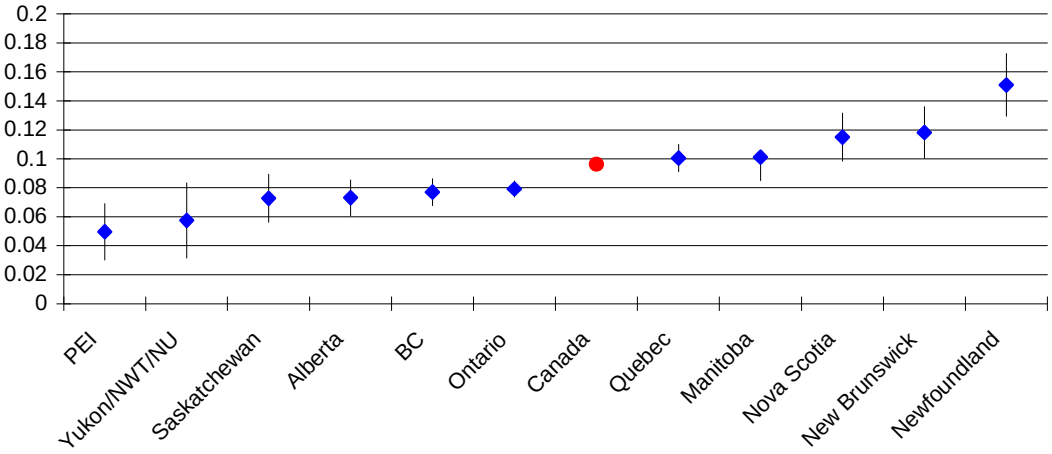
(C) Specialist



(D) Hospital



(E) Dentist



5. Discussion

5.1 Overall findings

There are similar patterns of inequity across the provinces, although with some significant exceptions. On the whole, the results are comparable to previous analysis using data from 2001 (van Doorslaer and Masseria 2004) showing pro-rich inequity in physician and dental care and pro-poor inequity in hospital care. Aggregated results for Canada are very similar to those reported by van Doorslaer and Masseria, although the level of pro-rich inequity is slightly higher in the present analysis, which is suggestive of governments having moved further from, rather than closer to, the goal of equity from 2001 to 2003. Although in absolute terms the change over the two year period was minimal, the percentage increase in horizontal inequity from 2001 to 2003 corresponds to 14.3% for any visit, 10.4% for GP visits and 10.0% for specialist visits. For dental care, there is a decline in the level of pro-rich inequity of 14.6%, which is due to the inclusion of the needs variable for dental care; the decline is only 6.4% when this is left out.

When comparing levels of inequity across the country, Prince Edward Island, a small province with less than 140,000 inhabitants, appears to have the lowest inequity in all service areas. The sample from the Yukon, Northwest Territories and Nunavut is also notable: it has the highest level of pro-rich inequity in the probability of any physician visit and GP visit and the highest level of pro-poor inequity for hospital care.

Due to the considerable differences across the provinces in population size, a sensitivity analysis was performed combining the four smallest provinces located along the Atlantic coast (Maritime provinces PEI, Nova Scotia, New Brunswick and Newfoundland). These results are shown in the figures in Appendix 3. Similar patterns to the ungrouped analysis are seen: the Maritime provinces show consistently low levels of inequity compared to the rest of Canada in all health services areas. With the exception of hospital care which reveals pro-poor, or no inequity, in the remaining services areas, only British Columbia appears more equitable in primary (GP) care than in the Maritime provinces.

These results relate broadly to the level of income inequality in each region; PEI clearly demonstrates the lowest income inequality and the territories the highest. Patterns of inequity may also relate to differential utilization rates. Descriptive statistics show that PEI has a high-use population compared to the other provinces/territories, in particular in any physician visit, GP, and hospital care.

Moreover, the provinces with the lowest levels of inequity in GP services are also those with the highest utilization rates– PEI, Nova Scotia and British Columbia. The same relationship does not appear, however, with the other service areas.

It is possible that the relatively less multicultural population of PEI, which may characterise a greater degree of homogeneous preferences for health care utilization, helps to explain both the low level of income inequality in that province and the level of inequity in service use. For instance, about 3% of the population in PEI report themselves as 'immigrants' compared to 2% in Newfoundland, 4-6% in New Brunswick, Nova Scotia and Saskatchewan, and between 8 and 28% in the remainder. The size of the immigrant population is in no way an indicator of health or income status, as this depends on many things including the country of origin, but it may create additional barriers to accessing health care that relate to language and culture. Indeed results of the country-level logistic regression analyses (reported in Appendix 2) suggest that being born outside of Canada is associated with significantly lower likelihood of hospital and specialist (including eye doctor) visits, after controlling for need and socioeconomic status, and a higher probability of dental visits.

Moreover, the variation within provinces is likely to be more important in explaining inequity, where differential use of health services by income might be more pronounced in wealthier, urban areas; therefore further investigation at regional within-province level is needed to determine contributors to inequity at provincial level. It is also interesting that there was virtually no difference found in the inequity observed between the provinces that have undergone regionalization and Ontario, which at the time of the survey, had not. Furthermore, the more recent revisions to the regionalization reform in recent years in almost all provinces do not appear to have led to equity improvements, which although was not a stated aim, was implied in the objective of more closely aligning services to local needs. The results may also be related to geographic barriers to access, which are much more pronounced in the sparsely populated territories than the provinces, in particular PEI which is a small island.

It is important to note that the survey employed for this study excluded the Aboriginal population living on reserves; this population accounts for a far greater proportion of the population in the territories than the provinces, therefore these results can only generalise to the Canadian population residing in private households.

5.2 Limitations

It is important to note the methodological limitations of this study. Self-reported health care utilization may be biased because of problems in recall. If recall difficulties affect all population groups equally, then this will not present a problem; however, if population groups are reporting utilization in a systematically different way (e.g. older people may have worse recall), then bias is introduced. Some researchers believe self-reporting of physician visits may be unreliable (Roberts et al 1996). Recall for hospital visits is generally better than that for physician contacts (Barer et al 1982).

Self-reported health status may be biased if different population groups systematically perceive their health status differently (i.e. worse or better) than other groups. There is considerable debate surrounding the measurement of need based on self-reported health (Goddard and Smith 2001). Biases in the reporting of health may systematically exist across age groups (O'Donnell and Propper 1991; Adamson et al 2003). On the other hand, numerous studies have supported the validity of self-reported health status, demonstrating significant relationships with other measures of health status (Mossey and Shapiro 1982; Kaplan and Camacho 1983; Sutton et al 1999).

It is also important to consider the possible endogeneity of needs variables in the models due to the potential causal effect of utilization on health status. The results of utilization studies may be biased if self-reported morbidity is included as an exogenous effect (Sutton et al 1999). As the relationship between morbidity and utilization is bi-directional, endogenous and exogenous effects should ideally be addressed in the analysis and could be corrected, to some extent, by measuring need based on past (i.e. six years prior) health status (Sutton et al 1999). However, this is a limitation of cross sectional data in the absence of available longitudinal data sources.

This Public Use Microdata includes income grouped in quartiles, and does not report the actual value. This is an important limitation since the study examines variation in utilization of health care according to income. Income remains a categorical, not continuous, variable based on reported income range and adjusted for the number of people in the household but not equivalized according to the composition of the household (e.g. applying different weights to children); therefore, the level of variability of income in the population is limited.

Estimating the impact of private insurance on utilization is complex. In countries where private insurance offers access to private alternatives to public providers, it can be argued that holding private insurance is endogenous to utilization. Further, it is possible that individuals in worse health, and needing to use more services, will take-up private insurance. However, in Canada there is no private alternative to the core Medicare services (physician and hospital). Moreover, the majority of private health insurance is employer-based; therefore, premiums are community- and not individually-rated. Individually-purchased insurance would have selected out the high risks because of significantly higher premiums or exclusion criteria for pre-existing conditions which affect unhealthy and older people (Mossialos and Thomson 2002). Therefore the potential bias with introducing private insurance as an explanatory variable is minimised.

Finally, it is important to underscore that this line of research, based on a macro study of inequity in health care in Canada rather than a micro level investigation of a specific disease or service category, does not address the issue of appropriateness of care.

5.3 Further research

As a follow-up to this study I intend to replicate the present methods using more recent data, once available, from 2005(cycle 3.1 of the CCHS). My current work also includes drawing comparisons with the results of the present study with analyses of uncensored CCHS data that has the advantage of including individual-level income data. Income measured as a continuous variable will enable a more accurate reflection of income inequality in the provinces, which will strengthen the analyses of equity in health care by income.

In addition, it will be interesting to decompose the contributors to income-related inequity in each province. While adjusted odds ratios provide an indication of the factors associated with service use, they do not correspond to the variability of each factor across the income distribution. It will also be useful to investigate not only the probability of a health care visit, but the intensity of use as measured by the number of visits.

Finally, perceived quality of health services has been identified as a factor influencing utilization. For example, poor quality might lead to patient dissatisfaction and deter adherence to treatment or future use (Starfield 1993). Moreover, many indicators of quality such as staff attitude, the condition of facilities, time spent with patients, and clinical outcome may vary systematically between population groups. However, due to the complexity of measuring quality, few studies have investigated

variations in the quality of access (Goddard and Smith 2001). Although quality indicators were not included in the present analysis, it will be interesting to incorporate these in future work using data from CCHS on perceived quality of care.

6. Conclusions

This paper reports preliminary findings from work in progress. Analyses of equity in utilization of health services in Canada reveal pro-rich inequity in physician (including GP and specialist) and dental care; and pro-poor inequity in hospital care. In light of the highly decentralized nature of health care in Canada, such that provinces and, to a lesser extent, territories, are responsible for the planning, management and delivery of publicly funded health services, this study investigates variations across the country in utilization patterns, and goes further to measure and compare levels of income-related inequity. Not only do rates of utilization and patterns of utilization across socioeconomic groups vary across the provinces and territories, so too does the level of inequity. The pattern that emerges shows British Columbia and Prince Edward Island (and the four Maritime provinces considered together) as having lower levels of pro-rich inequity than the remaining provinces, and the territories demonstrating the highest inequity in physician care. This pattern appears to correspond somewhat to differences in overall income inequality, proportions of the population born outside Canada, and utilization rates; however, further research is needed to measure the significance of these associations.

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APPENDIX 1. Provincial/territorial variation in financing and delivery

Table 1.1. Characteristics of the provincial/territorial health systems

	Per capita spending on health care (in CAD $)	Public spending as a % of total spending	Gini coefficient of income inequality*	Average life expectancy at birth	Hospitalization rate for ambulatory care sensitive conditions[3]	GPs per 100,000 population	Specialists per 100,000 population	Total population (in 000s)[†]
British Columbia	4,316.58	69.89	0.143	80.40	326	108	88	4,310
Alberta	4,819.99	72.94	0.122	79.50	430	100	86	3,376
Saskatchewan	4,399.26	75.14	0.135	79.00	597	87	66	985
Manitoba	4,789.65	73.20	0.124	78.40	451	92	85	1,178
Ontario	4,595.23	67.22	0.126	79.70	364	86	92	12,687
Québec	3,878.06	69.82	0.134	79.3	389	108	106	7,652
Nova Scotia	4,502.39	68.87	0.129	78.80	493	115	98	934
New Brunswick	4,364.11	69.37	0.132	79.00	658	100	67	749
Prince Edward Island	4,132.44	69.99	0.104	78.60	724	95	57	139
Newfoundland and Labrador	4,400.54	76.32	0.134	77.90	604	99	93	510
Yukon Territories	6,051.70	79.07	0.161[a]	76.80	645	176	19	31
Northwest Territories	6,826.72	88.83		76.20	888	88	33	42
CANADA	4,410.58	69.59	0.137	79.50	406	97	92	32,623

Sources: Canadian Institute for Health Information, 2006; *CCHS author's own calculations; [†] Statistics Canada 2006; [a] the territories are aggregated in the CCHS therefore only one estimate of income inequality was calculated for the whole region.

[3] Ambulatory care sensitive conditions include those conditions that should be treated with effective health care; they include pneumonia, asthma, hypertension, angina, diabetes and epileptic convulsions. Therefore, hospitalisation rates for these conditions may reflect shortcomings in medical, mainly primary, care.

APPENDIX 2. Canada-level analysis of covariates of health care utilization

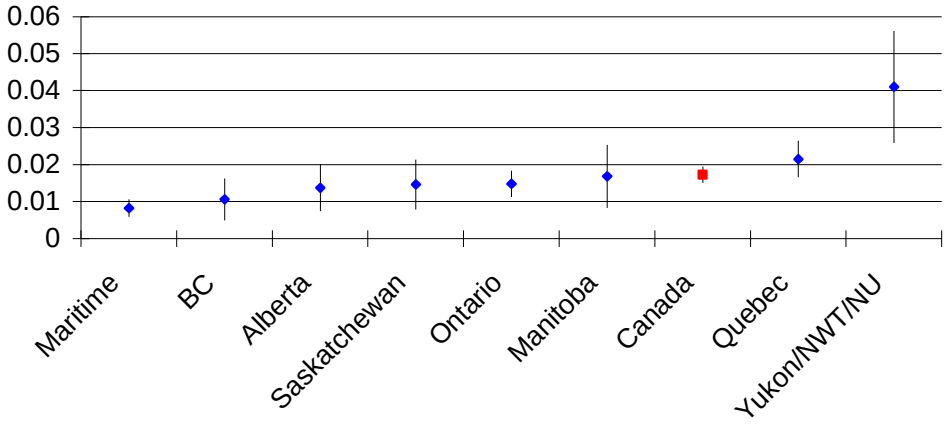
Table 2.1. Covariates of health service utilization in six categories for Canada

	Any visit	GP visit	Specialist visit	Specialist (without eye doctor)	Hospital	Dentist
inc2	0.97	1.01	**0.91**	0.99	0.99	**0.90**
inc3	**1.21**	**1.18**	1.07	**1.10**	0.94	**1.15**
inc4	**1.43**	**1.32**	**1.28**	**1.30**	**0.88**	**1.86**
inc5	**1.81**	**1.56**	**1.50**	**1.45**	**0.81**	**2.90**
V. good health	**1.34**	**1.35**	**1.14**	**1.27**	**1.08**	**0.93**
Good health	**1.57**	**1.59**	**1.26**	**1.64**	**1.51**	**0.78**
Fair health	**2.23**	**2.17**	**1.64**	**2.35**	**2.39**	**0.65**
Poor health	**3.25**	**2.84**	**1.98**	**3.24**	**3.89**	**0.57**
healthlim1	**1.82**	**1.67**	**1.45**	**1.83**	**1.47**	**1.08**
healthlim2	**2.75**	**2.26**	**1.90**	**2.67**	**2.18**	1.04
Male 35-44	0.96	1.05	**0.90**	1.05	**0.79**	0.98
Male 45-64	**1.41**	**1.45**	**1.39**	**1.30**	**1.15**	**0.83**
Male 65-74	**2.58**	**2.43**	**2.30**	**1.68**	**1.66**	**0.68**
Male 75+	**3.68**	**3.20**	**2.94**	**1.42**	**2.35**	**0.50**
Female 15-34	**3.46**	**2.84**	**1.93**	**2.35**	**3.13**	**1.52**
Female 35-44	**2.50**	**2.36**	**1.68**	**2.10**	**1.56**	**1.54**
Female 45-64	**2.88**	**2.68**	**2.11**	**2.00**	1.09	**1.20**
Female 65-74	**5.04**	**3.53**	**3.20**	**1.74**	1.13	**0.91**
Female 75+	**4.82**	**3.81**	**3.37**	**1.20**	**2.17**	**0.60**
educ2	**1.14**	**1.12**	**1.14**	**1.31**	1.00	**1.40**
educ3	**1.43**	**1.30**	**1.34**	**1.56**	**1.08**	**1.74**
Migrant	0.96	1.01	**0.93**	0.99	**0.89**	**1.14**
PMI_drugs	**1.52**	**1.41**	**1.35**	**1.25**	-	-
PMI_hospital	-	-	-	-	1.07	-
PMI_dent	-	-	-	-		**1.82**
Inactive	**2.27**	**1.61**	**1.47**	**1.38**	**1.63**	**0.89**
Retired	**1.45**	**1.38**	**1.19**	**1.28**	1.09	**1.16**
Unemployed	**1.33**	**1.26**	**1.18**	**1.22**	**1.51**	**0.91**
Student	**1.31**	**1.14**	**1.31**	1.05	**0.78**	**1.41**
Employed	**1.14**	**1.10**	**1.07**	0.98	0.99	0.96
Newfoundland	**1.21**	**1.33**	**0.85**	**0.91**	**1.25**	**0.41**
PEI	**1.50**	**1.64**	1.06	**1.15**	**1.47**	0.96
Nova Scotia	**1.25**	**1.40**	**0.89**	0.96	**1.06**	**0.76**
New Brunswick	**1.12**	1.04	0.98	1.05	**1.33**	**0.62**
Quebec	**0.75**	**0.60**	1.00	**1.23**	**1.19**	**0.56**
Manitoba	**0.88**	0.94	**0.80**	**0.77**	**1.28**	**0.66**
Saskatchewan	1.09	1.07	0.95	**0.85**	**1.32**	**0.56**
Alberta	0.99	**1.07**	**0.82**	**0.71**	**1.13**	**0.61**
British Columbia	**1.09**	**1.25**	**0.77**	**0.84**	0.98	**0.94**
Yukon/NWT	**0.67**	**0.65**	**0.76**	**0.63**	**1.42**	**0.62**

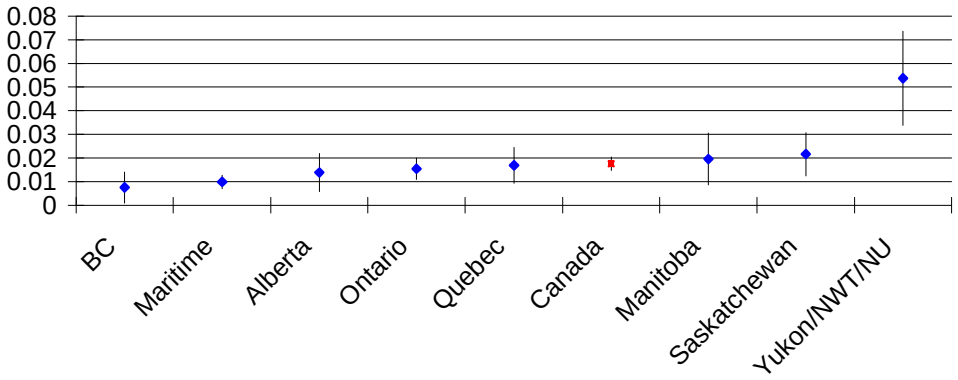
Note: OR = adjusted odds ratios; bold represents significance at 0.05 level

APPENDIX 3. Income-related inequity in utilization of health services in Canadian provinces (with grouped Maritime provinces)

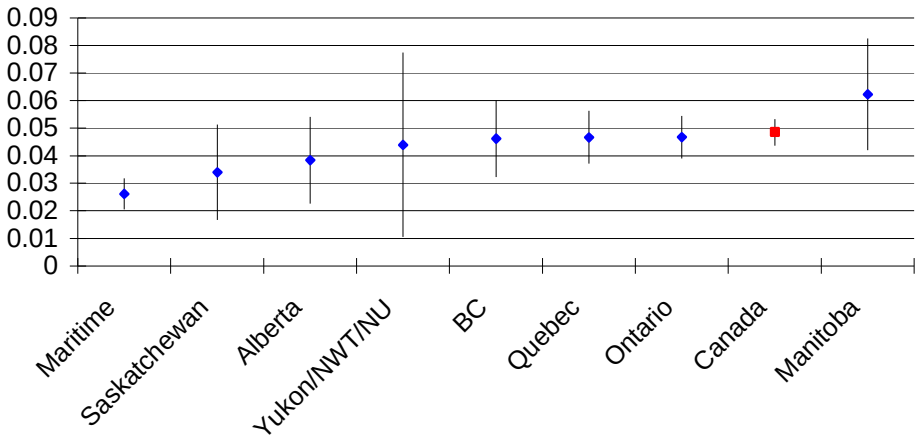
(A) Any visit



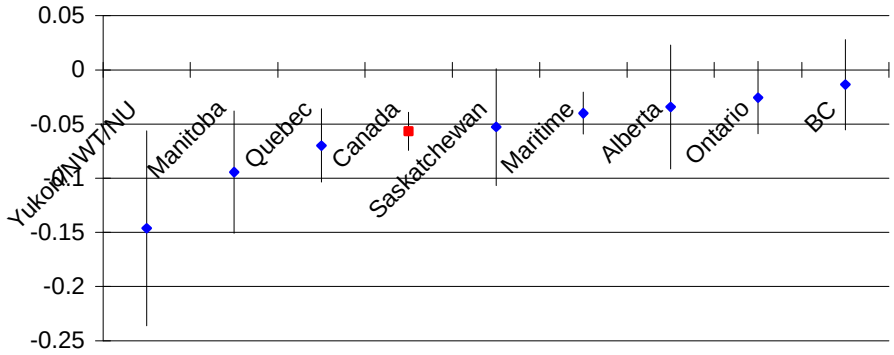
(B) GP



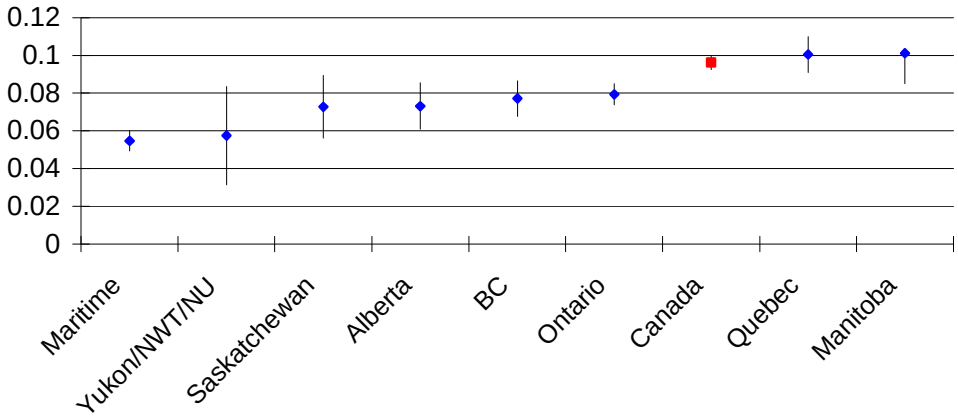
(C) Specialist



(D) Hospital



(E) Dentist



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