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Gillian Mulvale

Jeremiah Hurley

McMaster
University

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# Insurance Coverage and the Treatment of Mental Illness: Effect on Medication and Provider Use in Canada

Gillian Mulvale[1,2,*]

Jeremiah Hurley[1,2,3]

[1]Centre for Health Economics and Policy Analysis, McMaster University
[2]Department of Clinical Epidemiology and Biostatistics, McMaster University
[3]Department of Economics, McMaster University


[*]Corresponding author:    Centre for Health Economics and Policy Analysis
                            McMaster University
                            HSC 3H1B
                            1200 Main Street West
                            Hamilton, Ontario  L8N 3Z5
                            Tel:  905-525-9140, x 23198
                            Fax: 905-546-5211
                            E-mail:  mulvalg@mcmaster.ca

# Abstract

*Background*

Canada's public health insurance system fully covers medically necessary hospital and physician services, but does not cover community-based non-physician mental health provider services or prescription drugs. Almost 2/3 of Canadians have private supplemental insurance for extended health benefits, typically through their employer, so its distribution is skewed to higher-income, employed Canadians, and typically features substantial cost-sharing and coverage limits. A recent national survey suggests only one-third of Canadians with selected mental disorders talked to a health professional during the previous 12 months and only a minority (19.3%) receive drug treatment. Financial barriers to care constitute a potentially important contributor to this under-use of mental health treatments.

*Aims of the Study*

The objective is to understand how private supplemental insurance status affects the utilization of prescription medication and four types of community-based providers for mental health problems in Canada.

*Methods*

The data derive from a special mental health supplement to the nationally representative Canadian Community Health Survey. Utilization of five types of prescribed medications (sleep, anxiety, mood stabilizers, anti-depressants and anti-psychotics) is measured dichotomously as use/no-use in the previous 12 months. Utilization of community-based provider services (family physician, psychiatrist, psychologist and social worker) is measured as (i) use/no-use and (ii) conditional on use, number of contacts in the previous 12 months. We employ multivariate regression methods appropriate to the binary and count nature of the dependent variable to measure the impact of supplemental private insurance status on utilization, controlling for health, demographic and socio-economic characteristics. We test for endogeneity of insurance status using instrumental variable techniques.

*Results*

Having private supplemental insurance significantly increases the odds of using medications for mental illness, with particularly large increases for anti-psychotic and mood-stabilizer medications. Private supplemental insurance coverage does not significantly determine use of provider services. We find little evidence of endogeneity of private insurance.

*Discussion*

Lack of supplemental insurance for prescription medication is a potentially important financial barrier to mental health treatment in Canada. The estimated effect is likely understated because the utilization measure does not capture quantity of use.

It is not surprising that no significant relationship between private insurance status and utilization of provider services is found for publicly-covered family physician and psychiatry services, where the link between supplemental insurance and use is indirect, through the need to visit a physician to obtain a prescription. The result is surprising for psychologists and social workers, and may reflect limits to private coverage which are not fully captured here.

*Implications for Health Care Provision and Use*

Insurance coverage has an important relative impact on the likelihood of drug use for mental illness.

*Implications for Health Policies*

A program that offers insurance coverage for anti-psychotic and mood-stabilizing medication could reduce the high personal and societal burden associated with serious mental illness, without a large overall budgetary impact.

*Implications for Future Research*

Future research should incorporate insurance measures which capture details of coverage among all survey respondents. Linking survey to utilization data will help to overcome issues of recall bias.

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## Introduction

Because health care insurance for mental health services is often less generous – in terms of both the breadth of services covered and the depth of coverage -- financial barriers to accessing mental health services are a policy concern in many health systems.   Canada, for instance, has a universal system of public health insurance that fully covers the cost of medically necessary hospital and physician services, but the public plan generally does not cover the services of community-based non-physician mental health providers such as psychologists and social workers; nor does it cover prescription drugs, which are an integral part of treatment for many mental health conditions.  Private supplemental insurance, which is held by many Canadians, provides some coverage, but includes cost-sharing and coverage limits which may be a barrier to utilization, and the distribution of those with supplemental insurance is skewed to higher-income, employed Canadians [1], leaving many of those most in need with no coverage.   It is perhaps, not surprising, therefore, that according to a recent Canadian survey, only 32% of Canadians who suffered from selected mental disorders saw or talked to a health professional during the previous 12 months [2], and only a minority (19.3%)  receive drug treatment [3, 4]. Financial barriers to care constitute a potentially important contributor to this under-use, and will likely constitute an increasing barrier as care shifts from fully insured in-patient settings to inadequately insured community settings.  Understanding the role of financial and other barriers to mental health care use is therefore an important issue for policy-makers seeking to improve access to care.

This paper uses data from a special mental health supplement to the Canadian Community Health Survey [5] [6] to examine the role that insurance coverage, particularly private supplemental coverage, plays in the utilization of prescription medication and four types of community-based providers -- family physicians, psychiatrists, psychologists and social workers – for mental health problems.  The CCHS is a special community-based population survey which has already been used extensively to examine demographic, health status, socioeconomic status and other influences on mental health service use in Canada for particular regions and conditions [3, 7-10], as well as to understand the characteristics of individuals with mental illness who do not have prescription drug coverage [1].   This is, to our knowledge, the first analysis of the role of insurance coverage on utilization using these data.

The next section provides background on health insurance coverage in Canada and some survey features that bear importantly on the design of the analysis.  This is followed by a discussion of our analytic approach, variable specification, and results.   We end with a

discussion of some implications of our findings, limitations to the analysis and suggestions for future work.


# Background

*Health Insurance Coverage in Canada*

As noted above, Canada's core public health insurance system fully covers the cost of medically necessary physician and in-patient hospital services. Therefore, coverage for physician services is available regardless of setting. Public coverage for non-physician providers depends on the care setting. Non-physician providers are fully covered in the in-patient setting; non-physician providers in office-based community settings are, with a few exceptions (e.g, a small number of Community Health Centres and public health departments), not covered by the public plan and must be paid for privately.

Public coverage for prescription medications depends both on the care setting and individual characteristics. Once again, prescription drugs are fully covered in the in-patient setting. Public drug programs for out-patient drugs are universal in only 5 of Canada's 13 provinces and territories (British Columbia, Alberta, Manitoba, Saskatchewan and Quebec) [1, 11]. In the remaining provinces, public coverage is limited to the elderly (aged 65 or over), social assistance recipients, and other vulnerable populations (e.g., those with very high drug expenditures). All public plans include substantial patient cost-sharing, with the level varying across provinces [12]. Overall, approximately 25% of the population is eligible for public drug coverage [1].

Approximately two-thirds of Canadians hold private supplemental coverage for health care services not covered by the public plans [13], including prescription drugs and some non-physician providers. Most supplemental policies are obtained through employer group policies [14]. About 80% of such group plans include coverage for prescription drugs and paramedical services [15]. Such private plans also include cost-sharing; in addition, they often include annual coverage limits, typically in the range of $300-$600 across all non-physician providers [14]. Given that a psychologist typically charges about $125 per hour, these limits can quickly be reached for someone utilizing mental health services. Hence, these private plans at best provide partial coverage. Many individuals with the most serious mental illness are unemployed but are likely to have some supplemental coverage as part of social assistance. Others may be working on a part-time basis or in positions without employer-sponsored supplemental insurance and lack any private coverage.

*Data Source*

The Canadian Community Health Survey (CCHS), Cycle 1.2 is a cross-sectional, community-based population health survey that collected information about mental health status, mental health care utilization, mental health determinants, insurance status and a variety of individual and household characteristics for a random sample of 36,984 respondents aged 15 years and older living in private occupied dwellings[1] in 2002. The survey used a multi-stage clustered design [5, 16], and responses were weighted to adjust for over-sampling of youth and seniors, non-response, under-coverage and other survey design issues. The overall response rate was 77%, and varied by province from 73.4% in Ontario to 82.4% in Manitoba. Non-response to individual survey questions was generally less that 1% and often less than 0.1% [16].

Three aspects of the survey have an important bearing on how we measure utilization and insurance status in the analysis and for the analytic methods employed. The first is the utilization measures included. The survey asked respondents whether they had used each of various types of prescription and over-the-counter medications in the past 12 months. Unfortunately, it did not ask about quantity of use. Hence, the analysis of medication use is limited to dichotomous use/non-use measures of utilization for each of the medication types analyzed. For provider services, the survey first asked the respondent whether they had ever used each of eight types of professionals (psychiatrist, family physician, other doctor, psychologist, nurse, social worker, religious counsellor or other professional) for an emotional or mental health issue, or abuse of alcohol or drugs. For each type of professional the respondent had used, the survey then asked the number of contacts in the previous 12 months and the setting in which the contact(s) occurred. Hence, for provider services we can assess both the likelihood that an individual used a particular type of professional in the previous 12 months as well as the intensity of use, as measured by the number of visits. Given our interest in the role of insurance, we limit the analysis to contacts in the office-setting with family physicians, psychiatrists, psychologists and social workers (recall that hospital services are publicly-covered regardless of provider type).

The second key feature is the insurance measures included. The survey asked all respondents whether they had insurance (public or private) that covered at least part of the costs of prescription medications. This information can be used to identify the impact of drug insurance on use of prescription drugs for mental health conditions. The information on provider insurance is less complete. We know that all individuals have public coverage for

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[1] Individuals living in the three territories, on Indian Reserves and Crown lands, residents of institutions and full-time members of the Armed Forces and some remote areas are not included.

family physicians and psychiatrists and that the public system does not insure any community-based non-physician providers. The survey includes a question regarding private insurance coverage for non-physician providers, but unfortunately it was asked only of respondents who had had contact with a particular provider in their lifetime. Therefore, we cannot use it to analyze the impact of insurance on use. In the analysis of provider utilization, we instead use a proxy measure of insurance coverage for a provider. The proxy measure is whether the individual has private drug insurance. Recall that 80% of private extended health plans include coverage for both drugs and psychological services [12, 14]. Further, among those who used a non-physician, for which we know insurance coverage for both drugs and non-physician providers, the two types of insurance coverage are reasonably correlated (Spearman's rank correlation statistics of 0.47 (p = 0.00) and 0.39 (p = 0.00) respectively for psychologist and social worker). We do not know explicitly whether a person's drug insurance is public or private, but the provincial public drug insurance plans concentrate coverage on the elderly and those on social assistance. We therefore exclude those aged 65 or older or on social assistance whose drug insurance status, if present, likely reflects public rather than private supplemental coverage, when estimating the non-physician provider models that use this proxy. Because we know the actual provider insurance status for users of a provider, we test the reasonableness of the proxy measure in assessing quantity of visits conditional on being a user, by comparing estimates based on the proxy with estimates using the actual insurance variable.

The third feature of the survey is that for all of our private insurance measures, we know only about the presence or absence of insurance; we have no information on the nature of the coverage, including co-payments, coverage limits, etc.

In summary, the analyses employ the following measures of insurance status.

(i) The analysis of the impact of insurance status on use/non-use of prescription drugs is estimated over the full sample and employs a direct measure of whether the respondent has at least some drug insurance coverage (public or private).

(ii) The analysis of the use a family physician or a psychiatrist for a mental health problem is estimated over the full sample and includes the above measure of drug insurance coverage. All individuals have coverage for these providers; the drug insurance measure in these models is included to capture the effect of coverage for a complementary health care service, since those with drug insurance may be more likely to visit a physician provider to obtain a prescription for a medication.

(iii) The analysis of the use of a psychologist or a social worker employs drug insurance as a proxy measure for private coverage for these providers, and is estimated only over non-elderly,

non-social assistance respondents for which the proxy measure is most valid.    In addition, we are able to check the validity of the proxy for one aspect of utilization:    quantity of use conditional on being a user, for which we have information on both the proxy and coverage for the provider.  We therefore estimate the separate models of conditional use of non-physician providers using the proxy measure and the actual measure.

Branching in the structure of the provider use component of the survey affects the sample size used in our analysis. Figure 1 provides a schematic overview of this branching for the full sample.  For example, in the case of psychologist services, of the original sample of 36,984 individuals, only 2,805 had a lifetime use of psychologists services, only 667 had a contact during the past 12 months of which 435 were in the office setting. For estimation using the proxy measure of insurance status, we exclude those aged 65 and over or on social assistance and the sample size is smaller for estimates of utilization of psychologist and social work services (e.g. the sample size drops from roughly 34,000 to 25,000 for models of use of psychologist services and from 403 to 353 for models of contacts with psychologists, conditional on use).

## Methods

*Analytic Approach*

We model mental health care utilization within a standard economic approach that includes determinants of the demand for and supply of mental health care treatments in a reduced-form model.  Utilization of medication and provider services is modeled as a function of insurance status, controlling for the individual's health status, socioeconomic status, demographic characteristics, social support and provider supply.

The analysis of drug utilization is limited to use/non-use, which is estimated using a logistic regression.  The analysis of the use of providers employs a standard two-part model. The first part concerns the probability of any use of the service in question and is estimated with a logistic regression.  The second part concerns the number of contacts conditional on being a user and, given the count nature of the data, is estimated using a zero-truncated negative binomial model (the data exhibited over-dispersion, violating the Poisson assumption).

Endogeneity is a matter of concern where there is self-selection with regard to insurance status that may be correlated with unmeasured aspects of health status that affect utilization.  The traditional concern is that those who are relatively unhealthy are more likely to hold insurance and to use services. A number of factors in this analysis reduce the likelihood of such endogeneity bias.  First, in the analysis of drug use, many elderly and low-income

individuals obtain drug coverage automatically through public programs. Second, the vast majority of individuals with private supplemental insurance (for drugs or providers) obtain it through a group policy, most often linked to employment. The individual market in Canada is very small, which means that coverage is not directly linked to health status. Some selection may arise through employment decisions, but here the concern would be the opposite of the usual case -- those with insurance may be relatively healthy. Finally, we have a number of good measures of health status (see below). The endogeneity arises only through unmeasured health status, and other studies demonstrate that in the presence of good control for health status at the individual level, endogeneity is often not a problem [17-22]. We first estimate the models assuming that insurance status is exogenous, and then test for endogeneity using an instrumental variables approach. Our instrument is the marginal tax rate an individual faces. Because supplemental insurance is tax deductible in Canada, and tax rates vary provincially, the true price of private insurance varies across provinces for individuals with the same income, inducing differing probabilities of holding such insurance [23]. Hence, the tax rate is correlated with holding private insurance, but is exogenous to an individual and should not be correlated with health status [23] [24 p. 84].

*Variable Specification*

Dependent Variables

We analyze separately the utilization of five types of prescribed medications commonly used in the treatment of mental illness: those for sleep, anxiety, mood stabilizers, anti-depressants, and anti-psychotics. In each case utilization is measured dichotomously as use/no- use in the previous 12 months.

We analyze the utilization (for a mental health problem) of four provider types in an office setting: psychiatrist, family physician, psychologist and social worker. Utilization for part 1 of the model is specified dichotomously as use/no-use in the 12 months prior to the survey; utilization for part 2 is measured as the number of contacts in the previous 12 months conditional on being a user.

Independent Variables

In all models insurance status is measured dichotomously to indicate presence/absence of insurance. As noted above, for the analyses of medication use we include a dichotomous measure indicating the presence or absence of drug insurance. For the analyses of utilization of family physicians and psychiatrists, both of which are fully covered by the public plan and

both of which can prescribe medication, this same dichotomous drug insurance measure is included because medications can be a complement or substitute to their services [23, 25]. For the analyses of the utilization of psychologists and social workers, we include drug insurance as a proxy measure of insurance coverage for these providers and restrict estimation of these models to individuals under age 65 and not on social assistance for which drug insurance best proxies for private extended coverage.

We include a number of measures of mental health status. These measures include diagnostic scores for major depression, manic episode, panic disorder, social phobia or agoraphobia (based on the World Mental Health – Composite International Diagnostic Interview Instrument (Andrews and Peters, 1998) [16]); indicators of whether the respondent had ever been given psychiatric diagnoses for schizophrenia, other psychotic disorder, dysthymia, post-traumatic stress disorder (PTSD); a measure of self-assessed mental health status (SAMHS); a measure of distress levels; indicators for substance abuse, suicidal thinking, and suicide attempts in the last 12 months. We expect those with a psychiatric diagnosis, lower SAMHS, higher distress scales, and the presence of suicidal or substance abuse indicators are more likely to use mental health services. Because physical health problems lead to more frequent provider visits and thereby increase the likelihood of detection of a mental disorder, we include dummy indicators for the following chronic disorders: diabetes, arthritis, asthma, heart disease, back problems and high blood pressure.

Socioeconomic variables include household income adequacy (income adjusted for family size) and the respondent's highest level of education completed. Demographic variables include marital status, age (age and age$^2$ to allow for non-linearities), sex, immigrant status, and, because those living in an urban setting have easier access to providers due to better supply and decreased travel costs, we include a dichotomous indicator of urban/rural residence. We include scores on social support scales derived by Statistics Canada from survey responses [16]: tangible, affection, positive social interaction, and emotional and information support which may either be helpful in getting an individual to care when required or used as a substitute for formal mental health treatment. The models for number of contacts included measures of satisfaction and helpfulness of provider services.

Finally, a set of provincial dummy variables is included to capture unmeasured, fixed province-specific effects, including the impact of differences across provinces in health care system and supply of providers (health care systems in Canada are administered at the provincial level).

Table 1 presents a summary of the variables used in the analysis and their specification.

# Results

*Descriptive Findings*

Given that the sample is community-based, we observe generally low levels of use of mental health services and of mental illness (Table 2). The most frequently used medications were sleep (10.2% of respondents), anti-depressant (5.8%) and anxiety medications (5.5%), while 1% of respondents reported using a mood stabilizer and 0.4% an anti-psychotic medication. More respondents (4.1%) saw their family physician for mental, emotional or substance abuse problems in the past 12 months than any other provider types, although the mean number of contacts was fewer (5.1) for family physicians. This likely reflects the role of family physicians as the first point of access before referral to specialty services. Most patients had a small number of contacts regardless of provider type; many had only one contact, and the majority had six or fewer contacts in the past 12 months.

Most respondents had some insurance coverage for medication (77%). Among those who used a non-physician provider, most had coverage for psychologist (70%) and social work (61%) services.

The mental disorders most frequently reported during the past 12 months were a major depressive episode (4.8% of respondents), social phobia (3.0%), panic disorder (1.5%) and manic episode (1.0%). Most respondents rated their mental health highly (good, very good or excellent mental health status) and distress measures were generally low. Substance abuse (3%), suicidal thinking (3.7%) and suicide attempts (<1%) in the last year were reported by a minority of respondents. A significant portion of respondents had at least one chronic physical condition, with back problems and arthritis reported most often (by 20.9% and 17.5% respectively). Most respondents had high levels of socioeconomic status and were either married or living common-law (61.7%) with high levels of social support. The mean age was 44 years and just over half of the respondents were female (51%). There was a fair level of satisfaction among service users, with higher mean scores for satisfaction and helpfulness of services for psychiatrists and psychologists compared with family physicians and social workers.

*The Impact of Insurance Status on Utilization*

<u>Medication</u>

Table 3 summarizes the results for the logistic analysis of use/non-use of each type of medication. Overall the models perform well in explaining the likelihood of using the five medications given the cross-sectional nature of the data (pseudo $R^2$ ranging from 11% for sleep

to 44% for anti-psychotic medications). The results indicate that having drug insurance has a statistically significant positive effect on likelihood of use of sleep, mood stabilizer, anti-depressant and anti-psychotic medication; the estimated effect for anxiety medication is positive but not significant. We measure the magnitude of the impact of insurance in absolute (marginal effect) and relative terms (odds ratio and percentage change). The marginal effect indicates the absolute impact insurance has on the probability of using a medication. Hence, other things equal, the predicted probability that a person with drug insurance used sleep medication is 0.01 higher than a person without insurance. In all cases, the marginal effects are small. This, however, primarily reflects the low baseline prevalence of use. In relative terms, a person with drug insurance is nearly 15% more likely to use sleep medication than is the identical person without insurance. For anti-depressants and mood-stabilizers, the relative effects of insurance are 27.7% and 81.5% respectively, and what is particularly striking is the more than a three-fold increase in likelihood of using an anti-psychotic medication for those with insurance than the identical person without.

The relationships of other covariates to medication use (not shown) were as expected.[2] For all types of medication, indicators of mental health status had the most important effect on medication use. Self-assessed mental health status (SAMHS) was found to have a clear gradient, with lower SAMHS associated with higher use. Having a chronic physical disorder, increasing age, higher education levels and being female also generally had a positive impact on use, while being an immigrant had a negative impact. There was only a weak or non-existent relationship between medication use and income adequacy, social support, the measure of distress, and province .

Provider Services

*Use/Non-Use*

As was the case for medications, the use/no-use models performed well in terms of explaining the likelihood of using services, (pseudo $R^2$ ranging from 17 to 29% depending on the provider). Wald statistics suggested that the explanatory power of the model was statistically significant overall. However, private, supplemental insurance appears to exert little impact on the use of providers (Table 4). None of the estimated impacts of insurance on the likelihood of use are statistically significant at the 5% level; the estimated impact of the likelihood of contact with a family physician is significant at the 10% level. Once again, marginal effects are estimated to be quite small, though relative effects are larger. Having drug insurance, for instance, increases

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[2] For a list of full sets of estimation results see Appendix, Table A-2.

the likelihood of visiting a family physician by 20%. Tests for endogeneity of insurance status in this first stage were negative in all cases but one, use of a psychologist (See Appendix Table A-7). Correction for endogeneity using the marginal tax rate as an instrument had no impact on the estimated insurance effect for psychologists: the estimated coefficient was not statistically significant in both the uncorrected and IV corrected specifications.

*Number of Contacts*

The impact of insurance on number of contacts is also weak; it is not significant for any of the provider types at the 5% level, though once again it is significant for family physicians at the 10% level. The marginal tax rate was found to be a weak instrument in the models of number of contacts, so we did not proceed with endogeneity correction.

Because for users we know the insurance status for each provider, we can assess the validity of using drug insurance as the proxy for provider insurance. The proxy appears to perform reasonably: for both psychologists and social workers estimates using the drug insurance proxy have the same sign, similar magnitude and are similarly non-statistically significant as when the actual insurance variable is used (e.g. a reduction of 0.4 vs. 0.3 psychologist contacts).

Patterns among other covariates were generally as expected (see Appendix Tables A-3 and A-5). The presence of specific diagnoses and a clear gradient in self-assessed mental health status in particular were found to be major determinants of utilization of provider services. Education and demographic variables were generally significant and income adequacy was an important determinant in the case of likelihood of using psychologist services. In general, fewer covariates were significant in the models of number of contacts, which may reflect the relatively small sample sizes in these analyses.

## Discussion

Our findings suggest that insurance coverage has an important relative impact on the likelihood of drug use: insurance coverage increased likelihood of using all but anxiety medication. The effect was particularly large for the use of anti-psychotic medication (347%) and mood-stabilizers (81.5%), which are essential elements of treatment of schizophrenia [26] and bipolar disorders [27], both of which typically have high individual and societal burden [28]. Currently only about half of individuals with schizophrenia in Canada use antipsychotic agents and only 8.2% of those with bipolar disorder use a mood stabilizer [3]. From a policy perspective the findings suggest that insurance coverage could increase access to mental health treatment

for those in need who do not have access to supplemental coverage. At the same time, the small absolute increases suggest the overall budgetary impact of the increased utilization is not large. Furthermore, given the specificity of such drugs in treating these serious mental health conditions, moral hazard would unlikely be a problem.

Our estimates of the impact of insurance on use are conservative because they consider only the effect on likelihood of using a medication. They do not capture the impact on the intensive margin -- quantity of use conditional on being a user -- which has been shown to be important in other studies. In the absence of insurance, many individuals continue with some use of medication, but reduce their dose or take it less frequently than recommended [29-31].

The findings indicate a generally weak relationship between private insurance status and utilization of provider services, measured as either propensity for service use or contacts conditional on being a user. This is not surprising in the case of family physicians and psychiatrists, where their services are fully covered by public insurance and the link between supplemental insurance and use is indirect, through the need for a physician visit to obtain a medication prescription. The finding is more surprising for psychologists and social workers. Although the results are not statistically significant, if anything the estimates suggest that insurance has a negative impact on the number of contacts. Any such effect may derive from limits to private coverage: among users, those who rely on insurance may reduce their use once they reach the coverage limit, while those paying out of pocket are a selected sub-set of those who can pay.

Endogeneity of insurance does not appear to be a substantial problem in this analysis. This has also been found in a number of other studies [17-22, 32]. There could be several reasons for this finding. The first is that the instrument used could be of poor quality. However, we found the instrument was significantly related to insurance status in all but the count data equations. The second reason is that when the insurance measure in the private market is obtained through large groups of individuals, as is the case for employer-based plans, individual-level selection effects are avoided. The third reason is that the models estimated here include a rich set of health status measures, reducing unmeasured health status in the error term.

Other factors to consider as we interpret the results are the role that provider supply and attitudes of stigma may have on the estimates provided here. Supply constraints in particular regions cannot be captured with this data set and if present, would mean the estimates of the role of insurance coverage may be underestimated. Issues of stigma may also keep individuals who have employer-sponsored private insurance from using (and claiming) for mental health

treatments for fear of adverse impact on their employment situation. This effect, if present would suggest the impact of insurance coverage has been underestimated.

A number of limitations must be kept in mind in interpreting these findings. The first is the need to use a proxy for insurance status with respect to non-physician providers. The proxy appears to perform well, but is obviously a less preferred measure. Second, we lack detailed information on the nature of insurance coverage, which limits our ability to advance our understanding of how co-payments, deductibles and annual limits affect medication and provider use. Third, in the case of prescription medications, we are limited by the survey data to a relatively crude utilization measure – use/non-use – missing the potential effect on the quantity of use. Finally, as in any study which relies on self-report data there is the concern of recall bias [33]. In particular, patients may have difficulty accurately identifying the type of provider seen and their insurance status. The emphasis on recent use (in previous 12 months) reduces recall problems, but likely some recall bias remains. Future work should incorporate insurance measures which capture details of coverage among all survey respondents. Linking survey to utilization data will help to overcome issues of recall bias.

## Conclusions

We find that insurance coverage has an important impact on utilization of medications for the treatment of mental illness, with particularly important effects on use of anti-psychotic and mood stabilizer medications. Although the absolute effects are small, the relative effects are large. This suggests that there is room to improve access to these much-needed medications for treatment of serious mental illness without a large budgetary concern for policy-makers. We find few effects of insurance coverage on use of provider services, which may reflect the fact that full public coverage is available for some provider types and settings as well as the limitations within private coverage.

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# Table 1:  Variable Specification

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| Variable | Definition |
| --- | --- |
| **Dependent Variables:** | |
| **Medication** | |
| Sleep | O-1 dummy variable, =1 if individual took medication to sleep in the past 12 months |
| Anxiety | O-1 dummy variable, =1 if individual took medication to reduce anxiety in the past 12 months |
| Mood Stabilizer | O-1 dummy variable, =1 if individual took a mood stabilizer in the past 12 months |
| Anti-depressant | O-1 dummy variable, =1 if individual took an anti-depressant in the past 12 months |
| Anti-Psychotic | O-1 dummy variable, =1 if individual took an anti-psychotic during the past 12 months |
| **Provider Services** | |
| Use of Any  of the Four Provider Types | O-1 dummy variable, =1 if individual contacted any of the four health professionals considered here (psychiatrists, family physician, psychologist, social worker)  in the past 12 months in the provider's office for a problem with mental health or substance abuse. |
| Psychiatrist Services | O-1 dummy variable, =1 if individual contacted a psychiatrist in provider's office in the past 12 months |
| # of contacts | No. of Contacts in past 12 months in provider office: Psychiatrist |
| Family Physician | O-1 dummy variable, =1 if individual contacted a family practitioner in provider's office in the past 12 months |
| # of contacts | No. of Contacts in past 12 months in provider office: Family Doctor |
| Psychologist | O-1 dummy variable, =1 if individual contacted a psychologist in provider's office in the past 12 months |
| # of contacts | No. of Contacts in past 12 months in provider office : Psychologist |
| Social Worker/Counsellor | O-1 dummy variable, =1 if individual contacted a social worker/counsellor in provider's office in the past 12 months |
| # of Contacts | No. of Contacts in past 12 months in provider office: Social Worker/Counsellor |
| **Independent Variables:** | |
| **Health Status** | |
| **Mental Health Status past 12 months based on survey diagnostic scale responses** | |
| Major Depressive Episode | O-1 dummy variable, =1 if individual met the criteria for a major depression order during the past 12 months with marked impairment in occupational or social functioning |
| Manic episode | O-1 dummy variable, =1 if individual met the criteria for a mania during the past 12 months with marked impairment in occupational or social functioning Past 12-month algorithm |
| Panic disorder | O-1 dummy variable, =1 if individual met the criteria for panic disorder during the past 12 months with emotional distress |
| Social Phobia | O-1 dummy variable, =1 if individual met the criteria for a social phobia during the past 12 months with marked impairment |
| Agoraphobia | O-1 dummy variable, =1 if individual met the criteria for agoraphobia during the past 12 months. |

**Substantial Interference**

| | |
|---|---|
| Depression interference | 0-1 dummy variable, =1 if depressive episode substantially interfered with the person's normal routine, occupational (academic) functioning or social activities or relationships during past 12 months. Only calculated for those who met the criteria for disorder above. |
| Mania interference | 0-1 dummy variable, =1 if mania substantially interfered with the person's normal routine, occupational (academic) functioning or social activities or relationships during past 12 months. Only calculated for those who met the criteria for disorder above. |
| Panic interference | 0-1 dummy variable, =1 if panic significantly interfered with the person's normal routine, occupational (academic) functioning or social activities or relationships during past 12 months. Only calculated for those who met the criteria for disorder above.activities |
| Social phobia interference | 0 - 1dummy variable, =1 if social phobia substantially interfered with the person's normal routine, occupational (academic) functioning or social activities or relationships during past 12 months. Only calculated for those who met the criteria for disorder above. |
| Agoraphobia interference | 0-1 dummy variable, =1 if agoraphobia substantially interfered with the person's normal routine, occupational (academic) functioning or social activities or relationships during past 12 months. Only calculated for those who met the criteria for disorder above. |

**Doctor has given diagnosis of**:

| | |
|---|---|
| Schizophrenia | 0-1 dummy variable, =1 if doctor has given a diagnosis of schizophrenia. |
| Other Psychotic Disorder | 0-1 dummy variable, =1 if doctor has given a diagnosis of another psychotic disorder. |
| Dysthymia | 0-1 dummy variable, =1 if doctor has given a diagnosis of dysthymia. |
| Post Traumatic Stress Disorder (PTSD) | 0-1 dummy variable, =1 if doctor has given a diagnosis of post traumatic stress disorder. |

**Self-Assessed Mental Health Status**

| | |
|---|---|
| Poor | 0-1 dummy variable, = 1 if poor SAMHS |
| Fair | 0-1 dummy variable, = 1 if fair SAMHS |
| Good | 0-1 dummy variable, = 1 if good  SAMHS |
| Very good | 0-1 dummy variable, = 1 if very good SAMHS |
| Excellent | 0 -1 dummy variable, = 1 if excellent SAMHS, reference category |

**Distress Scale**

| | |
|---|---|
| Dist10 | 0-1 dummy variable = 1 if score between 0 and 10 on distress scale. |
| Dist20 | 0-1 dummy variable = 1 if score between 11 and 20 on distress scale. |
| Dist30 | 0-1 dummy variable = 1 if score between 21 and 30 on distress scale. |
| Dist 40 | 0-1 dummy variable = 1 if score between 31 and 40 on distress scale, reference category. |

**Other Mental Health Status Indicators:**

| | |
|---|---|
| Substance Abuse | 0-1 dummy variable, =1 if individual met criteria for a substance abuse problem in past 12 months |
| Suicidal Thought (past 12 months) | 0-1 dummy variable, =1 if individual has had suicidal thoughts during the past 12 months. |
| Suicide Attempt(past 12 months) | 0-1 dummy variable, =1 if individual has attempted suicide during the past 12 months.. |

**Chronic Physical Disorders**

| | |
|---|---|
| Diabetes | 0-1 dummy variable, =1 reported having diabetes. |
| Arthritis | 0-1 dummy variable, =1 reported having arthritis. |

| Asthma | 0-1 dummy variable, =1 reported having asthma. |
| Heart Disease | 0-1 dummy variable, =1 reported having heart problems. |
| Back Problems | 0-1 dummy variable, =1 reported having back problems. |
| High Blood Pressure | 0-1 dummy variable, =1 reported having high blood pressure. |

**Socioeconomic Status**
**Income Adequacy:**

| Lowest | 0-1 dummy variable, =1 if family income adjusted for family size in lowest range. |
| Lower middle | 0-1 dummy variable, =1 if family income adjusted for family size in lower middle range. |
| Middle | 0-1 dummy variable, =1 if family income adjusted for family size in middle range. |
| Upper middle | 0-1 dummy variable, =1 if family income adjusted for family size in upper middle range. |
| Highest | 0-1 dummy variable, =1 if family income adjusted for family size in highest range, reference category. |

**Highest Level of Education**

| Elementary | O-1 dummy variable, =1 if the highest level of education completed is elementary school |
| Secondary | O-1 dummy variable, =1 if the highest level of education completed is secondary school |
| Some Postsecondary | O-1 dummy variable, =1 if the highest level of education completed is at the post-secondary level (excluding university programs). It may include a certificate, college or other diploma. |
| University | O-1 dummy variable, =1 if the highest level of education completed is some university, reference category. |

**Demographic**

| Marital Status | O-1 dummy variable, =1 if individual is married or living common law with a partner. Single is reference category. |
| Age | Individual's age |
| Age$^2$ | Individual's age-squared |
| Sex | O-1 dummy variable, =1 if individual is female. Male is reference category. |
| Immigrant Status | 0-1 dummy variable, =1 if born outside Canada. |

**Social Support Scale**

| Tangible | Tangible Social Support Sub-scale Score ; min 0, max 16. |
| Affection | Affection Scale Score; min 0, max 12. |
| Social Interaction | Positive Social Interaction Sub-scale Score; min 0, max 16. |
| Emotional, Informational | Emotional or Informational Support Sub-scale Score; min 0, max 32. |

**Satisfaction with Service**

| Psychiatrist | Level of satisfaction with provider services – psychiatrist; min 1, max 5 |
| Family Physician | Level of satisfaction with provider services – family physician; min 1, max 5 |
| Psychologist | Level of satisfaction with provider services – psychologist; min 1, max 5 |
| Social Worker | Level of satisfaction with provider services – social worker; min 1, max 5 |

**Helpfulness of Service**

| Psychiatrist | Extent to which service helped – psychiatrist; min 1, max 4 |
| Family Physician | Extent to which service helped  - family physician; min 1, max 4 |
| Psychologist | Extent to which service helped – psychologist; min 1, max 4 |
| Social Worker | Extent to which service helped – social worker; min 1, max 4 |

**Rural/urban location**

| rural | O-1 dummy variable, =1 if individual resides in rural area |
| urban | O-1 dummy variable, =1 if individual resides in urban area, reference category. |

**Provincial Dummies**

| NFLD | O-1 dummy variable, =1 if individual lives in Newfoundland |
| PEI | O-1 dummy variable, =1 if individual lives in Prince Edward Island, Reference Category |
| NS | O-1 dummy variable, =1 if individual lives in Nova Scotia |

| | |
|---|---|
| NB | O-1 dummy variable, =1 if individual lives in New Brunswick |
| QUE | O-1 dummy variable, =1 if individual lives in Quebec |
| ON | O-1 dummy variable, =1 if individual lives in Ontario |
| MAN | O-1 dummy variable, =1 if individual lives in Manitoba |
| SASK | O-1 dummy variable, =1 if individual lives in Saskatchewan |
| ALB | O-1 dummy variable, =1 if individual lives in Alberta |
| BC | O-1 dummy variable, =1 if individual lives in British Columbia |

**Instrumental Variable**

| | |
|---|---|
| Individual Marginal Tax Rate | Estimated by applying the provincial average individual marginal tax rates for salaried income for 2000/01 [34, p. 19-20] to the individual's personal income as reported in the CCHS 1.2 . |

## Table 2: Descriptive Statistics for Selected Variables

| Variable | Mean | Std. Dev |
|---|---|---|
| **Use of Medication in past 12 months:** | | |
| Sleep | 0.102 | 0.303 |
| Anxiety | 0.055 | 0.228 |
| Mood Stabilizer | 0.011 | 0.105 |
| Anti-depressant | 0.058 | 0.235 |
| Anti-Psychotic | 0.004 | 0.060 |
| **Psychiatrist** | | |
| Use of Services | 0.013 | 0.112 |
| # of contacts | 9.4 | 17.1 |
| **Family Physician** | | |
| Use of Services | 0.041 | 0.198 |
| # of contacts | 5.1 | 8.6 |
| **Psychologist** | | |
| Use of services | 0.012 | 0.108 |
| # of contacts | 10.5 | 18.5 |
| **Social Worker** | | |
| Use of services | 0.011 | 0.104 |
| # of Contacts | 11.4 | 30.2 |
| **Insurance Status** | | |
| Drug | 0.770 | 0.421 |
| Psychologist* | 0.703 | 0.457 |
| Social Worker* | 0.614 | 0.487 |
| **Mental Health Status Past 12 months:** | | |
| Major Depression | 0.048 | 0.214 |
| Manic episode | 0.010 | 0.098 |
| Panic disorder | 0.015 | 0.123 |
| Social Phobia | 0.030 | 0.171 |
| Agoraphobia | 0.007 | 0.085 |
| **Interference:** | | |
| Depression | 0.043 | 0.202 |
| Mania | 0.008 | 0.090 |
| Panic | 0.011 | 0.106 |
| Social Phobia | 0.023 | 0.150 |
| Agoraphobia | 0.034 | 0.058 |
| **Prior Diagnosis of:** | | |
| Schizophrenia | 0.003 | 0.050 |
| Other Psychotic | 0.007 | 0.082 |
| Dysthymia | 0.003 | 0.058 |
| Posttraumatic Stress Disorder | 0.010 | 0.100 |
| **Self-Assessed MH Status:** | | |
| Poor | 0.012 | 0.107 |
| Fair | 0.057 | 0.232 |
| Good | 0.261 | 0.439 |
| Very good | 0.392 | 0.488 |
| Excellent | 0.278 | 0.448 |
| **Distress Scale** | | |
| 0 - 10 | 0.853 | 0.354 |
| 11 - 20 | 0.120 | 0.325 |

| Variable | Mean | Std. Dev |
|---|---|---|
| 21 - 30 | 0.020 | 0.141 |
| 31 - 40 | 0.003 | 0.050 |
| **Other:** | | |
| Substance Abuse | 0.031 | 0.172 |
| Suicidal Thought | 0.037 | 0.188 |
| Suicide Attempt | 0.005 | 0.072 |
| **Chronic Physical Disorder:** | | |
| Diabetes | 0.048 | 0.215 |
| Arthritis | 0.175 | 0.380 |
| Asthma | 0.085 | 0.279 |
| Heart Disease | 0.054 | 0.227 |
| Back Problems | 0.209 | 0.406 |
| High Blood Pressure | 0.148 | 0.355 |
| **Socioeconomic Status:** | | |
| **Income Adequacy:** | | |
| Lowest | 0.028 | 0.166 |
| Lower middle | 0.064 | 0.244 |
| Middle | 0.190 | 0.392 |
| Upper middle | 0.324 | 0.468 |
| Highest | 0.299 | 0.458 |
| Not Stated | 0.095 | |
| **Education:** | | |
| Elementary | 0.067 | 0.198 |
| Second | 0.244 | 0.401 |
| Some Postsecondary | 0.425 | 0.493 |
| University | 0.264 | 0.413 |
| **Demographic:** | | |
| Married | .617 | 0.486 |
| Age | 44.0 | 17.9 |
| Female | 0.51 | 0.50 |
| Immigrant | 0.221 | 0.415 |
| **Satisfaction With:** | | |
| Psychiatrist | 2.02 | 1.08 |
| Family Physician | 1.75 | 0.98 |
| Psychologist | 1.86 | 1.04 |
| Social Worker | 1.72 | 0.97 |
| **Helpfulness of Service** | | |
| Psychiatrist | 1.91 | 1.05 |
| Family Physician | 1.68 | 0.91 |
| Psychologist | 1.81 | 0.99 |
| Social Worker | 1.65 | 0.92 |
| **Social Support Scale:** | | |
| Tangible | 13.54 | 3.29 |
| Affection | 10.60 | 2.29 |
| Social Interaction | 13.71 | 3.06 |
| Emotional | 26.94 | 6.14 |
| **Geography** | 0.188 | 0.391 |
| rural | | |
| urban | 0.812 | |
| **Instrumental Variable** | | |
| Marginal Tax Rate% | 39.479 | 10.034 |

\* Provider Insurance Status was measured among users of the service in CCHS 1.2
NOTE: Means are based on sampling weights provided by Statistics Canada.

# Table 3: Impact of Drug Insurance Status on Use of Medications

|  | Sleep | Anxiety | Mood Stabilizer | Anti-Depressant | Anti-Psychotic |
|---|---|---|---|---|---|
| Odds Ratio | **1.159** | 1.112 | **1.819** | **1.285** | **4.482** |
| (s.e.) | **(0.076)** | (0.105) | **(0.373)** | **(0.120)** | **(1.771)** |
| Marginal Effect | **0.010** | 0.003 | **0.002** | **0.006** | **0.001** |
| Percent Change | **14.62** | 11.54 | **81.46** | **27.74** | **347.3** |
| Sample Size | 34017 | 34014 | 34004 | 34012 | 34008 |
| Pseudo-$R^2$ | .1072 | .2022 | .2616 | .2795 | .4381 |
| Pseudo Log Likelihood ratio | -9870.59 | -5600.47 | -1438.92 | -5305.7 | -405.87 |
| Wald $\chi^2(57)$ | **1422.41** | **1429.54** | **1027.65** | **1932.78** | **918.18** |
| (p value) | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |

Notes:
1. Results of logistic regressions with use/non-use of specified medication during the past 12 months as the dependent variable.
2. First value in cell is the estimated coefficient, followed by the standard errors in brackets.
3. Note that these equations were estimated including the full set of covariates [35].
4. Coefficients that are statistically significant at the 95% level are bolded.
5. Tests of significance use robust standard errors and probability weights provided by Statistics Canada.
6. Marginal effects are calculated holding all other variables at their mean levels.
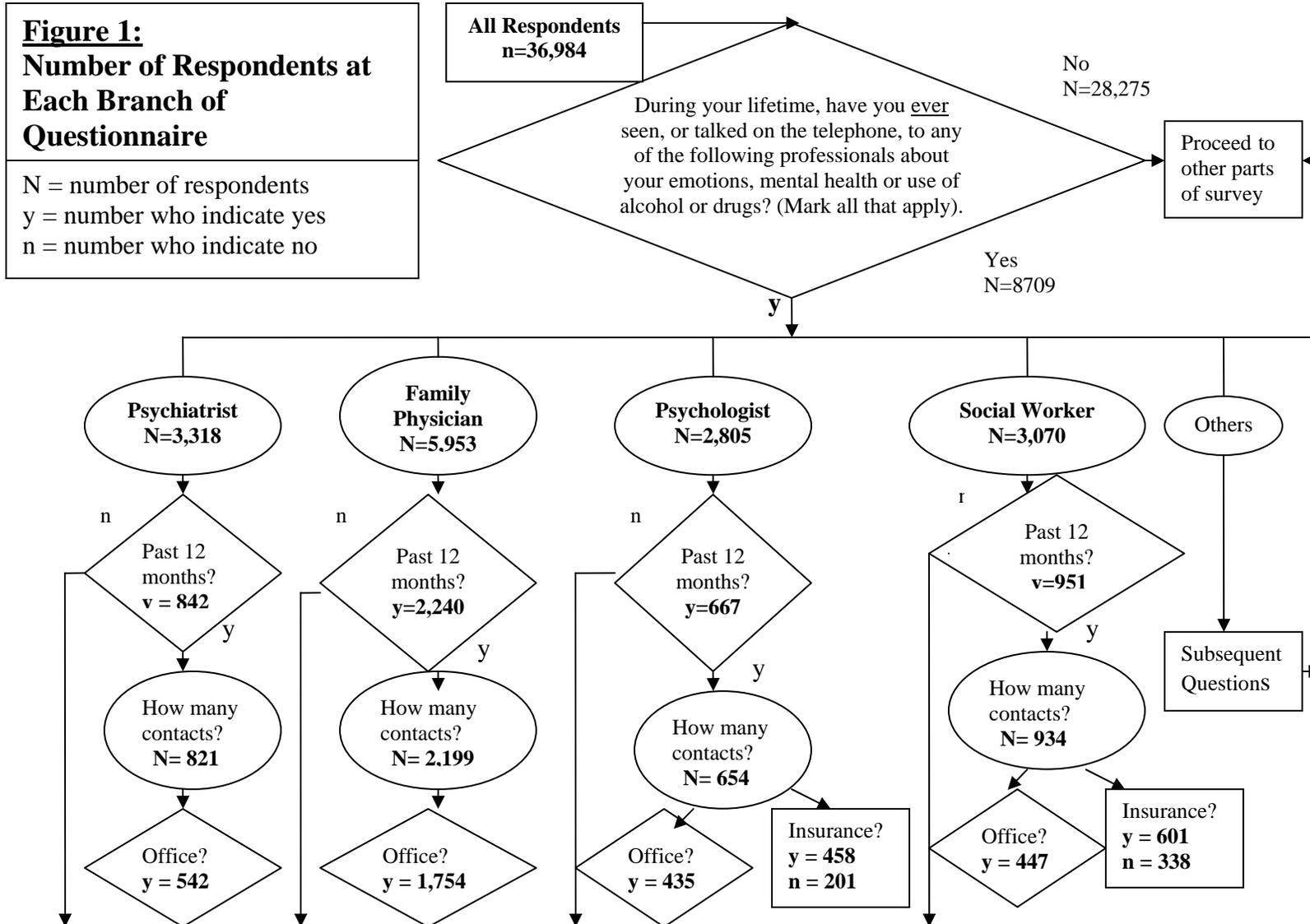
## Table 4: Summary of Measures of Impact of Insurance Status on Use of Provider Services

| Provider Type | Any | Psychiatrist | Family Physician | Psychologist | | Social Worker | |
|---|---|---|---|---|---|---|---|
| **Likelihood of Use:** | | | | Logit | IV** | | |
| Insurance Measure | Drug | Drug | Drug | Drug | Drug | Drug | |
| Odds Ratio | 1.118 (.121) | 1.169 (0.215) | 1.207 (0.120) | 1.113 (0.208) | -0.127 (0.067) | 0.140 (0.199) | |
| Marginal Effect | .002 | .001 | .003 | .001 | -- | .001 | |
| Percent Change | 11.5 | 16.9 | 20.3 | 11.3 | -- | 14.9 | |
| Sample Size | 25392 | 34021 | 34021 | 25392 | 25392 | 24937 | |
| Pseudo-$R^2$ | 0.1849 | 0.2908 | 0.2460 | 0.2147 | | 0.1706 | |
| Pseudo Log Likelihood ratio | -3563.64 | -1564.83 | -4317.93 | -1374.4 | | -1270.52 | |
| Wald $\chi^2$(57) | **1095.9 (0.000)** | **1182.83 (0.000)** | **1656.90 (0.000)** | **577.76 (0.000)** | | **548.59 (0.000)** | |
| | | | | | | | |
| **Number of Contacts:** | | | | | | | |
| Insurance Measure | Drug | Drug | Drug | Drug | Provider | Drug | Provider |
| Coefficient Estimate | | -0.204 (0.155) | 0.031 (0.089) | -0.427 (.182) | -0.342 (0.144) | -0.200 (0.150) | -0.100 (0.155) |
| Marginal Effect | | -1.61 | 0.13 | -3.81 | -2.88 | -1.51 | -0.75 |
| Sample Size | | 466 | 1592 | 353 | 403 | 345 | 410 |
| Pseudo Log Likelihood Ratio | | -846797 | -2366445 | -731962 | -811770 | -625196 | -759819 |
| Wald $\chi^2$(57) | | **245.52 (0.000)** | **335.83 (0.000)** | **254.85 (0.000)** | **258.71 (0.000)** | **194.00 (0.000)** | **266.87 (0.000)** |

** IV estimate is based LPM specification. Marginal effects were not calculated for the IV estimate.

Notes:
1. First value in cell is the estimated coefficient, followed by the standard error in brackets.
2. Note that these equations were estimated including the full set of covariates [35].
3. Coefficients that are statistically significant at the 95% level are bolded.
4. Tests of significance use robust standard errors and probability weights provided by Statistics Canada.
5. For likelihood of use, the marginal effect is the estimate of increased likelihood of using the provider service if an individual has provider insurance, holding all other covariates at their mean levels. For number of contacts conditional on use, the marginal effect is the estimate of change in number of visits attributable to having insurance, holding all other covariates at their mean levels.

**Figure 1:**
**Number of Respondents at Each Branch of Questionnaire**

N = number of respondents
y = number who indicate yes
n = number who indicate no

All Respondents
n=36,984

During your lifetime, have you ever seen, or talked on the telephone, to any of the following professionals about your emotions, mental health or use of alcohol or drugs? (Mark all that apply).

No
N=28,275

Proceed to other parts of survey

Yes
N=8709

**y**

**Psychiatrist**
**N=3,318**

**Family Physician**
**N=5.953**

**Psychologist**
**N=2,805**

**Social Worker**
**N=3,070**

Others

n — Past 12 months? **v = 842** — y

n — Past 12 months? **y=2,240** — y

n — Past 12 months? **y=667** — y

r — Past 12 months? **v=951** — y

How many contacts? **N= 821**

How many contacts? **N= 2,199**

How many contacts? **N= 654**

How many contacts? **N= 934**

Subsequent Questions

Office? **y = 542**

Office? **y = 1,754**

Office? **y = 435**

Insurance? **y = 458** **n = 201**

Office? **y = 447**

Insurance? **y = 601** **n = 338**

Note: that the sample size is further reduced for estimation of utilization of psychologist or social work services when the proxy insurance measure is used, because individuals over the age of 65 and/or on social assistance are excluded from the analysis.