An Analysis of Canadian Mental Health Services

by

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ABSTRACT

Among the developed countries, the burden of mental disorders has become increasingly important. According to Statistics Canada (2013), one in five Canadians will experience a mental illness in their lifetime, though one-third of these individuals perceive their needs in mental health (MH) care to be partially met or not met at all. Canada has a universal healthcare system, where all provinces and territories provide universal coverage for medically necessary hospital and physician services that are free at the point of use. Despite the lifting of financial burden, many people with mental illness are not getting the healthcare they need. The purpose of this thesis is to better understand how Canadians seek MH services and to estimate the publicly-funded MH expenditures for Fiscal Year (FY) 2013, using the most available, publicly accessible database. In addition, the cost estimates for FY 2013 are compared to the results from a published report for FY 2003.

The research questions include: a) What are the important factors associated with the demand behavior for MH services identified by the published empirical evidence from the literature? b) What are the directions and magnitudes of the associations between the key factors and the demand behavior for MH services, in terms of likelihood and frequency of MH visits? c) What is the public provincial spending for MH services as a proportion of the total public healthcare costs, for the most recent years that public data is available? d) How are resources allocated to MH services with respect to changes in the total healthcare costs in the preceding decade? e) What are the policy and practice implications?

A three-part thesis, including a literature review, an economic model and a cost analysis were developed to examine the MH system in the Canadian provinces. Data for the economic modelling was obtained from the Canadian Community Health Survey, Mental Health

Wellbeing, conducted by Statistics Canada (2012). The cost analysis was based on healthcare expenditures acquired from publicly-accessible databases, such as the Canadian Institute for Health Information and Intercontinental Marketing Services Health Canada. Factors associated with the demand for MH services were identified and interpreted.

For the general population, indicators of MH needs, proxied by diagnoses and distress levels, independently and significantly increase the odds and frequency of visits to all MH services. Some sociodemographic factors (e.g., female gender) significantly increase the odds and number of MH visits, while other factors, (e.g., being a senior, immigration status, and being employed) significantly decrease the odds and number of MH visits and the likelihood of using prescribed psychotropic medication. In FY 2013, the total provincial public MH expenditures were estimated to be $6.75 billion; however, the proportion of total public national health spending allocated to MH programs and services decreased from 5.4% to 4.9% over the decade from FY 2003 to FY 2013.

This thesis provides important information on the MH outcomes, MH service utilization, and resources being allocated to mental healthcare across the Canadian provinces to inform the development of MH programs and services that will address the needs of those in specific population subgroups. In addition, this three-part thesis identifies an information gap in the existing evidence from MH service research. The development of a longitudinal MH database and a standardized reporting system at the level of provincial governments is recommended for a more robust demand and cost assessment.

PREFACE

Some of the research conducted for this thesis forms part of a research collaboration, led by Professor Philip Jacobs and Professor Arto Ohinmaa at the University of Alberta, and Professor Alain Lesage at University of Montreal. The econometric technique employed in Chapter 3 was designed by myself, with the assistance of Professor Arto Ohinmaa. The data analysis in Chapter 3 and concluding analysis in Chapter 5 are my original work, as well as the literature review in Chapter 2.

Chapter 4 of this thesis had been published in the Canadian Journal of Psychiatry as "Public Expenditures for Mental Health Services in Canadian Provinces" in December, 2017. I was the first author and was responsible for the data collection and analysis as well as the manuscript composition. Dr. Dezetter contributed to IMS Pharmaceutical data analysis. Dr. Alain Lesage contributed to concept formation. Dr. Jacobs and Dr. Ohinmaa were the supervisory authors and were involved with manuscript edits. Dr. Jacobs, Dr. Lesage, and Dr. Ohinmaa were also involved in the study design, consulted on the drafting, and revised manuscript for important intellectual content.

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LIST OF ABBREVIATIONS

AD   Anxiety disorders

CAMH   Centre for Addiction and Mental Health

CCHS – MH Canadian Community Health Survey – Mental Health and Wellness

GP   General practitioner

HIE   Health Insurance Experiment

HSPM   The Health System and Policy Monitor

IHE   Institute of Health Economics

IRR   Incident Rate Ratio

IV   Instrumental Variable

MDD   Major depressive disorder

MDE   Major depressive episode (depression)

MH   Mental health

MHC   Mental health care

WHO   World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background

Mental illness has become an increasingly significant public health concern in recent years. Across the developed world, mental illness stands out as a major contributor to the prevalence of disability and healthcare costs. The World Health Organization (2001) projected that depression would be the second leading cause of disability by 2020. Other mental illnesses, such as schizophrenia, bipolar disorder, and substance use disorders are among the ten most common causes of disability worldwide, accounting for 30.8% of the total disability and 12.3% of the total burden of disease (WHO, 2001). The total cost of mental illness to the Canadian economy, in terms of healthcare and loss in productivity, is estimated to be $51 billion per year, accounting for 2.96% of the Canadian GDP in 2011 (Jacobs et al., 2008).

Despite the rising need for mental health services, government health reports have shown that many people with a mental illness either go untreated or are treated by someone other than a mental health professional and Statistics Canada has reported that only one-third of those with a mental health care need stated that their needs were fully met (Statistics Canada Catalogue no. 82-624-X, 2013). Much of the research in mental health service utilization has been conducted in the United States (McGuire, 1981; Horgan, 1986; Taube et al., 1986; Keeler et al., 1988; Haas-Wilson et al., 2001; Wells et al., 1987); and of the demand analyses for mental health services conducted in the developed countries, none of the studies in this literature review were from the Canadian context.

Most of the developed countries have publicly and privately funded healthcare. In Canada, medically necessary hospital and physician services are covered by the universal healthcare system, while other aspects of healthcare, such as prescription drugs dispensed outside of the hospital or consultations with psychologists in the private sector, are paid through private insurance or out-of-pocket. Previous studies have documented that an individual's entitlement to insurance coverage, demographic and socio-economic status, and need for mental healthcare influences their demand and decision to use mental health services (McGuire, 1981; Horgan, 1986; Taube et al., 1986).

Mental illness has been documented as an important driver of costs in various public sectors (Jacobs et al., 2008; Jacobs et al., 2016). In 2008, Jacobs reported that total public and private mental health expenditures in Canada in 2003/2004 amounted to $6.6 billion, of which, $5.5 billion was from public sources. In particular, public mental health expenditures, were estimated to be 6% of the total public health expenditures, with wide variations occurring between the provinces. Information about utilization and expenditures, as well as their change over time is essential for measuring the progress of the mental health systems in terms of de-hospitalization or other advances in practice.

The rational planning of mental health services requires knowledge about what influences utilization, and the financing of services in the mental healthcare system. To ensure that the delivery and utilization of services is appropriate in meeting the needs of Canadians, the demands and costs of the system must be accurately assessed. The aim of this study is to provide up-to-date information about the utilization patterns and public expenditures for mental health services in Canada.

1.2   Study Objectives

Resources allocated to mental health services and programs need to be adequate to address the increasing burden of mental illness. To understand the mental health system across the Canadian provinces, the present study answers three research questions from the perspective of the public healthcare system:

1. What factors are associated with the demand behavior for mental health services as identified by empirical evidence from the literature?

2. What is the direction and magnitude of the association between the key factors and the demand behavior for mental health services, in terms of likelihood and number of mental healthcare visits?

3. What was the provincial spending on different types of mental health services in fiscal year (FY) 2013; what was the proportion of total publicly funded healthcare costs, and how does this compare to a decade ago?

This study presents evidence on the demand studies on mental health services, and on public expenditures associated with mental healthcare services in the Canadian context. It is meant to support the mental health service planning for those who are in the most need. The study is unique in its scope, covering the Canadian context and the provinces, to help policy makers with cost estimates of the publicly funded mental health services and the factors associated with the demand for those services.

1.3   Structure of the Thesis

In Chapter 2, I present a literature review that examines research evidence for associations between demand for mental health and personal costs, individual-level demographics, socio-economic factors, and health status, in the developed countries.

In Chapter 3, several econometric models are set up to explain the possible associations between the demographic, socio-economic, health status, community and economic factors and the utilization of mental health services in the Canadian universal healthcare system. The demand model adopts a two-stage analysis: 1. the first set of two models are the logistic regression models examining the association between various covariates and the likelihood of any service and medication utilization for mental health; 2. while the second set of negative binomial regression models are based on respondents with positive service use, to investigate the association between various covariates and the number of mental health visits to the selected service providers.

In Chapter 4, we estimated the provincial public expenditures for mental health services for FY 2013. The information was obtained from the publicly available databases and the results were also compared with the cost estimates from a decade earlier to identify trends in mental health costs. The cross-year cost comparisons for provincial mental health services were restricted to general and psychiatric hospital inpatients, clinical payments to general practitioners (GPs) and specialists, and prescribed psychotropic medications. Total public expenditures were expressed as per capita and as a percentage of the total provincial health spending. Chapter 5 includes a discussion that concludes the thesis and provides some suggestions for future research and policy actions for mental health in Canada.

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CHAPTER 2: THE DEMAND RESPONSE OF MENTAL HEALTHCARE SERVICES TO ECONOMIC AND OTHER FACTORS: A LITERATURE REVIEW

The increase in the demand for mental health services, combined with limited public resources, have resulted in attempts of governments to explore different methods of healthcare financing, including imposing various forms of patient payments. The question of financing mental health services through the public health budget and/or private health insurance, often leads to controversy. How extensive should the benefits for mental health services be? Should all psychotherapies be covered? Should any deductible/copayment limits be imposed? The idea of demand behavior for mental health services is of interest in light of the increasing pressure to reduce health benefit costs, and the increasing attention on the high prevalence and burden of mental illness.

The Canadian Community Health Survey – Mental Health and Wellbeing supplement, conducted by Statistics Canada in 2012, revealed that 10.1% or approximately 2.8 million Canadians aged 15 and older, experienced at least one selected mental or substance use disorder in the 12 months prior to the survey. In addition, statistics from the Mental Health Commission of Canada (MHCC, 2016) show that more than 6.7 million people in Canada are currently living with a mental disorder or illness. In 2008, Jacobs et al. reported that total public and private mental health expenditures in Canada in 2003/4 amounted to $6.6 billion, of which $5.5 billion was from public sources. An understanding of the demand behavior for mental health services is crucial for the public and is an important element in policy formation.

Users of mental health services have become more like consumers of mental health care (McGuire, 1981). Patients who pay fees become more rational and cost-conscious in healthcare consumption: seeking the services that they really need. On the other hand, the revenue

generated from patients' payment raises additional resources to expand healthcare provision and improvements to the quality of care (Skriabikoca et al., 2010).

A thorough demand analysis of mental health services would be possible if integrated models of demand for mental health services were available with clear evidence on reliability, validity, and generalizability. Such demand models need to incorporate important theoretical factors related to individual-level demographics, socio-economic and health status; consumer attitudes, experience, culture, preferences and willingness to pay; and the supply constraint on demand. Beginning in 1980, notable studies were conducted by health economists in the field of mental health service demand and utilization (McGuire, 1981; Horgan, 1986; Keeler & Rolph, 1988; Taube et al., 1986). The demand analyses were considerably different in their study designs and settings, study populations and analytical methods, thus making the comparison of the findings difficult.

This review summarizes and evaluates the empirical micro-level models of demand for mental health services where the patient payment was included either directly as an independent variable, or indirectly as a level of deductible or copayment defined by the insurance coverage. This review also analyzes the relevance of these models for analyzing cost-sharing in mental health services. The following two sections describe the research methods and strategies used for the literature search and the main findings of the empirical demand models included in this research. The next section presents and discusses the main findings, which is followed by outlines of the research and recommendations for future research.

2.1   Methods and Materials

A comprehensive literature review was undertaken to examine current research evidence on how personal costs influence individual demand and utilization of mental health services in Canada and other developed countries.

2.1.1   Definitions and search strategy

Personal costs for mental healthcare services include absolute price (e.g., fee-for-service) that patients need to pay for mental health treatments, the marginal price or 'shadow price', (e.g., supplemental insurance coverage), and opportunity costs (e.g., waiting and traveling time to access services) (Haas-Wilson et al., 2001). With a universal healthcare system, personal costs for accessing healthcare services refer only to the marginal price and opportunity costs at the point of receiving mental health treatment.

This analysis is focused on mental healthcare or substance abuse treatments delivered by mental healthcare providers, such as GPs, psychiatrists, and psychologists in various professional settings. Visits to other professionals, such as social workers and nurses; visits to non-medical staff; and inpatient service utilization, were excluded from this study. Demand for hospitalization inpatient services may not accurately reflect the individual's decision to seek care due to the person's clinical condition, and therefore, these cases are beyond the scope of this study.

The definition of mental health services in this study includes any physician visits due to a mental health condition, regardless of the kind of service providers involved. Specifically, visits to a psychiatrist, psychologist, or GP in regards to mental health are all included. The location of visits could be in an office, emergency room, out-patient department of any general hospital, a freestanding outpatient mental health clinic, or a community mental health clinic.

The literature search for "insurance coverage," "demand," and "mental health services" was carried out with electronic databases from Ovid MEDLINE, Econlit, Embase, PsycInfo, and Scopus. The search terms were designed to capture all relevant articles reporting the effect of personal costs on the demand or utilization of mental healthcare services.

A list of keywords was developed and categorized into three tiers. At first, keywords such as "mental healthcare," "mental disorders," and "mental illness" were used to specify the illness. Second, keywords such as "demand," "need,*" "access,*" or "utili*" were developed to find studies that examined mental health services. Finally, keyword search terms, such as "economic,*" "cost-sharing," "drug insurance," "insurance psychiatric," and "health benefit plan" were used to retrieve studies in economics. In addition, a Google search was performed using the search terms from the search strategy. Based on the initial literature search, a primary list of publications was obtained. The used search terms and the search strategy are shown in Appendix A.

The references of the included articles were also manually searched for other relevant articles.

2.1.2 Journals

Because of the relevance and notable citations in demand analysis of mental health services, the following academic journals were hand-searched: Journal of Health Economics (Vol. 1, 1982 to Vol. 48, 2016); International Journal of Health Economics and Management (Vol. 1, March 2001 to Vol. 1, March 2016); The European Journal of Health Economics (Vol. 0 March 2000 to Vol. 17, July 2016); Journal of Mental Health Policy and Economics (Vol. 1, March 1998 to Vol. 8, December 2005); and the Nordic Journal of Health Economics (Vol. 1, 2012 to Vol. 4, 2016).

2.2   Research-Based Evidence

A total of 1,754 publications were identified from a search of PubMed and MEDLINE, and an additional 12 publications were identified from a Google Scholar search, giving a total of 1,766 publications. The inclusion of studies was then manually judged based on a screening of titles to exclude studies not relevant to demand or utilization of mental health services. The abstracts of the remaining articles were then screened, and in some cases, the full text was read to determine whether or not they met the relevance in the context of economics studies. In addition, review studies regarding the impact of economic factors on the demand for mental health services, such as the report from Frank and McGuire (1986), were excluded. In total, eight economics studies on the demand for mental health care services that met the inclusion criteria were included in the literature review. Flowchart of the literature selection is presented in Appendix B. The publications that were selected for being relevant were then reviewed to identify the main characteristics of the empirical models of demand for mental health care services. The study designs, the methodology, and the main empirical findings were also reviewed. The results of the review are summarized in tables with categories related to: 1) general characteristics of the selected studies, methods of data collection, specifics of the analyses; and 2) major research findings, such as the responsiveness of mental health services visits on changes in the included variables, as well as estimates of the price elasticity of demand for mental health services, if reported. The categories were considered when interpreting the empirical results and when assessing the effect of personal cost on the demand for mental health care services.

2.2.1 Inclusion/exclusion criteria

The list was reduced using a set of relevance criteria; specifically, all publications had to be original, quantitative, peer-reviewed, and published in English, and undertaken in developed countries, with variable(s) measuring personal costs. The systematic search focused on articles measuring the effect of personal costs on the demand and utilization of professional mental healthcare services from GPs, psychiatrists, psychologists, as well as pharmaceutical interventions, for the general population and specific groups of individuals with mental disorders.

Additional inclusion criteria were: studies had to be focused on specific mental diseases, such as major depressive episode, bipolar disorder, generalized anxiety disorder, and abuse of or dependence on alcohol, cannabis, or other drugs. Thus, the inclusion criteria were consistent with the CCHS – MH 2012 survey (Statistics Canada, 2012) inclusion criteria, the data source that is used for the analysis in later chapters.

Utilization of inpatient services was excluded from the scope of this review since the demand for inpatient services is less common and in many case hospitalization is not sought by the individual themselves, but rather a caregiver or loved one, due to the deterioration of the individuals condition. For example, in Canada, the group of patients utilizing inpatient services in the CCHS – MH 2012 during the 12 months prior to the survey was less than 1% of the sample size (Statistics Canada, 2012) making it insufficient for a separate demand analysis. Studies solely concerned with homeless individuals, individuals living in institutions, or full-time armed forces personnel were also excluded because their utilization patterns for access to healthcare that would likely differ from that of the general population.

Table 2-1: Overall characteristics of the included literature (N = 8 studies)

Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
Haas-Wilson, Cheadle, Scheffler (2001) **Demand for mental health services: An episode of treatment approach**	**Study design**: cross-sectional study **Time-frame**: 1979, 1980, 1981 **Data source**: secondary data from insurance claims of subscribers in the high option* Blue Cross and Blue Shield Plan for the Federal Employees Health Benefit Program. *Note: In 1979 and 1980, the Blue Cross/Blue Shield high-option plan had a 20% copayment on outpatient mental health services and a $100 deductible. In January 1981, the outpatient copayment was increased to 30% and the deductible was increased to $150.	Model 1 estimates the probability of beginning a mental health treatment episode (N = 646), and model 2 analyzes the level of outpatient utilization within episodes (N = 468).	Statistical models included a multinomial logit model, and logit estimates of outpatient episode type. **Testing:** Regressions using ordinary least squares and regressions using an instrumental variable for out-of-pocket price (NETPR) yielded similar results.	**Outcome variables:** The decision to seek a certain type of mental health treatment, such as hospitalization, outpatient psychotherapy, or outpatient psychotherapy with drug treatment. **Economic variables:** The money price or the out-of-pocket price of mental health services: the individual's expenditures for outpatient mental health visits by his/her number of visits, multiplied by the average visit price by the coinsurance rate (0.2 before January 1981 and 0.3 after January 1981). Salary and log Salary.	**Major finding:** The results suggest that price does not have a statistically significant effect on the choice of episode treatment type and a negative and significant effect on utilization within episodes. Further, the elasticity of demand for outpatient mental health visits appears to vary by type of mental health care episode and type of mental health care provider, between -0.74 and -0.15, in episodes where psychologists or psychiatrists and other physicians are the providers.	**Definition:** An episode of mental health treatment is defined as a period of continuous contacts with the mental health system. To ensure that the analysis was based on complete episodes of treatment, the sample includes only those episodes contained entirely within one calendar year.
Hogan M. Constance (1986) **The demand for ambulatory mental health services from**	**Study design**: cross-sectional study **Time-frame**: calendar year 1977 **Data source:** secondary data from	In the first model, the probability of having a mental health visit is estimated; in the second part of the model, variations in levels of use,	Two-part demand model was used to examine the demand for ambulatory mental health services in the specialty sector. In the first model, logistic regression was used to	**Outcome variables:** For model 1, the dependent variable was dichotomous (1 if a person had an ambulatory visit and 0 if no visit). In equation 2, the dependent variable was continuous, a	**Major findings:** Cost-sharing matters in the demand for ambulatory mental health services from specialty providers. Nevertheless, the decision to use mental health services is affected	**Definition:** Use of ambulatory providers is defined as ambulatory visits to psychiatrists, psychologists, psychiatric social workers, and mental

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Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
specialty providers	the National Medical Care Expenditure Survey (NMCES).	expressed in terms of visits and expenditures, were examined in turn, with each of these equations conditional on positive utilization of mental health services.	estimate the probability of using ambulatory mental health services; in the second model, a linear function estimated by weighted least-squares regression was used to estimate both the annual number of visits and the annual expenditures for ambulatory mental health services from specialty providers, conditional on positive utilization. **Testing:** n/a	logarithm of the annual number of ambulatory mental health visits in the specialty sector. In equation 3, the dependent variable was the expenditures as the logarithm of the sum of cost for all visits in the specialty mental health sector. (Equation 3 was omitted in the current review.) **Economic variables:** **Insurance coverage:** the presence of private insurance, and the presence of public insurance policies, such as Medicaid and Medicare. **Price:** observed out-of-pocket payments	by the level of cost-sharing to a lesser degree than is the decision regarding the level of use of services. The results also show that price is only one of several important factors in determining the demand for services. Price elasticity: -0.44 The lack of significance of family income and of being female is notable. Evidence is presented for the existence of bandwagon effects. The importance of Medicaid in the probability of use equations is noted.	health counselors. Visits to emergency rooms and telephone contacts are not included.
Taube, Kessler, & Burns (1986). **Estimating the probability and level of ambulatory mental health services use**	**Study design:** cross-sectional **Time-frame:** calendar year 1980 **Data source:** secondary data from National Medical Care Utilization and Expenditure Survey (NMCUES)	To estimate: 1. The probability of any ambulatory mental health use (N^1 = 17,900) and, 2. The level of use given positive use (N^2 = 440)	Two-part demand model: Model 1, logistic regression model analyzing the probability of using services; Model 2, OLS regression for log of number of visits for those who used ambulatory mental health services. **Testing:** n/a	**Outcome variables:** Model 1: Either if a respondent reported mental care received (0,1); Model 2: the log of the number of visits. **Economic variables** Income: Log of family income; Price: average percent paid out-of-pocket for mental health visits;	Demand for an ambulatory mental health visit is responsive to price, and considerably more so than demand for health visits. Price (measured by percent out-of-pocket expenses) elasticity for population with positive out-of-pocket expenditures for ambulatory mental health visits: -0.98.	**Definition:** A mental health visit is defined as a visit to either a psychiatrist, psychologist, or psychiatric clinic, whether or not a mental health reason prompted the visit.

Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
				Insurance: 1) Private insurance coverage: no private insurance vs. all or partial coverage; 2) Medicaid coverage: no coverage vs. all or partial coverage.		
Keeler, Manning, & Wells (1988) **The demand for episodes of mental health services**	**Study design**: Randomized social experiment design. **Time-frame**: 1974 to 1976 **Data source**: data from a randomized trial, the RAND Health Insurance Experiment (HIE); the sample excludes those with very high income, the military and their dependents, the elderly, those eligible for Medicare because of disability, the homeless, and those institutionalized in long-term hospitals and jails.	To estimate the separate effects of coinsurance and the cap on the demand for episodes of outpatient mental health services. (N = 16,429 person-years in all three years).	Survival methods (Weibull regression of the hazard) for analyzing when episodes start; a model of within-year price effects; negative binomial regression was used to test factors associated with the number of months of care for a user. **Approach to test/correct for adverse selection:** This study avoids the adverse selection problems by using data from a randomized trial. **Testing:** Rand HIE data set.	**Outcome variable:** The probability to start a mental health outpatient treatment episode; **Economic variables:** Medical coinsurance rates, income.	**Main findings:** The use of outpatient mental health care is responsive to the price paid out-of-pocket by the patient. Outpatient mental health use was much more responsive to price than outpatient medical (for other services) use at the higher coinsurance rates, but not in the free to 25% range. Even with free care, few people use outpatient mental health care, so relatively little is spent on outpatient mental health care. They found that only 4.5% used any care in a year, and only 14% had any use in five years on the HIE free plan. Modest deductibles had little (NS) or no effect on the use of outpatient mental health care. Keeler et al.'s results suggest a price elasticity of demand for mental health services of -0.59 to -0.79.	**Definition:** Mental health services were defined to include care delivered by mental health specialists. **Note:** Each HIE plan had a coinsurance rate (varying from 0 to 95%), an upper limit on out-of-pocket expense (beyond which care is free) called the maximum dollar expenditure (MDE), and a limit of 52 psychotherapy visits per year.
McGuire, T. (1981)	**Study design:** cross-sectional	Research Question: to estimate the	**Approach to test/correct for**	**Outcome variable**:	**Main findings:**	**Note:** Mental health services provided by

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Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
Financing psychotherapy: Costs, effects, and public policy	**Time-frame**: 1973 **Data source:** Joint Information Service survey of office-based psychiatrists. Each patient in the sample was in treatment by a psychiatrist at the time of the survey.	effect of income and compulsory coverage (at least partial coverage) on demand for mental health services. Note: The percentage of charges paid by the insurer is the basic measure of insurance coverage used in this study. Slightly less than one-half of all patients surveyed had some insurance, ranging in coverage from less than 50% to 100% of all charges. i.e., the national health insurance paying 80% of charges. (N = 4,000)	**adverse selection:** An instrumental variables procedure was used for the adverse selection issue for the insurance variable. **Testing:** McGuire corrected for selection bias arising from observing only last ten individuals in treatment.	The (logarithm of the) total number of actual and projected visits a patient made to office-based psychiatrists. **Economic variables**: **Income** (measured in categories) and insurance variables (PROSH and Insurance {0 (none), 1 (less than 50%, 50%, 75-80%, and more than 80%)} * PROSH); **Insurance**: (0, 1) If insurance = 0, no coverage; if insurance =1, the person has at least partial coverage (including insurance paying less than 50%, 50%, 75%-80%, or more than 80%). Note: The sign of the coefficient on PROSH will be negative if psychiatrists underestimate future visits; it will be positive if psychiatrists overestimate future visits. If psychiatrists are unbiased, the estimated coefficient of PROSH will be close to zero.	The main empirical finding was that the demand for psychotherapy was more responsible to insurance than demand for general medical office visits. McGuire concluded that the elasticity of demand of average price to the consumer for psychotherapy was -1.0 or greater. The relationship between income and response to insurance in lower-income groups was more responsive to insurance coverage than in high income groups. In McGuire's (1981) study, the sample of patients is classified by income, the effect of insurance by income group is also reported.	office-based psychiatrists. **Limitation:** McGuire relied on psychiatrists' estimates of visits to be made by their patients. Nevertheless, psychiatrists may systematically over- or under-estimate the number of future visits.
Wells, Manning, Duan, Newhouse, & Ware (1987)	**Study design:** Randomized social experiment design: Rand Health	**Research questions:** Is the cost of care delivered by general medical providers	Multiple regression (Probit) equations were used to estimate the probability of any use of outpatient mental	**Outcome variable**: The choice of MH services provider (between any mental health specialists versus	**Main finding:** mental health status, at enrollment, was similar for those who received their mental health care	**Note**: MH services were defined as any mental health evaluation or treatment as indicated

Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
Cost-sharing and the use of general medical physicians for outpatient mental health care	Insurance Experiment (HIE) **Time-frame**: from 1974 to 1977. **Data source:** data from a randomized trial, the RAND HIE. The sample consisted of those enrollees who participated for at least one full year in the first three years of the experiment. Sample excluded: those eligible for Medicare; family incomes above $56,000; those in jails or institutionalized in long-term hospitals; the military and their dependents; veterans with service-connected disabilities.	significantly lower than that provided by mental health specialists? Do changes in insurance coverage affect the patient's choice of provider for mental health care? (N = 12,435)	health services (Model 1), and the choice of provider (any mental health specialist versus only general medical providers) given any use (Model 2). **Testing:** Rand HIE data set.	general medical providers) among mental health users. **Economic variables**: insurance plan, family income.	from either provider group. Despite the large difference in cost of care, the choice of provider (mental health specialist versus medical provider) was not sensitive to the coverage level of insurance. The study also found that general medical providers deliver the same amount of care regardless of the patient's severity of mental illness at enrollment. Mental health specialists provide significantly more care to patients with more severe mental health conditions.	by either a mental health procedure or diagnosis, according to the standard coding system. "Mental health specialists" included psychiatrists, psychologists, psychiatric social workers, or other mental health specialists; while "General medical providers" included all other providers.
Lu, Chunling, Richard G. Frank, McGuire, G. Thomas (2008) **Demand response of mental health services to cost sharing under managed care**	**Study design:** Cross-sectional **Time-frame:** 1996 **Data source**: The Medical Expenditure Panel Survey (MEPS) in 1996.	This study measures demand response of mental health services to cost-sharing under managed health care and compares it to demand response under conventional indemnity plan* or fee-for-service health care delivery systems.	Logit models were used to analyze the effect of price on the probability of any ambulatory mental health uses. **Testing:** To address the selection problem, the study focused on employees and their dependents who were privately insured and who had no choice of health plan.	**Outcome variable**: Whether or not an individual used ambulatory mental health services. **Economic variables**: Deductible ($), Coinsurance rate (%) Insurance type: Health Maintenance Organization (HMO), Preferred Provider Organization (PPO), Fee-for-service (FFS)	Deductibles had no significant impact on the likelihood of utilization for either indemnity or managed care plans in the range observed. The coinsurance rate had a significant negative effect on seeking mental health services under indemnity plans. The effect of the coinsurance rate on demand under managed care plans was significantly smaller than	**Note**: Ambulatory mental health services visits were defined to include outpatient visits, office-based visits, and emergency care visits. Mental health visits are defined by either the Clinical Classification Code or the ICD-9-CM Procedure Code; therefore, visits to general practitioners resulting in a mental

Study (Author/citation)	Study design, Time-frame, data source	Research Question	Methods	Description of variables	Results	Notes
		*Note: Managed care (MC) refers to any plan that uses a network of providers, such as HMO and PPO plans. (N = 1,774)			that under indemnity plans and not significantly different from zero. Managed care itself had decreased rates of utilization.	health diagnosis were defined as mental health services. A visit to psychologist or social workers or a visit which was categorized as psychotherapy or mental health counseling was also defined as mental health services.
Ellis P. Randall, McGuire G. Thomas, 1986 **Cost sharing and patterns of mental health care utilization**	**Study design:** Cross-sectional **Time-frame:** April 1, 1979 to April 30, 1983 **Data source**: Claims dataset from Massachusetts Blue Shield.	This study used within-year utilization information to estimate price response to deductibles, limits, and other benefit plan features. (N: ~60,000)	A probit model was used to estimate the probability of exceeding $475 in first year of use; A tobit regression model was used of the log of the total expenditures on outpatient mental health in the first 30, 60, and 90 days of treatment by new users, while taking into account the $500 limit (the truncation of covered expenses at $500; this study defined "reaching" $500 as having exceeded $475, which is within one visit for even the lowest price providers). **Testing:** n/a	**Outcome variables**: Model 1: whether or not a person reached the $500 coverage ceiling during the first calendar year for new users, 1981-1982. Model 2: cumulative MH expenditure **Economic variables**: Price: expected end-of-year price as a proxy for the notion of "effective price".	Physical health status included in the models did not contribute to greater levels of mental health use in the first 30, 60, or 90 days of use. The parameter estimates on the expected end-of-year price variable was negative and significant; these coefficients indicate an inelastic price elasticity (-0.59, -0.83, and -0.75 for first 30 or 60 or 90 days, respectively), and suggest the price responsiveness during the first 30 days of treatment is less than in 60 or 90 days.	**Definition:** Effective price here is proxied by an estimation of the expected end-of-year price.

Note: In 1973, 2.5 million federal employees and their adult dependents were enrolled in the Blue Cross/Blue Shield "high option" plan, which paid (after a small deductible applicable to all medical expenses and up to a limit of $250,000) 80% of charges made in a psychiatrist's private office.

Table 2-1 also summarizes the reported data collection processes, where five out of eight studies used data collected from cross-sectional surveys and two studies used a randomized social experimental design to infer the impact of socioeconomic, health status, and other important factors on the demand and utilization of mental health services. In half of the publications, the authors used existing datasets (e.g., national surveys) that are subject to the restrictions of the original dataset.

2.2.2 Specificity of the data analysis

The details of the data analysis and demand modeling used in the publications are presented in Table 2-1. Almost all of the reviewed publications were based on their reported approach preferences (i.e., data about past consumer behavior) and only one publication reported on the hypothetical or future behavior of patients who had already begun treatment, which refers to predicted visits made by patients reported by office-based psychiatrists (McGuire, 1981).

Five of the eight publications used probability of visiting (Haas-Wilson, et al., 2001; Horgan, 1986; Taube, et al., 1986; Wells, et al., 1987; Lu, et al., 2008), and two used number of visits to a mental health service provider as the dependent variables (Horgan, 1986; Taube, et al., 1986) in their analyses (Table 2-1). The direct personal cost was included in four publications as independent variables (Ellis, et al., 1986; Haas-Wilson, et al., 2001; Horgan, 1986; Taube, et al., 1986); and two of the studies (Haas-Wilson et al., 2001; Horgan, 1986) used models where indirect costs, such as travelling and waiting time were taken into account, in addition to direct costs. In all publications, insurance coverage, measured either by level of deductibles and/or co-insurance was a relevance criterion for selecting a study. Individual demographics, and socio-economic and health status were included as explanatory variables in most of the publications. Nevertheless, only a few empirical studies incorporated data on the relationship of family size, or

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residential areas (Wells, et al., 1987; Horgan, 1986; Lu, et al., 2008). Furthermore, the characteristics of the primary healthcare settings, such as psychiatrist or psychologist office, and quality of care perception were included in two of the analyses (Wells, et al., 1987; Taube, et al., 1986).

According to Table 2-1, half of the reviewed publications adopted logistic regression for their data analyses, while weighted least-squared and survival analyses were used in one publication (Keeler et al., 1988). Two-part models were most often used, with the first-stage of the analysis on the probability of seeing a mental health service provider using either a probit or logit regression. In the second stage, the number of visits to service providers was analyzed by either least square regression or count data specification.

2.3   Summary of Results

Three generations of research have contributed to our understanding of the utilization of mental health services. The first generation used aggregate utilization within a population over time. For example, Feldstein (1971) used predominately aggregate statistics to infer the impact of insurance coverage on health utilization. As Ellis and McGuire (1987) and Newhouse et al. (1980) pointed out, however, aggregation across individuals and across health services would lead to various methodological difficulties in estimating price elasticity. The price or cost-sharing elasticity estimates could be highly sensitive to these types of aggregations. "Second generation" and "third generation" studies are the focus of the present review (Table 2-1).

Second generation demand models deals with individuals as the unit of observation, most often measuring total use during a single year (McGuire, 1981; Wells et al., 1986; Taube et al., 1986; Horgan, 1986). These studies include non-experimental studies of mental health service use that usually focus on the insured population. These non-experimental studies have used

annual utilization data disaggregated to the level of individual or family use of mental health

services to examine the impact of insurance coverage on service utilization. Notable studies

conducted in the 1980s by health economists to examine the impact of insurance coverage fall

into this category (McGuire, 1981; Horgan, 1986; Taube et al., 1986). Most of the second

generation econometric analyses used cross-sectional survey data to investigate the magnitude of

the demand response for ambulatory mental health services, leading to similar findings across

studies: ambulatory mental health services were highly responsive to cost sharing (e.g., insurance

coverages were found to have a higher impact on MH services utilization), in comparison to

ambulatory medical services in general (McGuire, 1981; Horgan, 1986; Keeler & Rolph, 1988;

Taube et al., 1986). These studies were an advancement over the first-generation, aggregate

utilization studies since they allowed researchers to control for various socioeconomic and other

factors influencing individual use of mental health services and to identify the drivers of demand

for mental health services. Controlling for these variables permitted further investigation of the

effects of income, education, age, and other important variables, and created more precise

estimates of the impact of insurance coverage.

   Research on episodes of treatment constitutes the "third generation" of mental health

demand studies. This generation of research enables researchers to model demand response more

precisely to insurance coverage that change within a year (Frank, 1985). Examples of the "third

generation" studies include econometric studies by the Rand Corporation analyzing cost-sharing

and the demand for ambulatory mental health care in the Health Insurance Experiment (HIE)

study. The RAND HIE improved upon the earlier second-generation demand studies by

randomly assigning health insurance coverages to families, thus minimizing the potential

problem of correlation between insurance and some unobserved variables (Aron-Dine, et al.,

2013). Rather than relying on self-reported utilization data, the HIE directly observed what was used and when it was used.

All of the included studies were conducted in the US; and cross-country comparisons were lacking. More than half of the reports were for research aimed at the demand for mental health services, or for analyzing the impact of health insurance on the use of mental health services. All but one of the studies were reported in the 1980s, and their main focus was on research in ambulatory mental health services (Table 2-1).

2.3.1   Demand elasticity for mental health services

More than half (n = 6) of the included publications reported price elasticity. The main findings are summarized in Table 2-1. The results of the own-price elasticity estimates from second generation demand studies for mental health services were mixed. Two reports found an absolute value of less than 0.5, which is equivalent to a low price elasticity, while three reports found higher elasticities between 0.5 and 1, and one study reported it being higher than 1. In general, observational data studies, compared to those using social experimental data, have reported higher absolute value estimates for the own-price elasticity of demand. For example, McGuire (1981) used patient-level data reported by office-based psychiatrists and generated a price responsiveness of -1.0 or greater. Using data from the Rand HIE studies, Keeler et al.'s (1986) results suggest a price elasticity for the demand for mental health services of -0.59. Another study based on the RAND HIE database, but solely focused on the subgroup of new users (Ellis & McGuire, 1987) found that the price responsiveness during the first 30, 60, and 90 days was -0.30, -0.42, and -0.47, respectively. Moreover, in the study of the Blue Cross/Blue Shield Federal Employee Plan, Haas-Wilson et al. (2001) found that the price elasticity of demand for outpatient mental health visits varied by the type of service provider: elasticity was -

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0.74 during episodes when psychologists were the providers, and -0.15 when psychiatrists and

other physicians were the mental healthcare providers.

Table 2-2a: Direction and significance of the effects reported in the non-experimental studies included in the review (N = 5 studies)

Second-generation demand studies	Taube, Kessler, & Burns (1986)		Haas-Wilson, Cheadle, & Scheffler (2001)		Horgan M. Constance (1986)		McGuire T. (1981)	Lu, Frank, & McGuire (2008)
Mental health services studied	**Model 1: Probability of any MH visit**	**Model 2: Level of MH visit**	**Model 1: Estimate the impact of economic and other factors on the choice of episode type**	**Model 2: Estimate of outpatient utilization within episodes**	**Model 1: Estimate of the probability of having a mental health visit**	**Model 2: Examine the variations in levels of use expressed in terms of visits and expenditures, conditional on positive utilization of mental health services**	**Visits to office-based psychiatrists**	**Ambulatory mental health services**
Age	Age ↑, Age^2↓	NS	Inpatient only (↑)	NS	Age ↑, Age^2↓	Pay I & Pay II: > 65 years ↓	Age in years ↓	Age ↓
Gender	NS	NS	Inpatient only: Female (↓);	NS	Male: NS	Male: NS	Male: NS	Female: NS
Education	n/a	College graduate ↑,	n/a	NS	Years of education of family head ↑	Pay II: Log of years of education of family head: ↑	n/a in individual-level education level; percentage of county with 4 + higher education: NS	Middle education (between 12 and 16 years) ↑
Married	Married ↓, not married under 17 ↑	Married: NS	n/a	n/a	Single/Widowed/Divorced or separated (↑)	n/a	Married ↓	n/a
Ethnicity	(White =1) ↑	NS	Inpatient only (non-White ↑)	Outpatient with hospitalization (non-White ↑)	White ↑	Pay II White ↑	Black: NS	n/a
Income	NS	Log of family income ↓	Outpatient with hospitalization (Salary ↓); Inpatient only (Salary ↓);	Log (Salary) ↑; Log (NETPR^2) ↓	Family income: NS	Pay II: Log of family income: ↑	Income ↑	n/a
Price	n/a	Log of percent out-of-pocket expense (↓)	Average area-wide price of a psychiatrist visit: NS	Marginal price of an additional outpatient visit ↓	n/a	(Pay I) Log of the average percent paid out-of-pocket per visit ↓; (Pay II)	Price in dollars* ↑ Note: McGuire point out that the	(Price paid was measured by the deductible and the coinsurance rate;

						Log of the average amount paid out-of-pocket per visit ↓	positive coefficient on price is puzzling. He indicated that a high price may be an indicator of quality of service.	Please see insurance covariates)
Employed	NS	NS	n/a	n/a	Not in labor force (↑)	NS	Unemployed: NS	n/a
Insurance	Presence of private insurance NS; Medicaid ↑	n/a	n/a	n/a	Psychiatric coinsurance rate ↓; Mandated mental health benefits ↑	Free I: Mandated mental health coverage: ↑	Insurance (0, 1): NS; Insurance {0 (none), 1 (less than 50%, 50%, 75-80%, and more than 80% coverage)}	Coinsurance rate ↓, MC[3]coinsurance rate ↑
Physical health	Health condition ↑; bed disability days ↓; limitation of activity ↓	Health condition: NS, perceived health status: NS, limitation of activity: NS	Outpatient with drugs (individual current health status ↓)	NS	Good or excellent self-perceived health status ↓; number of disability days ↑	NS	NS	Having chronic disease before 1996 ↑, Fair/Poor mental health ↑
Mental illness	n/a	n/a	n/a	n/a	n/a	Pay I: Neurosis ↑	Primary diagnosis (other neurosis, personality disorder) ↑; severe impairment when treatment began: ↑	n/a
Comorbidity of substance abuse	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other significant variables		Primary setting (i.e., psychiatrist office, psychologist office) ↑	Inpatient only (availability of mental health provider ↓)	Outpatient services provided by MD ↓, Mixed ↑	Psychiatrists per 1,000 county population ↑	Pay I & Pay II: Log of family size: ↓; Free I: Log of psychiatrists per 1,000 country population: ↑	Insurance + Income interactions: NS	Living in Midwest ↓

Notes:

[1] NS stands for "not significant", while "n/a" indicates that the variable was not included in the model.

[2] NETPR refers to the out-of-pocket price of mental health services to an individual.

[3] MC stands for "managed care plans": if a plan is HMO or PPO, MC =1; if a plan is FFS, MC =0.

Table 2-2b: Direction and significance of the effects (social experimental studies or analysis of the Rand Health Insurance Experiment (HIE)) (N = 3 studies)

Third generation demand studies	Wells, Manning, Duan, Newhouse, & Ware (1987)		Keeler, Manning, & Wells (1988)			Ellis P. Randall, & McGuire G. Thomas, (1986)	
Mental health services studied	**Model 1:** To estimate the probability of any use of outpatient mental health services	**Model 2:** To examine the annual probability of choosing a mental health specialist (other than a general medical providers), given any use of mental health services	**Model 1:** To estimate the annual probability of a user visiting a psychiatrist	**Model 2:** To estimate the annual probability of a user ever purchasing a psychotropic drug (prescribed by a psychiatrist) during a year	**Model 3:** To examine the determinants for number of months of care within the first three years enrollment for a user	**Model 1:** To estimate the probability of exceeding $475 in first year of use	**Model 2:** To regress the log of the sum of all ambulatory mental health payments for the first 30 days/60 days/90 days
Age	Age $\downarrow$, Age^2 $\uparrow$	Age $\downarrow$, Age^2 $\uparrow$	Age (Not stated)	Age $\uparrow$	Age $\downarrow$	Age $\downarrow$	Age $\downarrow$
Gender	Female adult $\uparrow$	Female adult $\downarrow$, Child $\uparrow$	Female (Not stated)	Female: NS	Female: NS	NS	NS
Education	College (if education >= 16 years) $\uparrow$	Education: NS	Education: $\uparrow$	Years of education $\downarrow$	Education: $\uparrow$	n/a	n/a
Married	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ethnicity	Black: NS	Black: NS	Black (Not Stated)	n/a	Black: NS	n/a	n/a
Income	Family income: NS	Family income: NS	LINC^3 (Not Stated)	n/a	LINC^3: NS	n/a	n/a
Price	n/a	n/a	n/a	n/a	Pay: NS	n/a	Expected end-of-year price: $\downarrow$
Employed	n/a	Professional $\uparrow$	n/a	n/a	n/a	n/a	n/a
Insurance	M95 (if mental coinsurance rate = 95 percent, compared to free plan) $\downarrow$	Mental coinsurance: NS; individual deductible plan: NS	Big maximum dollar expenditure (MDE) 50 coinsurance rate (compare to free plan) $\downarrow$ Those with no insurance coverage would spend about	Pay plan $\downarrow$	The amount of MDE remaining has a strong influence on spending. P25, P50, P25 50, P95	Individual coverage: NS	Individual coverage: $\uparrow$

			¼ as much on mental health care as they would with free care.				
Physical health	LNDIS[5] (log (max (number of chronic disease) ↑	Log GHI[4]↑, physical limitations NS, chronic disease NS	GHI[4], PHYSLM[6](physically limited) ↑	n/a	GHI[4]: NS	Log (previous medical condition): NS; previous admissions: NS	Log (previous medical condition): ↑; previous admissions: ↓,
Mental illness	LMHI[7] (the Mental Health Inventory) ↓	Poor mental health status: NS	Mental Health Index : NS	Mental Health Index : NS	Baseline mental health status ↑	Depressive neurosis: NS, psychosis: NS, Substance abuse: NS, other mental health diagnoses: NS	Depressive neurosis ↑, non-mental health diagnoses ↓
Comorbidity of substance abuse	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other significant variables	n/a	Satisfaction with medical provider ↓, (area) Dayton ↓	n/a	n/a	n/a	Provider types: psychologist: ↓, social worker: NS, informal provider: ↓	Provider types: psychologist: ↓, social worker: NS, informal provider: ↓, Time trend: ↑

Notes:
[1] NS stands for "not significant," while "n/a" indicates that the specific variable was not included in the model.
[2] The Blue Cross/Blue Shield high-option plan: after a small deductible applicable to all medical expenses and up to a limit of $250,000.
[3] LINC represents log (Income).
[4] GHI stands for General Health Index.
[5] LNDIS represents log (max (number of chronic disease)).
[6] PHYSLM stands for physically limited.
[7] LMHI stands for the Mental Health Inventory.

2.3.2 Demographic factors

Demographic factors have been found to be important in explaining the demand behavior for mental health services (Table 2-2a and b). Nevertheless, the empirical results regarding the exact relationship between age and use of mental health services are inconsistent. All eight studies included age as a predictor for mental health demand, and three publications included both age and age-squared in the analysis. Using survey data, Taube et al. (1986) and Horgan (1986) suggested that age exhibits an inverted U-shaped pattern associated with the use of mental health services; with the age and age-squared specification, the age effect was found to be statistically significant in the above-mentioned non-experimental studies. Horgan (1986) and Taube et al. (1986) further concluded that middle-aged persons used the most outpatient psychotherapy services, and older persons had a lower probability to make mental health visits once treatment began. Similarly, Wells et al. (1987) concluded a higher probability for female adults to use outpatient mental health services, in comparison to their male counterparts.

Gender was not found to be significantly related to the probability of using ambulatory mental health services, a finding that could counter the stereotype that females make more mental health visits to specialists (Taube et al., 1986; Horgan, 1986; Lu et al., 2008). Nevertheless, this finding is not consistent with the results from Wells et al. (1982), who concluded that female gender had a higher probability of use but not level of utilization. Similarly, McGuire (1981) found that psychiatrists reported more visits for women than men.

2.3.3 Socioeconomic factors

Most studies found a higher probability and/or higher level of use of mental health services among individuals with higher socioeconomics status (Table 2-2a and b). For example,

Taube et al. (1986) and Horgan (1986) used survey data and concluded that race had a significant impact on the probability of using ambulatory mental health services. In particular, White individuals had a higher probability of using mental health services, compared to non-White individuals. For example, Haas-Wilson et al. (2001), in a study of Blue Cross/Blue Shield Federal Employee Plans, found that non-White individuals had a significantly higher probability of beginning an inpatient-only episode. This significant race effect is not consistent with the findings of Lu et al. (2008) and Wells et al. (1982), who reported no significant race differences in the use of ambulatory mental health services.

Higher education level was found to be significantly associated with an increased demand for ambulatory mental health services (Lu et al., 2008), and for demand for community mental health services (White, 1986). Results from the Rand HIE studies generated similar findings: Wells et al. (1987) and Keeler et al. (1988) concluded that college graduates had a significantly higher probability for using outpatient mental health services, compared to less educated individuals.

Income effects were not found to be significantly related to the probability of utilizing mental health services, a finding that is consistent across non-experimental studies (Horgan, 1986, Taube, et al. (1986) and the Rand HIE study (Wells et al., 1982). Horgan (1986) suggested that this may be because the introduction of social programs such as Medicaid and community mental health centers improved the access to care. Regardless of its significance, if income is not controlled in the demand analysis, it is difficult to distinguish whether the higher use is due to real income effects per se or to the more generous insurance coverage held by higher income groups. McGuire (1981) attempted to correct for the self-selection issue associated with insurance using the estimation methodology developed by Heckman (1976) and concluded that,

among the users of mental health services, visits are more price-elastic for lower-income rather than higher-income patients (e.g., prices had more impact on MH services utilization among lower income patients). The Rand HIE studies, on the other hand, failed to find a significant income effect on the use of mental health services (Table 2-2a and b).

Three non-experimental studies incorporated survey data for the relationship of marital status to the use of mental health services. The effect of being married was significantly associated with the probability of using ambulatory mental health services (Taube et al., 1986; Horgan, 1986). Among the mental health service users, being married had no effect on the volume of services being used, when compared to the non-married patient sub-groups (Taube et al., 1986). In addition, Wells et al. (1987) analyzed the Rand HIE data and found a negative but non-significant relationship between family size and use of mental health services.

2.3.4 Physical and mental health status

The physical health status indicator shows that the presence of chronic disease and limitations in activity significantly increases the use of ambulatory mental health services (Lu et al., 2008; Taube et al., 1986; Horgan, 1986). Results from the Rand HIE studies supported a similar conclusion with different measures of physical health status (Table 2-2b).

The relationship between diagnosed mental health disorders and the demand for services was analysed in several studies. Using survey data, Horgan (1986) found that the presence of psychosis or neurosis as mental disorders was positively associated with the demand for ambulatory mental health services. Similarly, McGuire (1981) found that patients with a primary diagnosis of neurosis or personality disorders were positively related to the demand for visits to office-based psychiatrists. Nevertheless, using the RAND HIE database, Ellis and McGuire (1987) found that the presence of a diagnosis of "depressive neuroses" and various types of

"psychoses" did not contribute to significantly greater expenditures for ambulatory mental health during the first 30, 60, and 90 days.

2.3.5   Supply-side factors

In the study of the Blue Cross/Blue Shield Federal Employee plan, Haas-Wilson et al. (2001) included the psychiatrist-physician ratio in the demand model to estimate the impact on the probability of beginning an inpatient-only episode, and concluded that the availability of psychiatrists has a negative and statistically significant impact on the probability of beginning an inpatient-only episode, relative to an outpatient-only episode. Horgan (1986) incorporated the psychiatrist-population ratio and had similar results. Based on these findings, Horgan (1986) found no evidence for an excess in the provider-induced demand.

2.4   Discussion

McGuire's study in 1981 was often considered as the first econometric study on the demand for mental health services (Frank, 1986; Taube et al., 1986); years after McGuire's pioneering study, only a small number of economics studies have been conducted. In addition, many of the documented methods and terms that have been used to estimate the demand function in mental health services cannot withstand scrutiny. The primary problem with these studies has been due to many factors, such as population characteristics, insurance coverage, and supply constraints on demand, coming together to produce the observed behavior. Among second-generation analyses, self-reported annual utilization was used as a decision unit in the estimations, and such observations were also used to model an individual's economic demand for mental health services. Nevertheless, these results were based on the non-experimental assignment of individuals to insurance plans; and therefore, the results could be subject to selection bias. Preventing the bias introduced by self-selecting into insurance based on a person's

mental health condition was the primary rationale for mounting the RAND Health Insurance Experiment (HIE).

The empirically documented associations between economic and other important factors and demand for mental healthcare services depends on various methodological factors, such as study population, study design, settings, and measures. I used the following indicators to discuss the quality of the included studies: 1) standardized measures of personal costs and mental service demand; 2) a genuine attempt to test and correct for potential confounding variables; and 3) selection of an unbiased sample. First, all of the included studies have at least one economic price variable, though some of the measures for personal cost were called into question, such as the private insurance indicator that was not originally designed to measure mental health coverage (Taube, et al., 1986), and the percentage of out-of-pocket expenses used as a proxy for price (Taube et al., 1986). Furthermore, insurance coverage and waiting times are sometimes seen as confounding variables to be controlled, rather than as variables of interest (White, 1986).

Similarly, most of the reviewed studies were cross-sectional and asked about service utilization prior to the survey; therefore, they do not provide information on the change in demand as a function of time. Furthermore, the results cannot be used to predict changes in demand for mental health services over multiple years. Wells (1990) found a striking difference between repeat users and new users in the pattern of their entry into outpatient mental healthcare over time. Wells' (1990) findings show that the typical one-year study period may ignore the fact that recent historical trends can have an impact on the relationship between cost-sharing and current demand for mental healthcare services. In general, multiyear studies that have rigorous statistical approaches would be needed in the near future to reveal the true price effects, and

long-term effects on the mental healthcare demand, without confounding effects or selection bias.

Almost all of the existing evidence from second-generation studies suggests that the use of mental health services increases along with a decrease in cost-sharing; however, the studies have focused solely on the extent to which utilization is responsive to cost-sharing, and not on the source of a demand increase. In particular, it is not known what utilization or who is affected along with a change in cost-sharing. Frank and McGuire (1986) suggested that if individuals who already are in treatment react to more generous insurance coverage by increasing their use of mental health services, insurance may encourage treatment of limited value. On the other hand, if more people initiate mental health treatment in response to expanded coverage, the effect of insurance may bring individuals in need of care into treatment, who were not previously receiving mental health services. Frank and McGuire (1986) further suggested that important factors, such as new or repeat users and the severity of diagnoses, could effectively contribute to an informed decision on structuring cost-sharing.

Unless the above mentioned important factors related to the second-generation studies are appropirately measured and incorporated into the demand model, a gap will exists between research evidence being generated and the demand behavior observed. Compared to the non-experimental, observational survey datasets, the episode based analysis used in the third generation models corresponds more closely to a realistic decision methodology. The availability of a large claims database; however, will be needed to support such analyses. In general, the main findings of the present review suggest that a universal methodology for modeling the demand for mental health services, with evidence of reliability, validity, and generability, is lacking from the existing publications.

Most of the selected studies discuss possible methodological issues, like adverse selection (see description below); however, rigorous statistical approaches to test and control for this bias were often absent. For instance, the greater price responses recorded by the observational studies could result from adverse selection, where sicker individuals might select more generous coverage to lower their out-of-pocket costs (Frank & McGuire, 1986). With adverse selection, the price response is overestimated since some of the difference due to sickliness may be attributed to price (Keeler et al., 1988).

When adverse selection is present, it is impossible to discern whether the observed greater demand for mental health services is due to the effects of more generous insurance coverage, or to people with poorer mental health status seeking more services. As a consequence, the higher propensity for using mental health services may lead to choosing better plans to reduce the financial burden. McGuire (1981) attempted to use an instrumental variable procedure to correct for the adverse selection issue associated with insurance coverage. In addition, Lu et al. (2008) used the strategy of only selecting employees and their dependents who were privately insured and who had no choice for their health plan to reduce the adverse selection problem. The complexity of insurance coverage makes the analysis "problematic," according to Frank and McGuire (1986), when trying to interpret the estimated coefficients on the price variables for the demand equation.

Wells (1990) claimed that the HIE experimental design with randomization prevented the study results from being confounded by self-selection into insurance coverage. Nevertheless, the restrictions imposed on the study design of the HIE, such as exclusion of elderly and the highest income group, make it difficult to generalize the results to subpopulations. Similarly, McGuire's (1981) study was criticized for only selecting patients who were already in treatment. In this

case, the initial decision of individuals to seek care in response to changes in cost-sharing cannot be revealed (Taube et al., 1986). Based on the counterfactual theory of causation, unless insured and uninsured patients are otherwise the same, comparing the effect of cost-sharing to the demand for mental health services for the two groups would not generate reliable results.

Mental health treatments can be provided by a range of medical and non-medical professionals, such as psychiatrists, psychologists, psychiatric nurses, general practitioners, or social workers, etc. Only two of the included studies addressed the economic relationship between mental health services being provided by physicians or other providers in the demand for mental healthcare services (Atella & Deb, 2008; Ettner et al., 1999). Most of the studies grouped multiple professional mental health service providers together, making it impossible to examine the demand response for specific mental health services.

2.5   Conclusions

Different price and income elasticities are important for public policy. From the included studies, a reduction in the demand-side cost sharing does not seem to encourage an initial contact with mental health care providers; however, a lower price will increase the level of mental health utilization among service users. This finding suggests that an extended universal coverage plan for mental health services; (e.g., psychotherapy) could benefit individuals differently along their mental health journey that includes varying phases of illness and recovery, or could offer more benefits for the current service users.

In addition, McGuire (1981) concluded that reduction in personal cost due to cost-sharing with insurance had a less impact on MH services utilization for higher income groups in the US, compared to the lower income groups. This result indicates that the effect of cost-sharing will be more apparent for the lower income groups. Therefore, government activities or campaigns

should be targeted to these income groups. Empircal research is also essential for assessing the magnitude of the needs and burden of mental illness. The selected studies in the present review provide some important insights about the demand for mental health services. Since all of the selected studies were conducted in the US, information gaps may exist in regards to the demand behavior for mental health services in the Canadian context, where further research could uncover the price and income elasticities, and the cross-price elasticity of services among general practitioners and mental health specialists.

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2.7   Chapter 2 Appendix A: Search Strategy for Literature Review

The literature search for "insurance coverage", "demand", and "mental health services" was carried out with electronic database from the following electronic databases: Ovid MEDLINE, Econlit, Embase, PsycInfo, and Scopus. The search terms were designed to capture all relevant articles reporting the effect of personal costs on the demand or utilization of mental healthcare services.

A list of keywords was developed and categorized into three tiers. At first, keywords such as "mental healthcare," "mental disorders," and "mental illness" were used to specify the illness. Second, keywords such as "demand," "need,*" "access,*" or "utili*" were developed to find studies that examined mental health services. Finally, keyword search terms, such as "economic,*" "cost-sharing," "drug insurance," "insurance psychiatric," and "health benefit plan" were used to retrieve studies in economics. In addition, a Google search was performed using the search terms from the search strategy. Based on the initial literature search, a primary list of publications was obtained.

A total of 1,754 publications were identified from a search of PubMed and MEDLINE, and an additional 12 publications were identified from a Google Scholar search, giving a total of 1,766 publications. The inclusion of studies was then manually judged based on a screening of titles to exclude studies not relevant to demand or utilization of mental health services. The abstracts of the remaining articles were then screened, and in some cases, the full text was read to determine whether or not they met the relevance in the context of economics studies. In addition, review studies regarding the impact of economic factors on the demand for mental health services were excluded. In total, eight economics studies on the demand for mental health care services that met the inclusion criteria were included in the literature review.

2.8   Chapter 2 Appendix B: Flowchart for Literature Selection

MedLINE + PubMed n = 1,754	Google Scholar n = 12

Combined results = 1,766

Excluded review studies, n = 2

Article screening based on abstracts and titles,
Excluded articles, n = 1,720

Excluded duplicate studies, n = 15

Manuscript full text reviewed, n = 21

Total included studies for analysis, n = 8
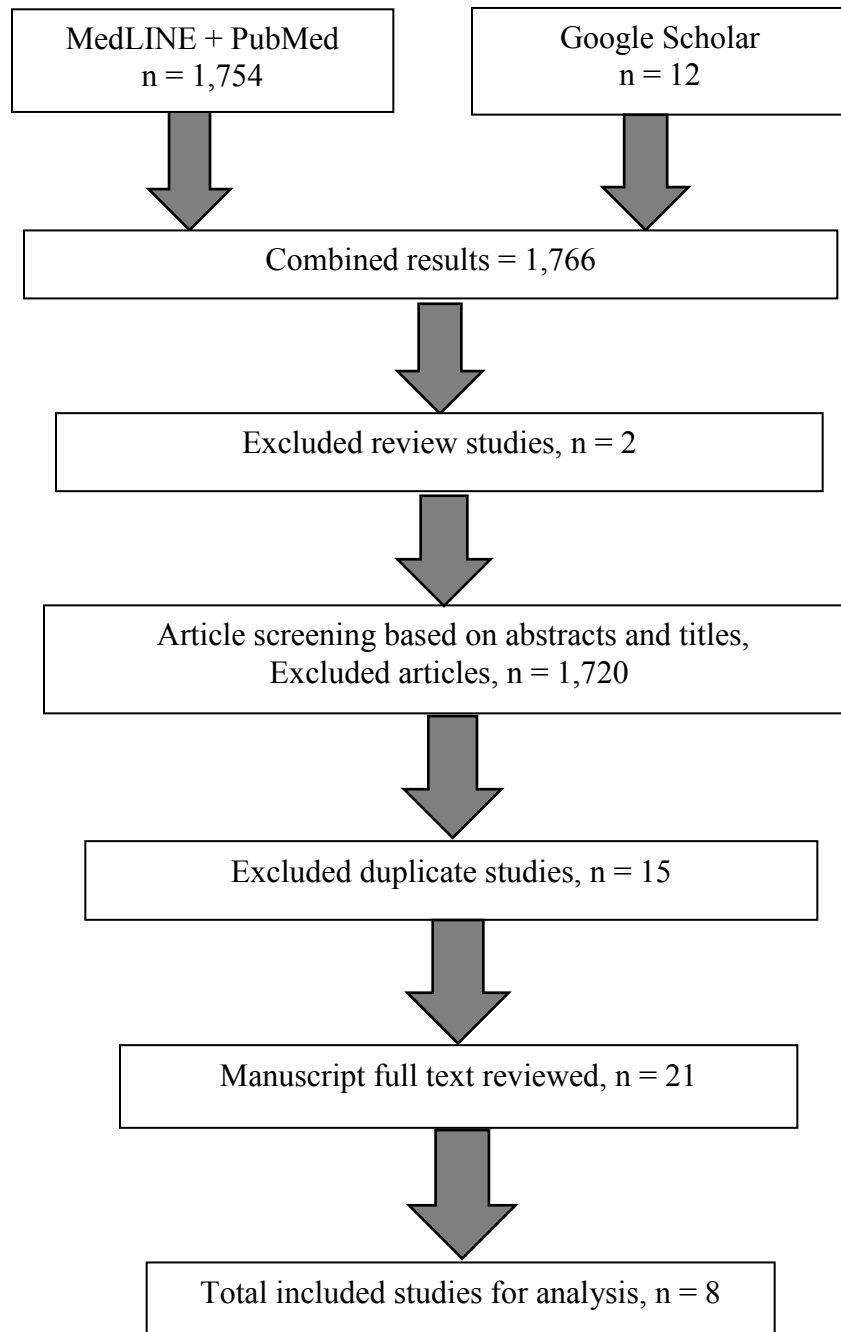
CHAPTER 3: MODELLING ANALYSIS OF DEMAND RESPONSE OF MENTAL HEALTHCARE SERVICES TO ECONOMIC AND OTHER IMPORTANT FACTORS – A CANADIAN COMMUNITY HEALTH SURVEY STUDY

3.1   Introduction

In recent decades, mental illnesses have become increasingly significant as a public health concern. In the World Health Report 2001, the World Health Organization (WHO, 2001) projected that depression would be the second leading cause of disability by 2020. Other mental illnesses, like schizophrenia, bipolar disorder, and substance use disorders are among the ten most common causes of disability worldwide, accounting for 30.8% of the total disability and 12.3% of the total burden of disease (WHO, 2001). Recent Canadian data reported that total public and private mental health expenditures in Canada in 2003/2004 amounted to $6.6 billion, of which $5.5 billion was from public sources. Furthermore, public mental health expenditures amounted to 6% of the total public health expenditures (Jacobs et al., 2008).

Mental and addictive disorders are costly to society in terms of direct medical costs and indirect costs due to loss in productivity and decreased quality of life for individuals, families, and society as a whole. The total cost of mental illness to the Canadian economy, in terms of healthcare and loss in productivity, is estimated to be $51 billion per year, accounting for 2.96% of the Canadian GDP in 2011. A costing report on mental health and addiction, published by the Institute of Health Economics (IHE), concluded that more than $14.3 billion in public expenditure goes toward mental health services and supports in Canada (Jacobs et al., 2011). In contrast to the rapid advances in practice in most aspects of physical health (resulting in dramatic reductions in mortality rates), the resources and accessibility to mental health services are more limited. The term "treatment gap" was used by WHO (2003) to refer to the gap between the

quality and quantity of mental health services that are available, and the needs of those who are at risk for or who have a mental illness. In 2012, approximately 10% of Canadians used mental healthcare (MHC) services (Sunderland & Findlay, 2013). Statistics Canada online health reported that only one-third of individuals aged 15 or older who reported having a MHC needs stated that their needs were fully met (Pearson, Janz & Ali, 2013). This suggests that individuals who are mentally ill either do not seek treatment or they are treated by someone other than a mental health professional.

A major objective of the healthcare system is to encourage the efficient use of healthcare for individuals with healthcare needs (Hurley, 2010). A first step in the analysis, the key factors that influence the demand for MHC services must be identified. Important predictors that are related to mental health service demand are the price of services, health insurance coverage for different MHC services, and socioeconomic factors. More generous insurance coverage is generally believed to increase the demand (Frank & McGuire, 1986). From an individual consumer's perspective, better coverage effectively reduces personal costs for receiving the services, and similarly from a general demand theory perspective, reduced pricing will increase both the demand and the utilization of MHC (McGuire, 1981). Thus, gaining a better understanding of all characteristics of population demand behavior for mental health services is crucial for public and healthcare policy-makers. The changing demands for MHC services also needs to be understood so that current and new healthcare initiatives can support the goals set by policy makers. This economic study is designed to examine the effect of socio-demographic, health status, insurance, and economic factors on the decisions of individuals for their demand and utilization of mental health services.

3.1.1 The Canadian healthcare system

Canada's public healthcare system provides universal coverage for medically necessary healthcare services, such as hospital, physician, and surgical services, to meet the healthcare needs of all residents. The organization and delivery of healthcare services are the responsibility of the provincial and territorial governments that maintain their own universal, publicly funded healthcare systems.

The institutional context of medical services is similar across the Canadian provinces. In general, all provinces and territories provide universal coverage for medically necessary hospital and physician services that are free at the point of use (Canadian Health Act Annual Report, FY 2013). Although the coverage of services by MHC specialists tends to vary across the provinces, certain generalizations can be made. For instance, upon referral from a GP, psychiatrist consultations are covered for outpatient and inpatient care by both provincial and territorial health plans. Psychologist and social worker services, on the other hand, are not insured benefits under these health insurance programs unless the service providers are part of a hospital program or a publicly funded mental health service. In addition, prescription drugs dispensed outside hospitals are beyond the provincial government drug programs, and therefore, they are paid through private insurance agents or out-of-pocket (HSPM, 2015).

In a public healthcare system, the out-of-pocket price paid by the consumer is typically not the same as the full amount paid to the medical service providers. Insurance coverage lowers the effective individual price of MHC, making health expenditures less expensive for such individuals. This change in relative price alters the individual's allocation between wealth and health, and thus influences the decision of groups entitled to insurance coverage to seek mental health services in both private and publicly funded systems (Liu & Chollet, 2006).

3.2   Methods

3.2.1   Sample selection

The dataset for this study was from the population-based Canadian Community Health Survey (CCHS), conducted in 2012. The CCHS is a nationally representative, cross-sectional survey conducted annually by Statistics Canada. It targets those who are 15-years-of-age and older and living in one of the ten Canadian provinces (CCHS-MH Microdata File User Guide). A number of restrictions were imposed on the CCHS respondents. Individuals living on reserves and other aboriginal settlements, full-time members of the Canadian armed forces, and members of institutionalized populations were excluded from the study sample. Together, these exclusions represent less than 3% of the target population

(http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015).

The initial selection of 36,443 households had a household-level response rate of 79.8%, and for the responding households, the person-level response rate was 86.3%. Consequently, at the total/full Canada level, the combined (household and person) response rate was 68.9%. The final analysis sample consisted of 25,113 individual observations, representing 28.3 million Canadians who were 15 years or older (www.statcan.gc.ca).

The CCHS-MH questionnaires were administered face-to-face in English or French for all respondents. The CCHS-MH survey used a three-stage survey design. First, geographical areas ("clusters") were selected. Households were then selected within each sampled cluster, and one respondent per household was randomly selected. A survey weight was given to each person included in the final sample, corresponding to the number of persons in the entire population that were represented by the particular respondent (CCHS-MH Microdata File User Guide).

The CCHS that was conducted in 2012 consisted of two components; namely, a general survey and a mental health supplement (CCHS-MH). The national database contains information on individual level demographics and socio-economic information, medical care utilization, prescription drug use and coverage, and physical health and mental health status. The household-level data allows for an analysis of the decisions made by individuals to seek help and to access services from mental health professionals. CCHS is generally considered an excellent source for individual medical and other health service utilization data in Canada, and the dataset allowed this research study to explore the pathways through which socio-demographic, health status, and economic factors might affect the utilization of MHC services.

3.2.2 Empirical model selection

To identify the impact of prescription drug coverage and other background variables on utilization of MH services, we consulted the literature to select the appropriate demand model. In the literature, two main approaches are focused on modeling the demand behaviors for mental health services. The first approach is the demand behavior studies that use the Andersen socio-behavior model for broadly identifying the determinants of mental health services. The Andersen behavior model includes predisposing, enabling, and need factors, and in this thread of the literature, insurance is generally considered as an enabling factor (Andersen, 1995, 2005). The second thread in the literature uses models for the demand for mental health services under a principal-agent relationship as a two-stage process, where 1: the patient initially decides to seek care and after consulting with the physician, 2: the patient depends on the physician for advice as to the required level of medical services (Comanor, 1980).

In the context of the mental health system, outpatient psychiatric visits to general practitioners (GPs), psychiatrists, and psychologists for psychotherapy, consultation, or

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medication, are not demanded for their own sake, but rather to help improve/address the person's mental health concerns. The theory of demand for healthcare; therefore, is appropriate for modeling the effects of individual socio-demographic characteristics and changes in cost-sharing with regards to the utilization of mental health services. In addition, the chosen model must include an empirical specification that accurately represents the decision-making processes that involve the patient and the healthcare provider. Specification of a demand model for mental health services should take into account two special characteristics for the utilization. First of all, a very large part of the population does not use these services (Horgan, 1986). Second, of those who use the services, the distribution of use is highly skewed (Horgan, 1986; Haas, 2001). To accommodate these characteristics, a two-part model, a common approach for analysing the demand for mental health services, was proposed. The first equation estimates the probability of having a mental health visit, that is, the decision to seek care. In the second part of the model, variations in levels of use are expressed in terms of visits (Page 802. Greene, 2012). These are examined, in turn, with each equation being conditional on positive utilization of mental health services (Page 811, Greene, 2012).

The two outcomes for our two-stage model are the probability of MHC service use, which is conditional on any selected service use, and the frequency of visits to a GP, psychiatrist, or psychologist. A two-stage model is more appropriate than one regression model because the effects of socio-demographic and healthcare variables, including insurance holding onto MHC service utilization, can be rather different at each stage.

Two sets of outcome variables were used to estimate the demand for mental health services, and service utilization measures were then created based on the MHC services. The first set of binary outcome variables was created to identify whether or not the respondents had used

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prescribed psychotropic medications or visited a GP, psychiatrist, or psychologist for mental health reasons in the 12 months prior to the survey; and the probability of utilizing one of the MHC service providers at least once was then estimated separately. Respondents who reported utilizing MHC services at least once (N = 2,443) in the past 12 months prior to the survey were asked: "Thinking of the GP/psychiatrist/psychologist you talked to the most often during the past 12 months, how many times did you see or talk on the telephone to this person?" (Statistics Canada, 2013) The dependent variables in the analysis were the counts of the self-reported numbers of visits/contacts to a GP, psychiatrist, or psychologist. Visits to social workers, counselors and informal care providers are not included since the financing of these mental health services have unique characteristics, and thus are beyond the scope of the present study.

3.3   Need, Demand, and Utilization

Need, demand, and utilization of healthcare are important interrelated terms used in health economics. According to Hurley (2010), the need for healthcare originates from a person's health status, which can be estimated by the presence of their disorder(s). A broad range of definitions of need have been documented in the literature in studies of the relationships between the use of mental health services and indicators of needs (i.e., diagnosis, perceived need of services, number of symptoms, and reported disability). Among these, diagnosis is usually considered as the most appropriate and objective indicator (Sunderland & Findlay, 2013). For the sake of this analysis, need is defined as the presence of any diagnosable mental health concern meeting the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) criteria for mental or substance use disorders (American Psychiatric Association, 1994).

Healthcare demand describes the desire of an individual to obtain a healthcare good (e.g., medication) or healthcare service (e.g., physician appointment), given its price. Moreover,

healthcare utilization refers to the amount of healthcare resources that are actually consumed. A "causal" relationship between the three terms was explained by Hurley (2010, p. 207): "Need predicts healthcare demand, and demand determines utilization; utilization of healthcare services is the typical piece of information that is directly observable and measurable and likely to be recorded in population-based surveys or administrative databases." Individual's decision to access to or demand for MH services is unobservable; therefore, MH care utilizations have served as proxies for the unknown demand for MH services. The following sub-sections define how we measure the likelihood and the frequency of MHC service utilization.

3.4   Model Variables

3.4.1   Prescribed medication coverage

The CCHS-MH contains a question asking whether or not individuals have any private, government, or employer-paid insurance plan that covers all or part of their cost of prescribed medications. Individuals were first asked if they regularly take prescription drugs. Persons who answered "yes" were then asked whether or not the costs of their medications are covered by insurance. A binary-response, insurance status variable (insured vs. uninsured) was created; the variable takes the value "1" if the person reports being either fully or partially covered, and "0" if they are not covered at all. Respondents are assigned "missing" if the person refused to answer the question or reported that they did not know. The survey did not follow up to ascertain whether that policy was related to recent or former employment, a retirement package, or other private insurance.

3.4.2   Other independent variables

In addition to the MHC service utilization, the following set of independent variables was included in the analysis: individual-level socio-demographic characteristics (age, gender, marital

status, employment, immigrant status, education and income level), health status indicators (self-perceived physical/mental health, presence of chronic condition(s) or mental disorder(s), and psychological distress); community factor (rural residency), and economic indicator (prescription drug coverage).

Age was treated as a categorical variable in the models. Since this study does not include children under 15 years, the research was confined to an age effect that was affecting the demand and utilization for adolescents and adults. Five age groups: adolescents and youth (15 to 21), young adults (22 to 34), middle-aged adults (35 to 49), older adults (50 to 64), and seniors (65 and older) were created for the subgroup analysis. Residents who were born outside Canada were identified as immigrants. In addition, marital status was divided into two categories: married/cohabiting, and not married/cohabiting, where not-married referred to individuals who were never married, or were widowed, separated, or divorced.

An individual's socio-economic status was defined by employment status, education attainment, and household income. A binary variable for employment was created, and employment status indicated whether respondents went to work or were absent from their job during the two weeks prior to the CCHS-MH interview. Four dummy variables were created to proxy an individual's highest level of education attainment: less than high school graduation, high school graduation, some post-secondary education, and post-secondary graduation.

The CCHS-MH also measured household income in four income categories that were created to indicate the respondents' household income quintiles: $29,999 or less, $30,000 to $49,999, $50,000 to $89,999, and $90,000 and more.

3.5   Health Status Factors

3.5.1   12-month prevalence of mental disorders

The CCHS-MH measured health status using a number of dimensions. Physical and mental health statuses were self-reported as: "excellent," "very good," "good," "fair," or "poor". The survey also extended the questions into specific diseases and chronic conditions. For example, the survey measured six major mental disorders presented in the 12 months prior to the interview: depressive episode, bipolar disorder, generalized anxiety disorder, alcohol abuse and dependence, cannabis or other drug abuse and dependence, and general substance abuse and dependence. The survey measured the disorders using criteria from the *World Health Organization Composite International Diagnostic Interview 3.0* (WHO-CIDI) (Kessler, 2004, Gravel & Béland, 2010). The WHO-CIDI is a standardized instrument used for assessing mental disorders and conditions according to the DSM-5 criteria, and it is widely used in population surveys (Sunderland & Findlay, 2013).

3.5.2   Chronic physical condition

Individuals with chronic conditions are reported to have a higher need for MHC, and thus, use more services (Sunderland & Findlay, 2013; Haas-Wilson, 2001). In the CCHS-MH, the presence of specific, long-term physical conditions in the past 12 months that have been diagnosed by a health professional were recorded. These specific physical conditions included: asthma, arthritis, back problems, high blood pressure, migraine headaches, chronic bronchitis, diabetes, epilepsy, heart disease, cancer, stroke, bowel disorder, Alzheimer's disease, and fatigue syndrome. The presence of the above chronic physical condition(s) was captured by a dichotomous chronic disease indicator (Chronic).

3.5.3 Psychological distress

The Kessler Psychological Distress Scale (K10) is an assessment method to collect individuals' self-reported mental health condition (Kessler, 2004). K10 has been used extensively in healthcare services research as a measure of overall severity of mental health problems (Mosier et al., 2010), as well as an indicator for distress level (Sunderland & Findlay, 2013). In this study, the K10 was used as an indicator/measure of distress, not an indicator of mental illness. Sunderland and Findlay (2013) found that psychological distress has been associated with perceived need for mental health, independent of the presence of mental illness. Three dummy variables were created to represent a continuous measure, and scores ranging from 0 to 40 were assessed using the K10, to indicate the severity of the respondent's current distress: low distress (0 to 5), medium distress (6 to 19), or high distress (20 to 40).

3.6   Statistical Analyses

3.6.1   Demand model specifications

This study looked into the demand response to socio-demographic characteristics, health status indicators, and economic factors with a two-step analysis, where demand for mental health services was broken into two decisions: the probability of using the services and the frequency of such service use.

3.6.1.1 Equations for using any MHC services

In the demand models the dependent variables were the four categories of the mental health service utilization during the last 12 months as described earlier. The independent variables that were included in the model were socioeconomic variables, such as age, gender, income, education, marital status, and immigration status; health status indicators, such as physical and mental health; and a co-morbidity indicator for drug-alcohol-substance

abuse/dependence. Four separate logistic regressions were then used to estimate the impact of independent variables on the likelihood that an individual contacted a: 1) GP, 2) psychiatrist, 3) psychologist, or 4) used any psychotropic medication. The dependent variable "Utilization$_i$" was dichotomous and had a value of "1" if the person had at least one selected service in a category, and a value of "0" otherwise. The dependent variable in the model is observed utilization and is assumed to be equivalent to demand. The Z matrix contained four categories of independent variables, and K is the subscript denoting these individual-level variables.

Four short-form logistic models were set up to estimate the probability of utilizing mental health services with GPs, psychiatrists, psychologists, and medication as follows:

$$\text{Logit [Utilization}_{\text{GP}}] = \beta + \sum_{k=1}^{K} Z^{\text{GP}}_{ik} \, \alpha_k \qquad\qquad\qquad (1a)$$

$$\text{Logit [Utilization}_{\text{psychiatrist}}] = \beta + \sum_{k=1}^{K} Z^{\text{psychiatrist}}_{ik} \, \theta_k \qquad\qquad\qquad (1b)$$

$$\text{Logit [Utilization}_{\text{psychologist}}] = \beta + \sum_{k=1}^{K} Z^{\text{psychologist}}_{ik} \, \lambda_k \qquad\qquad\qquad (1c)$$

$$\text{Logit [Utilization}_{\text{medication}}] = \beta + \sum_{k=1}^{K} Z^{\text{medication}}_{ik} \, \eta_k \qquad\qquad\qquad (1d)$$

In the above regression models, the Z^{GP}, $Z^{\text{Psychiatrist}}$, $Z^{\text{Psychologist}}$, and $Z^{\text{Medication}}$ matrixes contain variables in: demographics (i.e., age, gender, marital and immigrant status); socio-economics (i.e., education, employment status, and household income); health status (i.e., self-perceived physical/ mental health, presence of chronic condition(s), psychological distress level, and the presence of selected mental disorder(s)); community factor (i.e., rural residency), and

economic indicators (i.e., prescription drug coverage). Logistic regression models were used to produce the estimates of α, θ, λ, and η.

3.6.1.2 Frequency in service use equation

In the second model, the demand response was the frequencies in utilization as a count variable for each type of mental care service, conditional on being used at least once. The frequencies in utilization for each type of MHC service were then separately estimated from the respondents' self-reported quantities of mental health consultations with GPs, psychiatrists, and psychologists. From the public health literature, a Poisson regression was found to be the most widely used method for modeling the count data (Moineddin et al., 2011). A crucial assumption in the Poisson distribution specification is that mean or expected counts and variance of Y have to be equal to μ, known as "equi-dispersion". The validity of this assumption must be tested before adopting the Poisson distribution (Greene, 2012).

Three Poisson regression models were set up to estimate the frequency of mental health consultations made by service users. Let Y be the outcome variable indicating the number of visits an individual made to his or her GP, psychiatrist, or psychologist within the 12 months prior to the survey. Y has a Poisson distribution with μ (>0) if:

$$Pr\ (Y = y|\ \mu) = \exp\ (-\mu)\ \mu^{y}\ /\ y! \tag{2}$$

The Poisson post-estimation, goodness-of-fit test was used to test the property of the Poisson distribution, and whether or not the mean is equal to variance for each frequencies-in-utilization model. Significant p-values for the three frequencies-in-utilization models (p^{GP} |$p^{Psychiatrist}$ | $p^{Psychologist}$ <0.0001) indicated that the variances are expected to be greater than the means and the actual confidence intervals for Incidence Rate Ratios (IRRs) are wider than those

reported in the Poisson regression results. The above test results show that negative binomial regressions are more appropriate for the collected data (Greene, 2012).

The negative binomial density is a standard, popular choice in empirical studies of physician visits (Page 809, Greene, 2012, Cameron & Trivedi, 1998, Urbanoski, et al., 2017). The outcomes of interest in these regressions are non-negative integers: number of visits to MHC providers. In the current analysis, we assume that each of the counts follows a negative binomial distribution with mean λ and variance $\alpha\lambda^2$:

$$\Pr[Y = y[\lambda, \alpha] = [\Gamma(\alpha^{-1} + y) / (\Gamma(\alpha^{-1}) \Gamma(y + 1))] (\alpha^{-1} / \alpha^{-1} + \lambda)^{\alpha-1} (\lambda / \lambda + \alpha^{-1}) \quad (3)$$

3.7   Analytical Method

All analyses were conducted using the CCHS-MH (2012) confidential master files from the Research Data Centre at the University of Alberta. The analyses were performed using STATA 13 software. Survey sampling weights were applied, so that the analyses would be representative of the entire Canadian population. Bootstrap weights were also applied to account for the complex survey design as recommended by Statistics Canada (2014).

3.8   Econometric Approaches

Two steps were taken to ensure the validity of all assumptions made when estimating the demand and utilization for MHC. The first special issue is the potential problem of including health insurance coverage as a covariate (Zurekas & Fleishman, 2008). Individuals may self-select themselves into health insurance with various coverages, and the level of coverage selected may be partially based on that person's attitude toward health risk (Ayyagari & Shane, 2015). The omission of the unobservable "attitude" for a person's health risk could lead to a biased estimation if insurance coverage is correlated with the residual, ε.

When adverse selection is present, it is impossible to discern whether the observed greater demand for mental health services is due to the effects of more generous insurance coverages, or to people with poorer mental health status. Attempts to test, reduce and correct for adverse selection problems in demand analysis on mental health services have been documented by literature from the U.S. (McGuire, 1981, Wells, 1990, Lu, Frank & McGuire, 2008), however, empirical evidence addressing the importance of adverse selection in the Canadian universal healthcare system was lacking (see Chapter 2, section 2.4.2).

3.8.1 Testing adverse selection

An observed relationship between insurance coverage could be the result of adverse selection (Wells, 1990). To address the potential adverse selection issue, the determinants for having prescription drug coverage were analyzed separately; and particular attention was focused on the relationship between a variety of indicators of health status and the likelihood of holding a drug coverage plan. The following test procedures were performed: initially, a "naïve" logistic model was set up that treated the binary insurance coverage indicator as the outcome variable. The residual of the regression was saved. A full model estimation of the utilization of MHC services was then constructed, which included the residual from the previous regression in the model as a right-hand side variable. The significance of the estimated coefficient for that residual determines the existence of the adverse selection problem (Greene, 2012). The result of the Durbin-Wu Hausman test shows that the insurance coverage variable is in fact exogenous to MHC utilization. Based on these results, no evidence was found for adverse selection. In this case, the instrumental variable (IV) approach, or the two-stage least square (2SLS) estimator was not necessary (Greene, 2012).

3.8.2 Testing for over-dispersion

While comparing Poisson vs. Negative Binomial specifications, a "goodness-of-fit" test was used to test the assumption that expected means and variances were indeed equal; significant p-values indicate that the assumption of equi-dispersion was violated. Therefore, the results of this test confirm that the Negative Binomial specification is more appropriate than the Poisson specification for this particular data. Critical values from the "estat gof" test was commended in STATA. A likelihood ratio test was also used to compare the Poisson and Negative Binomial tests. Based on the results, the negative binomial specification (equation (3)) was adopted to estimate the frequency in MHC service utilization.

3.9   Results

3.9.1   Descriptive analysis

The complete CCHS-MH sample consisted of 25,113 respondents; however, only 2,443 individuals (or 9.7%) of the survey respondents reported using any of the mental health services from the selected providers. In 2012, 9.6% of the respondents had taken prescribed medication for mental health reasons. On the population level, mental health services were most often sought from general practitioners (GPs) (6.8%), followed by visits to psychiatrists (2.2%) and psychologists (2.4%). In addition, 2,501 individuals (10%) incurring positive out-of-pocket expenditures, with 9.85% (N = 2,464) incurred less than $5,000 (mainly for psychotropic medication) per person within the 12 months prior to the survey, and 0.15% (N = 37) incurring $5,000 or more.

Tables 3-1 and 3-2 show the prevalence of mental disorders, and some statistics that are related to mental health service utilization. During the 12 months prior to the CCHS-MH interviews, 10.1% of Canadians age 15 and older reported symptoms consistent with at least one

of the six mental or substance use disorders (Statistics Canada, 2013). Table 3-1 shows the

prevalence, by gender, of the mental disorders (depression, bipolar, generalized anxiety

disorders, any mood disorder) and drug and alcohol abuse or dependence symptoms.

As shown in Table 3-1, females were more likely to be screened positive for selected

mental disorders. On the other hand, males were more likely to meet the criteria for any

substance disorder, such as alcohol, cannabis, or other drug abuse or dependence.

Table 3-1: 12-month prevalence of selected mental and addictive disorders by gender.

12-month prevalence	Male		Female	
	Raw count (number of CCHS survey respondents selected)	Sample weighted proportion (population inflated to approximate 28 million)	Raw count (number of CCHS survey respondents selected)	Sample weighted proportion (population inflated to approximate 28 million)
Depression	467	1.8%	852	2.9%
General Anxiety Disorder	247	1%	501	1.6%
Mania	116	0.5%	153	0.6%
Hypomania	117	0.5%	116	0.4%
Bipolar	185	0.8%	198	0.7%
Any mood disorder	546	2.1%	941	3.2%
Alcohol abuse or dependence	527	2.3%	259	0.9%
Drug abuse or dependence (including cannabis)	302	1.2%	170	0.5%
Any substance use disorder	721	3.1%	388	1.2%
Any other selected disorder	1,237	5.1%	1,427	4.7%

From Table 3-2, individuals who screened positive for selected mental disorders were

more likely to be younger women, Canadian-born, urban residents, single or non-co-inhabiting,

and with a lower household income. Most of these individuals had a chronic health condition,

poorer self-perceived health, and significantly higher prevalence for contacting mental health

professionals.

Compared to the entire Canadian sample, individuals who met the criteria for any

substance use disorders, alcohol or drug abuse and dependence were more likely to be younger

men, not married/co-inhabiting, non-immigrant, and with higher household incomes. Compared

to the respondents with a selected mental disorder, respondents in the substance use sub-sample

group reported making significantly fewer visits to healthcare professionals, such as a GP,

psychiatrist, or psychologist, to discuss their mental health issues (Table 3-2).

Table 3-2: Demographic, socio-economic, health status, and mental health service utilization in
the CCHS-MH 2012 by respondents using diagnostic screening results.

Sample weighted proportion based on study population*	Characteristics of respondents*, % or mean (95% CI)	Characteristics of sample* with a Major Depressive Episode, a Bipolar Disorder or an Anxiety disorder (past 12 months)	Characteristics of sample* with any alcohol/drug/substance use disorder (past 12 months)	Characteristics of sample* with co-morbidity of mental and substance use disorders (past 12 months)
Mean Age	45.9 (45.7 – 46)	40.1 (39– 41.3)	32.5 (31.1– 34)	32.5 (29.9 – 35)
% Female	50.9 (50.7 – 51.1)	60.4 (56.5 – 64.3)	28.8 (24.9 – 32.7)	44.1 (35.1 – 53.1)
% Married or cohabiting	60.7 (59.8 – 61.7)	44.1 (40.4 – 47.9)	35.1 (30 – 40.3)	28.6 (19.4 – 37.8)
% Immigrant	25.1 (23.8 – 26.4)	17(13.8 – 20.2)	9.2 (6.4 – 11.9)	10.8 (4.8 – 16.8)
% Employed	64.5 (63.7– 65.3)	59.3 (55.8 – 62.8)	74 (70.2 – 77.8)	65.7 (56.8 – 74.5)
% High School Completed	77.1 (76.3 – 78)	77.1 (74.2 – 80)	74.3 (70.6 – 78.1)	68 (59 – 77)
Mean Household Income	$80,999 ($78,647 - $83,350)	$69,442 ($53,420 - $85,464)	$81,698 ($75,385 - $88,010)	68,436 (54,769 – 82,102)
% with Chronic condition	59.1 (58 – 60.1)	84.4 (81.7 – 87.1)	59.4 (54.8 – 64)	85.8 (79.5 – 92.1)
% Full/Part coverage for prescribed medicine	78.1 (77.1 – 79)	78.9 (75.8 – 82.1)	72.2 (68 – 76.3)	73.4 (64.7 – 82.1)

% residing in rural community	17.6 (16.1 – 19)	14.3 (11.8 – 16.8)	16.1 (11.6 – 20.6)	9.3 (5 – 13.7)
% perceived in good health	89.9 (89.3 – 90.5)	69.8 (66.4 – 73.2)	86.4 (83.6 – 89.3)	70.8 (62.4 – 79.2)
% had GP mental health visit	6.7 (6.2 – 7.2)	43 (39.2 – 46.8)	14.1 (10.8 – 17.4)	37.3 (27.5 – 47)
% had a psychiatrist visit	2.2 (2 – 2.4)	18.1 (15.3 – 20.8)	7.3 (4.7 – 9.8)	23.2 (14.6 – 31.7)
% had a psychologist visit	2.4 (2.1 – 2.7)	16.6 (13.4 – 19.7)	6.1 (4.2 – 7.9)	13.8 (7.9 – 19.8)
% had taken MH medication	9.6 (9.0 – 10.2)	49.0 (45.3 – 52.7)	18.7 (15.3 – 22.1)	48.3 (39.2 – 57.3)
Out-of-pocket expenditure ($)	53.6 (47.5 – 59.6)	292.8 (237.5 – 348)	102.1 (72.9 – 131.3)	267.4 (180.7 – 354)

*CCHS total respondents from age 15 and older who provided valid responses (non-responses were removed) for all the variables of interest in the above table, further sub-sampled by mental illness and substance dependent/abuse.

Respondents with co-morbid mental and addictive disorders were less likely to be married or have completed high school education. Compared to the respondents with only a mental disorder or addictive disorder, this group of individuals had the highest proportion with at least one chronic condition, lived in an urban community, and had the lowest household incomes (Table 3-2).

3.9.2   Modelling analysis of the data

The results of stage I regression analysis (n = 25,113) show the probability of using prescribed psychotropic medications, or receiving MHC services from GPs, psychiatrists, or psychologists (Table 3-3 (a-d)). The columns contain the odds ratio and 95% CI for each MHC service provider using four-stage specification of independent variables.

We first estimate the base model specified in Eq. (1) (column 1) and then add additional controls to evaluate the robustness of our results. Specifically, the regression in column 2 adds

quintiles of education and income, while column 3 adds indicators for individual health status,

and column 4 further uses the indicators of prescription drug coverage and rural residency.

Table 3-3a: Logistic regression of the effect of demographic, socio-economics, health status, and economics variables on demand for GP mental health services.

Logistic regression results	Effect of demographic variables on demand for GP mental health services	Effect of demographics, and socio-economics variables on demand for GP mental health services	Effect of demographics, socio-economics, and health status variables on demand for GP mental health services	Effect of demographics, socio-economics, health status, community and economic factors on demand for GP services
Female	1.94*** (1.64 – 2.30)	1.80*** (1.51 – 2.14)	1.82*** (1.52 – 2.18)	1.79*** (1.50 – 2.15)
Married or cohabiting	0.67*** (0.58 – 0.79)	0.80*** (0.67 – 0.95)	0.99 (0.83 – 1.17)	0.98 (0.82 – 1.17)
Child & youth (age 15 to 21)	0.63*** (0.47 -0.85)	0.64**(0.46 – 0.91)	0.77 (0.54 – 1.09)	0.76 (0.53 – 1.09)
Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	1.36*** (1.09 – 1.69)	1.38*** (1.11 – 1.72)	1.23 (0.96 – 1.58)	1.21 (0.94 – 1.54)
Old adults (age 50 to 64)	1.19 (0.95 – 1.49)	1.09 (0.87 – 1.37)	1.16 (0.91 – 1.49)	1.14 (0.90 – 1.45)
Seniors (65 or older)	0.63*** (0.49 – 0.81)	0.41*** (0.31 – 0.54)	0.66** (0.48 – 0.91)	0.64*** (0.46 – 0.88)
Immigrant	0.49*** (0.39 – 0.62)	0.44*** (0.35 – 0.56)	0.62*** (0.48 – 0.78)	0.63*** (0.49 – 0.81)
Employed		0.59*** (0.49 – 0.71)	0.79** (0.65 – 0.97)	0.79** (0.64 – 0.97)
Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		1.02 (0.78 – 1.34)	1.13 (0.84 – 1.53)	1.12 (0.83 – 1.53)
Some post-secondary education		1.31 (0.93 – 1.85)	1.32 (0.93 – 1.87)	1.31 (0.92 – 1.86)
Post-secondary graduation		1.30** (1.01 – 1.66)	1.52*** (1.17 – 1.96)	1.49*** (1.15 – 1.93)

Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		0.86 (0.67 – 1.10)	1.10 (0.86 – 1.42)	1.11 (0.86 – 1.43)
Household Income $50,000 to $89,999		0.72*** (0.58 – 0.89)	1.09 (0.85 – 1.39)	1.07 (0.83 – 1.37)
Household Income $90,000 and more		0.54*** (0.42 – 0.69)	0.98 (0.75 – 1.26)	0.93 (0.71 – 1.21)
Perceived good health			0.63*** (0.50 – 0.80)	0.64*** (0.51 – 0.81)
with Chronic condition			3.30*** (2.55 – 4.26)	3.26*** (2.53 – 4.22)
Any selected mental disorder (12 months)			4.89*** (4.05 – 5.90)	4.93*** (4.08 – 5.96)
Low distress level			Ref.	Ref.
Medium distress level			3.16*** (2.60 – 3.84)	3.16*** (2.60 – 3.84)
High distress level			5.61*** (4.0 – 7.88)	5.49*** (3.91 – 7.71)
Full/Part coverage for prescribed medicine				1.49*** (1.18 – 1.88)
Reside in rural community				0.88 (0.67 – 1.15)

Note: Dependent variable: Likelihood to have at least one visit to GP. * p < 0.10, ** p < 0.05, *** p < 0.01; Ref. stands for Reference Group.

Female gender was found to significantly increasing the odds to a GP visit for MH reasons, while being married, being recently employed, and being an immigrant were found to significantly decrease the odds (2nd column, Table 3-3a). In addition, being in the highest two income quantiles significantly lowers the likelihood of using a GP for a mental health consultation, compared to individuals in the lowest income quantile. Compared to young adults (age 22 to 34), being in the middle age category (age 35 to 49) was positively associated with GP mental health visits. This is in contrast to seniors (age 65 or older) who were negatively associated (OR = 0.64) with the probability of using these services (the difference was

significant). After controlling for measures of health status and economic factors, three socio-demographic variables, including female gender, senior, and immigrant status, were found to be significantly associated with mental health visits to GPs. Measures of individual-level health status and drug coverage indicators were found to be strongly associated with increased utilization for GP mental health services. The presence of chronic physical illness, mental disorder, and high or medium distress levels were identified to have very high and significant increased ORs (between 3.2 and 5.6) with GP services. (Table 3-3a)

Table 3-3b: Logistic regression of the effect of demographic, socio-economics, health status, and economics variables on demand for psychiatrist services.

Independent variables	Effect of demographic variables on demand for psychiatrist services	Effect of demographics, and socio-economics variables on demand for psychiatrist services	Effect of demographics, socio-economics, and health status variables on demand for psychiatrist services	Effect of demographics, socio-economics, health status, community and economic factors on demand for psychiatrist services
Female	1.42*** (1.12 – 1.80)	1.24* (0.98 – 1.58)	1.11 (0.86 – 1.42)	1.09 (0.85 – 1.41)
Married or cohabiting	0.42*** (0.33 – 0.54)	0.53*** (0.39 – 0.71)	0.64*** (0.47 – 0.88)	0.63*** (0.46 – 0.87)
Child & youth (age 15 to 21)	0.46*** (0.29 – 0.74)	0.38*** (0.21 – 0.67)	0.51** (0.28 – 0.95)	0.48** (0.25 – 0.89)
Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	1.26 (0.88 – 1.80)	1.27 (0.89 – 1.81)	0.95 (0.64 – 1.40)	0.92 (0.62 – 1.37)
Old adults (age 50 to 64)	0.92 (0.64 – 1.31)	0.73* (0.51 – 1.03)	0.72 (0.48 – 1.08)	0.69* (0.46 – 1.05)
Seniors (65 or older)	0.43*** (0.28 – 0.68)	0.19*** (0.11 – 0.30)	0.32*** (0.19 – 0.56)	0.31*** (0.18 – 0.53)
Immigrant	0.51*** (0.35 – 0.73)	0.43*** (0.29 – 0.62)	0.76 (0.51 – 1.14)	0.78 (0.53 – 1.17)
Employed		0.33*** (0.25 – 0.43)	0.45*** (0.34 – 0.61)	0.45*** (0.33 – 0.61)

Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		0.70* (0.46 – 1.05)	0.73 (0.47 – 1.16)	0.70 (0.44 – 1.11)
Some post-secondary education		1.11 (0.62 – 2.01)	1.09 (0.59 – 2.03)	1.08 (0.57 – 2.04)
Post-secondary graduation		1.11 (0.78 – 1.57)	1.31 (0.90 – 1.91)	1.25 (0.86 – 1.83)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		0.86 (0.62 – 1.20)	1.15 (0.78 – 1.72)	1.16 (0.77 – 1.75)
Household Income $50,000 to $89,999		0.72*(0.51 – 1.03)	1.24 (0.85 – 1.80)	1.22 (0.82 – 1.80)
Household Income $90,000 and more		0.48*** (0.30 – 0.78)	1.09 (0.65 – 1.82)	1.05 (0.61 – 1.78)
Perceived good health			0.71** (0.52 – 0.98)	0.71** (0.51 – 0.99)
with Chronic condition			6.14*** (2.93 – 12.87)	5.98*** (2.86 – 12.53)
Any selected mental disorder (12 months)			4.86*** (3.41 – 6.93)	4.89*** (3.42 – 7.0)
Low distress level			Ref.	Ref.
Medium distress level			2.66*** (1.88 – 3.79)	2.64*** (1.86 – 3.77)
High distress level			6.95*** (3.93 – 12.29)	6.79*** (3.77 – 12.22)
Full/Part coverage for prescribed medicine				1.76*** (1.17 – 2.65)
Reside in rural community				0.82 (0.56 – 1.20)

Note: Dependent variable: likelihood to have at least one visit to psychiatrist. * p < 0.10, ** p < 0.05, *** p < 0.01

Six socio-demographic variables: being married, child & youth (age 15 to 21), senior (age 65 or older), being employed, immigrant status, and being in the highest income quantile (annual household income $90,000 and more) were found to be negatively and significantly associated with utilized psychiatrist services (Table 3-3b). Similarly, four of these six socio-

demographic variables were found to significantly decrease the odds to use psychiatrists'

services (except being immigrant and the highest income quantile), after the model was

expanded to take into account health status and economic factors. The strongest associations

were with being senior (OR = 0.31) and being employed (OR = 0.45). Reporting mental health

visits to a psychiatrist was positively associated with the presence of chronic physical conditions

(OR = 5.98) and mental illness (OR = 4.89), and a higher distress level (OR = 6.79). Similarly,

drug coverage was found to significantly increase the likelihood (OR = 1.76) to visit a

psychiatrist (Table 3-3b).

Table 3-3c: Logistic regression of the effect of demographic, socio-economics, health status, and economics variables on demand for psychologist services.

Independent variables	Effect of demographic variables on demand for psychologist services	Effect of demographics, and socio-economics variables on demand for psychologist services	Effect of demographics, socio-economics, and health status variables on demand for psychologist services	Effect of demographics, socio-economics, health status, community and economic factors on demand for psychologist services
Female	2.23*** (1.75 – 2.85)	2.10*** (1.63 – 2.70)	2.11*** (1.64 – 2.70)	2.04*** (1.59 – 2.62)
Married or cohabiting	0.59*** (0.45 – 0.78)	0.65*** (0.48 – 0.87)	0.81 (0.61 – 1.08)	0.81 (0.61 – 1.09)
Child & youth (age 15 to 21)	0.54*** (0.36 – 0.81)	0.63** (0.42 – 0.93)	0.71* (0.48 – 1.04)	0.68* (0.46 – 1.01)
Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	0.98 (0.69 – 1.40)	0.99 (0.70 – 1.40)	0.88 (0.63 – 1.23)	0.86 (0.62 – 1.21)
Old adults (age 50 to 64)	0.51*** (0.35 – 0.75)	0.48*** (0.33 – 0.70)	0.59*** (0.40 – 0.87)	0.58*** (0.40 – 0.85)
Seniors (65 or older)	0.19*** (0.12 – 0.30)	0.15*** (0.09 – 0.25)	0.30*** (0.17 – 0.50)	0.28*** (0.17 – 0.48)
Immigrant	0.42*** (0.28 – 0.63)	0.38*** (0.25 – 0.58)	0.54*** (0.36 – 0.80)	0.54*** (0.36 – 0.81)

Employed		0.70** (0.53 – 0.92)	0.92 (0.69 – 1.24)	0.92 (0.68 – 1.24)
Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		1.05 (0.66 – 1.68)	1.16 (0.73 – 1.85)	1.16 (0.72 – 1.86)
Some post-secondary education		1.27 (0.79 – 2.03)	1.19 (0.72 – 1.96)	1.16 (0.70 – 1.94)
Post-secondary graduation		1.55** (1.04 – 2.33)	1.77*** (1.20 – 2.62)	1.72*** (1.16 – 2.56)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		1.06 (0.65 – 1.71)	1.15 (0.73 – 1.81)	1.14 (0.72 – 1.79)
Household Income $50,000 to $89,999		0.88 (0.62 – 1.25)	1.23 (0.83 – 1.83)	1.20 (0.80 – 1.80)
Household Income $90,000 and more		0.69* (0.46 – 1.03)	1.14 (0.75 – 1.73)	1.07 (0.69 – 1.65)
Perceived good health			1.33 (0.92 – 1.94)	1.33 (0.92 – 1.93)
with Chronic condition			2.32*** (1.73 – 3.10)	2.30*** (1.71 – 3.08)
Any selected mental disorder (12 months)			4.67*** (3.56 – 6.13)	4.66*** (3.54 – 6.13)
Low distress level			Ref.	Ref.
Medium distress level			3.24*** (2.48 – 4.24)	3.23*** (2.46 – 4.23)
High distress level			5.73*** (3.50 – 9.40)	5.60*** (3.42 – 9.16)
Full/Part coverage for prescribed medicine				1.67*** (1.22 – 2.29)
Reside in rural community				0.74* (0.54 – 1.02)

Note: Dependent variable: likelihood to have at least one visit to psychologist. * p < 0.10, ** p < 0.05, *** p < 0.01

Five socio-demographic variables were negatively associated with using psychologist services: being married, immigrant status, child or young adult, older adult (50 to 64 year) and seniors (65 year and older). Female gender was positively associated with utilizing psychologist

services in all models (OR = 2.04). After controlling for health status and economic factors, obtaining post-secondary graduation was found to significantly increase the likelihood to receive service from a psychologist (OR = 1.72), while being an older adult (age 50 to 64) (OR = 0.58) and senior (age 65 or older) (OR = 0.28), and being an immigrant (OR = 0.54) significantly lowers the odds for visiting a psychologist. Health status variables had the strongest associations with visiting a psychologist (ORs between 2.3 and 5.6) (Table 3-3c).

Table 3-3d: Logistic regression of the effect of demographic, socio-economics, health status, and economics variables on demand for prescribed psychotropic medication.

Independent variables	Effect of demographic variables on demand for prescribed psychotropic medication	Effect of demographics, and socio-economics variables on demand for prescribed psychotropic medication	Effect of demographics, socio-economics, and health statusvariables on demand for prescribed psychotropic medication	Effect of demographics, socio-economics, health status, community and economic factors on demand for prescribed psychotropic medication
Female	1.79*** (1.55 – 2.08)	1.67*** (1.44 – 1.94)	1.66*** (1.42 – 1.94)	1.64*** (1.41 – 1.92)
Married or cohabiting	0.68*** (0.60 – 0.78)	0.80*** (0.70 – 0.93)	0.97 (0.83 – 1.12)	0.96 (0.82 – 1.12)
Child & youth (age 15 to 21)	0.54*** (0.41 – 0.73)	0.52*** (0.38 – 0.72)	0.60*** (0.44 – 0.84)	0.60*** (0.43 – 0.83)
Young adults (age 22 to 34)	**Ref.**	**Ref.**	**Ref.**	**Ref.**
Middle age adults (age 35 to 49)	1.78*** (1.46 – 2.17)	1.83*** (1.49 – 2.24)	1.65*** (1.30 – 2.09)	1.61*** (1.27 – 2.04)
Old adults (age 50 to 64)	1.43*** (1.17 – 1.74)	1.31*** (1.07 – 1.59)	1.33** (1.06 – 1.67)	1.29** (1.03 – 1.62)
Seniors (65 or older)	1.03 (0.83 – 1.27)	0.65*** (0.51 – 0.82)	0.88 (0.67 – 1.16)	0.84 (0.64 – 1.11)
Immigrant	0.42*** (0.34 – 0.52)	0.38*** (0.31 – 0.47)	0.52*** (0.42 – 0.65)	0.54*** (0.43 – 0.67)
Employed		0.56*** (0.47 – 0.66)	0.71*** (0.59 – 0.86)	0.71*** (0.58 – 0.86)

Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		0.96 (0.77 – 1.20)	1.06 (0.81 – 1.40)	1.04 (0.79 – 1.37)
Some post-secondary education		1.42** (1.04 – 1.94)	1.42** (1.03 – 1.97)	1.39** (1.0 – 1.94)
Post-secondary graduation		1.23* (0.99 – 1.52)	1.40*** (1.10 – 1.78)	1.36** (1.07 – 1.73)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		0.80** (0.65 – 0.99)	0.97 (0.79 – 1.20)	0.96 (0.78 – 1.19)
Household Income $50,000 to $89,999		0.69*** (0.57 – 0.83)	0.99 (0.79 – 1.24)	0.96 (0.76 – 1.20)
Household Income $90,000 and more		0.58*** (0.47 – 0.72)	1.04 (0.82 – 1.32)	0.97 (0.76 – 1.24)
Perceived good health			0.80** (0.67 – 0.95)	0.80** (0.67 – 0.96)
with Chronic condition			6.41*** (4.93 – 8.34)	6.30*** (4.84 – 8.20)
Any selected mental disorder (12 months)			3.82*** (3.20 – 4.56)	3.81*** (3.19 – 4.56)
Low distress level			Ref.	Ref.
Medium distress level			3.22*** (2.74 – 3.79)	3.22*** (2.73 – 3.80)
High distress level			6.33*** (4.65 – 8.62)	6.42*** (4.71 – 8.74)
Full/Part coverage for prescribed medicine				1.57*** (1.28 – 1.92)
Reside in rural community				0.92 (0.74 – 1.14)

Note: Dependent variable: likelihood to have at least one prescription for a psychotropic medication. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Multiple socio-demographic factors were found to be strongly associated with the

likelihood of using prescribed psychotropic medication: females, being middle aged (age 35 to

49), and older adults (age 50 to 64) were significantly associated with a higher odds of using

psychotropic medication, compared to male gender and the young adult age categories (Table 3-

3d). Being married, and the child & youth (age 15 to 21) category, the seniors category (age 65 or older), immigrant status, and being employed were found to be significantly associated with a lower odds in utilization of any prescribed psychotropic medication. Similarly, being in the two highest household income categories were significantly associated with a lower odds of prescribed psychotropic medication utilization. After controlling for the self-reported health status and economic indicators, the income effect was not significant for psychotropic medication utilization. The strongest association was with the health status variables and both chronic conditions and high distress levels, which had ORs above 6. Moreover, drug coverage was found to significantly increase the likelihood (OR = 1.57) to use prescribed psychotropic medication. (Table 3-3d)

Tables 3-3 (a-d) present the results for the association of socio-economic factors with likelihood of any psychotropic medication use, and GP or specialist mental health visit. We found that female gender had significantly increased the likelihood of medication use, and GP and specialist visits. Nevertheless, this gender effect on MHC utilization from GPs was reduced as more control variables were included in the models and was in general between OR=1.42 and OR=2.23. We also found evidence of an age effect for all service use, though it varied between the service categories. The youngest (15 to 21 years) and the oldest (65 years or older) age groups were associated with significantly less psychotropic medication use and fewer specialist consultations, compared to the middle-age groups. Married individuals had fewer mental health consultations from GPs, compared to those who were never married or who were divorced/separated or widowed. In addition, immigrant status was found to decrease the likelihood to demand for mental health services from GPs and psychologists. Similarly, being employed was associated with lower odds of using physician mental health consultations and

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psychotropic medications. Moreover, full or partial coverage for prescribed psychotropic medication were found to be associated with an increased use of any selected MH services; the direction and magnitude of the insurance effect were similar in all models, with ORs ranging from 1.49 to 1.76.

Importantly, health indicators, such as self-perceived poor health, the presence of mental disorders or chronic conditions, and distress levels, were strongly associated with all service use categories. Adding additional control variables to the regression did not alter the main results.

Table 3-4a: Negative Binomial regression of the effect of demographic, socio-economics, health status, and economics variables on number of visits to GP mental health services.

Independent variables	Effect of demographic variables on demand for GP mental health services	Effect of demographics, socio-economics variables on demand for GP mental health services	Effect of demographics, socio-economics, health status variables on demand for GP mental health services	Effect of demographics, socio-economics, health status, community and economic factors on demand for GP services
	IRR	IRR	IRR	IRR
Female	1.90*** (1.37 – 2.62)	1.99*** (1.44 – 2.75)	1.78*** (1.30 – 2.44)	1.78*** (1.30 – 2.44)
Married or cohabiting	0.75* (0.55 – 1.03)	0.88 (0.64 – 1.21)	0.81 (0.56 – 1.17)	0.77 (0.54 – 1.10)
Child & youth (age 15 to 21)	0.84 (0.45 -1.59)	0.98 (0.49 – 1.96)	0.39*** (0.22 – 0.70)	0.40*** (0.22 – 0.71)
Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	1.98*** (1.35 – 2.88)	2.01*** (1.32 – 3.06)	1.15 (0.70 – 1.87)	1.13 (0.71 – 1.81)
Old adults (age 50 to 64)	1.77*** (1.21 – 2.59)	1.46** (0.87 – 1.37)	1.16 (0.72– 1.88)	1.16 (0.73 – 1.85)
Seniors (65 or older)	2.64* (0.96 – 7.29)	1.26 (0.63 – 2.55)	0.99 (0.57 – 1.72)	0.98 (0.57 – 1.71)
Immigrant	0.82 (0.53 – 1.29)	0.65** (0.43 – 0.97)	0.66** (0.46 – 0.93)	0.72* (0.50 – 1.03)
Employed		0.54***	0.92 (0.66 – 1.28)	0.89 (0.64 – 1.23)

		(0.38 – 0.77)		
Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		0.81 (0.43 – 1.50)	1.28 (0.74 – 2.22)	1.31 (0.76 – 2.26)
Some post-secondary education		1.06 (0.53 – 2.12)	1.81 (0.76 – 4.30)	1.81 (0.75 – 4.36)
Post-secondary graduation		1.04 (0.57 – 1.91)	1.41*** (0.91 – 2.21)	1.44* (0.94 – 2.19)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		1.65 (0.87 – 3.14)	1.22 (0.76 – 1.95)	1.25 (0.77 – 2.02)
Household Income $50,000 to $89,999		0.81 (0.55 – 1.21)	1.30 (0.84 – 2.03)	1.26 (0.80 – 1.97)
Household Income $90,000 and more		0.70 (0.45 – 1.09)	1.26 (0.75 – 2.10)	1.22 (0.72 – 2.06)
Perceived good health			0.42*** (0.28 – 0.64)	0.42*** (0.28 – 0.81)
with Chronic condition			3.11*** (2.11 – 4.59)	3.05*** (2.05 – 4.54)
Any selected mental disorder (12 months)			7.28*** (4.24 – 12.49)	7.65*** (4.57 – 12.80)
Low distress level			Ref.	Ref.
Medium distress level			3.92*** (2.90 – 5.32)	3.91*** (2.88 – 5.30)
High distress level			7.54*** (3.49 – 16.28)	7.00*** (3.25 – 15.12)
Full/Part coverage for prescribed medicine				1.55** (1.0 – 2.41)
Reside in rural community				0.90 (0.61 – 1.33)
Physician ratio (by provinces)				1.69 (0.61 – 4.65)

Note: Dependent variable: number of visits to GPs. * p < 0.10, ** p < 0.05, *** p < 0.01

Table 3-4b: Negative Binomial regression of the effect of demographic, socio-economics, health status, and economics variables on number of visits to psychiatrist services.

Independent variables	Effect of demographic variables on demand for Psychiatrist services	Effect of demographics, socio-economics variables on demand for Psychiatrist services	Effect of demographics, socio-economic, and health status variables on demand for Psychiatrist services	Effect of demographics, socio-economics, health status, community and economic factors on demand for Psychiatrist services
	IRR	IRR	IRR	IRR
Female	1.40 (0.84 – 2.31)	1.17 (0.76 – 1.81)	1.32 (0.81 – 2.14)	1.40 (0.89 – 2.20)
Married or cohabiting	0.36*** (0.21 – 0.64)	0.62** (0.39 – 0.98)	0.58** (0.35 – 0.96)	0.56** (0.34 – 0.90)
Child & youth (age 15 to 21)	0.77 (0.37 -1.59)	1.69 (0.77 – 3.70)	0.60 (0.26 – 1.36)	0.48* (0.21 – 1.10)
Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	2.92** (1.23 – 6.92)	1.75 (0.89 – 3.43)	0.56 (0.27 – 1.15)	0.48** (0.24 – 0.95)
Old adults (age 50 to 64)	1.15 (0.65 – 2.05)	0.68 (0.40 – 1.16)	0.50 (0.21 – 1.22)	0.47* (0.21 – 1.08)
Seniors (65 or older)	0.51* (0.25 – 1.05)	0.25*** (0.12 – 0.52)	0.39* (0.15 – 1.05)	0.36** (0.14 – 0.90)
Immigrant	0.91 (0.50 – 1.66)	0.69 (0.37 – 1.31)	0.91 (0.45 – 1.85)	0.88 (0.43 – 1.79)
Employed		0.36*** (0.21 – 0.61)	0.50*** (0.30 – 0.84)	0.55** (0.33 – 0.91)
Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		0.81 (0.43 – 1.50)	0.91 (0.44 – 1.87)	0.85 (0.42 – 1.72)
Some post-secondary education		1.06 (0.53 – 2.12)	0.73 (0.28 – 1.89)	0.70 (0.28 – 1.74)
Post-secondary graduation		1.04 (0.57 – 1.91)	2.01** (1.17 – 3.43)	1.82** (1.05 – 3.13)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		0.76 (0.39 – 1.46)	0.62 (0.33 – 1.15)	0.55* (0.30 – 1.02)

Household Income $50,000 to $89,999		1.05 (0.45 – 2.48)	1.91* (0.97 – 3.77)	1.55 (0.79 – 3.02)
Household Income $90,000 and more		1.89** (1.09 – 3.29)	0.66 (0.30 – 1.43)	0.61 (0.28 – 1.33)
Perceived good health			0.96 (0.57 – 1.63)	0.96 (0.58 – 1.58)
with Chronic condition			8.10*** (4.17 – 15.71)	7.74*** (4.05 – 14.80)
Any selected mental disorder (12 months)			13.85*** (8.02 – 23.91)	16.76*** (9.49 – 29.59)
Low distress level			Ref.	Ref.
Medium distress level			4.87*** (3.01 – 7.88)	4.29*** (2.68 – 6.87)
High distress level			16.65*** (5.79 – 47.86)	12.72*** (4.91 – 32.95)
Full/Part coverage for prescribed medicine				2.76** (1.58 – 4.81)
Reside in rural community				0.78 (0.46 – 1.34)

Note: Dependent variable: number of visits to psychiatrist. * p < 0.10, ** p < 0.05, *** p < 0.01

Table 3-4c: Negative Binomial regression of the effect of demographic, socio-economics, health status, and economics variables on number of visits to psychologist services.

Independent variables	Effect of demographic variables on demand for Psychologist services	Effect of demographics, socio-economics variables on demand for Psychologist services	Effect of demographics, socio-economic, and health status variables on demand for Psychologist services	Effect of demographics, socio-economics, health status, community and economic factors on demand for Psychologist services
	IRR	IRR	IRR	IRR
Female	3.40*** (2.24 – 5.17)	3.53*** (2.37 – 5.25)	2.95*** (2.0 – 4.35)	2.74*** (1.89 – 3.97)
Married or cohabiting	0.55*** (0.37 – 0.81)	0.53*** (0.36 – 0.78)	0.56*** (0.37 – 0.87)	0.61** (0.37 – 0.99)
Child & youth (age 15 to 21)	0.50** (0.28 -0.91)	0.76 (0.38 – 1.52)	0.74 (0.38 – 1.44)	0.73 (0.36 – 1.47)

Young adults (age 22 to 34)	Ref.	Ref.	Ref.	Ref.
Middle age adults (age 35 to 49)	2.19** (1.13 – 4.24)	2.62*** (1.40 – 4.91)	1.12 (0.58 – 2.17)	1.10 (0.62 – 1.95)
Old adults (age 50 to 64)	0.65 (0.38 – 1.10)	0.60** (0.38 – 0.97)	0.63* (0.37 – 1.08)	0.66 (0.38 – 1.17)
Seniors (65 or older)	0.13* (0.08 – 0.24)	0.09*** (0.04 – 0.20)	0.32*** (0.15 – 0.70)	0.28*** (0.13 – 0.62)
Immigrant	0.45** (0.23 – 0.90)	0.29*** (0.15 – 0.57)	0.20*** (0.11 – 0.36)	0.31*** (0.16 – 0.60)
Employed		0.37*** (0.21 – 0.67)	0.83 (0.51 – 1.35)	0.74** (0.44 – 1.23)
Less than high school graduation		Ref.	Ref.	Ref.
High school graduation		2.24* (1.01 – 4.95)	1.36 (0.75 – 2.47)	1.40 (0.75 – 2.63)
Some post-secondary education		1.52 (0.74 – 3.13)	1.05 (0.55 – 1.97)	1.03 (0.54 – 1.98)
Post-secondary graduation		2.28*** (1.25 – 4.14)	2.92*** (1.75 – 4.86)	2.65*** (1.55 – 4.53)
Household Income $29,999 or less		Ref.	Ref.	Ref.
Household Income $30,000 to $49,999		1.04 (0.55 – 1.94)	0.64 (0.36 – 1.12)	0.70 (0.38 – 1.31)
Household Income $50,000 to $89,999		0.80 (0.49 – 1.32)	0.71* (0.43 – 1.18)	0.71 (0.42 – 1.19)
Household Income $90,000 and more		0.69** (0.38 – 1.26)	0.95 (0.49 – 1.83)	0.92 (0.48 – 1.74)
Perceived good health			1.23 (0.72– 2.12)	1.12 (0.64 – 1.97)
with Chronic condition			2.47*** (1.51 – 4.06)	2.88*** (1.81 – 4.58)
Any selected mental disorder (12 months)			6.63*** (4.46 – 9.86)	6.09*** (3.86 – 9.63)
Low distress level			Ref.	Ref.
Medium distress level			3.25*** (2.26 – 4.68)	3.19*** (2.19 – 4.66)
High distress level			83.23*** (18.91-366.32)	67.11*** (15.38 – 292.82)
Full/Part coverage for prescribed medicine				1.70** (1.04 – 2.78)

Reside in rural community				0.60** (0.38 – 0.95)
Psychologist ratio (by provinces)				5.32*** (2.71 – 10.42)

Note: Dependent variables: number of visits to psychologist. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We further examined the associations between the covariates and the frequency of GP and specialist visits among service users, and found that each of the need factors (e.g., proxies for the presence of chronic condition(s), mental disorder(s), and higher distress level) had the strongest association with frequency in mental health services utilization.

Tables 3-4 (a-c) show that women tend to visit more GPs (IRR = 1.78) and psychologists (IRR = 2.74) for mental health conditions, though the association between gender and psychiatrist consultations is relatively small. Individuals with drug coverage are likely to make more frequent visits to any type of mental health service provider with the highest Incidence Rate Ratio (IRR) for psychiatrists (IRR = 2.76). In addition, people who are employed tend to make fewer visits to GPs and specialists, compared to unemployed individuals (IRRs from 0.55 to 0.89). Respondents with post-secondary graduation made somewhat more visits to specialists and GPs with the highest IRR for psychologist consultation (IRR = 2.65), while other education variables were not significant. The data shows no evidence that income was associated with changes in the likelihood and frequency of visiting a GP or specialist for mental health reasons.

3.10   Discussion

This chapter estimates the use patterns for mental health services in Canada based on the associations between various socio-demographic, health status, and economic factors on the utilization of mental health services. The main findings of the current study suggest that, for the general population in Canada, indicators of mental health needs, including diagnosis and distress

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levels, are independently and significantly associated with the likelihood and level of use of all selected mental health services. We also found a marked association between several socio-demographic factors and the use of mental health services. Female gender had a significantly increasing association, while being senior, having immigrant status, and being employed significantly decreased the odds and the level of visits to a mental health services provider. Similarly, being in the youngest age group (aged 15 to 21) with immigrant status and being employed, significantly decreased the odds of using prescribed psychotropic medications within 12 months prior to the survey. On the other hand, having post-secondary education and insurance coverage significantly increased the likelihood and level of mental health visits. Household income was not found to be independently associated with mental health use in the context of the universal healthcare system. Finally, the psychologist-to-physician ratio (e.g., number of psychologists as a proportion to total physicians practice in a province) was found to be positively and significantly associated with an increased number of visits to psychologists.

The data for this analysis was derived from the Canadian Community Health Survey (CCHS-MH). The advantage of using this population health survey is that it provides comprehensive insight and is a reliable estimate of the most current situation for mental illness in the Canadian provinces, especially with regards to the prevalence of mental and substance use disorders, mental health determinants, utilization of services, and the perceived need for care. In this study, we used the presence of mental disorder and distress as a proxy for the individual needs for mental health services. In the CCHS-MH survey, the respondents' mental health conditions were assessed through diagnostic interviews to determine whether or not individuals met the criteria for having a mental disorder. This use of psychiatric measures for mental health status has been well validated and widely used internationally in population surveys (Steele et

al., 2007; Kessler & Ustun, 2004); however, meeting the criteria for a diagnosis is not equivalent to a clinical diagnosis (Urbanoski et al., 2017) and it could be subject to such errors as recall bias. Despite its wide use in population survey analyses, the self-reported number of mental health visits from the CCHS-MH has been questioned for its accuracy (Steele et al., 2007). For example, the over-reporting of psychiatric visits tends to occur in analyses of self-reported numbers of healthcare visits (Steele et al., 2007). Rhodes and colleagues (2004) compared self-reported mental health service visits to administrative service use records and found that individuals with higher distress levels tended to over-report their frequency of service use. Moreover, people may have mental health conditions that are not included in the CCHS-MH questionnaire. In addition, Vasiliadis et al. (2005) pointed out that indicators for other dimensions of mental health, such as disability or suicidal ideation or attempt, could also be considered as indicators of mental health needs.

Our study provides evidence for a "treatment gap" in mental healthcare (MHC) service utilization. According to the results from the CCHS-MH, about 9.7% of Canadians over 15 years old were users of mental health services in 2012 for GP, psychiatrist, or psychologist consultations, while an additional 4.1% of the population (representing approximately 1.2 million Canadian adults) perceived a need to use MHC services but did not utilize them. Sunderland and Findlay (2013) indicated that 9.1% of the population had perceived needs for psychotropic medication, but their needs for medication were reported to be either unmet or only partially met. In 2012, 34.4% of the respondents had unmet needs for MHC, and screened positive for selected mental disorders, while 82.3% experienced high or medium levels of distress. Consistent with previous Canadian studies, we found that people with mental health needs were most likely to use services, but also made more visits in the 12 months prior to the

survey (Vasiliadis et al., 2005, Lefebvre et al., 1998). Each of the proxies for mental health needs (the presence of a chronic condition, mental disorder, and high or medium distress level) were positively and statistically significantly associated with the likelihood and frequency of using mental health services in FY 2012.

Based on our results, having prescription drug insurance is positively associated with the likelihood and frequency of utilizing prescribed psychotropic medication and mental health consultations with GPs and specialists. In most models, the increased likelihood is from 50% to 80% in terms of using services. This association can be seen in both publicly funded and privately funded services (e.g., psychologists) and for most psychotropic medications. To the best of our knowledge, this is the first Canadian study deconstructing the association between specific factors and the use of mental health services across various financing types in the context of the universal healthcare system. An important topic for future research would be to evaluate the extent to which prescription drug coverage, either by private insurance or by extending the public drug plan to cover psychotropic medications, might influence the choice of mental health service providers and the frequency of their use.

Our results indicate that mental health service utilization is distributed differently across various service providers, based on the different background characteristics of respondents. After adjusting for indicators of MH needs, seniors aged 65 or older were less likely than any other adult age group to use mental health services from any selected healthcare provider; and after seniors began their mental health consultations, they tended to make significantly fewer visits to GPs and psychologists. In addition, we found that Canadian women used more GP and psychologist consultation services, compared to the services used by men. Our observation that women used more MH services is consistent with the finding from a European study conducted

in the Netherlands (Bijl & Ravelli, 2000). However, this result is not consistent with the finding from Horgan (1986) and Lu, Frank, and McGuire (2008), who both found no significant gender effect in the probability and level of specialty MH service use.

Our results also reveal some associations between socioeconomic status and MH service utilization. People who had completed post-secondary education were more likely to access almost all forms of mental health care in terms of likelihood and frequency of use. Nevertheless, the differences between other education categories were small; individuals with at least some post-secondary education had higher odds of using prescribed psychotropic medication while in other service categories, the results were similar to the subgroup with less than high school education. This association may be explained by the observation that education level affects MH services through literacy and other factors that may influence access or whether or not a referral is made and followed (Urbanoski et al., 2017). Immigrant status was found to be associated with a significant decrease in the likelihood of visiting a GP or psychologist for a mental health consultation, highlighting the possible influence of barriers of language, information channels, and cultural differences faced by immigrants. This result could be further explained by the healthy immigrant health effect: Statistics Canada Health survey data confirms the presence of a healthy immigrant effect in the area of mental health. Since immigrants undergo a health examination and are therefore considered to be healthy at arrival, their condition would converge toward the Canadian norm over time. In particular, recent immigrants have been found to have the lowest risk for depression and alcohol dependence (Ng & Omariba, 2010). In contrast, previous research focusing on refugees or recent immigrants from various war-torn countries has revealed that this specific sub-group of immigrants experiences a higher level of psychiatric and

substance use disorders (Ali, 2002). Generally, immigrants have been found to be mentally healthy at arrival and thus use less MH services.

The descriptive analysis showed that people with the lowest household incomes used more mental health services, compared to the entire Canadian sample of the CCHS-MH. Our results indicate that household income, a key indicator of socioeconomic inequity in many public health reports conducted in developed countries (Van Doorslaer, et al., 2006, Bijl & Ravelli, 2000), did not appear to be independently associated with MH service use when the models include mental health needs and health care system variables. This is true even though not all forms of mental health services are covered by the Canadian universal healthcare system. Our finding that household income is not independently associated with the use of mental health services is consistent with previous analyses conducted in Canada and the US that used community health survey data (Steele et al., 2007; Horgan, 1986; Taube et al., 1986).

After controlling for other socioeconomic factors and indicators of MH needs, we found significant negative associations between recent employment status and the likelihood of visiting a GP or psychiatrist. The effects of employment on visits to psychologists were small and not significant. However, when people made a mental health visit, recently employed respondents tended to make significantly fewer visits to psychologists and psychiatrists. In Canada, most employed individuals have private health insurance that covers private MH services, such as a psychologist consultation at a private clinic. We hypothesize that the insurance coverage indicator is capturing some of the difference between employed and not-employed populations as well as some income effect in this study. Because having health insurance is very common (78%) among the CCHS-MH respondents, it was not possible to analyze this effect further in this study.

The marginal cost of investment in healthcare was documented as a function of the monetary price or out-of-pocket price for the MH services to an individual, as well as the time cost to access the services (Haas-Wilson et al., 2001). In this study, the psychologist-to-physician ratio served as a proxy for the availability of mental health service providers. An increase in availability of psychologists relative to different types of physicians may decrease the time costs (i.e., travel and waiting time costs) for outpatient mental health services from psychologists. We found an important association between the psychologist-to-physician ratio and psychologist visits. This ratio implies the importance of supply-side effects on the demand, such as the availability of psychologists by geographical region. Our result is also consistent with the Bandwagon effect – a higher psychologist-to-physician ratio reflects a greater acceptance of the psychologist consultation, leading to increased utilization of mental health services for people with need.

3.11   Limitations

A few limitations should be kept in mind when examining these results. First, the CCHS-MH has a cross-sectional design; thus, causal relationships cannot be determined between mental health service utilization and their determinants. Second, no measure was made of the service pathways or collaborations among MHC professionals, where consultations with a specialist may or may not have been initiated through a referral from a GP.

Furthermore, the time points of each consultation are missing from the cross-sectional dataset. Therefore, we were not able to distinguish persons who were chronic mental health patients from those who were first-time service users, since service utilization patterns could differ substantially for former users and new users, as would the incurred healthcare expenditures. Lacking information on utilization of services as a function of time may prevent

these results from being used to predict a change in the demand for MHC services over multiple years. Such information could be especially helpful in determining and planning future resource allocations.

Finally, according to the CIHI (2007), 23-67% of homeless people reported having mental illness. Because of the known relationship between homelessness and mental/substance use disorders (CIHI, Statistics Canada, 2007), the exclusion of the institutionalized and homeless population from the CCHS-MH may lead to an underestimation of actual mental health prevalence. Similarly, specific sub-group information was unavailable for the mental health needs for residents of reserve communities, where the rate of mental health and addiction problem is higher than in the general Canadian population. Therefore, the exclusion of these groups having a high prevalence of mental and addiction problems may lead to an underestimation of the needs and utilization for mental health services.

3.12   Conclusion

Our results suggest that the indicators of mental health needs, including diagnosis and distress levels, are the most important determinants of the likelihood and level of use of all selected mental health services. The association of socioeconomic variables for accessing mental health services was small, but it should be noted that the survey misses some potential high user sub-groups like homeless people and indigenous populations. The higher service use by females needs to be considered in the future planning for the specific types of mental health services included within this analysis. Last but not the least, insurance coverage reduces the personal cost while accessing care and encourages the use of MH treatment; therefore, an expansion of public coverage to include prescribed psychotropic medication and psychotherapy may bring the previously uninsured individuals in need of care into treatments.

Our results point to the need to develop a longitudinal database on mental health service utilization and spending, to estimate any causal effects that might exist between the covariates being studied and service use. When making decisions on policy or programs, the government should always take into account the best available evidence to ensure that MHC is effective and properly serving the population.

3.13   References for Chapter 3

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CHAPTER 4: PUBLIC EXPENDITURES FOR MENTAL HEALTH SERVICES IN CANADIAN PROVINCES[1]

4.1 Introduction

According to the Canadian Community Health Survey – Mental Health and Wellbeing survey, conducted by Statistics Canada in 2012, 10.1% or approximately 2.8 million Canadians aged 15 and older, experienced at least 1 mental or substance use disorder, including depression, bipolar disorder, generalized anxiety disorder, or alcohol, cannabis or substance abuse or dependence, in the 12 months prior to the survey. Statistics from the Mental Health Commission of Canada (MHCC) revealed that more than 6.7 million people in Canada are currently living with a mental disorder or illness (MHCC, 2017). Even though a number of public services and programs that target this group are provided with funding from a range of health and non-health Ministries, the magnitude of the expenditures are seldom estimated.

In an article in the *Canadian Journal of Psychiatry* in 2008, a wide variety of mental health costs per person and mental health expenditures as a percentage of total health expenditures were reported for the provinces. Jacobs et al. (2008) reported that total public and private mental health expenditures in Canada in 2003/4 amounted to $6.6 billion, of which $5.5 billion was from public sources. Furthermore, public mental health expenditures, a widely used indicator of mental health service availability, was about 6% of the total public health expenditures, with wide variations occurring between the provinces. In the interceding years, a great deal of attention was paid to this issue in reports by the Senate of Canada, the Parliament,

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and the MHCC (Canadian Senate, 2017; Parliament, 2017; MHCC, 2017). Nevertheless, any policies or programs to promote mental health were left to be implemented by each province. In this paper, we consider the publicly-funded health care costs associated with mental illness a decade after Jacobs et al. (2008) (fiscal year, [FY] 2003) estimated expenditures for publicly-funded mental health services. We consider data for FY 2013, the most recent year for which data is available, and compare the estimates to those of FY 2003.

4.2 Methodology for the Cost Estimates

4.2.1 Expenditure categories

We adapt a government or public perspective in our cost estimations, focusing on public mental health expenditures. We collected data for the following expenditure categories: general hospital stays, psychiatric hospital stays, as well as total clinical payments to physicians, community mental health centers, and pharmaceutical services. We adjusted the 2003-04 data for expenditures to 2013-14 dollars using the provincial Consumer Price Index (Statistics Canada, 2017). Expenditures for mental health services were expressed per capita and as percentages of total provincial health spending.

4.2.2 Cost Comparison

For Jacobs et al. (2008) and the present studies, hospital inpatient and physician billing data was obtained from the Canadian Institute for Health Information (CIHI) national databases and they were comparable for the years under examination. Pharmaceutical expenses for the study by Jacobs et al.'s (2008) were estimated based on information from provincial drug plans and the health ministries. For the present study; however, pharmaceutical expenses were obtained from the Intercontinental Marketing Services (IMS) health database. To compare the publicly funded proportion of the psychiatric drug costs for FY 2003 and FY 2013, we used the

public/private ratio for drug costs in both years in each province from the CIHI's National Health

Expenditure Trends, 1975-2016. In the study by Jacobs et al. (2008), outpatient mental health

services, such as community mental health services, were obtained from provincial sources or

from stand-alone reports. Because the relevant information for FY 2013 was not publicly

available, it was excluded from the cost comparison in the present study.

4.2.3   Hospitals

Inpatient costs for FY 2013 were estimated from the annual volume and average cost data

for mental health hospitalizations in psychiatric and general hospitals. Hospital inpatient costs

per inpatient case were estimated using the interactive database, the Patient Cost Estimator

(PCE), developed by CIHI (CIHI, 2016). The PCE provides estimated average costs per Case

Mixed Group (CMG) and average total length of stay (LOS) by CMG, by province and age

group. We included all cases reported in CIHI national PCE database that were in psychiatric-

related CMGs, from CMG 670 to 709. Although the PCE contains only costs for typical patients,

we applied the same cost *per day* for both typical and atypical cases (i.e., deaths, transfers, sign-

outs, and long-stay cases) in our analyses.

The PCE interactive tool focuses only on typical-only inpatients, or hospital patients

receiving a normal and expected course of treatment, which represents approximately 84% of all

inpatient cases. Atypical outcomes have been excluded from calculations for the estimated

average per patient cost (measured by Patient Cost Estimator, CIHI) (CIHI, 2017). Because we

wanted to include both typical and atypical inpatient costs, we estimated the total costs in two

steps: first, an average mental health-related inpatient cost per day was calculated using the total

reported typical inpatient costs for psychiatric inpatient cases and average total days reported for

each province. The resulting typical cost per day was used as an approximation for the average

total (typical and atypical) cost per day. To estimate the total inpatient costs, we used all inpatient days, including both typical and atypical cases that were in psychiatric-related CMGs, as reported in CIHI Hospital Mental Health Services Database (HMHDB), and multiplied this by the average cost per day (CIHI, 2016). The HMHDB contains data from all provinces in Canada in terms of total days stayed for mental health and addiction inpatient cases. HMHDB data was collected from administrative separation (discharge or death) records of psychiatric and general hospitals.

4.2.4 Clinical payments to physicians

Data for clinical payments for mental illness consultations was obtained from CIHI's National Physician Database (NPDB), 2014-15 data release (CIHI, 2016). The NPDB includes clinical payment data, where total payment refers to the sum of the physicians' clinical payments from fee-for-service and alternative payment systems, including salary, sessional, capitation, and blended payment methods. Fee-for-service payments are based on billing data submitted to the NPDB; alternative clinical payment data was collected through provincial and territorial Ministry of Health reports. In the NPDB, clinical payments to physicians is a product of services and unit fees.

Physician specialty designations were assigned and grouped by province and territory, though province-specific variations exist in grouping some of the specialists. In addition, the NPDB defines physician specialities by payment plan specialty (CIHI, 2016), which refers to a practice area in which the physician was paid for services; for example, psychiatry includes subspecialties such as neuropsychiatry. Physician specialities were grouped by province and territory; CIHI NPDB groups them according to their national equivalences.

In FY 2013, CIHI obtained information on fee-for-service payments for all provinces, and the information for alternative physician payments were for seven provinces. The data for alternative payments was missing for Nova Scotia and Alberta (CIHI, 2016). Alternative forms of clinical payment for psychiatrists in Nova Scotia and Alberta were thus excluded.

4.2.5 Pharmaceuticals

Psychotropic drugs are defined as including psychotherapeutic outpatient prescription medications, such as anti-depressants, major and minor tranquilizers (e.g., antipsychotics), analeptics, sedatives, and other psychotherapeutic medications. Other psychotropic-related medications, such as medications for neurological disorders, as well as smoking cessation therapies were excluded. In addition, medications dispensed in hospitals or in psychiatric institutions were not included in this category.

The data for estimating publicly-funded drug expenditures was obtained from IMS Health Canada. IMS Health Canada maintains a national database that measures the number of prescriptions dispensed by Canadian retail pharmacies (IMS Health Canada). We obtained total retail sales volumes and dollar amounts for each province from the IMS CompuScript database. Sales information from IMS contains total psychotherapeutic drug expenditures. Medications covered by provincial drug plans were integrated with medications paid privately (either by out-of-pocket or through third-party private insurers). To distinguish the public portion from the total drug expenditures, we estimated the publicly-funded proportion of the prescription drug costs using information from the National Health Expenditure Trends, 1975-2016 from CIHI (CIHI, 2016).

4.2.6 Comparison with FY 2003 results

The cost estimates for the key service categories in this analysis were compared with the FY 2003 results (Jacobs, et al., 2008). The service categories used in comparing public mental health expenditure were: hospital inpatient stays, drugs, and physician services since this information has been reported consistently across provinces and over the years.

Jacobs et al. (2008) provided mental health service expenditures based on FY 2003; the cost estimates included pharmaceuticals by private and public sources. Therefore, we estimated the proportion of psychiatric drugs that were publicly-funded, based on the public/private ratio of all drug costs (including psychiatric and non-psychiatric drugs) in each province for FY 2003. We then adjusted the FY 2003 mental health service expenditures to 2013 dollars using the provincial Statistics Canada Consumer Price Index (Statistics Canada, 2017). We obtained per capita values for expenditures for both years by adjusting for provincial populations using data from Statistics Canada (Statistics Canada, 2017). The results for FY 2003 and FY 2013 were expressed per capita.

4.3   Results

4.3.1   Nominal results

Provincial expenditures for mental health services for FY 2013 are shown in Table 1. Total public spending for the included mental health and addiction programs/services was estimated to be $6.75 billion. Of the estimated spending on mental health services, the largest costs were in hospitalization ($4.02 billion, 59.6%), clinical payments ($1.69 billion, 25%), and then prescribed psychotherapeutic medications ($1.04 billion, 15.4%).

Table 4-1: Total mental health service expenditures, by province, in FY 2013.

Mental Healthcare Services (2013/14)	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	Total
Population estimates, 2013-2014 (in millions)	0.53	0.15	0.94	0.76	8.16	13.56	1.27	1.11	4.00	4.59	35.04
($000,000)											
General hospital inpatient costs	29.7	17.2	59.6	97.5	490.7	844.7	94.5	77.9	328.0	356.4	2,396.2
Psychiatric hospital inpatient costs	19.2	1.6	39.3	111.8	203.5	889.3	15.3	46.8	260.3	40.1	1,627.2
Psychiatrist FFS payment	6.8	3.2	6.5	6.9	273.2	417.0	28.0	14.2	149.0	142.9	1,047.7
Psychiatrist alternative payment	16.7	2.4	n/a	17.2	120.4	38.2	17.1	20.5	n/a	49.5	281.9
Total clinical payments to GP for psychotherapy/ counselling	1.8	n/a	3.5	3.3	14.7	175.6	5.5	9.4	92.5	50.6	356.9
Estimated public-paid amount for psychotherapeutic medications	12.7	3.4	26.0	18.8	332.6	367.5	32.2	32.6	115.6	101.0	1,042.4

Note: According to Statistics Canada, data for Newfoundland and Labrador has not been finalized for fiscal years 2013-2014 and 2014-2015 and should be considered to be preliminary. Fee-for-service (FFS) payments are based on data submitted to the National Physician Database, with the exception of Prince Edward Island for 2008-2009 to 2014-2015, and Newfoundland and Labrador for 2010-2011 to 2013-2014 that submitted fee-for-service information with alternative clinical payment data collection. "n/a" indicates that information for this category was not available.

4.3.2   Comparison of results

Figure 1 provides an overview comparison of the per capita public mental health expenditures between FY 2003 and FY 2013 by service category, adjusted for inflation. Overall, inflation-adjusted mental health service costs per capita increased from $135.2 to $192.7 over the ten-year period. The increase varied across provinces, with New Brunswick having the largest, due to increases in hospitalization costs.

From 2003 to 2013, mental health-related hospital inpatient costs in Canada substantially increased from $70.4 to $104.2 per capita (Figure 1); moreover, the proportion of inpatient costs

to total public mental health costs increased by $1.335 billion to 58.1% in 2013. Variations exist across the provinces in the changes in inpatient costs; for example, the per capita hospital costs in Newfoundland and Labrador, Manitoba, and British Columbia fell or remained constant between 2003 and 2013, while the inpatient costs in other provinces increased substantially during the same period. In addition, fee-for-service clinical payments to psychiatrists significantly increased, while alternative clinical payments to psychiatrists and the cost psychotherapeutic medication only changed slightly (Figure 1).
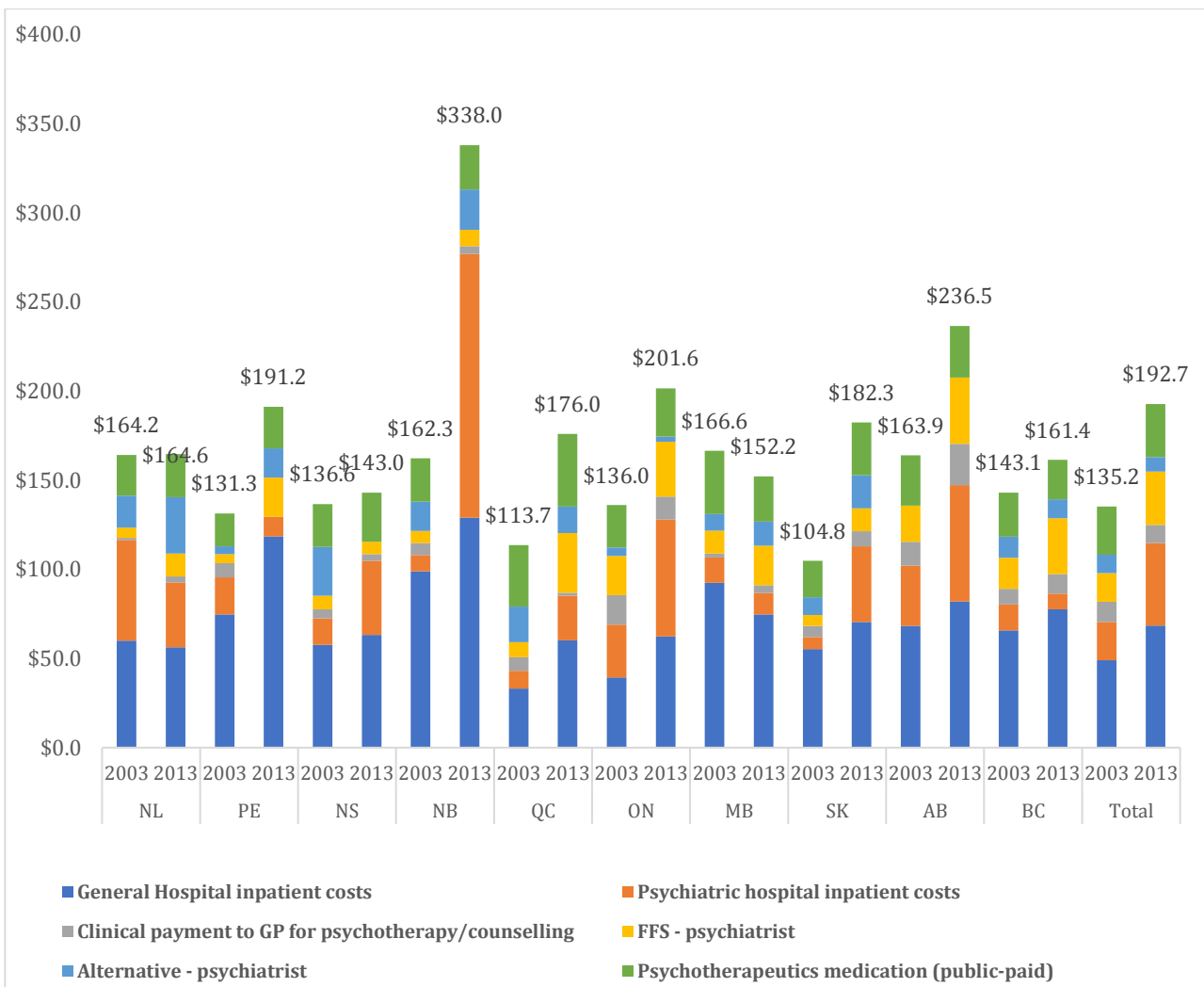

Figure 4-1: Per capita public mental health expenditures by province and in Canada: FY 2003 vs. FY 2013, by category of service.

Our results (Figure 2) indicate that overall, mental health services amounted to 4.9% of provincial government health expenditures in FY 2013, compared to 5.4% in FY 2003. Only New Brunswick had an increase, owing to its large increase in mental health hospitalizations.
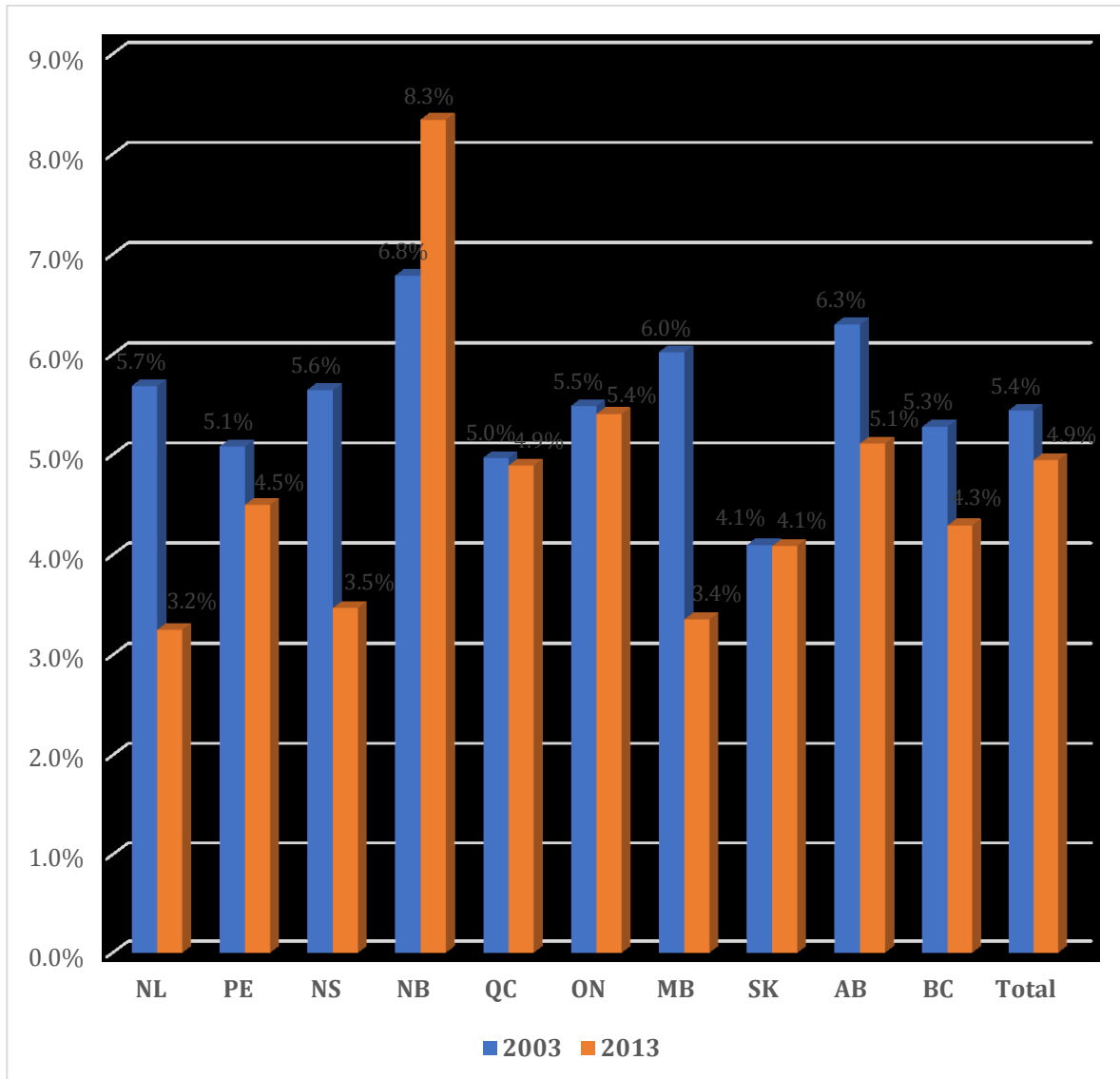

Figure 4-2: Mental health expenditures as a percentage of Canadian and provincial government health expenditure: FY 2003 vs. FY 2013

**4.4	Discussion**

We measured provincial publicly-funded mental healthcare services for FY 2013, including inpatient services provided by general and psychiatric hospitals, costs of consultations provided by psychiatrists under fee-for-service or alternative payment plans, and prescribed psychotherapeutic medications. Our results during FY 2003 and FY 2013 show that the *inflation-adjusted* dollar-value of public mental health services increased from \$135.1 to \$192.7 per person. Nevertheless, the percentage of mental health costs with respect to total provincial public healthcare expenditures decreased overall for the same period, as a national average from 5.4% to 4.9%.

Compared to the trend in health care expenditures in Canada (CIHI, 2016), inpatient costs for mental health increased by about 6% units, compared to an approximate 0.6% unit increase in the whole health care sector. Physician payments decreased slightly for mental health while in the whole health care sector they increased slightly (1.9% units). The relative proportion of publicly-funded psychotropic drug costs decreased by about 4.6% units from all mental health costs while the general trend in health care remained unchanged (CIHI, 2016). These trends indicate that in mental health care compared to other sectors of health care, the main cost driver has been inpatient care. In addition, the proportion of psychotropic drug costs may have decreased because of the increased use of generic drugs in mental health care.

We excluded community services and addiction services from our estimates, even though these are important components of a balanced mental health and addictions system that we had assessed previously (Jacobs, et al., 2008). In our previous report, we collaborated with mental health directorates in each province, but this was not possible in the current study due to budget constraints. Instead, we searched the websites of the health ministries of every Canadian

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province for data on these services. After reviewing the annual reports from each ministry for FY 2013, 7 of the 10 provinces reported budget funding for community mental health services (Alberta Health Services, 2017; Government of New Brunswick, 2017; Government of Nova Scotia, 2017; Government of Prince Edward Island, 2017; Government of Saskatchewan, 2017; MSSS, 2017; Treasury Board Secretariat, Public accounts of Ontario, 2017). The community mental health expenditures, as a percentage of all public provincial health expenditures for FY 2013, ranged from 0.07% in New Brunswick to 2.4% in Saskatchewan. This indicates a wide variation in the reporting of community services or availability of this information.

The large variation in public spending for community mental health services suggests a lack of standardized definitions for the relevant programs/services. This lack of standardization was identified in CIHI report on community mental health statistics (CIHI, 2017) Public spending for community mental health services in Quebec (MSSS, 2017), for example, was estimated to be $463.8 million or $56.9 per capita in FY 2013, which was about ten times higher than that reported in Ontario ($5.8 per capita). In Quebec, du Ministère de la Santé et des Services Sociaux (MSSS) is responsible for overseeing and funding the delivery of health and social services. The MSSS website provides detailed information on the utilization and cost of mental health services and programs, which is publicly available in French. For the other provinces; however, similar information is not publicly available. Projecting the Quebec amount pro-rata to other provinces would bring provincial Canadian community mental services to a total of $1.992 billion; and Canadian public mental health expenditures to $8.7 billion, or 6.4% of all public health care expenditures. Further research in this topic is needed.

Our results indicate that, while mental health services have increased in "physical" (inflation-adjusted) terms, they have not kept up with overall health expenditures. As stated,

expenditures for community mental health are missing from our analysis. Information about these expenditures is essential for measuring the progress of the mental health systems in terms of de-hospitalization. The move to community-based care is one of the most important phenomena that aggregate studies, such as this one, can address. Without such data, we continue to have an incomplete picture of the Canadian mental health system. At the same time, the federal government recently announced a 10-year, $5 billion mental health transition fund to serve as a lever towards more community care for those who are severely mentally ill or for primary care nested treatment for those who also have a mental disorder (Lesage, et al., 2017). More consistent monitoring of mental health spending could be achieved by supporting the provinces to report their community expenditures in a standardized manner. This was the case when the Public Health Agency of Canada reported funding across the provinces using standardized aggregate data for its chronic disease surveillance system, which also covered mental health (PHAC, 2017). Standardized reporting for community care will also enable us to conduct a more robust assessment of the policy changes ten years hence.

Our analysis reveals considerable gaps in information and reporting for mental health services and their costs in Canada. The following main limitations have an impact on the accuracy of our estimates. First, from the publicly accessible datasets, it is difficult to obtain utilization and cost data for persons served, or information regarding sex- or age-specific sub-groups. This hinders making detailed comparisons for the mental health care among the provinces and between mental health care and other sectors in health care. In addition, some provinces did not collect data on mental health services provided by physicians who are paid through alternative forms of payment, and thus, these costs are somewhat underestimated. Similarly, we did not have sufficient data to estimate the costs for MH-related emergency room

visits by province. According to CIHI, only a few provinces reported these costs. Finally, the use of standard definitions in mental health services and programs in Canada would make these types of comparisons easier in the future.

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CHAPTER 5: DISCUSSION AND CONCLUSION

In recent decades, mental illnesses have become increasingly significant as a public health concern. In the World Health Report 2001, the World Health Organization (WHO, 2001) projected that depression would be the second leading cause of disability by 2020. Mental illness has placed a tremendous economic burden on the Canadian healthcare system. Jacobs et al. (2008) estimated the direct and indirect costs of mental and substance use disorders to be $6.6 billion in Canada in 2003/2004, of which $5.5 billion was covered by public funding.

The Canadian universal healthcare system covers medically necessary hospital and physician services, to minimize the financial barriers of patients at the point of service (Canadian Health Act Annual Report, FY2013). Despite the reduction in financial barriers for accessing treatments, most individuals with mental illness do not speak with mental health (MH) professionals about their symptoms. Data from the Canadian Community Health Survey-Mental Health (CCHS-MH)-Cycle 1.2 reveals that only 32% of the individuals with mental illness made a MH visit during the 12 months prior to the survey. To address the needs of people and to properly plan MH services, an accurate understanding of the demand behavior for MH services is crucial. Our study uses a literature review, modelling, and a cost study to elucidate the demand characteristics for MH services across the Canadian provinces.

The literature review used a general research strategy for all economic studies dealing with the demand for MH services. Since the first econometrics study on the demand for MH services by McGuire (1981), three generations of research have explored the utilization of MH services. The first generation used aggregate utilization within a population, over time. In advancing the aggregate utilization studies, the second-generation studies used annual utilization data disaggregated to the level of individuals, or the family use of MH services to examine the

impact of insurance coverage. For example, notable studies by health economists in the 1980s examined the impact of insurance coverage (McGuire, 1981; Horgan, 1986; Watts, Scheffler & Jewel, 1986; Taube, Kessler & Burns, 1986). The third-generation research adopted decision periods of less than a year; for example, 30, 60, or 90 days (Ellis & McGuire, 1987). These studies reported that various factors, like individual-level health status, cost-sharing indicator(s), and various socio-economic factors were important drivers of the demand for MH services.

In any case, many of the methods and terms used in estimating the demand function in studies of MH services cannot withstand scrutiny. For instance, the second-generation demand analyses permitted the statistical separation of the different factors influencing individual changes in the use of MH services and identifying the drivers of demand for MH. Furthermore, the results were based on the non-experimental assignment of individuals to insurance plans; and therefore, they were subject to selection bias (McGuire, 1981; Frank & McGuire, 1986; Wells, 1990).

The population-based CCHS was used to identify the key factors influencing the demand for MH services. In 2012, the descriptive results revealed that approximately 2.8 million people (10.1% of Canadians) aged 15 and older, reported symptoms consistent with at least one of mental or substance use disorders in the 12-months before the survey. The CCHS-MH data also shows that MH was not equally distributed across socio-economic strata. Respondents with mental disorders had lower household incomes, on average, with fewer respondents being recently employed, though no significant difference was seen in their education attainment or insurance coverage, compared to individuals without mental disorders. If the universal healthcare system actually distributes MH care according to the people's needs, it would be reasonable to expect higher rates of MH service use by individuals in the lower household-income groups.

However, the data from the CCHS-MH shows that rates of MH service use does not vary by household income level, a finding that is consistent across healthcare service types, including services from physicians and MH specialists. Our finding is consistent with previous Canadian studies that have used community survey data, though our results are not replicated by the documented association between income and use of MH services by some US studies that used administrative datasets. The association between income and use of services could be of interest to policy makers in the development of programs aimed at delivering services to consumers who have lower household-incomes.

The modelling chapter concluded that the need variable (proxied by the presence of mental disorder(s), chronic condition(s), and higher distress level) was significantly associated with an increased use of MH services, in terms of likelihood and frequency of use. Socio-demographic factors have also been found to be significantly associated with the likelihood and level of use of MH services. Immigrant status and being recently employed significantly decrease both the odds of visits to a mental health service provider, as well as the odds of using prescribed psychotropic medication. On the other hand, having post-secondary education and prescription drug coverage were found to significantly increase the odds of making MH visits, and using prescribed psychotropic medication, and making more frequent visits to any type of MH service provider. Household income, on the other hand, was not found to be independently associated with MH service utilization. Generally, our findings agree with the empirical evidence from Canada (Leah, et al., 2007).

We estimated publicly-funded MH expenditures for the most recent year for which data was available (FY 2013) and went further by comparing the cost estimates to those reported a decade earlier by Jacobs et al. (2008). Total public spending for MH and addiction programs and

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services was estimated to be $6.75 billion for FY 2013. The largest component of the expenditure was hospital inpatient services (59.6%), followed by clinical payments to physicians or psychologists (25%), and then, prescribed psychotherapeutic medications (15.4%). Public spending for community MH services was missing from our cost estimation due to the lack of standardized reporting across the provinces. We estimated the Canadian provincial community MH services to be approximately $1,992 million in FY 2013. Our results indicate that even decades after the movement for MH de-hospitalization, hospital inpatient costs are still the largest cost drivers in the MH system. Overall, from FY 2003 to FY 2013, the portion of total public national spending on health that was spent on MH decreased from 5.4% to 4.9%. These results indicate that, while mental health services have increased in "physical" (inflation-adjusted) terms, they have not keep up with overall health expenditure.

The thesis reveals a gap in the research findings for MH services. In particular, information about the services and their costs are incomplete or inaccurate. For a more accurate future demand analysis, longitudinal MH data would be necessary. Similarly, standardized definitions for the variety of MH services and programs would be helpful for making meaningful evaluations and comparisons.

This thesis reviewed the empirical evidence from published population-based, economic analyses on the demand behavior for mental health (MH) services. The demand model was then applied to the CCHS-MH database for FY 2012 to find associations between the demographics, socio-economic factors, health status, community factors, and economic indicator, and use of MH services. Besides using an extensive review of the published, empirical evidence, the strength of this analysis also lies in its use of a rigorous demand modelling process based on a

large, population-based sample, a rigorous, up-to-date cost analysis, and the measurement of the change in public spending on MH services over the decade from FY 2003 to FY 2013.

The present study highlights the demand behavior for key population subgroups such as unemployed people, immigrants, those with lower education attainment, and those without prescription drug coverage. Our findings highlight the need to develop adequate, publicly-funded MH programs to address the needs of those in the population sub-groups. In addition, provincial governments should work toward implementing evidence-based practices, such as developing a longitudinal MH database and a standardized reporting system for community MH care programs, and for analysing spending to enable more robust cost assessment.

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