2-23-2021 10:30 AM

Ethnic and Socioeconomic Variations in Psychiatric Hospitalization and 30-day Readmission in Canada

Meghan PJ Smith, *The University of Western Ontario*

Supervisor: Anderson, Kelly K., *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Epidemiology and Biostatistics

Abstract

Ethnicity and socioeconomic status have been implicated as determinants of inpatient mental health service use internationally, but there is little Canadian evidence. This thesis uses data from the 2006 Canadian Census linked to the 2006/07 through 2008/09 Discharge Abstract Database (excluding Ontario and Quebec) to investigate the relative prevalence of psychiatric hospitalization and the relative risk of 30-day readmission following a psychiatric hospitalization for adults (aged 25 to 64) across ethnic groups and socioeconomic status, measured by income, education, and employment. Results suggest that the prevalence of psychiatric hospitalization was lower in ethnic minority groups relative to White Canadians, and for those in higher socioeconomic positions relative to those in lower positions. There were fewer statistically significant differences in the risk of 30-day readmission. Future research should explore these trends with data on mental illness severity or access to other mental health care to improve understanding of reasons for hospitalization.

Keywords

mental illness, hospitalization, 30-day readmission, ethnicity, socioeconomic status, income, employment, education

Summary for Lay Audience

Hospitalization is an indicator of severe mental illness, and can be necessary to manage psychiatric symptoms. Internationally, research has shown that the risk of hospitalization for mental illness is not equal across social groups. Due to the diversity of the Canadian population and differences in access to appropriate health care, it is important to consider ethnicity and socioeconomic status as social determinants of health in research on psychiatric hospitalizations in Canada. Previous international literature suggests that people in ethnic minority groups or lower socioeconomic positions experience more hospitalizations, although few studies control for the effect of other influencing factors. With a high level of correlation between socioeconomic status and ethnicity, it is important to control for the effects of one when studying the other. The ethnic groups included in past literature are often highly aggregated and do not take into account variations within larger ethnic groups (e.g. "Asian"). Furthermore, few studies include multiple dimensions of socioeconomic status. Within Canada there are few studies on social determinants of all hospitalizations for mental illness, although studies have found differences in access to any type of mental health care services across ethnic and socioeconomic groups.

This thesis uses data from administrative hospital discharge records and the 2006 Canadian Census (excluding Ontario and Quebec) to compare the prevalence of hospitalization for mental illness or self-harm and subsequent risk of 30-day readmission across ethnic groups and socioeconomic status. The prevalence of hospitalization was lower in ethnic minority groups and in those in higher socioeconomic positions (measured by education, employment, and income adjusted for family size). There were fewer significant differences in the incidence of 30-day readmission across groups with a few exceptions: West Asian people had higher risk compared to White people, and people who worked 14 to 48 weeks had lower risk of readmission compared to those who worked less than 14 weeks. These associations are likely due to a combination of differing need for and access to mental health services across groups. Future research should include updated data across Canada and should examine the reasons for hospitalization for mental illness across social determinants.

Co-Authorship Statement

This thesis includes two integrated articles which will be submitted for publication to a peer-reviewed journal. **Chapter 3** and **Chapter 4** each contain extended versions of what are expected to be submitted for publication.

Chapter 3: Smith M, Anderson KK, Klar N, Wilk P. A Canadian study of ethnic variations in psychiatric hospitalization and 30-day readmission. Being prepared for journal submission.

Meghan Smith was involved in the conceptualization of the research questions, design and implementation of analyses, and in writing the manuscript. Dr. Kelly K. Anderson was involved in the conceptualization and design of the study and provided content expertise and technical advice. Dr. Neil Klar and Dr. Piotr Wilk provided technical and content advice. All members revised the manuscript.

Chapter 4: Smith M, Anderson KK, Klar N, Wilk P. Socioeconomic variations in psychiatric hospitalization and 30-day readmission in Canada. Being prepared for journal submission.

Meghan Smith was involved in the conceptualization of the research questions, design and implementation of analyses, and in writing the manuscript. Dr. Kelly K. Anderson was involved in the conceptualization and design of the study and provided content and technical advice. Dr. Neil Klar and Dr. Piotr Wilk provided technical and content advice. All members revised the manuscript.

Acknowledgments

I would first like to thank Dr. Kelly Anderson for her incredible support and guidance through my educational journey in epidemiology and biostatistics. She had confidence in me even when I questioned myself, and I truly appreciate her pushing me to learn and trust myself as a researcher. I would also like to sincerely thank my supervisory committee members Dr. Piotr Wilk and Dr. Neil Klar for their guidance.

I would like to extend my thanks to the larger Department of Epidemiology and Biostatistics at Western University. Having completed two degrees in this department, I am always grateful for this amazing community. Special thanks to Dr. Greta Bauer and Dr. Ayden Scheim, for their encouragement and support as I navigated working and finishing a degree at the same time.

I would also like to acknowledge my wonderful friends and family. To my dear friends, thank you for your unwavering encouragement and understanding. To Kevin, thank you doesn't seem like enough. To my family, who have nodded along politely as they listened to me drone on about epidemiology for the past two degrees, you will never know how important you were to this process. Finally to my dog Winston, who will be thrilled about all the time I have for walks now, thank you for reminding me to find joy in even the smallest moments. Because I knew you, I have been changed for good.

Table of Contents

List of Tables

List of Figures

List of Appendices

Abbreviations

CCHS	Canadian Community Health Survey
CEGEP	Collège d'enseignement général et professionnel
CFI	Canadian Foundation for Innovation
CI	Confidence Interval
CIHR	Canadian Institute for Health Research
CRDCN	Canadian Research Data Centre Network
DAD	Discharge Abstract Database
ICD-10	International Statistical Classification of Diseases and Related Health Problems, version 10
PEI	Prince Edward Island PEI
PR	Prevalence Ratios
RR	Risk Ratio
SD	Standard Deviation
SSHRC	Humanities Research Council
YLD	Years Lived with Disability

Chapter 1

1 Introduction

1.1 Thesis overview

Mental illness is being increasingly recognized as a major health concern, both in Canada and globally, and is projected to be the largest cause of disability in high-income countries by 2030 [1]. There are many biological and social factors that affect access to mental health services and the probability of using hospital care for mental illness. Social determinants of health, such as socioeconomic status and ethnicity, have been strongly tied to rates of mental illness, as well as access to health services [2–4]. Many people with mental illness have symptoms that cannot be managed by a primary care physician, and therefore need to seek care from outpatient or specialized mental health services [5]. However, these services are not always accessed. This could be for many different reasons, such as difficulty navigating multiple appointments or not being able to find affordable and acceptable care [6, 7]. Not accessing appropriate outpatient care can lead to worsening psychiatric symptoms until a crisis point where hospitalization is necessary [7, 8]. Therefore for many people with severe mental illness, specialized care within a hospital is necessary for managing their symptoms [8]. Information on the distribution of hospitalizations across sociodemographic groups in Canada can help illustrate how well our healthcare system is functioning, and can help identify gaps in service delivery or inappropriate use. Finding disproportionate use in specific sociodemographic groups could inform policies aimed to direct people to appropriate care.

This integrated article thesis examines how the prevalence of psychiatric hospitalizations and the risk of 30-day readmission is distributed across ethnic and socioeconomic groups in Canada using individual-level administrative and survey data. The current chapter provides a brief background on mental illness and mental health care in Canada, the social determinants of health and health care use, and the rational and objectives for this thesis. Chapter 2 provides a review of the existing literature investigating associations between social determinants of health and psychiatric hospitalization and 30-day

readmission, focusing on ethnicity, income, employment, and education. Chapters 3 and 4 are individual manuscripts intended for publication; Chapter 3 focuses on ethnicity and its relationship to hospital admission and readmission for mental illness, and Chapter 4 focuses on measures of socioeconomic position (income, employment, and education) with the same outcomes. Finally, Chapter 5 is a summary and integration of the findings and implications of this thesis as a whole.

1.2 Mental illness prevalence and economic burden

Globally, mental and substance use disorders were responsible for 22.9% of total years lived with disability (YLD) in 2010, making it the top contributor to YLD [9]. The global burden of mental illness has increased substantially; from 1990 to 2010 there was a 37.5% increase in the burden of depression alone [10]. Within Canada, 6.7 million people (20.1%) struggle with their mental health every year, compared to 1.4 million who live with heart disease [11]. The most common group of mental illnesses in Canada is anxiety disorders, which affected over 4 million Canadians in 2011 [11]. Along with the emotional burden on patients and their caregivers, there is also a large economic burden associated with mental illness. Approximately 3 million Canadians accessed mental health care in 2012, resulting in over $51 billion in direct costs due to mental illness [12, 13]. In Ontario, mental illness accounts for approximately 10% of all disease burden but receives only 7% of all health care funding [12]. This means that any efforts to mitigate the burden of mental illness on the health care system are incredibly important.

1.3 Mental health services in Canada

In 2012, 17.5% of Canadians aged 15+ reported needing mental health care in the previous 12 months [14], and one third reported that their needs were not met [14]. In Canada, mental health care can be accessed at many different levels, but only some of this care is publicly funded. Currently, only care that is deemed medically necessary is publicly funded under the Canada Health Act [15]. The services that are covered are usually delivered in a hospital or primary care setting, and often do not include community-based services like counselling and psychotherapy [15]. This leads to 80% of

Canadians using their family physician to care for their mental health needs [15]. Often, family doctors are not able to deal with more complex mental health concerns, and inpatient care can be important for the treatment of many mental illnesses. Hospital-based psychiatric care is often accessed by people with more complex or severe mental illness because their needs cannot be adequately met at other levels of care [8, 16]. Approximately 1.5% of the Canadian population lives with severe mental illness, of whom 1 in 3 will need specialized care [8]. This hospital care can be very effective, but without proper care in hospital and after discharge, people may end up needing repeated hospitalizations for their mental illness. 30-day readmission is generally used as an indicator of quality of care, with rapid readmission sometimes indicating inadequate hospital care or a lack of follow-up care [17]. Worldwide, almost 1 in 7 people are readmitted to the hospital within 30 days of a psychiatric hospitalization [18]. In Canada from 2009-2010, 9.2% of patients had a readmission within 30 days [19].

1.4 Social determinants of health

Health is more determined by political, economic, and social environment in which we live than by genetics and individual choices [20, 21]. Social determinants of health include factors such as health care systems and social networks, and they contribute to the majority of health disparities [21]. Some common social determinants of health include disability, race, employment, income, education, housing, and gender [22]. These factors can be used to investigate variations in many different health outcomes, and have been found to explain disparities in a wide range of diseases and health services utilization [22]. Overall, health outcomes and access to health services both rely heavily on positive social attributes and environment. Social determinants of health have also been found to play a strong role in mental health outcomes. The most common determinants associated with poor mental health include female gender, socioeconomic disadvantage, lack of social support, and discrimination [2, 23]. With higher rates of mental illness in these groups, a proportionally greater amount of mental health care should be accessed; however, this is not always the case. Many people who need mental health care do not access health services, and this disparity is not uniformly distributed in

the population [3, 24]. A detailed literature review of the social determinants of psychiatric hospitalization examined in this thesis can be found in Chapter 2.

1.5 Conceptual framework

The conceptual framework for this project is informed by Andersen's Behavioural Model of Health Service Use [25], specifically focusing on the relationship between individual characteristics and service-related outcomes (Figure 1). Andersen's model examines the factors that influence access to health services, generally including contextual factors, individual characteristics, need for care, health behaviours, and outcomes [25]. This project will focus on individual characteristics and assess how they affect the outcomes of psychiatric hospitalization and 30-day readmission. Andersen's model generally differentiates between predisposing characteristics that impact the risk of needing health care, and enabling resources that affect the probability that someone accesses care [25]. These characteristics affect the need for and ability to access health care services, which affects the probability of accessing care [25]. Socioeconomic factors like income and education could be classified as both predisposing and enabling factors, depending on how they are conceptualized. For example, lower income has been associated with higher risk of mental illness, potentially through increased exposure to compounding life stressors [26–28], which would make it a predisposing factor that leads to increases in the need for mental health care; however, income can also be viewed as an enabling resource, as financial resources may be needed to access care (e.g. transportation, out of pocket fees). The data used in this thesis does not allow us to distinguish between predisposing and enabling factors because we are unsure if the hospitalizations are happening because of increased need for care, or differences in ability to access care. Therefore, this thesis will not differentiate between predisposing and enabling resources. The rationale for each factor included in this model will be discussed with more detail in the following chapter (Chapter 2).

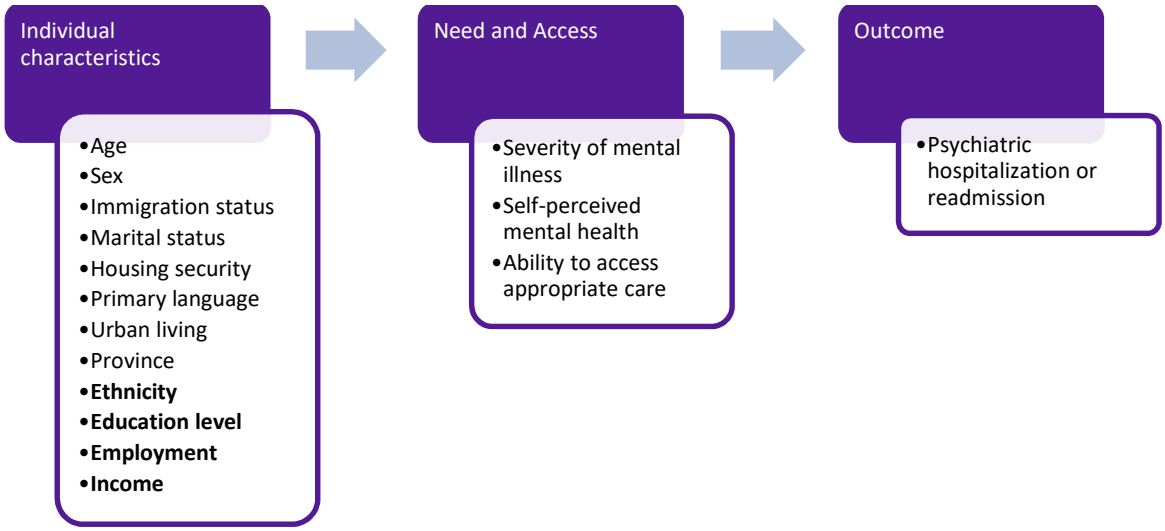

Figure 1: Theoretical framework

1.6 Rationale and objectives

The strain on mental health services can be lessened if we first identify groups most in need of mental health care. This will then allow specific strategies to be developed targeting such individuals. Ethnicity and socioeconomic status have both been identified as key determinants of overall health, and these relationships have also been found in mental health outcomes. Therefore, this project will investigate the relationships between ethnicity and socioeconomic status and psychiatric hospitalizations through four objectives:

1. Is the proportion of Canadian adults living outside of Ontario and Quebec with a psychiatric hospitalization between 2006 and 2009 different across ethnic minority groups, relative to the White group?
2. Among Canadian adults living outside of Ontario and Quebec who had a psychiatric hospitalization between 2006 and 2009, is the proportion of adults who were readmitted within 30-days different in ethnic minority groups compared to White groups?

3. Does the proportion of Canadian adults living outside of Ontario and Quebec with a psychiatric hospitalization between 2006 and 2009 differ by socioeconomic position, measured by income, education, and employment?
4. Among Canadian adults living outside of Ontario and Quebec who had a psychiatric hospitalization between 2006 and 2009, does the proportion of adults who were readmitted within 30-days differ by socioeconomic position, measured by income, education, and employment?

This project will focus on hospitalizations for mental illness or intentional self-harm as defined by the 10th version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). The mental illnesses included are substance use disorders, schizophrenia or other delusional disorders, mood disorders, neurotic or anxiety disorders, and a group of other disorders including some personality disorders and behavioural syndromes (See Appendix A for a detailed list of inclusions).

1.7 References

1. Mathers CD, Loncar D (2006) Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med 3:e442. https://doi.org/10.1371/journal.pmed.0030442

2. Silva M, Loureiro A, Cardoso G (2016) Social determinants of mental health: A review of the evidence. Eur J Psychiatry 30:259–292

3. Shim R, Koplan C, Langheim FJP, et al (2014) The social determinants of mental health: an overview and call to action. Psychiatr Ann 44:22–26. https://doi.org/10.3928/00485713-20140108-04

4. Dey M, Jorm AF (2017) Social determinants of mental health service utilization in Switzerland. Int J Public Health 62:85–93. https://doi.org/10.1007/s00038-016-0898-5

5. Gask L (2013) Educating family physicians to recognize and manage depression: where are we now? Can J Psychiatry 58:449–455. https://doi.org/10.1177/070674371305800803

6. Steele LS, Glazier RH, Lin E (2006) Inequity in mental health care under Canadian universal health coverage. Psychiatr Serv Wash DC 57:317–324. https://doi.org/10.1176/appi.ps.57.3.317

7. Thompson A, Hunt C, Issakidis C (2004) Why wait? Reasons for delay and prompts to seek help for mental health problems in an Australian clinical sample. Soc Psychiatry Psychiatr Epidemiol 39:810–817. https://doi.org/10.1007/s00127-004-0816-7

8. Wilson M, Bradley L (2017) Strengthening the case for investing in Canada's mental health system: economic considerations. Mental Health Commission of Canada, Ottawa, ON

9. Whiteford HA, Degenhardt L, Rehm J, et al (2013) Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. The Lancet 382:1575–1586. https://doi.org/10.1016/S0140-6736(13)61611-6

10. Salleh MR (2018) The burden of mental illness: an emerging global disaster. J Clin Health Sci 3:5. https://doi.org/10.24191/jchs.v3i1.6150

11. Mental Health Commission of Canada (2013) Making the case for investing in mental health in Canada. Mental Health Commission of Canada

12. Smetanin P, Stiff D, Briante C, et al (2011) The life and economic impact of major mental illnesses in Canada: 2011 to 2041. RiskAnalytica, on behalf of Mental Health Commission of Canada

13. Table: 13-10-0465-01 Mental health indicators. Statistics Canada

14. Sunderland A, Findlay LC (2013) Perceived need for mental health care in Canada: Results from the 2012 Canadian Community Health Survey–Mental Health. Health Rep 24:9

15. Canadian Mental Health Association (2018) Mental health in the balance: Ending the health care disparity in Canada. Canadian Mental Health Association

16. Clatney L, MacDonald H, Shah SM (2008) Mental health care in the primary care setting. Can Fam Physician 54:884–889

17. Ortiz G (2019) Predictors of 30-day postdischarge readmission to a multistate national sample of state psychiatric hospitals. J Healthc Qual JHQ 41:228–236. https://doi.org/10.1097/JHQ.0000000000000162

18. Vigod SN, Kurdyak PA, Seitz D, et al (2015) READMIT: A clinical risk index to predict 30-day readmission after discharge from acute psychiatric units. J Psychiatr Res 61:205–213. https://doi.org/10.1016/j.jpsychires.2014.12.003

19. Canadian Institute for Health Information (2012) Hospital Mental Health Services in Canada, 2009–2010. Canadian Institute for Health Information, Ottawa, Ont

20. Catalyst N (2017) Social determinants of health (SDOH). NEJM Catal

21. WHO Commission on Social Determinants of Health, World Health Organization (2008) Closing the gap in a generation: health equity through action on the social determinants of health. World Health Organization

22. Raphael D (2009) Social determinants of health: Canadian perspectives. Canadian Scholars' Press

23. Shim RS, Compton MT (2018) Addressing the social determinants of mental health: if not now, when? If not us, who? Psychiatr Serv 69:844–846. https://doi.org/10.1176/appi.ps.201800060

24. Mackenzie CS, Gekoski WL, Knox VJ (2006) Age, gender, and the underutilization of mental health services: the influence of help-seeking attitudes. Aging Ment Health 10:574–582

25. Andersen R (1968) A behavioral model of families' use of health services. Behav Model Fam Use Health Serv

26. Muntaner C, Eaton WW, Miech R, O'Campo P (2004) Socioeconomic position and major mental disorders. Epidemiol Rev 26:53–62. https://doi.org/10.1093/epirev/mxh001

27. Aneshensel, CS, Rutter, CM, Lachenbruch, PA (1991) Social structure, stress, and mental health: Competing conceptual and analytic models. Am Sociol Rev 56:166–178. https://doi.org/10.2307/2095777

28. Katerndahl DA, Parchman M (2002) The ability of the stress process model to explain mental health outcomes. Compr Psychiatry 43:351-60. https://doi.org/10.1053/comp.2002.34626

Chapter 2

2 Literature review

This chapter contains a summary of the previous literature investigating social determinants of psychiatric hospitalization and 30-day readmission for adults. Section 2.2 contains a brief overview of the concept of social determinants of health. Sections 2.3 and 2.4 specifically focus on ethnicity and socioeconomic status, respectively. Each of these sections begin with a brief discussion of the measurement of these constructs. Following this is a summary of the evidence identified through structured searches, first discussing how ethnicity or socioeconomic status is associated with psychiatric hospitalization. Following this is a short summary of other relevant literature specific to Canada. Concluding each of these sections is a discussion of the literature investigating ethnicity and socioeconomic status and 30-day readmissions after psychiatric hospitalizations. Section 2.5 contains a review of the evidence on other social factors and psychiatric hospitalization or 30-day readmission. Finally, section 2.6 summarizes the gaps in the literature that this thesis will aim to address.

2.1 Search strategy

A structured search for studies was done using Embase, Medline-Ovid, CINAHL and PsycINFO, yielding thirteen studies to be summarized in this review. Medical subject headings and keyword searches were done for the following concepts: hospitalization or readmission; mental illness; and ethnicity or socioeconomic status. Studies investigating ethnicity or socioeconomic status as determinants of inpatient psychiatric hospital care or 30-day readmission for any mental illness in adult populations were identified. Studies published before 1990 were excluded because the availability and acceptability of mental health care has changed significantly over time, so older research is likely not applicable to current social climates and mental health care context.

2.2 Social determinants of health, mental health, and access to care

The social determinants of health include variables that reflect the social, political, or economic experiences of individuals [1]. Social determinants of health include indicators of social class and affluence, but also factors such as gender and ethnicity. These variables can tell us about the social conditions that people are living in and have an impact on many aspects of health and healthcare access. Social determinants that are commonly associated with poor mental health include low income, migrant status, urban living, and being an ethnic minority [2, 3]. There has also been research showing that these factors negatively impact access to health promoting resources and healthcare, and can subsequently increase the risk for early readmission [4, 5]. The research on the associations of these factors with access to inpatient care for mental illness is more limited, and there is a large gap in Canadian literature in this area. This thesis will add to the current literature by investigating the effect of ethnicity and socioeconomic status on the prevalence of psychiatric hospitalization and 30-day readmission in Canada.

2.3 Ethnic determinants of mental health care

2.3.1 Measuring race & ethnicity

Race and ethnicity are common variables of interest in social determinants of health research. Being a racial/ethnic minority is often associated with inadequate access to care and poorer health outcomes [6]. Race and ethnicity are often conflated and, although similar, are distinct social concepts. Both concepts are used to set sociological boundaries to categorize people into groups with similar characteristics. Ethnicity refers to groups of people who share certain social, cultural, or religious characteristics at some point in time [7]. These groups are not static, and people can choose their affiliation to one group or multiple groups. This concept, while extremely important, is difficult to measure in large surveys due to the need for detailed information and the large number of categories that would be required to accurately conceptualize ethnicity for each person. In contrast, race refers to categorization based on physical characteristics. Historically, racial

categorizations were assigned based on phenotypic differences, identifying people by their skin colour or ancestry. This makes race more convenient to measure, as it can be determined by visual inspection, but does not accurately capture peoples' lived experiences. Current research has shifted its focus from race to racialization, which asserts that certain people become racialized by society treating them unequally based on physical differences [7]. Racialization is also rarely measured accurately in large surveys, as it requires individualized information to understand people's experiences of marginalization and inequity.

Throughout its numerous iterations, the Canadian Census has consistently collected data on race or ethnicity, originally collecting information on respondents' race [8]. Following World War II, people were more sensitive to the idea of race, so the 1951 Census shifted to asking respondents about their ancestral ethnic or cultural origins [9]. This question consisted of a wide range of categories, such as "French" or "Chinese", until 1991 [10]. In 1996, the question about ethnic origins was modified to allow respondents to write in their origins. At this time, an increasing number of Canadians were reporting that they were of Canadian origin, so the ethnic origin question could no longer reliably provide information on whether or not the respondent was a visible minority [9]. The Canadian government recognized the importance of self-identification of ethnic groups, but still wanted to estimate the number of Canadians who would be considered a visible minority. Therefore, in 1996 the census began asking people to self-identify as visible minority, defined in the 1995 Employment Equity Act as "persons other than Aboriginal persons, who are non-Caucasian in race or non-White in colour" [11]. The resulting question is based on a combination of ethnicity- and race-based categorization. It avoids the assignment of racial categories by governmental bodies and allows people to indicate belonging to different ethnic groups, but still includes vague race-based categories like "Black" [9]. This question consists of 12 population group options in a check-all-that-apply format, which are combined with the census question regarding Aboriginal identity to identify the different population groups within Canada. These population groups will form the basis of our analyses comparing psychiatric hospitalization and 30-day readmission across Canadian ethno-racial groups, and for simplicity will be referred to as ethnicity for the remainder of this thesis.

2.3.2 Ethnic differences in psychiatric hospitalization

Of the reviewed articles, five investigated the association between race or ethnicity and psychiatric hospitalization and most (three of five) found people from some ethnic minority groups to be at a higher risk of psychiatric hospitalization compared to non-minority groups (Appendix B, Table 1) [12–14]. Two studies (one conducted in the US, and one systematic review done in the UK) found Black people at higher risk of psychiatric hospitalization, and one Canadian study found First Nations people at higher risk of psychiatric hospitalization. One study found racial minorities who had attempted suicide in the past 12 months were less likely to be hospitalized for psychiatric care relative to White people who had attempted suicide [15]. The remaining two articles found no statistically significant differences across ethnic groups [16, 17]. Two studies were designed using large population-based databases from the United States, but found conflicting results [12, 17]. Padgett and colleagues found no significant association between ethnicity and having at least one inpatient day for mental health care, while the study by Snowden and colleagues found both Black-African and Black-Caribbean people at higher risk for hospitalization. The study published by Snowden and colleagues highlights an important distinction between Black people of African and Caribbean descent in terms of mental health and access to mental health care. Although the research specifically on differences in the rate of psychiatric hospitalization is limited, it has been established that Black-African and Black-Caribbean people have significantly different pathways to care and perceptions about mental health care [18–20].

Two systematic reviews looking at ethnic differences in psychiatric hospitalization were identified through our search. A systematic review conducted in 2003 by Bhui and colleagues states that 13 of 17 papers investigating ethnic representation in inpatient units in Great Britain found an overrepresentation of Black patients, relative to the population of the catchment areas [13]. However, upon reading the individual studies, all of these studies used bivariate analyses, and most of these studies did not actually report a relative measure of inpatient representation. Therefore, it is unclear whether these findings are due to confounding factors. A more recent systematic review of hospital admission for first-episode psychosis done by Mann and colleagues came to a different conclusion – of

the three studies included, two found no statistically significant relationships and one found higher rates of hospitalization in White patients relative to Black or "other" people [16]. One of the studies in this review that found no effect was Canadian, done in Ontario in 2010 [21]. It is important to consider that this review was limited to studies on hospitalizations for first-episode psychosis. Although psychotic disorders are responsible for a large proportion of psychiatric hospitalizations, the findings for this specific disorder may not be generalizable to other mental illnesses [22].

It was surprising that none of the studies above included more than three ethnic groups. Although the groups included varied across studies, most included a comparison of Black and White groups and some included a third group, such as Asian or "Other". This categorization clearly does not represent the diverse ethnic makeup of the Canadian population and could be masking differences within these aggregate ethnic groups. There is evidence that different ethnic groups experience different levels of discrimination and health disparities [23], so it is important to investigate many different ethnic groups without aggregation into broad racial categories. Also, only one of the five articles included adjustment for confounders. This is problematic for interpretation as socioeconomic status is strongly associated with the rate of hospitalization, and ethnicity and socioeconomic status are also highly interrelated [24]. It is also very interesting that none of the studies above controlled for immigration status. There is a strong tie between ethnicity and immigration, and between immigration and health or access to health care, so this is another important potential confounder that is not included in the research summarized above [25].

2.3.3 Ethnicity and access to any mental health care in Canada

Our literature search found no studies that investigated hospitalization for any type of mental illness across multiple ethnic groups in Canada. There were two studies published in Canada summarized above [14, 21] but both had limited ethnic comparisons and one was limited to hospitalizations for first episode psychosis. There is other Canadian literature that looks at ethnic differences in access to mental health care, but it focuses on a more general measure of mental health service use. This is a measure that was included

in the Canadian Community Health Survey (CCHS) – Mental Health and Well-being in 2002 and 2012 [26]. This survey question asked people if they have been in contact with any health professionals for their mental or emotional health in the past 12 months, and then asks about the specific type of care provider that they accessed. Many analyses have been done using this CCHS data, and other studies have modelled their outcomes to increase comparability. This is not equivalent to the focus of this thesis, because it includes outpatient care, but can give us an idea of the ethnic differences in access to any mental health care in Canada. Some of the Canadian literature using this type of outcome found no significant association between ethnicity and service use [27, 28], but most found lower use of mental health services among ethnic minority groups, specifically in Black, Chinese, South Asian groups [3, 29, 30]. The factors included in the multivariable models varied across studies, but most studies included important potential confounders such as immigration and socioeconomic status.

Also included in this body of literature is a comparison of unmet needs and barriers to care across ethnic groups in Canada. There is generally higher unmet need and more reported barriers, especially accessibility and availability barriers, among ethnic minority groups [3, 30, 31]. These barriers, along with the evidence above, suggest that ethnic minorities in Canada may not be accessing the mental health care that they need. This is possibly because they are hesitant to access care due to a lack of culturally appropriate mental health services and increased stigma in some cultural groups [32]. This is also supported by a Canadian study that found more severe psychiatric symptoms in Chinese and South Asian patients at hospital presentation than White patients, with American studies that find the same in Black groups [32, 33], suggesting that services may have been avoided until symptoms reached a crisis point.

2.3.4 Ethnicity and 30-day readmission after a psychiatric hospitalization

Overall, the literature on ethnicity and the risk of 30-day psychiatric readmission is somewhat more consistent, with no ethnic differences observed in three of five studies (Appendix B, Table 2) [34–36]. Two of these studies were done using Ontario data and

both did not find significantly different risks of 30-day readmission between Aboriginal and non-Aboriginal Ontarians, and between South Asian, Chinese, and other Ontarians [14, 36]. A systematic review by Donisi and colleagues included four studies looking at ethnic differences in 30-day psychiatric readmissions; two found no significant associations, one found Hispanic ethnicity was associated with lower risk of 30-day readmission, and one found Black patients had a lower risk of readmission [35]. However, the studies included in this review were done in specific populations, such as veterans or older adults, and may not be applicable to the general Canadian population. Another study was published by Evans and colleagues in 2017, finding Black patients more likely to have a rapid readmission (within 30 days of discharge) [37]. Adding to this literature is another Canadian study from British Columbia, which looked at the change in 30-day psychiatric readmissions for First Nations people living on- and off-reserve, relative to the general population of British Colombia, from 1994 to 2010 [14]. This study did not test for statistically significant differences in the rates of readmission, but noted that the rate of readmission among First Nations people fell below the provincial average after 2002-2006 [14]. All of the studies summarized above controlled for basic confounders such as socioeconomic status and sex. However, only the studies that found no association controlled for immigration status. This could suggest that the significant effect of ethnicity found in the other studies could largely be attributable to differences across immigration groups. There were also limited ethnic groups included in these studies. Although there were more groups included than in the literature on psychiatric hospitalization, most studies were still limited to two ethnic groups. As discussed above, these limited ethnic groups do not properly represent the ethnic diversity in the Canadian population. Therefore, more research should be done that includes multiple ethnic groups to more thoroughly understand ethnic differences in psychiatric readmissions.

2.4 Socioeconomic determinants of mental health care

2.4.1 Measuring socioeconomic status

Socioeconomic status is a determinant of most human activity. Socioeconomic status includes things like income, education, and employment, which give people access to

resources. Socioeconomic position has been strongly associated with many health outcomes, almost always finding those with higher advantage to have better health [4]. Low socioeconomic status has been associated with worse mental health and suicidal behaviours [38]. However, there is variation in this relationship, and it is highly dependent on how socioeconomic status is conceptualized and operationally defined. Most often, socioeconomic status is operationalized through income, education, employment or a combination of economic factors into a composite measure. There is evidence that composite measures of socioeconomic position fail to show the complex interaction between different measures and can hide socioeconomic inequalities [39].

This project will focus on three key determinants of socioeconomic advantage: income, education, and employment. These concepts are highly interconnected. For example, higher paying jobs usually require more education, but higher education is expensive, and therefore linked with income. Income is also directly linked to employment, so there is an explicit association between employment and income. Because of the interrelationships between these concepts, some research has tried to use one measure as a proxy for another (for example, using education as a proxy measure for income). However, previous research has shown that they are not sufficiently correlated to serve as a proxy for each other, and each can have independent associations with health outcomes [40]. Furthermore, there is also the possibility for health to affect a person's socioeconomic status. People who are in poor health are often compromised in their ability to complete education or work, which would directly affect their income [1]. This suggests that the direction of relationships between socioeconomic indicators and health outcomes cannot easily be established. There is also significant variation across countries because of differences in health systems. In a universal healthcare system such as in Canada, income is likely a weaker predictor of hospitalization because it is associated with less direct costs than in a private healthcare system such as the United States [1]. There is also variation across, and within, countries in access to paid time off of work, and in the navigability of a health system, that affect the relationships between socioeconomic indicators and access to health care. Therefore, it is difficult to generalize international research on health care access directly to Canadian contexts because there are many differences in the ways that socioeconomic status affects health.

The effect of income has been studied for decades and has been consistently found to be associated with disease and poor health [41]. Because health conditions often require treatments, which almost always come with some financial burden, income often facilitates treatment for various conditions [1]. Along with this effect on treatment, having insufficient income can cause decreased access to resources that facilitate health, such as nutritious food or leisure activity, which can add to the development of chronic health conditions [1]. Having higher income therefore not only facilitates easier treatment of disease but also facilitates a lifestyle that decreases risk for the development of disease. Income has been measured in many ways, often by categorizing people into groups based on their ability to afford basic needs. This allows for comparison of people deemed to have adequate income to those without adequate income. Although this comparison can be interpreted easily, it doesn't necessarily represent the nuances of income as a determinant of health. By dichotomizing income according to a set cut-off point, one can lose the nuanced differences within these categories of income. A large portion of literature also uses aggregate neighbourhood level income to determine the effects of income on health outcomes because it is relatively easier to measure than individual level income, or because data are not available on individual income. This can be problematic in the interpretation of income effects on health, as neighbourhood- and individual-level income are not always concordant [42, 43]. Additionally, individual income determines much of a person's access to resources that can improve their health, but it also needs to be contextualized by the demand on that income. For example, a single person and a family of six would have very different demands on the same income. Therefore, it is important to investigate individual level income adjusted for family size on a continuous scale, but also keep in mind the impact of affording basic needs.

Education is another important indicator of socioeconomic advantage, as it gives people resources to build their health. There are many mechanisms hypothesized to explain this relationship, with the most common based around how more educated people have better access to health care and healthier lifestyles [44]. Education is often included as a factor associated with health status, operationalized either as a simple linear variable measuring the number of years of schooling or categorized into general attainment categories. The former measurement assumes that one year of education has a uniform effect on health,

no matter where in the lifespan it occurs (e.g. distance from grade five to grade six is the same as distance from third year of university to fourth year). This assumption is questionable, so to avoid this many studies and surveys choose to categorize education by the highest level of education attained [45]. Although gradient gains in health have been consistently found with increasing education levels, research has found no additional health benefits beyond a Bachelor's level [46]. Therefore, in the current study education will be considered as a categorical variable as measured in the 2006 Canadian census, with the highest category consisting of people who have achieved a Bachelor's degree or higher.

Employment is the final measure of socioeconomic position to be considered in this thesis. Being employed is often associated with having health insurance, leading to better health and greater access to health care, even in a country like Canada with universal healthcare coverage [47]. There is a large body of evidence investigating the effect of unemployment on health outcomes, with the majority of research finding people who are unemployed to have worse health [47]. Research on the effect of employment on health has also considered the differences between stable and temporary or precarious employment. People who work in unstable contract-based jobs or seasonal work have been found to have significantly worse psychological health [48], and more occupational injuries than workers with low to no occupational instability [49]. Additionally, people with severe mental illness are often not employed consistently as their symptoms can affect their ability to work [50]. There is also evidence that people within different levels of precarious employment may have different prevalence of poor mental health [51]. All of this evidence suggests that measures consisting of multiple categories of employment including precarious or inconsistent work could help better understand relationships between mental health outcomes and employment. In 2006, the Canadian census measured employment by the number of weeks worked in 2005. This data is usually presented by Statistics Canada as full-year and part-year workers, using 49 weeks of the year as the cut point. However, dichotomizing this variable into full-year and part-year workers could mask important differences in those with precarious employment. To compare more categories of employment, the Canadian government's definition of casual work will be applied. Casual work in Canada consists of a contract not exceeding 90 days

in a single calendar year [52]. Therefore, this thesis will operationalize employment based on weeks worked in 2005, with three categories: those who worked 49 to 52 weeks, 14 to 48 weeks, and less than 14 weeks.

2.4.2 Socioeconomic status and psychiatric hospitalization

Income

Of the four studies identified that examined the association between income and psychiatric hospitalization, all found a gradient relationship - those in higher income groups had significantly lower risk of hospitalization (Appendix B, Table 3) [12, 53–55]. This literature included men and women hospitalized for a wide range of mental illness diagnoses or self-harm, across multiple countries. These studies had differing levels of adjustment for confounders (for example, Leao and colleagues just included age and country of birth while Snowden and colleagues controlled for eight confounders) and the relationship seems to hold regardless of the level of adjustment. It is important to consider that two of these studies were done using the linkage of national databases in Sweden with overlapping time periods (1992-1999 and 1997-1998). These studies had different objectives and inclusion criteria, and one included a multilevel approach to investigate neighbourhood income as well as individual level income. The study using a multilevel approach confirms that the relationship between low individual income and increased risk of hospitalization holds even when including neighbourhood-level income. The study by Leao and colleagues focused on hospitalizations for psychotic disorders in first- and second-generation immigrants and found consistently higher risk of hospitalization in people in lower income quintiles. This relationship was particularly strong for the risk of hospitalization for schizophrenia, where men in the lowest income quintile had more than 36 times the risk of those in the highest quintile [54]. Although all the studies looking at income and psychiatric hospitalization found similar results, the strength of the relationships were different across different diagnoses, with the strongest relationship generally observed for psychotic disorders [12, 53, 54]. One additional paper of importance is a report from the Manitoba Centre for Health Policy and Evaluation [56]. This report did not test for statistical significance, but found the same general trends

as the studies above – those in the lowest income quintile had more acute care hospitalizations for mental illness than those in the higher quintiles [56]. Despite the descriptive nature of this report, these data suggest that the findings in other countries may be consistent in Canada.

Education

Four studies were identified that examined the relationship between education and psychiatric hospitalization (Appendix 2, Table 3). All four studies found that less educated people were at higher risk of hospitalization, although one did not find this association to be statistically significant [12, 17, 55, 57]. All four studies used national databases to investigate the role of education in the risk of hospitalization for mental illness. The association between education and hospitalization seems to hold with differing operationalization of education (continuous years of education or categorization by degrees), suggesting that the relationship is robust to different operationalizations of education. Additionally, a systematic review by Savoie and colleagues also included studies that looked at education and hospitalization for depression, and overall these studies found no statistically significant association between education and inpatient treatment for depression [58]. The studies included in this review were less similar to the aims of this thesis – they were all limited to hospitalizations for depression, with small samples, low levels of adjustment for other factors, different outcome measures (e.g. compared length of stay instead of hospitalization rate) and included some elderly populations [58]. In addition, three of the included studies did not adjust for many confounders – for example, only one controlled for ethnicity [12]. This indicates more research should be done with adjustment for confounders to investigate if these observed relationships are being driven by other factors.

Employment

The association between employment and the risk of hospitalization was studied in three identified studies, which all found employment to be associated with a lower risk of hospitalization (Appendix 2, Table 3) [12, 53, 58]. The measures of employment were based on a simple comparison of people who were currently employed and those not

currently employed. One of these studies is a systematic review looking at determinants of hospitalization for depression, which included 2 studies that found contrasting results [58]. One of these studies found the same trend as the above studies – employed people had lower risk of hospitalization for depression [60]. The other study in this review found no significant association between employment and hospitalization [61]. This second study, however, did not control for any confounders, whereas the other studies controlled for basic demographic factors like age and sex. In addition, a study published in 2012 in Germany found neighbourhood-level employment rates were associated with a higher risk of hospitalization for schizophrenia or affective disorders, also measured at the neighbourhood level [62]. This study was done at the neighbourhood level, so it cannot be interpreted at the individual level, but may support the findings at the individual level.

Multiple Indicators of Socioeconomic Status

Of the six studies that investigated the effect of a socioeconomic measure on hospitalization, only three studies included multiple indicators of socioeconomic status [12, 53, 55]. These studies found independent associations between hospitalization and socioeconomic indicators, even after adjustment for the other factors [12, 53, 55], highlighting the importance of using multiple measures of socioeconomic status to better understand their relationships with hospitalization. It is possible that the relationships found were being driven by one aspect of socioeconomic position more than the others, but without more studies assessing multiple indicators of socioeconomic status simultaneously this remains unclear. As a whole, there is a fairly clear socioeconomic gradient – people in lower socioeconomic positions are more likely to have a psychiatric hospitalization. Income was the indicator that was most consistently associated with hospitalization, and both education and employment were found to have no statistically significant association with psychiatric hospitalization in some studies. There was also a surprisingly low number of studies that controlled for multiple confounders. Generally, most studies adjusted for very few, if any, confounders, and only one study adjusted for ethnicity [12]. The association between race/ethnicity and socioeconomic status is well established, and some research has found different relationships between socioeconomic indicators and health outcomes across ethnic groups [24, 63, 64].

2.4.3 Socioeconomic status and access to any mental health care in Canada

As with ethnicity, there are few studies focusing on differences in inpatient mental health care across socioeconomic groups in Canada, but there are studies assessing access to any mental health care. Income and education are the most common socioeconomic factors investigated in this body of literature. Four studies of fourteen found no association between any measures of socioeconomic status and mental health service use – two using income [65, 66], and two using the highest level of education attained [27, 67]. The remaining studies found at least one of the socioeconomic indicators included to have a significant association with the use of mental health services. The results of these studies varied, but most (n=7) found that people in higher socioeconomic positions use more mental health services [68–74]. This opposes the relationship seen in the international literature on inpatient care. Generally, people in higher socioeconomic positions use more outpatient care, and less inpatient care [66, 75]. These same relationships were found in the report from the Manitoba Centre for Health Policy – those in the lowest income quintiles used the least outpatient care, and the most inpatient care. This is possibly a function of the universal healthcare system in Canada, which covers inpatient care, but not all outpatient care, most notably private psychologists. People with lower income might not be able to afford outpatient care, and therefore might need more inpatient care as a result of not seeking care in outpatient settings – for some people, hospitalization is the only choice for care in a crisis. There is also evidence that people in low socioeconomic positions prefer to get care in hospital settings [75]. This is possibly because they perceive hospital care as higher quality and better value than other levels of care [75].

2.4.4 Socioeconomic status and 30-day readmission after a psychiatric hospitalization

<u>Income</u>

One article studied the influence of income on psychiatric readmission within 30 days of a psychiatric hospitalization (Appendix 2, Table 4). A systematic review by Donisi et al. in 2016 included two studies that looked at income as a determinant of 30-day readmission and found no association [35]. It is important to note that one of these studies was completed with patients admitted to a geriatric psychiatric unit, and the other was done in a hospital for American Veterans [35]. Because these studies were conducted in such specific populations, the findings may not be generalizable to the general population. Along with these studies, there is a statistical brief published by the Healthcare Cost and Utilization Project in 2012 that found Americans living in lower income neighbourhoods had higher rates of 30-day readmission [76]. This study did not control for any confounders and used neighbourhood income, which is not directly indicative of individual level income as previously discussed, however it provides theoretical justification for investigating the effect of income on early readmission. Outside of psychiatric care, low income is often associated in accessing less follow-up care and therefore is associated with increased rates of 30-day readmission for any reason [77, 78]. This relationship may extend to psychiatric care, but the limited research in this area does not allow for clear conclusions to be made.

Education

Three articles explored the effect of education on the risk of 30-day psychiatric readmission (Appendix 2, Table 4); two found no significant associations and one found people with a high school education were less likely to be readmitted within 30 days for psychotic disorders, relative to those who had not completed high school. One study by Vigod and colleagues from 2015 looked at four models with increasing levels of adjustment. In the first two models, which adjusted for sociodemographic factors and prior health service use, having a high school education was associated with slightly lower risk of 30-day readmission compared to respondents with less than high school education [79]. In further adjusted models, which controlled for more clinical factors such as diagnosis and symptoms, this association was no longer statistically significant, so the study concluded that education was not associated with 30-day readmission [79]. A systematic review done by Donisi and colleagues also found no statistically significant

association between education and 30-day readmission across three studies [35]. Similarly, a study of Ontario residents in 2018 found no association between education level and the risk of 30-day and 5-year readmission for all diagnosis groups except for schizophrenia and dementia [34]. When focusing on hospitalizations for schizophrenia, respondents with at least high school education had significantly lower risk for readmission within 30 days of discharge [34]. These findings were reversed in patients with dementia, where having more education was associated with an increased risk for readmission at 30 days [34]. Although most of the research found no significant association between level of education and 30-day readmission, the results from the study done by Chen and colleagues suggests there could be a relationship in our Canadian context [34].

Employment

Two of three articles investigating employment as a determinant of psychiatric readmission found unemployed people had a higher risk of 30-day readmission relative to employed people (Appendix 2, Table 4). The previously mentioned systematic review conducted by Donisi and colleagues found significantly lower rates of 30-day readmission among employed people in bivariate analyses in two studies, and no significant association in a third study [35]. Another study by Evans and colleagues did not include employment in their main regression models because of a high degree of missing data, but they found no association between employment and readmission [37]. The investigators were unclear on if this relationship was adjusted for confounding. Therefore, this result must be interpreted with caution due to the high amount of missing data and unclear methods. Similarly, Chen found 30-day readmission rates to be significantly higher among unemployed patients relative to employed patients with diagnoses other than schizophrenia or dementia [34]. This was the only study that controlled for confounding factors, and included variables such as age, immigration status, and marital status. Overall, it is difficult to make conclusions on the association between 30-day readmission after a psychiatric hospitalization and employment because of the sparse literature and lack of adjustment for confounding factors.

Multiple Indicators of Socioeconomic Status

As seen above, the trends in 30-day readmission are not as clear – some of the research suggests no association between 30-day readmission and indicators of socioeconomic position, but there is also literature showing people in lower socioeconomic positions may have higher rates of 30-day readmission after a psychiatric hospitalization [34, 35]. However, most of this literature did not control for confounding factors, and some studies used specific population subgroups and the findings are likely not generalizable to other populations. Employment and education were the most commonly studied socioeconomic indicators in this literature. In addition to the studies above, we identified three studies that used composite measures of socioeconomic status. One used a measure called the Index of Relative Socioeconomic Disadvantage, which measures community level disadvantage in a multilevel, multifaceted way, and cannot be interpreted at the individual level [80]. This study done by Li and colleagues in Australia found people in the most disadvantaged areas were less likely to be readmitted within 30 days of discharge [81].

None of the studies identified in our search included all three measures investigated in this thesis, and only three included two of the three indicators [34, 35]. Two of these studies that included two indicators of socioeconomic status were found in the systematic review published by Donisi and colleagues [35]. Both found no association between readmission and either income or education, and education or employment, in multivariable models. However, Chen and colleagues found both higher levels of education and employment were associated with a lower risk of readmission, although the relationships varied across diagnoses [34]. This study suggests that different indicators of socioeconomic status could have different associations with the risk of 30-day readmission depending on type of diagnosis. The sparseness of the literature in this area makes drawing any conclusions difficult, but the associations between 30-day readmission for other physical health conditions and indicators of socioeconomic status give theoretical justification to further study these relationships for psychiatric readmission.

2.5 Other determinants of mental health care

2.5.1 Immigration status, generation status, and language proficiency

Due to the strong association between immigration and ethnicity, immigration and generation status are very important in this study. There is evidence of different rates of mental disorders among immigrants, relative to people who have not immigrated [82, 83]. The Canadian literature tends to suggest a lower prevalence of mental disorders among first-generation immigrant groups, and immigrants have better self-rated mental health than non-immigrants [83, 84], but the evidence on the use of mental health services is less clear. Of exception, there is Canadian evidence to suggest that some migrant groups have higher rates of psychotic disorders, and different patterns of mental health service use [85, 86].

In general, the studies identified through our search showed very mixed results for the effect of being a migrant, with conflicting findings across studies [54, 68, 69, 87, 88]. These studies came from different countries and had differing levels of adjustment for potential confounders (for example language spoken and refugee status) which could explain some of the variation across studies. Three main studies that are of interest were done in France and Sweden, using linked national databases. These studies included groups of migrants based on country of birth or generation status, and found higher rates of hospitalization for some first and second generation migrant groups, but the specific groups at higher risk were different in the different countries [54, 87, 88]. Along with these studies, a report on Ontario hospital data found that immigrants had a lower rate of mental health and addictions related emergency department visits than non-immigrants [89]. The relationship between immigration status and 30-day readmission after a psychiatric hospitalization was not reported in any of the identified studies above. The literature on 30-day readmissions after any hospitalization suggests that there could be lower readmission rates among immigrants, relative to non-immigrants, but it is unclear if this relationship exists for psychiatric hospitalizations [90]. Along with immigration status, generation status was found as an important determinant of psychiatric hospitalization, generally finding that first- and second-generation immigrants had higher

rates of admission, relative to people of third or higher generation [54, 87, 91]. This thesis will therefore investigate the effect of immigration status, but also consider generation status in a sensitivity analysis to assess the role of each factor.

Language proficiency also plays a large role in patterns of health service use. Even with interpreters, not speaking the official language can be a large barrier to accessing care [92]. Without speaking the same language as the service provider, people do not always fully understand their care, and sometimes do not access care because they are unaware of the care options available to them [93]. Some research has found that these barriers do not affect the rate of psychiatric hospitalization [94], but when looking at ethnic differences in access to care, it is important to consider language abilities because it likely varies significantly across ethnic groups [95].

2.5.2 Other covariates

Age is one of the most consistent predictors of health outcomes and access to care [96]. The effect of age on psychiatric hospitalization varied across studies, but a number of studies found inverted U-shaped relationships between age and risk of psychiatric hospitalization, with middle aged people at the highest risk for hospitalization [17, 27, 58, 87]. There was also some literature that found older people at higher risk for psychiatric hospitalization, relative to younger people [12, 97]. This literature provides a rationale to include age as a categorical predictor to allow for detection of non-linear relationships. For 30-day psychiatric readmissions, many studies in the systematic review published by Donisi and colleagues found no association with age [35], but two Canadian studies found that older patients had lower risk of readmission [34, 79].

The literature has consistently shown that men are at higher risk for psychiatric hospitalization than women [12, 17, 58, 87, 91, 97]. The effect of sex on 30-day readmission is not as clear. Of the studies reviewed, most found no significant association, two found males at lower risk, and three found males at higher risk for 30-day readmission [35]. The different results could be stemming from different diagnosis profiles included in the study samples, and different social systems creating different levels of stigma and ability to access care for different genders.

Being married generally is associated with better mental health, and has been associated with increased access to health services for men [98]. There was limited literature looking at marital status and psychiatric hospitalization – one study found no significant effect, whereas a systematic review concluded that widowed people had the lowest risk of hospitalization for depression [12, 58]. There is, however a large body of literature looking at access to any mental health care which shows a consistent relationship between being unmarried and an increased use of mental health services [27, 34, 35, 58, 68, 70, 71, 73, 99–102]. For 30-day readmission, four studies found no significant association with marital status, but two studies found opposing significant associations between being single and the risk of 30-day readmission, one with higher and one with lower risk in people who are single [34, 35, 79].

There is literature showing that initiatives to increase affordable stable housing for people with mental illness decrease the need for emergency and hospital care [103, 104], but the literature in this area is sparse. There is also limited evidence on the association between living circumstances and 30-day readmissions. Two studies identified in our search found no significant association between living situation and readmission risk, but neither looked at housing stability. However, being homeless is an established risk factor for any 30-day hospital readmission, with some studies finding as much as three times the risk compared to people who are adequately housed [105]. Along with stability of housing, rural place of residence has been implicated as an important factor in mental illness [106]. Overall, the risk of serious mental illness is higher in urban centres [106], and the access to mental health services is higher for people who live in urban areas [35, 68, 70]. We only identified one study that looked at the effect of living in an urban area on psychiatric hospitalization, which found no significant effect. Similarly, there was limited evidence on the effect of urban versus rural living on the risk of 30-day psychiatric readmission. Two studies were included in the systematic review published by Donisi and colleagues; one study found no significant association, and one study found people in urban areas were readmitted more often [35].

For 30-day readmissions after psychiatric hospitalization, length of stay of the index hospitalization is one of the most consistent confounding variables included in

multivariable analyses. As discussed in Chapter 1, 30-day readmissions are often conceptualized as indicators of insufficient care in the initial hospitalization, and shorter hospitalizations are associated with lower quality of care. Along with length of stay, the type of psychiatric diagnosis is very commonly included as a potential confounder, given the large differences in readmission rates across diagnoses. Psychotic and personality diagnoses are associated with the highest risk of 30-day readmission, whereas hospitalizations for anxiety have relatively infrequent readmissions [35].

2.6 Summary of gaps in literature

The literature review suggests a clear lack of large population-based studies internationally, and a large gap in Canadian evidence, on the social determinants of psychiatric hospitalization and 30-day readmissions. Using large population-based studies allows for the prevalence of psychiatric hospitalization to be assessed and compared across social groups and could allow for international comparisons. Population-based research on determinants of healthcare access is often achieved through the use of national survey data linked to hospital databases, as is planned for this thesis. Although there is some international literature using this approach, it is important to also have Canadian evidence, as social determinants of health and healthcare are highly dependent on social context and healthcare systems, and trends can vary significantly across, and even within, different countries. In particular, the generalizability of research on social determinants of health from the United States to Canada has been brought into question [107, 108]. For example, one study that directly compared US and Canadian data found that race was much more closely associated with poor self-rated health in the United States, relative to Canada [108]. This thesis will build upon the previous international literature to better understand the relationship between ethnicity, socioeconomic status, and access to mental health care in a Canadian context.

2.7 References

1. Raphael D (2009) Social determinants of health: Canadian perspectives. Canadian Scholars' Press

2. Canadian Mental Health Association (2008) Mental health promotion in Ontario: a call to action

3. Chiu M, Amartey A, Wang X, Kurdyak P (2018) Ethnic differences in mental health status and service utilization: a population-based study in Ontario, Canada. Can J Psychiatry 63:481–491. https://doi.org/10.1177/0706743717741061

4. Flaskerud JH, DeLilly CR (2012) Social determinants of health status. Issues Ment Health Nurs 33:494–497. https://doi.org/10.3109/01612840.2012.662581

5. Zhang Y, Zhang Y, Sholle E, et al (2020) Assessing the impact of social determinants of health on predictive models for potentially avoidable 30-day readmission or death. PLoS ONE 15:. https://doi.org/10.1371/journal.pone.0235064

6. Waldron IR (2010) The impact of inequality on health in Canada: a multi-dimensional framework. Divers Equal Health Care 7:

7. Bolaffi G, Bracalenti R, Braham P, Gindro S (2003) Dictionary of race, ethnicity & culture. SAGE

8. McKenney NR, Bennett CE (1994) Issues regarding data on race and ethnicity: the Census Bureau experience. Public Health Rep 109:16–25

9. Stevens G, Ishizawa H, Grbic D (2015) Measuring race and ethnicity in the censuses of Australia, Canada, and the United States: Parallels and paradoxes. Can Stud Popul Arch 42:13–34. https://doi.org/10.25336/P6PW39

10. Li PS (2003) Cultural diversity in Canada: the social construction of racial difference. Department of Justice Government of Canada

11. Employment Equity Act (1995) SC 1995, c.44

12. Snowden LR, Hastings JF, Alvidrez J (2009) Overrepresentation of Black Americans in psychiatric inpatient care. Psychiatr Serv 60:7. https://doi.org/10.1176/ps.2009.60.6.779

13. Bhui K, Stansfeld S, Hull S, et al (2003) Ethnic variations in pathways to and use of specialist mental health services in the UK: Systematic review. Br J Psychiatry 182:105–116. https://doi.org/10.1192/bjp.182.2.105

14. Lavoie JG, Ward A, Wong ST, et al (2018) Hospitalization for mental health related ambulatory care sensitive conditions: what are the trends for First Nations in British Columbia? Int J Equity Health 17:156. https://doi.org/10.1186/s12939-018-0860-7

15. Sheehan AE, Walsh RFL, Liu RT (2018) Racial and ethnic differences in mental health service utilization in suicidal adults: A nationally representative study. J Psychiatr Res 107:114–119. https://doi.org/10.1016/j.jpsychires.2018.10.019

16. Mann F, Fisher HL, Johnson S (2014) A systematic review of ethnic variations in hospital admission and compulsory detention in first-episode psychosis. J Ment Health 23:205–211. https://doi.org/10.3109/09638237.2014.910641

17. Padgett DK, Patrick C, Burns BJ, Schlesinger HJ (1994) Ethnic differences in use of inpatient mental health services by blacks, whites, and Hispanics in a national insured population. Health Serv Res 29:135–153

18. Doyle O, Joe S, Caldwell CH (2012) Ethnic differences in mental illness and mental health service use among Black fathers. Am J Public Health 102:S222–S231. https://doi.org/10.2105/AJPH.2011.300446

19. Yorke CB, Voisin DR, Berringer KR, Alexander LS (2016) Cultural factors influencing mental health help-seeking attitudes among Black English-Speaking Caribbean immigrants in the United States and Britain. Soc Work Ment Health 14:174–194. https://doi.org/10.1080/15332985.2014.943832

20. Anderson KK, Flora N, Ferrari M, et al (2015) Pathways to first-episode care for psychosis in African-, Caribbean-, and European-origin groups in Ontario. Can J Psychiatry Rev Can Psychiatr 60:223–231. https://doi.org/10.1177/070674371506000504

21. Archie S, Akhtar-Danesh N, Norman R, et al (2010) Ethnic diversity and pathways to care for a first episode of psychosis in Ontario. Schizophr Bull 36:688–701. https://doi.org/10.1093/schbul/sbn137

22. Heslin KC, Elixhauser A, Steiner C (2015) Hospitalizations involving mental and substance use disorders among adults, 2012: statistical brief #191. Agency for Healthcare Research and Quality, Rockville (MD)

23. Khan M, Kobayashi K, Lee SM, Vang Z (2015) (In)visible minorities in Canadian health data and research. Popul Change Lifecourse Strateg Knowl Clust Discuss Pap Ser Un Réseau Strat Connaiss Chang Popul Parcours Vie Doc Trav 3:

24. Anderson NB, Bulatao RA, Cohen B, Ethnicity National Research Council (US) Panel on Race (2004) Race/Ethnicity, socioeconomic status, and health. In: Critical Perspectives on Racial and Ethnic Differences in Health in Late Life. National Academies Press

25. Kobayashi K, Prus S, Lin Z (2008) Ethnic differences in health: does immigration status matter? Ethn Health 13:

26. Lesage A, Vasiliadis H-M, Gagné M-A, et al (2006) Prevalence of mental illness and related service utilization in Canada: an analysis of the Canadian Community Health Survey. Canadian Collaborative Mental Health Initiative, Mississauga, Ont.

27. Cairney J, Veldhuizen S, Vigod S, et al (2014) Exploring the social determinants of mental health service use using intersectionality theory and CART analysis. J Epidemiol Community Health 68:145–150. https://doi.org/10.1136/jech-2013-203120

28. Lin E, Goering P, Offord D, et al (1996) The use of mental health services in Ontario: epidemiologic findings. Can J Psychiatry Rev Can Psychiatr 41:572–577. https://doi.org/10.1177/070674379604100905

29. Kakuma R (2008) Utilization of health services for depression and anxiety in Ontario: An eleven-year comparison of determinants. McGill University

30. Gadalla TM (2010) Ethnicity and seeking treatment for depression: a Canadian national study. Can Ethn Stud 41:233–245. https://doi.org/10.1353/ces.2010.0042

31. Chen AW, Kazanjian A, Wong H, Goldner EM (2010) Mental health service use by Chinese immigrants with severe and persistent mental illness. Can J Psychiatry 55:35–42. https://doi.org/10.1177/070674371005500106

32. Chiu M, Lebenbaum M, Newman A, et al (2016) Ethnic differences in mental illness severity: a population-based study of Chinese and South Asian patients in Ontario, Canada. J Clin Psychiatry 77:. https://doi.org/10.4088/jcp.15m10086

33. Bhui K (2002) Mental illness in Black and Asian ethnic minorities: Pathways to care and outcomes. Adv Psychiatr Treat 8:26–33. https://doi.org/10.1192/apt.8.1.26

34. Chen S, Collins A, Kidd SA (2018) Thirty-day and 5-year readmissions following first psychiatric hospitalization: a system-level study of Ontario's psychiatric care. Can J Psychiatry 63:410–415. https://doi.org/10.1177/0706743717751667

35. Donisi V, Tedeschi F, Wahlbeck K, et al (2016) Pre-discharge factors predicting readmissions of psychiatric patients: a systematic review of the literature. BMC Psychiatry 16:449. https://doi.org/10.1186/s12888-016-1114-0

36. Chiu M, Gatov E, Zaheer J, et al (2018) Postdischarge service utilisation and outcomes among Chinese and South Asian psychiatric inpatients in Ontario, Canada: a population-based cohort study. BMJ Open 8:. https://doi.org/10.1136/bmjopen-2017-020156

37. Evans LJ, Harris V, Newman L, Beck A (2017) Rapid and frequent psychiatric readmissions: associated factors. Int J Psychiatry Clin Pract 21:271–276. https://doi.org/10.1080/13651501.2017.1324037

38. Burrows S, Laflamme L (2010) Socioeconomic disparities and attempted suicide: state of knowledge and implications for research and prevention. Int J Inj Contr Saf Promot 17:23–40. https://doi.org/10.1080/17457300903309231

39. Conway DI, McMahon AD, Brown D, Leyland AH (2019) Measuring socioeconomic status and inequalities. In: Vaccarella S, Lortet-Tieulent J, Saracci R, et al (eds) Reducing Social Inequalities in Cancer: Evidence and Priorities for Research. International Agency for Research on Cancer, Geneva, pp 71–89

40. Braveman P, Cubbin C, Egerter S, et al (2006) Socioeconomic status in health research: one size does not fit all. JAMA 294:2879–88. https://doi.org/10.1001/jama.294.22.2879

41. Präg P, Mills M, Wittek R (2014) Income and income inequality as social determinants of health: do social comparisons play a role? Eur Sociol Rev 30:218–229. https://doi.org/10.1093/esr/jct035

42. Buajitti E, Chiodo S, Rosella LC (2020) Agreement between area- and individual-level income measures in a population-based cohort: Implications for population health research. SSM - Popul Health 10:. https://doi.org/10.1016/j.ssmph.2020.100553

43. Southern DA, McLaren L, Hawe P, et al (2005) Individual-level and neighborhood-level income measures: agreement and association with outcomes in a cardiac disease cohort. Med Care 43:1116–1122

44. Conti G, Heckman J, Urzua S (2010) The education-health gradient. Am Econ Rev 100:234–238. https://doi.org/10.1257/aer.100.2.234

45. Zimmerman E, Woolf SH (2014) Understanding the relationship between education and health. NAM Perspect 4:. https://doi.org/10.31478/201406a

46. Zajacova A, Hummer RA, Rogers RG (2012) Education and health among U.S. working-age adults: a detailed portrait across the full educational attainment spectrum. Biodemography Soc Biol 58:40–61. https://doi.org/10.1080/19485565.2012.666122

47. Hergenrather K, Zeglin R, McGuire-Kuletz M, Rhodes S (2015) Employment as a social determinant of health: a systematic review of longitudinal studies exploring the relationship between employment status and physical health. Rehabil Res 29:. https://doi.org/10.1891/2168-6653.29.1.2

48. Moscone F, Tosetti E, Vittadini G (2016) The impact of precarious employment on mental health: The case of Italy. Soc Sci Med 158:86–95. https://doi.org/10.1016/j.socscimed.2016.03.008

49. Virtanen M, Kivimäki M, Joensuu M, et al (2005) Temporary employment and health: a review. Int J Epidemiol 34:610–622. https://doi.org/10.1093/ije/dyi024

50. Henderson M, Harvey S, Øverland S, et al (2011) Work and common psychiatric disorders. J R Soc Med 104:198–207. https://doi.org/10.1258/jrsm.2011.100231

51. Vives A, Amable M, Ferrer M, et al (2013) Employment precariousness and poor mental health: evidence from spain on a new social determinant of health. J Environ Public Health 2013:. https://doi.org/10.1155/2013/978656

52. Treasury Board of Canada Secretariat (2019) Casual Worker. Government of Canada. https://www.canada.ca/en/treasury-board-secretariat/services/staffing/public-service-workforce/casual-worker.html. Accessed 01 December 2020

53. Roelands M, Vanoverloop J, Maron L, Bilsen J (2018) Socioeconomic risk factors for hospital admittance due to a suicide attempt in Belgium: a population-based study using administrative data. Soc Psychiatry Psychiatr Epidemiol 53:53–61. https://doi.org/10.1007/s00127-017-1458-x

54. Leao TS, Sundquist J, Frank G, et al (2006) Incidence of schizophrenia or other psychoses in first- and second-generation immigrants: a national cohort study. J Nerv Ment Dis 194:27–33. https://doi.org/10.1097/01.nmd.0000195312.81334.81

55. Sundquist K, Ahlen H (2006) Neighbourhood income and mental health: a multilevel follow-up study of psychiatric hospital admissions among 4.5 million women and men. Health Place 12:594–602. https://doi.org/10.1016/j.healthplace.2005.08.011

56. Tataryn D, Mustard C, Derksen S (1994) The utilization of medical services for mental health disorders Manitoba: 1991 - 1992. Manitoba Centre for Health Policy and Evaluation, Department of Community Health Sciences

57. Aro S, Aro H, Salinto M, Keskimäki I (1995) Educational level and hospital use in mental disorders. A population-based study. Acta Psychiatr Scand 91:305–312. https://doi.org/10.1111/j.1600-0447.1995.tb09787.x

58. Savoie I, Morettin D, Green CJ, Kazanjian A (2004) Systematic review of the role of gender as a health determinant of hospitalization for depression. Int J Technol Assess Health Care 20:115–127. https://doi.org/10.1017/s026646230400090x

59. ten Have M, Vollebergh W, Bijl RV, de Graaf R (2001) Predictors of incident care service utilisation for mental health problems in the Dutch general population. Soc Psychiatry Psychiatr Epidemiol 36:141–149. https://doi.org/10.1007/s001270050303

60. Boardman AP, Hodgson RE, Lewis M, Allen K (1997) Social indicators and the prediction of psychiatric admission in different diagnostic groups. Br J Psychiatry J Ment Sci 171:457–462. https://doi.org/10.1192/bjp.171.5.457

61. Harrison J, Barrow S, Creed F (1995) Social deprivation and psychiatric admission rates among different diagnostic groups. Br J Psychiatry 167:456–462. https://doi.org/10.1192/bjp.167.4.456

62. Losert C, Schmauß M, Becker T, Kilian R (2012) Area characteristics and admission rates of people with schizophrenia and affective disorders in a German rural catchment area. Epidemiol Psychiatr Sci 21:371–379. https://doi.org/10.1017/S2045796012000157

63. Braveman P, Cubbin C, Marchi K, et al (2001) Measuring socioeconomic status/position in studies of racial/ethnic disparities: maternal and infant health. Public Health Rep 116:449–463

64. Kaufman JS, Cooper RS, McGee DL (1997) Socioeconomic status and health in blacks and whites: the problem of residual confounding and the resiliency of race. Epidemiology 8:621–628

65. Lin C-H, Chen W-L, Lin C-M, et al (2010) Predictors of psychiatric readmissions in the short- and long-term: a population-based study in Taiwan. Clinics 65:. https://doi.org/10.1590/S1807-59322010000500005

66. Alegría M, Bijl RV, Lin E, et al (2000) Income differences in persons seeking outpatient treatment for mental disorders: a comparison of the United States with Ontario and the Netherlands. Arch Gen Psychiatry 57:383. https://doi.org/10.1001/archpsyc.57.4.383

67. Katz SJ, Kessler RC, Frank RG, et al (1997) Mental health care use, morbidity, and socioeconomic status in the United States and Ontario. Inq J Med Care Organ Provis Financ 34:38–49

68. Dey M, Jorm AF (2017) Social determinants of mental health service utilization in Switzerland. Int J Public Health 62:85–93. https://doi.org/10.1007/s00038-016-0898-5

69. Alonso J, Angermeyer MC, Bernert S, et al (2004) Use of mental health services in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. Acta Psychiatr Scand Suppl 47–54. https://doi.org/10.1111/j.1600-0047.2004.00330.x

70. Kovess-Masfety V, Alonso J, Brugha TS, et al (2007) Differences in lifetime use of services for mental health problems in six European countries. Psychiatr Serv 58:8

71. Neighbors HW, Caldwell C, Williams DR, et al (2007) Race, ethnicity, and the use of services for mental disorders: results from the National Survey of American Life. Arch Gen Psychiatry 64:485. https://doi.org/10.1001/archpsyc.64.4.485

72. Parslow RA, Jorm AF (2000) Who uses mental health services in Australia? An analysis of data from the National Survey of Mental Health and Wellbeing. Aust N Z J Psychiatry 34:997–1008. https://doi.org/10.1080/000486700276

73. Tiwari SK, Wang J (2008) Ethnic differences in mental health service use among White, Chinese, South Asian and South East Asian populations living in Canada. Soc Psychiatry Psychiatr Epidemiol 43:866–871. https://doi.org/10.1007/s00127-008-0373-6

74. Steele LS, Dewa CS, Lin E, Lee KLK (2007) Education level, income level and mental health services use in Canada: associations and policy implications. Healthc Policy 3:96–106

75. Kangovi S, Barg FK, Carter T, et al (2013) Understanding why patients of low socioeconomic status prefer hospitals over ambulatory care. Health Aff (Millwood) 32:1196–1203. https://doi.org/10.1377/hlthaff.2012.0825

76. Heslin KC, Weiss AJ (2006) Hospital readmissions involving psychiatric disorders, 2012: statistical brief #189. In: Healthcare Cost and Utilization Project (HCUP) Statistical Briefs. Agency for Healthcare Research and Quality (US), Rockville (MD)

77. Balogh R, Lin E, Dobranowski K, et al (2017) All-cause, 30-day readmissions among persons with intellectual and developmental disabilities and mental illness. Psychiatr Serv 69:353–357. https://doi.org/10.1176/appi.ps.201600534

78. Canadian Institute for Health Information (2012) All-Cause Readmission to Acute Care and Return to the Emergency Department. Canadian Institute for Health Information

79. Vigod SN, Kurdyak PA, Seitz D, et al (2015) READMIT: A clinical risk index to predict 30-day readmission after discharge from acute psychiatric units. J Psychiatr Res 61:205–213. https://doi.org/10.1016/j.jpsychires.2014.12.003

80. Walker R, Hiller JE (2005) The Index of Relative Socio-economic Disadvantage: general population views on indicators used to determine area-based disadvantage. Aust N Z J Public Health 29:442–447. https://doi.org/10.1111/j.1467-842X.2005.tb00224.x

81. Li X, Srasuebkul P, Reppermund S, Trollor J (2018) Emergency department presentation and readmission after index psychiatric admission: a data linkage study. BMJ Open 8:e018613. https://doi.org/10.1136/bmjopen-2017-018613

82. Alegría M, Álvarez K, DiMarzio K (2017) Immigration and mental health. Curr Epidemiol Rep 4:145–155. https://doi.org/10.1007/s40471-017-0111-2

83. Edwards J, Hu M, Thind A, et al (2019) Gaps in understanding of the epidemiology of mood and anxiety disorders among migrant groups in Canada: a systematic review. Can J Psychiatry 64:595–606. https://doi.org/10.1177/0706743719839313

84. Salami B, Yaskina M, Hegadoren K, et al (2017) Migration and social determinants of mental health: Results from the Canadian Health Measures Survey. Can J Public Health Rev Can Santé Publique 108:362–367. https://doi.org/10.17269/CJPH.108.6105

85. Anderson KK, Cheng J, Susser E, et al (2015) Incidence of psychotic disorders among first-generation immigrants and refugees in Ontario. CMAJ 187:E279–E286. https://doi.org/10.1503/cmaj.141420

86. Anderson KK, McKenzie KJ, Kurdyak P (2017) Examining the impact of migrant status on ethnic differences in mental health service use preceding a first diagnosis of schizophrenia. Soc Psychiatry Psychiatr Epidemiol 52:949–961. https://doi.org/10.1007/s00127-017-1403-z

87. Tortelli A, Morgan C, Szoke A, et al (2013) Different rates of first admissions for psychosis in migrant groups in Paris. Soc Psychiatry Psychiatr Epidemiol. https://doi.org/10.1007/s00127-013-0795-7

88. Westman J, Johansson LM, Sundquist K (2006) Country of birth and hospital admission rates for mental disorders: a cohort study of 4.5 million men and women in Sweden. Eur Psychiatry 21:307–314. https://doi.org/10.1016/j.eurpsy.2006.02.001

89. MHASEF Research Team (2018) Mental health and addictions system performance in Ontario: a baseline scorecard. Institute for Clinical Evaluative Sciences, Toronto, ON

90. Zamir D, Zamir M, Reitblat T, et al (2006) Readmissions to hospital within 30 days of discharge from the internal medicine wards in southern Israel. Eur J Intern Med 17:20–23. https://doi.org/10.1016/j.ejim.2005.10.004

91. Binbay T, Ulaş H, Alptekin K, Elbi H (2012) Psychotic disorders among immigrants from Turkey in Western Europe: An overview of incidences, prevalence estimates, and admission rates. Türk Psikiyatri Derg Turk J Psychiatry 23:53–62. https://doi.org/10.5080/u6608

92. Bowen S (2001) Language barriers in access to health care. Health Canada, Ottawa

93. National Collaborating Centre for Mental Health (UK) (2011) Access to healthcare. In: Common Mental Health Disorders: Identification and Pathways to Care. British Psychological Society

94. Ohtani A, Suzuki T, Takeuchi H, Uchida H (2015) Language barriers and access to psychiatric care: a systematic review. Psychiatr Serv 66:798–805. https://doi.org/10.1176/appi.ps.201400351

95. Parameshwaran M (2014) Explaining intergenerational variations in English language acquisition and ethnic language attrition. Ethn Racial Stud 37:27–45. https://doi.org/10.1080/01419870.2013.827794

96. Forma L, Rissanen P, Aaltonen M, et al (2009) Age and closeness of death as determinants of health and social care utilization: a case-control study. Eur J Public Health 19:313–318. https://doi.org/10.1093/eurpub/ckp028

97. Lay B, Nordt C, Rössler W (2007) Mental hospital admission rates of immigrants in Switzerland. Soc Psychiatry Psychiatr Epidemiol 42:229–236. https://doi.org/10.1007/s00127-007-0157-4

98. Robards J, Evandrou M, Falkingham J, Vlachantoni A (2012) Marital status, health and mortality. Maturitas 73:295–299. https://doi.org/10.1016/j.maturitas.2012.08.007

99. Leaf PJ, Bruce ML, Tischler GL, et al (1988) Factors affecting the utilization of specialty and general medical mental health services. Med Care 26:9–26. https://doi.org/10.1097/00005650-198801000-00002

100. Hunt JB, Eisenberg D, Lu L, Gathright M (2015) Racial/ethnic disparities in mental health care utilization among U.S. college students: applying the Institution of Medicine definition of health care disparities. Acad Psychiatry 39:520–526. https://doi.org/10.1007/s40596-014-0148-1

101. Thompson EE, Neighbors HW, Munday C, Trierweiler S (2003) Length of stay, referral to aftercare, and rehospitalization among psychiatric inpatients. Psychiatr Serv 54:1271–1276. https://doi.org/10.1176/appi.ps.54.9.1271

102. Jaramillo-Gonzalez LE, Sanchez-Pedraza R, Herazo MI (2014) The frequency of rehospitalization and associated factors in Colombian psychiatric patients: a cohort study. BMC Psychiatry 14:161. https://doi.org/10.1186/1471-244X-14-161

103. Nelson G, Laurier W (2010) Housing for people with serious mental illness: approaches, evidence, and transformative change special issue on homelessness in Canada. J Sociol Soc Welf 123–146

104. Forchuk C, Dickins K, Corring D (2016) Social determinants of health: housing and income. Healthc Q 18:27–31. https://doi.org/10.12927/hcq.2016.24479

105. Saab D (2014) Hospital readmissions among patients who are homeless in Toronto. University of Toronto

106. Gruebner O, A. Rapp M, Adli M, et al (2017) Cities and mental health. Dtsch Ärztebl Int 114:121–127. https://doi.org/10.3238/arztebl.2017.0121

107. Vasiliadis H-M, Lesage A, Adair C, et al (2007) Do Canada and the United States differ in prevalence of depression and utilization of services? Psychiatr Serv 58:63–71. https://doi.org/10.1176/ps.2007.58.1.63

108. Prus SG (2011) Comparing social determinants of self-rated health across the United States and Canada. Soc Sci Med 1982 73:50–59. https://doi.org/10.1016/j.socscimed.2011.04.010

Chapter 3

3 A Canadian Study of Ethnic Variations in Psychiatric Hospitalization and 30-day Readmission

3.1 Abstract

Introduction: Ethnic differences in the use of mental health services have been demonstrated internationally, but there is a lack of evidence from Canada. This project investigates variations in the prevalence of psychiatric hospitalization and 30-day readmissions across ethnic groups in Canada using linked census and health administrative data.

Methods: We obtained data from the 2006 Canadian Census linked to the 2006/07 through 2008/09 Discharge Abstract Database (DAD) for all provinces and territories except Ontario and Quebec. We estimated the relative prevalence of psychiatric hospitalization for each self-reported ethnic group, and examined the relative risk of 30-day readmission among adults (aged 25 to 64) hospitalized. All analyses were done using logistic regression models controlling for important sociodemographic characteristics identified through a literature search.

Results: The prevalence of psychiatric hospitalization over the three-year period was 0.7% in our sample of 1,306,805 adults, and 8.7% of those hospitalized had a readmission within 30-days. Overall, ethnic minority groups had a lower prevalence of psychiatric hospitalizations, relative to White Canadians. People who identified as West Asian had a significantly higher risk of 30-day readmission, relative to White people (Risk Ratio (RR)=4.19, 95% Confidence Interval (CI)= 1.86 to 9.43).

Conclusions: This project shows variations in the risk of psychiatric hospitalization and 30-day readmission across ethnic groups in Canadians living outside of Ontario and

Quebec. The results of this project could help describe ethnic patterns in service use and aid in the development of specialized mental health initiatives.

3.2 Background

Psychiatric hospitalizations are on the rise, with an 8% increase in psychiatric hospitalizations in Ontario between 2006 and 2014 [1], and similar trends elsewhere in North America [2]. Hospital care for mental disorders comprise approximately 10% of the service contacts worldwide for mental illness [3]. Although this is a small proportion of all mental health care visits, inpatient care accounted for 24% of direct healthcare-related costs for mental illness in Canada in 2015 [4]. Given these trends, it is important to understand the characteristics of people with psychiatric admissions to identify high risk groups and reduce disparities in access to mental health care.

Prior studies have examined the effects of race and ethnicity on the probability of psychiatric hospitalization, and the evidence does not point to one clear trend overall. The methodology varies largely across studies, with most using inpatients as the study base and few comparing to rates in the general population. Some studies find a higher probability of psychiatric hospitalization among ethnic minority groups, whereas others find the opposite result or no significant association [5, 6]. For example, there is evidence from the *National Survey of American Life* in the United States of America that Black respondents, particularly Black people of African heritage, used significantly more mental health inpatient care than Non-Black participants [7]. In direct contrast, data from the United Kingdom found White people were more likely to be hospitalized for early episode psychosis than other ethnic groups [8]. There are also a number of studies that have found no significant association between ethnicity and psychiatric hospitalization [5, 6, 9]. One previous Canadian study on psychiatric hospitalization focused on First Nations people and found a higher risk of hospitalization in First Nations people living in British Columbia than other British Columbian residents [10]. Other Canadian literature has investigated use of any mental health services in Chinese and South Asian Canadians and found significantly lower use in these groups than White Canadians [11]. There is currently no clear trend on the effect of race and ethnicity on the likelihood of psychiatric hospitalization. Hospitalization is complex because it is a function of access to other

appropriate services, need for care, and perception of the hospitalization, which are bound to differ across racial and ethnic groups, as appropriate care and perception of the health care system varies. Indeed, the relationship is likely complex and highly dependent on the social, economic, and health system context.

Another important indicator of psychiatric care is the rate of readmission to the hospital within 30 days. Thirty-day readmission rates are often used as an indicator of the quality of care, suggesting insufficient care during the initial hospitalization or lack of proper follow-up care in the community after discharge [12]. The evidence base for the effects of race and ethnicity on psychiatric readmissions echoes the dissonance found in the literature on psychiatric hospitalizations. A systematic review found that being in a Black racial group increased the risk of readmission in some studies, but decreased the risk of readmission in others [13]. A 2017 study from the United Kingdom found that Black and Black British people had higher odds of being readmitted within 30 days of the initial discharge, compared to White people [14]. They also found no significant differences in readmission rates in other ethnic minority groups, compared to the majority population, as did other studies done with Canadian data [15, 16]. Overall, ethnic groups may have similar risk of early psychiatric readmission, suggesting equivalent quality of mental health care received.

The role of immigration also needs to be considered when understanding the association between ethnicity and psychiatric hospitalization due to the high correlation between immigration and ethnic minority status. Evidence generally suggests that immigrants use fewer mental health services than non-migrants, which could be due to a number of different reasons [17]. The healthy immigrant effect could be playing a role, as recent immigrants tend to use fewer health services overall because they are often healthier than their native born counterparts [18]. As time passes, this effect lessens, and immigrants who have resided in the host country for a longer period of time use more health services than the general population [18]. Additionally, language barriers, lack of knowledge of our health care system, lack of availability of culturally appropriate care, and stigma within migrant communities all act as barriers to care, and could be responsible for the lower rates of mental health service use among immigrant groups [18]. Furthermore, patterns of mental

health service use among migrant groups do not consider the role of migrant class – people who arrive in Canada as refugees may have experienced trauma in their country of origin and may have higher mental health needs than economic migrants, and these patterns would be lost by considering migrants as one homogenous group.

In the current study, the first objective was to investigate whether ethnic minority groups in Canada have different prevalence of psychiatric hospitalization, relative to White Canadians. Our second objective was to examine whether ethnic minority groups have a different risk of 30-day readmission, among those who had a psychiatric hospitalization, relative to White Canadians. Our study is unique in that we were able to compare the population prevalence of psychiatric hospitalization using data coming from two Canadian data sources. Previous studies often use only health administrative databases, which can have fragmented and unreliable sociodemographic data, and limited or no information on race or ethnicity [19]. There is also a notable lack of studies using Canadian data to investigate the social determinants of psychiatric admissions. This project aims to add to the current literature base using newly linked administrative and sociodemographic data from the Discharge Abstract Database and the 2006 Canadian Census.

3.3 Methods

3.3.1 Sample

Individual-level data from the 2006 Canadian Long-Form Census were linked to the 2006/07 through 2008/09 Discharge Abstract Database (DAD) hospitalization records through hierarchical deterministic exact matching using date of birth, sex, and postal code [20]. A validation study has previously shown that 80% of DAD records were accurately linked to a Census record [20]. More detailed information about the linkage and data cleaning process has been reported elsewhere [20, 21]. The Canadian Census includes a national survey collecting demographic information using short- and long-form questionnaires. In 2006, one in five (20%) Canadian households received the long-form questionnaire, which has 53 additional sociodemographic questions and provides more detailed demographic information than its short-form counterpart [22]. The DAD is a database of hospital discharge records from all provinces and territories, except for Quebec.

Each fiscal year of the DAD (from April 1st to March 31st) contains approximately 3 million records.

All eligible 2006 Census records were linked to DAD records to obtain outcome data using unique identifiers created by Statistics Canada. People were included in our sample if they were between the ages of 25 and 64 years and resided in any province other than Quebec or Ontario. We chose this age range because there is evidence of different mental health care needs and service use patterns for people under the age of 24 [23], and the proportion of successful linkages was lower in youth below 25 years [20]. Respondents over the age of 65 years were also excluded from our study because previous literature has shown that older adults should be considered independently of adult populations, as they have unique mental health care needs and patterns of mental health service use [24]. The DAD does not include hospital records for Quebec, and psychiatric hospitalizations in Ontario are reported to a separate database from the DAD, so these provinces were excluded from our analyses.

3.3.2 Measures

Self-reported ethnic group was obtained from the 2006 Census, where respondents were asked to select the population group, or groups, they felt they belonged to from a list. The ethnic groups included: White, Chinese, South Asian, Filipino, Latin American, Southeast Asian, Arab, West Asian, Korean, Japanese, Indigenous, multiple ethnicities, and Black. The Census does not differentiate between different origins of Black people, and prior research has found significant differences in mental health service use and outcomes between Black-Caribbean and Black-African people [25]. Therefore, we used the ethnic origin variable from the Census, which asks people for the ethnic or cultural origins of their ancestors, to classify respondents who selected “Black” into Black-Caribbean, Black-African, and “other” Black. The countries included in each definition can be found in Appendix C.

Psychiatric hospitalizations were identified using the most responsible diagnosis code for each hospitalization from the 2006/07 through 2008/09 DAD databases. The DAD uses the tenth edition of the International Statistical Classification of Diseases and Related

Health Problems (ICD-10) to classify the reasons for hospitalization. The first hospitalization with an ICD-10 code of F10-F51, F53, F55, F59, F60 or F99 in the primary diagnosis position, or with an ICD-10 code related to intentional self-harm (X60 to X84) in any diagnosis position, was considered to be a psychiatric hospitalization. Thirty-day readmission was defined as a second psychiatric hospitalization within 1 to 30 days of discharge from the first psychiatric hospitalization. In accordance with the Canadian Institute for Health Information episode of care definition, admissions on the same day as a discharge were considered to be transfers between hospitals and were therefore not considered to be readmissions [26].

Other sociodemographic factors used in our analyses were derived from the Census, and included: age group at the time of the census (25 to 34 years, 35 to 44 years, 45 to 54 years, or 55 to 64 years), sex (male or female), after-tax income adjusted for family size and composition (in $1000 units), employment in 2005 (worked more than 48 weeks, worked 14 to 48 weeks, or worked less than 14 weeks), highest level of education achieved at the time of the census (less than high school, high school, apprenticeship or other trade certificate, college education, university certificate below Bachelor's level, and Bachelor's degree or above), immigration status (non-immigrants, immigrants, or non-permanent residents such as people on temporary visas), marital status (never married, separated, divorced, widowed, married), primary language spoken (English, French, both English and French, or neither), residential tenure (owns their residence, rents their residence, or lives in band/collective housing), rurality (urban or rural place of residence), province/territory of residence (British Colombia, Alberta, Manitoba, Saskatchewan, New Brunswick, Nova Scotia, Newfoundland, Prince Edward Island (PEI), or a territory), and generation status (1^{st} generation Canadian, 2^{nd} generation Canadian, or 3^{rd} or more generation Canadian).

Additional covariates from the DAD were included for the analysis of 30-day readmission. Length of stay was defined as the number of days from admission to discharge of the first psychiatric hospitalization. Diagnosis from the first psychiatric hospitalization was also included in the models for readmission. More detailed information on how the diagnoses were grouped can be found in Appendix A.

3.3.3 Statistical Analysis

First, characteristics of the study sample were investigated. Categorical sociodemographic factors were examined by calculating the proportions of people in each category, and mean values and standard deviations were used for continuous variables. To comply with Statistics Canada regulations, all numbers reported in this paper were weighted using standardized weights for the 2006 Census and rounded to base 5. Some numbers were aggregated to maintain privacy. Initially, a modified Poisson model was planned, but due to the low prevalence of the outcomes (<10%), the prevalence ratios for hospitalization and risk ratios for 30-day readmission can be approximated using odds ratios [27, 28]. A logistic regression model estimated almost identical coefficients to the modified Poisson model, therefore we estimated a series of logistic regression models for each outcome.

Our first objective was to investigate the effect of ethnicity on the prevalence of psychiatric hospitalization. To assess this, we fit a logistic regression model estimating the relative proportion of people with a psychiatric hospitalization in each ethnic group, relative to White Canadians. To account for potential confounding, this model controlled for age, sex, adjusted household income, highest education earned, employment status, immigration status, marital status, primary language spoken, housing tenure, rurality, and province.

Our second objective was to investigate the effect of ethnicity on the risk of 30-day readmission following a psychiatric hospitalization. The analysis for our second objective was restricted to people who had a psychiatric hospitalization. Logistic regression models were created to estimate the risk of 30-day readmission comparing the proportion of people readmitted in each ethnic group to a White reference group. Previous studies have shown that 30-day readmission is associated with shorter length of stay at the initial hospitalization, and there are differences in the risk of readmission across diagnostic groups [29]. Thus, we controlled for length of stay and diagnosis of the initial hospitalization, in addition to the socio-demographic factors included in the previous model.

Due to the broad scope of this study, we conducted two exploratory subgroup analyses. There is evidence that different mental disorders have distinct relationships with sociodemographic factors [15, 30], but our study combines all diagnoses included in the ICD-10 mental illness category. Therefore, we repeated our analyses for each diagnosis group separately to examine whether the factors associated with the risk of hospitalization differed by diagnosis. Given that diagnosis was included as a covariate in the models for the risk of readmission, a diagnosis stratified analysis was not performed for our second objective. The second subgroup analysis investigated the effect of generation status on our findings, rather than immigration status. Immigration and generation status are very closely tied with ethnicity and the original analyses included immigration status, however there is also evidence of differences in mental disorders across generations for migrant groups [31]. The literature that focuses solely on migrants suggests there may be different relationships between ethnicity and hospitalization for different generation groups [32, 33]. To investigate these differences, the analyses for both objectives were repeated with generation status included as a covariate instead of immigration status. Additional analyses stratified by generation status were also completed for both objectives. All analyses used SAS Enterprise Guide Version 7.1, and results are presented as prevalence ratios (PR) and risk ratios (RR) with corresponding 95% confidence intervals (CI).

3.4 Results

Our final sample included 1,306,805 Canadians aged 25 to 64 years, which was weighted to represent the adult population of Canada excluding Ontario and Quebec. Table 3.1 shows the weighted demographic characteristics for each outcome group. The majority (80%) of people identified as White, with the three next largest ethnic groups being Indigenous (6%), Chinese (5%), and South Asian (3%). After White, these were the three most commonly reported groups in the 2006 Canadian population [34]. There was a larger proportion of Indigenous people among those who had a psychiatric hospitalization and among people who had a readmission, in comparison to the general population. There was a slightly lower proportion of immigrants and non-permanent residents among people with a hospitalization, and even fewer among people who had a readmission. There was no missing data for the variables of interest.

Table 3.1: Demographic characteristics across outcome groups

	No psychiatric hospitalization N=1,297,125	Psychiatric hospitalization N=9,680	Psychiatric readmission N=845
Sociodemographic variables	n (%)	n (%)	n (%)
Sex			
Female	661,520 (51%)	5,205 (54%)	465 (55%)
Male	635,610 (49%)	4,470 (49%)	380 (45%)
Age			
24-34	298,410 (23%)	2,325 (24%)	210 (25%)
35-44	354,060 (27%)	2,880 (30%)	260 (31%)
45-54	373,930 (29%)	2,890 (30%)	255 (30%)
55-64	270,725 (21%)	1,585 (16%)	125 (15%)
Ethnicity			
White	1,042,540 (80%)	7,730 (80%)	700 (83%)
Indigenous	70,965 (6%)	1,195 (12%)	90 (11%)
Chinese	61,140 (5%)	180 (2%)	15 (2%)
South Asian	41,815 (3%)	215 (2%)	15 (2%)
Korean	7,150 (0.6%)	25 (0.3%)	0 (0%)
Black-Caribbean	2,360 (0.2%)	10 (0.1%)	0 (0%)
Filipino	20835 (2%)	55 (0.6%)	30 (4%)
Multiple ethnicities	11345 (0.9%)	65 (0.7%)	
Southeast Asian	8555 (0.7%)	35 (0.4%)	
Latin American	8200 (0.6%)	40 (0.4%)	
Black-African	5360 (0.4%)	30 (0.3%)	
West Asian	4935 (0.4%)	35 (0.4%)	
Japanese	4700 (0.4%)	25 (0.3%)	
Arab	4575 (0.4%)	15 (0.2%)	
Black (Other)	2650 (0.2%)	25 (0.3%)	
Immigration Status			
Non-immigrants	1,032,760 (80%)	8,405 (87%)	765 (91%)
Immigrants	253,605 (20%)	1,230 (13%)	80 (9%)
Non-permanent residents	10,760 (0.8%)	40 (0.4%)	
Generation Status			
3rd+ Generation Canadian	841,570 (65%)	6,980 (72%)	650 (77%)
2nd Generation Canadian	187,470 (14%)	1,390 (14%)	115 (14%)
1st Generation Canadian	268,085 (21%)	1,305 (13%)	85 (10%)

3.4.1 Psychiatric hospitalization

Over the three-year period, 9,680 people (0.74%) had at least one psychiatric hospitalization. Our fully adjusted logistic regression model found significant differences in the prevalence of psychiatric hospitalization across ethnic groups (Table 3.2). The prevalence of psychiatric hospitalization was significantly lower in Black-African people (PR=0.63, 95% CI=0.44 to 0.89), Koreans (PR=0.46, 95% CI=0.30 to 0.80), Southeast Asians (PR=0.53, 95% CI=0.38 to 0.74), Latin Americans (PR=0.59, 95% CI=0.42 to 0.82), Filipinos (PR=0.43, 95% CI=0.33 to 0.56), South Asians (PR=0.85, 95% CI=0.73 to 0.99), Chinese people (PR=0.45, 95% CI=0.38 to 0.53), and those with multiple ethnicities (PR=0.75, 95% CI=0.58 to 0.96), relative to White people. The prevalence of hospitalization was significantly higher among Indigenous Canadians (PR=1.20, 95% CI=1.12 to 1.29), relative to White Canadians. There was also a significantly lower proportion of immigrants and non-permanent residents with psychiatric hospitalizations, relative to non-migrants (Immigrants: PR=0.89, 95% CI=0.83 to 0.96; Non-Permanent Residents: PR=0.51, 95% CI=0.38 to 0.79).

The sensitivity analyses investigating these relationships across different diagnostic groups showed some differences across categories (Table 3.3). The effect of being Indigenous varied the most across diagnoses. For substance use, anxiety, and self-harm related hospitalizations, Indigenous people had 1.60 (95% CI=1.40 to 1.85), 1.25 (95% CI=1.05 to 1.50), and 2.08 (95% CI=1.75 to 2.48) times higher prevalence of hospitalizations than White people, respectively. In contrast, there was a lower prevalence of hospitalization for psychotic disorders among Indigenous people, relative to White people (PR=0.58, 95% CI=0.47 to 0.72). Filipino and Chinese people had lower prevalence of hospitalizations in all diagnostic groups except for psychotic disorders, where there was no difference relative to White people. There was a significantly lower proportion of Black-African people than White people with hospitalizations for substance use disorders (PR=0.19, 95% CI=0.04 to 0.87) and mood disorders (PR=0.40, 95% CI=0.19 to 0.84). Southeast Asian and Latin American people only had significantly lower prevalence of hospitalizations for mood disorders compared to White people (Southeast Asian: PR=0.32,

95% CI=0.15 to 0.66; Latin American: PR=0.58, 95% CI=0.34 to 0.99), with no statistically significant differences in the other diagnostic categories. People with multiple ethnicities had a lower prevalence of hospitalization for substance use disorders (PR=0.47, 95% CI=0.22 to 0.99). South Asian people only differed from White people when considering hospitalizations for anxiety disorders (PR=0.62, 95% CI=0.40 to 0.97) and behavioural/other diagnoses (PR=0.27, 95% CI=0.10 to 0.72).

Table 3.2: Unadjusted and adjusted logistic regression model results for ethnicity and psychiatric hospitalization

Sociodemographic variables	Unadjusted PR (95% CI)	Adjusted [a] PR (95% CI)
Ethnicity (Reference: White)		
Indigenous	2.27 (2.13 to 2.41) *	1.20 (1.12 to 1.29) *
Chinese	0.40 (0.34 to 0.46) *	0.45 (0.38 to 0.53) *
South Asian	0.59 (0.60 to 0.79) *	0.85 (0.73 to 0.99) *
Korean	0.44 (0.29 to 0.66) *	0.46 (0.30 to 0.69) *
Black-Caribbean	0.64 (0.35 to 1.15)	0.61 (0.34 to 1.11)
Filipino	0.36 (0.27 to 0.46) *	0.43 (0.33 to 0.56) *
Multiple ethnicities	0.78 (0.61 to 0.99) *	0.75 (0.57 to 0.96) *
Southeast Asian	0.55 (0.40 to 0.77) *	0. 53 (0.38 to 0.74) *
Latin American	0.62 (0.45 to 0.85) *	0.59 (0.42 to 0.82) *
Black-African	0.81 (0.57 to 1.15) *	0. 63 (0.44 to 0.89) *
West Asian	1.02 (0.74 to 1.41)	0.95 (0.68 to 1.32)
Japanese	0.67 (0.44 to 1.00)	0.70 (0.46 to 1.05)
Arab	0.47 (0.29 to 0.77) *	0.49 (0.30 to 0.80) *
Black (Other)	1.19 (0.79 to 1.79)	0.96 (0.63 to 1.44)
Immigration Status (Reference: Non-immigrant)		
Immigrant	--	0.89 (0.82 to 0.96) *
Non-permanent resident	--	0.51 (0.38 to 0.70) *

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, immigration status, education, employment, family adjusted income, marital status, primary language spoken, rural living, housing tenure, province

* $p < 0.05$

Table 3.3: Adjusted logistic regression model results for ethnicity and hospitalization across diagnosis groups

Sociodemographic variables	Substance use disorders Adjusted [a] PR (95% CI)	Psychotic disorders Adjusted [a] PR (95% CI)	Mood disorders Adjusted [a] PR (95% CI)	Anxiety disorders Adjusted [a] PR (95% CI)	Behavioural/other disorders Adjusted [a] PR (95% CI)	Self-harm related Adjusted [a] PR (95% CI)
Ethnicity (Reference: White)						
Indigenous	1.61 (1.40 to 1.85)*	0.58 (0.47 to 0.72)*	1.06 (0.93 to 1.21)	1.25 (1.05 to 1.50)*	0.82 (0.55 to 1.21)	2.08 (1.75 to 2.48)*
Chinese	0.18 (0.10 to 0.32)*	0.91 (0.69 to 1.21)	0.32 (0.24 to 0.44)*	0.58 (0.40 to 0.86)	0.16 (0.06 to 0.44)*	0.63 (0.41 to 0.97)*
South Asian	1.33 (0.99 to 1.79)	0.97 (0.69 to 1.38)	0.79 (0.61 to 1.01)	0.62 (0.40 to 0.97)	0.27 (0.10 to 0.72)*	0.75 (0.47 to 1.21)
Korean	N/A [b]	0.71 (0.33 to 1.57)	0.53 (0.29 to 1.00)	0.69 (0.29 to 1.69)	N/A [b]	0.38 (0.10 to 1.46)
Black-Caribbean	0.77 (0.23 to 2.63)	1.01 (0.37 to 2.82)	0.74 (0.30 to 1.83)	N/A [b]	N/A [b]	0.46 (0.06 to 3.73)
Filipino	0.46 (0.24 to 0.87)*	0.83 (0.52 to 1.35)	0.30 (0.18 to 0.50)*	0.33 (0.15 to 0.73)	0.26 (0.07 to 0.94)*	0.44 (0.20 to 0.99)*
Multiple ethnicities	0.47 (0.22 to 0.99)*	0.92 (0.56 to 1.52)	0.77 (0.52 to 1.16)	0.96 (0.55 to 1.68)	0.14 (0.02 to 1.30)	0.51 (0.21 to 1.23)
Southeast Asian	0.49 (0.21 to 1.13)	0.2 (0.31 to 1.24)	0.32 (0.15 to 0.66)*	0.44 (0.17 to 1.15)	0.91 (0.32 to 2.58)	0.73 (0.30 to 1.73)
Latin American	0.87 (0.46 to 1.68)	0.71 (0.36 to 1.41)	0.58 (0.34 to 0.99)*	0.55 (0.23 to 1.29)	0.05 (0.00 to 3.29)	0.28 (0.07 to 1.15)
Black-African	0.19 (0.04 to 0.87)*	1.56 (0.94 to 2.59)	0.40 (0.19 to 0.84)*	0.61 (0.25 to 1.47)	0.35 (0.06 to 2.06)	0.18 (0.02 to 1.30)
West Asian	N/A [b]	1.23 (0.65 to 2.31)	0.97 (0.57 to 1.66)	1.52 (0.75 to 3.08)	0.84 (0.21 to 3.33)	1.00 (0.38 to 2.67)
Japanese	1.15 (0.52 to 2.55)	0.46 (0.13 to 1.55)	0.81 (0.43 to 1.49)	0.17 (0.02 to 1.35)	N/A [b]	1.20 (0.48 to 2.99)
Arab	0.67 (0.24 to 1.92)	0.29 (0.06 to 1.36)	0.49 (0.21 to 1.10)	0.35 (0.09 to 1.36)	0.55 (0.10 to 3.06)	1.00 (0.35 to 2.87)
Black (Other)	1.75 (0.84 to 3.64)	1.29 (0.62 to 2.71)	0.69 (0.30 to 1.57)	0.57 (0.17 to 1.98)	N/A [b]	0.57 (0.12 to 2.62)

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, immigration status, education, employment, family adjusted income, marital status, primary language spoken, rural living, housing tenure, province

b No hospitalizations in this group

* $p < 0.05$

Table 3.4: Adjusted logistic regression model results for ethnicity and hospitalization across generations of Canadians

	All Canadians	1st Generation Canadians	2nd+ Generation Canadians
Sociodemographic variables	Adjusted PR (95% CI)	Adjusted [a] PR (95% CI)	Adjusted [a] PR (95% CI)
Ethnicity (Reference: White)			
Indigenous	1.20 (1.12 to 1.29)*	-- [b]	-- [b]
Chinese	0.45 (0.38 to 0.53)*	0.39 (0.32 to 0.47)*	0.73 (0.52 to 1.02)
South Asian	0.85 (0.73 to 0.98)*	0.77 (0.64 to 0.91)*	1.18 (0.86 to 1.62)
Korean	0.41 (0.27 to 0.63)*	0.37 (0.23 to 0.58)*	1.25 (0.43 to 3.68)
Black-Caribbean	0.61 (0.34 to 1.10)	0.49 (0.23 to 1.04)	0.78 (0.30 to 2.03)
Filipino	0.42 (0.32 to 0.55)*	0.39 (0.29 to 0.53)*	0.56 (0.24 to 1.31)
Multiple ethnicities	0.74 (0.58 to 0.95)*	0.51 (0.34 to 0.76)*	0.94 (0.71 to 1.33)
Southeast Asian	0.52 (0.37 to 0.74)*	0.47 (0.33 to 0.67)*	0.31 (0.04 to 2.44)
Latin American	0.57 (0.41 to 0.80)*	0.53 (0.37 to 0.74)*	0.73 (0.21 to 2.52)
Black-African	0.62 (0.43 to 0.88)*	0.55 (0.37 to 0.81)*	0.96 (0.36 to 2.56)
West Asian	0.94 (0.68 to 1.13)	0.88 (0.62 to 1.24)	2.28 (0.48 to 10.88)
Japanese	0.64 (0.42 to 0.97)*	0.57 (0.32 to 1.00)*	0.75 (0.41 to 1.39)
Arab	0.48 (0.29 to 0.78)*	0.40 (0.22 to 0.71)*	0.78 (0.29 to 2.09)
Black (Other)	0.95 (0.63 to 1.43)	1.43 (0.79 to 2.58)	0.69 (0.39 to 1.22)
Generation Status (Reference: 3rd+ Generation Canadian)			
1st Generation Canadian	0.88 (0.82 to 0.96)*	--	--
2nd Generation Canadian	1.03 (0.97 to 1.09)	--	--

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, education, employment, family adjusted income, marital status, primary language spoken, rural living, housing tenure, province

b Due to the complexities of Indigeneity and generation status in the context of a colonial nation, people who identified as Indigenous were not included in this subgroup analysis

* $p < 0.05$

Including generation status rather than immigration status showed no significant differences between second-generation Canadians and third- and subsequent generation Canadians. Therefore, a stratified subgroup analysis was done for first-generation

Canadians and second- and subsequent-generation Canadians separately. The analyses limited to first-generation Canadians were largely the same as the main analyses. The adjusted logistic regression model limited to first-generation Canadians showed larger differences between ethnic minority Canadians and White Canadians than the general models including the entire population (Table 3.4).

3.4.2 30-day readmission

Of the 9,680 people who had a psychiatric hospitalization, 845 (8.7%) had a readmission within 30 days. Unlike the models for hospitalization, the readmission outcome analyses found fewer statistically significant differences across ethnic groups (Table 3.5). West Asians were the only ethnic group with significant effects, relative to the White group, with West Asian patients having more than a four-fold greater risk of 30-day readmission compared to White patients (RR=4.19, 95% CI=1.86 to 9.43). Immigrants had a significantly lower risk of readmission relative to non-immigrants (RR=0.62, 95% CI=0.45 to 0.84), but non-permanent residents did not have a significantly different risk of readmission relative to non-immigrants. People who were hospitalized for self-harm behaviours (RR=0.65, 95% CI=0.51 to 0.84), those with a hospitalization for anxiety disorders (RR=0.63, 95% CI=0.49 to 0.81), and people with substance use related hospitalizations (RR=0.78 95% CI=0.63 to 0.95) had a significantly lower risk of readmission, relative to people with an index hospitalization for mood disorders.

When including generation status in the model, rather than immigration status, first generation Canadians were significantly less likely to be readmitted than third generation Canadians (RR=0.59, 95% CI=0.44 to 0.81), but there was no significant difference between second and third generation Canadians (Table 3.6). Due to the smaller sample size, it was not possible to run the models stratified by generation status.

Table 3.5: Adjusted logistic regression model results for ethnicity and 30-day readmission

Sociodemographic variables	Adjusted [a] RR (95% CI)
Ethnicity (Reference: White)	
Indigenous	0.84 (0.65 to 1.09)
Chinese	1.20 (0.66 to 2.18)
South Asian	0.90 (0.49 to 1.66)
Korean	N/A [b]
Black-Caribbean	N/A [b]
Filipino	1.60 (0.63 to 4.05)
Multiple ethnicities	1.22 (0.53 to 2.84)
Southeast Asian	0.67 (0.13 to 3.39)
Latin American	1.12 (0.32 to 3.89)
Black-African	0.39 (0.05 to 3.01)
West Asian	4.19 (1.86 to 9.43) *
Japanese	0.52 (0.06 to 4.10)
Arab	1.71 (0.35 to 8.35)
Black (Other)	1.13 (0.29 to 4.58)
Immigration Status (Reference: Non-immigrant)	
Immigrant	0.62 (0.45 to 0.84) *
Non-permanent resident	0.49 (0.12 to 2.04)

Abbreviations: RR=Risk Ratio; CI= Confidence Interval

a Adjusted for age, sex, immigration status, education, employment, family adjusted income, marital status, primary language spoken, rural living, housing tenure, province, initial hospitalization diagnosis, length of stay of initial hospitalization

b No readmissions in this group

* $p < 0.05$

Note: Unadjusted regression models for ethnicity and 30-day readmission cannot be presented due to privacy rules surrounding the Census data

Table 3.6: Adjusted logistic regression model results for ethnicity and 30-day readmission controlling for generation status instead of immigration status

Sociodemographic variables	Adjusted [a] RR (95% CI)
Ethnicity (Reference: White)	
Indigenous	0.83 (0.64 to 1.08)
Chinese	1.24 (0.68 to 2.25)
South Asian	0.91 (0.49 to 1.68)
Korean	N/A [b]
Black-Caribbean	N/A [b]
Filipino	1.61 (0.64 to 4.08)
Multiple ethnicities	1.21 (0.52 to 2.83)
Southeast Asian	0.72 (0.14 to 3.61)
Latin American	1.12 (0.33 to 3.87)
Black-African	0.40 (0.05 to 3.08)
West Asian	4.32 (1.92 to 9.72) *
Japanese	0.50 (0.06 to 4.00)
Arab	1.83 (0.37 to 8.92)
Black (Other)	1.18 (0.30 to 4.67)
Generation Status (Reference: 3rd+ generation Canadian)	
1st generation Canadian	0.59 (0.44 to 0.81)*
2nd generation Canadian	0.85 (0.68 to 1.06)

Abbreviations: RR=Risk Ratio; CI= Confidence Interval

a Adjusted for age, sex, education, employment, family adjusted income, marital status, primary language spoken, rural living, housing tenure, province, initial hospitalization diagnosis, length of stay of initial hospitalization

b No readmissions in this group

* $p < 0.05$

3.5 Discussion

Our findings suggest that in general, most ethnic minority groups had a significantly lower prevalence of psychiatric hospitalization relative to White Canadians. However, few ethnic differences were observed for 30-day readmissions.

These findings could potentially be explained by differences in the severity of mental illness or differences in access to care across ethnic groups. People from ethnic minority groups may have lower rates of some mental disorders, or when disorders are present experience less severe forms of illnesses, which would lower their need for hospital care. Conversely, there could be a similar need for mental health care, but differences in the perceived need, or in the willingness and ability to access hospital care – in this scenario, our findings would suggest an unmet need for hospital care among ethnic minority groups. Prior evidence suggests that people from ethnic minority groups may have a lower perceived need for mental health care, relative to White people, particularly within African-American groups [35, 36]. Ability and willingness to access health care has also been found to vary across ethnic groups [37], and people from ethnic minority groups often face greater barriers to accessing health care, which could explain why we see fewer hospitalizations among ethnic minorities [37–39]. Differences in pathways to mental health care could also be driving the trends that we observed; for example, people from ethnic minority groups have been found to more frequently enter into the criminal justice system, rather than the health care system, when experiencing the symptoms of a mental disorder, which would reduce the likelihood of a psychiatric admission [40].

Of exception, our findings suggest that people who self-identified as Indigenous had a higher prevalence of psychiatric hospitalization, which was also found in a 2018 study looking at First Nations people in British Colombia [10]. In the current study, there were some interesting variations within specific diagnostic groups: Indigenous people were more likely than White people to be hospitalized for substance use, anxiety, and self-harm diagnoses, but had a lower prevalence of hospitalization for psychotic disorders. There are high rates of substance use disorders and suicide in Indigenous communities, relative to the general population [41], and there is also prior evidence of higher rates of anxiety disorders in Indigenous populations [42]. Our findings are also likely reflecting the effects

of racism, discrimination, and colonial policies that negatively impact Indigenous people and reduce access to culturally appropriate care, thereby leading people to reach a crisis point where they need hospitalization [43]. The differing results across diagnosis groups could also be reflecting differences in the presentation and conceptualization of mental illness in Indigenous people, which do not necessarily map onto mental illnesses as they are defined in the ICD-10 [43].

Prior evidence comparing psychiatric hospitalizations across ethnic minority groups in Canada is very limited. Existing research in this area has often relied on self-reported mental health service use, which asks respondents whether they have consulted a professional for their emotional or mental health. This gives a good indicator of access to mental health care but loses the distinction between inpatient and outpatient care. Prior Canadian research has found lower general mental health service use in ethnic minorities, specifically for Chinese and South Asian Canadians [11, 44–46]. A prior study by Chiu and colleagues in 2018 found that Chinese people in Ontario had poorer mental health than White people, but Chinese and South Asian Canadians were less likely to seek help for mental health reasons [11]. They also found that Chinese and South Asian Canadians who had a psychiatric hospitalization had more severe symptoms than White Canadians [47]. Taken together, these findings suggest there may be an unmet need for mental health care for Chinese and South Asian people in Canada, and there could be delays in help-seeking for these groups. In the current study, Chinese people had significantly fewer hospitalizations than White people, both overall and in all diagnostic categories except for psychotic disorders. South Asian people had a lower prevalence of hospitalization overall, but only for anxiety and behavioural/other diagnoses in the stratified analysis. Overall, our results suggest that ethnic differences in access to general mental health care can also be seen in inpatient care, however further research is needed to clarify potential differences across care settings.

Previous literature has typically been limited in the ethnic groups that are included, and often aggregates heterogeneous ethnic groups from similar geographic regions. The results of the current study – which included all available ethnic groups without combining categories – suggest that there are notable differences when considering specific ethnic

subgroups. For example, it is very common for Filipino and Southeast Asian people to be combined into one ethnic group. We found larger differences across diagnostic subgroups in the proportion of Filipino Canadians with a psychiatric hospitalization than for Southeast Asian Canadians. Similarly, West Asian and Arab groups are rarely included as distinct ethnic groups. In this study, West Asian people were at a significantly higher risk for 30-day readmission, relative to White people, but there was no significant difference observed for Arab Canadians in the risk of 30-day readmission. These specific ethnic differences illustrate the potential effect of cultural factors on patterns of mental health service use, and call for more research to be done using disaggregated ethnic groups.

We also found that immigrants had a lower prevalence of psychiatric hospitalizations, relative to non-immigrants. There is not a clear evidence base on mental health service use among immigrant groups, but prior studies suggest that the overall prevalence of some disorders is lower in immigrants than non-immigrants [32]. Following this trend, our study found that immigrants and non-permanent residents – such as people living in Canada on a work or study visa – had a lower prevalence of psychiatric hospitalization, but only immigrants were at lower risk of 30-day readmission. This generally follows the healthy immigrant effect, in which immigrants have better health than the general Canadian population [48]. In our subgroup analysis limited to first-generation migrants, we found a larger magnitude of difference between first-generation ethnic minority groups relative to first-generation White groups, as compared to findings for second- and third-generation Canadians where there was no significant difference across groups. This may suggest that the differences found in the overall analyses are driven by the differences across first-generation ethnic minority groups.

3.5.1 Limitations

Our findings are strengthened by the use of linked census and health administrative data, which allowed for detailed analysis of the effects of socio-demographic factors on the prevalence of psychiatric hospitalization. This also enabled us to examine specific ethnic groups without aggregation, which has been a limitation of prior studies on this topic. However, this study has several noteworthy limitations, primarily due to inherent limitations of the data, we focus here on three of them.

This study does not include the provinces of Quebec and Ontario, so the findings are not representative of all of Canada. Ontario and Quebec are home to a large proportion of foreign born Canadians [49], and hospitalization trends could be very different in these areas. We also do not know whether people in our sample moved out of Canada or died between 2006 and 2009, which would mean the prevalence estimates presented in this study could be underestimated. Finally, there is the risk of residual confounding by unmeasured variables associated with ethnicity and mental illness or mental health service use. For example, social support systems vary by ethnic group and are associated with patterns of mental health service use; however, our study could not include this factor because it is not measured by the census. Notably, we also did not have information on migrant class among first-generation ethnic minority groups, and the prevalence of hospitalization may differ for economic, family reunification, and refugee groups.

3.5.2 Conclusions

We found variations in the prevalence of psychiatric hospitalization and risk of 30-day readmission across ethnic groups. There was a significantly lower prevalence of psychiatric hospitalizations among Black-African, Arab, Chinese, Filipino, Korean, Latin American, South Asian, Southeast Asian, and people who identify as multiple ethnicities, and significantly higher prevalence of hospitalization in those who identified as Indigenous, relative to White people. Few differences were observed in 30-day readmission. These findings, combined with previous literature showing a higher incidence and severity of mental disorders in some ethnic minority groups, may suggest disparities in access to psychiatric inpatient care.

3.6 Acknowledgements

This research was supported by funds to the Canadian Research Data Centre Network (CRDCN) from the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institute for Health Research (CIHR), the Canadian Foundation for Innovation (CFI), and Statistics Canada. Although the research and analysis are based on data from Statistics Canada, the opinions expressed do not represent the views of Statistics Canada.

3.7 References

1. Chiu M, Gatov E, Vigod SN, et al (2018) Temporal trends in mental health service utilization across outpatient and acute care sectors: a population-based study from 2006 to 2014. Can J Psychiatry 63:94–102. https://doi.org/10.1177/0706743717748926

2. McDermott KW, Elixhauser A, Sun R (2017) Trends in hospital inpatient stays in the United States, 2005-2014: statistical brief #225. Agency for Healthcare Research and Quality, Rockville (MD)

3. World Health Organization (2018) Mental health atlas 2017. World Health Organization, Geneva, Switzerland

4. Wilson M, Bradley L (2017) Strengthening the case for investing in Canada's mental health system: economic considerations. Mental Health Commission of Canada, Ottawa, ON

5. Bhui K, Stansfeld S, Hull S, Priebe S (2003) Ethnic variations in pathways to and use of specialist mental health services in the UK Systematic review. Br J Psychiatry 182:105–116

6. Mann F, Fisher HL, Johnson S (2014) A systematic review of ethnic variations in hospital admission and compulsory detention in first-episode psychosis. J Ment Health 23:205–211. https://doi.org/10.3109/09638237.2014.910641

7. Snowden LR, Hastings JF, Alvidrez J (2009) Overrepresentation of Black Americans in psychiatric inpatient care. Psychiatr Serv 60:779–785

8. Goater N, King M, Cole E, et al (1999) Ethnicity and outcome of psychosis. Br J Psychiatry 175:34–42. https://doi.org/10.1192/bjp.175.1.34

9. Padgett DK, Patrick C, Burns BJ, Schlesinger HJ (1994) Ethnic differences in use of inpatient mental health services by blacks, whites, and Hispanics in a national insured population. Health Serv Res 29:135–153

10. Lavoie JG, Ward A, Wong ST, et al (2018) Hospitalization for mental health related ambulatory care sensitive conditions: what are the trends for First Nations in British Columbia? Int J Equity Health 17:156. https://doi.org/10.1186/s12939-018-0860-7

11. Chiu M, Amartey A, Wang X, Kurdyak P (2018) Ethnic differences in mental health status and service utilization: a population-based study in Ontario, Canada. Can J Psychiatry 63:481–491. https://doi.org/10.1177/0706743717741061

12. Hermann R, Mattke S (2004) Selecting indicators for the quality of mental health care at the health systems level in OECD countries. OECD Publishing, Paris

13. Donisi V, Tedeschi F, Wahlbeck K, et al (2016) Pre-discharge factors predicting readmissions of psychiatric patients : a systematic review of the literature. BMC Psychiatry 16:449. https://doi.org/10.1186/s12888-016-1114-0

14. Evans LJ, Harris V, Newman L, Beck A (2017) Rapid and frequent psychiatric readmissions: associated factors. Int J Psychiatry Clin Pract 21:271–276. https://doi.org/10.1080/13651501.2017.1324037

15. Chen S, Collins A, Kidd SA (2018) Thirty-day and 5-year readmissions following first psychiatric hospitalization: a system-level study of Ontario's psychiatric care. Can J Psychiatry 63:410–415. https://doi.org/10.1177/0706743717751667

16. Chiu M, Gatov E, Zaheer J, et al (2018) Postdischarge service utilisation and outcomes among Chinese and South Asian psychiatric inpatients in Ontario, Canada: a population-based cohort study. BMJ Open 8:. https://doi.org/10.1136/bmjopen-2017-020156

17. Alonso J, Angermeyer MC, Bernert S, et al (2004) Use of mental health services in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. Acta Psychiatr Scand Suppl 47–54. https://doi.org/10.1111/j.1600-0047.2004.00330.x

18. Rivera B, Casal B, Currais L (2016) The Healthy Immigrant Effect on Mental Health: Determinants and Implications for Mental Health Policy in Spain. Adm Policy Ment Health 43:616–627. https://doi.org/10.1007/s10488-015-0668-3

19. National Research Council (US) Panel on DHHS Collection of Race and Ethnicity Data (2003) Improving racial and ethnic data on health: report of a workshop. National Academies Press (US), Washington (DC)

20. Rotermann M (2015) Linking 2006 Census and hospital data in Canada. Health Rep 26:13

21. Statistics Canada, Social Survey Methods Division (2010) 2006 Census Technical Report: Coverage. Statistics Canada, Social Survey Methods Division, Ottawa

22. Statistics Canada, Census Operations Division (2010) 2006 Census dictionary. Statistics Canada, Ottawa

23. MHASEF Research Team (2018) Mental health and addictions system performance in Ontario: a baseline scorecard. Institute for Clinical Evaluative Sciences, Toronto, ON

24. Faculty of Old Age Psychiatry, the Royal College of Psychiatrists (2018) Suffering in silence: age inequality in older people's mental health care. Royal College of Psychiatrists

25. Gibbs TA, Okuda M, Oquendo MA, et al (2013) Mental health of African Americans and Caribbean Blacks in the United States: results from the national epidemiological survey on alcohol and related conditions. Am J Public Health 103:330–338. https://doi.org/10.2105/AJPH.2012.300891

26. Peng M, Li B, Southern D, et al (2017) Constructing episodes of inpatient care: how to define hospital transfer in hospital administrative health data? Med Care 55:74–78. https://doi.org/10.1097/MLR.0000000000000624

27. Bastos LS, Oliveira R de VC de, Velasque L de S (2015) Obtaining adjusted prevalence ratios from logistic regression models in cross-sectional studies. Cad Saúde Pública 31:487–495. https://doi.org/10.1590/0102-311x00175413

28. Zocchetti C, Consonni D, Bertazzi PA (1997) Relationship between prevalence rate ratios and odds ratios in cross-sectional studies. Int J Epidemiol 26:220–223. https://doi.org/10.1093/ije/26.1.220

29. Fuller DA, Sinclair E, Snook J (2016) Length of stay and readmission rates in state hospitals - a comparative state survey. Treatment Advocacy Center, Arlington, Virginia

30. Haggerty R, Mrazek P (1994) Risk and protective factors for the onset of mental disorders. In: Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research. National Academies Press (US)

31. Pahwa P, Karunanayake CP, McCrosky J, Thorpe L (2012) Longitudinal trends in mental health among ethnic groups in Canada. Chronic Dis Inj Can 32:13

32. Edwards J, Hu M, Thind A, et al (2019) Gaps in understanding of the epidemiology of mood and anxiety disorders among migrant groups in Canada: a systematic review. Can J Psychiatry 64:595–606. https://doi.org/10.1177/0706743719839313

33. Leao TS, Sundquist J, Frank G, et al (2006) Incidence of schizophrenia or other psychoses in first- and second-generation immigrants: a national cohort study. J Nerv Ment Dis 194:27–33. https://doi.org/10.1097/01.nmd.0000195312.81334.81

34. Population Groups (28) and Sex (3) for the Population of Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 2006 Census [Table]. Statistics Canada

35. Villatoro AP, Mays VM, Ponce NA, Aneshensel CS (2018) Perceived need for mental health care: the intersection of race, ethnicity, gender, and socioeconomic status. Soc Ment Health 8:1–24. https://doi.org/10.1177/2156869317718889

36. Memon A, Taylor K, Mohebati LM, et al (2016) Perceived barriers to accessing mental health services among black and minority ethnic (BME) communities: a qualitative study in Southeast England. BMJ Open 6:. https://doi.org/10.1136/bmjopen-2016-012337

37. Szczepura A (2005) Access to health care for ethnic minority populations. Postgrad Med J 81:141–147. https://doi.org/10.1136/pgmj.2004.026237

38. Degrie L, Gastmans C, Mahieu L, et al (2017) How do ethnic minority patients experience the intercultural care encounter in hospitals? A systematic review of qualitative research. BMC Med Ethics 18:2. https://doi.org/10.1186/s12910-016-0163-8

39. Katikireddi SV, Cezard G, Bhopal RS, et al (2018) Assessment of health care, hospital admissions, and mortality by ethnicity: population-based cohort study of health-system performance in Scotland. Lancet Public Health 3:e226–e236. https://doi.org/10.1016/S2468-2667(18)30068-9

40. Halvorsrud K, Nazroo J, Otis M, et al (2018) Ethnic inequalities and pathways to care in psychosis in England: a systematic review and meta-analysis. BMC Med 16:223. https://doi.org/10.1186/s12916-018-1201-9

41. Aboriginal Mental Health: The statistical reality | Here to Help. https://www.heretohelp.bc.ca/aboriginal-mental-health-statistical-reality. Accessed 30 Aug 2019

42. Carrière G (2018) Acute care hospitalizations for mental and behavioural disorders among First Nations people. Health Rep 29:11

43. Cultural Safety Working Group, First Nation, Inuit, Métis Advisory Committee of the Mental Health Commission of Canada (2011). Holding Hope in our Hearts: Relational Practice and Ethical Engagement in Mental Health and Addictions, Ottawa.

44. Gadalla TM (2010) Ethnicity and seeking treatment for depression: a Canadian national study. Can Ethn Stud 41:233–245. https://doi.org/10.1353/ces.2010.0042

45. Chen AW, Kazanjian A, Wong H (2009) Why do Chinese Canadians not consult mental health services: health status, language or culture? Transcult Psychiatry 46:623–641. https://doi.org/10.1177/1363461509351374

46. Grace SL, Tan Y, Cribbie RA, et al (2016) The mental health status of ethnocultural minorities in Ontario and their mental health care. BMC Psychiatry 16:. https://doi.org/10.1186/s12888-016-0759-z

47. Chiu M, Lebenbaum M, Newman A, et al (2016) Ethnic differences in mental illness severity: a population-based study of Chinese and South Asian patients in Ontario, Canada. J Clin Psychiatry 77:. https://doi.org/10.4088/jcp.15m10086

48. Government of Canada SC (2019) Healthy immigrant effect by immigrant category in Canada. https://www150.statcan.gc.ca/n1/pub/82-003-x/2019004/article/00001-eng.htm. Accessed 27 Aug 2019

49. Chui T, Flanders J (2013) Immigration and ethnocultural diversity in Canada: National Household Survey, 2011. Statistics Canada = Statistique Canada, Ottawa

Chapter 4

4 Socioeconomic Variations in Psychiatric Hospitalization and 30-day Readmission in Canada

4.1 Abstract

Background: Previous research on the association between indicators of socioeconomic status – such as income, education, and employment – and the use of inpatient mental health services in Canada is limited. This project used detailed demographic data from the 2006 Canadian Census linked to administrative hospital records to assess the impact of socioeconomic status on psychiatric hospitalization and 30-day readmission.

Methods: Records from adults age 25 to 64 years from the 2006 Canadian Census were linked to the 2006/07 through 2008/09 Discharge Abstract Database (excluding Ontario and Quebec). Indicators of socioeconomic status included family-adjusted after-tax income, highest educational attainment, and past 12-month employment. We assessed their associations with the prevalence of a hospital admission for a mental disorder, substance use disorder, or self-harm, and the risk of readmission within 30 days of a psychiatric hospitalization. We compared hospitalizations and 30-day readmissions across the indicators of socioeconomic status using logistic regression models controlling for important socio-demographic characteristics to estimate prevalence ratios (PR), risk ratios (RR), and 95% confidence intervals (95% CI).

Results: Our models showed gradient relationships between increasing prevalence of psychiatric hospitalization with decreasing socioeconomic status across all indicators. For 30-day readmission, working 14 to 48 weeks was associated with lower risk of readmission than working less than 14 weeks (RR=0.82, 95% CI=0.68 to 0.99).

Conclusion: Our findings suggest that indicators of socioeconomic status are significantly associated with psychiatric hospitalization using Canadian data. Findings from this project could inform initiatives to reduce the prevalence of psychiatric hospitalizations and the risk of readmission.

4.2 Background

A gradient relationship between socioeconomic status and negative health outcomes has been demonstrated across numerous health conditions and in various social contexts. Prior research has established that people with higher socioeconomic status have more resources at their disposal for maintaining good health [1]. This translates directly to mental health - people in lower socioeconomic positions have higher risk of mental disorders [2–4].

Previous international literature suggests that people in lower socioeconomic positions are more likely to use inpatient mental health services [5–10]. This is possibly the result of lower access to specialized mental health care in people in low socioeconomic positions [11–13]; specialized mental health services help people manage their mental illnesses and reduce their need for inpatient care [14, 15]. Lower access to specialized care for people in low socioeconomic positions is likely also affecting the risk of readmission after hospitalizations. Thirty-day readmissions are often used as an indicator of quality of inpatient care, but are also reflective of poor access to outpatient follow-up care after discharge [16]. Without proper follow-up care, the risk of readmission increases significantly [17]. Previous studies have found people in higher socioeconomic positions tend to be readmitted less often [18–20].

Defining socioeconomic status can be difficult because it is a concept that is not directly measurable. Therefore, research uses indicators such as income, education, and employment to represent socioeconomic advantage. These indicators are commonly used throughout the literature on socioeconomic variations in mental health service use, but many studies do not report multiple indicators of socioeconomic status [6, 7, 9, 10]. Measuring socioeconomic status using multiple indicators is important because each indicator may have a different relationship with psychiatric hospitalization depending on the social and health system context. In general, people with low income tend to report more accessibility barriers to get the care they need – such as lack of transportation or an inability to take time off work – whereas employment and education are usually associated with acceptability barriers, such as stigma [21, 22]. These barriers exist even within Canada, where inpatient healthcare is publicly funded so financial barriers are less

relevant to accessing inpatient care compared to other countries without publicly funded care [21–23]. For example, differences in unmet needs for any health care across income groups are stronger in the United States than in Canada, and there is evidence of more unmet need for mental health care in low-income Americans than Canadians [23–25].

There is a notable lack of Canadian studies investigating social determinants of hospitalizations for mental illness. The studies that have been published using Canadian data are focused on overall mental health service use, and do not distinguish between inpatient and outpatient care. Having Canadian data is important because each country has a unique healthcare system and funding model which will determine barriers to care and the factors associated with accessing care, as explained in the previous paragraph. Another important gap in the previous literature is the limited use of individual-level data; many studies used neighbourhood socioeconomic status, which does not necessarily represent the individual characteristics of each person. For example, previous research has found that measuring income at the neighbourhood level is not a good proxy measure for individual income [26]. Therefore, there is a need for more large-scale studies investigating the associations between multiple indicators of socioeconomic status and psychiatric hospitalization and 30-day readmission using individual-level Canadian data.

This project investigates the effect of income, education, and employment on the prevalence of psychiatric hospitalization and risk of 30-day readmission using linked national demographic and health administrative data from Canada. Our first objective was to investigate whether indicators of socioeconomic status were associated with the prevalence of psychiatric hospitalization for Canadians aged 25 to 64 years, living outside of Ontario and Quebec. Our second objective was to examine whether indicators of socioeconomic status were associated with the risk of 30-day readmission among those with a psychiatric hospitalization.

4.3 Methods

4.3.1 Data sources and sample

The Canadian Census is conducted every five years, and assesses demographic information though a short- and long-form questionnaire. All Canadian households receive the short-form questionnaire, whereas the long-form questionnaire is distributed to approximately 20% of the Canadian population and gathers more detailed socio-demographic information that can be weighted to represent the full Canadian population [27]. The Census data is collected, cleaned, and imputed by Statistics Canada [28]. The Discharge Abstract Database (DAD) is national dataset that includes information from inpatient hospitalizations in all provinces and territories in Canada, except for Quebec. A hierarchical deterministic linkage using date of birth, sex, and postal code was performed to link the 2006 long-form Census to the 2006/07 through 2008/09 DAD records. This linkage created a database that could be used to investigate relationships between socio-demographic factors and hospitalizations across Canada [29]. A validation study found that 80% of all DAD records were accurately linked to a Census record [29]. More detailed information about the linkage methodology has been reported previously [29].

The sample for this project was derived from this linked dataset and includes all Census-DAD linked records for adults age 25 to 64 years living in all provinces and territories in Canada, except for Quebec and Ontario. The province of Quebec does not report hospitalization data to the DAD, and Ontario reports all adult psychiatric hospitalizations to the Ontario Mental Health Reporting System. These provinces were therefore excluded from our analyses due to missing hospitalization information. Our choice of age range was based on prior literature showing different needs and patterns of mental health service use among youth [30], as well as a lower probability of Census-DAD linkage for people under the age of 25 [29]. Similarly, older adults have different patterns of mental health service use, and different risks for mental disorders, and previous literature recommends studying them independently from adult populations [31]. Furthermore, youth and older adults would have very different patterns of educational attainment, employment, and income; therefore, we opted to restrict the age of our sample to people between the ages of 25 and 64 years.

4.3.2 Measures

Socioeconomic Indicators:

This project uses multiple indicators of socioeconomic status – including educational attainment, past-year employment, and after-tax adjusted income – to investigate the factors associated with psychiatric hospitalizations and readmissions. Educational attainment has been shown to be important in many health outcomes, but having education beyond a Bachelor's degree is not generally associated with any additional health benefits [32]. Therefore, education has been categorized as follows, based on the highest degree earned: less than high school education; high school graduate or equivalent; trade certificate/apprenticeship certificate; college/CEGEP or other non-university certificate or diploma; university certificate or diploma below the Bachelor level; and university degree at a Bachelor's level or above. Employment was measured on the census as the number of weeks worked in the previous year (2005) and categorized into those who worked more than 48 weeks, 14 to 48 weeks, or less than 14 weeks in 2005. For our income variable, we used family-adjusted after-tax income in 2005, which adjusts income based on family composition and size [27]. The scale that adjusts this variable takes into account the lower resources required for each additional family member, relative to a single person, and gives a better estimate of the financial resources available [33]. The range of this variable was large, so it was divided into $10,000 units to aid interpretation. To further explore the effect of income, the census variable representing low-income family status was used in a sensitivity analysis in place of after-tax family-adjusted income. This variable compares a family's after-tax income to a cut-off point determined by Statistics Canada, and reports on their position relative to this point [27].

Outcomes:

Psychiatric hospitalizations were identified using diagnosis codes reported in the DAD, which are classified using the tenth version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). Our outcome of psychiatric hospitalization was defined as the first hospitalization in the DAD with a most

responsible diagnosis of a mental health condition (ICD-10 code F10-F51, F53, F55, F59, F60 or F99), or with diagnostic code for self-harm (ICD-10 code X64 to X80) in any diagnosis code position. We used a similar method to define 30-day psychiatric readmission; a readmission was defined as any psychiatric hospitalization fitting the definition above within 1 to 30 days of discharge from the first psychiatric hospitalization. This is consistent with the Canadian Institute for Health Information definition of an episode of psychiatric care, in which admissions on the same day as discharges are considered to be transfers between hospitals, and therefore are not considered to be readmissions [34].

Additional Covariates:

We included additional socio-demographic variables in our analyses to control for their potential impact. These variables were derived from the Census, and included: age at the time of the census, sex (male or female), ethnicity (White, Chinese, South Asian, Filipino, Latin American, Southeast Asian, Arab, West Asian, Korean, Japanese, Indigenous, multiple ethnicities, Black-African, Black-Caribbean, and Black-Other), immigration status (non-immigrants, immigrants, or non-permanent residents), marital status (never married, separated, divorced, widowed, married), primary language spoken (English, French, both, or neither), housing tenure (owns their residence, rents their residence, or lives in band/collective housing), rurality of residence (urban or rural), and province/territory (lives in British Colombia, Alberta, Manitoba, Saskatchewan, New Brunswick, Nova Scotia, Newfoundland, Prince Edward Island (PEI), or a territory). Length of stay was derived from the first psychiatric hospitalization records in the DAD, defined as the number of days between admission and discharge of the first psychiatric hospitalization. Diagnosis for the first psychiatric hospitalization was also obtained from DAD and categorized using the ICD-10 groupings for mental illness diagnosis codes (see Appendix A).

4.3.3 Statistical Analysis

Weighted frequencies of demographic factors were calculated using standardized weights provided by Statistics Canada. The proportion of people with a psychiatric hospitalization was calculated across categorical variables, and means and standard deviations were calculated for continuous variables. We had initially planned to use modified Poisson regression models for analyses, however due to the rarity of the outcomes (<10%) we opted to use logistic regression models to estimate odds ratios and 95% confidence intervals (CI), which were used to approximate the prevalence ratio (PR) and risk ratio (RR) [35, 36].

Our first objective was to investigate the effect of indicators of socioeconomic status on the proportion of people with a psychiatric hospitalization. First, unadjusted models looking at each socioeconomic indicator and the prevalence of hospitalization were created. We then used an adjusted multivariable logistic regression model to estimate the relative prevalence of hospitalization across the different socioeconomic indicators, using the lowest levels of education and employment as the reference group, and modelling income in $10,000 units. This model controlled for age, sex, ethnicity, immigration status, marital status, primary language spoken, housing tenure, rurality, and province. The covariance matrix of this model was checked to ensure there was no significant collinearity between variables.

Our second objective was to examine the effect of indicators of socioeconomic status on the risk of 30-day readmission. We again used multivariable logistic regression models with the aforementioned variables. These models additionally included length of stay and the diagnosis of the index hospitalization in the models, as shorter length of stay was strongly associated with increased risk of 30-day readmission in previous studies, and large variations in the risk of readmission have been found across diagnosis groups [37].

Previous literature suggests different risk profiles and service use patterns for different mental disorders [19, 38]. Therefore, we conducted a subgroup analysis to investigate the relationship between indicators of socioeconomic status and

hospitalization, stratified by diagnostic group. Because diagnosis was included in the analysis for the risk of 30-day readmission, a stratified analysis was not performed for our second objective. We also conducted a sensitivity analysis using low income status, rather than after-tax adjusted income, to investigate the robustness of our findings to differences in income measures. This indicator is not imputed by Statistics Canada like the other Census variables, and therefore some records had missing data points for this variable. As this analysis was not the primary focus of this study, complete case analysis was used.

Under Statistics Canada regulations, our findings are presented as weighted estimates using the standardized weights created for the 2006 Census. To protect the privacy of respondents, all frequency counts are rounded to base five and some groups have been aggregated. All statistical analyses were conducted using SAS Enterprise Guide version 7.1.

4.4 Results

The final sample comprised 1,306,805 linked Census-DAD records. There were slightly more females than males in the full sample, and a fairly uniform distribution of subjects across age groups (Table 4.1). Most people were White and were non-immigrants. On average, most people worked 14 to 48 weeks in 2005 and had an education above the high school level. People who had psychiatric hospitalizations and readmissions were more disadvantaged across our measures of socioeconomic status, having a lower average income, a smaller proportion in the highest employment group, and a larger proportion who did not have a high school education (Table 4.1).

Table 4.1 Demographic characteristics across outcome groups

Sociodemographic variables	No psychiatric hospitalization N=1,297,125 n (%)	Psychiatric hospitalization N=9,680 n (%)	Psychiatric readmission N=845 n (%)
Sex			
Female	661,520 (51%)	5,205 (54%)	465 (55%)
Male	635,610 (49%)	4,470 (49%)	380 (45%)
Age			
25-34	298,410 (23%)	2,325 (24%)	210 (25%)
35-44	354,060 (27%)	2,880 (30%)	260 (31%)
45-54	373,930 (29%)	2,890 (30%)	255 (30%)
55-64	270,725 (21%)	1,585 (16%)	125 (15%)
Education (Highest level achieved)			
Less than high school	208,255 (16%)	2,480 (26%)	205 (24%)
High school grad or equivalent	318,895 (25%)	2,615 (27%)	235 (28%)
Apprenticeship or other trades certificate/diploma	161,235 (12%)	1,270 (13%)	115 (14%)
College diploma (3 months to more than 2 years)	266,200 (21%)	1,795 (19%)	175 (21%)
University certificate below Bachelor's level	65,290 (5%)	395 (4%)	30 (4%)
At least Bachelor’s level	277,250 (21%)	1,125 (12%)	85 (10%)
Employment (in 2005)			
Worked 49 to 52 weeks	720,300 (56%)	3,240 (33%)	270 (32%)
Worked 14 to 48 weeks	320,100 (25%)	2,405 (25%)	190 (22%)
Worked less than 14 weeks	256,730 (20%)	4,035 (42%)	385 (46%)
Family-adjusted income in 2005 ($10,000 units)			
Mean (SD)	3.95 (5.03)	2.87 (4.74)	2.61 (2.14)
Low income family status			
Not low income	990,195 (93%)	5,510 (86%)	470 (89%)
Low income	77,180 (7%)	865 (14%)	60 (11%)

4.4.1 Psychiatric hospitalization

In total, 9,680 (0.74%) people had a psychiatric hospitalization within the three years. In the main regression model, a $10,000 increase in adjusted after-tax income was associated with a 3% lower prevalence of psychiatric hospitalization (PR=0.97, 95% CI=0.97 to 0.98) (Table 4.2). Compared to people with less than a high school diploma, people with a high school diploma or equivalent (PR=0.91, 95% CI=0.86 to 0.96) and people who completed an apprenticeship or had a trades certificate (PR=0.91, 95% CI=0.85 to 0.98) both had a 9% lower prevalence of psychiatric hospitalization. Similarly, there was a 19% and 20% lower prevalence of psychiatric hospitalization for people with college diplomas (PR=0.81, 95% CI=0.76 to 0.87) and university certificates (PR=0.80, 95% CI=0.72 and 0.89), respectively. The largest difference in the prevalence of psychiatric hospitalization was for people who had a university education at or above a Bachelor's level, with a 42% lower prevalence of psychiatric hospitalization compared to people with less than a high school education (PR=0.58, 95% CI=0.54 to 0.63). Both people who worked 49 to 52 weeks (PR=0.48, 95% CI=0.46 to 0.51) and those worked 14 to 48 weeks (PR=0.31, 95% CI=0.29 to 0.33) in the past year had a lower prevalence of psychiatric hospitalization, relative to those who worked less than 14 weeks.

The subgroup analyses investigating differences across diagnostic groups, and using low-income status rather than income in dollars, yielded results very similar to the main analyses. Across diagnostic groups, the general trends stayed consistent with the exception of hospitalizations for "other" diagnoses, which were not significantly associated with income or education (Table 4.3). Using low-income status instead of income in dollars also showed a similar result to the main regression model, with a 1.17 times higher prevalence of psychiatric hospitalization among people considered to have insufficient income, relative to those with adequate income (as defined by Statistics Canada) (95% CI=1.08 to 1.26) (Table 4.4).

Table 4.2 Unadjusted and adjusted logistic regression model results for socioeconomic indicators and psychiatric hospitalization

Sociodemographic variables	Unadjusted PR (95% CI)	Adjusted [a] PR (95% CI)
After-tax family-adjusted income ($10,000 units)		
	0.88 (0.87 to 0.89)*	0.97 (0.97 to 0.98)*
Education (Reference: Less than high school)		
High school graduate	0.69 (0.65 to 0.73)*	0.91 (0.86 to 0.96)*
Apprenticeship or other trades certificate	0.66 (0.62 to 0.71)*	0.91 (0.85 to 0.98)*
College diploma	0.57 (0.53 to 0.60)*	0.81 (0.76 to 0.87)*
University certificate below Bachelor's level	0.51 (0.46 to 0.57)*	0.80 (0.72 to 0.89)*
At least Bachelor's level	0.34 (0.32 to 0.36)*	0.58 (0.54 to 0.63)*
Employment in 2005 (Reference: Worked less than 14 weeks)		
Worked 14 to 48 weeks	0.48 (0.45 to 0.50)*	0.48 (0.46 to 0.51)*
Worked 49 to 52 weeks	0.29 (0.27 to 0.30)*	0.31 (0.29 to 0.33)*

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, immigration status, ethnicity, marital status, primary language spoken, rural living, housing tenure, province

* $p < 0.05$

Table 4.3 Adjusted logistic regression model results for socioeconomic indicators and psychiatric hospitalization across diagnosis groups

Sociodemographic variables	Substance use disorders Adjusted [a] PR (95% CI)	Psychotic disorders Adjusted [a] PR (95% CI)	Mood disorders Adjusted [a] PR (95% CI)	Anxiety disorders Adjusted [a] PR (95% CI)	Behavioural/other disorders Adjusted [a] PR (95% CI)	Self-harm related Adjusted [a] PR (95% CI)
After-tax family-adjusted income ($10,000 units)						
	0.98 (0.97 to 0.99)*	0.98 (0.97 to 0.98)*	0.98 (0.97 to 0.98)*	0.98 (0.97 to 0.98)*	0.98 (0.96 to 1.00)	0.98 (0.97 to 0.99)*
Education (Reference: Less than high school)						
High school graduate	0.86 (0.77 to 0.98)*	1.01 (0.87 to 1.16)	0.90 (0.82 to 1.00)*	1.01 (0.87 to 1.16)	0.82 (0.60 to 1.13)	0.87 (0.74 to 1.02)
Apprenticeship or other trades certificate	0.97 (0.84 to 1.11)	0.76 (0.62 to 0.92)*	1.02 (0.91 to 1.15)	0.93 (0.78 to 1.10)	0.65 (0.41 to 1.02)	0.82 (0.67 to 1.00)
College diploma	0.65 (0.56 to 0.75)*	0.84 (0.71 to 0.99)*	0.86 (0.78 to 0.96)*	0.90 (0.77 to 1.05)	0.97 (0.70 to 1.34)	0.75 (0.63 to 0.90)*
University certificate below Bachelor's level	0.81 (0.64 to 1.02)	0.82 (0.63 to 1.08)	0.86 (0.72 to 1.03)	0.69 (0.52 to 0.91)*	0.75 (0.42 to 1.34)	0.69 (0.50 to 0.96)*
At least Bachelor's level	0.42 (0.35 to 0.51)*	0.66 (0.55 to 0.79)*	0.66 (0.58 to 0.75)*	0.53 (0.44 to 0.64)	0.80 (0.56 to 1.15)	0.49 (0.39 to 0.61)*
Employment in 2005 (Reference: Worked less than 14 weeks)						
Worked 14 to 48 weeks	0.59 (0.53 to 0.66)*	0.23 (0.20 to 0.27)*	0.52 (0.48 to 0.57)*	0.58 (0.51 to 0.66)*	0.50 (0.39 to 0.65)*	0.53 (0.45 to 0.62)*
Worked 49 to 52 weeks	0.36 (0.32 to 0.40)*	0.16 (0.14 to 0.19)*	0.34 (0.31 to 0.37)*	0.38 (0.34 to 0.43)*	0.23 (0.17 to 0.30)*	0.36 (0.32 to 0.42)*

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, immigration status, ethnicity, marital status, primary language spoken, rural living, housing tenure, province

* $p < 0.05$

Table 4.4 Adjusted logistic regression model results for low-income status and psychiatric hospitalization

Sociodemographic variable	Adjusted PR (95% CI)
Low-income family (Reference: Not low-income family)	
Low-income family	1.17 (1.08 to 1.27)*

Abbreviations: PR=Prevalence Ratio; CI= Confidence Interval

a Adjusted for age, sex, ethnicity, education, employment, marital status, primary language spoken, rural living, housing tenure, province

* $p < 0.05$

4.4.2 30-day readmission

Of the 9,680 people who had a psychiatric admission, 845 (8.7%) had a psychiatric readmission within 30 days. Neither income nor education were significantly associated with the risk of 30-day readmission in our multivariable regression model (Table 4.5). Working 14 to 48 weeks in 2005 was associated with a 18% lower risk of readmission than working less than 14 weeks (RR=0.82, 95% CI=0.68 to 0.99), but no difference was observed for those who worked 49 to 52 weeks. People who had hospitalizations for self-harm (RR=0.65, 95% CI=0.51 to 0.84), anxiety disorders (0.63, 95% CI=0.49 to 0.81), or substance-use disorders (RR=0.78, 95% CI=0.63 to 0.95) had a lower risk of readmission, relative to those with a hospitalization for a mood disorder. Unfortunately, due to small sample size and missing data the sensitivity analysis investigating low-income status could not be completed for 30-day readmission.

Table 4.5 Unadjusted and adjusted logistic regression model results for socioeconomic indicators and 30-day readmission

Sociodemographic variables	Unadjusted RR (95% CI)	Adjusted [a] RR (95% CI)
After-tax family-adjusted income ($10,000 units)		
	0.97 (0.93 to 1.00)	0.77 (0.53 to 1.01)
Education (Reference: Less than high school)		
High school graduate	1.08 (0.89 to 1.31)	1.12 (0.91 to 1.37)
Apprenticeship or other trades certificate	1.13 (0.89 to 1.42)	1.17 (0.92 to 1.50)
College diploma	1.19 (0.96 to 1.47)	1.21 (0.97 to 1.51)
University certificate below Bachelor's level	0.85 (0.56 to 1.28)	0.94 (0.62 to 1.43)
At least Bachelor's level	0.92 (0.71 to 1.20)	0.97 (0.74 to 1.29)
Employment in 2005 (Reference: Worked less than 14 weeks)		
Worked 14 to 48 weeks	0.83 (0.69 to 0.99)*	0.82 (0.68 to 0.99)*
Worked 49 to 52 weeks	0.87 (0.74 to 1.02)	0.90 (0.75 to 1.08)

Abbreviations: RR= Risk Ratio; CI= Confidence Interval

a Adjusted for age, sex, ethnicity, marital status, primary language spoken, rural living, housing tenure, province, initial hospitalization diagnosis, length of stay of initial hospitalization

* $p < 0.05$

4.5 Discussion

Our findings suggest that people at higher socioeconomic disadvantage – including those who worked less than 14 weeks in 2005, of lower education level, or low income – had a higher proportion of psychiatric hospitalization relative to those in more advantaged social situations. It is generally found that people in lower socioeconomic strata have higher rates of mental illness, which is potentially explained through increased exposure to major and compounding life stressors [13, 39, 40], so our findings could be representing that people are appropriately accessing care at higher rates due to

an increased need for care. Another potential explanation for these findings is that people with poor mental health have more difficulty completing higher levels of education, finding stable employment, and keeping jobs with higher income [44, 45]. This effect of mental illness on socioeconomic position also varies across the different socioeconomic indicators and mental illnesses included [46]; for example, education level may be less affected by severe psychotic symptoms than employment, and both may be less affected by depressive symptoms than psychotic symptoms. Therefore, people in lower socioeconomic positions could be using more mental health care because there are more people with serious mental illness in these groups, compared to those in higher positions.

The socioeconomic gradient found in this study has also been observed in other studies on both mental and physical health conditions and access to hospital care [6, 32, 41–43]. Our findings on the negative association between socioeconomic position and psychiatric hospitalization align with international studies, where lower socioeconomic status is associated with higher inpatient mental health care use [5–7, 9]. It has also been found that people in higher socioeconomic positions have better access to specialty mental health services and better understanding of the healthcare system, and are using outpatient resources more frequently than people in lower socioeconomic positions, thus preventing an exacerbation of symptoms that would require inpatient psychiatric care [47, 48]. There is also evidence of lower rates of use of community or primary care services for mental illness than would be expected among lower socioeconomic groups [47]. This could lead to increased need for hospital care because their mental health needs are not being met in other health care settings.

We found no significant associations between the risk of 30-day psychiatric readmission and education or adjusted income. This could be partly due to the smaller sample size, which widens the confidence intervals and decreases the power to detect effects, but generally this suggests that there are not socioeconomic disparities in the quality of inpatient care or access to follow-up care. The only statistically significant difference was a lower risk of 30-day readmission in people who worked 14 to 48 weeks in 2005, relative to those who worked less than 14 weeks. There is literature showing higher rates of mental illness among unemployed people [13, 39], as well as higher rates

of readmission compared to people who are employed [18, 19]. 30-day readmissions are generally used as indicators of adequate care in hospital and sufficient access to follow-up care [17]. Therefore, this result could be due to increased need for readmission in those who worked less than 14 weeks due to poorer quality care in the initial hospitalization or not having adequate access to proper follow-up care. Most previous studies use a binary indicator of unemployment, so future research should include more categories of employment to investigate whether the results from previous studies are being driven by people who worked less than the full year.

4.5.1 Limitations

Our study has a number of limitations that could affect the interpretation of the findings. Due to the linked nature of the data, the socioeconomic indicators that we used were measured only at one time point on the 2006 Census. This means that our socioeconomic indicators may not represent the standing of the person at the time of hospitalization – this is especially noteworthy because Canada experienced a recession during the follow-up period (2008) that impacted the employment status and income of many Canadians [49]. We also do not have information on whether people moved out of the country or died, which could lead to an underestimate of the number of psychiatric hospitalizations over the follow-up period. Previous research suggests that the death rate is higher in lower socioeconomic groups [50], which means fewer people in these groups would be eligible for hospitalization over the time period. This could cause our study to disproportionately underestimate the prevalence of hospitalization in low socioeconomic groups. The generalizability of this study's findings are limited to the provinces included in the study; our results are not necessarily representative of Ontario and Quebec, especially considering the vastly different socio-demographic patterns in these provinces compared to the rest of Canada [51]. Another limitation to the generalization of our findings is the measurement of socioeconomic status using census variables, which may not correlate exactly to the more complex concept of social status; we are investigating quantitative measures of socioeconomic advantage, not social class. Finally, the interpretation of these results is limited by a lack of information on the underlying distribution of mental illness and access to outpatient care across socioeconomic groups.

Without knowing these distributions, we cannot know if our results are due to differences in the frequency of mental illness or disproportionate access to outpatient care across socioeconomic groups.

4.5.2 Conclusions

This study shows a gradient association between lower educational attainment, employment, and income with a higher prevalence of psychiatric hospitalization, and these trends were largely consistent across diagnosis groups. We found fewer associations between socioeconomic indicators and the risk of 30-day readmission. The findings of this study suggest that hospital care for mental illness is not equally distributed across socioeconomic groups, which could be due to higher rates of mental illness or poorer access to other mental health services in lower socioeconomic groups. Future research should investigate these associations further by assessing multiple indicators of socioeconomic status and their impact on need for mental health care and access to outpatient and inpatient mental health services in Canada.

4.6 Acknowledgements

This research was supported by funds to the Canadian Research Data Centre Network (CRDCN) from the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institute for Health Research (CIHR), the Canadian Foundation for Innovation (CFI), and Statistics Canada. Although the research and analysis are based on data from Statistics Canada, the opinions expressed do not represent the views of Statistics Canada.

4.7 References

1. Warren JR (2009) Socioeconomic status and health across the life course: a test of the social causation and health selection hypotheses. Soc Forces Sci Medium Soc Study Interpret 87:2125–2153. https://doi.org/10.1353/sof.0.0219

2. Regier DA, Farmer ME, Rae DS, et al (1993) One-month prevalence of mental disorders in the United States and sociodemographic characteristics: the Epidemiologic

Catchment Area study. Acta Psychiatr Scand 88:35–47. https://doi.org/10.1111/j.1600-0447.1993.tb03411.x

3. Kessler RC, McGonagle KA, Zhao S, et al (1994) Lifetime and 12-month prevalence of SM-III-R psychiatric disorders in the united states: results from the National Comorbidity Survey. Arch Gen Psychiatry 51:8–19. https://doi.org/10.1001/archpsyc.1994.03950010008002

4. Alegría M, Bijl RV, Lin E, et al (2000) Income differences in persons seeking outpatient treatment for mental disorders: a comparison of the United States with Ontario and the Netherlands. Arch Gen Psychiatry 57:383. https://doi.org/10.1001/archpsyc.57.4.383

5. Snowden LR, Hastings JF, Alvidrez J (2009) Overrepresentation of Black Americans in psychiatric inpatient care. Psychiatr Serv 60:779–785. http://dx.doi.org/10.1176/appi.ps.60.6.779

6. Aro S, Aro H, Salinto M, Keskimäki I (1995) Educational level and hospital use in mental disorders. A population-based study. Acta Psychiatr Scand 91:305–312. https://doi.org/10.1111/j.1600-0447.1995.tb09787.x

7. Savoie I, Morettin D, Green CJ, Kazanjian A (2004) Systematic review of the role of gender as a health determinant of hospitalization for depression. Int J Technol Assess Health Care 20:115–127. https://doi.org/10.1017/s026646230400090x

8. Losert C, Schmauß M, Becker T, Kilian R (2012) Area characteristics and admission rates of people with schizophrenia and affective disorders in a German rural catchment area. Epidemiol Psychiatr Sci 21:371–379. https://doi.org/10.1017/S2045796012000157

9. Westman J, Johansson LM, Sundquist K (2006) Country of birth and hospital admission rates for mental disorders: a cohort study of 4.5 million men and women in Sweden. Eur Psychiatry 21:307–314. https://doi.org/10.1016/j.eurpsy.2006.02.001

10. Leao TS, Sundquist J, Frank G, et al (2006) Incidence of schizophrenia or other psychoses in first- and second-generation immigrants: a national cohort study. J Nerv Ment Dis 194:27–33. https://doi.org/10.1097/01.nmd.0000195312.81334.81

11. Paananen R, Santalahti P, Merikukka M, et al (2013) Socioeconomic and regional aspects in the use of specialized psychiatric care—a Finnish nationwide follow-up study. Eur J Public Health 23:372–377. https://doi.org/10.1093/eurpub/cks147

12. Packness A, Waldorff FB, Christensen R dePont, et al (2017) Impact of socioeconomic position and distance on mental health care utilization: a nationwide Danish follow-up study. Soc Psychiatry Psychiatr Epidemiol 52:1405–1413. https://doi.org/10.1007/s00127-017-1437-2

13. Steele LS, Glazier RH, Lin E (2006) Inequity in mental health care under Canadian universal health coverage. Psychiatr Serv Wash DC 57:317–324. https://doi.org/10.1176/appi.ps.57.3.317

14. Heiden W, Krumm B (1985) Does outpatient treatment reduce hospital stay in schizophrenics? Eur Arch Psychiatry Neurol Sci 235:26–31. https://doi.org/10.1007/BF00380965

15. Wanchek TN, McGarvey EL, Leon-Verdin M, Bonnie RJ (2011) The effect of community mental health services on hospitalization rates in Virginia. Psychiatr Serv 62:6. https://doi.org/10.1176/ps.62.2.pss6202_0194

16. Benjenk I, Chen J (2018) Effective mental health interventions to reduce hospital readmission rates: a systematic review. J Hosp Manag Health Policy 2:. https://doi.org/10.21037/jhmhp.2018.08.05

17. Sfetcu R, Musat S, Haaramo P, et al (2017) Overview of post-discharge predictors for psychiatric re-hospitalisations: a systematic review of the literature. BMC Psychiatry 17:. https://doi.org/10.1186/s12888-017-1386-z

18. Donisi V, Tedeschi F, Wahlbeck K, et al (2016) Pre-discharge factors predicting readmissions of psychiatric patients : a systematic review of the literature. BMC Psychiatry 16:449. https://doi.org/10.1186/s12888-016-1114-0

19. Chen S, Collins A, Kidd SA (2018) Thirty-day and 5-year readmissions following first psychiatric hospitalization: a system-level study of Ontario's psychiatric care. Can J Psychiatry 63:410–415. https://doi.org/10.1177/0706743717751667

20. Lin C-H, Chen W-L, Lin C-M, et al (2010) Predictors of psychiatric readmissions in the short- and long-term: a population-based study in Taiwan. Clinics 65:. https://doi.org/10.1590/S1807-59322010000500005

21. Steele L, Dewa C, Lee K (2007) Socioeconomic status and self-reported barriers to mental health service use. Can J Psychiatry 52:201–206. https://doi.org/10.1177/070674370705200312

22. Slaunwhite AK (2015) The role of gender and income in predicting barriers to mental health care in Canada. Community Ment Health J 51:621–627. https://doi.org/10.1007/s10597-014-9814-8

23. Sareen J, Jagdeo A, Cox B, et al (2007) Perceived barriers to mental health service utilization in the United States, Ontario, and the Netherlands. Psychiatr Serv Wash DC 58:357–64. https://doi.org/10.1176/appi.ps.58.3.357

24. Sanmartin C, Berthelot J-M, Ng E, et al (2006) Comparing health and health care use in Canada and the United States. Health Aff (Millwood) 25:1133–1142. https://doi.org/10.1377/hlthaff.25.4.1133

25. Vasiliadis H-M, Lesage A, Adair C, et al (2007) Do Canada and the United States differ in prevalence of depression and utilization of services? Psychiatr Serv 58:63–71. https://doi.org/10.1176/ps.2007.58.1.63

26. Buajitti E, Chiodo S, Rosella LC (2020) Agreement between area- and individual-level income measures in a population-based cohort: Implications for population health research. SSM - Popul Health 10:. https://doi.org/10.1016/j.ssmph.2020.100553

27. Statistics Canada, Census Operations Division (2010) 2006 Census dictionary. Statistics Canada, Ottawa

28. Benjamin W, Janes D, Bankier M, et al (2009) 2006 Census technical report: sampling and weighting. Statistics Canada, Ottawa

29. Rotermann M (2015) Linking 2006 Census and hospital data in Canada. Health Rep 26:13

30. MHASEF Research Team (2018) Mental health and addictions system performance in Ontario: a baseline scorecard. Institute for Clinical Evaluative Sciences, Toronto, ON

31. MacCourt P, Wilson K, Tourigny-Rivard M-F (2011) Guidelines for comprehensive mental health services for older adults in Canada. Mental Health Commission of Canada, Calgary, AB

32. Zajacova A, Hummer RA, Rogers RG (2012) Education and health among U.S. working-age adults: a detailed portrait across the full educational attainment spectrum. Biodemography Soc Biol 58:40–61. https://doi.org/10.1080/19485565.2012.666122

33. Galobardes B, Lynch J, Smith GD (2007) Measuring socioeconomic position in health research. Br Med Bull 81–82:21–37. https://doi.org/10.1093/bmb/ldm001

34. Peng M, Li B, Southern D, et al (2017) Constructing episodes of inpatient care: how to define hospital transfer in hospital administrative health data? Med Care 55:74–78. https://doi.org/10.1097/MLR.0000000000000624

35. Bastos LS, Oliveira R de VC de, Velasque L de S (2015) Obtaining adjusted prevalence ratios from logistic regression models in cross-sectional studies. Cad Saúde Pública 31:487–495. https://doi.org/10.1590/0102-311x00175413

36. Zocchetti C, Consonni D, Bertazzi PA (1997) Relationship between prevalence rate ratios and odds ratios in cross-sectional studies. Int J Epidemiol 26:220–223. https://doi.org/10.1093/ije/26.1.220

37. Fuller DA, Sinclair E, Snook J (2016) Length of stay and readmission rates in state hospitals - a comparative state survey. Treatment Advocacy Center, Arlington, Virginia

38. Haggerty R, Mrazek P (1994) Risk and protective factors for the onset of mental disorders. In: Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research. National Academies Press (US)

39. Muntaner C, Eaton WW, Miech R, O'Campo P (2004) Socioeconomic position and major mental disorders. Epidemiol Rev 26:53–62. https://doi.org/10.1093/epirev/mxh001

40. Katerndahl DA, Parchman M (2002) The ability of the stress process model to explain mental health outcomes. Compr Psychiatry 43:351-60. doi: 10.1053/comp.2002.34626

41. Flaskerud JH, DeLilly CR (2012) Social determinants of health status. Issues Ment Health Nurs 33:494–497. https://doi.org/10.3109/01612840.2012.662581

42. World Health Organization and Calouste Gulbenkian Foundation (2014) Social determinants of mental health. World Health Organization, Geneva

43. Canadian Institute for Health Information (2010) Hospitalization disparities by socio-economic status for males and females. Canadian Institute for Health Information

44. Cook JA, Solomon ML (1993) The Community Scholar Program: An outcome study of supported education for students with severe mental illness. Psychosoc Rehabil J 17:83–97. https://doi.org/10.1037/h0095623

45. Isohanni I, Jones PB, Järvelin M-R, et al (2001) Educational consequences of mental disorders treated in hospital. A 31-year follow-up of the Northern Finland 1966 Birth Cohort. Psychol Med 31:339–349. https://doi.org/10.1017/S003329170100304X

46. Mossakowski KN (2014) Social causation and social selection. The Wiley Blackwell encyclopedia of health, illness, behavior, and society 6:2154-60. https://doi.org/10.1002/9781118410868.wbehibs262

47. Steele LS, Dewa CS, Lin E, Lee KLK (2007) Education level, income level and mental health services use in Canada: associations and policy implications. Healthc Policy 3:96–106

48. Canadian Institute for Health Information (2009) The association between socio-economic status and inpatient hospital service use for depression. Canadian Institute for Health Information

49. Recession of 2008–09 in Canada | The Canadian Encyclopedia. https://thecanadianencyclopedia.ca/en/article/recession-of-200809-in-canada. Accessed 7 Jan 2020

50. Preston SH, Taubman P (1994) Demography of Aging. In: Socioeconomic differences in adult mortality and health status. National Academies Press (US)

51. Edmonston B (2016) Canada's immigration trends and patterns. Can Stud Popul 43:78. https://doi.org/10.25336/P64609

Chapter 5

5 Synthesis and Conclusion

When considered together, the studies presented in Chapters 3 and 4 of this thesis build a greater understanding of the ethnic and socioeconomic variations in psychiatric hospitalization and 30-day readmission in Canada. The findings from this thesis suggest that the prevalence of psychiatric hospitalization varied across ethnic and socioeconomic groups, with a significantly lower prevalence of hospitalizations in some ethnic minority groups and in higher socioeconomic groups. There were weaker relationships found between ethnicity and socioeconomic position and the risk of 30-day readmission, but this could potentially be due to the small sample size in the readmission models. The observed relationships between both ethnicity and socioeconomic position and hospitalization were attenuated after adjustment. This is likely because ethnicity and socioeconomic status are highly correlated, with ethnic minority Canadians being more likely to be unemployed and have lower income, relative to White Canadians [1, 2]. Therefore, when the effects of socioeconomic status are controlled for, the relationship between hospitalization and ethnicity is attenuated, and vice versa.

The theoretical framework underlying this thesis is that individual characteristics – such as socioeconomic status and ethnicity – affect a person's need for mental health care and ability to access appropriate care, which in turn affects their probability of hospitalization for mental illness (See Figure 1 in Chapter 1). Without information on access to outpatient care or a direct measure of need for mental health care, it is difficult to determine the underlying reasons for the findings of this thesis. The trends we observed are likely due to a combination of differential need for and access to appropriate care. People with more severe mental illnesses, or more severe symptoms, have higher need for hospitalization. However, severe symptoms could also be a result of not seeking appropriate care earlier for mental illness. There are many factors that influence acting on symptoms and accessing mental health care. For example, stigma, inability to take time off, or a lack of appropriate services could all cause people not to seek care for their mental health. Alternatively, hospitalization could be reflecting increased facilitation of access to care. There is a shortage of psychiatric beds in Canada, so physicians may need

to make decisions on who to admit for inpatient care [3]. The decision to admit a patient could vary across ethnic and socioeconomic groups, which would affect the results of this thesis.

There is a large body of evidence showing higher rates of mental illness in lower socioeconomic groups, which could partly explain the results of this thesis [4, 5]. However, there is also significant evidence that patterns of healthcare access are not equal across socioeconomic groups. Socioeconomic status can affect a person's ability to access care, as they may not have adequate time off work to navigate appointments for primary care or specialist service [6, 7]. This inadequate access to mental health care may lead to worsening of psychiatric symptoms, which then causes a person to reach the point of crisis and require hospitalization. This would increase the number of people in lower socioeconomic groups who have a psychiatric admission. This has been demonstrated in the international literature, where people in lower socioeconomic groups use relatively less primary care and more hospital-based care [6].

Evidence on the relative rates of mental illness across ethnic minority groups is less clear, partly due to the diversity across ethnic groups. The incidence and prevalence of psychotic disorders is higher in some migrant and ethnic minority groups [8–10], but there is evidence showing similar or lower rates of common mental disorders in ethnic minority groups [11, 12]. However, some studies suggest that there are biases in the diagnosis of mental disorders among ethnic minorities, so this may be a result of under-reporting or under-diagnosis of mental illnesses in ethnic minorities [10, 13]. There is evidence that some ethnic minority groups are less likely to access care for mental health concerns, and report higher unmet needs for mental health care and more barriers to accessing care [14–16]. Ethnic minority groups also tend to have different perceptions of mental illness and the health care system, as well as divergent opinions regarding the appropriateness of different treatment options. This could be leading to the higher unmet needs in some groups, because many people have difficulties finding culturally acceptable care for their mental health issues [17–19]. Additionally, stigma can be a large barrier to accessing care, as many people experience shame and discrimination for struggling with mental illness [11, 19]. Cultural differences in perception of mental

illness could therefore cause people to delay seeking care at higher rates in ethnic minority groups where mental illnesses is highly stigmatized [15, 20]. These cultural differences could explain, in part, the lower use of services in some ethnic minority groups.

In contrast to differences in the initial hospitalization – which may reflect issues with access to outpatient care leading up to admission – the risk of 30-day readmission across ethnic groups may suggest that there are differences in the quality of inpatient care or access to community resources and follow-up care after discharge. The relative risks of 30-day readmissions across ethnic groups can be more clearly interpreted than hospitalizations, because those who have been hospitalized have more similar symptom severity and need for care. Although there are differences in the severity of illness within those hospitalized, we know they at least have engaged with the healthcare system and accessed care once, and they had severe enough symptoms to warrant an inpatient admission. 30-day readmissions are used as an indicator of insufficient care in hospital or inadequate connection to community supports or follow-up care after discharge [21]. Although we controlled for length of stay, which is a common indicator of early discharge and possibly insufficient care, hospital care for managing psychiatric disorders is complex and differs significantly across individual cases [22]. Therefore, there could be residual differences in quality of care not captured by this indicator. After discharge from the hospital, community support and follow-up care are very important in managing mental illness, and inadequate access to these may lead to further need for hospitalization [22]. The higher risk of 30-day readmission among West Asian people suggests that the care given in the hospital may have been insufficient, or that there was inadequate support or follow-up care after hospitalization, relative to White Canadians. Focusing on socioeconomic measures, people who worked 14 to 48 weeks in 2005 were at lower risk for 30-day readmissions than those who worked less than 14 weeks. Unemployed people are often found to have higher rates of hospital readmissions, possibly because of lower access to community support [23, 24]. More research into the reasons behind these readmissions would be beneficial for better understanding the care given in hospital and community supports for different ethnic and socioeconomic groups in Canada.

The diagnosis-specific models can provide some important context to the previous literature. As discussed in Chapter 2, there is considerable heterogeneity in the associations between ethnicity and psychiatric hospitalization in previous studies. Some of this variation might be explained by the different types of mental illness included in these studies and the proportion of cases in each of these illness groups. The results of this thesis suggest that the relationship between sociodemographic factors – specifically ethnicity – differed across different mental illnesses. For example, a lower proportion of Indigenous Canadians were hospitalized for psychotic disorders compared to White Canadians, but a higher proportion were hospitalized for anxiety disorders. This could be reflecting biases in our system along with gaps in care for Indigenous people; future research taking a more nuanced approach to the needs for culturally appropriate mental health care for Indigenous people could help contextualize these findings. The measures of socioeconomic status were more consistently associated with hospitalizations across diagnostic categories, which could help explain why the literature base on socioeconomic status and psychiatric hospitalization is more congruent.

5.1 Strengths and limitations

This thesis focused on the social determinants of the population prevalence of psychiatric hospitalization and 30-day readmissions in Canada. Linking two individual-level national databases allowed for the control of many potential confounders and facilitated more thorough measurement of ethnicity and socioeconomic status, including multiple self-reported ethnic groups and three socioeconomic indicators, which helped to build a baseline understanding of the impact of these factors on psychiatric care in Canadian hospitals. Including a sensitivity analysis of low-income status, and subgroup analyses across generation status and diagnoses, also helped build a more multifaceted understanding of the socio-demographic factors associated with the prevalence of psychiatric hospitalizations.

Due to the nature of the data used for this project, there are a number of limitations that need to be considered in the interpretation of the findings. Our understanding of the trends found in this thesis are inherently limited because hospitalization is only one small

part of mental health care, and we do not have information on level of need for care or access to other mental health services. The sample also does not include the provinces of Quebec and Ontario, which have a large proportion of migrants and ethnic minorities in Canada [25], so the trends identified in this thesis may not be applicable to these provinces. Furthermore, the data used in this thesis is not current (2006-2009). The measures of ethnic and socioeconomic status used in this study are derived from questions asked on the 2006 Canadian Census. Additionally, because these variables were measured at the beginning of the follow-up period (2006-2009), there could be changes across the time period that affect the risk of being hospitalized for mental illness. Similarly, there could be people who become ineligible for hospitalization – for example, if they have moved out of Canada – and these losses to follow-up could vary significantly across ethnic or socioeconomic groups. These two issues mean that our study likely underestimates the prevalence of psychiatric hospitalization, and this underestimation is likely not distributed equally across social groups.

Although our studies controlled for many potential confounding factors, there are a number of variables that were not available in the data that affect the risk of hospitalization and readmission and are also associated with socioeconomic position and ethnicity. One notable example of this is social support, which can vary largely across social groups, and high levels of social support have been found to significantly decrease the risk of hospitalization and early readmission for mental illness [26–28]. Furthermore, socioeconomic measures like the ones used in this study can approximate the resources available to people, but do not necessarily represent the full picture of their standing in society. For example, a person who comes from a very wealthy family could be reporting a low number of weeks worked and a lower individual income because they do not need to work to support themselves financially, but they still have reliable access to resources that they need, such as shelter and transportation.

5.2 Conclusions and future research directions

The data used in this thesis is from more than a decade ago and may not accurately represent current patterns in access to psychiatric care and the current profile of

diversification in Canada – thus, replication of this study using more recent data is warranted. The use of more recent iterations of the data used in this thesis could also allow for the identification of longitudinal trends in social determinants of psychiatric hospitalization and 30-day readmission across Canada. Research using hospitalization data linked to Canadian Community Health Survey mental health survey data on psychiatric symptoms and access to mental health care could also be useful in teasing apart whether the trends we observed in this thesis are due to differences in need or access to other mental health services. Mixed methods research exploring the perceptions and reasons for accessing inpatient psychiatric care could build upon this quantitative research to gain a more nuanced understanding of the relationship. Intersectional research could also help understand the interplay between the social determinants of psychiatric hospitalization.

Despite the noted limitations, this project provides evidence of significant variation in the prevalence of psychiatric hospitalization and subsequent risk of 30-day readmission across social groups using linked Canadian data sources. The results from this study show that the use of linked individual-level administrative and survey data can help quantify the social determinants of mental health service use. Future research should continue to investigate the findings highlighted in this thesis to determine the root cause of these variations, which could be used to inform policy and programs that increase the equity of our mental health care system.

5.3 References

1. Block S, Galabuzi G-E, Tranjan R Canada's colour coded income inequality. Canadian Centre for Policy Alternatives

2. City of Ottawa and City for All Women Intitiative (2016) Equity & Inclusion Lens Snapshot Racialized People. City of Ottawa and City for All Women Initiative, Ottawa, ON

3. BC Schizophrenia Society and BC Psychiatric Association (2019) Inadequate Access to Acute Psychiatric Beds in British Columbia. BC Schizophrenia Society and BC Psychiatric Association

4. Silva M, Loureiro A, Cardoso G (2016) Social determinants of mental health: A review of the evidence. Eur J Psychiatry 30:259–292

5. Warren JR (2009) Socioeconomic status and health across the life course: a test of the social causation and health selection hypotheses. Soc Forces Sci Medium Soc Study Interpret 87:2125–2153. https://doi.org/10.1353/sof.0.0219

6. Kangovi S, Barg FK, Carter T, et al (2013) Understanding why patients of low socioeconomic status prefer hospitals over ambulatory care. Health Aff (Millwood) 32:1196–1203. https://doi.org/10.1377/hlthaff.2012.0825

7. Steele LS, Glazier RH, Lin E (2006) Inequity in mental health care under Canadian universal health coverage. Psychiatr Serv Wash DC 57:317–324. https://doi.org/10.1176/appi.ps.57.3.317

8. Kirkbride JB, Hollander A-C (2015) Migration and risk of psychosis in the Canadian context. CMAJ Can Med Assoc J 187:637–638. https://doi.org/10.1503/cmaj.150494

9. Pahwa P, Karunanayake CP, McCrosky J, Thorpe L (2012) Longitudinal trends in mental health among ethnic groups in Canada. Chronic Dis Inj Can 32:13

10. Halvorsrud K, Nazroo J, Otis M, et al (2019) Ethnic inequalities in the incidence of diagnosis of severe mental illness in England: a systematic review and new meta-analyses for non-affective and affective psychoses. Soc Psychiatry Psychiatr Epidemiol 54:1311–1323. https://doi.org/10.1007/s00127-019-01758-y

11. Mental Health Commission of Canada (2016) The case for diversity building the case to improve mental health services for immigrant, refugee, ethno-cultural and racialized populations: report to the Mental Health Commission of Canada

12. Wu Z, Noh S, Kaspar V, Schimmele CM (2003) Race, ethnicity, and depression in Canadian society. J Health Soc Behav 44:426–441

13. Sohler NL, Bromet EJ (2003) Does racial bias influence psychiatric diagnoses assigned at first hospitalization? Soc Psychiatry Psychiatr Epidemiol 38:463–472. https://doi.org/10.1007/s00127-003-0653-0

14. Schaffer A, Cairney J, Cheung A, et al (2009) Differences in prevalence and treatment of bipolar disorder among immigrants: results from an epidemiologic survey. Can J Psychiatry Rev Can Psychiatr 54:734–742. https://doi.org/10.1177/070674370905401103

15. Chiu M, Amartey A, Wang X, Kurdyak P (2018) Ethnic differences in mental health status and service utilization: a population-based study in Ontario, Canada. Can J Psychiatry 63:481–491. https://doi.org/10.1177/0706743717741061

16. Chen AW, Kazanjian A, Wong H (2009) Why do Chinese Canadians not consult mental health services: health status, language or culture? Transcult Psychiatry 46:623–641. https://doi.org/10.1177/1363461509351374

17. Hunt JB, Eisenberg D, Lu L, Gathright M (2015) Racial/ethnic disparities in mental health care utilization among U.S. college students: applying the Institution of Medicine definition of health care disparities. Acad Psychiatry 39:520–526. https://doi.org/10.1007/s40596-014-0148-1

18. Lai DWL, Surood S (2013) Effect of service barriers on health status of aging South Asian immigrants in Calgary, Canada. Health Soc Work 38:41–50. https://doi.org/10.1093/hsw/hls065

19. Wood J, Newbold KB (2011) Provider perspectives on barriers and strategies for achieving culturally sensitive mental health services for immigrants: a Hamilton, Ontario case study. J Int Migr Integr. https://doi.org/10.1007/s12134-011-0215-3

20. Eylem O, de Wit L, van Straten A, et al (2020) Stigma for common mental disorders in racial minorities and majorities a systematic review and meta-analysis. BMC Public Health 20:879. https://doi.org/10.1186/s12889-020-08964-3

21. Ortiz G (2019) Predictors of 30-day postdischarge readmission to a multistate national sample of state psychiatric hospitals. J Healthc Qual JHQ 41:228–236. https://doi.org/10.1097/JHQ.0000000000000162

22. Durbin J, Lin E, Layne C, Teed M (2007) Is readmission a valid indicator of the quality of inpatient psychiatric care? J Behav Health Serv Res 34:137–50. https://doi.org/10.1007/s11414-007-9055-5

23. Sfetcu R, Musat S, Haaramo P, et al (2017) Overview of post-discharge predictors for psychiatric re-hospitalisations: a systematic review of the literature. BMC Psychiatry 17:. https://doi.org/10.1186/s12888-017-1386-z

24. Schmutte T, Dunn CL, Sledge WH (2010) Predicting time to readmission in patients with recent histories of recurrent psychiatric hospitalization: a matched-control survival analysis. J Nerv Ment Dis 198:860–863. https://doi.org/10.1097/NMD.0b013e3181fe726b

25. Chui T, Flanders J (2013) Immigration and ethnocultural diversity in Canada: National Household Survey, 2011. Statistics Canada = Statistique Canada, Ottawa

26. Madi N, Li HZ and JF (2007) CIHI survey: hospital readmissions for patients with mental illness in Canada. In: Healthc. Q. http://www.longwoods.com/content/18818. Accessed 14 Jun 2020

27. Harandi TF, Taghinasab MM, Nayeri TD (2017) The correlation of social support with mental health: A meta-analysis. Electron Physician 9:5212–5222. https://doi.org/10.19082/5212

28. Norman RMG, Malla AK, Manchanda R, et al (2005) Social support and three-year symptom and admission outcomes for first episode psychosis. Schizophr Res 80:227–234. https://doi.org/10.1016/j.schres.2005.05.006

Appendices

Appendix A Mental illness diagnosis groupings

Diagnosis category	**ICD-10 codes included**
Substance use disorders (F10s)	F10-F19
Psychotic disorders (F20s)	F20-F29
Mood [affective] disorders (F30s)	F30-F39
Anxiety disorders (F40s)	F40-F49
Behavioural/other disorders (F50s, F60 or F99)	F50, F51, F53, F55, F59, F60, F99
Self-harm related (X)	X60-X84

Appendix B Tables for chapter 2 (literature review)

Appendix B Table 1: Summary of Studies (n=5) Investigating Race or Ethnicity as a Determinant of Psychiatric Hospitalization

Study Authors (Year)	**Country**	**Sample**	**Data sources**	**Race/Ethnicity Measurement**	**Outcome Measure**	**Methods**	**Results**
Snowden (2009)	US	9,371 adults (age 18 and over)	National Survey of American Life and National Comorbidity Survey Replication	Non-Hispanic White, Caribbean Black, African American	Lifetime psychiatric hospitalization	Logistic regression controlling for age, sex, education, marital status, employment, income, lifetime psychological counselling, any lifetime disorder	African American and Caribbean Black people had higher rates of hospitalization than non-Hispanic White
Bhui (2003)	UK	N/A (Systematic Review)	Quantitative studies comparing use of mental health services by more than one ethnic group in the UK	Most studies just included Black and White	Inpatient mental health service use (representation on inpatient units)	Systematic review of ethnic pathways to and use of specialized mental health care	17 papers reported measures of inpatient use – representation on inpatient units consistently showed greater use of inpatient services by Black people (13 of 17 studies) One study found South Asians less likely than Black people

Mann (2014)	Multiple countries	N/A (Systematic Review)	Studies reporting rates of hospital admission or compulsory detention rates	White, Black, Asian, Other Maori, non-Maori White, Black, "Other"	Hospital admission in early psychosis	Systematic review of studies reporting admission/detention rates at first presentation for people with first episode psychosis	2 studies found no statistically significant result, 1 found White people more likely to have a hospitalization than Black and "Other" people
Padgett (1994)	US	951,742 Federal employees and family insured by Blue Cross/ Blue Shield	Federal employees blue cross/blue shield insurance claims database	Black, White, Hispanic	Inpatient mental health service use (nervous or mental reason for inpatient care)	Weighted logistic regression	No statistically significant associations
Lavoie (2018)	Canada		British Colombia hospitalization data linked to demographics from the Consolidation file	First Nations people living on or off-reserve identified through BC Medical Services Plan claims	Hospital care for ambulatory sensitive mental disorders (psychosis and major depression)	Rate of hospital care adjusted for age, sex, and socioeconomic status	First Nations people not living on reserve had higher rates of care than BC residents, First Nations people living on reserve had higher rates than other BC residents until 2008

Appendix B Table 2: Summary of Studies (n=5) Investigating Race or Ethnicity as a Determinant of 30-day Readmission

Study Authors (Year)	**Country**	**Sample Size**	**Data sources**	**Race/Ethnicity Measurement**	**Outcome Measure**	**Methods**	**Results**
Chen, 2018	Canada	42, 280 patients in Ontario	OMHRS	Aboriginal status	30-day and 5-year readmission after a first psychiatric hospitalization	Multivariate logistic regression model controlling for gender, age, marital status, language spoken, education, type of hospital and index admission length of stay	No significant associations for Aboriginal Identity and 30- day readmission for any diagnosis
Donisi (2016)	Multiple countries	N/A (Systematic review)	Studies investigating readmission after a psychiatric hospitalization **Limited to studies on 30-day readmission for this review*	White, Black, Hispanic, Other	Readmission within 30 days of psychiatric hospitalization	Hierarchical logistic regression	Included in 4 studies Being Hispanic was associated with a lower risk of readmission at 8-30 days compared to white patients
Chiu (2018)	Canada	All adult (age 19+) psychiatric inpatients who were	OMHRS linked to Hospital Discharge Database, the Registered Persons	validated surnames algorithm to classify patients as those of	psychiatric hospital readmission, ascertained from	multivariable binary logistic regression models to examine the	Psychiatric readmission within 30 days was not significantly different from

		discharged between 1 April 2006 and 31 March 2014	Database, Ontario Health Insurance Plan physician billing database, the National Ambulatory Care Reporting System, and the Immigration, Refugees and Citizenship Canada-Permanent Resident database	Chinese origin, South Asian origin or all other ethnicities	hospital discharge data within 30 days post discharge	effects of each ethnic group, compared with the reference population, adjusted for age, sex, income, education, marital status, immigration status, community size, discharge diagnosis and diagnosis of substance abuse	comparison group in Chinese or in South Asian people
Lavoie (2018)	Canada	All residents of British Colombia between 1994 and 2010	British Colombia hospitalization data linked to demographics from the Consolidation file from 1994 to 2010	First Nations people living on or off-reserve identified through BC Medical Services Plan claims	Hospital care for ambulatory sensitive mental disorders (psychosis and major depression)	Rate of hospital readmission adj usted for age, sex, and socioeconomic status	Rates of 30-day readmission for First Nations people were lower than the rest of the province after 2002-2006
Evans (2017)	Britain	7,648 inpatients	Records from electronic patient record system	White, Black/Black British, Asian/Asian British, “Other”	Time to readmission was calculated as the difference between the discharge date of the first admission during the study period, and the subsequent admission date	Binary logistic regression controlled for age, gender, diagnosis, marital status, number of care coordinators, and MHA section	Black/Black British more likely to have rapid readmission than White (OR=1.34, 1.07 to 1.68) Asian and Other both not significantly different than White

Appendix B Table 3: Summary of Studies (n=6) Investigating Socioeconomic Status as a Determinant of Psychiatric Hospitalization

Study Authors (Year)	**Country**	**Sample Size**	**Data sources**	**Socioeconomic Measurement**	**Outcome Measure**	**Methods**	**Results**
Padgett (1994)	US	951,742 Federal employees and family insured by Blue Cross/ Blue Shield	Federal employees blue cross/blue shield insurance claims database	Level of education (<12 years of education, high school graduate, some college education, college graduate)	At least one inpatient day coded as "Nervous and Mental" over the year	Weighted logistic regression models created for each ethnic group separately	Few notable differences, but slightly higher rates among less-educated Hispanic and White people *Not statistically significant
Snowden (2009)	US	9,371 adults (age 18 and over)	National Survey of American Life and National Comorbidity Survey Replication	Annual household income Employment status (currently working vs not) Educational level (Less than high school, high school graduate, some college, college graduate or higher)	Lifetime psychiatric hospitalization	Logistic regression controlling for age, sex, ethnicity, marital status, lifetime psychological counselling, any lifetime disorder	Higher income = lower rates (OR=0.64, 0.71, 0.38 for 30-59k, 60k-89k, >90k vs <30k) Currently working less than not working (OR=0.62, 0.50 to 0.78) Only some college statistically significantly lower than less than high school (OR=0.63, 0.45 to 0.90)

Aro (1995)	Finland	Adult Finish population (age 25 to 64)	National Hospital Discharge Register linked to Finish census	Educational level (less than 10 years of education, 10-12 years of education, more than 12 years of education)	At least one hospital discharge for mental illness in 2-year period	Age-standardized hospital rates	Men with basic education had a 2- to 3-fold risk of being admitted compared to highest education Similar gradients in women but weaker in magnitude than men
Sundquist (2006)	Sweden	4.5 million Swedish adults (aged 25 to 64)	Linkage of several national databases	Neighbourhood income (in quintiles), annual individual disposable income Education (no high school, some high school or completion of high school, more than high school)	First hospital admission due to mental disorders from 1998 to 1999	Age-standardised hospital admission rates, separate multilevel logistic regressions for men and women controlling for marital status, immigration status, age	Lower education was associated with higher risk of hospitalization in men and women Risk increased with decreasing individual income quintiles fir men and women Neighbourhood income similar trends as individual income
Savoie (2004)	Multiple countries	N/A (Systematic Review)	Studies looking at gender as a role in depression	Employment status in multiple measures	Hospitalization for depression		1 study found no statistically significant association

							1 study found an association between unemployment and increased risk for hospitalization
Roelands (2017)	Belgium	3,156,030 Belgian residents	Administrative databases (Socialist Health Insurance Schemes)	Employment (unemployed or employed), Income (incapable of work with substitute income, receiving a disability benefit, living on social welfare, having an increased healthcare reimbursement)	Hospitalization for suicide attempt	Gender, age, region, being unemployed, incapable of work with substitute income, receiving a disability benefit, living on social welfare, having an increased healthcare reimbursement, living alone, using antidepressants, and using antipsychotics	All measures of income were associated with higher risk of hospitalization Employment was associated with increased risk of hospitalization

Appendix B Table 4: Summary of Studies (n=4) Investigating Socioeconomic Status as a Determinant of 30-day Readmission

Study Authors (Year)	**Country**	**Sample Size**	**Data sources**	**Socioeconomic Measurement**	**Outcome Measure**	**Methods**	**Results**
Chen (2018)	Canada	42, 280 patients in Ontario	OMHRS	Education Employment	30-day and 5-year readmission after a first psychiatric hospitalization	Multivariate logistic regression model controlling for gender, age, marital status, language spoken, aboriginal identity, type	Compared to those with less than high school education: high school education was associated with less

						of hospital and index admission length of stay	30-day readmissions for psychotic disorders Unemployed people had higher rates of readmission for mood disorders, substance disorders, other diagnoses. No significant differences in readmission across employment for schizophrenia or delirium
Donisi (2016)	Multiple countries	N/A (Systematic Review)	Studies investigating readmission after a psychiatric hospitalization **Limited to studies on 30-day readmission for this review*	Income Employment Education	Readmission within 30 days of a psychiatric hospitalizations		Income not significantly associated with readmission in 2 studies 1 study found increased risk of readmission for unemployed compared to those who were employed, 2 studies found no significant associations Education not significantly associated with readmission in three studies

Vigod (2015)	Canada	all individuals over age 18 discharged from acute psychiatric units in Ontario, Canada	OMHRS	Education	Psychiatric readmission to any hospital in Ontario within 30 days of discharge from the index admission	Series of multivariable logistic regression models to determine the best predictive model for 30-day psychiatric readmission	Education was not significant by the final models High school education was protective compared to no high school education in less adjusted models
Evans (2017)	Britain	7,648 inpatients	Records from electronic patient record system	Employment	Time to readmission was calculated as the difference between the discharge date of the first admission during the study period, and the subsequent admission date	Binary logistic regression controlled for age, gender, ethnicity, diagnosis, marital status, number of care coordinators, and MHA section	No association between employment and rapid readmission, but employment had considerable missing data (39.49%)

Appendix C Countries included in Black-African and Black-Caribbean groups

Ethnic group	Ethnic origins included
Black-African	Egyptian, Algerian, Angolan, Burundian, Cameroonian, African, East African, South African, Chadian, Congolese, Dinka, Eritrean, Ethiopian, Gabonese, Gambian, Ghanaian, Guinean, Ivorian, Kenyan, Libyian, Malagasy, Malian, Mauritian, Moroccan, Nigerian, Rwandan, Senegalese, Seychellois, Sierra Leonean, Somali, Sudanese, Tanzanian, Togolese, Tunisian, Ugandan, Zambian, Zimbabwean
Black-Caribbean	Bermudan, Jamaican, Trinidadian/Tobagonian, Barbadian, Antiguan, Bahaman, Dominican, Grenadian, Monteserratan, Kittian/Nevidian, St. Lucian, Vincentian/Grenadinian, Turk, Cuban, Haitian, Martinican, Puerto Rican, Carib, Caribbean (not otherwise specified)

Curriculum Vitae

Name:	Meghan Smith
Post-secondary Education and Degrees:	Western University London, Ontario, Canada 2018-present M.Sc. Epidemiology & Biostatistics Western University London, Ontario, Canada 2014-2018 B.M.Sc. - honours specialization in Epidemiology and Biostatistics
Honours and Awards:	Western Graduate Research Scholarship 2018-2019
Related Work Experience	Research Associate (Data Analyst) The University of Western Ontario 2019-2021 Teaching Assistant Western University 2019 Graduate Research Assistant Western University 2018-2019

Oral Presentations:
Smith, M & Anderson KK. Socioeconomic Variations in Psychiatric Hospitalization and 30-day Readmission in Canada. Mental Health Research and Innovation Day. October 2019. London, Ontario.

Poster Presentations:
Smith, M & Anderson KK. Ethnic Variations in Psychiatric Hospitalizations in Canada. Canadian Academy of Psychiatric Epidemiology (CAPE) Annual Scientific Symposium. September 2019. Quebec City, Quebec.