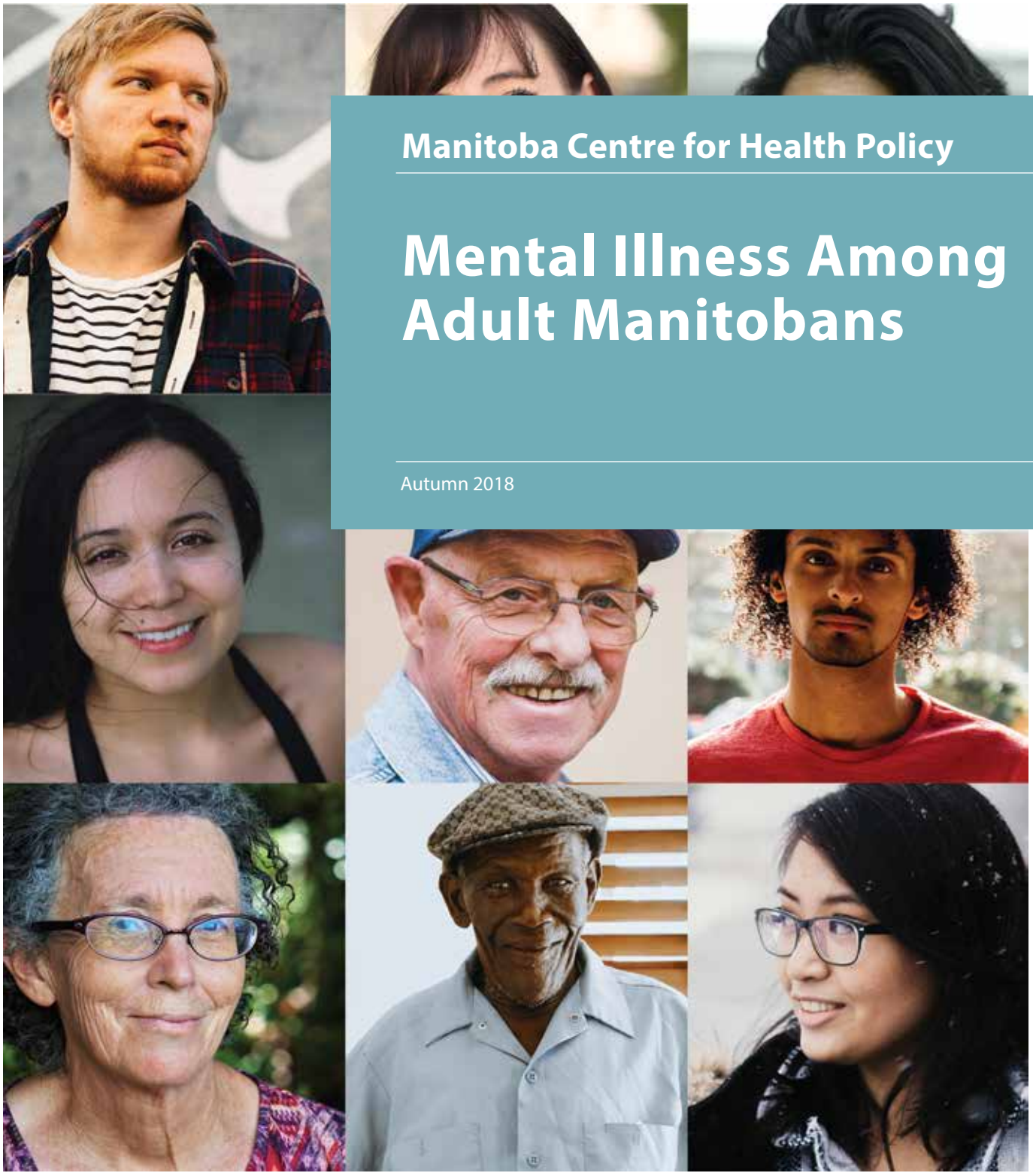

Manitoba Centre for Health Policy

Mental Illness Among Adult Manitobans

Autumn 2018

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About the Manitoba Centre for Health Policy

The Manitoba Centre for Health Policy (MCHP) is located within the Department of Community Health Sciences, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba. The mission of MCHP is to provide accurate and timely information to healthcare decision–makers, analysts and providers, so they can offer services which are effective and efficient in maintaining and improving the health of Manitobans. Our researchers rely upon the unique Manitoba Population Research Data Repository (Repository) to describe and explain patterns of care and profiles of illness and to explore other factors that influence health, including income, education, employment, and social status. This Repository is unique in terms of its comprehensiveness, degree of integration, and orientation around an anonymized population registry.

Members of MCHP consult extensively with government officials, healthcare administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards, enables MCHP to contribute to the health policy process. MCHP undertakes several major research projects, such as this one, every year under contract to Manitoba Health, Seniors and Active Living. In addition, our researchers secure external funding by competing for research grants. We are widely published and internationally recognized. Further, our researchers collaborate with a number of highly respected scientists from Canada, the United States, Europe, and Australia.

We thank the Health Research Ethics Board, University of Manitoba, Rady Faculty of Health Sciences, Max Rady College of Medicine, Health Research Ethics Board for their review of this project. MCHP complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for Manitoba Health, Seniors and Active Living.

The Manitoba Centre for Health Policy

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Table of Contents

List of Tables

List of Figures

Executive Summary

Introduction

This report was conducted by the Manitoba Centre for Health Policy (MCHP) at the request of Manitoba Health, Seniors and Active Living (MHSAL). It provides background information on the burden of mental illness in Manitoba from 2010/11 to 2014/15 and some insight into the longer-term associations between childhood/adolescent mental illness and adverse adult outcomes. This wealth of information can inform the development of Manitoba's Mental Health and Addictions Strategy, including the provincial Child and Youth Mental Health Strategy, and provide a baseline measure of adult mental health before implementation of the strategy.

This report used existing data from the Manitoba Population Research Data Repository (Repository), which is housed at MCHP at the University of Manitoba. All data are de-identified, meaning that identifiers such as names and addresses were removed to protect people's privacy before any data were transferred to MCHP. All datasets contain a scrambled version of the Personal Health Identification Number (PHIN), which allows for person-level, de-identified linkage across datasets and over time.

Part 1 of this report describes the diagnostic prevalence of mental illness among adults and the patterns of service use of adults experiencing mental illness in Manitoba. Mental illnesses can be considered chronic diseases and are not necessarily recorded in administrative data on a regular basis (e.g., yearly). For this reason, the research team decided that the prevalence of mental illness in adults would be more accurately determined by calculating a five-year prevalence. Using this time frame also permitted comparisons with the 2004 MCHP report, given that a five-year prevalence was previously used [1].

Part 2 examines a birth cohort of 60,838 people (born 1980/81 to 1984/85) who were continuously covered by Manitoba Health insurance and lived in Manitoba for at least one day after their 18th birthday. We used this cohort to compare rates of adverse adult outcomes between those with childhood/adolescent mental illness and those without. Both groups were followed from the age of 18 until the first instance of an adverse outcome, they left the cohort, or the end of the study period.

Table E.1 presents the mental health indicators used in this study. The term diagnostic prevalence is used to communicate that the prevalence of mental illnesses are based on International Classification of Diseases (ICD) diagnoses from medical claims and hospital abstracts. Within this report, the prevalence of each mental health indicator is presented by age, sex, health region, health district, Winnipeg neighbourhood cluster and income

quintile. The diagnostic prevalence of mental illness is calculated for the entire adult Manitoba population and also for specific populations including: women in the postpartum period, adults living in personal care homes or in social housing, adults receiving income assistance, and adults who are victims or accused of a crime. Rates of healthcare service use and justice system involvement were compared between those with and without mental illness using adjusted relative risks.

Table E.1: Mental Illness Indicators used in this Study

	Description
Main Mental Illness Indicators for Adults	
Mood and Anxiety Disorders	A broad group of mental disorders including depressive (depressed mood and lack of interest in activities), bipolar (periods of elevated mood and increased energy, and periods of depressed mood), and anxiety disorders (excessive fear, anxiety or worry and often avoidance).
Substance Use Disorders	The excess use of and reliance on a drug, alcohol or other chemical that leads to severe negative effects on the user's health and well-being or the welfare of others.
Psychotic Disorders	A broad group of disorders characterized by extreme impairment of the ability to think clearly, respond emotionally, communicate effectively, understand reality and behave appropriately. Included in this group is schizophrenia and delusional and psychotic disorders.
Schizophrenia	A severe mental disorder characterized by difficulty in distinguishing between real and unreal experiences (delusions and hallucinations), thinking logically, and difficulties in social and emotional functioning. To obtain a diagnosis of schizophrenia, the symptoms must be present for at least one month.
Personality Disorders	A diverse category of mental disorders that are characterized by long-term patterns of thoughts and behaviours that cause serious problems with relationships and work.
Any Mental Illness	Consists of having at least one of the following disorders examined in this report: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.
Dementia	Neurodegenerative disorders affecting the brain that are characterized by memory loss or difficulties with thinking, problem solving or language.
Suicidal Behaviours	
Hospitalizations for Attempted Suicide	Hospitalized for self-inflicted injury or poisoning. Hospitalizations for poisoning of undetermined intent, injury of undetermined intent or accidental poisoning are also included if there was a mental illness diagnosis code found in the hospitalization record.
Suicide	Death with the primary cause as self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning.
Additional Mental Illness Indicators Diagnosed in Childhood	
Attention-Deficit Hyperactivity Disorder (ADHD)	A neurobehavioural developmental disorder that is characterized by a persistent pattern of impulsiveness, hyperactivity and absence of attention in children.
Conduct Disorder	A repetitive and persistent pattern of dissocial, aggressive or defiant behaviour, which is enduring and more severe than ordinary childish mischief or adolescent rebelliousness.

Summary of Findings

Diagnostic Prevalence of Mental Illness

Table E.2 shows that over the five-year period from 2010/2011 to 2014/15, 27.6% of adults in Manitoba received a diagnosis of at least one of the mental illnesses examined in this study. This high prevalence was driven by mood and anxiety disorders (23.2%), followed by substance use disorders (5.9%), psychotic disorders (2.3%) and personality disorders (0.9%). The prevalence of mental illness appears to have remained stable since the 2004 MCHP report. Mental illness tended to be more commonly diagnosed among young adults (25 to 44 years old) and middle-aged adults (45 to 64 years old) than among youth (18 to 24 years) or older adults (65 years and older). Men were more likely to be diagnosed with substance use and psychotic disorders than women, and conversely, women were more likely to be diagnosed with mood and anxiety disorders than men. The prevalence of the majority of mental illnesses was higher in urban areas than rural areas. In both rural and urban regions, there was a linear trend across income quintiles, where the five-year diagnostic prevalence of mental illness increased as area-level income decreased.

Table E.2: Summary of Diagnostic Prevalence of Mental and Neurodegenerative Disorders and Rates of Suicidal Behaviours in Adults in Manitoba, 2010/11-2014/15

Age- and sex-adjusted, five-year time period

Mental Illness Indicators	Manitoba Overall	Age - Female				Age - Male				Urban vs. Rural	Income Gradient†	
		18-24	25-44	45-64	65+	18-24	25-44	45-64	65+		Urban	Rural
Mental Disorders												
Mood and Anxiety Disorders (%)	23.16	32.92*	36.56*	36.32*	30.45*	18.06*	21.39*m	22.32*m	22.82*m	Urban higher	↑	↑
Substance Use Disorders (%)	5.88	4.73	6.41*f	5.91*f	2.5*f	5.63	7.98*m	7.78*m	4.41*m	Urban higher	↑	↑
Psychotic Disorders (%)	2.33	1.11*	1.30*	2.41f	9.32f	2.58*	2.18*	2.70	7.73m	No difference	↑	↑
Schizophrenia (%)	0.91	0.79*	0.86*	1.54f	1.61f	1.84*	1.80*	1.88	1.24	Urban higher	↑	↑
Personality Disorders (%)	0.95	2.06*	1.52	1.42f	2.27	1.07*	1.12	1.09	1.73m	Urban higher	↑	↑
Any Mental Illness (%)	27.57	36.11*	41.78*	41.65*	37.17*	22.73*	28.56*m	30.16*m	31.26*m	Urban higher	↑	↑
Suicidal Behaviours												
Hospitalizations for Attempted Suicide[a] (per 100,000)	262.15	474.20	364.19	304.04f	253.94f	326.51	257.30	257.35	289.25	Rural higher	↑	↑
Suicide[b] (per 100,000)	88.19	165.64	78.44	81.14*	57.56f	117.29	114.44	159.14*	116.36	No difference	↑	↑
Neurodegenerative Disorders												
		55-64	65-74	75-84	85+	55-64	65-74	75-84	85+			
Dementia (%)	10.34	3.31	13.6f	41.79f	59.47f	3.02	11.49m	40.56m	64.19m	No difference	↑	↑

† linear trend test was conducted to determine if prevalence increased or decreased with each increase in area-level income:
↑ indicates the prevalence increased as area-level income decreased ↓ indicates the prevalence decreased as area-level income decreased

* indicates that males and females are statistically significantly different in that age group ($p<0.05$)

m indicates that males in that age group are statistically significantly different from males in the youngest age group ($p<0.01$)

f indicates that females in that age group are statistically significantly different from females in the youngest age group ($p<0.01$)

a females have a higher rate of hospitalizations for attempted suicide than males when all ages are combined (340 versus 281 per 100,000)

b females have a lower rate of suicide than males when all ages are combined (88 versus 126 per 100,000)

Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders

Suicide and Attempted Suicide Rates

During the five-year period, we calculated 67 deaths by suicide per 100,000 adults and 262 attempted suicides per 100,000 adults that resulted in hospitalization. The suicide rate in this report has remained unchanged since the 2004 MCHP report, which differs from US findings where rates have increased over time [2]. When we broadened our definition of suicide to include deaths by a) poisonings of undetermined intent, or b) both accidental poisonings and poisonings of undetermined intent, the rate was as high as 71 and 88 deaths per 100,000 adults, respectively. The broadest definition of suicide, which included both accidental poisonings and poisonings of undetermined intent, was used and is shown in Table E.2 because poisonings that are coded as accidental or of undetermined intent have been shown to likely be suicides [3]. Males had higher suicide rates than women overall, however, only the 45-64 age group was statistically significantly different when divided into age groups. Overall, women had higher rates of hospitalizations for attempted suicide than men, although these sex differences varied by age groups. Hospitalizations for attempted suicide were higher in rural than in urban regions. In both rural and urban regions, the rate of suicide attempts increased as area-level income decreased.

Diagnostic Prevalence of Dementia

The five-year diagnostic prevalence of dementia was 10.3% and was essentially unchanged since the 2004 MCHP report. The prevalence increased dramatically with age. Among men and women aged 85 and older, the prevalence was 64% and 59%, respectively. In both rural and urban regions, there was a linear trend across income quintiles, where the five-year diagnostic prevalence of dementia increased as area-level income decreased.

Mental Illness in Subpopulations

When compared to the Manitoba prevalence, a higher prevalence of mental illness was found among adults living in personal care homes, those receiving income assistance, those living in social housing, and those involved in the justice system either as accused or victims. For these indicators, we measured mental illness and service use at the same time, so we cannot determine whether one caused the other nor can we determine whether the mental illness was present before an individual became part of the specific population being studied or whether the mental illness occurred after.

We also examined women in the postpartum period in a more comprehensive way. Compared to women who had not recently given birth, we found that women in the postpartum period had lower rates of mental illness after adjusting for factors that could be linked to mental illness. When compared to their pre-pregnant mental health, women in the postpartum period had a higher prevalence of psychotic disorders and a similar prevalence of mood and anxiety disorders, substance use disorders and attempted suicide.

Healthcare Use

Individuals with mental illness used more healthcare services compared to those without mental illness, even after controlling for age, sex, income and medical conditions. Notably, the rates of long-stay hospitalizations (lasting between 14 to 365 days) were three times higher for people with mood and anxiety disorders and almost 14 times higher for those who had attempted suicide compared to those with no mental illness in the last year. Emergency department visit rates were close to three times higher for those with personality disorders or those who had attempted suicide compared to people with no mental illness.

Association between Childhood/ Adolescent Mental Illness and Adult Mental Illness

Of the 60,838 people in the Manitoba birth cohort (born 1980/81 to 1984/85), 16.5% were diagnosed with a mental disorder during their childhood or adolescence. In fact, among those diagnosed with mental illness over their lifetime (at some point from childhood to age 34), a high proportion were first diagnosed before the age of 18. For example, 35% of those diagnosed with mood and anxiety disorders were first diagnosed in childhood/adolescence. Further, we found that having a diagnosed childhood/ adolescent mental disorder increased the risk of being diagnosed with the same disorder in adulthood.

Association between Childhood/ Adolescent Mental Illness and Adverse Adult Outcomes

This study found that having a diagnosed childhood/ adolescent mental illness increased the likelihood of a range of adverse experiences in adulthood, including suicidal behaviours, not graduating from high school, justice system involvement, receiving income assistance, and living in social housing. For example, people who were hospitalized for attempted suicide before age 18 were three times more likely to die by suicide and six times more likely to be re-hospitalized for attempted suicide in adulthood. Other childhood factors such as sex, urbanicity, income, family structure, maternal mental health, and child welfare involvement explained some of the association between childhood/adolescent mental

disorders and adult outcomes. However, the association remained strong and statistically significant even after adjusting for these factors, suggesting that childhood/adolescent mental illness is a very important risk marker for subsequent adverse adult outcomes.

Strengths and Limitations of this Report

It is important to interpret our findings with a good understanding of the strengths and limitations of the methods and datasets utilized. This report offers a wealth of information on the burden of mental illness of adults in Manitoba and on the longer-term outcomes of children and adolescents diagnosed with mental illness. It provides a population-based perspective of the mental health of adult Manitobans, meaning that we used data from everyone in the province registered with Manitoba Health – including First Nations people living on reserve.

We acknowledge that our diagnostic prevalence figures likely under-report the true five-year prevalence of mental disorders, as they only reflect the number of adults who were diagnosed by physicians or nurse practitioners. We did not have access to diagnoses provided by psychologists or services provided by nurses, social workers, and counsellors. Further, many children and adults with mental disorders do not seek treatment. Many of our analyses are cross-sectional, with the exception of our birth cohort, therefore we can observe an association but cannot determine causality (i.e., we could not conclude that being in a personal care home causes mental illness). Finally, we note some important mental illnesses that we were unable to examine, such as eating disorders, tic disorder, and oppositional disorders.

Conclusions

This report finds a high prevalence of mental illness, which is consistent with previous Manitoban and Canadian studies. Mental illness is often associated with a high degree of suffering and disability, requiring not only mental health services but also other health and social services. Previous studies have also reported that mental illnesses are among those most responsible for causing long-term disability [4]. This report also demonstrates that childhood/adolescent mental illness is associated with a range of adverse experiences in adulthood, including suicidal behaviours, use of social services, poor educational outcomes and justice system involvement. This emphasizes the importance of providing prevention and timely intervention early in life. Given the profound consequences on the well-being of Manitobans and the impact on long-term services, greater investment in prevention of mental illness and in mental health services in childhood and adolescence is imperative. Recommendations include increasing mental health promotion and mental illness prevention efforts, increasing suicide prevention efforts, enhancing access and strengthening mental health services, enhancing access and strengthening services for people living with dementia, developing mental health skills and knowledge of existing workforce in health and beyond, addressing health inequities, and supporting ongoing mental health research and evaluation. Given the high prevalence and the many services accessed by people with mental illness, these recommendations will require a whole-of-government approach.

Chapter 1: Introduction

Purpose of the Report

This report was conducted by the Manitoba Centre for Health Policy (MCHP) at the request of Manitoba Health, Seniors and Active Living (MHSAL). MCHP was asked: 1) to update, from the 2004 MCHP report, our knowledge of mental illness in Manitoba, and 2) to conduct a longitudinal analysis comparing those diagnosed with mental illness in childhood to those with no diagnosis. This report examined the diagnostic prevalence of mental illness among adults in Manitoba, as well as the healthcare use and justice system involvement of adults with mental illness. To address the mental health needs of certain populations who may be at higher risk of mental illness, this report presents the prevalence in specific populations of Manitoba. A cohort of Manitobans born in the province was also developed to examine the relationship between childhood/adolescent mental disorders and adverse adult outcomes.

This report provides valuable background information on the burden of mental illness in Manitoba and some insight into the longer-term associations between childhood/adolescent mental illness and adverse adult outcomes. This information can inform the development of Manitoba Health's Mental Health and Addictions Strategy and provide a measure of adult mental health before implementation of the strategy. The remainder of this chapter will provide an overview of the mental health indicators examined in this report, introduce the topic of mental illness in Manitoba, and describe the objectives of the report and the methods used to address them.

Mental Illness Indicators Examined in this Report

We used data in the Manitoba Population Research Data Repository to examine a number of mental health indicators, listed and defined below. These will be described in greater detail in Chapter 2. The specific International Classification of Diseases (ICD) codes (ICD-9-CM and ICD-10-CA) used to create these indicators are found in Appendix 1. The ICD is a diagnostic tool developed and maintained by the World Health Organization to measure disease prevalence [5]. Note that the databases used in this study contain medical claims and hospitalization records that provide the ICD-9-CM and ICD-10-CA codes, but not the codes from the American Psychiatric Association's Diagnostic Statistical Manual (DSM) [6].

In Canada, clinicians are trained to use the DSM to diagnose mental illness and these are subsequently translated into ICD codes.

Since the 2004 MCHP report, changes have been made to a number of mental health indicators based on new research and our expanding understanding of mental illnesses. We consider these changes when comparing the results from the current report to the previous 2004 report. These changes are described later in this chapter (Considerations in Defining Mental Health Indicators).

For additional information on indicators and other concepts found in this report, please see the MCHP Concept Dictionary. The Concept Dictionary contains detailed operational definitions and SAS® program code for variables and measures developed from administrative data (http://umanitoba.ca/faculties/health_sciences/medicine/units/chs/departmental_units/mchp/resources/concept_dictionary.html).

Main Mental Illness Indicators for Adults

- Mood and anxiety disorders consist of a broad group of mental disorders including depressive (depressed mood and lack of interest in activities), bipolar (periods of elevated mood and increased energy, and periods of depressed mood), and anxiety disorders (excessive fear, anxiety or worry and often avoidance). Examples of anxiety disorders include panic disorder, post-traumatic stress disorder and obsessive-compulsive disorder.
- Substance use disorders are characterized by the excess use of and reliance on a drug, alcohol or other chemical that leads to severe negative effects on the user's health and well-being or the welfare of others.
- Psychotic disorders are a broad group of disorders characterized by extreme impairment of the ability to think clearly, respond emotionally, communicate effectively, understand reality and behave appropriately. Included in this group is schizophrenia and delusional and psychotic disorders.
- Schizophrenia is a severe mental disorder characterized by difficulty in distinguishing between real and unreal experiences (delusions and hallucinations), thinking logically, and difficulties in social and emotional functioning. To obtain a diagnosis of schizophrenia, the symptoms must be present for at least one month [6].
- Personality disorders are a diverse category of mental disorders that are characterized by long-term patterns of thoughts, emotional responses, and behaviours that cause serious problems in multiple life domains.
- Any mental illness consists of having at least one of the following disorders examined in this report: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.
- Dementia is a neurodegenerative disorder caused by diseases affecting the brain and is characterized by memory loss or difficulties with thinking, problem solving or language.

Suicidal Behaviours

- Hospitalizations for attempted suicide is defined as being hospitalized for self-inflicted injury or poisoning. Hospitalizations for poisoning of undetermined intent, injury of undetermined intent or accidental poisoning are also included if there was a mental illness diagnosis code found in the hospitalization record.
- Suicide is defined as self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning as the primary cause of death.

Additional Mental Illness Indicators Identified in Childhood

- Attention-deficit hyperactivity disorder (ADHD) is a neurobehavioural developmental disorder that is characterized by a persistent pattern of impulsiveness, hyperactivity and absence of attention in children. This disorder is diagnosed less often in adults.
- Conduct disorder is characterized by a repetitive and persistent pattern of dissocial, aggressive or defiant behaviour, which is enduring and more severe than ordinary childish mischief or adolescent rebelliousness.

Objectives

We identified the following objectives:

Part 1: Burden of Mental Illness among Adults

1a. Determine the diagnostic prevalence of mental illness, suicide and attempted suicide for adults, and whether this prevalence differs by age, sex, geographic region, and income quintile;

1b. Determine the diagnostic prevalence of mental illness among specific populations, namely, women in the postpartum period, adults living in personal care homes or social housing, adults receiving income assistance, and adults who were accused of a crime or who were victims of a crime; and

1c. Determine whether there are any associations between mental illness and use of healthcare services

or involvement with the justice system.

Part 2: Association between Childhood/Adolescent Mental Illness and Adverse Adult Outcomes

2a. Determine the age of onset of mental illness among individuals who were diagnosed with a mental illness over the course of the study period;

2b. Determine whether there is any association between diagnosed mental illness and suicidal behaviours in childhood/adolescence and these same mental health indicators in adulthood; and

2c. Determine whether there is an association between diagnosed mental illness and suicidal behaviours in childhood/adolescence, and adult social services use, justice system involvement and high school graduation.

Background on Mental Illness

Mental illness is prevalent across Manitoba and Canada. Statistics Canada reports that 20% of Canadians will experience a mental illness in their lifetime [7]. Using administrative data housed at MCHP, Martens et al. found that 37% of the population in Manitoba aged 10 and over had at least one healthcare contact coded with a mental illness diagnosis over a five-year period [1]. Furthermore, one in ten visits to a physician and one in ten hospitalizations were mental health-related. A more recent MCHP study reported that 23.3% of Manitobans aged 10 and older reported a mood and anxiety disorder in the last five years, and 5% reported a substance use disorder [8].

Previous studies found that among adults with mental illness, half reported that their symptoms began in childhood or adolescence [9]. Research suggests that the majority of children and adolescents do not seek help for mental health problems [10]. Public health experts and researchers have called for more attention to prevention and early intervention. This is because once a disorder has developed, it often disrupts the life course of these young people, and it is difficult to treat [9,11]. Children with mental illness are more likely to utilize health, social and correctional services than those with no disorders [12–14]. Children with ADHD, for example, have higher rates of poor outcomes on a number of indicators compared to controls: arrests, convictions, and incarcerations [15]; substance use disorders and cigarette smoking [16]; being placed in a special class, requiring extra tutoring, repeating grades, being suspended from school, not graduating from high school [17]; and being jobless in adulthood, financially dependent on their parents, and attaining a lower personal social class than their family of origin [18]. Results from a meta-analysis found that children with conduct disorder or oppositional defiant disorder are more likely to experience depression as adults [11]. However, not all children with symptoms of mental illness have the same trajectories, depending on several factors that include the type of mental disorder in childhood. A recent study reported that 4.9% to 9% of children and adolescents experience hallucinations; however, most do not develop a psychotic disorder in adulthood [19].

What's in this Report

Chapter 2 describes the diagnostic prevalence of mental illnesses, suicide and attempted suicide among adults in Manitoba. Chapter 3 describes the diagnostic prevalence of mental disorders, suicide and attempted suicide among specific adult populations in Manitoba, namely, women in the postpartum period, adults living in personal care homes or social housing, adults receiving income assistance, and adults who were accused of a crime or who were victims of a crime. Chapter 4 examines associations between mental illness and the use of healthcare services and involvement with the justice system among adults in Manitoba. Chapter 5 examines the associations between diagnosed mental illness and suicidal behaviours in childhood/adolescence and adult mental illness, use of social services, justice system involvement and high school graduation. Chapter 6 provides a summary of the report findings, and recommendations based on these findings.

Methods

Datasets Used in Report

This report used existing data from the Manitoba Population Research Data Repository (Repository), which is housed at MCHP at the University of Manitoba. The Repository is a comprehensive collection of administrative, registry, survey, and other data relating to residents of Manitoba. It was developed to describe and explain patterns of healthcare use and profiles of health and illness. Because the Repository also contains education, social services and justice data, inter-sectoral research is possible. All data are de-identified, meaning that identifiers such as names and addresses were removed to protect people's privacy before any data were transferred to MCHP. All datasets contain a scrambled version of the Personal Health Identification Number (PHIN), which allows for person-level, de-identified linkage across datasets and over time.

Several datasets within the Repository from a variety of data sources were used for this study:

- Canada Census (Statistics Canada) was used to obtain relevant community-level data on key socioeconomic characteristics (e.g., income quintile).
- Drug Program Information Network (Manitoba

Health) was used in some definitions of mental disorders as well as for reporting on the number of different medication types people were prescribed.

- Hospital Abstracts (Manitoba Health) was used in definitions of mental disorders and attempted suicide as well as for reporting on hospitalizations.
- Manitoba Health Insurance Registry (Manitoba Health) was used to provide information on age and place of residence (by geographic areas only) for population comparison groups, to provide denominators for the calculation of rates and to create the birth cohort.
- Medical Services (Manitoba Health) was used in definitions of mental disorders as well as for reporting on physician visit rates.
- Midwifery Summary Reports (Manitoba Health) was used to identify women who gave birth with midwifery involvement.
- Long Term Care Utilization (Manitoba Health) was used to identify adults living in personal care homes.
- Emergency Department Information System (Winnipeg Regional Health Authority) was used to report on the frequency of visits to emergency departments. These data are available for Winnipeg only.
- Vital Statistics Mortality (Vital Statistics) was used to determine deaths by suicide.
- Child and Family Services Applications and Intake (Department of Families) was used to identify children in care.
- Enrollment, Marks, and Assessments (Manitoba Education and Training) was used to measure high school graduation.
- Tenant Management System (Department of Families) was used to determine who was living in social housing.
- Employment/Income Assistance (Department of Families) was used to determine income assistance beneficiaries.
- Prosecution Information and Scheduling Management (Manitoba Justice) was used to examine patterns of contact with the legal system.

Detailed descriptions of these databases can be found on MCHP's Repository Data List web-page: http://umanitoba.ca/faculties/medicine/units/community_health_sciences/departmental_units/mchp/resources/repository/datalist.html

Study Population and Time Period

Part 1 of this report presents descriptive and statistical analyses regarding mental illness of adults in Manitoba. For the purposes of this study, an "adult" was considered to be any Manitoba resident aged 18 and older. Mental illnesses are considered to be chronic diseases and are not necessarily captured in administrative data on a regular basis (e.g., yearly). For this reason, the research team decided that the prevalence of mental illness in adults would be more accurately determined by calculating a five-year prevalence. Using this time frame would also permit comparisons with the 2004 MCHP report, given that it reported a five-year prevalence [1]. The study period in the current report was fiscal years 2010/11 to 2014/15 (i.e., April 1, 2010 to March 31, 2015). Tables 1.1 and 1.2 show the number of adults living in Manitoba by geographic region (health regions, health districts and Winnipeg neighbourhood clusters), age and sex. Note that the small number of adults under the category "Public Trustee" could not be categorized by geography because of insufficient information on where they lived. The Public Trustee manages and protects the affairs of Manitobans who are unable to do so themselves and have no one else able to act on their behalf, including mentally incompetent and vulnerable adults and children. See Appendix Figure 3.1 for more information on the Public Trustee.

Table 1.1: Population Counts of Adults by Age Group, Sex, Health Region and Winnipeg Neighbourhood Cluster, 2012

Area	Male				Female			
	18-24	25-44	45-64	65+	18-24	25-44	45-64	65+
Health Region								
Southern Health-Santé Sud	10,230	22,877	22,508	10,822	9,520	23,003	22,030	12,369
Winnipeg RHA	37,768	101,407	96,535	44,012	36,527	102,625	98,916	59,587
Prairie Mountain Health	8,019	20,307	21,594	13,326	7,816	20,042	21,913	16,113
Interlake-Eastern RHA	6,183	13,636	19,154	9,862	5,662	13,485	18,752	10,440
Northern Health Region	4,509	9,593	8,017	2,287	4,458	9,809	7,306	2,370
Public Trustee	327	296	657	543	249	213	434	627
Manitoba	67,036	168,116	168,465	80,852	64,232	169,177	169,351	101,506
Winnipeg Neighbourhood Cluster								
Fort Garry S	3,317	6,862	5,449	2,420	3,121	6,909	5,785	2,916
Fort Garry N	1,897	3,999	4,763	2,242	1,886	4,236	4,907	3,121
Assiniboine South	1,911	3,982	5,179	3,075	1,812	4,265	5,814	3,800
St. Vital S	2,154	4,967	5,609	2,540	1,969	5,220	6,253	3,425
St. Vital N	1,267	3,860	3,589	1,932	1,298	3,920	3,738	2,738
St. Boniface E	2,073	5,633	5,880	2,688	1,933	6,000	5,981	3,033
St. Boniface W	730	2,235	2,244	1,071	758	2,281	2,158	1,696
Transcona	1,855	5,257	4,990	1,940	1,732	5,243	5,101	2,360
River Heights W	1,548	5,259	4,693	2,524	1,638	5,531	5,281	3,668
River Heights E	902	3,851	2,596	1,274	1,050	3,958	2,743	2,048
River East N	582	1,038	1,698	695	565	975	1,706	661
River East E	1,695	4,046	3,946	1,710	1,496	4,200	4,271	2,148
River East W	1,755	4,700	5,168	3,305	1,809	4,785	5,779	5,328
River East S	934	3,074	2,385	760	970	2,942	2,210	967
St. James - Assiniboia W	1,544	3,774	4,260	2,898	1,462	4,068	4,737	3,893
St. James - Assiniboia E	1,255	3,711	3,828	2,036	1,190	3,760	3,879	2,832
Seven Oaks N	237	597	809	369	220	589	787	463
Seven Oaks W	1,558	4,058	3,357	1,483	1,367	4,168	3,574	1,848
Seven Oaks E	1,857	5,345	5,202	2,376	1,725	5,430	5,573	3,494
Inkster W	1,177	2,808	2,678	804	1,073	2,895	2,721	931
Inkster E	883	2,164	1,967	661	852	2,164	1,854	934
Downtown W	2,078	6,463	5,042	1,699	2,002	6,190	5,030	2,504
Downtown E	1,888	6,870	4,928	1,564	2,036	6,003	3,553	2,163
Point Douglas N	1,679	4,429	3,892	1,251	1,570	4,519	3,672	1,677
Point Douglas S	948	2,294	2,223	659	949	2,223	1,682	894
Churchill	44	131	160	36	44	151	127	45
Winnipeg	38,051	101,572	97,032	44,519	36,732	102,687	99,223	60,169

Table 1.2: Population Counts of Adults by Age Group, Sex and Health Region District, 2012

Health Region District	Male				Female			
	18-24	25-44	45-64	65+	18-24	25-44	45-64	65+
Southern Health-Santé Sud								
MacDonald	384	815	1,010	337	326	858	971	319
Stanley	425	690	660	163	355	681	603	157
Altona	538	1,150	1,070	516	532	1,148	1,014	660
Hanover	823	1,552	1,289	515	707	1,553	1,231	525
Roland/Thompson	109	253	277	139	98	243	254	151
Cartier/SFX	376	876	1,078	391	346	865	1,016	377
Niverville/Ritchot	506	1,555	1,320	437	493	1,627	1,219	466
Steinbach	1,147	2,797	2,132	1,008	1,224	2,793	2,223	1,334
Winkler	908	1,916	1,468	680	811	1,908	1,439	994
Morris	267	622	609	313	263	617	601	373
Carman	280	605	676	538	229	647	704	631
Ste Anne/LaBroquerie	513	1,312	1,301	701	467	1,299	1,239	687
St. Pierre/DeSalaberry	227	526	558	293	223	517	550	343
Morden	467	1,130	999	631	478	1,187	1,077	786
Tache	515	1,243	1,220	346	437	1,247	1,177	293
Lorne/Louise/Pembina	356	739	980	611	313	685	934	723
MacGregor	250	504	518	302	210	507	500	307
Notre Dame/St Claude	197	405	560	299	216	383	512	326
Rural East	156	399	634	460	145	355	580	401
Rural Portage	384	823	951	441	350	847	965	416
Red River South	268	515	629	307	229	510	602	345
City of Portage	751	1,738	1,869	1,015	730	1,859	1,988	1,364
Seven Regions	383	712	700	379	338	667	631	391
Prairie Mountain Health								
Bdn South End	449	1,348	1,152	574	496	1,447	1,333	713
Bdn West End	779	2,046	1,802	929	838	2,171	1,983	1,238
Turtle Mountain	494	1,091	1,336	952	438	1,075	1,396	1,086
Bdn North Hill	322	921	912	532	359	974	1,031	600
Spruce Woods	756	1,496	2,085	1,314	691	1,791	2,026	1,557
Whitemud	505	1,703	1,482	945	425	1,312	1,475	1,103
Souris River	681	1,646	1,899	1,206	697	1,585	1,863	1,444
Riding Mountain	268	529	877	570	198	503	820	508
Little Saskatchewan	523	1,235	1,766	1,038	495	1,150	1,738	1,125
Asessippi	621	1,347	1,782	1,134	555	1,288	1,699	1,337
Duck Mountain	225	586	776	607	218	532	775	734
Dauphin	344	918	1,060	790	357	1,027	1,192	1,193
Agassiz Mountain	342	721	971	643	326	755	929	647
Bdn East End	325	1,108	677	428	331	1,013	695	683
Swan River	277	551	643	475	250	597	707	641
Porcupine Mountain	532	1,039	1,235	690	500	970	1,146	645
Bdn Downtown	576	2,022	1,139	499	642	1,852	1,105	859

Table 1.2: Continued

Health Region District	Male				Female			
	18-24	25-44	45-64	65+	18-24	25-44	45-64	65+
Interlake-Eastern RHA								
Springfield	681	1,575	2,216	864	668	1,587	2,177	798
Stonewall/Teulon	1,008	2,146	2,863	1,270	901	2,138	2,809	1,453
Pinawa/LDB	308	636	1,399	1,128	236	599	1,457	1,078
Gimli	195	436	949	910	159	486	1,023	928
Wpg Beach/St. Andrews	788	1,751	2,863	1,302	719	1,796	2,861	1,196
Beausejour	370	1,078	1,349	656	353	1,034	1,243	791
Whiteshell	166	371	572	327	174	339	516	297
Arborg/Riverton	247	567	648	355	241	544	604	416
St. Clements	354	875	1,467	622	340	868	1,404	595
St. Laurent	198	444	666	428	173	394	625	428
Eriksdale/Ashern	400	828	873	487	352	711	833	511
Selkirk	495	1,095	1,331	757	457	1,134	1,416	1,174
Fisher/Peguis	405	713	860	366	349	727	799	399
Powerview/PF	327	722	782	322	314	714	721	306
Northern Remote	241	399	316	68	226	414	264	70
Northern Health Region								
Flin,Snow,Cran,Sher	349	865	1,366	513	339	893	1,217	580
Thompson, Myst Lake	890	2,290	1,822	372	820	2,346	1,596	363
The Pas/OCN,Kels	586	1,388	1,426	531	617	1,519	1,407	507
Gillam, Fox Lake Cree Nation	72	236	181	29	74	243	149	22
Thick,Pik,Wab, Ilf/WLFN,Corm	85	167	172	55	73	161	155	57
LL/MCFN,LR,O–P(SIL)CN, PN(GVL)	86	175	174	71	106	188	142	53
Cross Lake/Cross Lake FN	340	506	371	85	349	565	374	96
SayD(TL)FN,Bro/BLFN, NoL(Lac)FN	116	232	132	45	100	207	125	37
GR/MisCN,ML/MosCN, Eas/CheCN	255	445	348	99	236	448	324	91
Bu(OH)CN,MS(GR)CN, GLN/GLFN	275	523	286	98	293	479	267	114
Norway House/NH CN	369	692	516	114	351	749	472	128
Puk/Mat Col CN	134	181	131	29	122	213	116	30
IsL/GHFN,RSL/RSLFN, STPFN, WFN	504	1,062	566	123	528	998	505	144
Sham,YorkFN,TatCN(SPL)	206	438	271	68	221	408	236	73
Nelson House/NCN	242	393	255	55	229	392	221	75

The full Northern Health Region district names are provided in Appendix 2.

Part 2 of this report examines a birth cohort of 60,838 people (born 1980/81 to 1984/85) who were continuously covered by Manitoba Health insurance and lived in Manitoba from birth up to at least one day after their 18th birthday. The cohort is described in more detail in Chapter 5.

Presentation of Mental Health Indicators

The prevalence of each mental health indicator is presented by age, sex, health region, health district, Winnipeg neighbourhood cluster and income quintile. Age groups were defined to represent stages across the life course: youth (18 to 24 years), young adults (25 to 44 years), middle-age adults (45 to 64 years) and older adults (65 years and older). We compared men and women within each age group. We compared each age group to the youngest age group (18 to 24 years) for men and women separately. Given that dementia is far more prevalent in older adults, dementia is reported by the following age groups: 55-64 years, 65-74 years, 75-84 years, 85 and older.

The health regions across Manitoba are shown in Figure 1.1 and include Northern Health Region, Interlake-Eastern Regional Health Authority, Prairie Mountain Health, Southern Health-Santé Sud, and Winnipeg Regional Health Authority. Health region zones and districts and Winnipeg neighbourhood clusters are shown in Figures 1.2 to 1.4. Note that Churchill is included in the Winnipeg neighbourhood cluster graphs as it is within the Winnipeg Regional Health Authority even though it is not located within Winnipeg geographically. The order of the health regions in the graphs and tables is by health status, with regions with the lowest premature mortality rates (mortality before 75 years of age) presented first. All the information presented in this report is based on where people lived, not on where they received services. For example, some people may receive mental health services in Winnipeg, but if their home residence is in a rural health region, they will be counted in the prevalence of that rural health region.

Figure 1.1: Map of Manitoba Health Regions

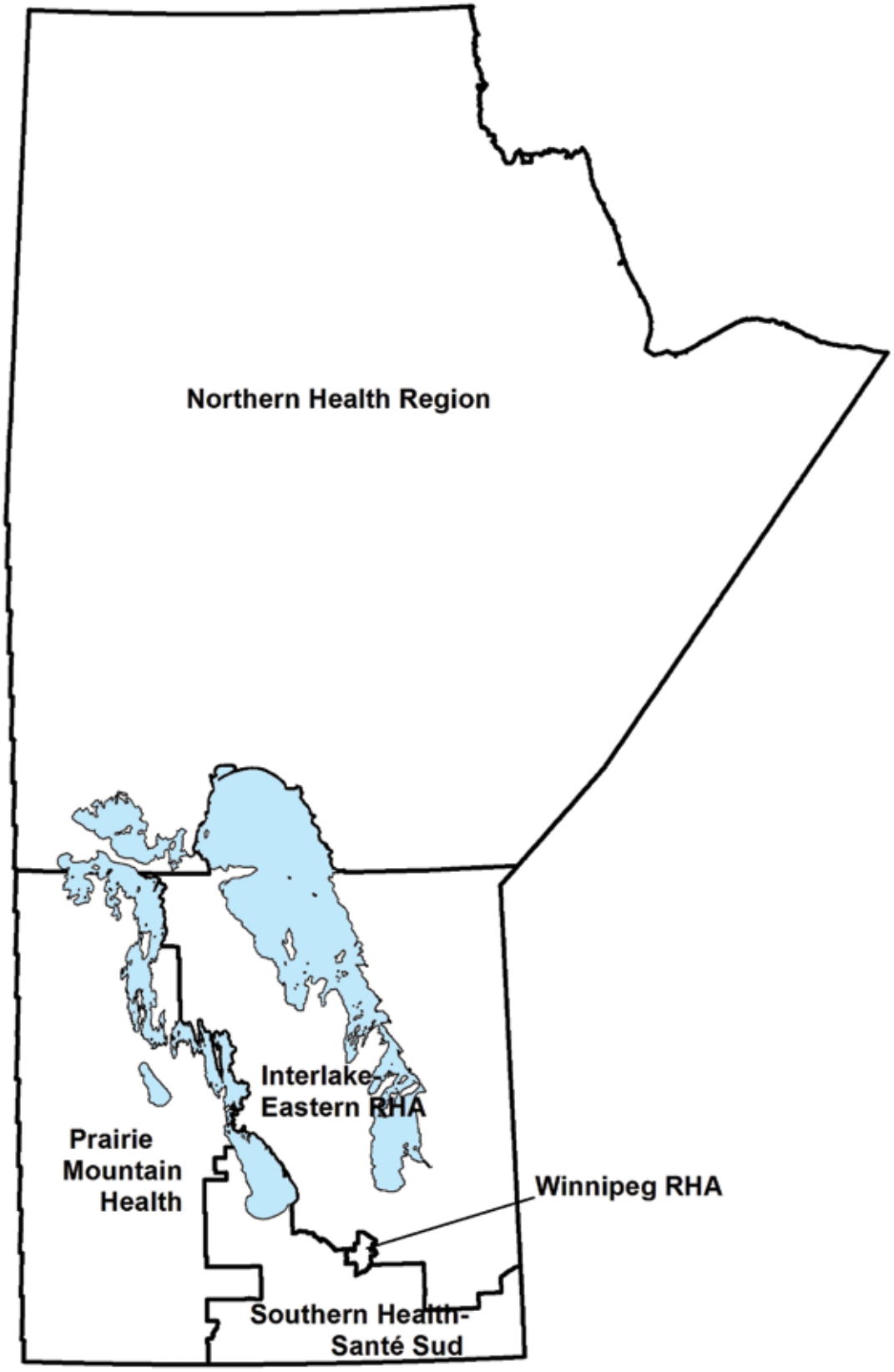


Figure 1.2: Map of Manitoba Health Region Zones

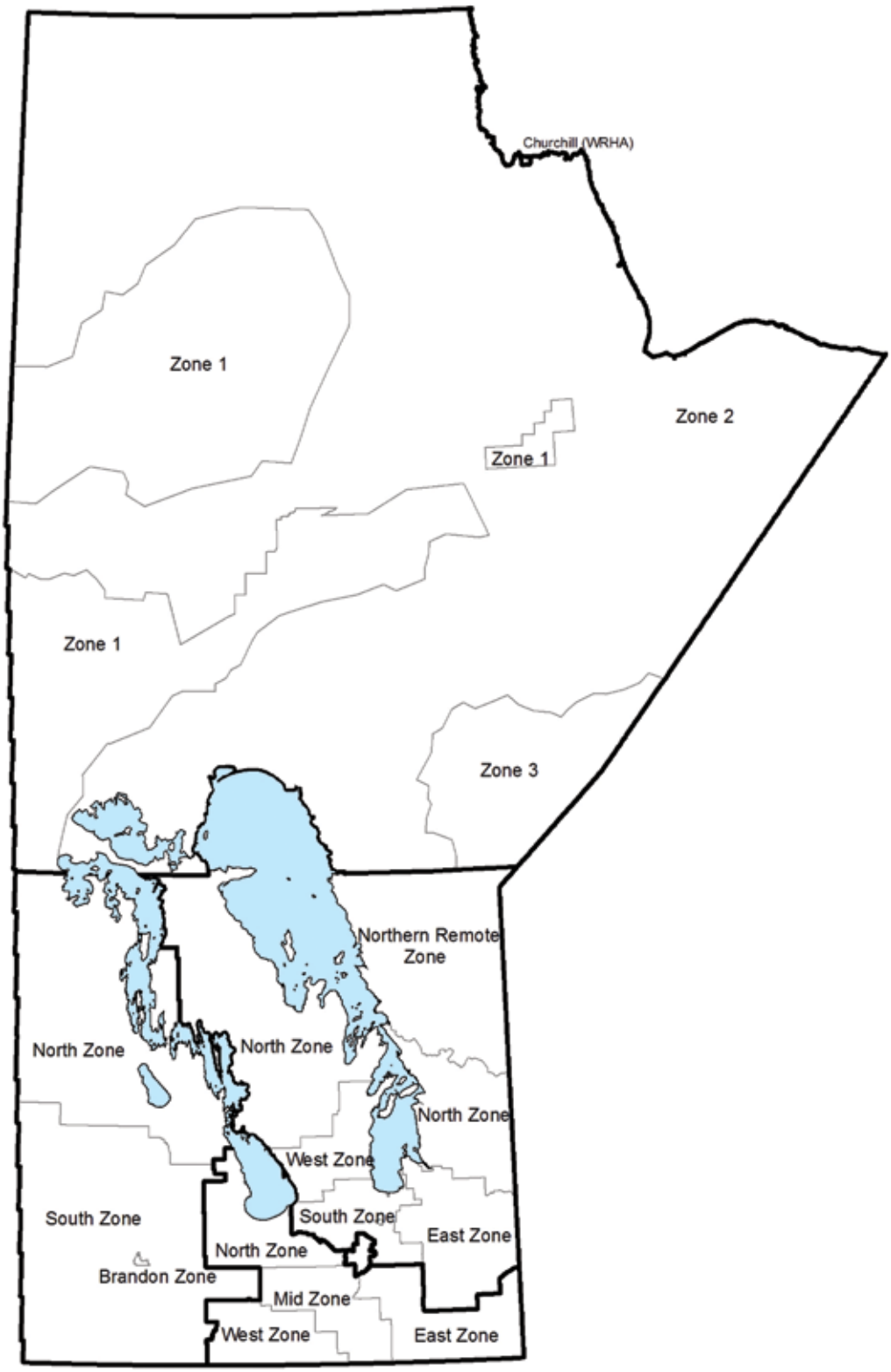
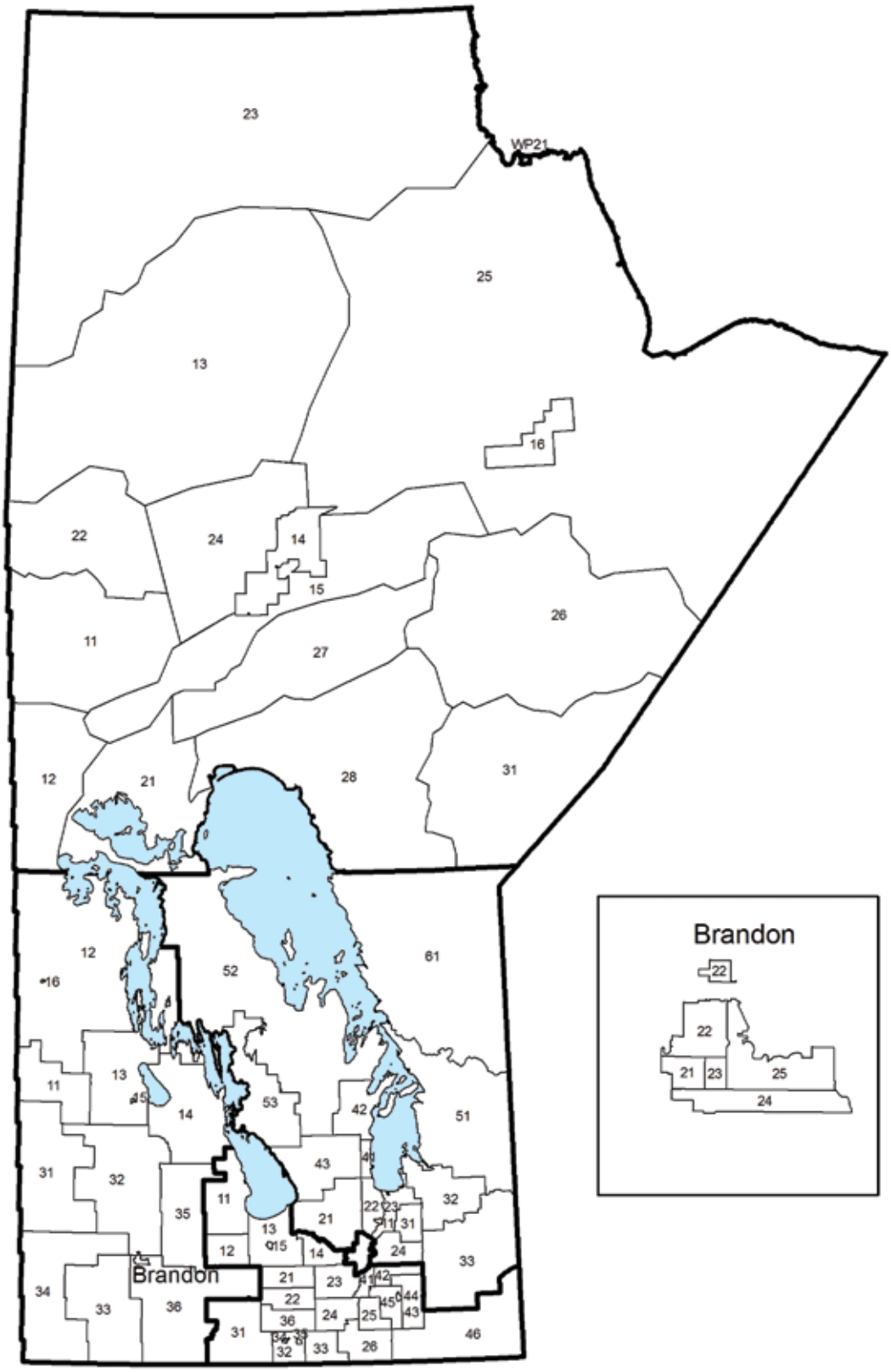


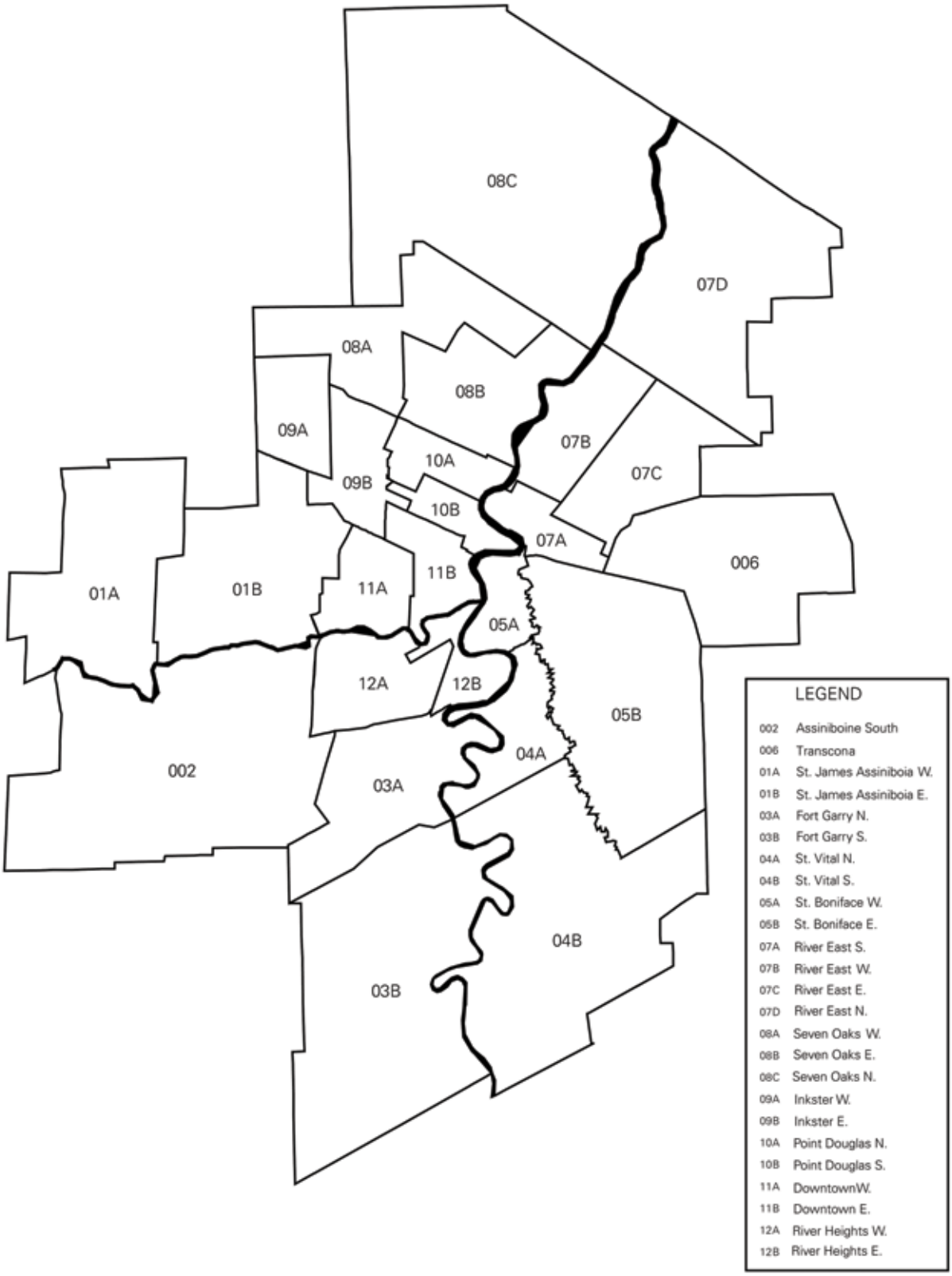
Figure 1.3: Map of Manitoba Health Region Districts



Districts Legend	
Northern Health Region	**Interlake-Eastern Regional Health Authority**
11 Flin,Snow,Cran,Sher	11 Selkirk
12 The Pas/OCN,Kels	21 Stonewall/Teulon
13 LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	22 Wpg Beach/St. Andrews
14 Thompson, Myst Lake	23 St. Clements
15 Thick,Pik,Wab,Ilf/WLFN,Corm	24 Springfield
16 Gillam, Fox Lake Cree Nation	31 Beausejour
21 GR/MisCN,ML/MosCN,Eas/CheCN	32 Pinawa/Lac Du Bonnet
22 Puk/Mat Col CN	33 Whiteshell
23 SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	41 Gimli
24 Nelson House/NCN	42 Arborg/Riverton
25 Sham,YorkFN,TatCN(SPL)	43 St. Laurent
26 Bu(OH)CN,MS(GR)CN,GLN/GLFN	51 Powerview/Pine Falls
27 Cross Lake/Cross Lake FN	52 Fisher River (Ochekwi-Sip) Cree Nation, Peguis First Nation
28 Norway House/NH CN	53 Eriksdale/Ashern
31 IsL/GHFN,RSL/RSLFN,STPFN,WFN	61 Northern Remote
Prairie Mountain Health	**Southern Health-Santé Sud**
11 Duck Mountain	11 Seven Regions
12 Porcupine Mountain	12 MacGregor
13 Riding Mountain	13 Rural Portage
14 Agassiz Mountain	14 Cartier/SFX
15 Dauphin	15 City of Portage la Prairie
16 Swan River	21 Grey/St. Claude
21 Bdn West End	22 Carman
22 Bdn North Hill	23 MacDonald
23 Bdn Downtown	24 Morris
24 Bdn South End	25 St Pierre/DeSalaberry
25 Bdn East End	26 Red River South
31 Asessippi	31 Lorne/Louise/Pembina
32 Little Saskatchewan	32 Stanley
33 Turtle Mountain	33 Altona
34 Souris River	34 Morden
35 Whitemud	35 Winkler
36 Spruce Woods	36 Roland/Thompson
	41 Niverville/Ritchot
	42 Tache
	43 Ste Anne/LaBroquerie
	44 Steinbach
	45 Hanover
	46 Rural East

Note: WP21 denotes Churchill, which is within the Winnipeg Regional Health Authority.

Figure 1.4: Map of Winnipeg Neighbourhood Clusters



The mental health indicators are presented by area-level income quintiles in urban (Winnipeg and Brandon) and rural areas (all other areas) to examine the association between socioeconomic status and mental health indicators. These income quintiles were developed by using the average household income of small geographical areas called dissemination areas from the 2011 Census, and ranking them from highest to lowest. Dissemination areas are uniform in terms of population size, which is targeted at 400 to 700 persons to ensure a large enough sample size for analysis. The dissemination areas are grouped into five groups or quintiles, each containing approximately 20% of the total population. Rural 1 (R1) and Urban 1 (U1) represent the lowest income areas of rural and urban Manitoba, respectively, while R5 and U5 represent the highest rural and urban incomes areas, respectively. Figure 1.5 and 1.6 show the distribution of income quintiles. Because of the lower population density in rural communities, a single dissemination area can include several neighbourhoods with varying household income in order to meet the 400 to 700 persons per dissemination area requirement. This is unlike urban areas where a dissemination area is often a single neighbourhood that is more homogenous in terms of household income. This is one of the reasons why the observed income gradient of mental illness in rural areas may be less pronounced than in urban areas. Everyone living in Manitoba with a known home address could be grouped into an income quintile, given that the income quintiles are based on the average household income of the area where they live. We note that some people could not be grouped in income quintiles, including the following: residents of long-term care facilities, psychiatric facilities, and some personal care homes; federal and long-term prisoners; wards of the Public Trustee and Child and Family Services; and residents of various areas reporting no income in the Census.

Figure 1.5: Distribution of Income Quintiles, 2011 Census Data Dissemination Areas

Based on 2011 Census Average Household Income, and MCHP 2011 Urban/Rural Quintile Splits

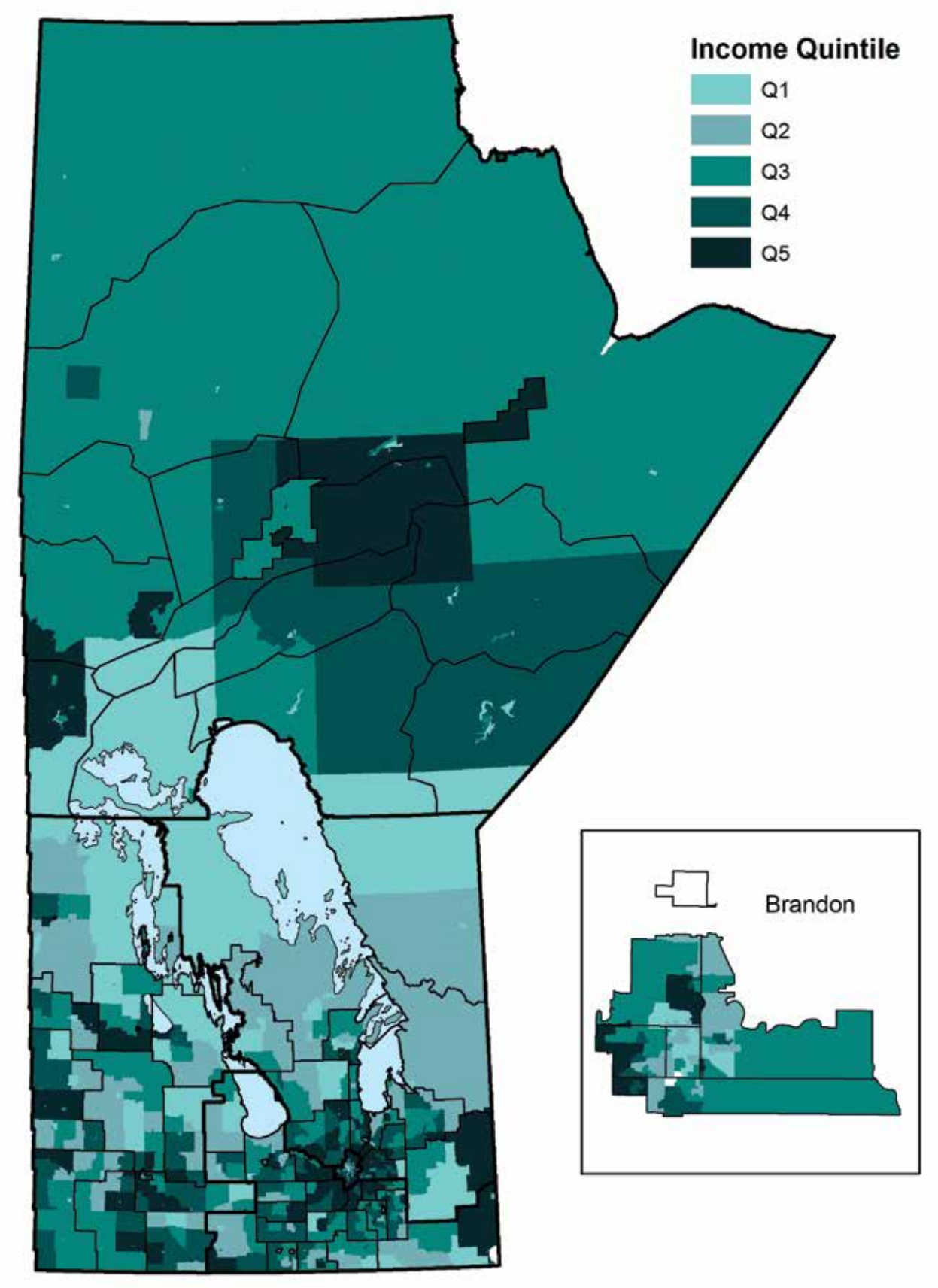
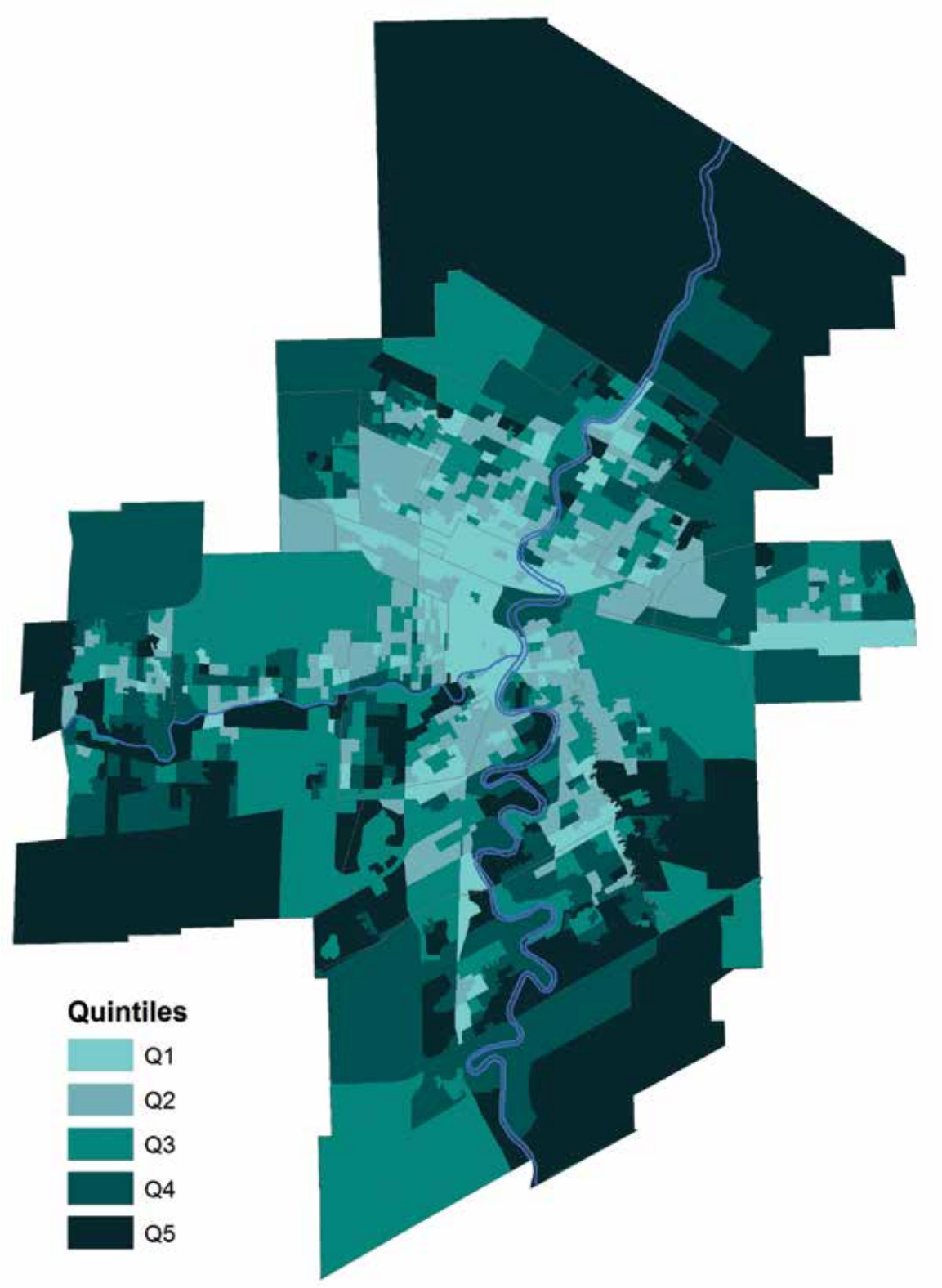


Figure 1.6: Distribution of Winnipeg Income Quintiles, 2011 Census Data Dissemination Areas

Based on 2011 Census Average Household Income, and MCHP 2011 Urban/Rural Quintile Splits



Considerations in Defining Mental Health Indicators

This report describes the diagnostic prevalence of mental illness among adults and patterns of service use of adults experiencing mental illness in Manitoba. The mental health indicators examined in Chapters 2, 3 and 4 are mood and anxiety disorders, substance use disorders, psychotic disorders, schizophrenia, personality disorders, any mental illness, dementia, attempted suicide, and suicide. In Chapter 5, attention-deficit hyperactivity disorder (ADHD) and conduct disorder were added so that we could examine the longer-term associations of common childhood and adolescent mental illness.

The term diagnostic prevalence is used to communicate that the prevalence of mental illness is based on ICD diagnoses from medical claims and hospital abstracts. For ADHD, drug claims were also included in the administrative definition of the disorder. Individuals who were diagnosed with a mental illness by a physician or nurse practitioner at some point in the five-year period are identified by these definitions. While the MCHP definitions identify many Manitobans with mental health problems, there are many others who are not identified, such as those who have never received treatment, those diagnosed by a psychologist or those who received services by nurses, social workers or other counsellors. As a result, the true prevalence of mental illness will likely be higher than reported in this study.

The definitions utilized in this deliverable are based on ICD-9-CM and ICD-10-CA codes used in diagnosing mental illness. These diagnoses are made by psychiatrists, pediatricians, nurse practitioners, primary care physicians, and other specialist physicians. Our definitions were reviewed by experts in psychiatry to ensure that the codes are consistent with the disorders we intended to measure. These definitions have not been compared to a "gold standard" to determine how close the definition is to the actual disorder. An example of a gold standard would be a chart review or a clinical database containing patients who have been systematically assessed as having the disorder. More details on the definitions are found in Chapter 2 and Appendix 1.

Since the 2004 MCHP report, some changes have been made to these definitions based on new research and our expanding understanding of the mental illnesses. We consider these changes when comparing the results from this current report to the previous 2004 report. A substantial change was made to the definition of mood and anxiety disorders because of growing evidence of the disabling effects of anxiety disorders. To count an anxiety disorder, previous definitions required a prescription of psychotropic medication or at least three diagnostic codes. In this report, the definition was changed to requiring at least two physician claims or one hospital diagnosis with one of the anxiety disorders diagnostic codes and with no prescription requirements. Psychotic disorders, which include schizophrenia, were added to the list of indicators. The definition for schizophrenia was restricted by removing some of the codes previously used in the 2004 MCHP report.

We defined suicide as having a primary cause of death record in Vital Statistics of self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning. This definition is broader than the one used by Statistics Canada, as we also included accidental poisonings and poisonings of undetermined intent. In many cases, Vital Statistics data may not have all the information to determine whether a death is by self-inflicted injury or poisoning or whether is was accidental. Many poisonings that were coded as accidental or of undetermined intent were likely suicides. For example, a UK study found that close to 50% of accidental poisonings were likely suicide [3]. Given that it is not always possible to determine if a death was accidental or intentional, some underreporting is likely occurring. We used the broader definition to address this underreporting.

An attempted suicide is defined by any hospitalization for self-inflicted injury or poisoning. Hospitalizations for injuries and poisonings where intent could not be determined and for accidental poisonings were also included when accompanied by a mental illness code in the hospital record. We included hospitalizations for injuries and poisoning of undetermined intent and accidental poisoning to address underreporting. Even with this addition to the definition, the attempted suicide rate presented in this report will be underestimated because many cases of attempted suicide are not hospitalized. The cases reported here are arguably the most life threatening, given that a hospitalization was deemed necessary.

In Appendix Table 4.1 we present each mental disorder by the type of physician that made the diagnosis. Primary care physicians register the majority of mental illness diagnoses with the exception of schizophrenia, which tends to be diagnosed by psychiatrists.

Prevalence, Adjusted Rates, Crude Rates, Relative Rates, and Statistical Testing

All data management and analyses were performed using SAS® version 9.4.

In this report, prevalence refers to the percentage of the population that has a certain condition over a given period of time (e.g., five-year period prevalence). It is calculated using a numerator of people with a given

condition (for example, schizophrenia) over the five-year period divided by a denominator of the relevant population. This gives the proportion of the population that has the condition during a given time period. Individuals are only counted once in the time period. The definition of rate can differ across disciplines and even among epidemiologists. We will refer to rate as a measure of the frequency with which an event occurs in a defined population over a specified period of time. In this report, we have calculated the rate by using the number of events in the numerator over a denominator of the relevant population. In a rate, an individual can contribute more than one event over the time period; for example, one person can have many more than one visit to a psychiatrist over a period of time.

The count of events for each indicator was modeled using a statistical technique called generalized linear modeling (GLM) to compare and estimate rates in this report. This method is suitable for non-normally distributed data such as counts. Various distributions were used for different indicators – for example, Poisson distribution for very rare events, negative binomial distribution for relatively rare but highly variable events, and binomial distribution for events with two possible outcomes.

Age and sex were included in the models to adjust for differences in age and sex distributions across geographic regions and income quintiles. This means that any differences noted between health regions, health districts, neighbourhood clusters or income quintiles are not because of differences in the ages or number of males and females in each area. In the appendices, we present the exact number of adults with mental illness as well as the crude (i.e., not adjusted) rates and percentages.

Relative rates are defined as the ratio of two estimates. The prevalence, proportion, or rate of the population of interest is divided by that of a comparison group. For example, hospitalization rates of people with mental illness are divided by hospitalization rates of people with no mental illness.

Wherever we mention differences of mental illness prevalence between age groups, sex or geographic region in the report text, these differences are statistically significant. Statistical testing informs us about the degree of confidence we have in the results that we are observing. If a difference is "statistically significant", then we are confident that the difference we are observing is not just due to chance. For example, if the prevalence observed in the Northern Health Region is statistically significantly different than the prevalence in Winnipeg, we are confident that this difference is not due to random fluctuation but that the difference is real. A p-value less than 0.01 tells us that we are very confident (i.e., 99 times out of 100, there is an actual difference between our two groups). When we made multiple comparisons, such as examining difference between health regions, we used a 0.01 level of significance. When we made comparisons only between two groups, for example, between males and females, we utilized the less strict 0.05 level of significance.

Methods used for each Objective

PART 1

Objective 1a: Determine the diagnostic prevalence of mental illness, suicide and attempted suicide for adults, and whether this prevalence differs by age, sex, geographic region, and income quintile.

We calculated the five-year diagnostic prevalence (2010/11-2014/15) for the mental illness indicators listed below. These are described in detail in Chapter 2 and in Appendix 1. We also calculated the counts and crude percentages; these are found in Appendix 3.

- Mood and anxiety disorders
- Substance use disorder
- Psychotic disorders
- Schizophrenia
- Personality disorders
- Any mental illness
- Dementia
- Hospitalizations for attempted suicide
- Suicide

Objective 1b: Determine the diagnostic prevalence of mental illness among specific populations, namely, women in the postpartum period, adults living in personal care homes or social housing, adults receiving income assistance, and adults who were accused of a crime or who were victims of a crime.

In Chapter 3, we examine the five-year diagnostic prevalence of mental illness among a number of specific adult populations in Manitoba. The prevalence of mental illness among women in the postpartum period is an exception in that it is a one-year prevalence rate, since the postpartum period is often defined as one year following birth. We examined the same mental illness indicators as in Chapter 2. In order to better interpret the diagnostic prevalence of mental illness in these adult populations, each population was compared to a reference group of Manitobans. These reference groups were restricted to the Manitoba population who were comparable in terms of age and sex. Note that the specific populations were

not removed from the reference group; for example, the personal care home reference group included all older Manitobans living in the community as well as people in personal care homes.

Objective 1c: Determine the association between mental illness and use of healthcare services and involvement with the justice system.

In Chapter 4, we examine the association between mental illness and the use of healthcare services and involvement with the justice system among adults in Manitoba. Mental illness was examined using the same mental health indicators as reported in Chapter 2, with the exception of suicide due to the small sample sizes. The group of people with mental illness met the definition for a mental illness within the five-year period of 2010/11 to 2014/15. Service use was calculated over a one year period: 2014/15. The justice system indicators were measured over a slightly earlier time period due to data limitations. For justice system involvement, the group of people with mental illness was defined from 2007/08 to 2011/12, and justice involvement was calculated for 2011/12. The following indicators of service use and justice involvement were examined. Note that in addition to this list, we also examined premature mortality, which was added as a measure of population health to explain the healthcare service use.

- Hospitalizations for all causes
- Short stay hospitalizations
- Long stay hospitalizations
- Ambulatory visits
- Ambulatory visits, excluding those to psychiatrists
- Number of different medication types
- Number of different medication types, excluding psychotropic medications
- Emergency department visits (percentages and rates)
- Accusations of a crime (percentages and rates)
- Victims of a crime (percentages and rates)

In order to better interpret service use among people with mental illness, the indicators were also calculated for a comparison group of people with no mental illness. This comparison group was made up of people not diagnosed with any ICD-9-CM or ICD-10-CA diagnoses from the ICD mental illness chapter. We adjusted for a number of factors that potentially influence service use to determine the unique role that mental illness plays in using healthcare and justice systems. For healthcare use, we adjusted for age, sex, area-level income and medical conditions. Medical conditions were measured using the Charlson Index, which is based on hospital records and physician billing claims [20]. The Charlson Index score was calculated using data from the year prior to the service use. For the justice system indicators, we adjusted for age, sex, area-level income and prior substance use disorders. We decided to control for substance use disorders because they may be comorbid with other disorders, and alcohol and drug use may be a factor in criminal activity.

PART 2

In Chapter 5, we created a cohort of 60,838 Manitoba residents born during fiscal years 1980/81 to 1984/85. These residents were followed into adulthood up until the end of the study period in 2014/15, the last year of available data. In 2014/15, the youngest cases were 30 years old and the oldest were 34. Modeling was conducted using SAS PROC PHREG in SAS® version 9.4 [21].

Objective 2a: Determine the age of onset of mental illness among individuals who were diagnosed with a mental illness over the course of the study period.

Using the birth cohort, we identified people who had been diagnosed with a mental illness in childhood, adolescence or adulthood. The age of onset of the mental illness was determined for each person by noting their age the first time they were ever diagnosed with that illness. For each of the mental health indicators below, we then calculated the cumulative percentage of people with mental illness by age of onset.

- Mood and anxiety disorders
- Attention-deficit hyperactivity disorder (ADHD)
- Substance use disorders
- Conduct disorder
- Psychotic disorders
- Personality disorders

Objective 2b: Determine whether there is an association between diagnosed mental illness and suicidal behaviours in childhood/adolescence and these mental illness indicators in adulthood.

We created a group of people who had been diagnosed with mental illness or had been hospitalized for attempted suicide during their childhood/adolescence, and followed them into adulthood to determine if they had also been diagnosed as adults. We looked at the mental health indicators listed above as well as any mental illness and being hospitalized for attempted suicide. The comparison group consisted of people who had not been diagnosed

for the specific disorder during childhood or adolescence (e.g., the comparison group for those with mood and anxiety disorders consisted of people not diagnosed with mood and anxiety disorders). We used survival analysis (proportional hazard) to determine whether people with childhood or adolescent mental illness were at higher risk of being diagnosed with mental illness in early adulthood compared to those with no childhood or adolescent mental illness. Both groups were followed from age 18 until their first diagnosis of a mental illness, until they left the cohort or the end of the study period (March 2015).

A number of variables representing other childhood and adolescent factors were adjusted for in the models to ensure the associations observed between childhood/adolescent mental illness and adult outcomes were not due to these factors. These variables included: sex, area-level income (at age 18), urban or rural residence (at age 17), two parent family (from birth to age 12), number of children in family (at age 17), any diagnosis of maternal mental illness (from birth to age 17), and being taken into care by Child and Family Services at least once (from birth to age 17).

Objective 2c: Determine whether there is an association between diagnosed mental illness and suicidal behaviours in childhood/adolescence, and adult social services, justice system involvement and high school graduation.

We used the same cohort of people who had been diagnosed with mental illness or had been hospitalized for attempted suicide during their childhood/adolescence as we did for Objective 2b, and followed them into early adulthood to determine if they had experienced adverse adult outcomes. We looked at the same mental health indicators and used the same comparison groups as for Objective 2b. We used survival analysis (proportional hazard) to determine whether people with childhood/adolescent mental illness were at higher risk of experiencing adverse adult outcomes over the course of their early adult years compared to those with no childhood/adolescent mental illness. The adverse adult outcomes, expressed in hazard ratios, included suicide, attempted suicide, being accused of a crime, being a victim of a crime, receiving income assistance, and living in social housing. Both groups were followed from age 18 until the first instance of an adverse outcome, they left the cohort, or the end of the study period (March 2015). Given that most people graduate when they are around 18 years of age, we used logistic regression to examine the association between the mental health indicators and high school graduation. A number of variables representing other childhood and adolescent factors were adjusted for in the models to ensure the associations observed between childhood/adolescent mental illness and adult outcomes were not due to these factors. The same variables representing other childhood/adolescent factors as in Objective 2b were used.

Strengths and Limitations of this Report

It is important to interpret our findings with a good understanding of the strengths and limitations of the methods and datasets that were utilized. This report offers a wealth of information on the burden of mental illness of adults in Manitoba and on the longer-term outcomes of children and adolescents diagnosed with mental illness. It provides a population-based perspective of the mental health of adult Manitobans. We utilized the Repository, which has data on virtually everyone in the province. We reported the diagnostic prevalence of many clinically relevant mental illnesses and indicators of marked psychological distress (suicide and attempted suicide rates). An intersectoral perspective is also provided by examining populations that use social services or the justice system and by examining healthcare services use and justice involvement among people diagnosed with mental illness. The modeling in Chapter 5 sheds some light on the longer term associations between mental illness diagnosed in childhood/adolescence and adverse adult outcomes. Strengths and limitations specific to Chapter 5 are included at the end of that chapter.

In Chapter 2 and 3, this report describes the "What" rather than attempting to explain the "Why". It is important to note that in these chapters, we did not attempt to control for all confounders in our analyses, meaning we did not account for other factors that could influence the associations between mental disorders and the populations of interest. For example, we included age and sex in the models when examining mental illness by health region, however we did not include socio-economic status, distance from major centres, ethnicity, or availability of services. These factors could potentially explain some of the differences we found across health regions. For Chapters 4 and 5, however, we did control for some important confounding factors to understand the unique association between mental illness and the outcomes of interest.

We acknowledge that the diagnostic prevalence of mental illness likely underreports the true prevalence of mental disorders. The diagnostic prevalence that we reported tells us the number of adults who were diagnosed by physicians or nurse practitioners. Most of the diagnoses were provided by a primary care physician or nurse practitioner with the exception of schizophrenia, which was mainly provided by psychiatrists. We did not have access to diagnoses provided by psychologists or services provided by nurses, social workers, and counsellors. Also, many children and adults with mental disorders do not seek treatment.

To address the potential underreporting of suicides, we defined suicide as having a primary cause of death record in Vital Statistics of self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning. This

definition is broader than that used by Statistics Canada, as we have also included accidental poisonings and poisoning of undetermined intent. We acknowledge that this may have led to overreporting of suicide rates.

There is the potential for coding errors when using any data source. Errors may occur when entering the codes in the databases, although training offered to data entry personnel decreases the likelihood of this occurring. There is also the potential for incorrect diagnoses being made by physicians; for example, the physician may have diagnosed an individual with major depression when in fact he or she may not have the full criteria for this mental illness, or someone may have been diagnosed with schizophrenia when the psychotic symptoms were actually due to a drug-induced psychosis. Diagnoses made by primary care physicians would be more susceptible to this type of error because most do not receive advanced training in mental illness. Additionally, physicians may code only one mental disorder diagnosis when in fact several are present in the same patient, recognizing that mental disorders are often comorbid but only one is required to be coded for billing purposes.

When comparing the prevalence of mental illness across health regions, it is important to keep in mind that not all visits to salaried primary care physicians are captured in the Repository. Most physicians in Manitoba are paid by fee-for-service but some are paid a salary. Previous work at MCHP suggested that up to one third of all visits for salaried primary care physicians were not captured in the Repository [22]. This finding was based on comparisons between drug prescriptions and physician billings. More recent work found few differences in the expected number of billings between fee-for-service and salaried Winnipeg-based clinics [23]. Underreporting may still be an issue in the Northern Health Region where many physicians are salaried.

Finally, we note that there are some important mental illnesses that we were unable to examine, such as eating disorders, tic disorder and oppositional disorders. More than the first three digits of the ICD codes are required to be confident that we are defining these disorders specifically. At the time of this study, the physician claims databases in the Repository unfortunately had only the first three digits.

Chapter 2:
Prevalence of Mental Illness

In this chapter, we present the age- and sex-adjusted five-year diagnostic prevalence of mental illnesses, as well as rates of suicide and suicide attempts, for adults in Manitoba. Prevalence estimates are presented by health regions, health districts, Winnipeg neighbourhood clusters, age groups and sex, and income quintiles in the time period from 2010/11 to 2014/15. Given that the prevalence is calculated over a five-year period, these estimates will be higher than those calculated over a one-year period but lower than those calculated over a lifetime.

The diagnostic prevalence of the following mental illnesses as well as the rates of suicidal behaviours are presented in this chapter:

- Mood and anxiety disorders
- Substance use disorders
- Psychotic disorders
- Schizophrenia
- Personality disorders
- Any mental illness (having at least one disorder listed above)
- Dementia
- Hospitalizations for attempted suicide
- Suicide

An abridged definition of each mental disorder is provided prior to the prevalence estimates. ICD-9-CM and ICD-10-CA codes used to identify the mental health indicators are provided in Appendix Table 1.1. Diagnostic prevalence is the term used as a reminder that our definitions include only adults who have seen a physician and have received a diagnosis for a mental illness. It is likely that many more live with these disorders and have not received diagnosis or treatment.

The prevalence estimates are expressed as the percentage of the population that has been diagnosed with the disorder from 2010/11 to 2014/15. For suicide and attempted suicide, rates per 100,000 persons are provided, given that these indicators are rare. For each indicator, the crude and adjusted prevalence estimates or rates are presented in Appendix 3. In Appendix Table 4.1, we also provide information about the type of provider who made the diagnosis.

A small percentage of adults were in the care of the Public Trustee. The prevalence estimates of mental disorders for these adults are found in Appendix Figure 3.1. We note that these people are included in the overall

prevalence of mental illness in Manitoba, but could not be included in the prevalence estimates of geographic regions or income quintiles due to their postal code being that of the Public Trustee office.

Mood and Anxiety Disorders

Mood and anxiety disorders are a broad group of mental illnesses. Depressive disorders are marked by depressed mood and diminished interest in almost all activities [6]. Symptoms of bipolar disorder includes elevated mood, irritability and increased energy that may occur along with symptoms of depression [24]. The main features of anxiety disorders are excessive fear, anxiety or worry, and often avoidance of situations that provoke these strong emotions [6].

For the purposes of this study, these disorders were grouped together for the following reasons: the physician claims database in the Repository has only three digit ICD codes, making it impossible to accurately distinguish anxiety disorders from depressive disorders [25,26]; the symptoms for both disorders overlap and it may be difficult for primary care physicians to distinguish one from the other; they often occur together; and the medications used to treat them are similar.

We note that the 2004 MCHP report reported mood and anxiety disorders separately and required less restrictive criteria for depression and more restrictive criteria for anxiety disorders. These important differences make comparisons over time difficult. The definition for mood and anxiety disorders continues to evolve as more is learned about these disorders and as public awareness about them has increased. In recent years, it has become clear that anxiety disorders are associated with high levels of distress and interference with functioning at work and in social situations and are the most common mental disorder [27].

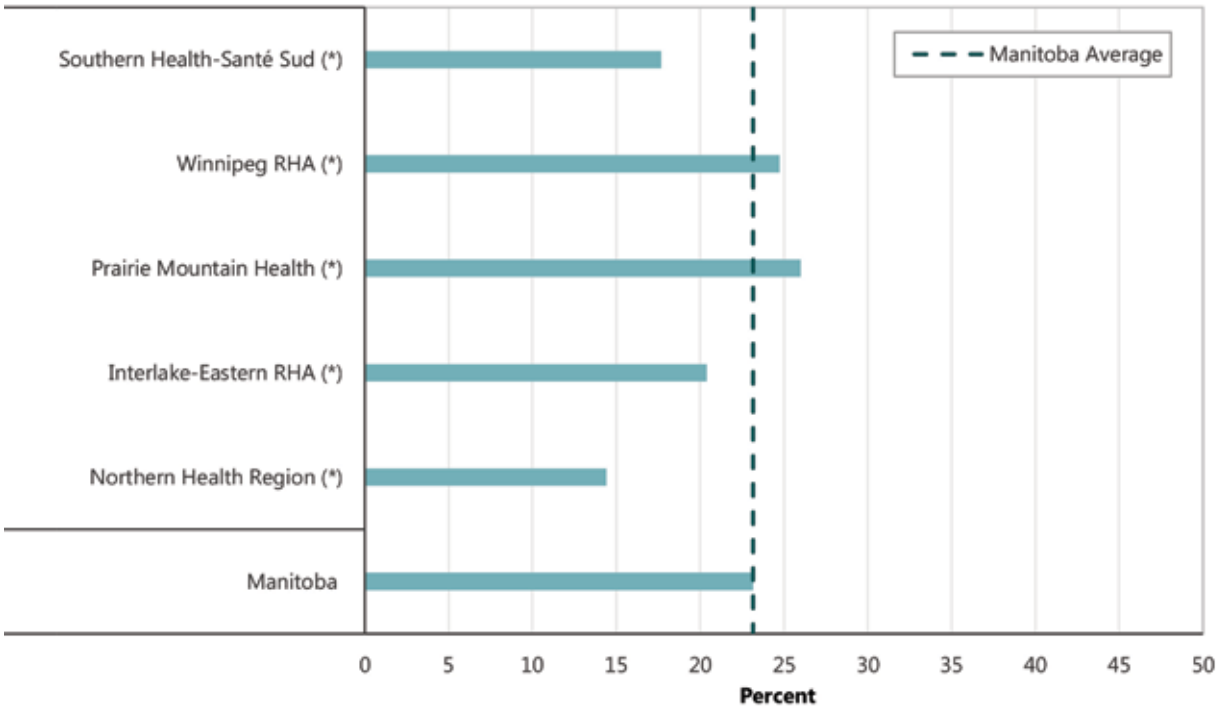
In this study, adults were considered to have a diagnosis of a mood or anxiety disorder from 2010/11 to 2014/15 if they met at least one of the following criteria:

- At least one hospitalization with a diagnosis of depressive disorder, affective psychoses, neurotic depression, adjustment reaction or bipolar disorders; or
- At least one hospitalization with a diagnosis for an anxiety state, phobic disorders or obsessive-compulsive disorders; or
- Two or more physician visits with a diagnosis of depressive disorder, affective psychoses, adjustment reaction or for anxiety disorders.

Key Findings

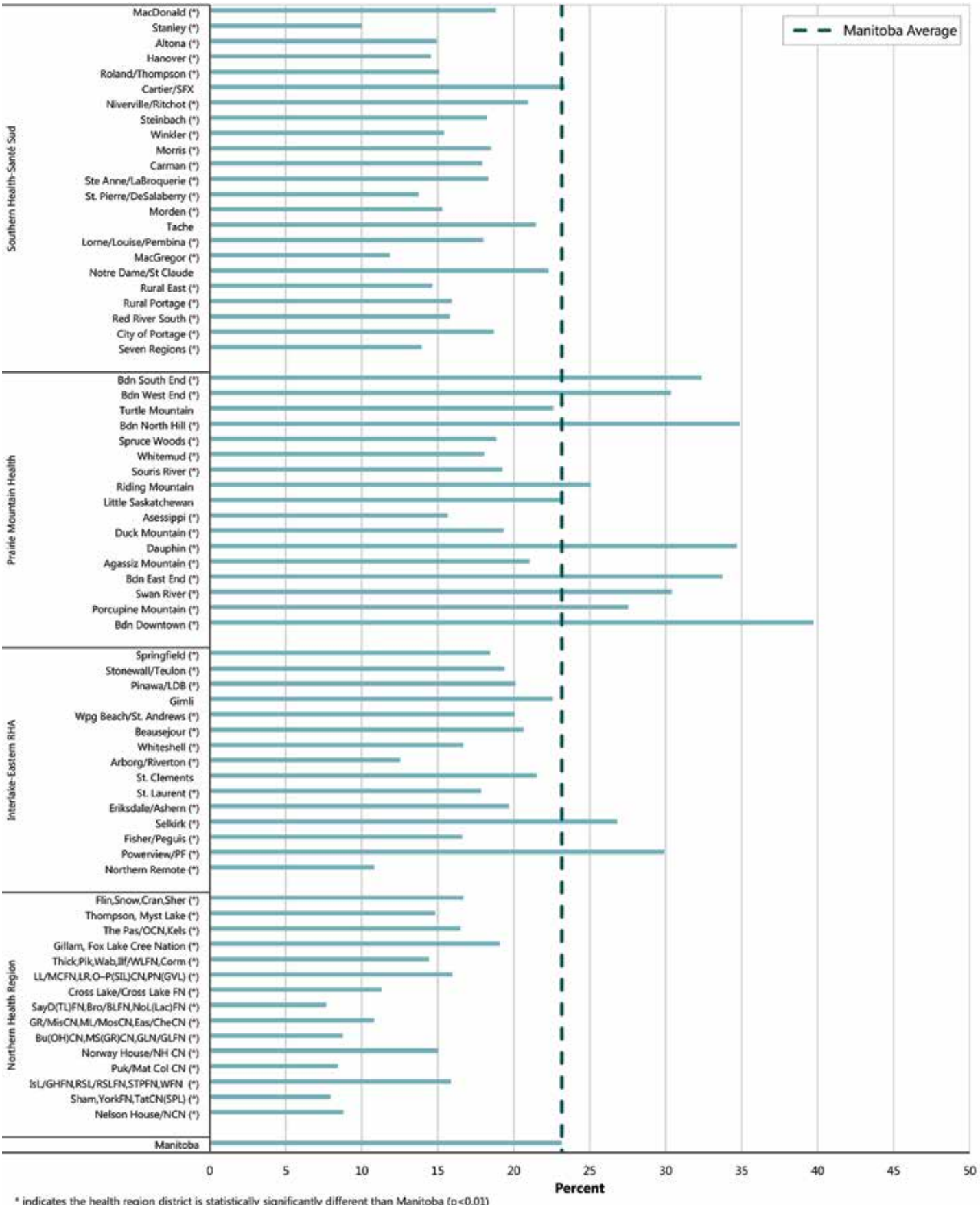
- The five-year diagnostic prevalence of mood and anxiety disorders for adults in Manitoba was 23.2%. It was lower in Southern Health-Santé Sud, Interlake-Eastern and Northern; however, it was higher in Prairie Mountain Health and in Winnipeg.
- Compared to all of Manitoba, the prevalence was lower in most districts of Southern Health-Santé Sud, Interlake-Eastern and Northern. In Prairie-Mountain Health, many districts had a higher prevalence than Manitoba, but some were also lower.
- Seven Oaks West and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of mood and anxiety disorders, and Point Douglas South and St. James Assiniboia West were among the highest. The prevalence in Churchill was lower than in Winnipeg.
- The prevalence of mood and anxiety disorders was higher for females than males across all age groups. Males in the 25 years and older age groups had a higher prevalence compared to males in the 18-24 age group.
- A higher prevalence of mood and anxiety disorders was found in urban areas compared to rural areas. In both urban and rural areas, there was a linear trend across income quintiles where the prevalence increased as area-level income decreased.

Figure 2.1: Prevalence of Mood and Anxiety Disorders among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



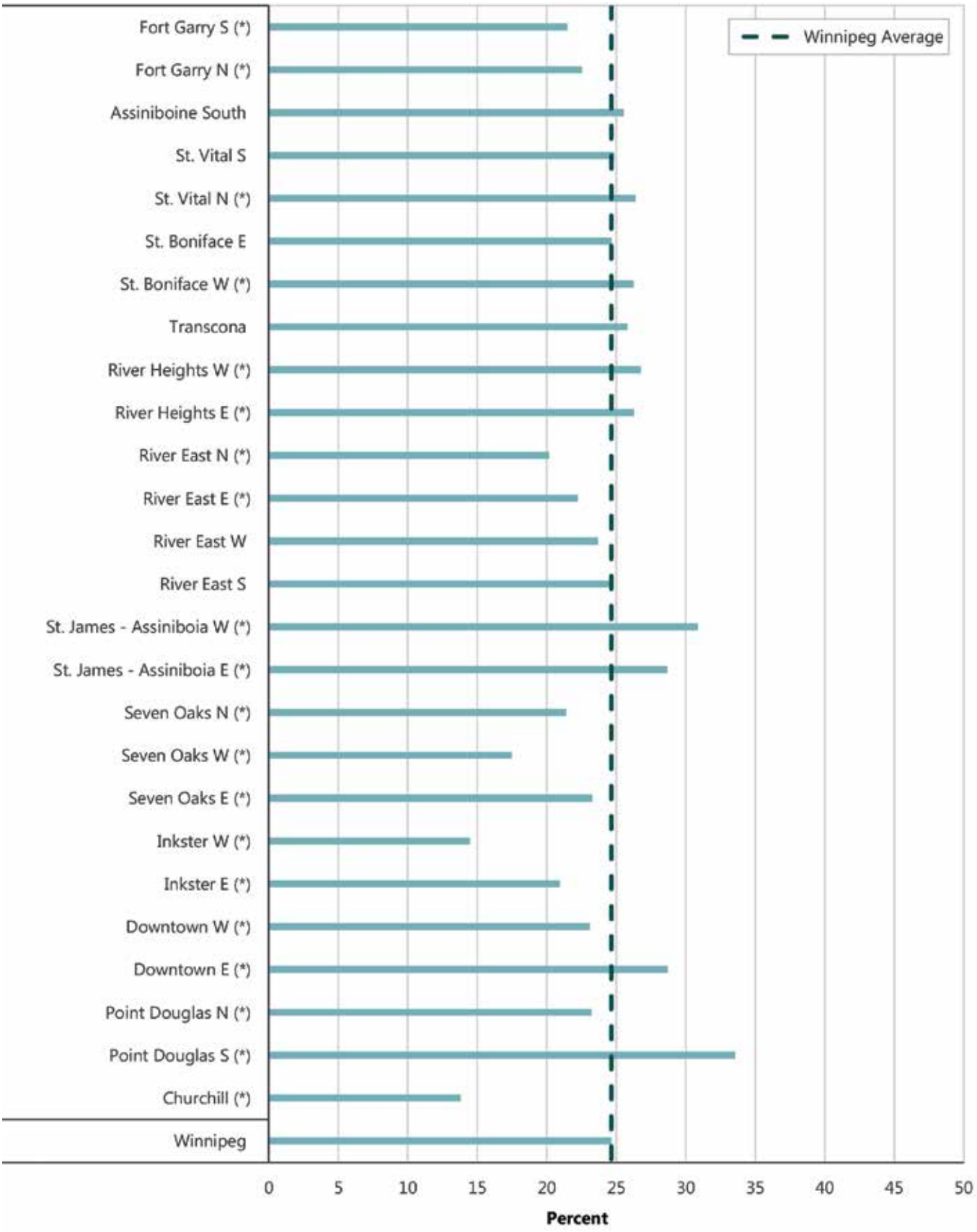
* indicates the health region is statistically significantly different than Manitoba ($p<0.01$)

Figure 2.2: Prevalence of Mood and Anxiety Disorders among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



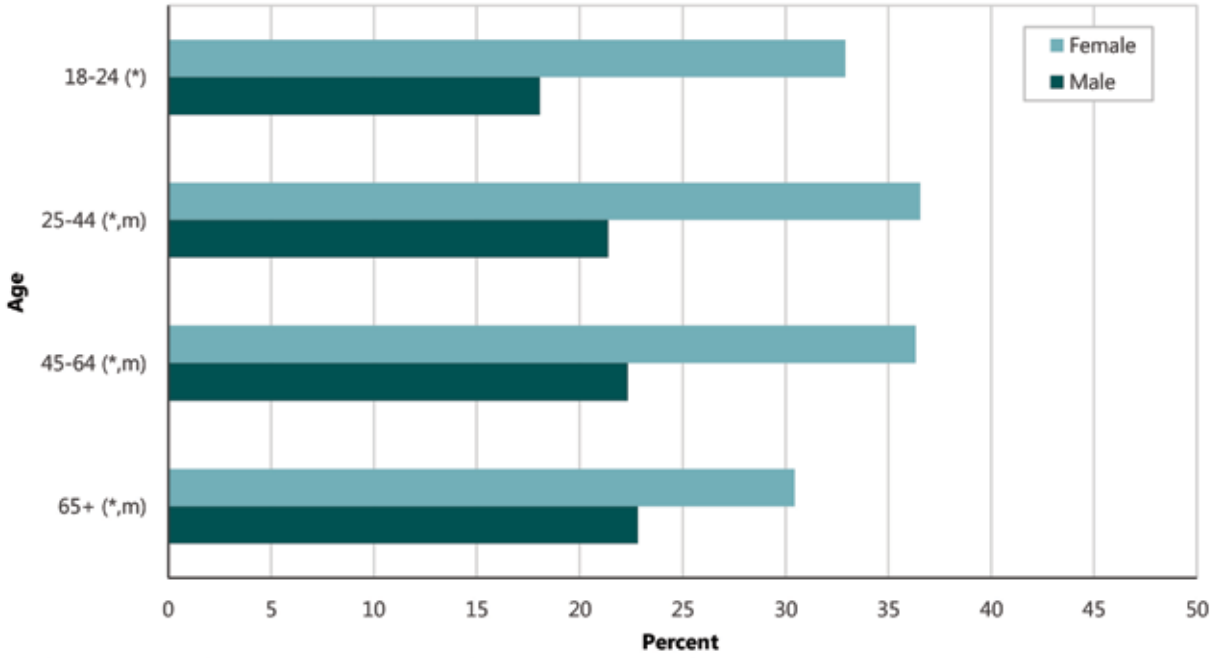
* indicates the health region district is statistically significantly different than Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.3: Prevalence of Mood and Anxiety Disorders among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



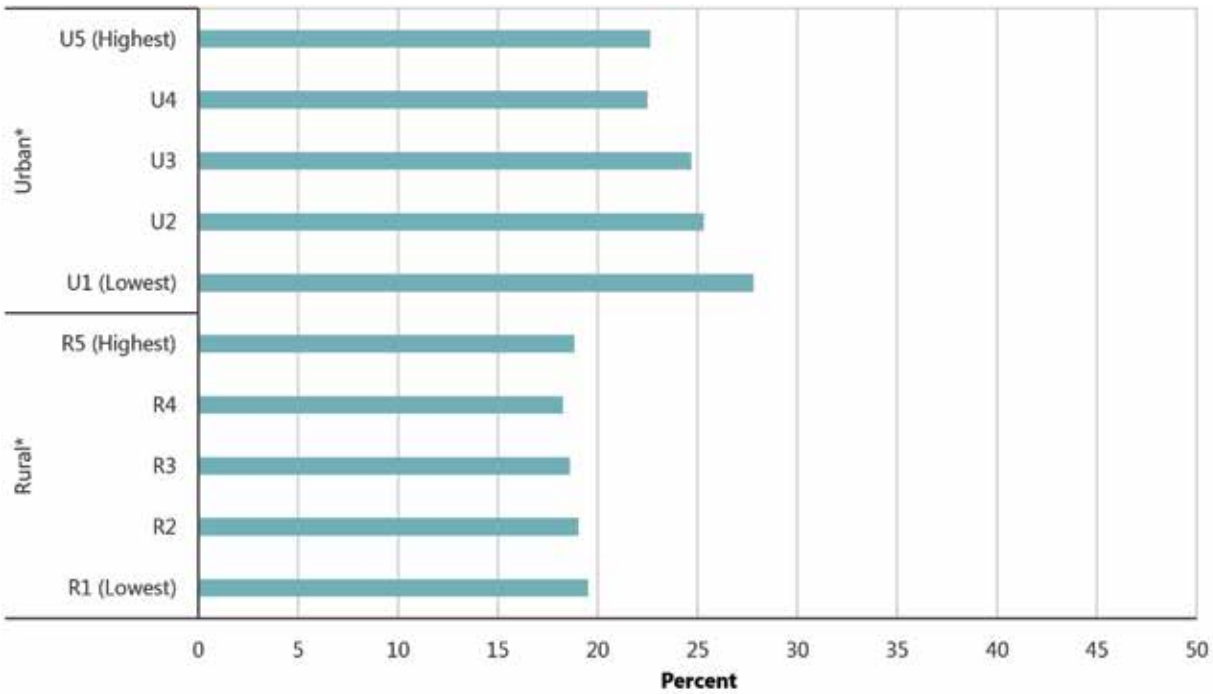
* indicates the neighbourhood cluster is statistically significantly different than Winnipeg

Figure 2.4: Prevalence of Mood and Anxiety Disorders among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) (p<0.01)

Figure 2.5: Prevalence of Mood and Anxiety Disorders among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are statistically significantly different from each other.

Substance Use Disorders

Substance use disorders are characterized by the excess use of and reliance on a drug, alcohol, or other chemical that leads to severe negative effects on the individual's health and well-being or to the welfare of others [6]. It is challenging to estimate the prevalence of these disorders because patients are not usually forthright in describing their excess use of alcohol and drugs [28].

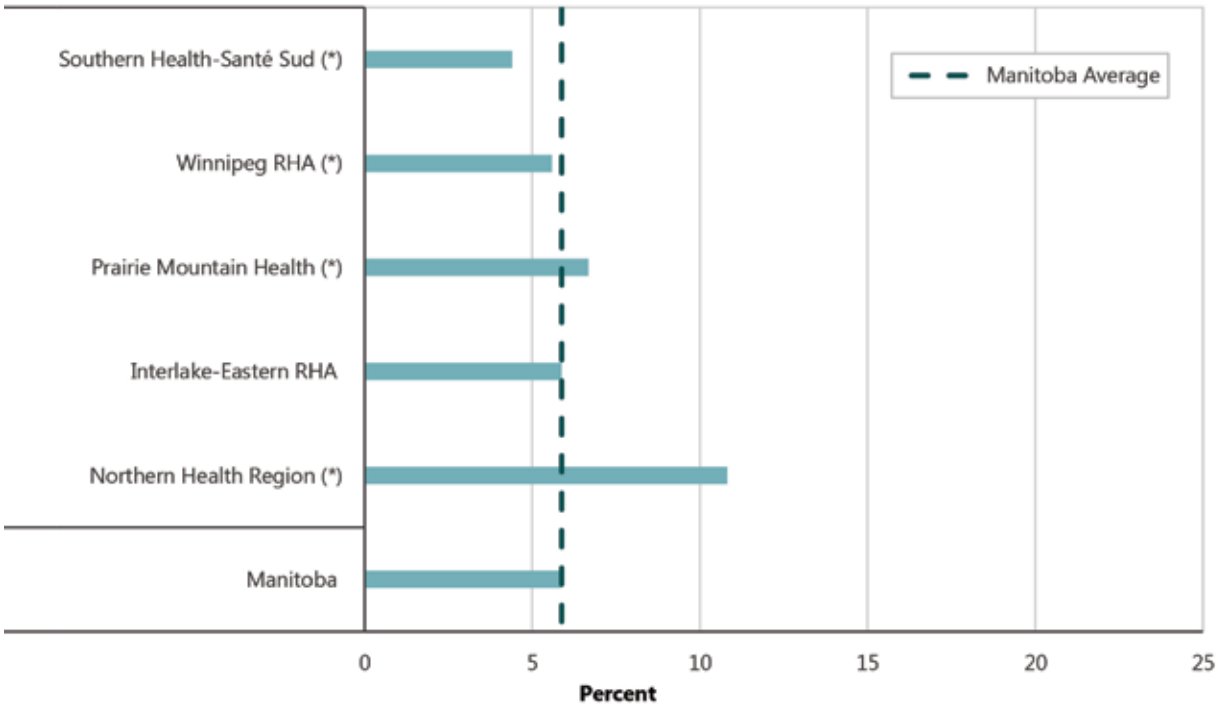
In this study, adults were considered to have a diagnosis of a substance use disorder from 2010/11 to 2014/15 if they met at least one of the following criteria:

- At least one hospitalization with a diagnosis for alcohol or drug-induced psychosis, alcohol or drug dependence, or nondependent abuse of drugs; or
- At least one physician visit with a diagnosis for alcohol or drug-induced psychosis, alcohol or drug dependence, or nondependent abuse of drugs.

Key Findings

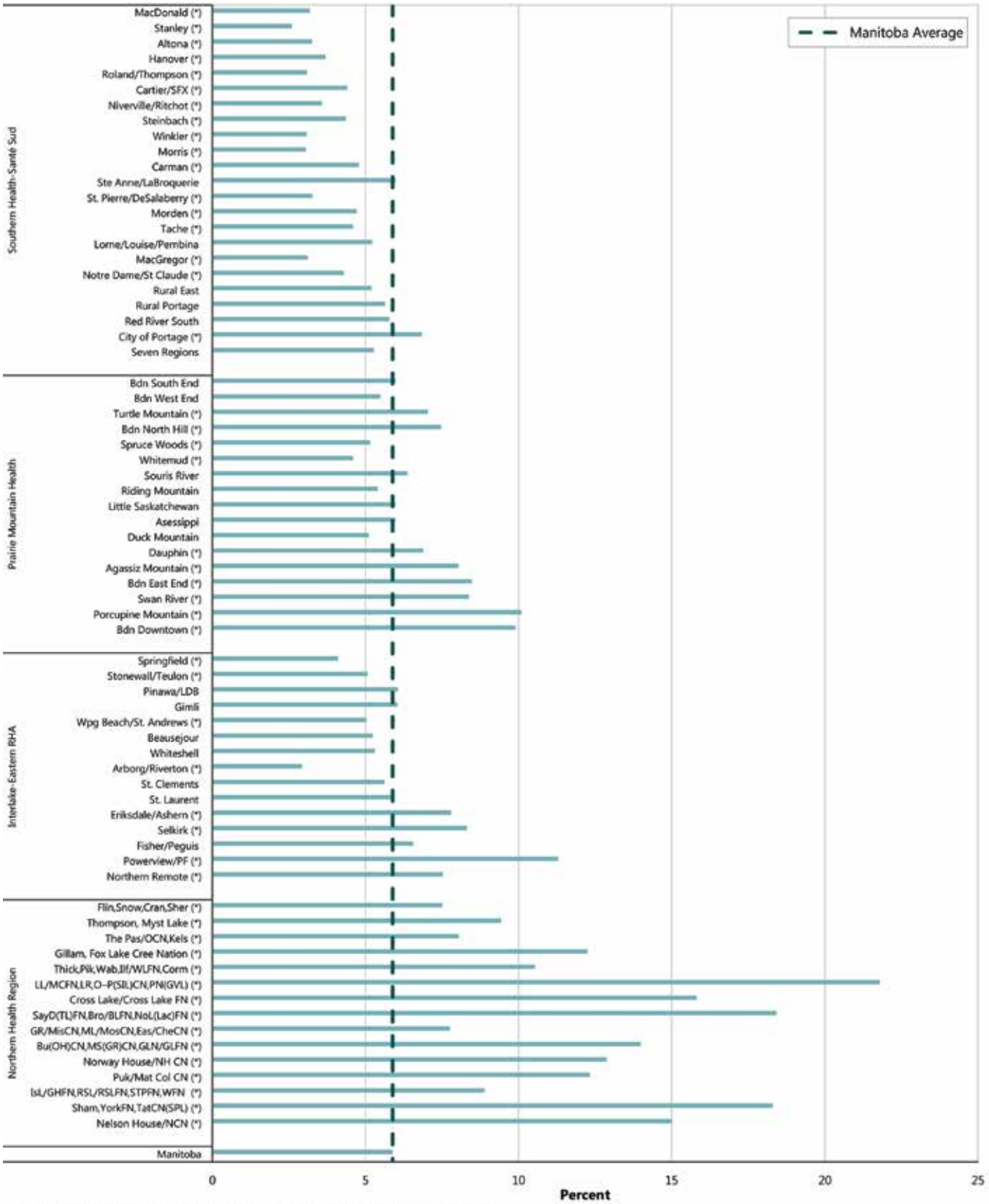
- The five-year diagnostic prevalence of substance use disorders for adults in Manitoba was 5.9%. It was lower in Southern Health-Santé Sud and Winnipeg; however, it was higher in Prairie Mountain Health and Northern.
- Similar to what was found for health regions, the prevalence was lower in health region districts in Southern Health-Santé Sud, and it was higher in districts in Prairie Mountain Health and Northern.
- Fort Garry and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of substance use disorders, and Point Douglas and Downtown were among the highest. The prevalence in Churchill was higher than in Winnipeg.
- The prevalence was higher for males than females across all age groups. The 65 and older age group had a lower prevalence compared to the 18-24 age group, for both males and females.
- A higher prevalence of substance use disorders was found in urban areas compared to rural areas. For both urban and rural areas, there was an inverse linear trend across income quintiles whereby the prevalence of substance use disorders increased as area-level income decreased.

Figure 2.6: Prevalence of Substance Use Disorders among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



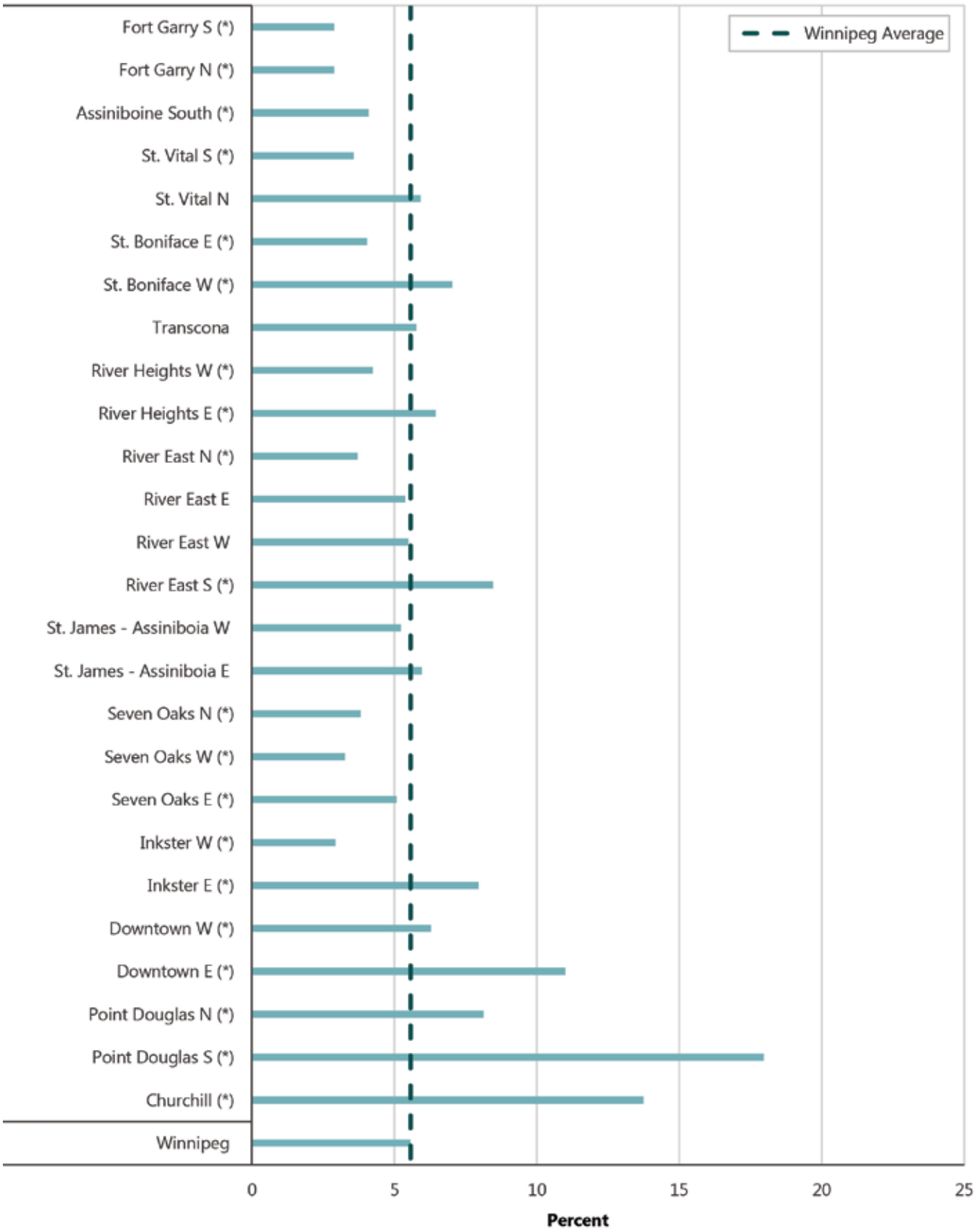
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.7: Prevalence of Substance Use Disorders among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



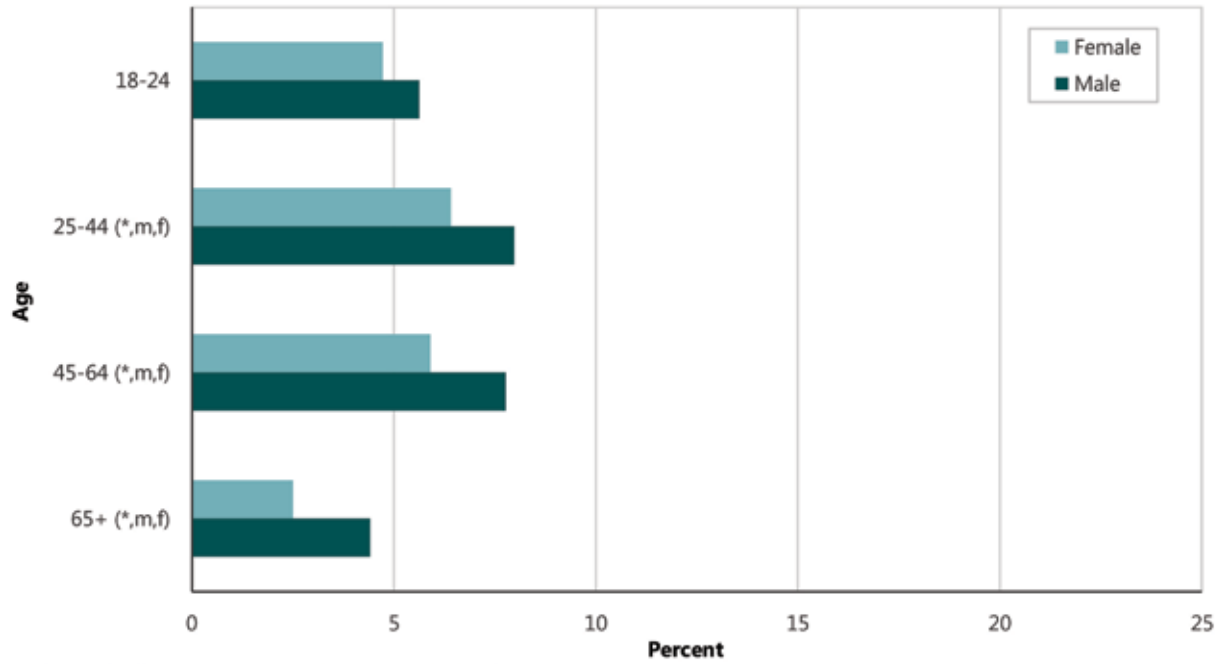
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.8: Prevalence of Substance Use Disorders among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



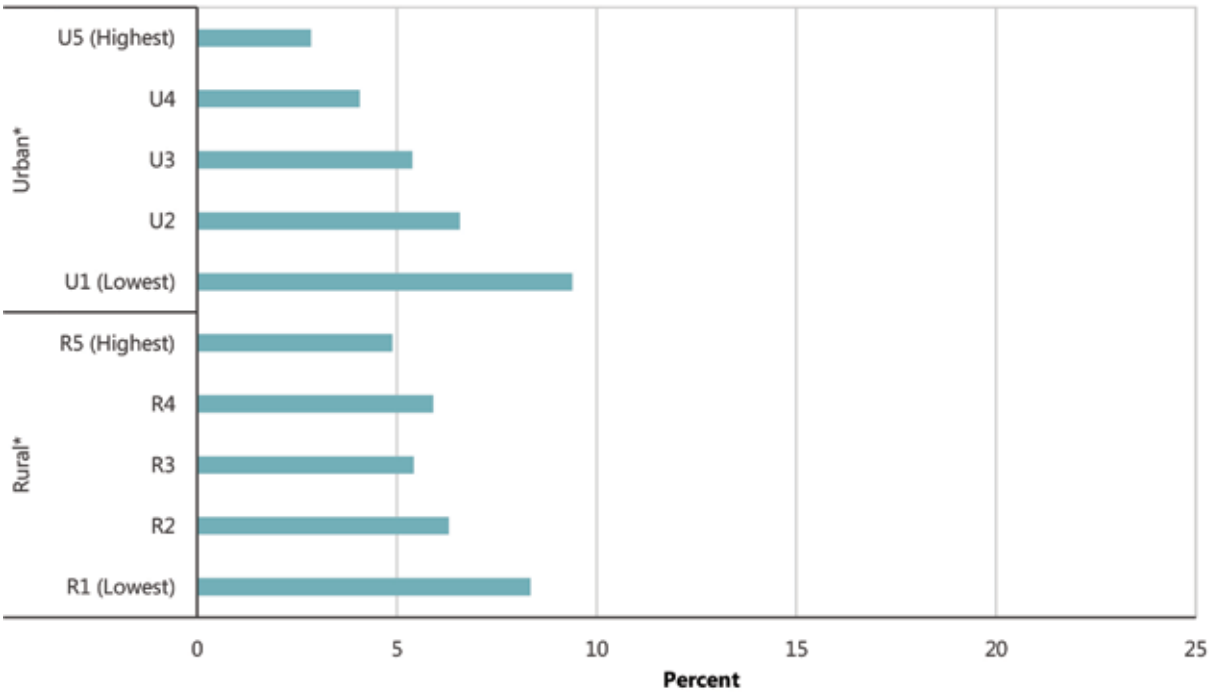
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg

Figure 2.9: Prevalence of Substance Use Disorders among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) (p<0.01)

Figure 2.10: Prevalence of Substance Use Disorders among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are statistically significantly different from each other.

Psychotic Disorders

Psychotic disorders are characterized by extreme impairment of a person's ability to think clearly, respond emotionally, communicate effectively, understand reality, and behave appropriately. Symptoms associated with psychotic disorders include delusions, hallucinations and disorganized speech or behaviour [6].

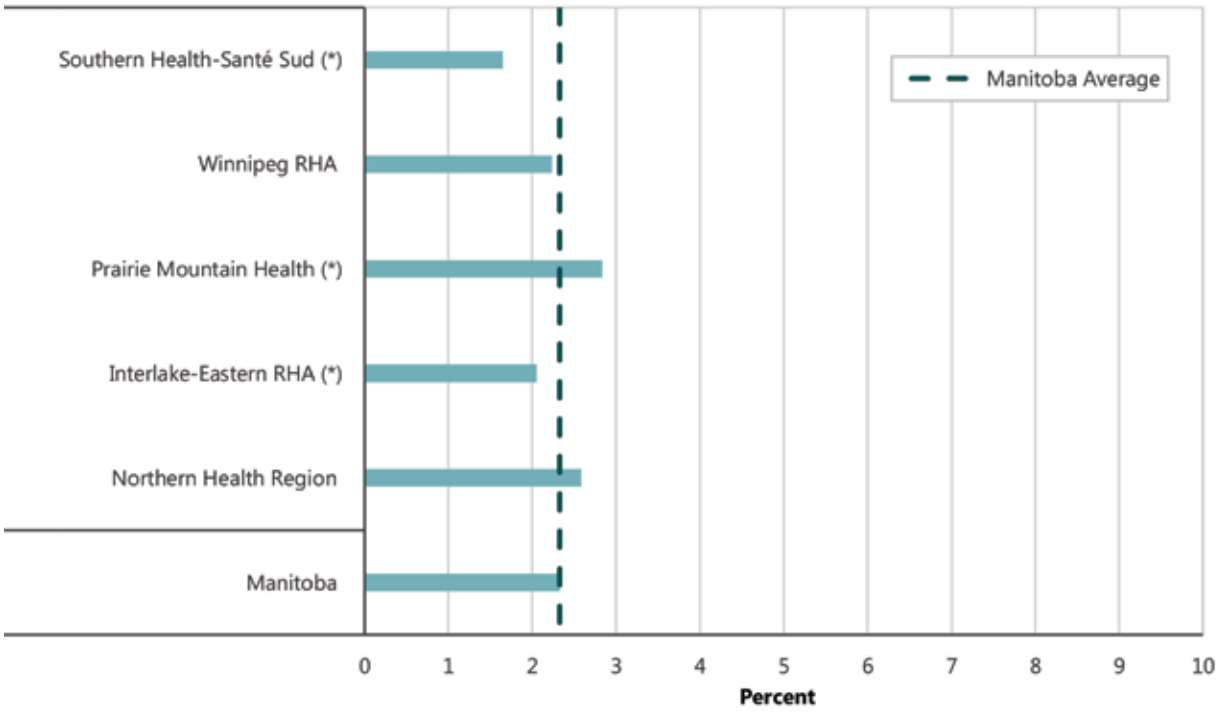
In this study, adults were considered to have a diagnosis of a psychotic disorder from 2010/11 to 2014/15 if they met at least one of the following criteria:

- At least one hospitalization with a diagnosis of psychotic disorder: schizophrenia, psychotic disorders due to drug use (except tobacco), delusional disorders, acute and transient psychotic disorders, induced delusional disorder, schizoaffective disorders, other nonorganic psychotic disorders and unspecified nonorganic psychosis; or
- At least one physician visit with a diagnosis of psychotic disorder: schizophrenic disorders, delusional disorders or other nonorganic psychoses.

Key Findings

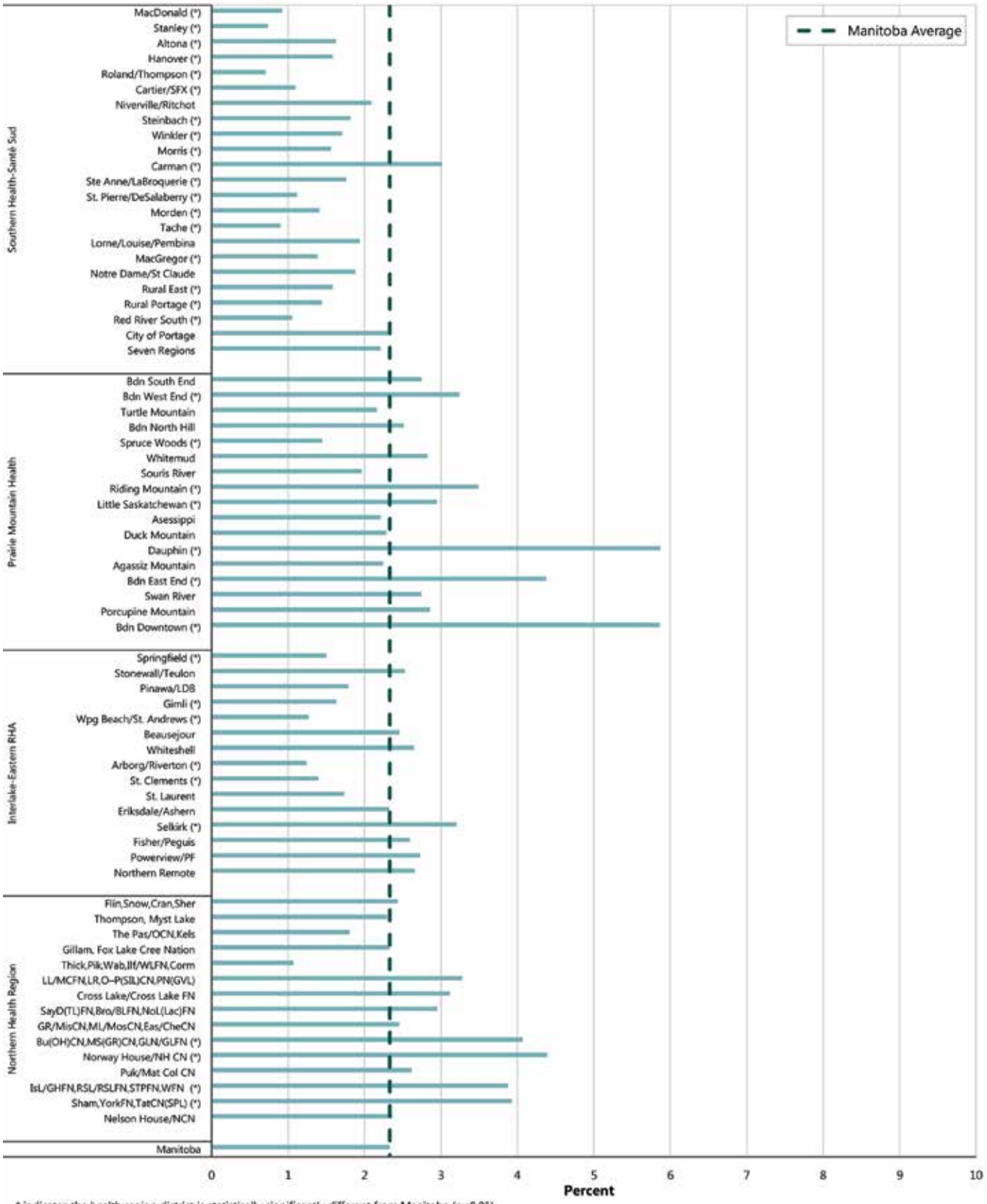
- The five-year diagnostic prevalence of psychotic disorders for adults in Manitoba was 2.3%. It was lower in Southern Health-Santé Sud and Interlake-Eastern; however, it was higher in Prairie Mountain Health.
- Compared to all of Manitoba, the prevalence was lower in most districts of Southern Health-Santé Sud and some districts in Interlake-Eastern. It was higher in some districts of Prairie Mountain Health and Northern. The prevalence of psychotic disorders was higher in areas where longer term psychiatric facilities were located (see Appendix Table 4.2).
- River East North and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of psychotic disorders, and Point Douglas South and Downtown East were among the highest.
- The prevalence of psychotic disorders was higher for males than females among the 18-24 and 25-44 age groups.
- Males and females in the 65 years and over age groups had higher prevalence compared to the youngest age groups. These high rates in the older age groups are likely due to the symptoms of dementia being initially mistaken for those of a psychotic disorder. This interpretation is supported by the finding that a large proportion (67.5%) of people with psychotic disorders among the 65 and older group also received a diagnosis of dementia.
- There was no difference in psychotic disorder prevalence between urban and rural areas, but in both areas there was a linear trend across income quintiles where the prevalence of psychotic disorders increased as area-level income decreased.

Figure 2.11: Prevalence of Psychotic Disorders among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



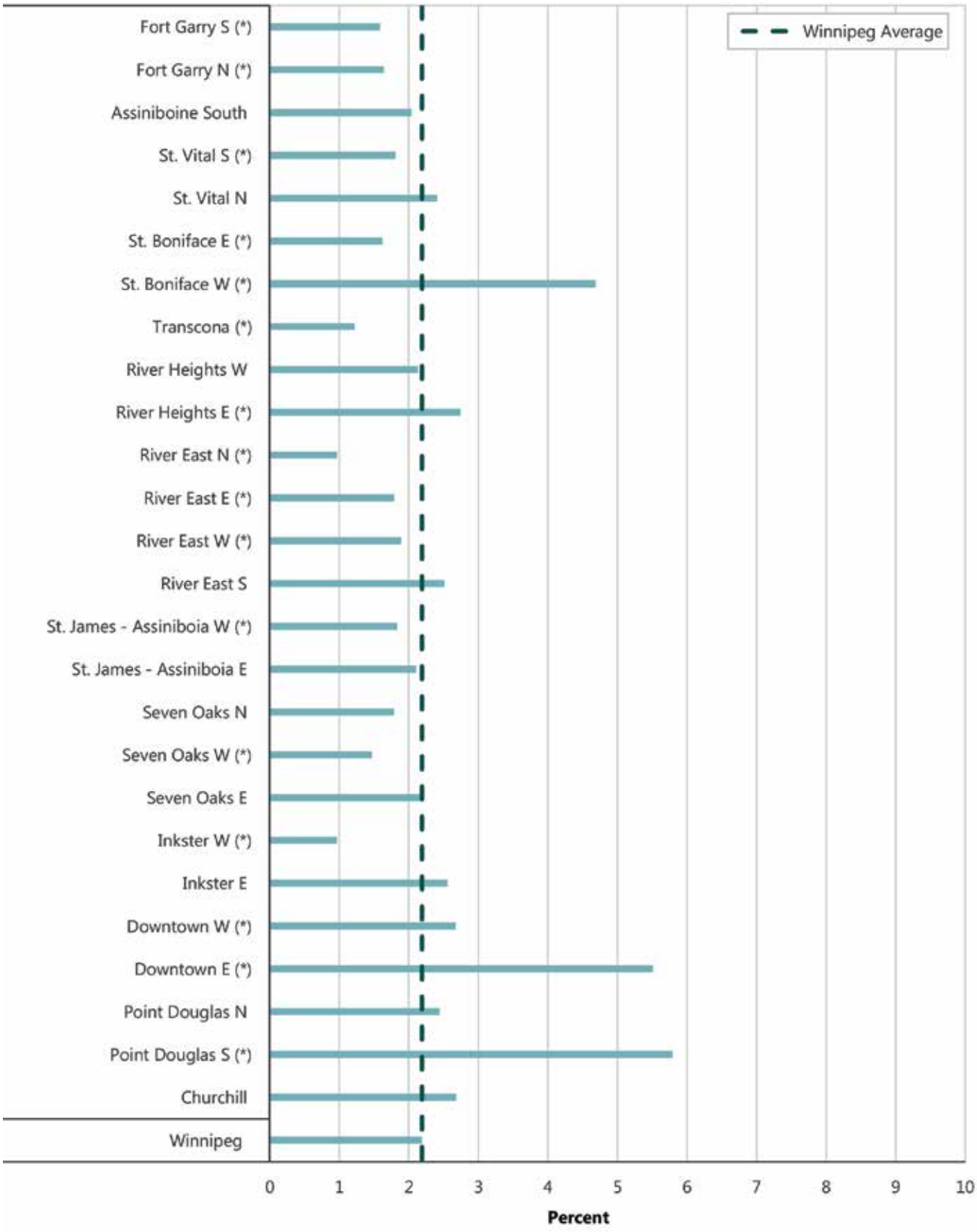
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.12: Prevalence of Psychotic Disorders among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



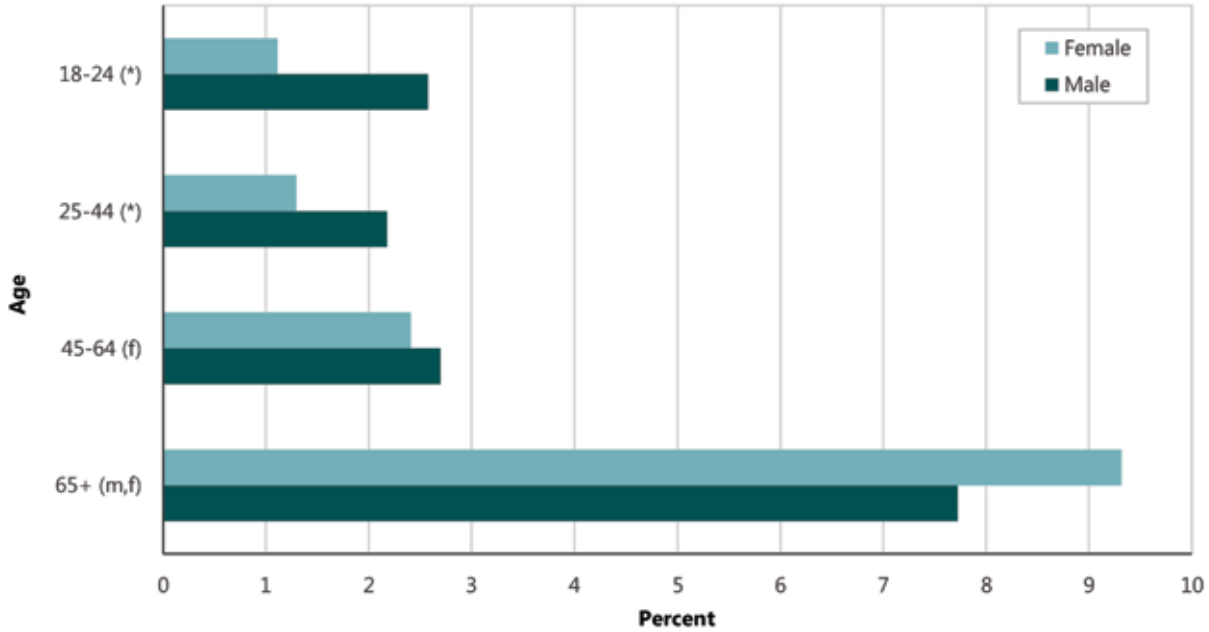
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.13: Prevalence of Psychotic Disorders among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



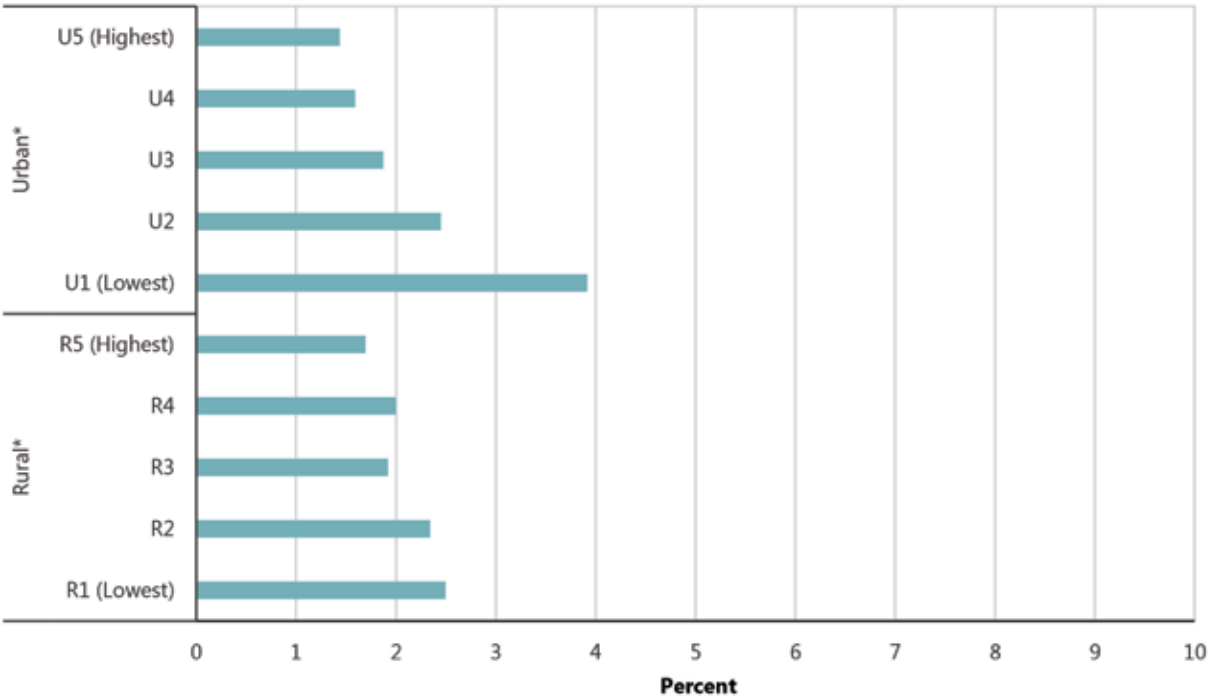
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg

Figure 2.14: Prevalence of Psychotic Disorders among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group ($p<0.05$)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) ($p<0.01$)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) ($p<0.01$)
Note: High rates in the 65+ age groups are likely due to the symptoms of dementia being initially mistaken for those of psychotic disorders.

Figure 2.15: Prevalence of Psychotic Disorders among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles ($p<0.01$)
Note: Urban and Rural overall are not statistically significantly different from each other.

Psychosis Not Otherwise Specified and Schizophrenia

When patients with psychotic symptoms are seen by a physician, the exact diagnosis is not always clear and they may be diagnosed with psychosis not otherwise specified (NOS). We found many cases of psychosis NOS in the five-year period and decided to explore this group of people further. We examined how many were eventually diagnosed with schizophrenia and whether certain sociodemographic characteristics or other diagnosed mental illnesses were associated with an eventual diagnosis of schizophrenia. Understanding who is at greatest risk of schizophrenia is important in early intervention and treatment [29].

Over a five-year period, we found that 3,289 people between ages 13 to 60 had been diagnosed with psychosis NOS (Appendix Table 4.3). Among this group, there were 788 (26%) diagnosed with schizophrenia in the follow-up period (up to 8 years after psychosis NOS diagnosis). Several factors were shown to increase the risk of a subsequent diagnosis of schizophrenia (Appendix Table 4.4). Males with a diagnosis of psychosis NOS were 1.4 times more likely than females to be diagnosed with schizophrenia during the follow-up period (hazard ratio (HR): 1.40). Other factors include being younger (HR: 0.98), having been hospitalized for mental illness in the previous year (HR: 1.27), and being diagnosed by a psychiatrist versus another physician (HR: 2.66). On the other hand, a lower risk of being diagnosed for schizophrenia was found among people diagnosed with a mood and anxiety disorder in the previous year (HR: 0.82).

Schizophrenia

Schizophrenia is a severe mental disorder characterized by difficulty in distinguishing between real and unreal experiences (delusions and hallucinations), thinking logically, and difficulties in social and emotional functioning. To obtain a diagnosis of schizophrenia, symptoms must be present for at least one month [6].

Schizophrenia is included in our definition of psychotic disorders. We have chosen to also examine this disorder separately because schizophrenia is the most studied and best described of the psychotic conditions, and is central to clinical practice.

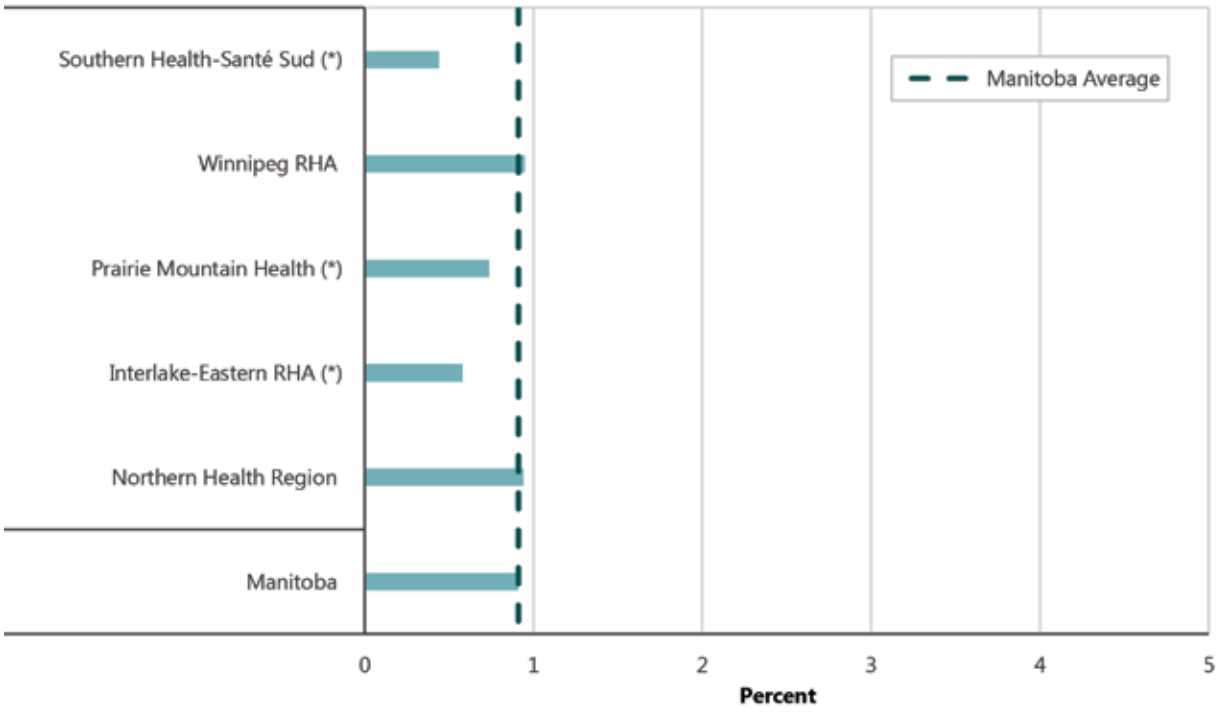
In this study, adults were considered to have a diagnosis of schizophrenia from 2010/11 to 2014/15 if they met at least one of the following criteria:

- At least one hospitalization with a diagnosis of schizophrenia; or
- At least one physician visit with a diagnosis of schizophrenia.

Key Findings

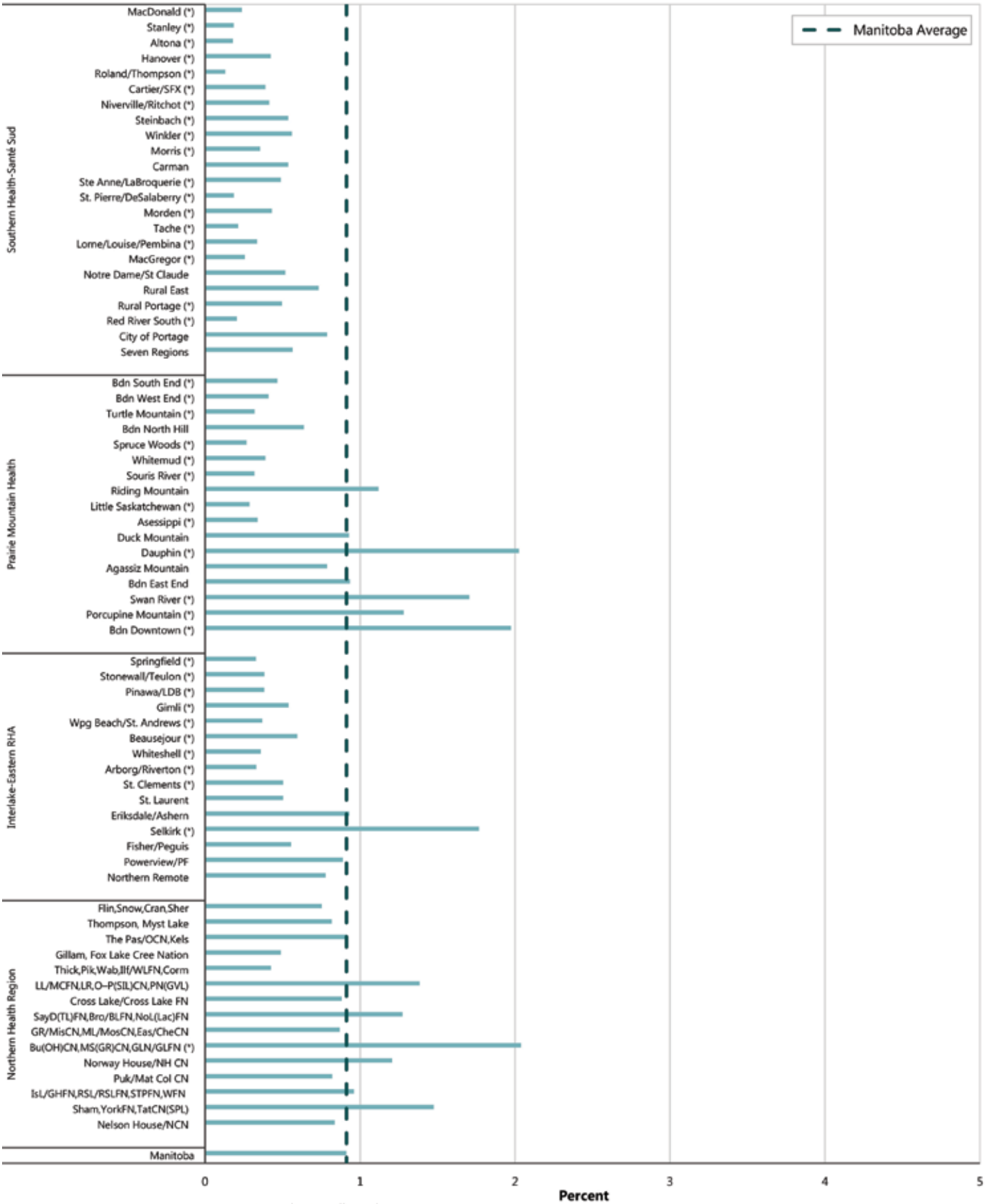
- The five-year diagnostic prevalence of schizophrenia for adults in Manitoba was 0.9%. It was lower in Southern Health-Santé Sud, Interlake-Eastern and Prairie Mountain Health.
- Compared to all of Manitoba, the prevalence was lower in many districts in Southern Health-Santé Sud and Interlake-Eastern. It appeared to be higher in some districts in Northern, but was actually statistically significant in only one of them. In Prairie Mountain Health, many districts had a lower prevalence than Manitoba, but some were also higher.
- River East North and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of schizophrenia, and Point Douglas South and Downtown East were among the highest.
- The prevalence of schizophrenia was higher for males than females among the 18-44 age groups. Females in the 45 years and older age groups had a higher prevalence compared to females in the 18-24 age group.
- A higher prevalence of schizophrenia was found in urban areas compared to rural areas. In both urban and rural areas, there was a linear trend across income quintiles where the prevalence of schizophrenia increased as area-level income decreased.

Figure 2.16: Prevalence of Schizophrenia among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



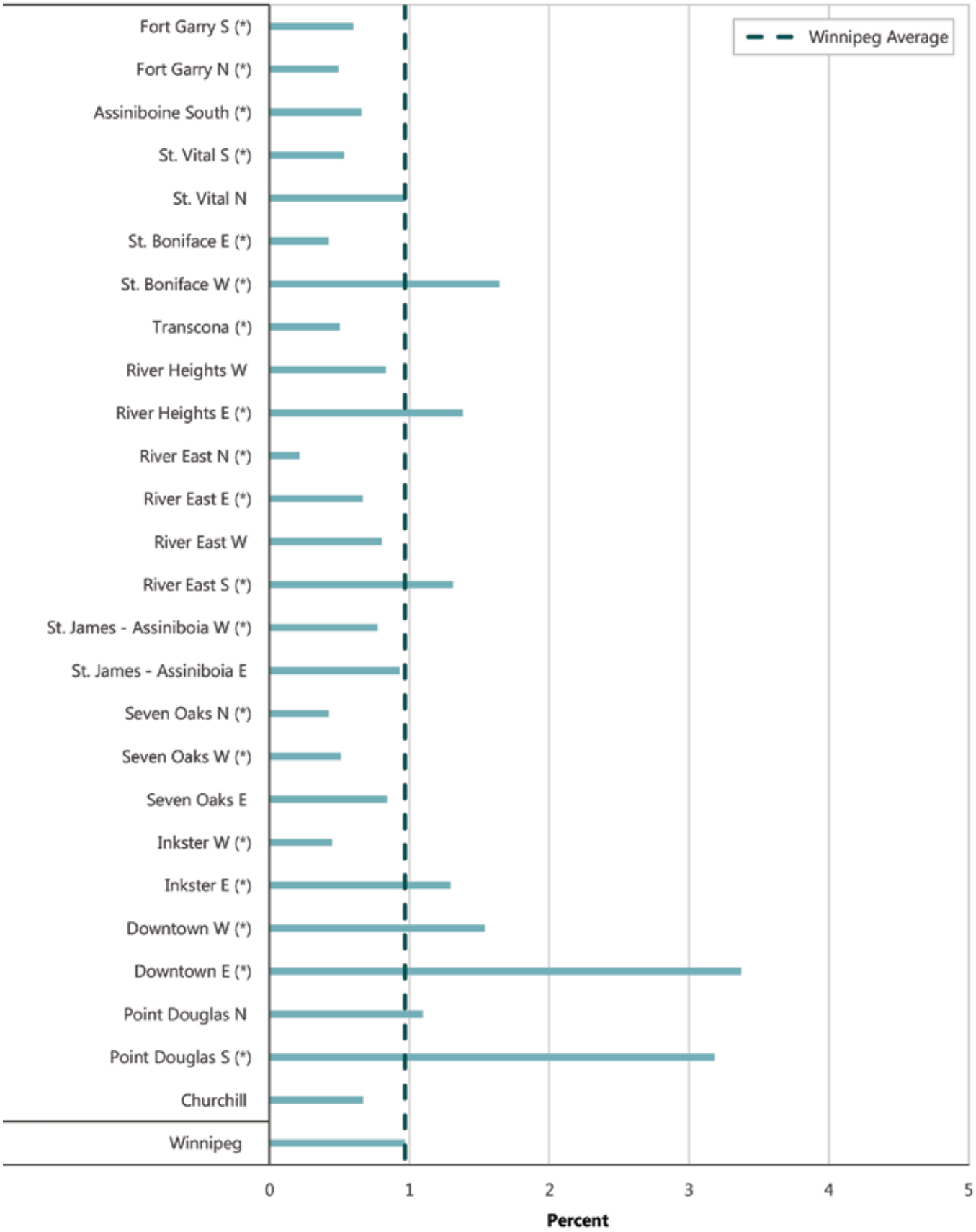
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.17: Prevalence of Schizophrenia among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



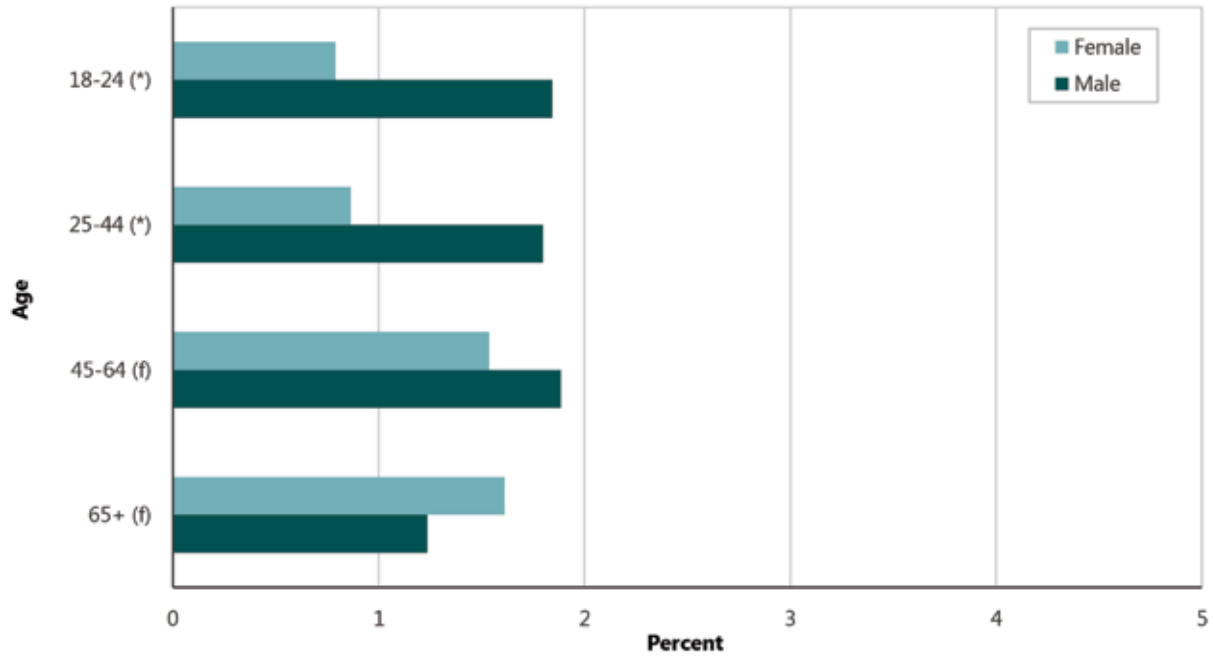
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.18: Prevalence of Schizophrenia among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



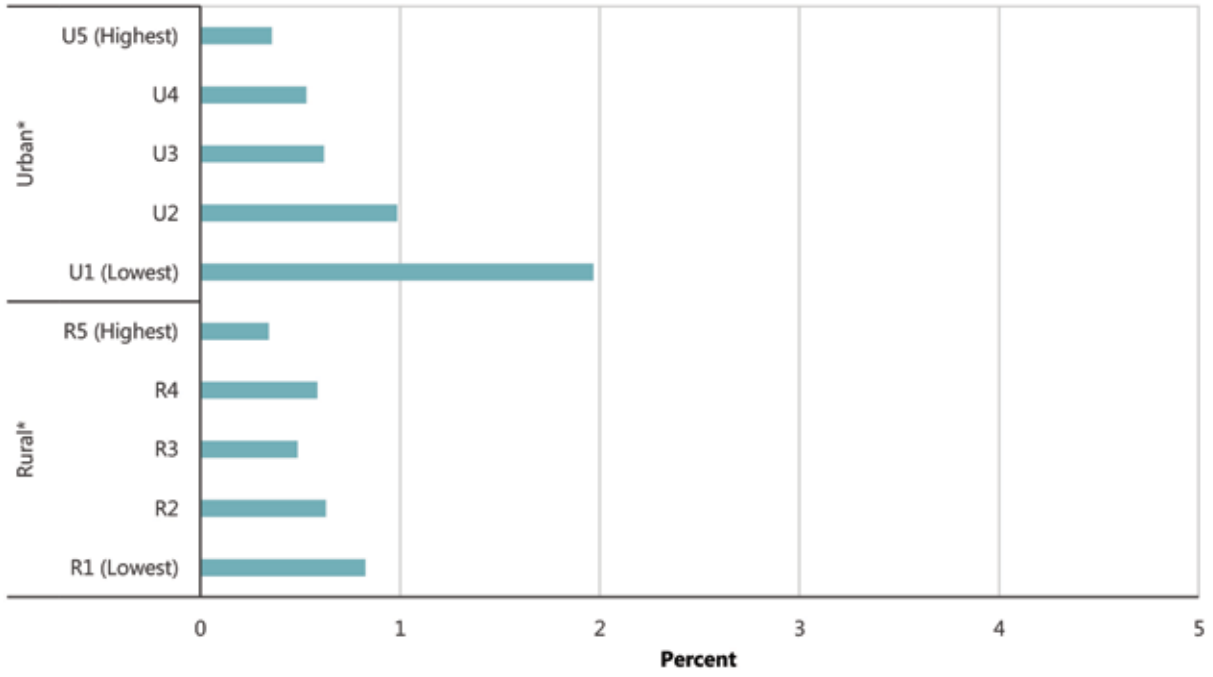
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg (p<0.01)

Figure 2.19: Prevalence of Schizophrenia among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) (p<0.01)

Figure 2.20: Prevalence of Schizophrenia among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are statistically significantly different from each other.

Personality Disorders

Personality disorders are characterized by long-term patterns of thoughts and behaviours that cause serious problems in multiple domains (e.g., relationships, work). Symptoms vary widely depending on the specific type of personality disorder [6]. Examples of the most common types include antisocial, histrionic, and borderline personality disorder.

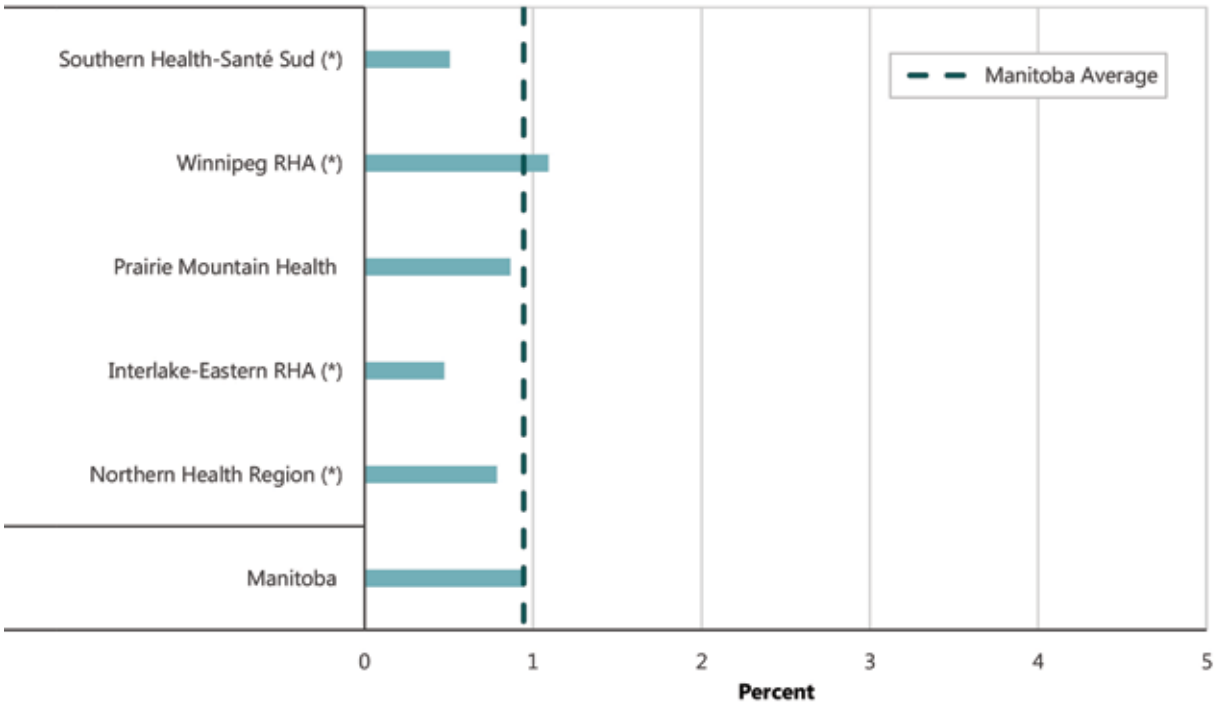
In this study, adults were considered to have a diagnosis of personality disorders from 2010/11 to 2014/15 if they met at least one of the following criteria:

- At least one hospitalization with a diagnosis for a personality disorder; or
- At least one physician visit with a diagnosis for a personality disorder.

Key Findings

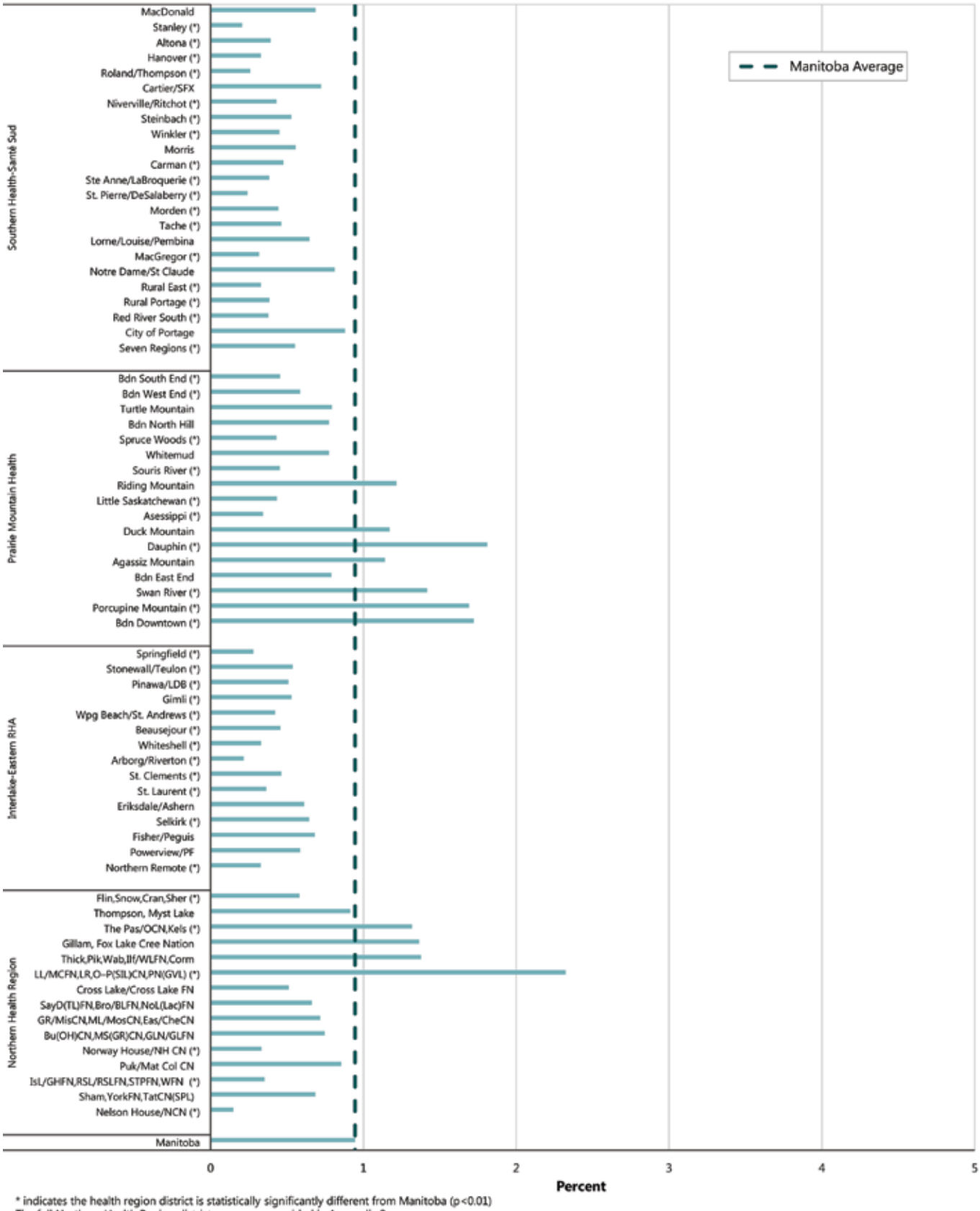
- The five-year diagnostic prevalence of personality disorders for adults in Manitoba was 0.9%. It was lower in Southern Health-Santé Sud, Interlake-Eastern and Northern; however, it was higher in Winnipeg.
- Compared to all of Manitoba, the prevalence of personality disorders was lower in districts in Southern Health-Santé Sud and Interlake-Eastern. In Northern and Prairie Mountain Health, many districts had a lower prevalence than Manitoba, but many were also higher.
- Fort Garry South and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of personality disorders, and Point Douglas South and Downtown East were among the highest.
- The prevalence was higher for females than males among the youngest age group only. Females in the 45-64 age group had a lower prevalence compared to females in the 18-24 age group. Males in the 65 and over old age group had a higher prevalence compared to males in the 18-24 age group.
- A higher prevalence of personality disorders was found in urban areas compared to rural areas. In rural areas and particularly in urban areas, there was a linear trend across income quintiles where the prevalence of personality disorders increased as area-level income decreased.

Figure 2.21: Prevalence of Personality Disorders among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



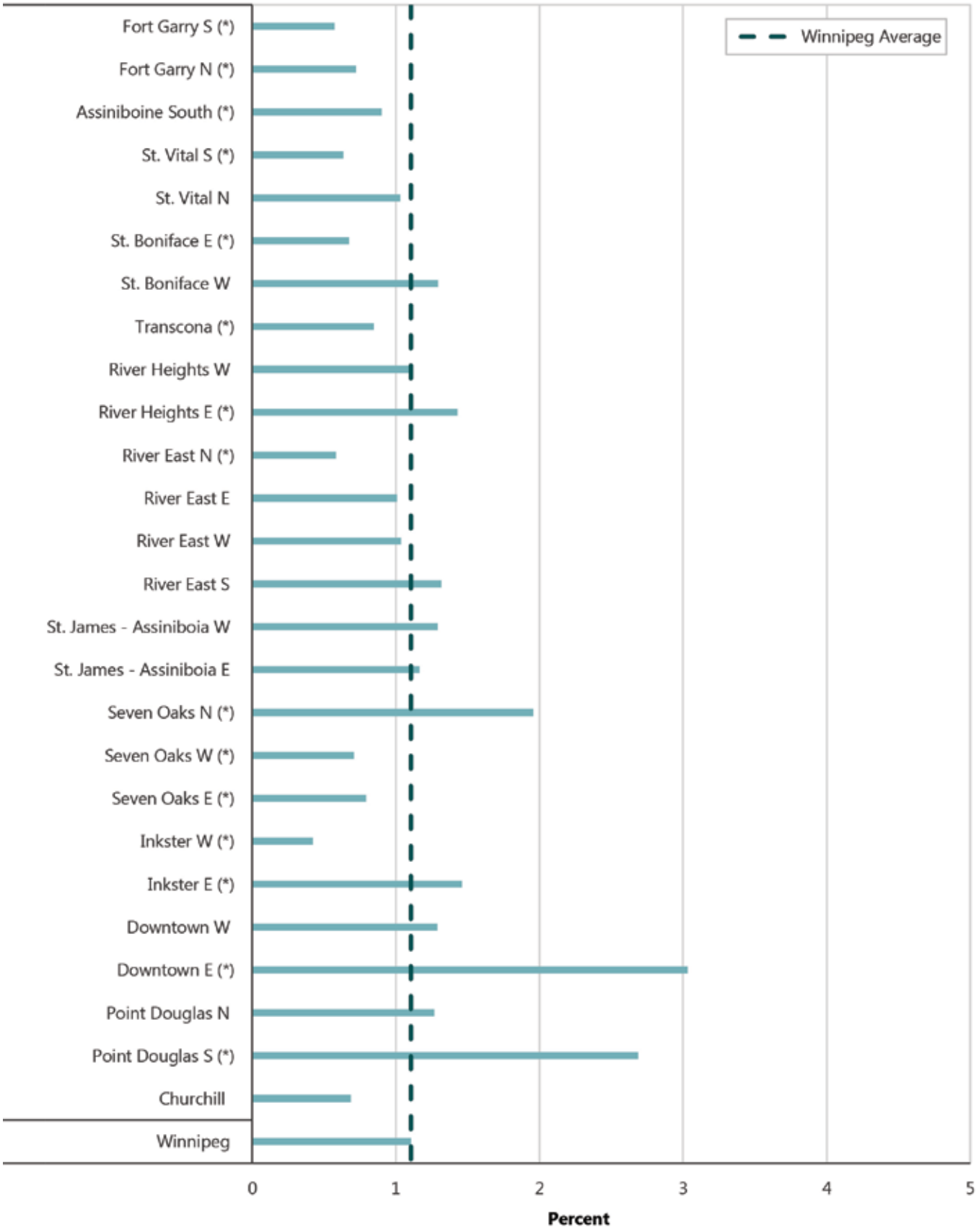
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.22: Prevalence of Personality Disorders among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



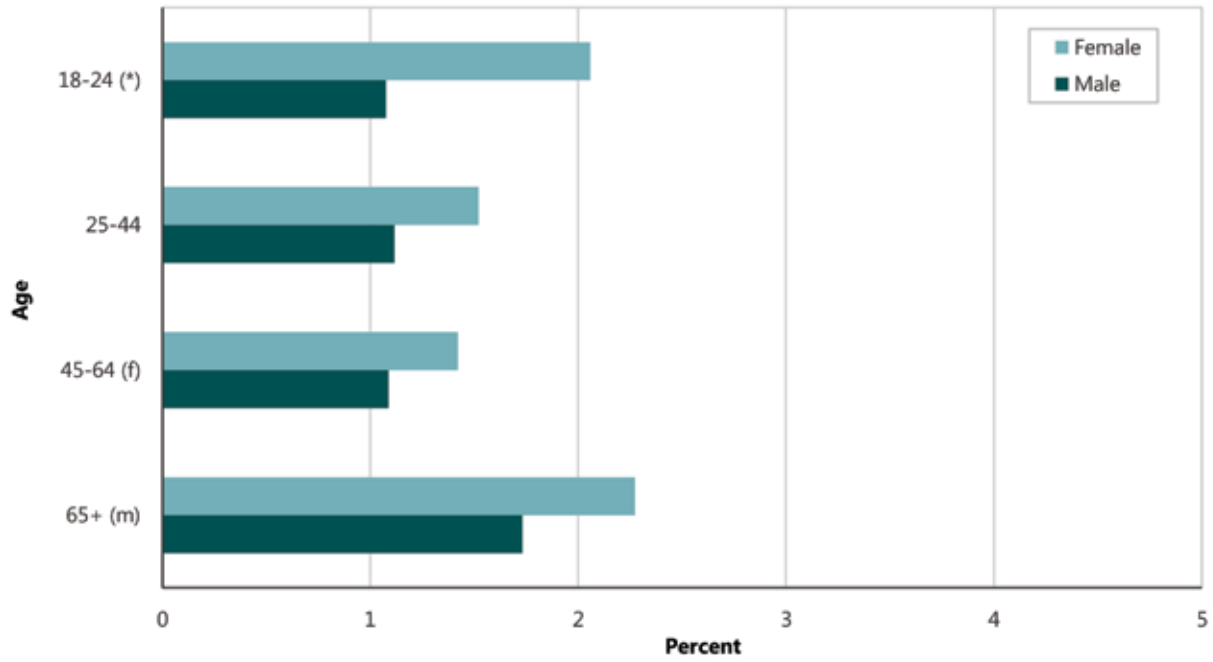
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.23: Prevalence of Personality Disorders among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



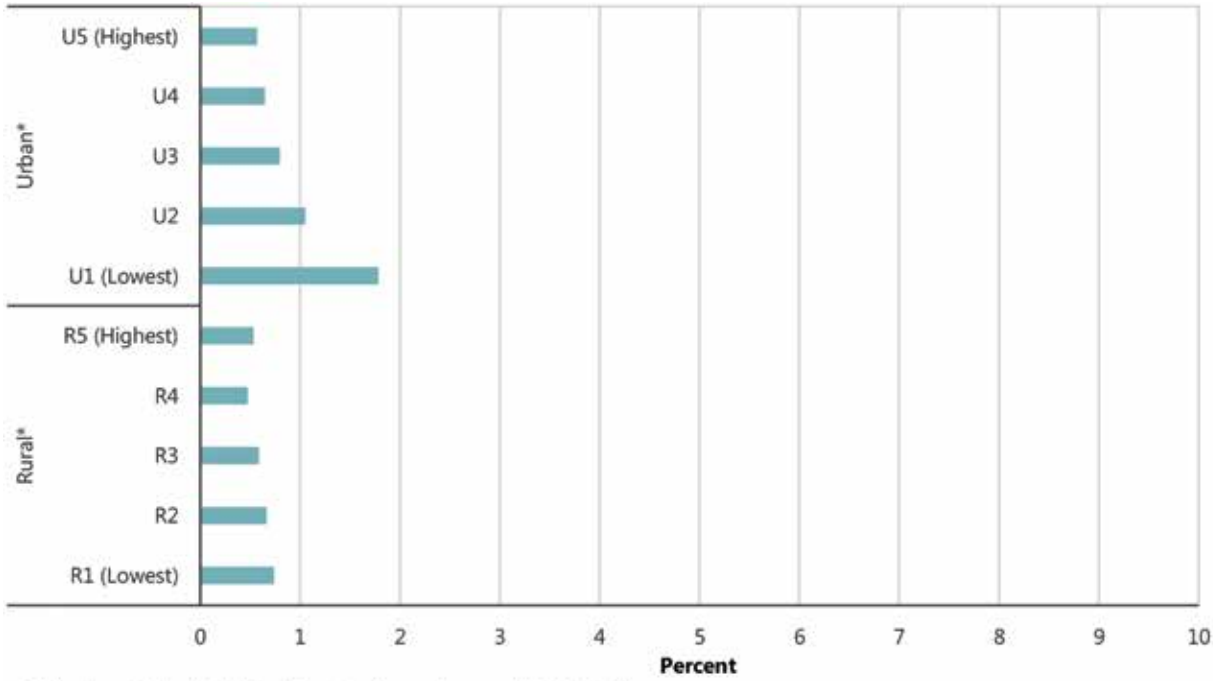
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg

Figure 2.24: Prevalence of Personality Disorders among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) (p<0.01)

Figure 2.25: Prevalence of Personality Disorders among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are statistically significantly different from each other.

Any Mental Illness

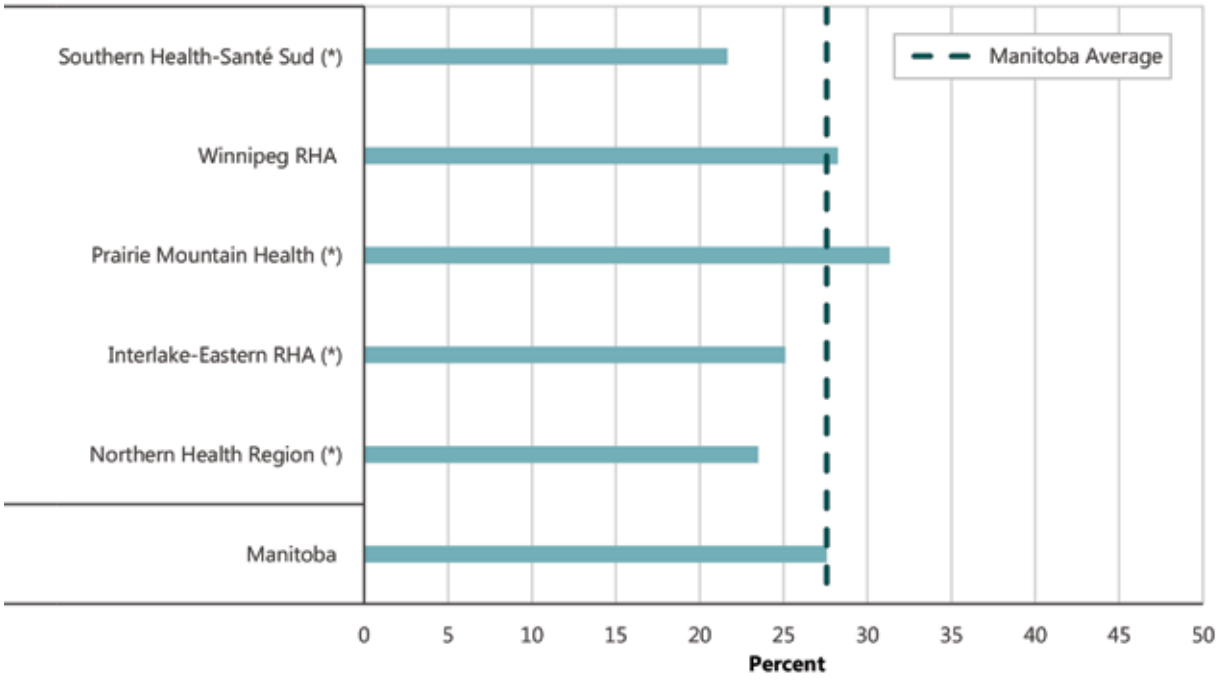
In this study, adults were considered to have a diagnosis of any mental illness from 2010/11 to 2014/15 if they had been diagnosed with at least one of the following mental disorders we examined in this report:

- Mood and anxiety disorders
- Substance use disorders
- Psychotic disorders (including schizophrenia)
- Personality disorders

Key Findings

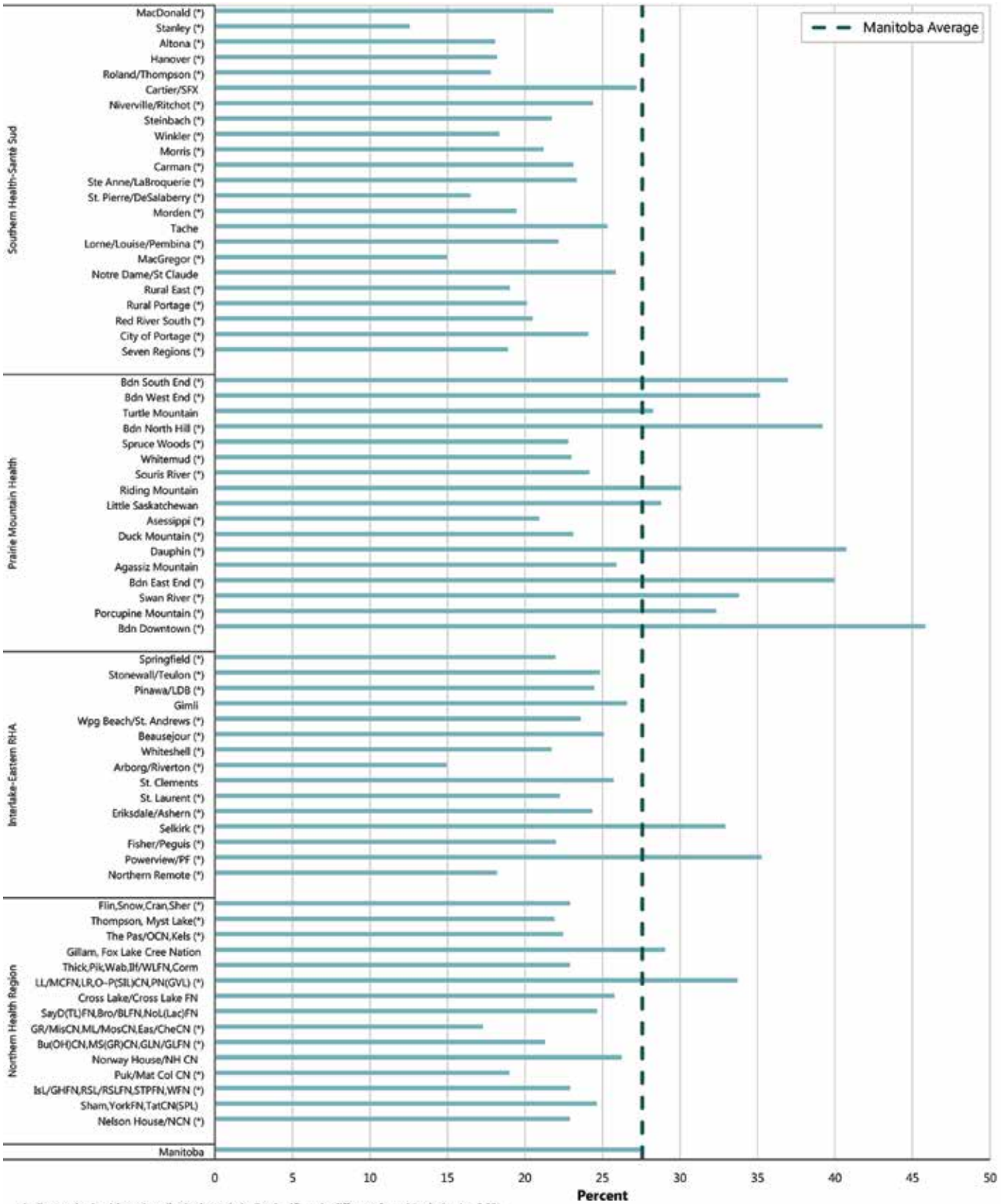
- The five-year diagnostic prevalence of mental illness for adults in Manitoba was 27.6%. It was lower in Southern Health-Santé Sud, Interlake-Eastern and Northern and higher in Prairie Mountain Health.
- Compared to all of Manitoba, the prevalence was lower in most districts in Southern Health-Santé Sud, Interlake-Eastern, and Northern. In Prairie Mountain Health, many districts had a higher prevalence than Manitoba, but some were also lower.
- Seven Oaks West and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of mental illness, and Point Douglas South and Downtown East were among the highest.
- The prevalence of mental illness was higher for females than males across all age groups. Over 40% of women in the 25-64 age groups were diagnosed with at least one mental illness in the five-year period. Males in the 25 years and older age groups had a higher prevalence compared to males in the 18-24 age group.
- A higher prevalence of mental illness was found in urban areas compared to rural areas. In both urban and rural areas, there was a linear trend across income quintiles where the prevalence of mental illness increased as area-level income decreased.

Figure 2.26: Prevalence of Any Mental Illness among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



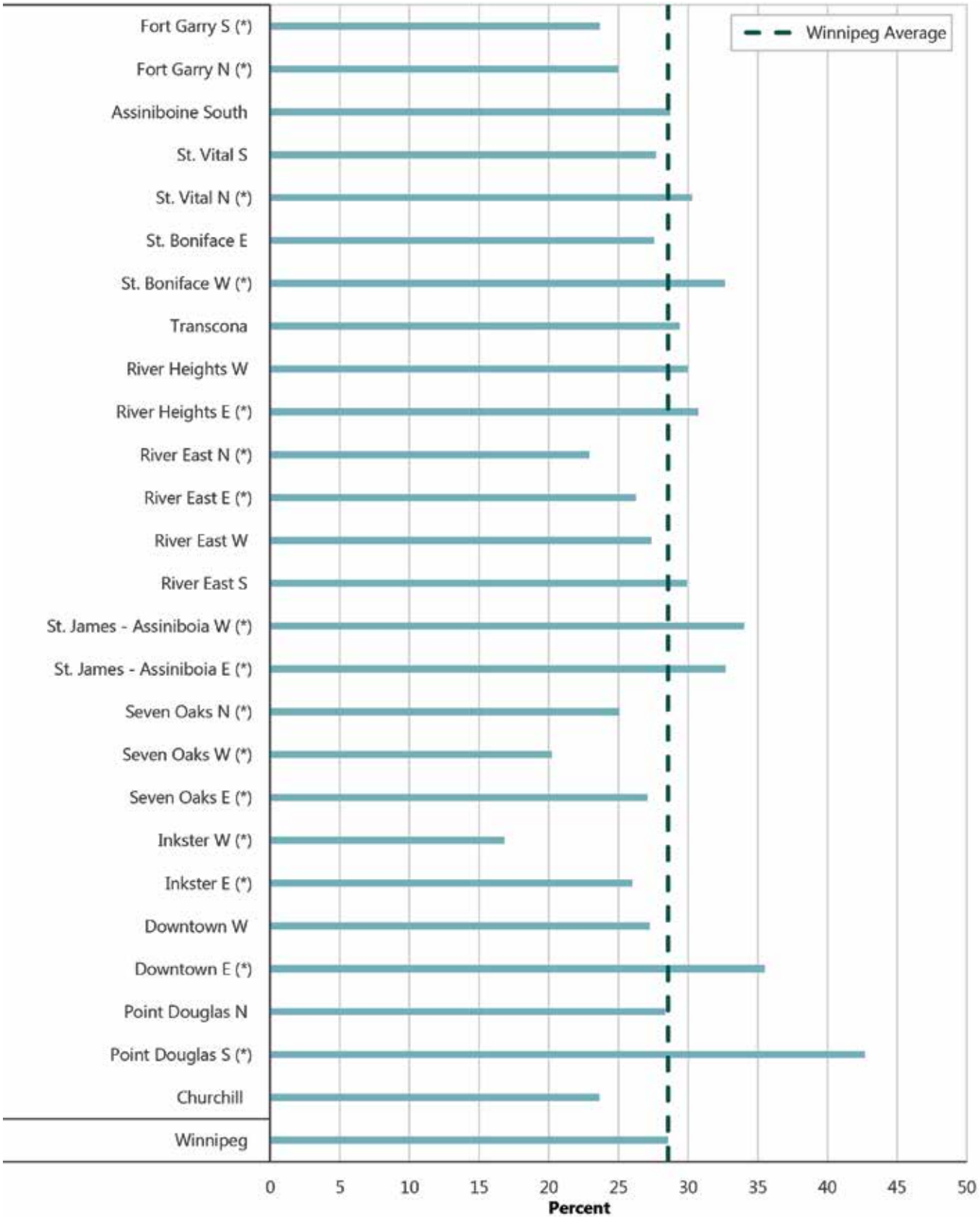
* indicates the health region is statistically significantly different from Manitoba (p<0.01)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Figure 2.27: Prevalence of Any Mental Illness among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



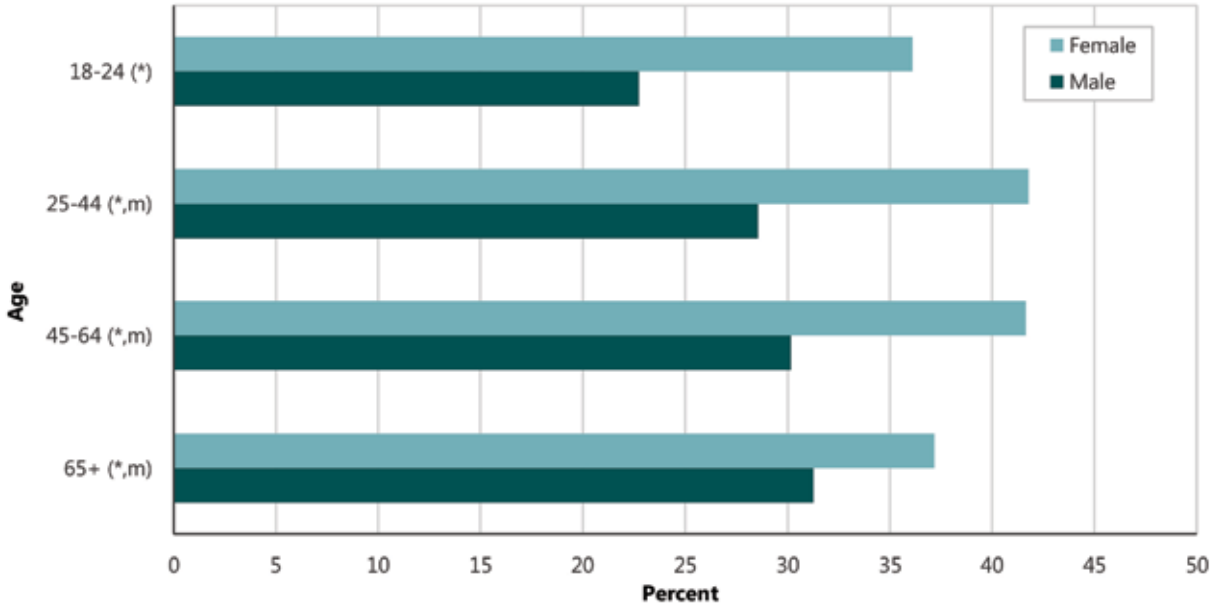
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Figure 2.28: Prevalence of Any Mental Illness among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



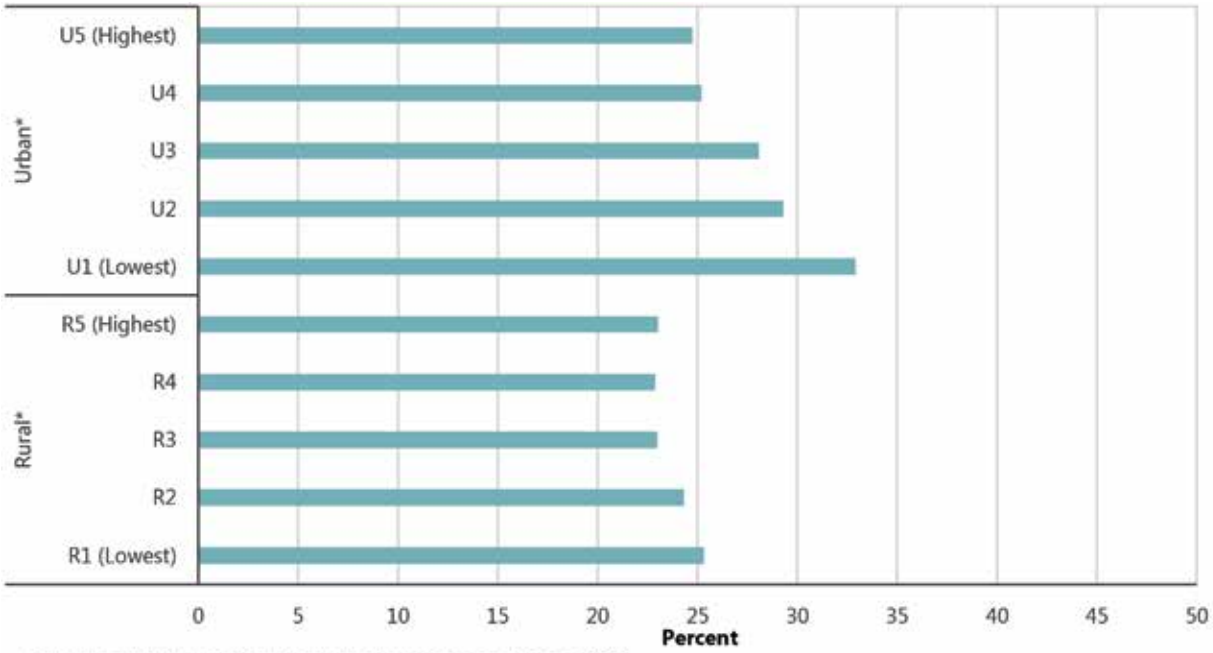
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg ($p<0.01$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Figure 2.29: Prevalence of Any Mental Illness among Adults by Age and Sex, 2010/11-2014/15
Adjusted†, adults aged 18+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group ($p<0.05$)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) ($p<0.01$)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) ($p<0.01$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Figure 2.30: Prevalence of Any Mental Illness among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles ($p<0.01$)
Note: Urban and Rural overall are statistically significantly different from each other.
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Dementia

Dementia (or major neurodegenerative disorder) is defined as a set of symptoms that are caused by diseases affecting the brain. Symptoms may include memory loss or difficulties with thinking, problem solving or language that are severe enough to reduce a person's ability to perform everyday activities. Many diseases can cause dementia, including Alzheimer's disease, vascular dementia (due to a stroke), Lewy Body disease, head trauma, fronto-temporal dementia, Creutzfeldt-Jakob disease, Parkinson's disease, and Huntington's disease [6].

In this study, older adults (55 years and over) were considered to have a diagnosis of dementia from 2010/11 to 2014/15 if they met at least one of the following criteria.

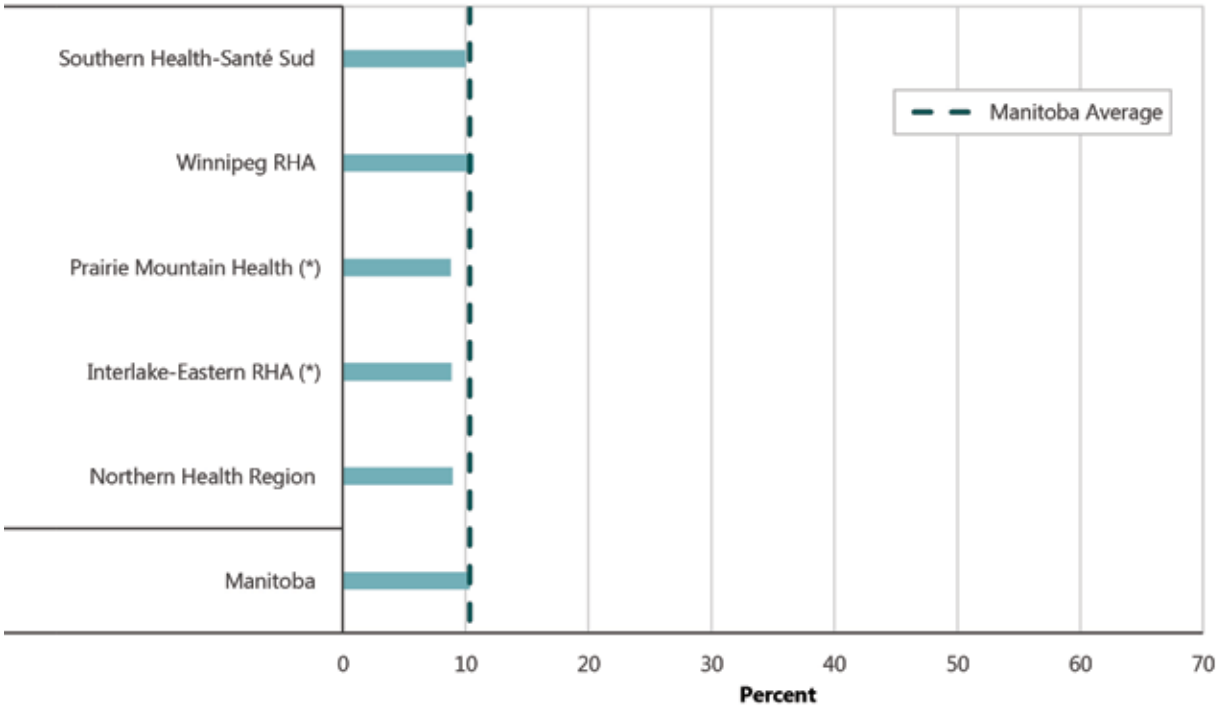
- At least one hospitalization with a diagnosis of dementia; or
- At least one physician visit with a diagnosis of dementia.

Note that dementia was examined in an older age group because a diagnosis of dementia under 55 years of age is rare.

Key Findings

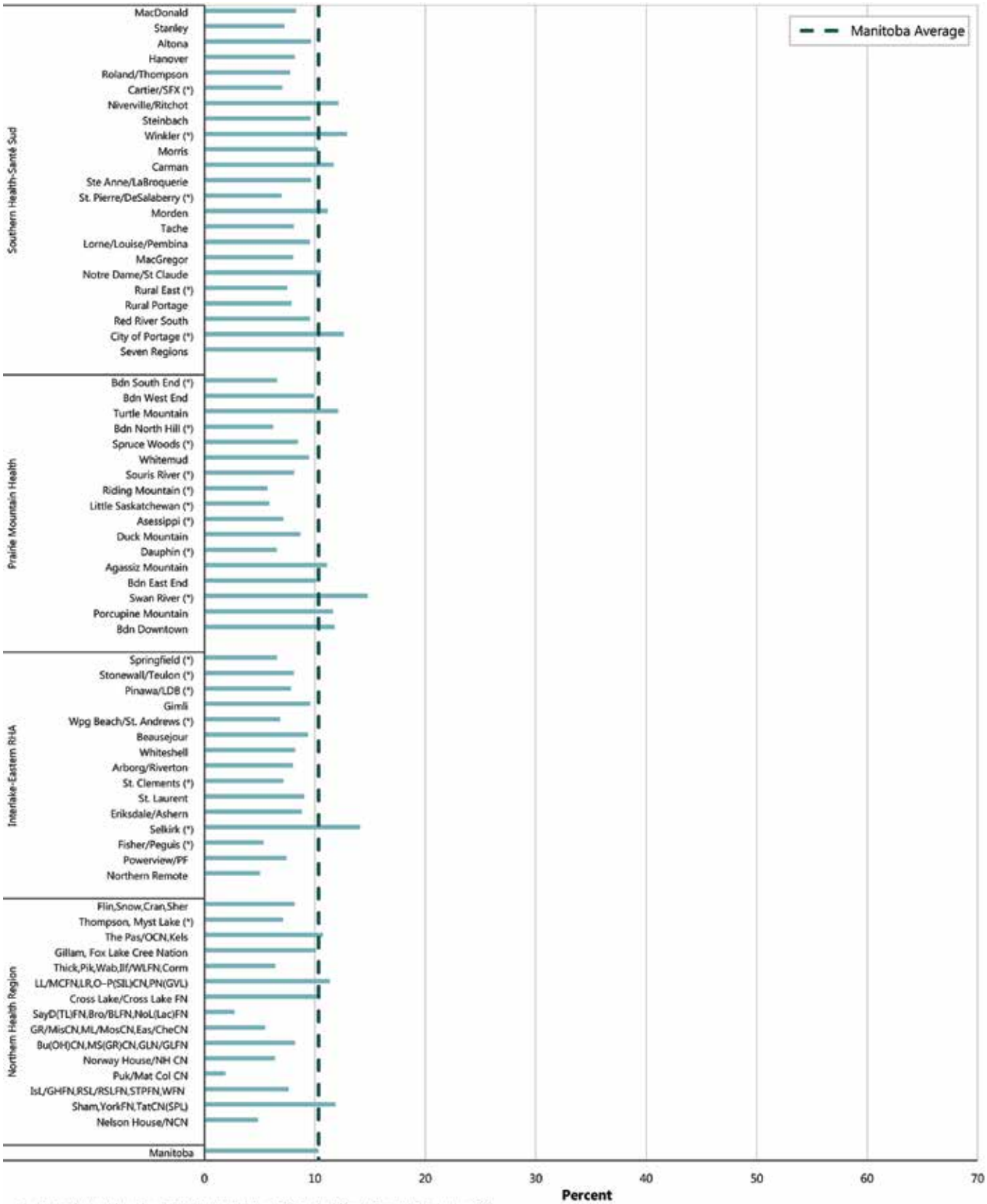
- The five-year diagnostic prevalence of dementia in Manitoba was 10.3%. It was lower in Prairie Mountain Health and Interlake-Eastern.
- Compared to all of Manitoba, the prevalence was lower in many districts of Prairie Mountain Health and Interlake-Eastern. In Southern Health-Santé Sud, a few districts were also lower than the Manitoba prevalence, but some were higher.
- River East North and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest prevalence of dementia, and Seven Oaks North and Point Douglas South were among the highest.
- The prevalence was remarkably higher in the older age groups (65 and older) compared to the 55 to 64 year old age group.
- No statistically significant differences were found between males and females.
- No differences in the prevalence of dementia were found between rural and urban areas. In both urban and rural areas, there was a linear trend across income quintiles where the prevalence of dementia increased as area-level income decreased.

Figure 2.31: Prevalence of Dementia among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; adults aged 55+ diagnosed with disorder in five-year time period



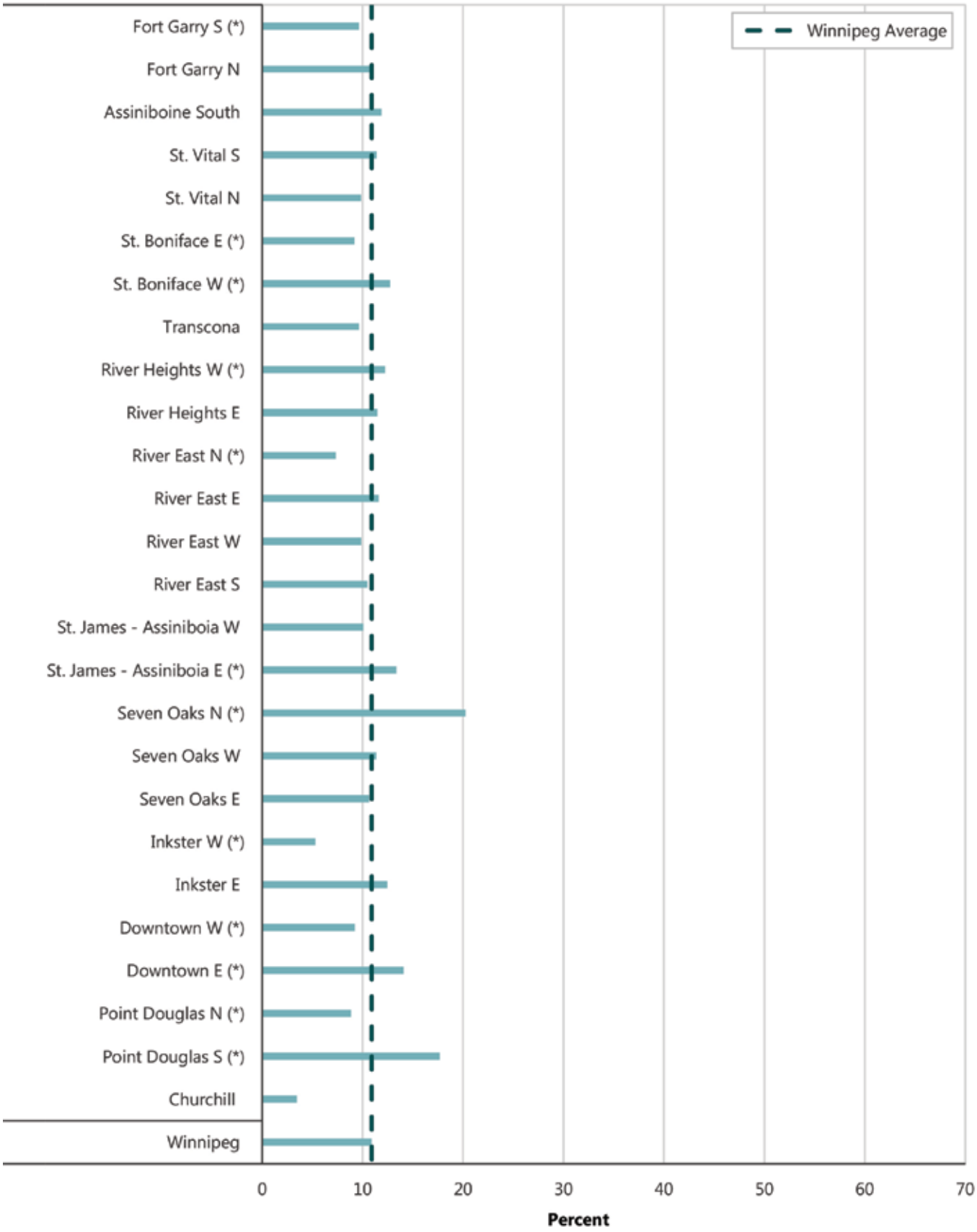
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.32: Prevalence of Dementia among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; adults aged 55+ diagnosed with disorder in five-year time period



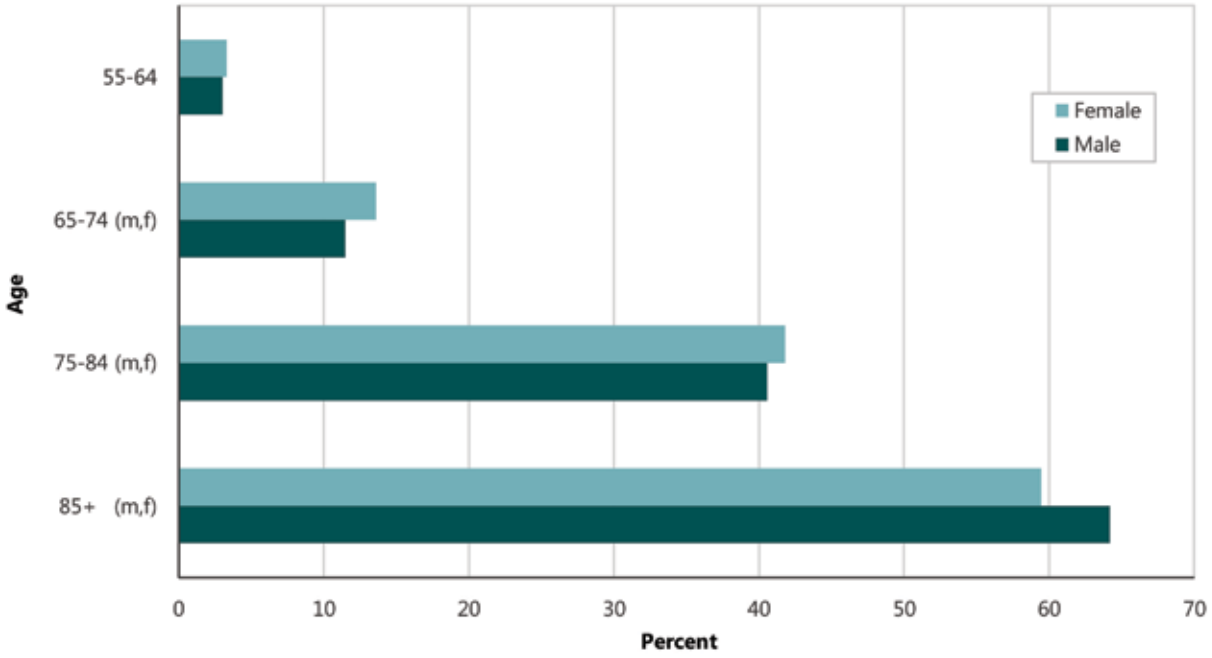
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.33: Prevalence of Dementia among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; adults aged 55+ diagnosed with disorder in five-year time period



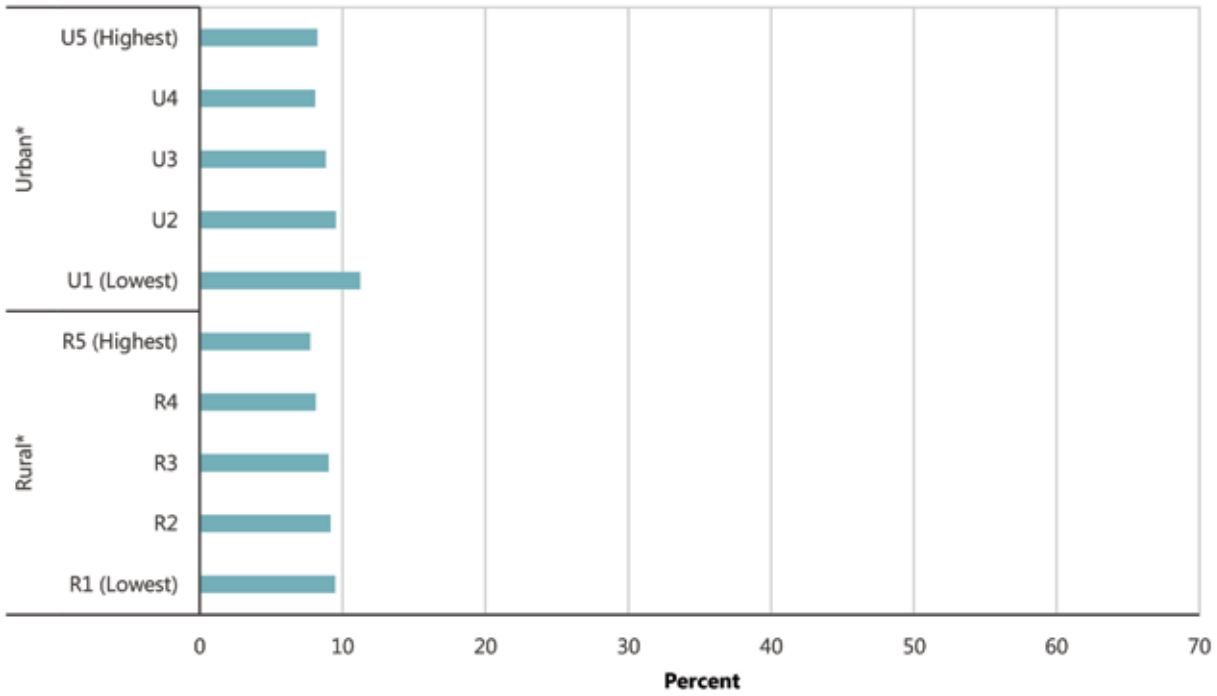
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg ($p<0.01$)

Figure 2.34: Prevalence of Dementia among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; adults aged 55+ diagnosed with disorder in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (55-64) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (55-64) (p<0.01)

Figure 2.35: Prevalence of Dementia among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; adults aged 55+ diagnosed with disorder in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are not statistically signifantly different from each other.

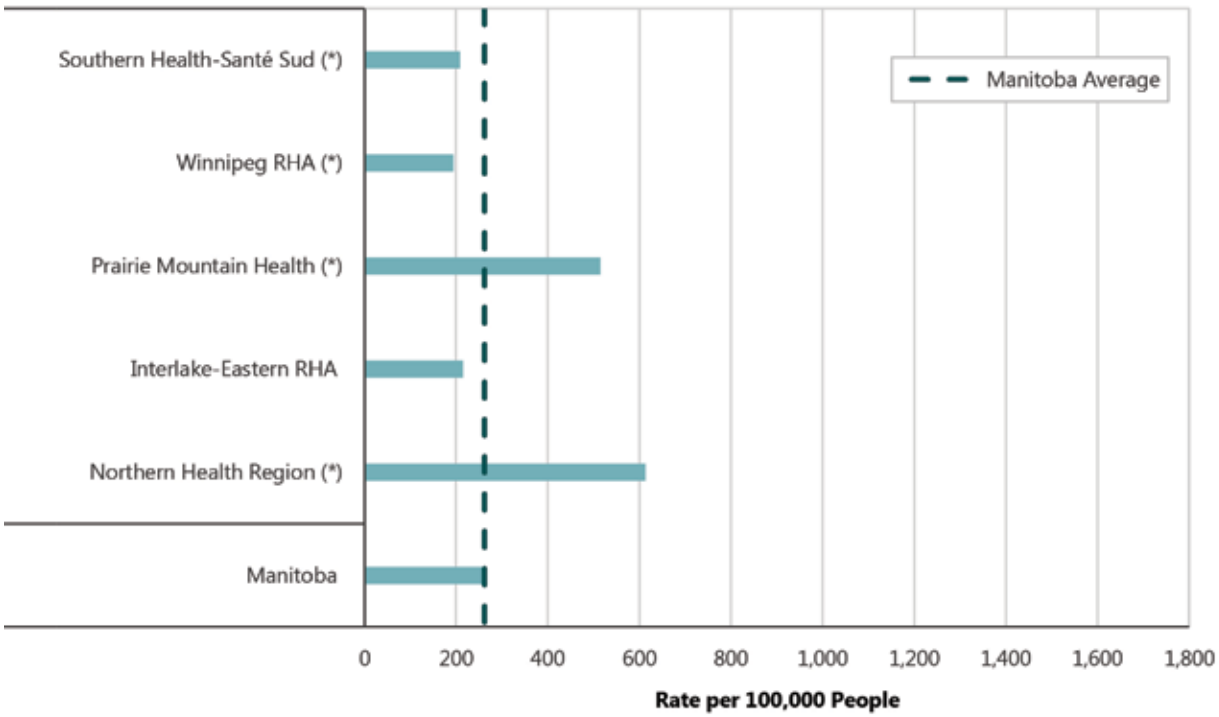
Hospitalizations for Attempted Suicide

An attempted suicide is defined as being hospitalized for self-inflicted injury or poisoning. Hospitalizations for poisoning of undetermined intent, injury of undetermined intent or accidental poisoning are also included if there was a mental illness diagnosis code found in the hospitalization record. A five-year time frame was chosen to be consistent with other mental illness indicators in this report. It was not possible to distinguish between self-harm and attempted suicide using the hospital diagnosis coding system, therefore some cases of self-harm were likely included among those who had attempted suicide. It should be noted that this definition undercounts the actual number of suicide attempts, given that our data do not capture emergency department visits for attempted suicide or other suicide attempts in the community.

Key Findings

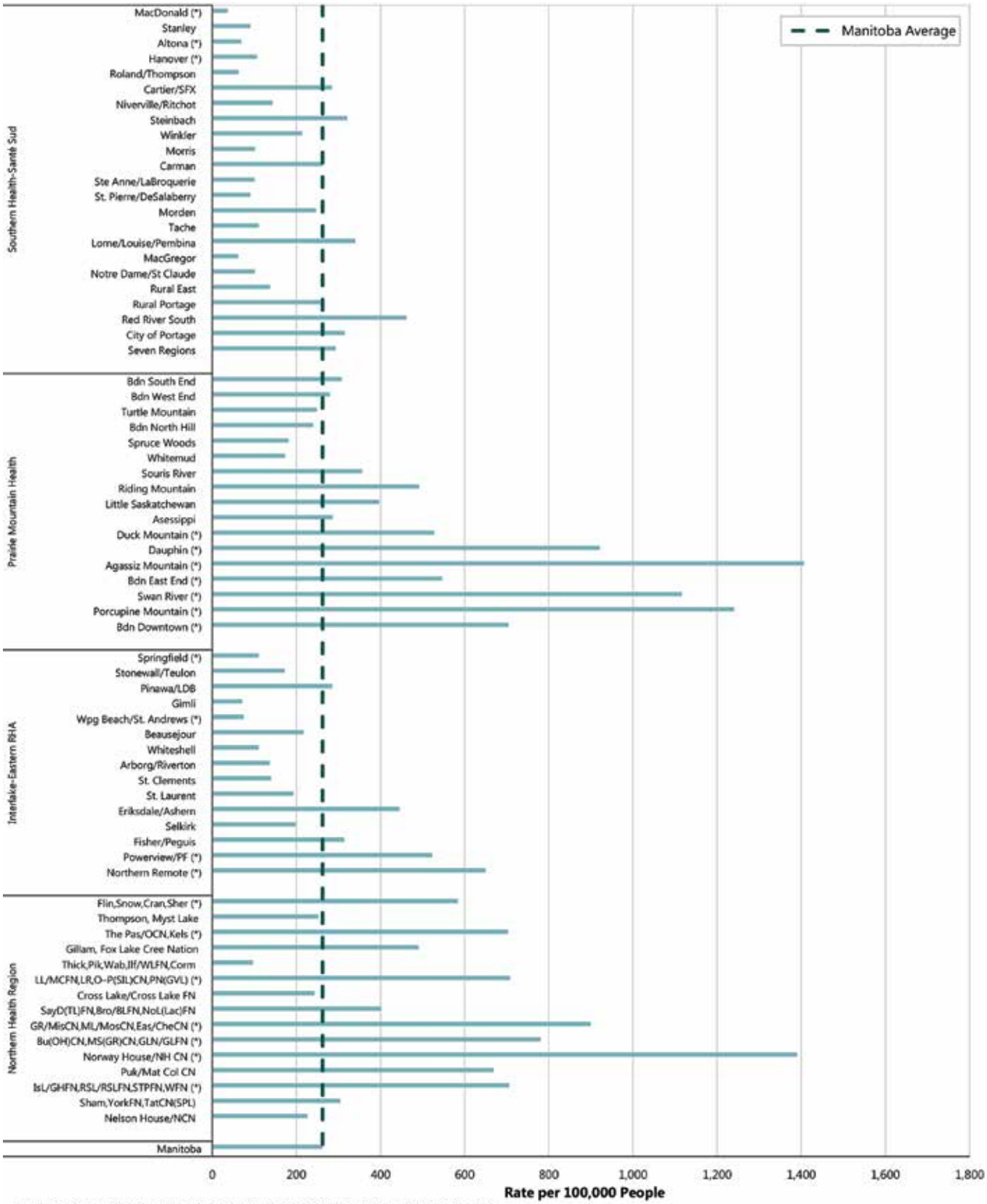
- The five-year rate of hospitalizations for attempted suicide in Manitoba was 262 per 100,000 adults. It was lower in Southern Health-Santé Sud and Winnipeg; however, it was higher in Prairie Mountain Health and Northern.
- Compared to all of Manitoba, rates were lower for health region districts in Southern Health-Santé Sud. In many districts in Northern and Prairie Mountain Health, rates were higher. Results were mixed in Interlake-Eastern, whereby rates were lower in a few districts and higher in others.
- Seven Oaks West and Inkster West were among the Winnipeg neighbourhood clusters that had the lowest rates of attempted suicide, and Point Douglas South and Downtown East were among the highest. The rate in Churchill was higher than in Winnipeg.
- The hospitalization rate of attempted suicide was higher for females than males; however, this difference was not statistically significant when the sexes were broken down into age groups. Females in the 45 year old and older age groups had lower rates compared to females in the 18-24 age group.
- Rural areas had a higher attempted suicide rate compared to urban areas. For both urban and rural areas, there was linear trend across income quintiles where the attempted suicide rate increased as area-level income decreased.

Figure 2.36: Rate of Hospitalizations for Attempted Suicide among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who were hospitalized for attempted suicide in five-year time period



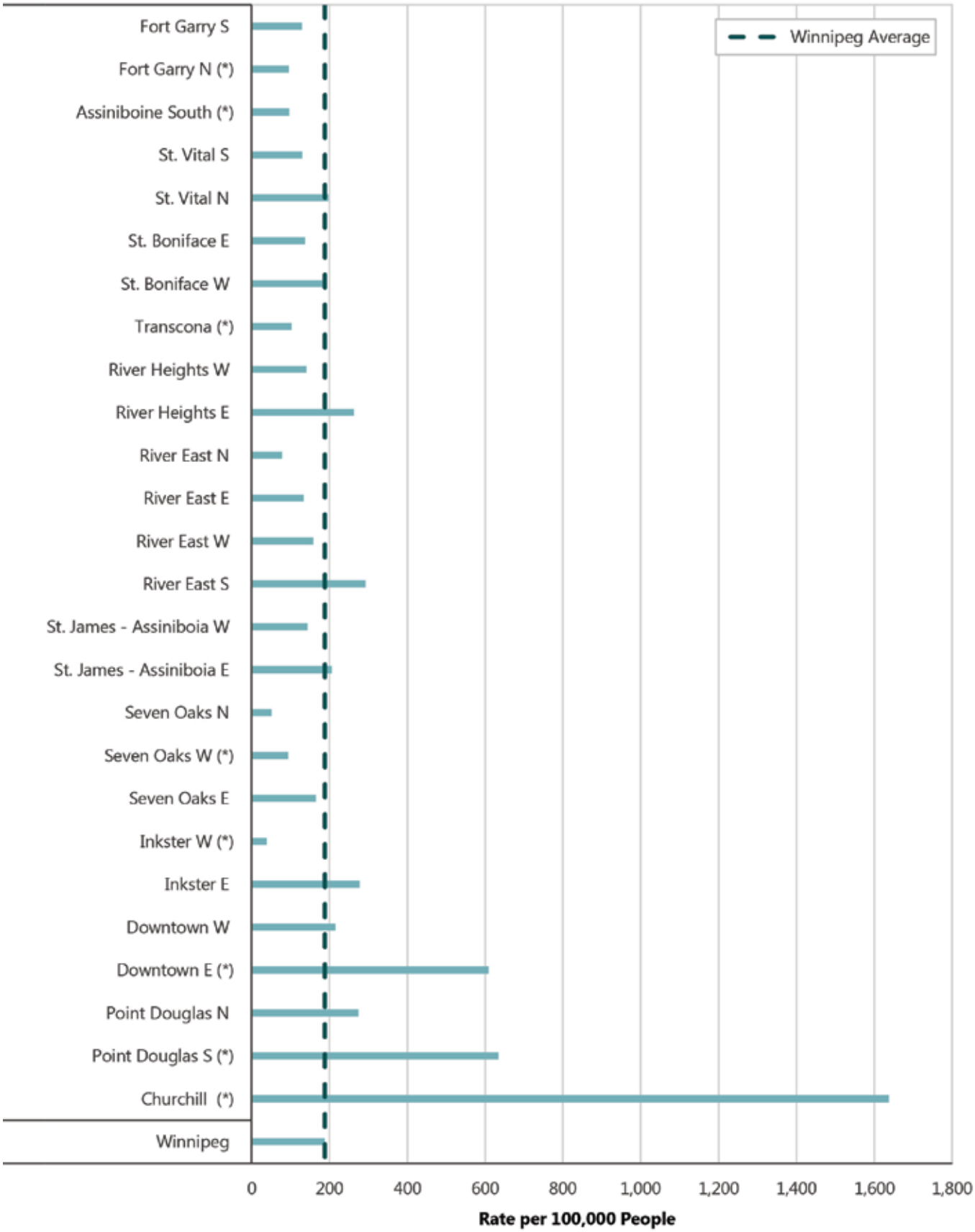
* indicates the health region is statistically significantly different from Manitoba (p<0.01)

Figure 2.37: Rate of Hospitalizations for Attempted Suicide among Adults by Health Region District, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who were hospitalized for attempted suicide in five-year time period



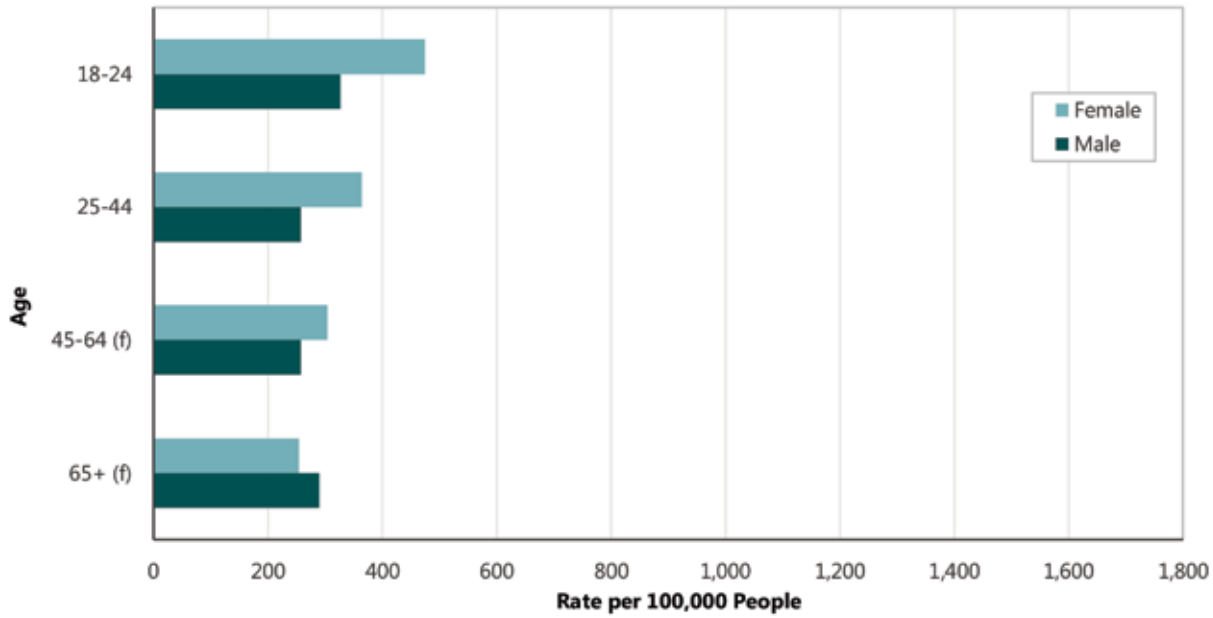
* indicates the health region district is statistically significantly different from Manitoba ($p<0.01$)
The full Northern Health Region district names are provided in Appendix 2.

Figure 2.38: Rate of Hospitalizations for Attempted Suicide among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who were hospitalized for attempted suicide in five-year time period



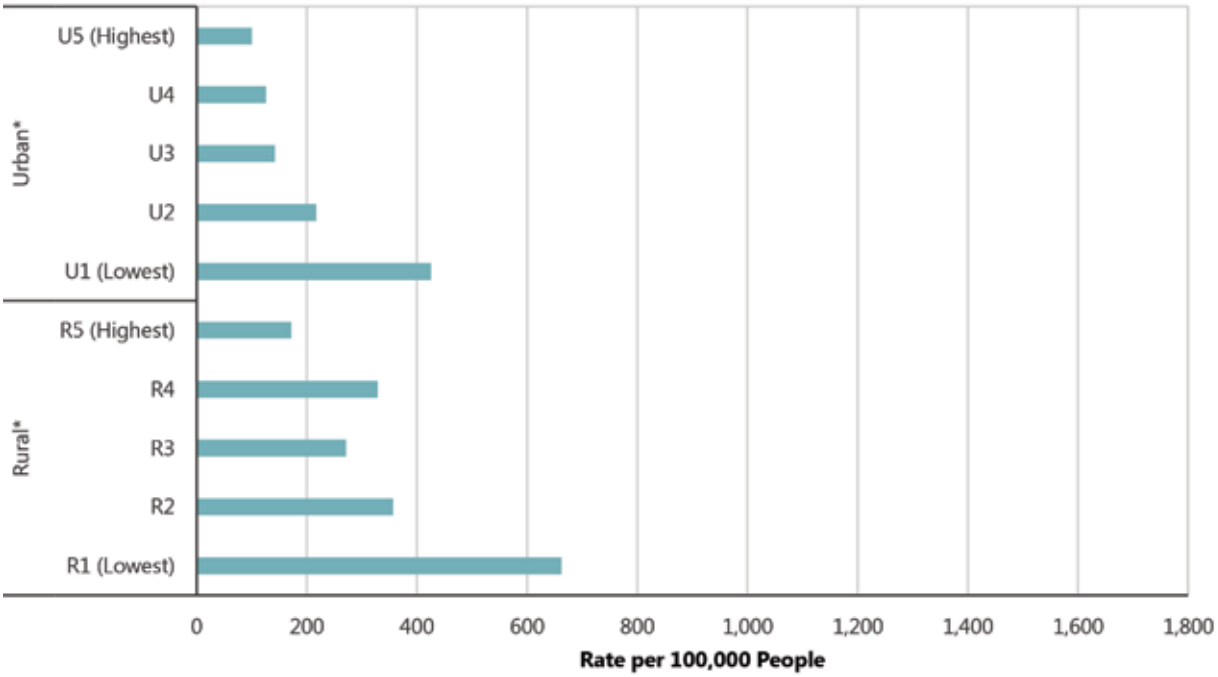
* indicates the neighbourhood cluster is statistically significantly different from Winnipeg ($p<0.01$)

Figure 2.39: Rate of Hospitalizations for Attempted Suicide among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; per 100,000 adults aged 18+ who were hospitalized for attempted suicide in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group ($p<0.05$)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) ($p<0.01$)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) ($p<0.01$)
Note: Females have a higher rate of hospitalizations for attempted suicide than males when all ages are combined (340 versus 281 per 100,000).

Figure 2.40: Rate of Hospitalizations for Attempted Suicide among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who were hospitalized for attempted suicide in five-year time period



* indicates a statistically significant linear trend across income quintiles ($p<0.01$)
Note: Urban and Rural overall are statistically significantly different from each other.

Suicide

Suicide is the act of intentionally killing oneself. In this report, we defined suicide as having a primary cause of death record in Vital Statistics of self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning over the five-year time period from 2010/11 to 2014/15. A five-year time frame was chosen to be consistent with other mental illness indicators in this report. The definition used in this report is broader than that used by Statistics Canada, as we also included accidental poisonings and poisonings of undetermined intent. Many poisonings that were coded as accidental or of undetermined intent were likely suicides. For example, a UK study found that approximately 50% of accidental poisonings were likely suicide [3].

In order to be able to compare to other reports, we also calculated Manitoba rates using two additional definitions of suicide that are commonly used. The main definition was used to show rates by health region, health region zone, Winnipeg paired community area, age, sex and income quintile. We report suicide rates by larger geographical areas because the number of suicides was relatively small compared to diagnosed cases of mental illness.

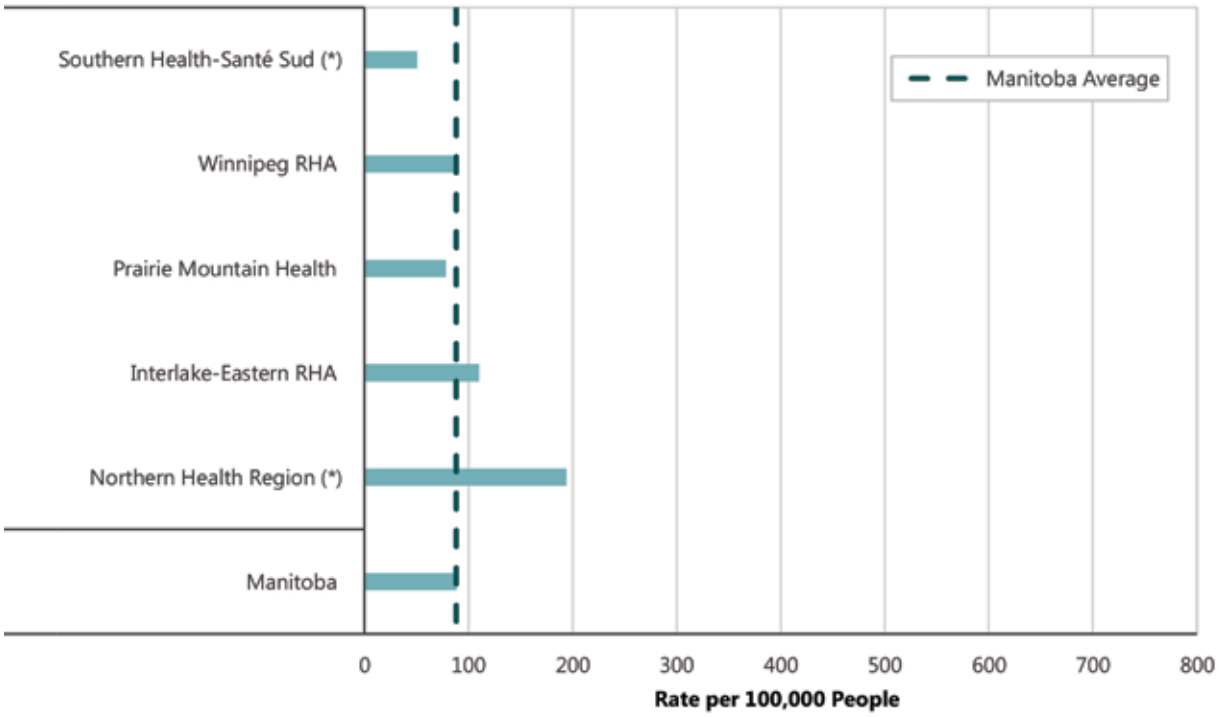
Key Findings

- Over a five year period, there were 88.2 suicidal deaths per 100,000 adults in Manitoba using the broadest definition, and 71.6 and 67.3 per 100,000 adults using more restrictive definitions (see the three definitions in Table 2.1).
- The suicide rate was lower in Southern Health-Santé Sud and higher in Northern.
- Compared to all of Manitoba, the suicide rate was considerably higher in health zones in Interlake-Eastern and Northern.
- Suicide rates were lower in the Winnipeg paired community areas of St. Vital/St. Boniface and higher in Downtown/Point Douglas.
- Suicide rates were higher for males than females overall; however, only the 45-64 age group was statistically significant after sex was divided into age groups. Females in the 65 and older age group had lower rates compared to females in the 18-24 age group.
- There was no difference in suicide rates between urban and rural areas, but in both areas there was a linear trend across income quintiles. This means that suicide rates increased as area-level income decreased.

Table 2.1: Suicide Rates among Adults in Manitoba based on different Suicide Definitions, 2010/11-2014/15
Per 100,000 people

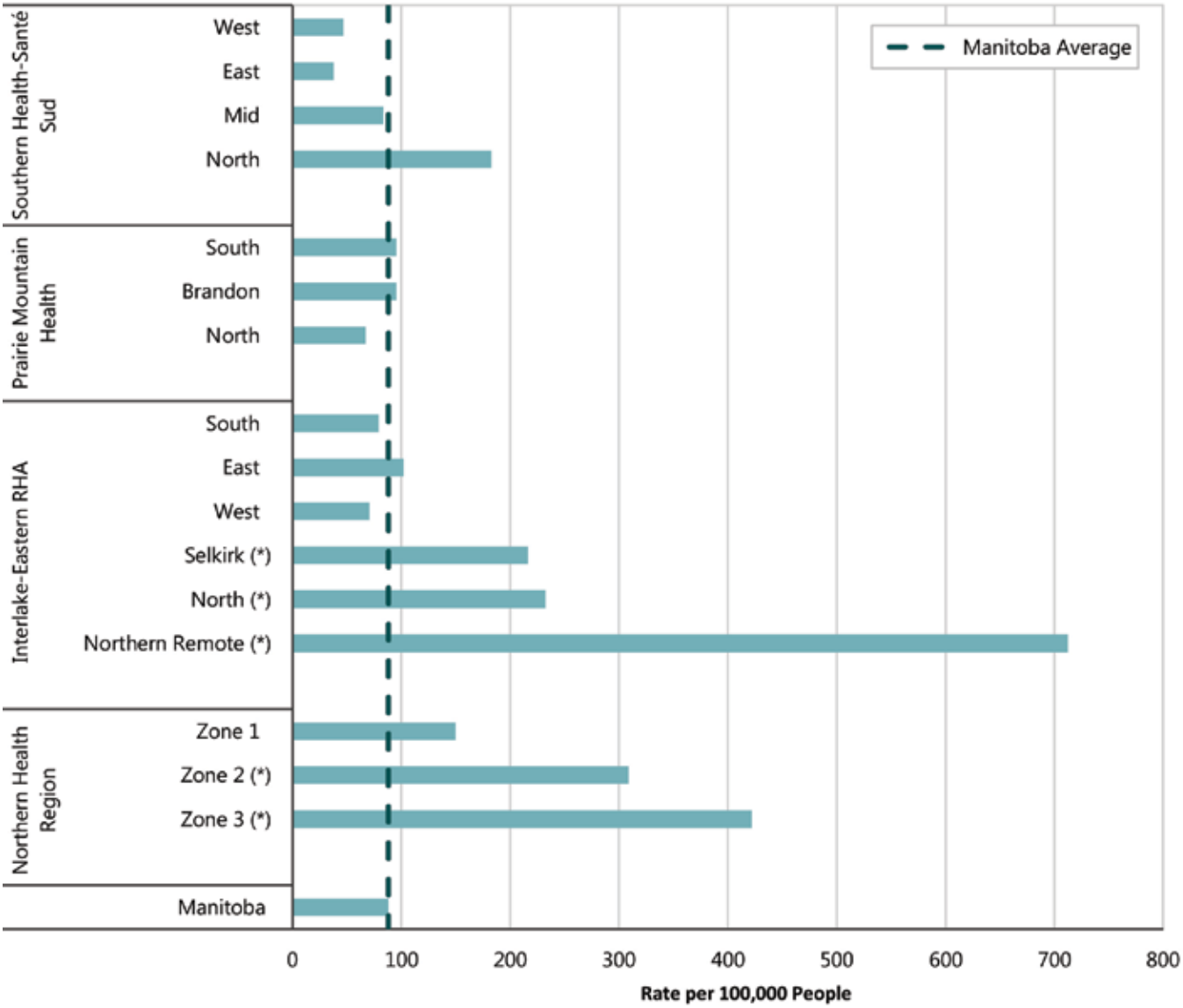
	Count	Crude Rate
Main Definition: Self-inflicted injury or poisoning, poisoning of undetermined intent, or accidental poisoning	872	88.19
Definition 2: Self-inflicted injury or poisoning, or poisoning of undetermined intent	708	71.61
Definition 3: Self-inflicted injury or poisoning	665	67.26

Figure 2.41: Suicide Rates among Adults by Health Region, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who died by suicide in five-year time period



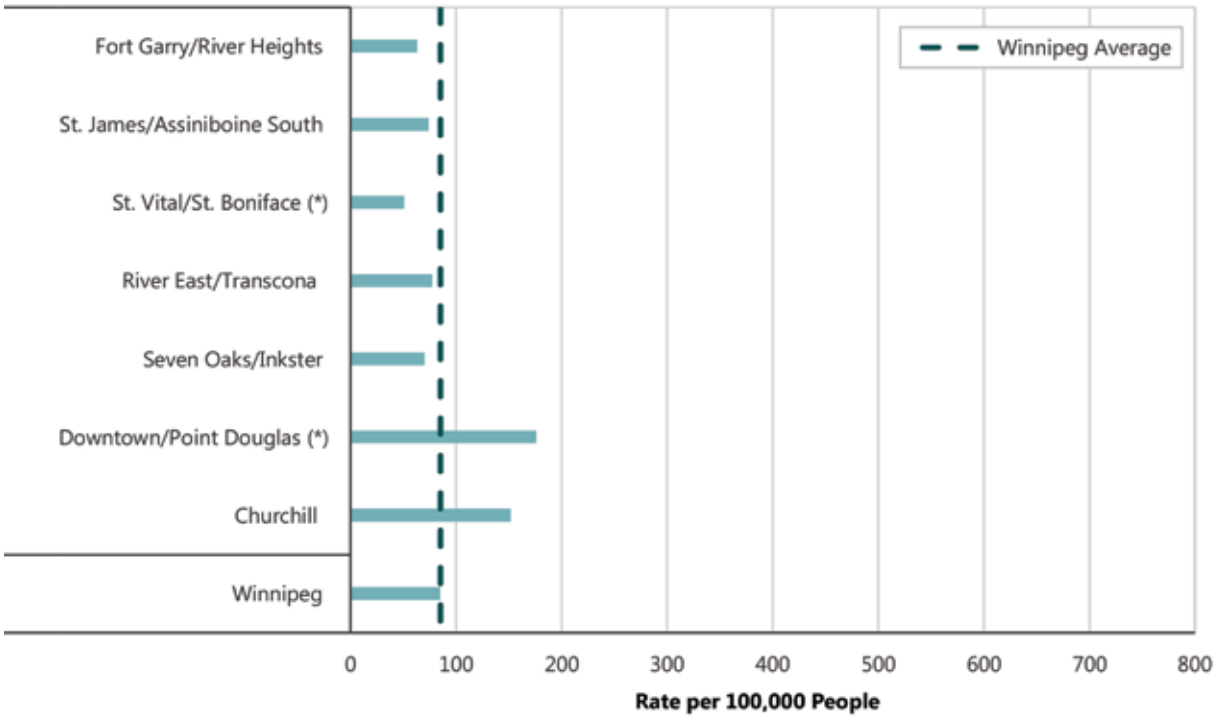
* indicates the health region is statistically significantly different from Manitoba ($p<0.01$)

Figure 2.42: Suicide Rates among Adults by Health Region Zone, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who died by suicide in five-year time period



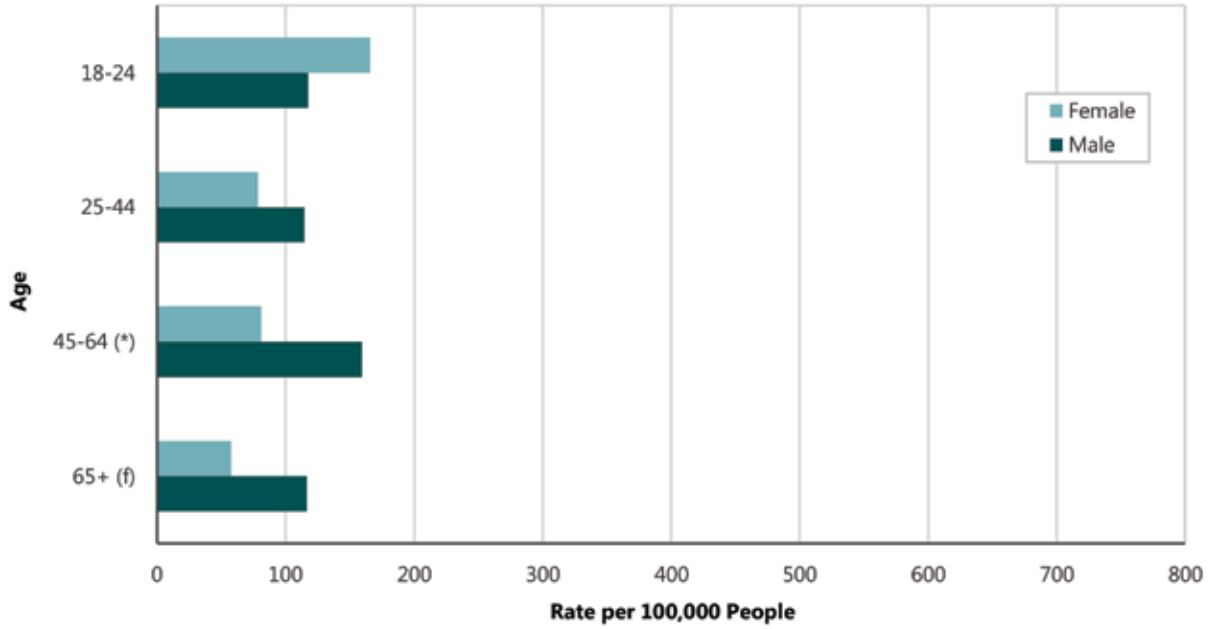
* indicates the health region zone is statistically significantly different from Manitoba ($p<0.01$)

Figure 2.43: Suicide Rates among Adults by Winnipeg Paired Community Areas, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who died by suicide in five-year time period



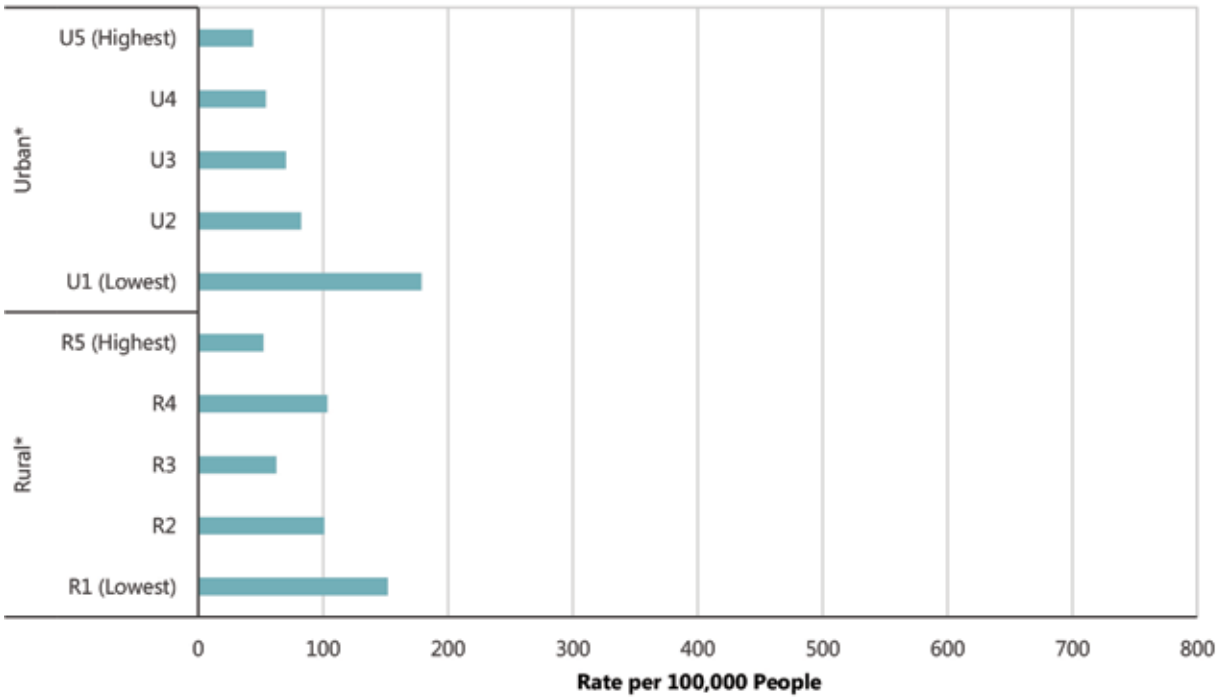
* indicates the paired community area is statistically significantly different from Winnipeg overall (p<0.01)

Figure 2.44: Suicide Rates among Adults by Age and Sex, 2010/11-2014/15
Adjusted†; per 100,000 adults aged 18+ who died by suicide in five-year time period



† these estimates come from a regression model which included age and sex as covariates
* indicates that males and females are statistically significantly different in that age group (p<0.05)
m indicates that males in that age group are statistically significantly different from the males in the reference age group (18–24) (p<0.01)
f indicates that females in that age group are statistically significantly different from the females in the reference age group (18–24) (p<0.01)
Note: Females have a lower suicide rate than males when all ages are combined (88 versus 126 per 100,000).

Figure 2.45: Suicide Rates among Adults by Income Quintile, 2010/11-2014/15
Age- and sex-adjusted; per 100,000 adults aged 18+ who died by suicide in five-year time period



* indicates a statistically significant linear trend across income quintiles (p<0.01)
Note: Urban and Rural overall are not statistically signifantly different from each other.

How do these Results Compare to Findings from Other Studies?

Epidemiological studies document patterns of disorders in communities in order to understand the burden of illness, better plan services and training, and set priorities for future research [30,31]. Several studies have examined the prevalence of mental disorders worldwide and these studies are useful for comparing the findings in this report. It is important to keep in mind that the prevalence of mental disorders reported depends on the type of data used (administrative or survey), the time frame, the survey design, the interview guide, and the population surveyed. Studies based on administrative data include people who sought services but do not capture those with mental illness who did not seek services. On the other hand, studies based on survey data depend on the participants' memory and understanding of the disorders. Longer time frames provide more time to detect a mental disorder and usually report higher prevalence estimates than studies with shorter time frames (e.g., five years or lifetime versus one year). Studies with more vulnerable populations find higher prevalence estimates compared to studies using a general population.

The following are studies that have examined the prevalence of mental illnesses and that were used to compare to our results:

- Patterns of Regional Mental Illness Disorder Diagnoses and Service Use in Manitoba: A Population-Based Study [1]. This MCHP report estimated the prevalence of mental illness of Manitobans (10 years and older) over the five year period from 1997/98 to 2011/02. With the exception of mood and anxiety disorders, the definitions used for the current study are similar to this earlier MCHP report.
- National Comorbidity Survey Replication (NCS-R) [27]. The NCS-R surveyed a representative sample of 9,282 English-speaking Americans aged 18 and older. The response rate was 70.9%. Face-to-face interviews were conducted by trained non-professional interviewers using a structured diagnostic interview guide that was based on the World Health Organization Composite International Diagnostic Interview (CIDI).
- The Global Prevalence of Common Mental Disorders: A Systematic Review and Meta-Analysis [32]. This study reviewed studies conducted from 1980 to 2013, 157 of which reported period prevalence and 82 of which reported lifetime prevalence of common mental disorders. The review was limited to studies where the majority of respondents were between 16 to 65 years of age and with a sample size of 450 or more.
- World Mental Health (WMH) Survey Initiative [33]. The WMH surveys were conducted in high-income

(United States, Japan, New Zealand, Belgium, France, Germany, Italy, the Netherlands, Spain, and Israel) and middle income (China, Columbia, Lebanon, Mexico, Nigeria, South Africa and Ukraine) countries. As with the NCS-R, the study used complex survey designs, the interviews were conducted face-to-face and the interview schedule was based on the CIDI. Lifetime and past-year prevalence, age of onset and projected lifetime risk of mental disorders were reported.

Mood and Anxiety Disorders

The current report found that the five-year diagnostic prevalence of mood and anxiety disorders for adults was 23.2%, suggesting that these conditions are extremely common in Manitoba. Using the administrative data housed at MCHP, but with a different definition that separated mood and anxiety disorders, Martens et al. found that the five-year diagnostic prevalence of depression was 18.2% and anxiety was 6.7% [1]. This previous MCHP report used less restrictive criteria for depression and more restrictive criteria for anxiety. These important differences make comparisons over time difficult. The definition for mood and anxiety disorders continues to evolve as more is learned about these disorders and as public awareness about them increases. In recent years, it has become clear that anxiety disorders are the most common mental disorder, and that they are associated with high levels of distress and interference with functioning at work and in social situations [27]. The previously used restrictive definition was likely not accurate and provided an artificially low prevalence of the burden of anxiety disorders in the population. Primary care providers are often consulted to treat mood and anxiety disorders as people are feeling less stigmatized in discussing the symptoms of these conditions. We found that 87.1% of cases captured in the present study were diagnosed by primary care (see Appendix Table 4.1).

The prevalence of mood and anxiety disorders varies widely depending on the methods used to estimate it. Using administrative data from Canadian provinces, Kisely et al. reported a one-year diagnostic prevalence of approximately 10% for mood and anxiety disorders in British Columbia, Ontario and Nova Scotia [25]. Differences in what diagnoses were included in the definition of mood and anxiety disorders also influence the prevalence. Our study included adjustment reaction, while the report by Kisely et al. did not include this diagnosis. Steel et al. reported a lifetime prevalence of mood disorders of 9.6% and anxiety disorders of 12.9% [32]. Somers et al. found a one-year prevalence of anxiety disorders of 10.6% and a lifetime prevalence of 16.6% in their systemic review [34]. Using the Canadian Community Health Survey data, Patten et al. reported a lifetime prevalence of major depression of 12.2% [35]. The WMH Survey Initiative reported a lifetime prevalence of mood disorders ranging from 3.3% in Nigeria to 21% in France and the United States, and a lifetime prevalence of anxiety disorders ranging from 4.8% in Asian countries to 31% in the United States [33].

As with the present study, other authors found mood and anxiety disorders to be more prevalent among females than males [1,32]. Consistent with our report, previous research reported that people with incomes of less than $20,000 per year were 1.43 to 2.56 times more likely to report a lifetime diagnosis of a mood or anxiety disorder compared to those with higher incomes [36].

Substance Use Disorders

The current report found the five-year diagnostic prevalence of substance use disorders for adults to be 5.9% in Manitoba. These findings are likely an underestimate of the true prevalence given that patients tend to underreport their alcohol and drug use [28], and that physicians may not always inquire about substance use. Most adults with substance use disorders are not routinely seen by psychiatrists. For example, in this report, we found that the majority (84.5%) of substance use disorders were diagnosed by primary care providers and only 11% were diagnosed by a psychiatrist (see Appendix Table 4.1).

The prevalence of substance use disorders has remained unchanged since it was reported by MCHP in 2004. That report found that the five-year prevalence of substance use disorders for men was 6.4% and for women was 5.3% [1]. The prevalence reported in the current study is lower compared to other epidemiologic studies. The lifetime prevalence in the WMH study ranged between 1.3% in Italy and 15% in the Ukraine [33]. The NCS-R study found a lifetime prevalence of 14.6% in the US population [27]. A meta-analysis of 74 surveys reported a lifetime prevalence of 10.7% [32]. The present report found a higher prevalence of substance use disorders among males than females, a similar finding to previous studies [1,32]. We found an association between substance use disorders and low income in this report. Previous research found that people with incomes of less than $20,000 per year were 1.17 times more likely to report a lifetime diagnosis of a drug use disorder than those with higher incomes; however, people with lower incomes were also less likely to report an alcohol use disorder [36].

Psychotic Disorders Including Schizophrenia

This study reported the prevalence of schizophrenia and the broader group of psychotic disorders. A diagnosis of schizophrenia is given more sparingly than the diagnosis of other psychotic disorders and is more often given later in the course of treatment, once the clinical impression is confirmed. In this study, we reported on both schizophrenia and psychotic disorders as a group, given

that schizophrenia specifically and psychotic disorders more broadly represent some of the most severe mental disorders. Our confidence in the validity of the schizophrenia diagnoses in the administrative data is higher than the psychotic disorders diagnoses, given that close to 60% of people with schizophrenia and less than a third of people with psychotic disorders were diagnosed by a psychiatrist (see Appendix Table 4.1).

The current study found that the five-year adult diagnostic prevalence of psychotic disorders was 2.3%. This prevalence is consistent with some of the studies to which we compared it, for example, the lifetime prevalence of 2.5% found in a representative sample of Hong Kong residents [37]. It is important to emphasize that the findings of psychotic disorders among individuals over the age of 65 may be misleading. Symptoms of dementia can be misdiagnosed as psychosis. Evidence for this phenomenon was revealed when re-analysis of this older age group found a very high percentage of people diagnosed with psychotic disorders who were also diagnosed with dementia. The opinion of content experts is that these people likely had dementia and not a true psychotic disorder.

It is important to track people first diagnosed with psychotic disorders as it may be an early indication of an enduring severe mental illness. When we followed 3,289 cases (aged 13 to 60 old) who had been diagnosed with psychosis not otherwise specified (NOS), we found that about one quarter of them were eventually diagnosed with schizophrenia over a three- to eight-year period. These results are consistent with studies that use a similar method to track early signs of severe mental illness [38].

The current study found that the five-year prevalence of schizophrenia was 0.9%. The schizophrenia prevalence in Manitoba has remained unchanged since it was reported by Martens et al. Using the administrative data at MCHP with a slightly less restrictive definition, Martens et al. found that the diagnostic prevalence of schizophrenia was 1.2% [1]. These prevalence rates for schizophrenia are similar to what was found in previous survey studies. In a systematic review of epidemiologic studies across the world, Goldner et al. found a lifetime prevalence of schizophrenic disorders of 0.4% to 2.2% [39]. Chang et al. reported a lifetime prevalence of schizophrenia of 1.3% from a representative sample of Hong Kong residents (aged 16 to 75) and reported no statistically significant differences between males and females [37].

We found that schizophrenia and psychotic disorders were associated with lower income levels. Previous research found that people with incomes of less than $20,000 per year were 1.71 times more likely to report a lifetime diagnosis of a psychotic disorder than those with higher incomes [36]. Other research suggests that the underlying causes of schizophrenia include both biological and social factors [40].

Personality Disorders

This report found that the five-year diagnostic prevalence of personality disorders for adults was 0.9% in Manitoba with a higher prevalence in younger females than younger males. This Manitoba prevalence rate has remained unchanged since it was reported in the MCHP report by Martens et al. [1]. Using the administrative data at MCHP and a similar definition, the report found that the five-year diagnostic prevalence of personality disorders for women was 1.0% and for men was 0.8%. Both of these prevalence estimates were believed to be underestimated [1]. A 2010 review of community studies found prevalence estimates ranging from 4.4% to 13.4% [41]. This review found that the prevalence of personality disorders increased as area-based income decreased and that this relationship appeared to be stronger in urban areas than in rural areas. This may be a reflection of differences in how personality disorders are diagnosed across rural and urban areas. Consistent with the findings of the present study, previous research found that people with incomes of less than $20,000 per year were 1.66 to 4.17 times more likely to report a lifetime diagnosis of a personality disorder compared to those with high incomes [36].

Some epidemiologic surveys ask respondents directly about personality characteristics, and this direct ascertainment may be responsible for the higher prevalence when compared to the present study. A further reason may be that outpatient physician billings, which are responsible for the majority of mental disorder diagnoses in administrative data, are restricted to a single physician diagnosis code and many physicians may preferentially record another mental disorder diagnosis (such as depression) after their assessment. Although primary care physicians are in contact with people with personality disorders on a regular basis, they may not be specifically observing these traits in their practice. We found that 50% of cases captured in the present study were diagnosed by primary care providers (see Appendix Table 4.1).

Dementia

The current report found that the five-year diagnostic prevalence of dementia for adults (aged 55 and older) was 10.3% in Manitoba. This Manitoba rate has remained unchanged since it was reported by an MCHP report in 2004. Using the administrative data at MCHP and a similar definition, Martens et al. found that the five-year diagnostic prevalence of dementia for women was 11.6% and males was 8.9% [1].

In the current report, we found that prevalence increased with age; the prevalence for the group aged 85 and older was 60%, suggesting that, as Manitoba's population continues to age, we can expect an increase in cases of dementia. Chambers et al. reported a pattern of higher prevalence rates by increasing age, where the prevalence

for females 85 years old and over was 37.1% and for males 85 years old and over was 28.7% [42]. With an aging population in Canada, the authors projected that these prevalence rates represented a doubling of cases by 2033 [42]. In a systematic review of 160 studies, Fiest et al. reported one-year prevalence rates of dementia ranging between 4.86% to 6.91% [43]. These studies are not inconsistent with our findings when we consider that the present study examined the prevalence over a five-year period rather than a one-year period. Also consistent with our findings, Au et al. reported no differences between males and females in most types of dementia [44]. In the present study, no association was found between a diagnosis of dementia and income quintiles, although a previous study reported a higher prevalence among people with lower incomes [45].

Hospitalizations for Attempted Suicide

This report found that the five-year attempted suicide rate in Manitoba was 262 per 100,000 adults. As previously mentioned, this rate undercounts the actual number of suicide attempts, given that our data does not capture emergency department visits for attempted suicide or other suicide attempts in the community. This rate appears to have remained unchanged over time, when we consider the different time frames (one year versus five years). Using the administrative data at MCHP and a slightly different definition over a shorter period, Martens et al. found that the one-year attempted suicide rate was 104 per 100,000 women and 57 per 100,000 men in Manitoba [1]. The Canadian Institute for Health Information (CIHI) reported the one-year self-injury rate in Canada to be 140 per 100,000 population, based on data from general hospitals, emergency departments and Vital Statistics [46]. Our current study reports a five-year estimate rather than a one-year estimate. Consistent with the CIHI report, we found that 74% of people who had attempted suicide had been diagnosed with mental illness in the previous year (see Appendix Table 4.5).

Suicide

Unlike the other indicators used in this report, suicide does not depend on healthcare services data, but rather, cause of death data from Vital Statistics. It is one of the most compelling indicators of mental distress. Using a broad definition for suicide, this report found that the five-year suicide rate in Manitoba was 88 per 100,000 adults. We used a broad definition for rates of suicide because it is believed that suicide rates are underestimated [47]. For example, a UK study found that 50% of deaths initially coded as accidental poisonings were actually self-inflicted poisonings [3]. When we used a more restrictive definition (excluded accidental poisonings), we found the suicide rate was 71.6 per 100,000, and when we further restricted the definition to the one used by Statistics Canada (excluded poisonings of undetermined intent and accidental poisonings), the rate was 67.3 per 100,000. Using the Statistics Canada definition (i.e., the most restrictive definition), the suicide rate in Manitoba is higher than the Canadian rate (67.3 versus 57.5 per 100,000) [48]. The 2004 MCHP report, using the Statistics Canada definition, found that the five-year suicide rate was 66 per 100,000 adults in Manitoba [1].

This study found that suicide rates were higher for males than females in the 45-64 age group only, while previous research found that suicide rates were higher for males than females in all age groups [48,49]. The rate in the Northern Health Region is considerably higher than the Manitoba rate. The rate is also higher among people living in low income areas compared to high income areas, providing the impetus for ensuring prevention efforts and mental health services in these areas.

Conclusion

Over a five-year period, 28% of adults in Manitoba were diagnosed with a mental illness. Most of these diagnoses were made by primary care physicians with the exception of schizophrenia. The mental illness prevalence has essentially remained unchanged since the 2004 MCHP report on mental illness [1]. The prevalence of mental illness varied by health region, health region district and Winnipeg neighbourhood cluster; therefore, the prevalence in these smaller jurisdictions was reported for health services planning purposes. While Manitobans living in all areas of the province were diagnosed with mental illness, those living in lower income areas had the highest prevalence. As shown in other studies, the prevalence of mental illness was not evenly distributed by sex. Substance use disorders and psychotic disorders were more common among males, while personality disorders and mood and anxiety disorders were more common among females.

Chapter 3:

Prevalence of Mental Health Indicators in Specific Populations

In this chapter, we examined the diagnostic prevalence of mental illness among a number of adult populations in Manitoba. We measured the same mental health indicators as reported in Chapter 2: mood and anxiety disorders, substance use disorders, psychotic disorders including schizophrenia, personality disorders, any mental illness (at least one of the previously named disorders), dementia, hospitalizations for attempted suicide and suicide. The prevalence of mental illness in the following populations was likewise calculated over a five-year period, with the exception of prevalence of mental illness for women in the postpartum period, which was calculated over a one-year period.

The following adult populations were examined:

- Women in the postpartum period
- Adults living in a personal care home
- Adults living in social housing
- Adults receiving income assistance
- Adults who were victims of a crime
- Adults who were accused of a crime

The main goal of this chapter was to describe the prevalence of mental illness among specific populations, not to explain why this might differ from the general population. However, in order to provide some context for the prevalence of diagnosed mental illness in these adult populations, they were compared to a reference group of all other Manitobans who were comparable in terms of age and sex. Note that the specific populations were not removed from the reference group of all Manitobans; for example, the personal care home reference group included people in personal care homes as well. Given that the suicide and attempted suicide rates were very low, they are reported in tables rather than graphs. Only statistically significant results are described in the text.

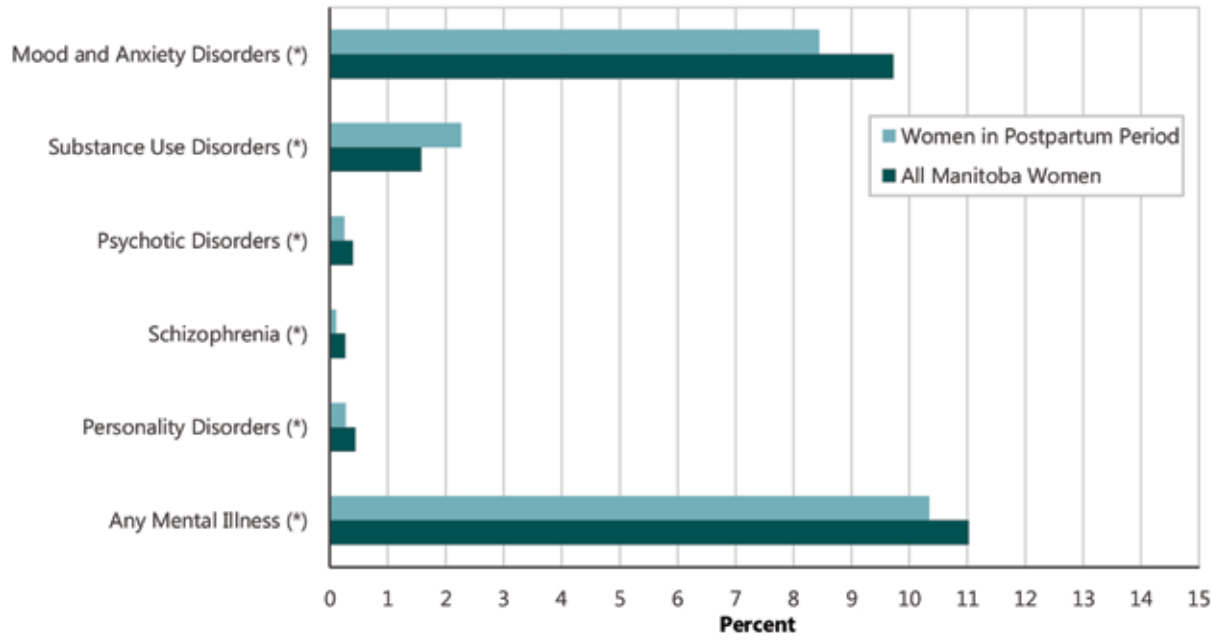
Women in the Postpartum Period

The postpartum period is defined as the time from giving birth (live birth or stillbirth with a gestation of 20 weeks or greater) to one year after birth [50]. The prevalence of mental illness for women aged 18 to 45 who gave birth in 2013/14 was calculated over a one-year period following the birth. The reference group included all women in Manitoba who were aged 18 to 45 during 2013/14-2014/15, including those who gave birth during that time or who were in the postpartum period.

Findings

The one-year prevalence of diagnosed mental illnesses for women (aged 18 to 45) in the postpartum period was lower compared to all women in the Manitoba population of the same age (Figure 3.1 and Table 3.1), with the exception of substance use disorders, which was higher among postpartum women. Suicide rates were too low to calculate among this population. Previous studies were inconsistent in determining whether the postpartum period was one of higher risk for mental illness among women [51–53].

Figure 3.1: Prevalence of Mental Illness among Women in the Postpartum Period Compared to All Manitoba Women, 2013/14-2014/15
Age-adjusted; women aged 18-45 diagnosed with disorder in one-year time period



* indicates a statistically significant difference between women in the postpartum period and all Manitoba women (p<0.05)
Note: Women in the postpartum period are those who gave birth in 2013/14.
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.1: Mental Illness among Women in the Postpartum Period Compared to All Manitoba Women, 2013/14-2014/15

Mental Illness	Women in the Postpartum Period			All Manitoba Women
	Count	Crude Percent	Adjusted Percent**	Adjusted Percent
Mood and Anxiety Disorders (*)	1,264	8.25	8.44 (7.99 - 8.93)	9.72 (9.60 - 9.85)
Substance Use Disorders (*)	353	2.30	2.27 (1.95 - 2.64)	1.58 (1.44 - 1.74)
Psychotic Disorder (*)	35	0.23	0.25 (0.18 - 0.35)	0.40 (0.37 - 0.42)
Schizophrenia (*)	15	0.10	0.11 (0.06 - 0.18)	0.27 (0.25 - 0.29)
Personality Disorders (*)	44	0.29	0.27 (0.20 - 0.37)	0.44 (0.42 - 0.47)
Any Mental Illness (*)	1,552	10.13	10.34 (9.83 - 10.88)	11.02 (10.87 - 11.17)
Hospitalizations for Attempted Suicide	9	0.06	0.05 (0.02 - 0.10)	0.06 (0.05 - 0.08)

* indicates a statistically significant difference between women in the postpartum period and all Manitoba women (p<0.05)
** adjusted for age
Note: Women in the postpartum period are those who gave birth in 2013/14.
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Supplementary Analysis to Explore Findings of Women in Prenatal and Postpartum Periods

We conducted a more sophisticated analysis to determine if our findings above remained the same after adjusting for a number of factors that could influence the prevalence of mental illness and by using a different reference group. We compared the prevalence of diagnosed mental illness and rate of hospitalizations for attempted suicide of women in the postpartum period to those of women who had not given birth in the study period. We also compared these mental health indicators across three time periods: pre-pregnancy, during pregnancy and postpartum. We created a cohort of 45,362 women aged 18 to 45 who had given birth during the period from April 1, 2011 to March 31, 2014. These women were matched by age to create a cohort of 139,705 women who were never pregnant during this study period. We calculated a 40-week diagnostic prevalence of mental illness and hospitalizations for attempted suicide to facilitate comparison between the perinatal time periods. To control for the influence of confounding factors, the following were included in the models: age, urbanicity, area-level income, number of children, any mental illness, psychotropic medication use and child apprehensions in the five years prior to the study period.

These results are found Appendix Tables 5.1 to 5.3.

After adjusting for confounding factors, the main findings are:

- When compared to the control group of women who had not given birth, pregnant women showed a lower risk of all mental illness outcomes. Women in the postpartum period had a lower risk of a mood and anxiety disorder, psychotic disorder, and suicide attempt.
- Among the cohort of women who had given birth, pregnancy was associated with a lower risk of diagnosed mood and anxiety disorders, substance use disorders, and suicide attempts compared to pre-pregnancy.
- There was a higher risk of being diagnosed with a psychotic disorder in postpartum compared to pre-pregnancy, but postpartum was also associated with a lower risk of mood and anxiety disorders and suicide attempts.
- Compared to postpartum, pregnancy was associated with a lower risk of all mental disorders and suicide attempts.

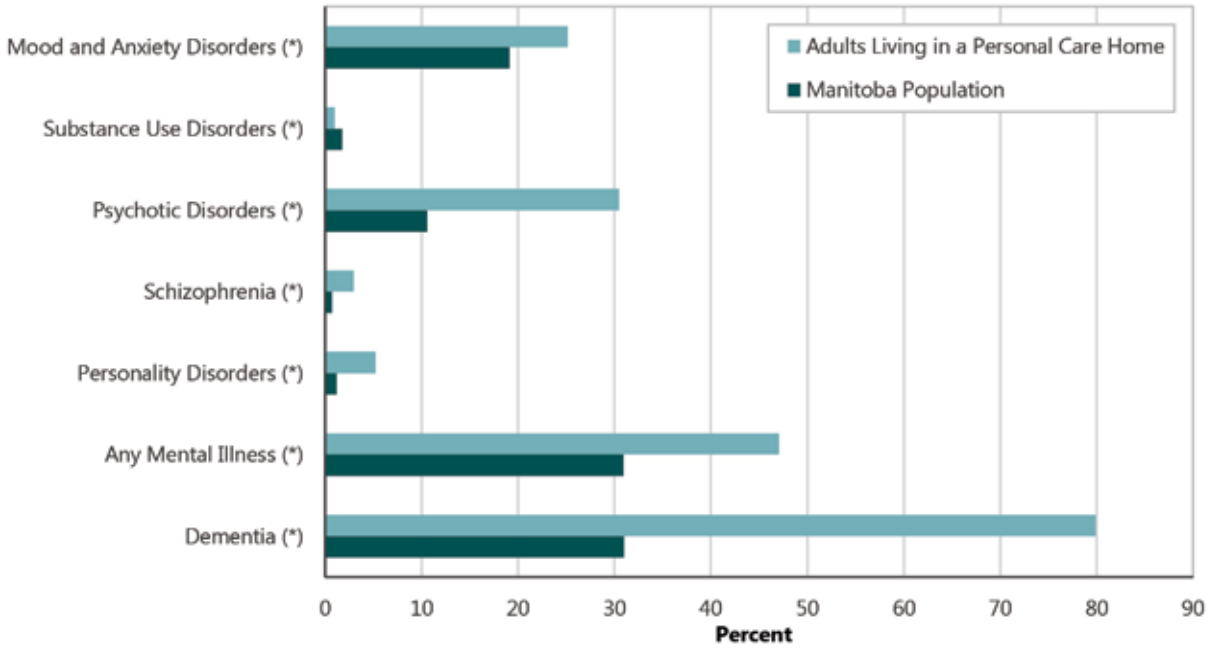
Adults living in a Personal Care Home

Adults living in a personal care home were defined as Manitoba residents aged 65 and older who lived in a personal care home in Manitoba for at least 6 months during the five-year period from April 1, 2010 to March 31, 2015. The prevalence of mental illness for these residents was calculated over the five-year period. The reference group includes all residents in Manitoba aged 65 and older, including those living in personal care homes.

Findings

The five-year diagnostic prevalence of mental illnesses for personal care home residents (aged 65 and older) was higher compared to all older adults in the Manitoba population (Figure 3.2 and Table 3.2), with the exception of the prevalence of substance use disorders, which was lower among residents. Rates of suicide and attempted suicide were too low to calculate among this population. We noted that the proportion of personal care home residents with a diagnosis of psychotic disorder was considerably higher than in the older adult Manitoba population (30.5% versus 10.6%). In exploring this further, we found that of the 5,489 personal care home residents with psychotic disorders, 80.7% of them also had a diagnosis of dementia within the five-year period. Not surprisingly, given the high levels of healthcare needs for people with dementia, the dementia prevalence was significantly higher among personal care home residents relative to the older adult Manitoba population.

Figure 3.2: Prevalence of Mental Illness among Adults living in a Personal Care Home Compared to the Manitoba Population, 2010/11-2014/15
Age- and sex-adjusted; adults aged 65+ diagnosed with disorder in five-year time period



* indicates a statistically significant difference between adults living in a Personal Care Home and the Manitoba population ($p<0.05$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.2: Mental Illness among Adults living in a Personal Care Homes Compared to the Manitoba Population, 2010/11-2014/15
Adults aged 65+ diagnosed with disorder in five-year time period

Mental Illness	Adults living in a Personal Care Home			Manitoba Population Adjusted Percent
	Count	Crude Percent	Adjusted Percent**	
Mood and Anxiety Disorders (*)	5,833	29.55	25.17 (23.79 - 26.62)	19.14 (18.25 - 20.08)
Substance Use Disorders (*)	214	1.08	1.00 (0.86 - 1.17)	1.75 (1.59 - 1.92)
Psychotic Disorders (*)	5,489	27.81	30.49 (26.78 - 34.71)	10.61 (9.34 - 12.05)
Schizophrenia (*)	615	3.12	2.97 (2.52 - 3.51)	0.70 (0.59 - 0.83)
Personality Disorders (*)	923	4.68	5.25 (4.53 - 6.09)	1.21 (1.04 - 1.39)
Any Mental Illness (*)	9,606	48.66	47.09 (44.34 - 50.02)	30.96 (29.33 - 32.68)
Dementia (*)	14,992	75.94	79.91 (70.00 - 91.22)	31.00 (27.15 - 35.38)

* indicates a statistically significant difference between adults living in a Personal Care Home and the Manitoba population ($p<0.05$)
** adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

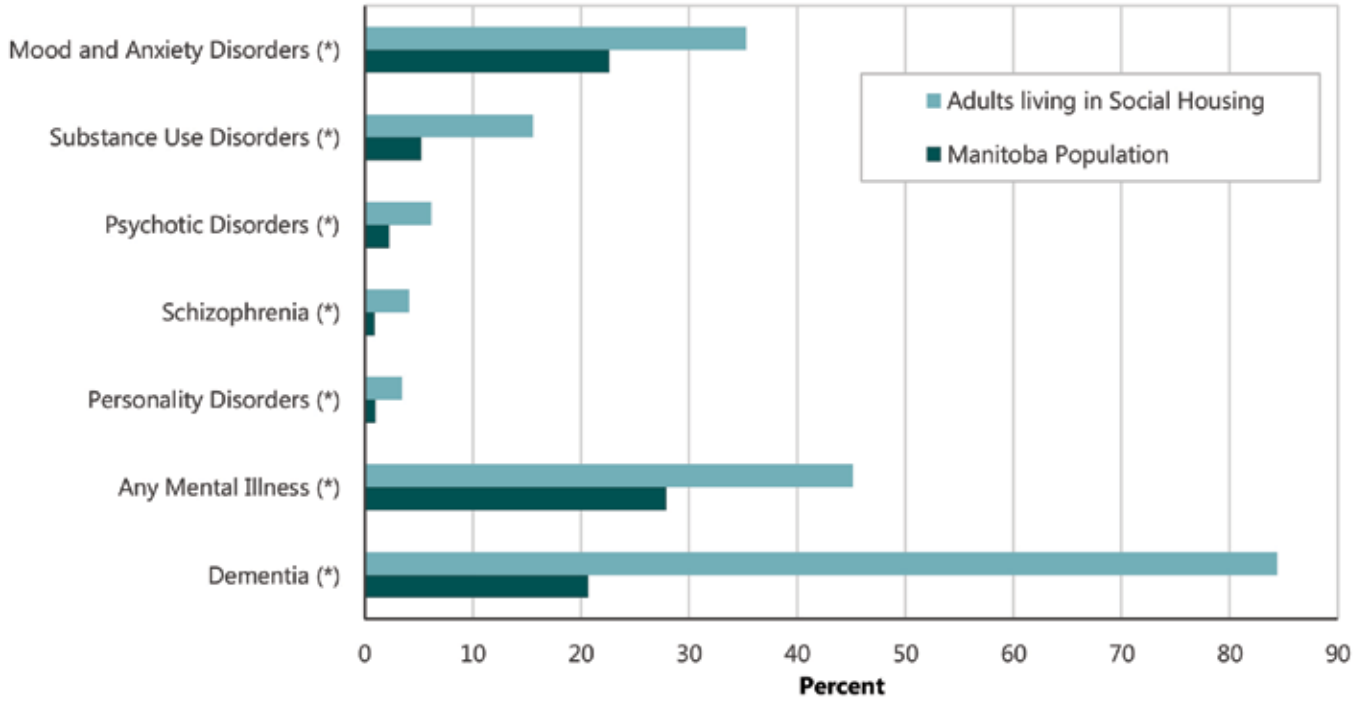
Adults living in Social Housing

Social housing is non-profit housing often subsidized by government funds to provide affordable and safe housing to Manitobans with low income. This indicator used data from about 14,000 social housing units directly owned and managed by the provincial government under Manitoba Housing. Adults living in social housing were defined as adults aged 18 and older who were living in social housing in Manitoba at some point during the five-year period from April 1, 2010 to March 31, 2015. The reference group includes all residents in Manitoba aged 18 and older, including those living in social housing.

Findings

The five-year diagnostic prevalence of mental illness for adults in social housing (aged 18 and older) was higher compared to all adults in the Manitoba population (Figure 3.3 and Table 3.3). The five-year rate of suicide and attempted suicide was considerably higher for adults in social housing than for all adult Manitobans (295 vs 87 suicides per 100,000; and 1,063 vs 323 suicide attempts per 100,000). Given that dementia is rare in young people, this illness was calculated only for an older age group (55 years and over) and was higher among those living in social housing compared to the reference group of older Manitobans.

Figure 3.3: Prevalence of Mental Illness among Adults living in Social Housing Compared to the Manitoba Population, 2010/11-2014/15
Age- and sex-adjusted; adults aged 18+** diagnosed with disorder in five-year time period



* indicates a statistically significant difference between adults living in social housing and the Manitoba population ($p<0.05$)
** dementia prevalence only for adults aged 55+
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.3: Mental Illness among Adults living in Social Housing Compared to the Manitoba Population, 2010/11-2014/15
Adults aged 18+** diagnosed with disorder in five-year time period

Mental Illness	Adults living in Social Housing			Manitoba Population Adjusted Percent
	Count	Crude Percent	Adjusted Percent†	
Mood and Anxiety Disorders (*)	10,699	38.16	35.29 (34.59 - 36.01)	22.59 (22.17 - 23.02)
Substance Use Disorders (*)	4,760	16.98	15.56 (15.11 - 16.02)	5.24 (5.16 - 5.31)
Psychotic Disorders (*)	1,907	6.80	6.13 (5.83 - 6.44)	2.26 (2.09 - 2.44)
Schizophrenia (*)	1,132	4.04	4.09 (3.86 - 4.34)	0.88 (0.83 - 0.93)
Personality Disorders (*)	1,010	3.60	3.44 (3.23 - 3.67)	0.96 (0.91 - 1.01)
Any Mental Illness (*)	13,079	46.65	45.14 (44.34 - 45.96)	27.89 (27.31 - 28.48)
Dementia (*)	1,262	16.27	84.40 (78.98 - 90.20)	20.68 (18.63 - 22.96)
Hospitalizations for Attempted Suicide (*)	324	1.16	1.06 (0.95 - 1.19)	0.32 (0.29 - 0.36)
Suicides (*)	82	0.29	0.29 (0.24 - 0.37)	0.09 (0.07 - 0.10)

* indicates a statistically significant difference between adults living in social housing and the Manitoba population ($p<0.05$)
** dementia prevalence only for adults aged 55+
† adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Adults receiving Income Assistance

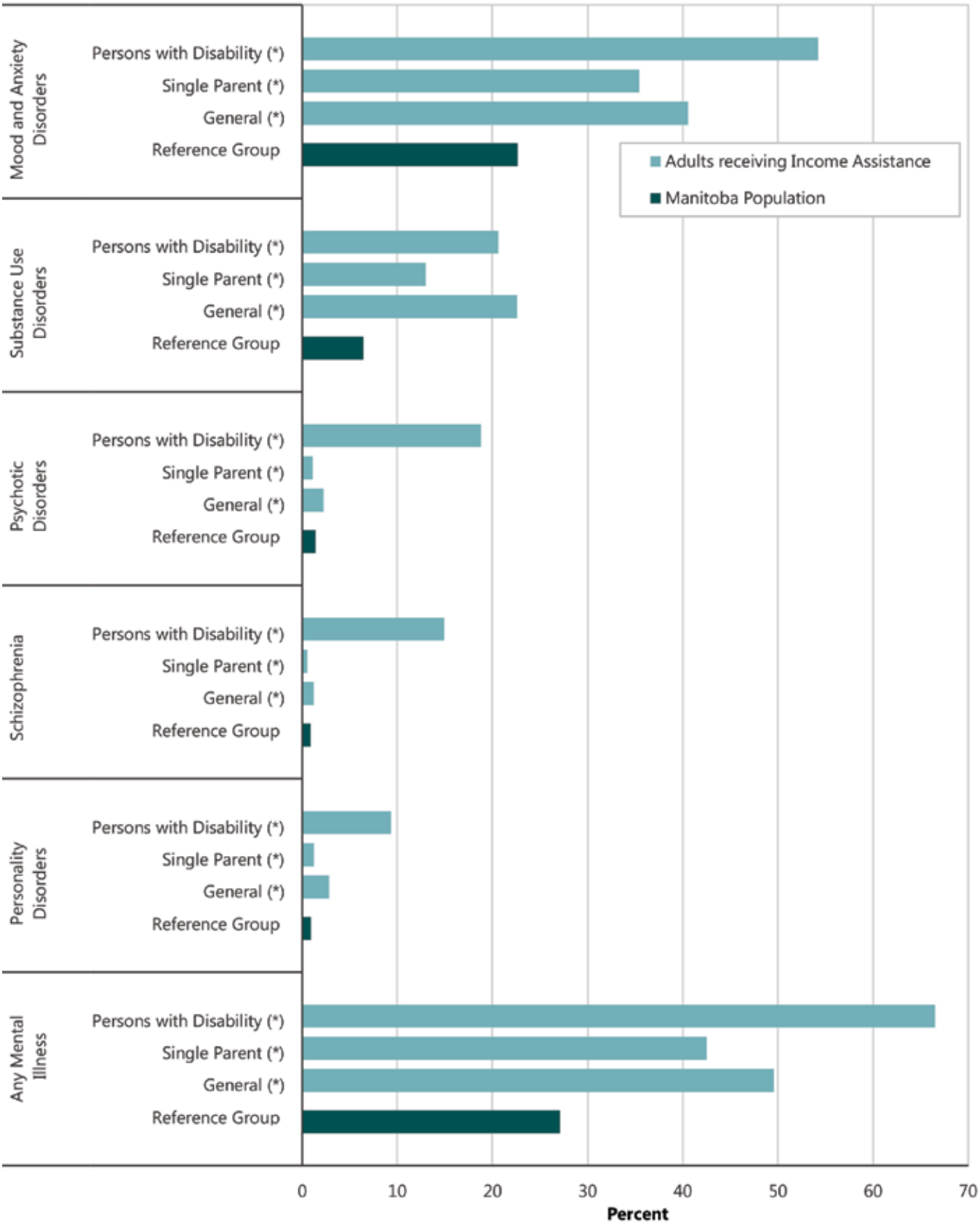
Income assistance is a program of financial assistance for people who need help to meet basic personal and family needs, and is administered through Manitoba's Employment and Income Assistance program. Adults receiving income assistance were defined as Manitoba residents aged 18 and older who received income assistance for at least 6 continuous months during the five-year period from April 1, 2010 to March 31, 2015. Income assistance recipients fall into one of three categories: persons with a physical or mental disability, single parents, or general assistance. The prevalence of mental illness for these three groups of people was calculated over the five-year period. The reference group includes all residents in Manitoba aged 18 and older, including those receiving income assistance.

Findings

The five-year diagnostic prevalence of mental illness and attempted suicide for people receiving income assistance (aged 18 to 64) was higher compared to all adults in the Manitoba population (Figure 3.4 and Table 3.4). Suicide rates were too low to calculate among this population. Persons with disabilities who received income assistance had the highest rates of mental illness when compared to all groups. For example, we note that psychotic disorders are remarkably higher relative to the other groups (Disability: 18.8% vs Single Parent: 1.10%, General: 2.24% and Manitoba population: 1.39%). This is not surprising, given that this group received income assistance for a mental or physical disability. It was not possible to report the prevalence by physical and mental disability separately with the available data. Although the two other groups of persons receiving income assistance (single parents and general) had a lower prevalence of mental illness than those with mental or physical disabilities, they still experienced a heavy burden of substance use disorders and mood and anxiety disorders relative to the general Manitoba population.

Figure 3.4: Prevalence of Mental Illness among Adults receiving Income Assistance Compared to the Manitoba Population, 2010/11-2014/15

Age- and sex-adjusted; adults aged 18-64 diagnosed with disorder in five-year time period



* indicates a statistically significant difference between people receiving income assistance and the Manitoba population ($p<0.05$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.4: Mental Illness among Adults Receiving Income Assistance Compared to the Manitoba Population, 2010/11-2014/15
Adults aged 18-64 diagnosed with disorder in five-year time period

Mental Illness	Adults Receiving Income Assistance			Manitoba Population Adjusted Percent
	Count	Crude Percent	Adjusted Percent**	
Persons with Disability				
Mood and Anxiety Disorders (*)	13,906	54.91	54.23 (52.93 - 55.56)	22.65 (22.25 - 23.05)
Substance Use Disorders (*)	5,318	21.00	20.60 (19.86 - 21.37)	6.46 (6.30 - 6.63)
Psychotic Disorders (*)	4,887	19.30	18.80 (17.97 - 19.66)	1.39 (1.34 - 1.44)
Schizophrenia (*)	3,954	15.61	14.95 (14.23 - 15.70)	0.89 (0.86 - 0.93)
Personality Disorders (*)	2,392	9.45	9.34 (8.92 - 9.77)	0.92 (0.89 - 0.94)
Any Mental Illness (*)	16,932	66.86	66.51 (65.07 - 67.99)	27.12 (26.68 - 27.56)
Hospitalizations for Attempted Suicide (*)	358	1.41	1.37 (1.23 - 1.53)	0.17 (0.16 - 0.18)
Single Parent				
Mood and Anxiety Disorders (*)	4,645	44.32	35.43 (33.93 - 37.00)	22.65 (22.25 - 23.05)
Substance Use Disorders (*)	1,427	13.62	13.01 (12.13 - 13.95)	6.46 (6.30 - 6.63)
Psychotic Disorders (*)	94	0.90	1.10 (0.89 - 1.36)	1.39 (1.34 - 1.44)
Schizophrenia (*)	44	0.42	0.53 (0.39 - 0.72)	0.89 (0.86 - 0.93)
Personality Disorders (*)	184	1.76	1.24 (1.07 - 1.45)	0.92 (0.89 - 0.94)
Any Mental Illness (*)	5,133	48.97	42.54 (40.87 - 44.28)	27.12 (26.68 - 27.56)
Hospitalizations for Attempted Suicide (*)	56	0.53	0.34 (0.26 - 0.44)	0.17 (0.16 - 0.18)
General				
Mood and Anxiety Disorders (*)	5,185	41.77	40.55 (39.22 - 41.91)	22.65 (22.25 - 23.05)
Substance Use Disorders (*)	3,012	24.26	22.58 (21.58 - 23.62)	6.46 (6.30 - 6.63)
Psychotic Disorders (*)	286	2.30	2.24 (1.98 - 2.53)	1.39 (1.34 - 1.44)
Schizophrenia (*)	161	1.30	1.21 (1.03 - 1.42)	0.89 (0.86 - 0.93)
Personality Disorders (*)	387	3.12	2.82 (2.54 - 3.13)	0.92 (0.89 - 0.94)
Any Mental Illness (*)	6,260	50.43	49.57 (48.10 - 51.09)	27.12 (26.68 - 27.56)
Hospitalizations for Attempted Suicide (*)	116	0.93	0.81 (0.67 - 0.98)	0.17 (0.16 - 0.18)

* indicates a statistically significant difference between people receiving income assistance and the Manitoba population ($p<0.05$)
** adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

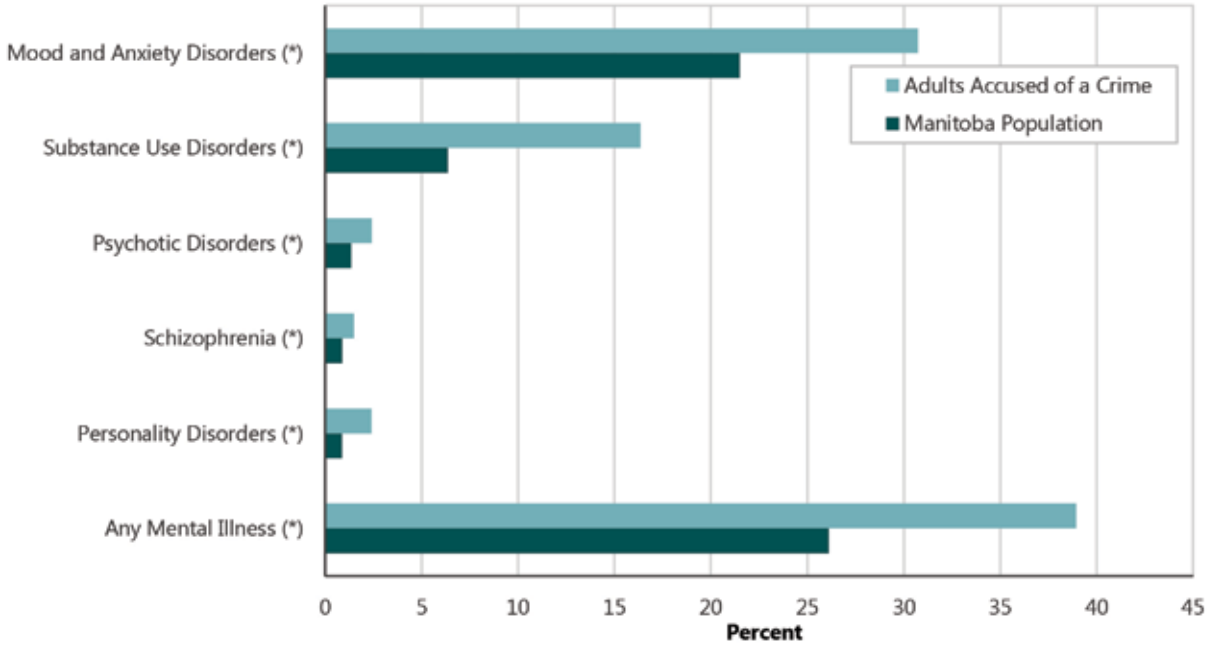
Adults Accused of a Crime

This indicator represents adults who were accused of a crime at least once in Manitoba as tracked by Manitoba Justice's Prosecution Information and Scheduling Management (PRISM) database. It is important to note that not all accusations lead to convictions. The PRISM database includes information on a wide array of crimes such as property damage, thefts and assaults, but also traffic offenses and alcohol-related crimes. The criminal accusations are listed by disorder in Appendix Table 5.4. People accused of a crime were defined as Manitoba residents aged 18 to 64 who were accused of crime during the five-year period from April 1, 2007 to March 31, 2012. Note that an earlier time period was used because later data were not available at the time of analysis. The reference group included all residents in Manitoba aged 18 to 64 during the same time period, including those accused of a crime.

Findings

The five-year diagnostic prevalence of mental illness for people accused of a crime (aged 18 to 64) was higher compared to all adults in the Manitoba population (Figure 3.5 and Table 3.5). Close to 40% of those accused of a crime had been diagnosed with a mental illness. The five-year rate of suicide and attempted suicide was considerably higher for those with criminal accusations compared to the reference group of all Manitobans (213 suicides vs 94 per 100,000; and 1,046 suicide attempts vs 291 per 100,000). It was important to adjust the rates by sex, given that males are overrepresented in the justice system.

Figure 3.5: Prevalence of Mental Illness among Adults Accused of a Crime Compared to the Manitoba Population, 2007/08-2011/12
Age- and sex-adjusted; adults aged 18-64 diagnosed with disorder in five-year time period



* indicates a statistically significant difference between adults accused of a crime and the Manitoba population ($p<0.05$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.5: Mental Illness among Adults Accused of a Crime Compared to the Manitoba Population, 2007/08-2011/12
Adults aged 18-64 diagnosed with disorder in five-year time period

Mental Illness	Adults Accused of a Crime			Manitoba Population Adjusted Percent
	Count	Crude Percent	Adjusted Percent**	
Mood and Anxiety Disorders (*)	20,750	27.14	30.74 (30.19 - 31.30)	21.49 (21.26 - 21.73)
Substance Use Disorders (*)	12,670	16.57	16.36 (15.79 - 16.95)	6.35 (6.17 - 6.54)
Psychotic Disorders (*)	1,944	2.54	2.43 (2.32 - 2.54)	1.35 (1.33 - 1.38)
Schizophrenia (*)	1,303	1.70	1.50 (1.41 - 1.59)	0.88 (0.86 - 0.90)
Personality Disorders (*)	1,882	2.46	2.41 (2.29 - 2.54)	0.87 (0.85 - 0.90)
Any Mental Illness (*)	27,034	35.36	38.95 (38.34 - 39.56)	26.13 (25.88 - 26.37)
Hospitalizations for Attempted Suicide (*)	873	1.14	1.05 (0.97 - 1.13)	0.29 (0.28 - 0.30)
Suicide (*)	192	0.25	0.21 (0.18 - 0.25)	0.09 (0.09 - 0.10)

* indicates a statistically significant difference between adults accused of a crime and the Manitoba population ($p<0.05$)
** adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Adults who were Victims of a Crime

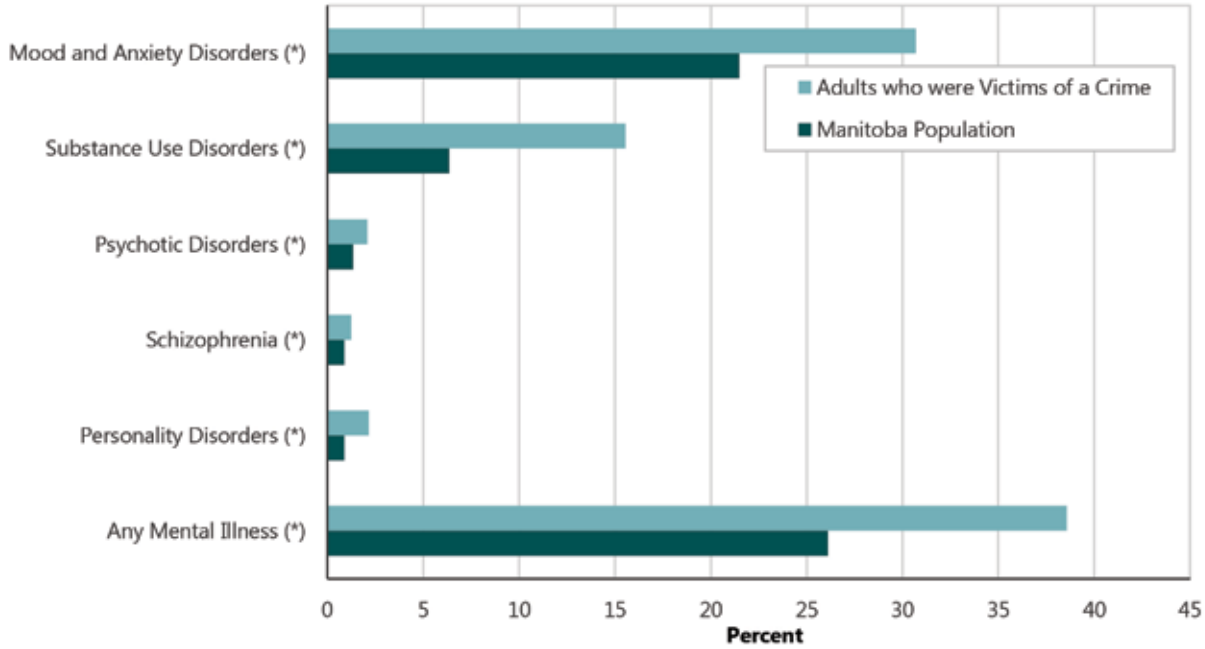
This indicator represents adults who were victims of a crime at least once as tracked by Manitoba Justice's PRISM database. The crimes are listed in Appendix Table 5.5. This indicator was defined as Manitoba residents aged 18 to 64 years old who were a victim of crime during the five-year period from April 1, 2007 to March 31, 2012. Again, the earlier time period was used because later data were not available at the time of analyses. The reference group included all residents in Manitoba aged 18 to 64 during the same time period, including those who were victims of a crime.

Findings

The five-year diagnostic prevalence of mental illness for people who were victims of a crime (aged 18 to 64) was higher compared to all adults in the Manitoba population (Figure 3.6 and Table 3.6). The five-year rate of suicide and attempted suicide was considerably higher for people who were victims of a crime compared to the reference group of all Manitobans (197 suicides vs 94 per 100,000; and 1,074 suicide attempts vs 290 per 100,000). The diagnostic prevalence followed a similar pattern to what was found for people who were accused of a crime. It is worthwhile to note that there is overlap between people who were victimized and those who were accused of a crime. During the study period, about one third (13,283/42,393) of individuals who were victims of a crime were also accused of a crime, and about one fifth (13,283/67,657) who were accused of a crime were also victims of a crime (Figure 3.7).

Figure 3.6: Prevalence of Mental Illness among Adults who were Victims of a Crime Compared to the Manitoba Population, 2007/08-2011/12

Age- and sex-adjusted; adults aged 18-64 diagnosed with disorder in five-year time period



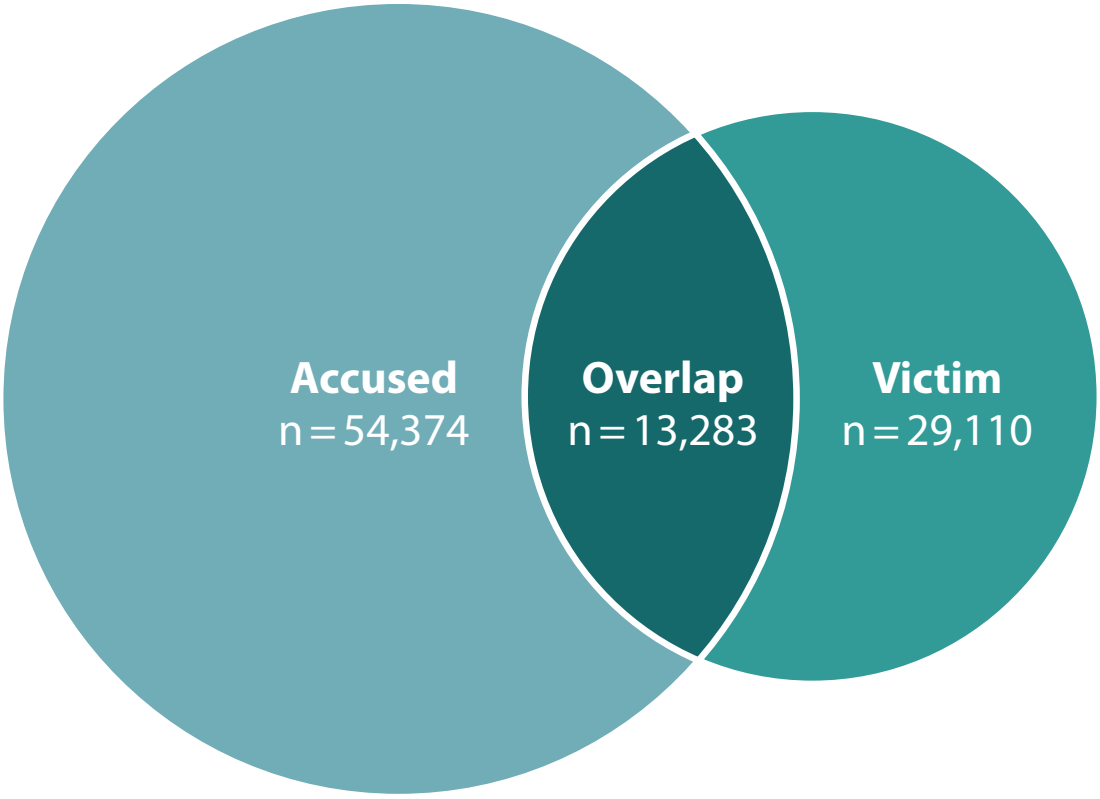
* indicates a statistically significant difference between people ever a victim of a crime and the Manitoba population ($p<0.05$)
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Table 3.6: Mental Illness among Adults who were Victims of a Crime Compared to the Manitoba Population, 2007/08-2011/12
Adults aged 18-64 diagnosed with disorder in five-year time period

Mental Illness	Adults who were Victims of a Crime			Manitoba Population Adjusted Percent
	Count	Crude Percent	Adjusted Percent**	
Mood and Anxiety Disorders (*)	15,131	32.87	30.69 (30.14 - 31.26)	21.50 (21.31 - 21.68)
Substance Use Disorders (*)	7,686	16.70	15.54 (15.00 - 16.10)	6.35 (6.19 - 6.51)
Psychotic Disorders (*)	911	1.98	2.07 (1.94 - 2.21)	1.35 (1.33 - 1.38)
Schizophrenia (*)	571	1.24	1.25 (1.15 - 1.36)	0.88 (0.86 - 0.90)
Personality Disorders (*)	1,136	2.47	2.17 (2.04 - 2.30)	0.87 (0.85 - 0.89)
Any Mental Illness (*)	18,490	40.17	38.57 (37.92 - 39.23)	26.13 (25.91 - 26.35)
Hospitalizations for Attempted Suicide (*)	630	1.37	1.07 (0.99 - 1.17)	0.29 (0.28 - 0.30)
Suicide (*)	94	0.20	0.20 (0.16 - 0.24)	0.09 (0.09 - 0.10)

* indicates a statistically significant difference between people who were a victim of a crime and the Manitoba population ($p<0.05$)
** adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Figure 3.7: Overlap between Adults who were Accused and/or Victims of a Crime, 2007/08-2011/12



What do these Results Mean?

We found high rates of mental illness among the specific populations examined, with the exception of women in the postpartum period, suggesting that these other populations consist of vulnerable individuals. The methods used cannot demonstrate that being part of a specific population caused mental illness or vice versa. These are cross-sectional analyses and so we did not determine whether the mental illness was present before an individual became part of the group being studied or whether the mental illness occurred afterwards. The high prevalence of mental illness among these populations should alert health planners and service providers of populations that are in need of mental health assessments and treatments.

Women in the Postpartum Period

Our results suggest that women in the postpartum period are not at greater risk of mental illness than women who have not recently given birth. However, the findings also demonstrate that mental illness is common among both groups of women. Among the 10% of postpartum women that do experience mental illness, there are urgent and important considerations for care. Mental illness is not only a concern for the new mothers themselves, but also for their children. Previous research reported an association between maternal mental illness and compromised child development [54], which is not surprising given the impact that mental illness can have on a mother's interactions with her child. Weinberg and Tronick found that mothers with depression spoke less to their infants, showed fewer facial expressions of interest and were less likely to touch their infants [55]. Maternal depression appears to influence language development indirectly through its negative effects on caregiving [56]. Others have found an association between maternal distress and adverse maternal, child and family outcomes, including maternal substance abuse [57], family dysfunction, and child developmental delay and poor school performance [58]. Maternal psychosis is also linked with infant mortality [59]. Recent intervention research provides promise to mitigate the effects of maternal mental illness. For example, children of mothers with depression exposed to professional child care centres were less likely to develop anxiety compared to those exposed to family child care or no child care [60].

Adults living in Personal Care Homes

The study suggests that the prevalence of mental illness among personal care home residents is higher compared to the Manitoba population of older adults. In a previous MCHP report, Martens and colleagues found that 43% of personal care home residents had been diagnosed with at least one mental illness and 67% had a dementia diagnosis in a five-year time period [1]. There are a number of possible reasons for these findings. The rates of mental illness among personal care home residents may have been higher because the residents may be seen by healthcare providers more often than older adults in the total population. Another possibility to consider is that behavioural and cognitive impairment may well have precipitated the admission to a personal care home. Nevertheless, the findings of the present study and the previous MCHP study are consistent with other studies that surveyed personal care home residents. These studies found that a high proportion of personal care home residents had depression and dementia [61], behavioural and psychological symptoms [62] and neuropsychiatric symptoms, which include hallucinations, depression and agitation [63]. These findings point to the need to be attentive to the mental health needs of personal care home residents, ensuring that staff receive adequate mental health training and providing adequate resources for mental health promotion and mental illness treatment. For example, exercise programs for older adults have been shown to reduce depression and anxiety [64,65].

Adults living in Social Housing

Knowledge of mental illnesses among social housing residents is scarce, but there are a few studies that report on older adults living in public housing in the US. These studies found that 23% of adults living in public housing were engaged in high risk drinking but despite this, none reported receiving substance abuse treatment [66]. An earlier study found a high lifetime prevalence of mental disorders (57.6%) among older adults living in public housing [67]. We would expect a higher prevalence, given that people living in social housing are of lower socioeconomic status. We found in Chapter 2 that people living in low income areas had a higher prevalence of mental illness compared to people living in high income areas. In our study, we have not disentangled the individual-level income from neighbourhood socioeconomic status. The location of social housing has been shown to be important in determining outcomes of individuals living in them. For example, Martens and colleagues found that children in social housing in high-income neighborhoods had fewer teen pregnancies and higher high school graduation rates than children living in social housing that was in low income neighborhoods [68].

It is noteworthy that the majority (84%) of adults living in social housing aged 55 and older were diagnosed with dementia during the five-year period, which is comparable to the prevalence found among adults living in personal care homes. Being aware of the high prevalence of dementia in older people living in social housing is important for planning home care services, given the high levels of care required for people with dementia. It is important to keep in mind that these are cross-sectional analyses and do not clarify the timing of the mental illness. The mental illness, particularly dementia, may have been the reason for being accepted into social housing.

Individuals receiving Income Assistance

These results are consistent with our findings in Chapter 2, where we observed an association between area-level income and mental illness. Other studies have found that people living in poverty were more likely to have a mental illness than their better off counterparts. In an urban primary care clinic in Iowa that serves lower-income and uninsured individuals, 49% of patients reported high rates of mental health problems [69]. It is important to keep in mind that these are cross-sectional analyses and so we cannot determine whether the income assistance was present before developing a mental illness (social causation) or whether the mental illness occurred prior to the poverty (social drift). Social causation refers to the theory that poverty causes an illness and social drift refers to the theory that mental illness causes the poverty. Researchers studying psychotic disorders have attempted to sort out this association. A review of their work found that 17 out of 23 studies reported higher risk of psychotic disorders in more socially deprived neighbourhoods [70]. Although they reached no definite conclusions about causation, they discussed that the association between psychotic disorders and social deprivation could be the result of the stress of being socially deprived and having higher prevalence of risk factors such as cannabis use and family history of psychosis in socially deprived areas (social causation), but also that those with psychotic disorders could be socially deprived because of their inability to work (social drift). Whatever the case, the findings of the present report and others suggest that the prevalence of mental illness is high among people receiving income assistance. This provides an opportunity to ensure that people receiving income assistance have access to mental health services and programs to promote mental health, and that the front-line staff working with them have mental health training.

Individuals Accused of a Crime

As found in other studies, people accused of a crime are more likely to experience mental illness. Cook examined suicide attempts among non-institutionalized American adults who had recently been arrested [71]. He found that adults with multiple arrests were 3.2 times more likely to attempt suicide than those without any arrests. In a survey of Ontario inmates, Brown and colleagues report that 41% had at least one current mental health problem [72].

There is a possibility that mental illness rates among accused were higher because some accused may eventually have access to mental health services within the justice system, thereby receiving a diagnosis. However, the very high suicide and attempted suicide rates point to a population experiencing mental distress. The high prevalence may be explained by shared risk factors of mental illness and criminal behaviour such as higher rates of substance abuse, impulsive and aggressive personality characteristics, relationship problems, job loss and financial stress, history of abuse and poor access to mental health services [71]. The prevalence of substance use disorders found in this population is particularly high, underlining the importance of providing addiction treatments for those accused of a crime. It also brings attention to upstream efforts in addiction prevention that may in turn lead to decreases in criminal behaviour. Research with individuals on probation suggests that those with substance use disorders and mental illness were at greater risk of reoffending, highlighting the need for mental health and addictions assessment and treatment to reduce rates of reoffending [73].

Individuals who were Victims of a Crime

This study found a higher prevalence of mental illness among those who were victims of a crime compared to the general population. Risk factors for being a victim of a crime are similar to those of mental illness, including living in low-income neighbourhoods, where there often are higher crime rates and higher availability of drugs. Also, being the victim of a crime may exacerbate mental illness. Previous research has shown that the crimes committed against psychiatric patients increased the symptoms of their illness [74]. These findings suggest that collaborations between the justice system and the healthcare system could provide mental health services to people who have been victimized.

Chapter 4:
Mental Illness and Service Use

In this chapter, we examined the association between mental illness and the use of healthcare services and involvement with the justice system among adults in Manitoba. The cohort of people with mental illness that we examined in this chapter was defined over a five-year period and included those who met the definition for a mental illness. Mental illness was examined with the same mental health indicators as reported and described in Chapter 2: mood and anxiety disorders, substance use disorders, psychotic disorders including schizophrenia, personality disorders, dementia, and hospitalizations for attempted suicide. Service use was calculated over a one-year period, 2014/15, with the exception of the justice system indicators which were only available until 2011/12. We were not able to examine suicide because of sample size. The number of people who died by suicide was too small given the number of covariates used and that service use was examined in a one-year period. The following service use indicators were examined:

- Hospitalizations for all causes
- Short stay hospitalizations
- Long stay hospitalizations
- Ambulatory visits
- Ambulatory visits, excluding those to psychiatrists
- Number of different medication types
- Number of different medications types, excluding psychotropic medications
- Emergency department visits (percentages and rates)
- Accusations of a crime (percentages and rates)
- Victims of a crime (percentages and rates)

Note that premature mortality was added as measure of population health to help explain the healthcare service use and is found at the end of the chapter.

In order to better interpret service use among people with mental illness, the indicators were also calculated for a comparison group of people with no mental illness. This comparison group was made up of people with no record of any diagnosed mental illness over the five year period. We adjusted for a number of factors that also influence service use to determine the unique role that mental illness plays in using healthcare and justice systems. For healthcare use, we adjusted for age, sex, area-level income and medical conditions. For the justice system indicators, we adjusted for age, sex, area-level income and substance use disorders. Differences were tested at a 0.05 level of significance. See Chapter 1 for more details on methodology.

Hospitalizations for All Causes

This indicator represents the number of hospitalizations from all causes per 1,000 people per year. We considered a hospitalization as a single, continuous stay in the hospital system, irrespective of transfers between hospitals. These hospitalizations can be for any reason requiring a hospital stay, including mental health and non-mental health reasons such as injuries (including self-inflicted injuries), medical conditions or surgical procedures. Included in the list of hospitals are four long-term mental health facilities in Manitoba: Selkirk Mental Health Centre, Eden Mental Health Centre, Parkland Regional Mental Health Centre and Centre for Adult Psychiatry (see Appendix Table 4.2). Given that our definition for attempted suicide was based solely on hospitalizations, we excluded all hospitalizations for attempted suicide when we computed hospital use rates for persons who had attempted suicide. Table 4.1 presents the crude rates of hospitalizations per 1,000 people in 2014/15 for people with a mental illness and those with no mental illness. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

Hospitalization rates were higher among people with mental disorders compared to those with no mental disorders. After adjusting for age, sex, income and medical conditions, the relative risk was attenuated but remained significantly higher. For example, the crude and adjusted rate of hospitalizations were, respectively, 6.56 and 3.64 times higher among people with psychotic disorders compared to people with no mental disorders. We note that people who have attempted suicide have the highest relative risks of hospitalization even though we excluded the hospitalization that was used to define those with attempted suicide.

Table 4.1: Hospitalizations for All Causes among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15
Among adults aged 18+

	Crude Rate per 1,000 People		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	134.2	56.7	2.37	1.90 (1.85-1.96)
Substance Use Disorders	204.7	56.7	3.61	3.08 (2.97-3.20)
Psychotic Disorders	372.0	56.7	6.56	3.64 (3.49-3.79)
Schizophrenia	297.1	56.7	5.24	4.24 (4.00-4.50)
Personality Disorders	334.5	56.7	5.90	4.61 (4.36-4.88)
Dementia**	399.8	89.4	4.47	2.54 (2.44-2.65)
Hospitalizations for Attempted Suicide	484.0	56.7	8.54	6.13 (5.62-6.67)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Short Stay Hospitalizations

This indicator represents the number of hospital days used in short stays (under 14 days) from all causes per 1,000 people per year. If an individual had more than one short hospitalization during the year, the days used in all short hospitalizations were summed. As with the previous hospitalization indicator, we excluded the days in hospital for suicide attempts when we computed hospital days for persons who had attempted suicide. Table 4.2 presents the crude number of hospital days used in short stays per 1,000 people for people with a mental disorder and those with no mental disorders in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the numbers of days between the two groups.

Findings

The crude number of hospital days in short stays were higher among people with mental illness compared to those with no mental illness. After adjusting for age, sex, income and medical conditions, the relative risk of a short hospital stay was attenuated but remained significantly higher. For example, the crude and adjusted rate of hospital days in short stays were, respectively, 4.98 and 3.44 times higher among people with schizophrenia compared to people with no mental illness. The adjusted relative risk ranged from 1.84 for people with mood and anxiety disorders to 5.53 for people who had attempted suicide.

Table 4.2: Number of Days for Short Stay Hospitalizations for All Causes among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15

Among adults aged 18+

	Crude Rate Per 1,000 People		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	440.3	180.2	2.44	1.84 (1.75-1.92)
Substance Use Disorders	702.5	180.2	3.90	2.93 (2.76-3.10)
Psychotic Disorders	1,160.8	180.2	6.44	3.07 (2.87-3.29)
Schizophrenia	897.3	180.2	4.98	3.44 (3.15-3.75)
Personality Disorders	1,094.6	180.2	6.08	3.98 (3.66-4.33)
Dementia**	1,240.3	336.6	3.69	1.90 (1.77-2.04)
Hospitalizations for Attempted Suicide	1,610.3	180.2	8.94	5.53 (4.94-6.18)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+
Note: Short stays are under 14 days.

Long Stay Hospitalizations

This indicator represents the number of hospital days used in long stays (14 to 365 days) from all causes per 1,000 people per year. If an individual had more than one long hospitalization during the year, the days used in all long hospitalizations were summed. The maximum length of stay was limited to 365 days. As with the previous hospitalization indicators in this chapter, we excluded the days in hospital for suicide attempts when we computed hospital days for persons who had attempted suicide. Table 4.3 presents the crude number of hospital days used in long stays per 1,000 people for people with a mental disorder and those with no mental disorders in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the numbers of days between the two groups. It is important to note that the hospitalizations include four long-term mental health facilities, which could influence the number of days used in long stays.

Findings

The crude number of hospital days in long stays were considerably higher among people with mental illness compared to those with no mental illness. After adjustments, the relative risk of a long hospital stay was attenuated but remained significantly higher. For example, the crude and adjusted rate of hospital days in long stays were respectively 27.57 and 12.57 times higher among people with personality disorders compared to people with no mental illness. The adjusted relative risk ranged from 3.31 for people with mood and anxiety disorders to 13.72 for people who had attempted suicide.

Table 4.3: Number of Days for Long Stay Hospitalizations for All Causes among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15
Among adults aged 18+

	Crude Rate Per 1,000 People		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	1,257.77	184.94	6.80	3.31 (2.85-3.84)
Substance Use Disorders	1,664.53	184.94	9.00	5.32 (4.43-6.40)
Psychotic Disorders	9,965.18	184.94	53.88	11.11 (9.19-13.43)
Schizophrenia	7,613.72	184.94	41.17	13.45 (10.25-17.63)
Personality Disorders	5,098.60	184.94	27.57	12.57 (9.73-16.23)
Dementia**	12,440.23	500.50	24.86	7.30 (6.11-8.73)
Hospitalizations for Attempted Suicide	5,110.57	184.94	27.63	13.72 (9.93-18.95)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+
Note: Long stays are 14 to 365 days.

Ambulatory Visits

Ambulatory visits include contact with a licensed physician or nurse practitioner in an outpatient setting in Manitoba for all causes. A physician can be a family physician or a specialist physician. A small number of these visits are made to nurse practitioners. Outpatient settings include office visits, walk-in clinics, home visits, and visits to outpatient departments in hospitals. In this report, inpatient visits (admitted to an acute care hospital) are not considered ambulatory visits. Outpatient surgeries and diagnostic test procedures are also not considered ambulatory visits. Table 4.4 presents the rate of ambulatory visits per person in 2014/15 for people with a mental illness and those with no mental illness. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

The crude average number of ambulatory visits per person were considerably higher among people with mental illness compared to those with no mental illness. After adjustment, the relative risk of an ambulatory visit remained statistically significant. For example, the adjusted average number of physician visits per person was 1.56 times higher among people with substance use disorders compared to people with no mental disorders. The adjusted relative risk ranged from 1.42 for people with dementia to 2.19 for people with personality disorders.

Table 4.4: Ambulatory Visits for Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15
Among adults aged 18+

	Crude Rate Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	8.6	3.6	2.37	1.61 (1.59-1.63)
Substance Use Disorders	7.5	3.6	2.07	1.56 (1.53-1.59)
Psychotic Disorders	10.9	3.6	3.00	1.78 (1.75-1.81)
Schizophrenia	9.7	3.6	2.67	1.89 (1.85-1.94)
Personality Disorders	11.8	3.6	3.24	2.19 (2.14-2.24)
Dementia**	12.2	5.8	2.10	1.42 (1.40-1.45)
Hospitalizations for Attempted Suicide	10.6	3.6	2.90	2.06 (1.99-2.13)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Ambulatory Visits, Excluding those to Psychiatrists

Ambulatory visits, excluding those to psychiatrists, includes contact with a licensed nurse practitioner or physician, excluding psychiatrists, in an outpatient setting in Manitoba for all causes. This indicator is meant to capture the impact of mental illness on health system use beyond mental healthcare settings. Table 4.5 presents the crude average number of ambulatory visits, excluding those to psychiatrists, per person in 2014/15 for people with a mental illness and those with no mental illness. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

Even with psychiatrist visits removed, people with mental illness still had greater numbers of outpatient encounters when compared to their non-mentally ill counterparts. The crude average number of ambulatory visits, excluding visits to psychiatrists, per person remained higher among people with mental disorders compared to those with no mental disorders. After adjustment, the relative risk of an ambulatory visit was lowered but remained statistically significant. The adjusted average number of ambulatory visits, excluding visits to psychiatrists, per person was 1.51 times higher among people with substance use disorders compared to people with no mental disorders. The adjusted relative risk ranged from 1.39 for people with dementia to 1.91 for people who had attempted suicide.

Table 4.5: Ambulatory Visits, Excluding those to Psychiatrists, for Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15

Among adults aged 18+

	Crude Rate Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	8.1	3.6	2.22	1.55 (1.53-1.57)
Substance Use Disorders	7.2	3.6	1.97	1.51 (1.48-1.53)
Psychotic Disorders	9.4	3.6	2.58	1.56 (1.53-1.59)
Schizophrenia	7.3	3.6	2.00	1.49 (1.45-1.53)
Personality Disorders	9.5	3.6	2.62	1.86 (1.82-1.90)
Dementia**	12.0	5.8	2.05	1.39 (1.37-1.42)
Hospitalizations for Attempted Suicide	9.3	3.6	2.54	1.91 (1.85-1.98)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Number of Different Medication Types

This indicator is defined as the average number of different types of medications dispensed per person who had a least one dispensation during a given year. A person who had several prescriptions for different medications, but which were used for the same health problem (for example, multiple antihypertensive drugs for high blood pressure), was counted as having only one medication. Table 4.6 presents the crude average number of different types of medications per person for people with a mental illness and those with no mental illness in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the numbers of medications between the two groups. A sample of the types of drugs dispensed to people with no mental illness are found in Appendix Table 6.1.

Findings

The crude average number of different types of medications per person was higher among people with mental illness compared to those with no mental illness. For example, the average number of medications per person was 1.62 times higher among people with mood and anxiety disorders compared to people with no mental illness. After adjustment, the relative risks of having medication dispensed were lowered but remained statistically significant. The adjusted relative risk for number of medications per person was 2.10 times higher among people who had attempted suicide compared to people with no mental disorders.

Table 4.6: Number of Different Medication Types among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15
Among adults aged 18+

	Crude Number Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	6.5	4.0	1.62	1.45 (1.43-1.46)
Substance Use Disorders	6.8	4.0	1.71	1.54 (1.52-1.56)
Psychotic Disorders	8.9	4.0	2.22	1.61 (1.58-1.63)
Schizophrenia	7.7	4.0	1.93	1.68 (1.65-1.71)
Personality Disorders	8.7	4.0	2.19	1.90 (1.86-1.93)
Dementia**	10.3	5.5	1.87	1.38 (1.36-1.40)
Hospitalizations for Attempted Suicide	9.7	4.0	2.44	2.10 (2.05-2.16)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Number of Different Medication Types, Excluding Psychotropic Medications

This indicator is defined as the average number of different types of medications, excluding psychotropic medications, dispensed per person who had at least one dispensation during a given year. This indicator is meant to capture the impact of mental illness on prescription drug dispensations beyond drugs used to treat mental illness. A person who had several prescriptions for different medications, but which were used for the same health problem, was counted as having only one medication. Table 4.7 presents the crude average number of different types of medications, excluding psychotropic medications, per person for people with a mental illness and those with no mental illness in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the number of medications between the two groups.

Findings

Even with psychotropic medications removed, people with mental illness were still dispensed greater numbers of medications when compared to their non-mentally ill counterparts. The crude average number of different types of medications, excluding psychotropic medications, per person remained higher among people with mental disorders compared to those with no mental disorders. For example, people with personality disorders had 1.74 times more types of non-psychotropic medications than those with no diagnosed mental illness. After adjusting for age, sex, income and medical conditions, the relative risk was attenuated but remained statistically significant. The adjusted average number of medications, excluding psychotropic medications, per person was 1.28 times higher among people with mood and anxiety disorders compared to people with no mental disorders. The adjusted relative risk ranged from 1.26 for people with dementia to 1.68 for people who had attempted suicide.

Table 4.7: Number of Different Medication Types, Excluding Psychotropic Medications, among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15
Among adults aged 18+

	Crude Number Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	5.4	3.9	1.41	1.28 (1.26-1.29)
Substance Use Disorders	5.8	3.9	1.50	1.37 (1.35-1.39)
Psychotic Disorders	7.4	3.9	1.91	1.34 (1.32-1.36)
Schizophrenia	6.0	3.9	1.55	1.32 (1.29-1.34)
Personality Disorders	6.7	3.9	1.74	1.50 (1.48-1.53)
Dementia**	9.0	5.3	1.72	1.26 (1.25-1.28)
Hospitalizations for Attempted Suicide	7.6	3.9	1.96	1.68 (1.63-1.72)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Emergency Department Visits: Percentage Visiting

This indicator is defined as the percentage of Winnipeg residents who visited the Emergency Department (ED) for any cause over a given year. This data is available for Winnipeg only. The main entrance complaints of people who visited the ED are listed in Appendix Table 6.2. Table 4.8 presents the percentage of adults with a mental illness and those with no diagnosed mental illness who visited the ED in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the percentages between the two groups.

Findings

The percentage of adults with mental illness who visited the ED was higher compared to those with no diagnosed illness. People with dementia were 2.6 times more likely to visit the ED compared to people who had no diagnosed mental illness, before adjusting for covariates. After adjustment, the relative risk of ED visits was lower but remained statistically significant. The percentage of adults who visited the ED was 2.33 times higher among people with a psychotic disorder compared to people with no mental disorders. The adjusted relative risk ranged from 1.79 for people with mood and anxiety disorders to 3.31 for people who had attempted suicide. Note that these results do not include visits to the Crisis Response Centre, which since 2013 accounts for many mental health-related visits annually.

Table 4.8: Percentage of Emergency Department Visits Among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/15

Among adults aged 18+

	Crude Percent		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	28.2	14.7	1.92	1.79 (1.76-1.81)
Substance Use Disorders	37.3	14.7	2.54	2.37 (2.32-2.43)
Psychotic Disorders	42.9	14.7	2.92	2.33 (2.25-2.41)
Schizophrenia	38.7	14.7	2.64	2.38 (2.27-2.49)
Personality Disorders	44.9	14.7	3.05	2.70 (2.59-2.82)
Dementia**	44.6	17.2	2.60	1.91 (1.84-1.98)
Hospitalizations for Attempted Suicide	58.1	14.7	3.96	3.31 (3.01-3.64)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Emergency Department Visit Rate

This indicator is defined as the number of any-cause ED visits among Winnipeg residents who had contact with the ED at least once over a given year. This data is available for Winnipeg only. Table 4.9 presents the crude average number of ED visits per person for people with a mental illness and those with no mental illness in 2014/15. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

The average number of ED visits per person was higher among adults with mental illness compared to those with no mental illness. After adjustment, the relative risk of ED visits remained statistically significant. The number of ED visits per person was 1.33 times higher among people with mood and anxiety disorders compared to people with no mental illness. The adjusted relative risk ranged from 1.29 for people with dementia to 2.62 for people who had attempted suicide.

Table 4.9: Emergency Department Visit Rate for Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2014/2015

Among adults aged 18+ with 1+ visit

	Crude Rate Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	2.1	1.5	1.38	1.33 (1.30-1.35)
Substance Use Disorders	2.6	1.5	1.77	1.63 (1.59-1.67)
Psychotic Disorders	2.7	1.5	1.83	1.67 (1.62-1.72)
Schizophrenia	3.1	1.5	2.07	1.95 (1.88-2.02)
Personality Disorders	3.3	1.5	2.20	2.03 (1.96-2.10)
Dementia**	2.1	1.6	1.33	1.29 (1.26-1.33)
Hospitalizations for Attempted Suicide	4.2	1.5	2.80	2.62 (2.49-2.76)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

Accused of a Crime: Percentage who were Accused

This indicator is defined as the percentage of adults who were accused of a crime for any reason over a given year. These individuals could have been accused one or more times during the timeframe of one year. It is important to note that not all accusations lead to convictions. Criminal accusations include a wide array of crimes; these are listed in Appendix Table 5.4. Table 4.10 presents the percent of adults (aged 18 to 64) with a mental illness and those with no mental illness, who were accused of a crime in 2011/12. The crude and adjusted relative risks are also presented to test for differences in percentages between the two groups.

Findings

The percentage of adults who were accused of a crime was higher among people with mental illness compared to those with no mental illness. After adjusting for age, sex, income and substance use disorders, the relative risk of being accused of a crime was lower but remained statistically significant. The percentage of adults who were accused of a crime was 4.25 times higher among people with personality disorders compared to people with no mental illness. The adjusted relative risk ranged from 2.14 for mood and anxiety disorders to 4.81 for attempted suicide. It is important to note that the vast majority of people with mental illness were not accused of a crime. For example, 6.9% of people with schizophrenia were accused of a crime, however, 93.1% were not.

Table 4.10: Percentage Accused of a Crime among Adults with a Mental Illness Compared to those without Any Diagnosis, 2011/12
Among adults aged 18-64

	Crude Percent		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	4.0	2.3	1.73	2.14 (2.06-2.22)
Substance Use Disorders**	9.8	2.3	4.22	4.40 (4.22-4.59)
Psychotic Disorders	6.8	2.3	2.94	2.37 (2.15-2.60)
Schizophrenia	6.9	2.3	2.97	2.21 (1.98-2.48)
Personality Disorders	10.7	2.3	4.61	4.25 (3.86-4.67)
Hospitalizations for Attempted Suicide	15.1	2.3	6.51	4.81 (4.19-5.53)

* adjusted for age, sex, income, and substance use disorders
** percentage of adults with substance use disorders is not adjusted by a prior diagnosis of a substance use disorder

Rate of Being Accused of a Crime

This indicator represents the average number of accusations among adults who were accused of a crime at least once over a given year. Table 4.11 presents the crude rate of accusations per person for people with a mental illness and those with no mental illness in 2011/12. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

The average number of accusations per person was higher among adults with mental illness compared to those with no mental illness. After adjustment, the relative risk of being accused was lower but remained statistically significant. The crude and adjusted number of accusations per person was 1.38 and 1.25 times higher, respectively, among people who attempted suicide compared to people with no mental illness. The adjusted relative risk ranged from 1.14 for people with mood and anxiety disorders to 1.33 for people with substance use disorders.

Table 4.11: Rate Accused of a Crime among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2011/12
Among adults aged 18-64 with 1+ accusations

	Crude Rate Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	1.7	1.5	1.15	1.14 (1.11-1.17)
Substance Use Disorders**	1.9	1.5	1.32	1.33 (1.30-1.37)
Psychotic Disorders	1.9	1.5	1.32	1.23 (1.15-1.32)
Schizophrenia	1.9	1.5	1.33	1.22 (1.13-1.33)
Personality Disorders	1.9	1.5	1.30	1.23 (1.15-1.32)
Hospitalizations for Attempted Suicide	2.0	1.5	1.38	1.25 (1.14-1.38)

* adjusted for age, sex, income, and substance use disorders
** rate of adults with substance use disorders is not adjusted by a prior diagnosis of a substance use disorder

Victims of a Crime: Percentage who were Victims

This indicator represents the percentage of adults who were victims of a crime over a given year, as tracked by Manitoba Justice's PRISM database. Table 4.12 presents the percentage of adults who were victims of a crime among people with a mental illness and those with no mental illness in 2011/12. The crude and adjusted relative risks are also presented to test for differences in percentages between the two groups.

Findings

The percentage of adults who were victims of a crime was higher among people with mental illness compared to those with no mental illness. After adjusting for age, sex, income and substance use disorders, the relative risks of being a victim were lower but remained statistically significant. The percent of adults who were victims of a crime was 1.97 times higher among people with psychotic disorders compared to people with no mental illness. The adjusted relative risk ranged from 1.87 for people with schizophrenia to 5.11 for people who had attempted suicide.

Table 4.12: Percentage who were a Victim of a Crime among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2011/12

Among adults aged 18-64

	Crude Percent		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	2.4	1.0	2.39	2.16 (2.04-2.28)
Substance Use Disorders**	4.5	1.0	4.45	4.00 (3.76-4.26)
Psychotic Disorders	2.3	1.0	2.30	1.97 (1.68-2.31)
Schizophrenia	2.3	1.0	2.26	1.87 (1.54-2.27)
Personality Disorders	4.7	1.0	4.64	3.51 (3.04-4.05)
Hospitalizations for Attempted Suicide	8.4	1.0	8.34	5.11 (4.24-6.15)

* adjusted for age, sex, income, and substance use disorders
** percentage of adults with substance use disorders is not adjusted by a prior diagnosis of a substance use disorder

Rate of Incidents of Victimization

This indicator represents the number of incidents of victimization among adults who were victims of a crime at least once over a given year. Table 4.13 presents the crude average number of incidents of victimization per person for people with a mental illness and those with no mental illness in 2011/12. The crude and adjusted relative risks are also presented to test for differences in the rates between the two groups.

Findings

The average number of incidents of victimization per person was statistically significantly higher among adults with mental illness compared to those with no mental illness, with the exception of schizophrenia and attempted suicide. After adjustment, the relative risk of being a victim was lower but remained statistically significant for most of the mental illnesses examined. The number of incidents of victimization per person was 1.14 times higher among people with personality disorders compared to people with no mental illness. The adjusted relative risk ranged from 1.07 for people with mood and anxiety disorders to 1.16 for people with psychotic disorders.

Table 4.13: Rate of Victimization among Adults Diagnosed with a Mental Illness Compared to those without Any Diagnosis, 2011/12
Among adults aged 18-64 who have been victimized 1+ times

	Crude Rate Per Person		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	1.3	1.2	1.13	1.07 (1.03-1.12)
Substance Use Disorders**	1.4	1.2	1.18	1.13 (1.08-1.19)
Psychotic Disorders	1.4	1.2	1.17	1.16 (1.02-1.32)
Schizophrenia	1.3	1.2	1.13	1.14 (0.97-1.33)
Personality Disorders	1.4	1.2	1.19	1.14 (1.02-1.28)
Hospitalizations for Attempted Suicide	1.4	1.2	1.23	1.15 (0.99-1.33)

* adjusted for age, sex, income, and substance use disorders
** rate of adults with substance use disorders is not adjusted by a prior diagnosis of a substance use disorder

Premature Mortality (Death before age 75)

This indicator shows the number of deaths among adults under 75 years old in a given year. Table 4.14 presents the crude rates of premature deaths per 1,000 people for people with a mental illness and those with no mental illness in 2014/15, as well as the crude and adjusted relative risk. Even after adjusting for age, sex, income and medical conditions, the relative risk of dying prematurely was statistically significantly higher for adults with mental illness compared to those without. For example, the adjusted rate of premature death was 4.0 times higher among people with substance use disorders compared to people with no mental illness. The adjusted relative risk ranged from 2.20 for people with mood and anxiety disorders to 6.25 for people who had attempted suicide.

Table 4.14: Premature Mortality Rate for Adults Diagnosed with a Mental Illness Compared to those without a Diagnosis, 2014/15
Among adults aged 18-74

	Crude Rate per 1,000 People		Relative Risk	
Mental Illness	With Mental Illness	Without Any Mental Illness	Crude	Adjusted*
Mood and Anxiety Disorders	6.2	2.7	2.29	2.20 (2.03-2.38)
Substance Use Disorders	12.1	2.7	4.47	4.00 (3.63-4.41)
Psychotic Disorders	25.8	2.7	9.52	4.89 (4.27-5.60)
Schizophrenia	18.5	2.7	6.84	5.54 (4.55-6.73)
Personality Disorders	14.2	2.7	5.25	5.13 (4.16-6.33)
Dementia**	59.3	7.9	7.48	3.69 (3.19-4.26)
Hospitalizations for Attempted Suicide	25.6	2.7	9.44	6.25 (4.61-8.49)

* adjusted for age, sex, income, and medical conditions
** dementia rate only for adults aged 55+

What do these Results Mean?

The goal of this chapter was to increase our understanding of service use among people with mental illness relative to those with no mental illness. This information will be useful for planning services to improve the quality of life for people with mental illness and the effective use of resources, as well as targeting upstream prevention efforts to ideally avoid later infractions of the law, as an example. Overall, we found that people with mental illness utilized more health services and had greater involvement with the justice system, either as victims or being accused of a crime, compared to people with no mental illness. These associations remained after taking into account age, sex, income and medical conditions (for health services use) and substance use disorders (for justice system involvement). To further understand health services use, we examined premature mortality, a recognized measure of population health. People with mental illness had higher premature mortality rates than those with no mental illness, dramatically indicating the poorer overall health status. People living with mental illness experienced poorer overall health and required more health services.

These findings underscore that people with mental illness are high utilizers of the healthcare system. The findings are not limited to mental health services, but also span other health problems. The overrepresentation of people with mental illness in the justice system suggests a need for better collaboration between the health and justice sectors.

It is important to note that we examined many different types of mental health indicators. The observed differences in relative risks suggest that severe and enduring mental illnesses like schizophrenia had higher service use than less severe, but nevertheless distressing, illnesses like mood and anxiety disorders. The group of people that tended to have the highest service use of all were those who had been hospitalized for a suicide attempt. This suggests that suicide attempts are a marker of high distress, high help seeking, and perhaps representative of behavioural traits (such as aggression or impulsivity) that may also predispose someone to criminality and victimization.

Hospitalizations

Hospitalization rates were higher among people with mental illness compared to those with no mental illness. For example, in examining hospital stays over 14 days, people with schizophrenia spent 13 times more days in hospital than people with no diagnosed mental illness. These hospitalizations were for all causes and were not restricted to hospitalizations where the primary reason was related to mental health. These findings suggest that people experiencing mental illness have high levels of morbidity. We did, in fact, find that the overall health of people with mental illness is poor. Depending on the type of mental health indicator, they were 2.20 to 6.25 more likely to die prematurely, compared to those with no mental illness.

In a previous MCHP report, Martens and colleagues examined hospitalizations among people with mental illness using a different method but reached similar conclusions [1]. They found that 41% of all hospitalizations were attributable to people with mental illness. Females (10 years and over) with mental illness were in hospital more frequently than females with no mental illness (301 vs 152 hospital stays per 1,000 females per year) and similarly, males with mental illness had more hospitalizations than males without (248 versus 102 hospital stays per 1,000 males per year). Males with at least one mental illness used 37% of all hospital services despite being 19% of the population. Females with mental illness used 44% of hospital services despite being 22% of the population [1].

The Canadian Institute for Health Information (CIHI), reporting on Canadian hospital mental health services in 2009/10, noted that hospitalizations that involved a mental health diagnosis made up 14.7% of all hospitalizations in Canada [75]. This percentage only included a hospitalization where the primary or secondary diagnosis recorded was for mental illness. This proportion would likely have been higher if the authors had included all diagnoses recorded on the hospital records, given that people with mental illness may be hospitalized for reasons other than mental health problems. In considering dementia specifically, the World Health Organization has declared dementia to be the leading cause of dependency and disability among older people [76]. At any one time in England's hospitals, one quarter of the hospital beds are used by people with dementia for reasons such as fractured hips, urinary tract infections or chest infections [77].

These findings point to opportunities to decrease the number of hospitalizations among people with mental illness by addressing the mental health problems and medical conditions afflicting them. Li et al. reported that many admissions for people with mental illness could be prevented by providing quality primary care [78]. They examined ambulatory care sensitive conditions (ACSC), which are defined as medical conditions that could be managed by primary care such as immunization-related and preventable conditions, infections, chronic lung diseases, diabetes, and hypertension, among others. People with mental illness were 2.3 times more likely to have been hospitalized for a ACSC than those with no mental illness [78]. Providing types of care other than a hospital setting would be beneficial to the patient and to the healthcare system. Guidelines outlining care to people with psychotic disorders should decrease the risk of hospitalizations [79]. In addition, Crisis Resolution Teams offer promising solutions [80]. A North Carolina transitional care support initiative was found to be effective in decreasing readmissions by 30% among adults with schizophrenia and multiple chronic conditions [81].

Ambulatory Visits

People with mental illness had more ambulatory visits compared to those with no mental illness for all mental health indicators examined. These visits were for many reasons and not specifically for a mental health reason. Excluding psychiatrist visits in the definition of ambulatory visits attenuated the relative risks slightly. Using the ambulatory visit definition that included all types of physicians, the relative risk ranged from 1.42 for people with dementia to 2.19 for people with personality disorders. For the ambulatory visit definition that excluded visits to psychiatrists, the relative risk ranged from 1.39 for people with dementia to 1.91 for people who had attempted suicide. The results did not differ greatly between including and excluding psychiatrists, likely because psychiatrists make up a small percentage of all physicians. It is important to keep in mind that physician and nurse practitioner services do not account for all outpatient mental health services in Manitoba and that the administrative data in the Repository do not include visits to social workers, psychologists, counsellors, nurses, spiritual leaders or student services.

The higher physician visit rates among people with mental illness have not changed greatly in the past decade. In a previous MCHP report, Martens and colleagues found that people with at least one mental illness visited physicians more than twice as often as those with no mental illness [1]. The relative risks in the present study may be slightly lower than previously shown because some of the risk was accounted for by income and medical conditions. Chochinov et al. examined people with schizophrenia during their last six months of life and found that this group had more visits with general practitioners (6.4 vs 5.5 visits) and psychiatrists (0.53 vs 0.07 visits) than matched controls did; however, they were only half as likely to have palliative care [82].

A recent interprovincial report suggests that the province of Manitoba could improve its community-based mental health services. This report entitled "Toward Quality Mental Health Services in Canada – A Comparison of Performance Indicators across 5 Provinces" found that only about 30% of youth and middle-aged adults and about 45% of older adults who had been hospitalized for mental health-related reasons were seen by a physician within 7 days of discharge [83]. When the study looked at 30 days after discharge, the percentages of follow-up to a physician improved to 60% to 80% across age groups. The province of Manitoba had lower percentages compared to Alberta and British Columbia and comparable percentages to Québec and Ontario. Pirkola et al. found that well-developed community mental health services were associated with lower suicide rates compared to services focused on hospitalizations, and suggested that population mental health can be improved by the use of multifaceted, community-based mental-health services [84].

Medication Use

The number of different types of medications per person was higher among people with mental illness compared to those with no mental illness. These medications included psychotropic medications but also medications for other health problems. When psychotropic medications were removed from the definition, the relative risks were only slightly attenuated, suggesting that mental illness is associated with greater physical impairment as well. The relative risk ranged from 1.38 times more different types of medications for people with dementia to 2.10 times more different types of medications for people who had attempted suicide. When psychotropic medications were removed from the definition, the relative risk ranged from 1.26 for people with dementia to 1.68 for people who attempted suicide.

This relatively higher medication use for people with mental illness appears to have remained largely unchanged in the past decade. In a previous MCHP report, Martens and colleagues found that people with at least one mental illness were dispensed about 1.5 times more different types of medications per person per year compared to those with no mental illness (females: 5.2 vs 3.4 medications; males: 4.2 vs 2.9 medications) [1]. The multiple types of medications dispensed to people with mental illness underscore their poor overall health. Alsalami et al. found that older women using multiple medications had poorer mental health than those who took fewer, suggesting the need to assess the mental health in this population [85].

Emergency Department Visits

The percentage of adults who have visited the ED was higher among people with mental illness compared to those with no mental illness. The main reason for the ED visit was not necessarily for mental health-related reasons. Among those who visited the ED, the number of visits per person was also higher among adults with mental illness. For the indicator measuring the percentage of adults visiting the ED, the relative risk of a visit ranged from 1.79 for people with mood and anxiety disorders to 3.31 for people who had attempted suicide. For the number of visits, the relative risk ranged from 1.29 for people with dementia to 2.62 for people who had attempted suicide.

A recent interprovincial report found that 20% of people visiting the ED in Winnipeg for mental health reasons had not been in contact with other health services in the two-year period before going to the ED. This proportion is lower than other provinces that were studied in the report. According to the authors, it is preferable to treat mental illness using community-based services or, for acute cases, hospitals, rather than the ED because people who present with mental illness in the ED may experience long stressful waits, crowding, stigma, lack of availability of beds for admissions, low referral rates for mental health assessments,

low detection rates of mental illness, and lack of connection to follow-up care. The proportion of people visiting the ED for mental health reasons who have not had contact with other health services in the previous two years should be tracked, as a decrease in this indicator would demonstrate better assessment and access to care in more appropriate settings in the community [83].

Justice System Involvement

The percentage of adults who were accused of a crime was higher among people with mental illness compared to those with no mental illness. Among those who were accused of a crime, those with mental illness had a higher number of accusations. For example, the percentage of adults who were accused of a crime was 4.25 times higher among people with personality disorders compared to people with no mental illness. It is important to note that the vast majority of people with mental illness were not accused of a crime. In speculating about the reasons for the association between mental illness and justice involvement, Cook found that people with mental health problems have shared risk factors with those who are involved in criminal activity, including substance abuse, financial difficulties, relationship problems, history of abuse and poor access to mental health services [71].

The percentage of adults who were victims of a crime was higher among people with mental illness compared to those with no mental illness. Among those who were victimized, those with mental illness had a higher number of incidents of victimization. For example, the percentage of adults who were victims of a crime was 1.97 times higher among people with psychotic disorders compared to people with no mental illness. These findings are similar to previous studies. De Mooij et al. found that patients with severe mental illness had a higher prevalence of violent victimization compared to those surveyed from the general population (22% vs 8.5%) [86]. Using a national crime survey questionnaire, a study reported that 40% of psychiatric patients compared to 14% of the controls were victims of a crime in the previous year. This study also revealed that the crimes against psychiatric patients exacerbated their illness [74]. Risk factors associated with victimization of people with mental illness include young age, disorganized behaviour, social isolation, homelessness, being hospitalized and substance use [74,86,87]. These results point to opportunity for protecting these vulnerable populations from being victimized by addressing modifiable risk factors, such as helping people develop skills to improve personal safety, addressing homelessness, improving conflict management and addressing addictions.

Chapter 5:

Mental Disorders in Childhood/Adolescence and Adverse Adult Outcomes

Introduction

Prior research has found associations between childhood/adolescent mental illness and adult outcomes [88,89]. A recent review by Costello and Maughan revealed that childhood and adolescent mental illness is linked to more impairment on measures of adult health, social and family functioning, education, and income, and increased risk taking behaviours [90]. Further, the authors report that half of those with depression, anxiety disorders, attention-deficit hyperactivity disorder, conduct disorder and substance use disorder in childhood or adolescence will continue to experience these illnesses in adulthood.

Mental illness among children and adolescents is highly prevalent and is arguably the most common pediatric illness [91]. It is associated with emotional distress and can interfere with academic success, relationships and eventually participation in the work force. Despite this, mental illness often goes unrecognized and most children and adolescents do not receive adequate treatment for their illness. Recent studies suggest that prevention and early intervention can decrease the rates currently being reported [9].

To our knowledge, no previous studies have used population-level administrative data to follow a cohort of children to examine the long-term associations with mental illness. These data address the challenges of selection bias, recall bias, and self-reporting. Understanding the life course of children and adolescents diagnosed with mental illness is an important area for investigation, since it could directly inform policy and practice that would prevent these later adverse adult outcomes.

Objectives

The specific objectives of this part of our research were as follows:

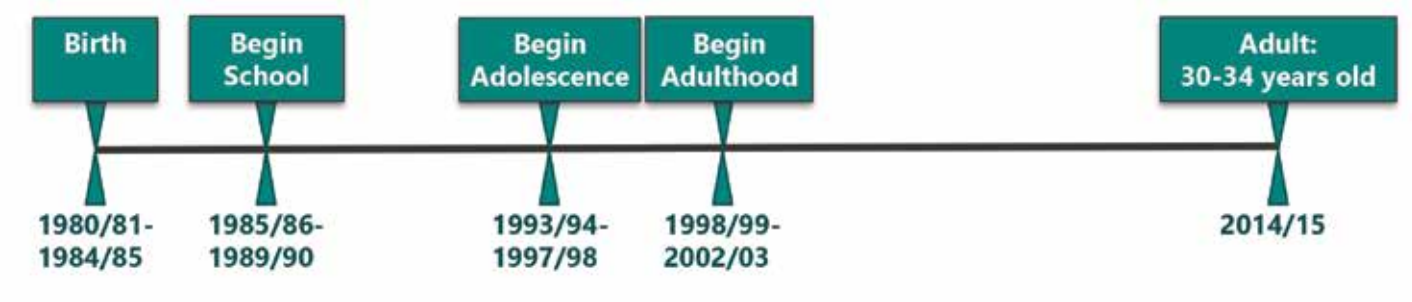
- Determine the age of onset of mental disorders among individuals with a lifetime diagnosis of a mental disorder;
- Determine the associations between diagnosed childhood/adolescence mental illness and suicidal behaviours and adult mental illness and suicidal behaviours.
- Determine the association between diagnosed childhood/adolescence mental illness and suicidal behaviours and adult social services use, justice system involvement and high school graduation.

Methods

Creating a Birth Cohort

We created a birth cohort of 60,838 Manitoba residents (born from fiscal years 1980/81 to 1984/85) and followed them into adulthood (until the end of study period in 2014/15, which was the last year of available data). By the end of the study period, the cohort ranged in age from 30 to 34.

Figure 5.1: Life Course of Birth Cohort (1980/81-1984/85) from Birth to Early Adulthood



Description of Variables Used in the Models

Diagnosed Childhood and Adolescent Mental Illness

The mental disorders we examined were mood and anxiety disorders, attention-deficit hyperactivity disorder (ADHD), substance use disorders, conduct disorder, psychotic disorders (including schizophrenia), personality disorders, any mental illness (any of the disorders listed above), and hospitalizations for attempted suicide. We have added ADHD and conduct disorder to these analyses, as they are commonly diagnosed in childhood. Although diagnosing personality disorders in childhood and adolescence is not universally accepted [6], we found that these diagnoses were recorded in the data for these age groups. We therefore included personality disorders in our analyses as a marker of mental health problems and to be consistent with our definitions of adult mental disorders. The ICD codes used to define these disorders are found in Appendix 1. The data included a very small number of children under four years of age who were diagnosed with the above disorders, but after consultation with clinical experts who felt these codes were unreliable and potentially inaccurate in these young ages, we excluded them from our analyses. The comparison group for these analyses consisted of individuals in the birth cohort who were not diagnosed with the specific disorder during childhood/adolescence.

Other Childhood and Adolescent Factors

A number of variables representing other childhood and adolescent factors that could influence adult mental health were included in the adjusted models to ensure that any associations between childhood/adolescent mental illness and adult mental illness were not due to these factors. These variables are defined in Appendix 1 and include: sex, area-level income quintile, urban or rural residence, two parent family[1], number of children in family, any diagnosis of maternal mental illness, and being taken into care by Child and Family Services at least once.

Early Adult Outcomes

The following early adult outcomes were examined and are defined in Appendix 1: mood and anxiety disorders, ADHD, substance use disorders, conduct disorder, psychotic disorders, personality disorders, any mental illness, attempted suicide, suicide, not graduating from high school, being accused of a crime, being a victim of a crime, receiving income assistance, and living in social housing. Each outcome was categorized as present or not for the birth cohort from age 18 to the end of the study period.

Statistical Methods

Descriptive Analyses

We first calculated the lifetime prevalence of mental illness for the entire birth cohort, where we determined whether or not the people in our birth cohort had ever been diagnosed with mental illness over the course of the study period. The cumulative percentage of age at diagnosis over the course of the study period was also determined to examine the age patterns of first diagnosis of mental illnesses. To examine the childhood and adult variables, we calculated the number and percentage of each childhood covariate and each adult outcome for those with a diagnosed mental illness in childhood or adolescence and for those without.

1 The variable "two parent family" compares children with parents who have registered their unions with Manitoba Health versus those who have not. The reference group includes single parents but also two parent families who have not registered their union with Manitoba Health.

Statistical Modeling

For all adult outcomes except high school graduation, we used survival analysis (proportional hazard) to determine whether people with childhood or adolescent mental illness were at higher risk of adverse outcomes over the course of their early adult years compared to those with no childhood or adolescent mental illness. Each model was conducted with and without adjusting for covariates. Given that high school graduation generally occurs in the late teen years and not evenly over the course of early adulthood, it was not appropriate to use survival analyses. We used logistic regression to determine if people with childhood or adolescent mental disorders were less likely to graduate from high school compared to those without mental disorders. Implementation of the models was done using SAS PROC PHREG in SAS® version 9.4 [21].

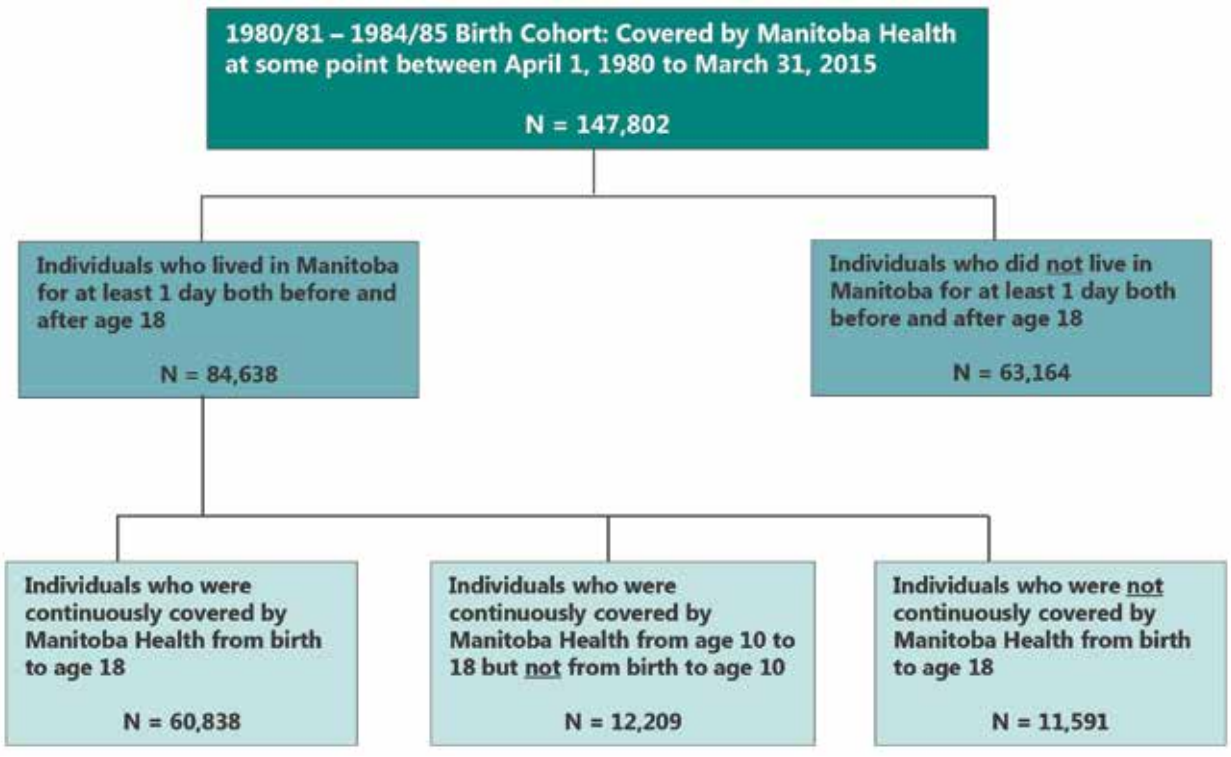
The following analyses were carried out:

- We calculated hazard ratios to determine whether people diagnosed with each mental illness during childhood or adolescence were at higher risk of being diagnosed with the same illness as an adult compared to people without the childhood illness. The diagnosed disorders examined were mood and anxiety disorders, ADHD, substance use disorders, conduct disorder, psychotic disorders, and personality disorders.
- We determined whether people diagnosed with each mental illness during childhood or adolescence were at higher risk of the following adverse adult outcomes compared to people without the childhood disorder: suicide or attempted suicide, receiving income assistance, living in social housing, being accused of a crime, or being a victim of a crime. Results were expressed in hazard ratios.
- We determined if people with each mental illness during childhood or adolescence had a greater likelihood of not graduating from high school compared to people without the childhood illness, expressed in odds ratios.

Results

There were 147,802 people born between 1980/81 and 1984/85 who were covered by public health insurance through Manitoba Health and were living in Manitoba at some point between their birth and the end of the study period, March 31, 2015 (Figure 5.2). Of these, 63,164 were excluded from our analyses because they did not live in Manitoba before and after age 18. This left 84,638 people who lived in Manitoba and were covered for at least 1 day both before and after age 18. Of these, we formed our main cohort, which included 60,838 people who had lived continuously in Manitoba from birth to age 18 and had lived in Manitoba for at least one day after their 18th birth. We excluded 11,591 people because they had incomplete or non-continuous coverage across their childhood and adolescence. There were another 12,209 people who were not continuously covered throughout their childhood but were continuously covered from age 10 to 18. These 12,209 were added to our main cohort for sensitivity analyses.

Figure 5.2: Development of Birth Cohort, 1980/81-1984/85



Of the 60,838 people in the cohort, 16.5% (n=10,040) were diagnosed with a mental illness at some point during their childhood or adolescence (4 to 17 years old) (Table 5.1). Compared to people with no diagnosed childhood/adolescent mental illnesses, those who were diagnosed were more likely to be from low-income areas, live in urban areas, have a mother with a history of mental illness, or have been in care of Child and Family Services. They were less likely to be male, from a two parent family, or from a family with a greater number of children. The group with childhood/adolescent mental illness had a high proportion of suicidal behaviours, justice involvement, and social services use, compared to those not diagnosed. They were also less likely to have graduated from high school.

Table 5.1: Number and Percentages of Cases with Childhood/Adolescent Factors and Adverse Early Adult Outcomes by Diagnosed Childhood/Adolescent Mental Illness and No Mental Illness

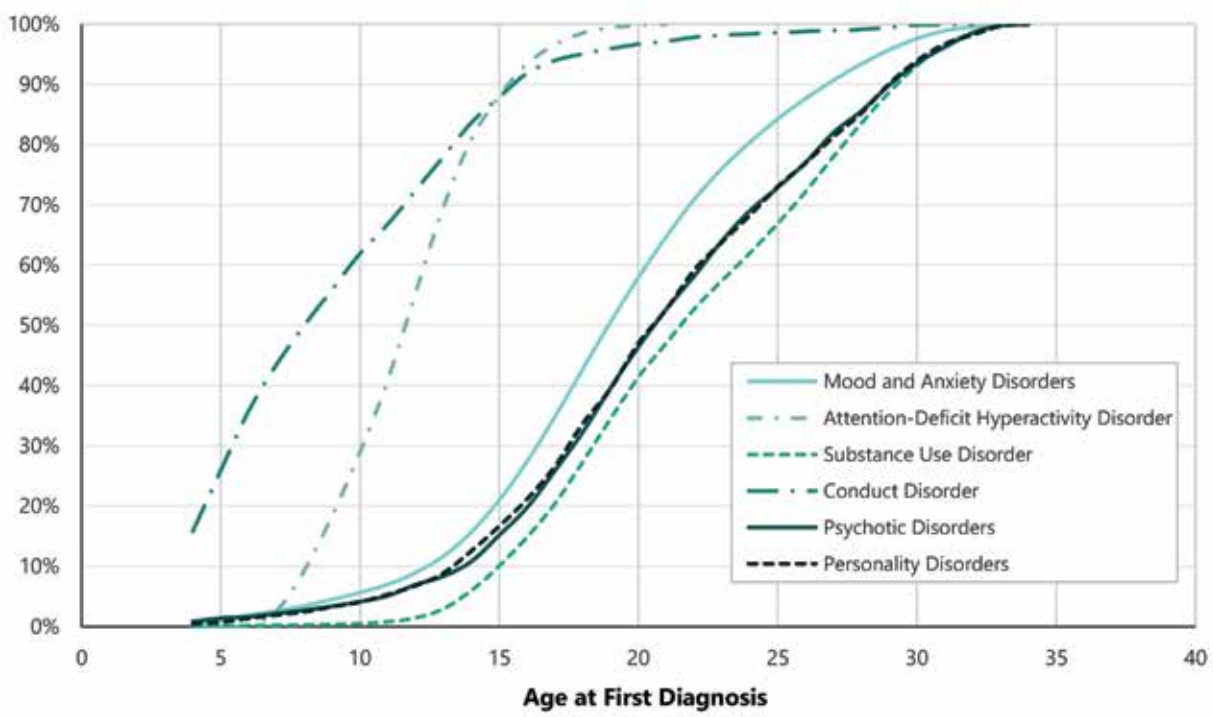
	Any Childhood/Adolescent Mental Illness (N = 10,040)		No Childhood/Adolescent Mental Illness (N = 50,798)		p-value
	Number	Percent	Number	Percent	
Childhood/Adolescent Factors					
Males	5,017	49.97	26,178	51.53	0.0042
Lowest Income Quintiles*	5,877	58.54	27,482	54.10	<.0001
Urban	6,044	60.20	25,374	49.95	<.0001
Two Parent Family	5,546	55.24	35,659	70.20	<.0001
Maternal Mental Health Diagnosis	7,459	74.29	29,174	57.43	<.0001
Four or more Children in Family	2,230	22.21	12,170	23.96	0.0002
Being in Care	1,284	12.79	1,178	2.32	<.0001
Early Adult Outcomes					
Hospitalizations for Attempted Suicide	344	3.43	434	0.85	<.0001
Deaths by Suicide	54	0.54	91	0.18	<.0001
Victim of a Crime	2,610	26.00	7,183	14.14	<.0001
Accused of a Crime	3,897	38.81	12,218	24.05	<.0001
Income Assistance	1,737	17.30	3,347	6.59	<.0001
Social Housing	584	5.82	1,250	2.46	<.0001
Not Graduating from High School	5,830	58.07	25,147	49.50	<.0001

* includes the lowest two income quintiles in rural and urban regions

Age of First Diagnosis of Mental Illness

Figure 5.3 shows the cumulative age at first diagnosis among those in the birth cohort who were diagnosed with mental illness over their lifetime (at some point from childhood to age 34). That is, it shows at what age people with mental illness were likely to be first diagnosed. Many people were first diagnosed before the age of 18, including 35% of those diagnosed with mood and anxiety disorders, 97% of those with ADHD, 20% of those with substance use disorders, 94% of those with conduct disorder, 26% of those with psychotic disorders, and 27% of those with personality disorders.

Figure 5.3: Cumulative Age at First Diagnosis of the Mental Disorder Among Individuals Diagnosed over their Lifetime, 1984/85-2014/15



Note: Diagnoses of children under 4 years of age were excluded

Adult Mental Disorders

Table 5.2 shows that a higher proportion of people diagnosed with a mental illness as a child/adolescent also had that same illness in early adulthood compared to those not diagnosed in childhood/adolescence. For example, 69.8% (3,635) of those diagnosed with mood and anxiety disorders in childhood/adolescence also had mood and anxiety disorders in early adulthood compared to 34.2% (19,010) of those with no diagnosis in childhood/adolescence[2]. The unadjusted and adjusted hazard ratios provide a measure of how strong this association is. For example, those diagnosed with a substance use disorder in childhood/adolescence were over three times more likely to also be diagnosed as a young adult (adjusted hazard ratio (aHR): 3.35) compared to those not diagnosed with a substance use disorder in childhood/adolescence. Those diagnosed with a psychotic disorder in childhood/adolescence were over 20 times more likely to also be diagnosed with a psychotic disorder in adulthood (aHR: 20.84).

Table 5.2: Association between having a Diagnosed Mental Disorder in Childhood/Adolescence and being Diagnosed with the same Disorder in Adulthood

Childhood Mental Illness	Adult Mental Disorder Among those with the Same Childhood/ Adolescent Mental Disorder % (N)	Adult Mental Disorder Among those who did not have the Same Childhood/ Adolescent Mental Disorder % (N)	Hazard Ratio	
			Unadjusted	Adjusted*
Mood and Anxiety Disorders	69.8 (3,635)	34.2 (19,010)	**3.11 (3.01-3.23)**	**2.52 (2.43-2.62)**
Attention-Deficit Hyperactivity Disorder (ADHD)	9.2 (211)	1.4 (807)	**7.35 (6.31-8.55)**	**5.43 (4.62-6.39)**
Substance Use Disorders	50.0 (978)	13.0 (7,634)	**5.20 (4.86-5.56)**	**3.35 (3.12-3.59)**
Conduct Disorder	2.6 (79)	0.3 (199)	**7.49 (5.77-9.72)**	**5.70 (4.29-7.57)**
Psychotic Disorders (including Schizophrenia)	39.5 (145)	1.7 (1,051)	**31.79 (26.72-37.82)**	**20.84 (17.34-25.04)**
Personality Disorders	23.9 (121)	2.3 (1,398)	**11.84 (9.83-14.25)**	**6.39 (5.24-7.79)**
Any Mental Illness	65.8 (6,602)	39.2 (19,934)	**2.34 (2.27-2.40)**	**2.13 (2.07-2.19)**
Hospitalizations for Attempted Suicide	14.5 (111)	1.1 (667)	**6.28 (3.40-11.61)**	**6.15 (4.96-7.63)**

Bold indicates a statistically significant association ($p<0.05$)
* Adjusted for sex, income quintiles, urbanicity, two parent family, number of children in the family, maternal mental health diagnosis, and being taken into care during childhood
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, ADHD, substance use disorders, conduct disorders, psychotic disorders (including schizophrenia) and personality disorders.

2 Note the differences between Figure 5.3 and Table 5.2. The samples include different individuals and therefore tell different stories. In Figure 5.3, we included only individuals in the birth cohort who have been diagnosed with a mental illness at some point in their lifetime (childhood, adolescence or adulthood). In Table 5.2, we included all individuals in the birth cohort and divided them into those with childhood/adolescent mental illness and those without. We then show the percentage who were eventually diagnosed in adulthood.

Suicidal Behaviours

Having a diagnosed childhood/adolescent mental disorder increased the likelihood of both suicide and attempted suicide in adulthood, even after adjusting for a number of childhood factors. The strongest predictor of a suicide attempt in adulthood was a suicide attempt in childhood/adolescence (aHR: 6.15), followed by childhood/adolescent psychotic disorders (aHR: 5.95) and substance use disorders (aHR: 4.77). Those with a childhood/adolescent diagnosis of substance use disorders or who were hospitalized for attempted suicide in adolescence were 3.58 and 3.60 times, respectively, more likely to die by suicide in adulthood compared to those with no substance use disorder diagnosis or suicidal behaviour during childhood/adolescence. The strength of the relationships (size of the aHR) between childhood/adolescent mental disorders and suicidal behaviours in adulthood were attenuated after adjusting for other childhood factors; however, these relationships remained statistically significant.

Table 5.3: Associations between Diagnosed Childhood/Adolescence Mental Disorders and Suicidal Attempts or Suicides as an Adult

	Attempted Suicide Hazard Ratios		Suicide Hazard Ratios	
Childhood Mental Illness	**Unadjusted**	**Adjusted***	**Unadjusted**	**Adjusted***
Mood and Anxiety Disorders	**4.17 (3.56-4.87)**	**3.53 (2.99-4.16)**	**2.67 (1.78-4.01)**	**2.48 (1.62-3.82)**
Attention-Deficit Hyperactivity Disorder (ADHD)	**1.81 (1.36-2.40)**	**1.88 (1.40-2.53)**	s	s
Substance Use Disorders	**9.00 (7.60-10.66)**	**4.77 (3.97-5.73)**	**6.61 (4.32-10.10)**	**3.58 (2.26-5.68)**
Conduct Disorder	**2.42 (1.94-3.02)**	**2.26 (1.79-2.85)**	**2.64 (1.61-4.32)**	**1.76 (1.04-2.97)**
Psychotic Disorders (including Schizophrenia)	**9.37 (6.84-12.83)**	**5.95 (4.31-8.22)**	s	s
Personality Disorders	**7.12 (5.23-9.68)**	**4.41 (3.20-6.07)**	s	s
Any Mental Illness	**4.06 (3.53-4.68)**	**3.49 (3.01-4.05)**	**3.01 (2.15-4.22)**	**2.38 (1.65-3.41)**
Hospitalizations for Attempted Suicide	**13.92 (11.38-17.01)**	**6.15 (4.96-7.63)**	**6.28 (3.40-11.61)**	**3.60 (1.89-6.87)**

s indicates suppression due to small numbers
Bold indicates a statistically significant association ($p<0.05$)
*Adjusted for sex, income quintiles, urbanicity, two parent family, number of children in the family, maternal mental health diagnosis, and being taken into care during childhood
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, ADHD, substance use disorders, conduct disorders, psychotic disorders (including schizophrenia) and personality disorders.

Social Services Use

Before adjusting for other childhood factors, all the childhood/adolescent mental illnesses (except for ADHD) predicted social services use as a young adult (Table 5.4). After adjusting, people diagnosed with any of the childhood/adolescent mental illnesses were more likely to receive income assistance as an adult (aHRs ranging from 1.79 to 2.48) compared to those not diagnosed with these illnesses in childhood/adolescence. We note that the aHRs were relatively similar across the mental health indicators, suggesting that they posed similar risks for increased use of income assistance. Regarding living in social housing, almost all childhood/adolescent mental illnesses were associated with using this service prior to adjustment for other childhood factors. After adjusting, the association remained for most of the indicators. For example, compared to people with no childhood/adolescent history of attempted suicide, those who attempted suicide were more likely to live in social housing in early adulthood (aHR: 1.67). However, after adjusting, the associations between ADHD or psychotic disorders and living in social housing were no longer statistically significant, suggesting that other childhood factors explained the association between having a history of these childhood/adolescent mental illnesses and social housing.

Table 5.4: Associations between Diagnosed Childhood/Adolescence Mental Disorders and Receiving Income Assistance or Living in Social Housing as an Adult

	Receiving Income Assistance Hazard Ratios		Living in Social Housing Hazard Ratios	
Childhood Mental Illness	Unadjusted	Adjusted*	Unadjusted	Adjusted*
Mood and Anxiety Disorders	**2.83 (2.64-3.03)**	**2.15 (2.00-2.31)**	**2.50 (2.22-2.81)**	**1.52 (1.35-1.72)**
Attention-Deficit Hyperactivity Disorder (ADHD)	**2.35 (2.13-2.61)**	**2.34 (2.10-2.60)**	0.90 (0.71-1.14)	1.20 (0.95-1.51)
Substance Use Disorders	**3.39 (3.08-3.72)**	**1.91 (1.72-2.11)**	**3.77 (3.25-4.37)**	**1.57 (1.35-1.84)**
Conduct Disorder	**2.31 (2.11-2.53)**	**1.94 (1.76-2.13)**	**1.94 (1.65-2.27)**	**1.49 (1.26-1.75)**
Psychotic Disorders (including Schizophrenia)	**3.99 (3.28-4.84)**	**2.48 (2.04-3.02)**	**2.43 (1.66-3.56)**	1.27 (0.87-1.86)
Personality Disorders	**3.92 (3.32-4.63)**	**2.17 (1.83-2.58)**	**3.13 (2.34-4.18)**	**1.40 (1.04-1.88)**
Any Mental Illness	**2.81 (2.65-2.98)**	**2.28 (2.14-2.43)**	**2.41 (2.18-2.66)**	**1.60 (1.44-1.78)**
Hospitalizations for Attempted Suicide	**3.64 (3.17-4.19)**	**1.79 (1.55-2.07)**	**4.83 (3.96-5.88)**	**1.67 (1.36-2.05)**

Bold indicates a statistically significant association ($p<0.05$)
*Adjusted for sex, income quintiles, urbanicity, two parent family, number of children in the family, maternal mental diagnosis, and being taken into care during childhood
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, ADHD, substance use disorders, conduct disorders, psychotic disorders (including schizophrenia) and personality disorders.

Justice System Involvement

Table 5.5 shows that having a diagnosed childhood/adolescent mental illness increased the likelihood of justice system involvement in adulthood, even after adjusting for a number of other childhood factors. People who were diagnosed with substance use disorders were over two times more likely to be accused of a crime (aHR: 2.23) or be the victim of a crime (aHR: 2.04) compared to those with no childhood/adolescent substance use disorders. The magnitude of the risk (size of the hazard ratio) of childhood/adolescent mental illness was similar for both accusations and victimizations. The strongest predictor of justice system involvement in adulthood was a suicide attempt in adolescence, followed by childhood/adolescent substance use and personality disorders. Adjusting for other childhood factors attenuated the hazard ratios for all the childhood mental health indicators, and the relationship between psychotic disorders and justice system involvement was no longer statistically significant. We note that being hospitalized for attempted suicide in adolescence carried a greater risk of being accused of a crime in early adulthood than conduct disorder (adjusted hazard ratios of 2.23 vs 1.34, respectively), which is surprising since having conduct disorder is often considered a major risk factor for getting involved in crime.

Table 5.5: Associations between Diagnosed Childhood/Adolescence Mental Disorders and Criminal Accusation or Victimization as an Adult

	Criminal Accusation Hazard Ratios		Criminal Victimization Hazard Ratios	
Childhood Mental Illness	**Unadjusted**	**Adjusted***	**Unadjusted**	**Adjusted***
Mood and Anxiety Disorders	**1.34 (1.28-1.41)**	**1.32 (1.25-1.39)**	**1.89 (1.79-2.01)**	**1.44 (1.36-1.53)**
Attention-Deficit Hyperactivity Disorder (ADHD)	**2.15 (2.02-2.29)**	**1.45 (1.36-1.55)**	**1.47 (1.35-1.61)**	**1.31 (1.19-1.43)**
Substance Use Disorders	**3.14 (2.95-3.33)**	**2.23 (2.09-2.38)**	**3.46 (3.22-3.72)**	**2.04 (1.89-2.20)**
Conduct Disorder	**1.93 (1.82-2.04)**	**1.34 (1.27-1.42)**	**1.69 (1.57-1.82)**	**1.33 (1.23-1.44)**
Psychotic Disorders (including Schizophrenia)	**1.79 (1.53-2.10)**	1.13 (0.97-1.33)	**1.61 (1.31-1.98)**	1.01 (0.82-1.25)
Personality Disorders	**2.30 (2.03-2.60)**	**1.68 (1.48-1.91)**	**2.86 (2.48-3.30)**	**1.69 (1.47-1.96)**
Any Mental Illness	**1.83 (1.77-1.90)**	**1.55 (1.50-1.61)**	**2.00 (1.91-2.09)**	**1.58 (1.50-1.65)**
Hospitalizations for Attempted Suicide	**2.78 (2.53-3.06)**	**2.23 (2.02-2.46)**	**4.55 (4.12-5.02)**	**2.45 (2.21-2.71)**

Bold indicates a statistically significant association ($p<0.05$)
*Adjusted for sex, income quintiles, urbanicity, two parent family, number of children in the family, maternal mental health diagnosis, and being taken into care during childhood
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, ADHD, substance use disorders, conduct disorders, psychotic disorders (including schizophrenia) and personality disorders.

Not Graduating from High School

Having a diagnosed childhood/adolescent mental illness increased the likelihood of not graduating from high school, even after adjusting for other childhood factors. People with childhood/adolescent substance use disorders (adjusted odds ratio (aOR): 3.45) or suicidal behaviours (aOR: 3.12) were three times less likely to graduate from high school compared to those without these mental health problems in childhood/adolescence. Adjusting for the other childhood factors attenuated the odds ratios; however, the association between not graduating from high school and all the childhood/adolescent mental health indicators remained statistically significant.

Table 5.6: Associations between Diagnosed Childhood/Adolescence Mental Disorders and Not Graduating From High School

	Odds Ratios	
Childhood Mental Illness	**Unadjusted**	**Adjusted***
Mood and Anxiety Disorders	**1.85 (1.71-1.99)**	**1.72 (1.58-1.88)**
Attention-Deficit Hyperactivity Disorder (ADHD)	**2.66 (2.40-2.94)**	**2.15 (1.92-2.41)**
Substance Use Disorders	**5.52 (4.90-6.22)**	**3.45 (3.01-3.95)**
Conduct Disorder	**2.44 (2.23-2.68)**	**1.81 (1.63-2.01)**
Psychotic Disorders (including Schizophrenia)	**3.42 (2.64-4.44)**	**2.17 (1.60-2.93)**
Personality Disorders	**4.02 (3.23-5.00)**	**2.49 (1.94-3.21)**
Any Mental Illness	**2.50 (2.36-2.65)**	**2.10 (1.97-2.24)**
Hospitalizations for Attempted Suicide	**5.23 (4.29-6.37)**	**3.12 (2.49-3.91)**

Bold indicates a statistically significant association ($p<0.05$)
*Adjusted for sex, income quintiles, urbanicity, two parent family, number of children in the family, maternal mental health diagnosis, and being taken into care during childhood
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, ADHD, substance use disorders, conduct disorders, psychotic disorders (including schizophrenia) and personality disorders

What Do these Results Mean?

Having a diagnosed childhood or adolescent mental illness increased the likelihood of adverse early adult outcomes, including being diagnosed with mental illness as an adult, suicidal behaviours, receiving income assistance, living in social housing, being accused of a crime, being a victim of a crime, and not graduating from high school. Adjusting for other childhood factors attenuated these associations, but almost all remained statistically significant. We note that the strength of the association (size of the hazard or odds ratio) differed across mental disorders. For example, mood and anxiety disorders tended to be associated with lower levels of risk, although, considering the high prevalence of mood and anxiety disorders among children and adolescents in Manitoba [14], this relatively smaller risk should not be discounted.

The association between childhood/adolescent mental illness and later adult mental health problems has been well documented [92]. Kessler et al. found that half of people reporting mental illness in adulthood had symptoms before age 14 and three quarters had symptoms before age 24 [27]. A variety of factors, including individual characteristics, family resources, school quality, and community level services and supports can positively or negatively influence whether or not a young person will develop mental illness. People who were hospitalized for attempted suicide before age 18 were at particularly high risk for early adult mental illness and for all adverse adult outcomes. Other studies have reported later adverse outcomes associated with suicide ideation in children. Herba and colleagues found that individuals with childhood suicidal ideation were more likely to report suicide attempts and mental illness in young adulthood [93].

Lahey has proposed different explanations linking childhood and adult mental illness. Both may have the same underlying causes, including genetic and early environmental risk factors. It may also be that the dysfunction associated with childhood mental illness puts the person at greater risk for adult mental illness, for example, poorer education attainment leading to lower employment possibilities and increased stress. Finally, the same stressors experienced in childhood, such as violence or economic pressures, may be present across the lifespan, placing the person at risk in both childhood and adulthood [94].

The few studies that have focused on the long term social and academic consequences of childhood and adolescent mental illness are consistent with the findings in this study. Goodman et al. found that those with childhood mental illness were less likely to find work and get married [88]. Further, these authors calculated that a 23-year-old person with a history of a childhood mental illness entering the 2008 labour market would miss out on the equivalent of $650,000 over their lifetime. Mordre et al. concluded that conduct disorder in childhood was associated with criminality in adulthood, but that ADHD was not [95].

These results were adjusted for sex, family difficulties, developmental disorders and other emotional and behavioural disorders. Similar to the present study, Breslau et al. found that young people with childhood mental disorders were between 1.5 to 3.5 times more likely to not graduate from high school [89]. Verboom et al. found, using longitudinal data, that children with depression were more likely to have poor academic performance over time, while those with poor academic performance were more likely to be depressed over time [96].

Other childhood factors explained some of the association between childhood/adolescent mental illness and adult outcomes, but not all. These observations point to the importance of supporting families, decreasing the number of children in care, and addressing maternal mental illness. Fryers and Brugha have reviewed the literature on the childhood determinants of adult mental illness and have identified the following critical determinants: child abuse and neglect, parenting and parent-child relationships, disrupted and dysfunctional families, adversity, genetic influences, school performance, and neurodevelopmental problems [97]. Many of these childhood determinants are modifiable with the appropriate supports or programs, such as home visiting programs, financial support or parenting support groups.

Strengths and Limitations

The strengths and limitations of the analyses conducted in this chapter should be considered when interpreting the findings. The study is based on a population-based cohort and included all records of physician-diagnosed mental illness and all records of adverse adult outcomes. The cases of childhood and adolescent mental illness were not based on recall, which can often be biased, but rather on physician visits for mental health reasons over the course of childhood/adolescence. However, our study did not capture those who may have experienced a mental illness in childhood or adolescence but did not seek help from a physician. It is unclear how including these unidentified cases in our study would have influenced the results.

Another strength was our ability to take into account other childhood factors that could potentially affect the adverse adult outcomes. Our analyses showed that these other childhood factors partially explained the association observed but certainly not all of it. We acknowledge that we could not account for all confounding variables such as genetic factors, parenting styles, and characteristics of fathers. Using the two parent family variable, we could ascertain children with parents who had registered their unions with Manitoba Health (either common-law or marriages); however, many parents do not register their unions and therefore were misclassified as single parent families.

The decision to restrict our birth cohort to people born in Manitoba may have influenced the results because of potential differences in the characteristics of people born in Manitoba and those who moved into the province after birth. Because not everyone who resided in Manitoba during their childhood did so continuously, we could not include all of them in our main cohort. We conducted sensitivity analyses to see if our result would stay the same using a larger, more inclusive cohort. We found that our results remained essentially the same. (Details of the sensitivity analyses methods are found in Appendix 7.) In addition, the statistical technique (survival analysis) we used allowed us to follow the entire cohort over the young adult period and adjust for those who were no longer in the cohort because of death or having moved out of the province.

Our understanding of childhood and adolescent mental illness has increased rapidly over the last few decades [98]. Those growing up in the 1990s were less likely to receive mental health services than children and adolescents today. The young people in our study may not have received adequate treatment for their mental illness and this almost certainly has influenced the results of our study. Future research could investigate further how early intervention and treatment influences long-term outcomes of children and adolescents experiencing mental illness.

Conclusion

The findings in this chapter reveal that mental illness experienced in childhood or adolescence has long-term consequences. Young people's health status has significant influence on the trajectories of their health and well-being into early adulthood and compels us to consider what is required for these young people now that will also benefit them in 10 to 20 years. O'Connell et al. led a report entitled "Preventing Mental, Emotional and Behavioural Disorders Among Young People: Progress and Possibilities" and argued the importance of an intersectoral approach to the prevention and early intervention of mental illness in children [9]. Given that many services touch the lives of children, efforts to promote mental health and prevent mental illness require concerted efforts from multiple sectors including public health, child welfare, education and justice systems.

Chapter 6:
Summary of Results and Recommendations

The first purpose of this report was to describe the burden of mental illness in Manitoba by examining the diagnostic prevalence of mental health indicators among adults, as well as the healthcare use and justice system involvement of adults with mental illness. A second purpose was to study the relationship between childhood/adolescent mental illnesses and adverse adult outcomes by following a birth cohort of Manitobans. It is hoped that this report will help inform the development of Manitoba's Mental Health and Addictions (MHA) Strategy, including the provincial Child and Youth Mental Health Strategy, and provide a measure of adult mental health in Manitoba prior to implementation of the strategy.

Summary of Results: Burden of Illness

Diagnostic Prevalence of Mental Illness

Over a five-year period from 2010/11 to 2014/15, this study found that 27.6% of adults in Manitoba received a diagnosis of at least one of the mental illnesses examined in this study. This high prevalence was driven by mood and anxiety disorders (23.2%), followed by substance use disorders (5.9%), psychotic disorders (2.3%) and personality disorders (0.9%). The prevalence of mental illness appears to have remained stable since the 2004 MCHP report [1]. Differences were found in mental illness prevalence across specific health regions in Manitoba. Mental illness tended to be diagnosed more commonly among younger (25 to 44 years old) and middle-aged adults (45 to 64 years old) than among youth (18 to 24 years old) or older adults (65 years and older). Men were more likely to be diagnosed with substance use and psychotic disorders than women, and conversely, women were more likely to be diagnosed with mood and anxiety disorders than men. The prevalence of most mental illnesses was higher in urban areas than rural areas, and in both areas, there was a linear trend across income quintiles, where the prevalence of mental illness increased as area-level income decreased.

Diagnostic Prevalence of Dementia

The five-year diagnostic prevalence of dementia was 10.3% and has essentially remained the same since the 2004 MCHP report. Some differences were found between health regions. The prevalence of dementia increased dramatically with age. Among men and women aged 85 and older, the prevalence was 64% and 59%, respectively. No statistically significant differences were found between men and women, nor between

urban and rural regions. In both urban and rural regions, there was a linear trend across income quintiles, where the prevalence of dementia increased as area-level income decreased.

Suicide and Attempted Suicide Rates

During the five-year period, we identified 67 deaths by suicide per 100,000 adults and 262 attempted suicides that resulted in hospitalization per 100,000 adults. The suicide rate presented in this report has remained unchanged since the 2004 MCHP report. When we broadened our definition of suicide to include deaths by poisonings of undetermined intent, and poisonings of undetermined intent and accidental poisonings, the rate was as high as 71 and 88 deaths per 100,000 adults, respectively. Men had higher suicide rates than women overall; however, only the 45-64 age group was statistically significantly different when divided into age groups. Overall, women had higher rates of hospitalizations for suicide attempts than men, although these sex differences varied by age groups. Suicidal death rates were highest in Interlake-Eastern and in Northern, while hospitalization rates for attempted suicide were highest in Prairie-Mountain and Northern. No statistically significant differences were found in suicide rates between urban and rural regions; however, hospitalization rates for attempted suicide were higher in rural than in urban regions. In both rural and urban regions, the rate of suicidal behaviours increased as area-level income decreased.

Diagnostic Prevalence in Specific Populations

When compared to the Manitoba prevalence, higher prevalence of mental illness was found among people living in personal care homes, those receiving income assistance, those living in social housing, those accused of a crime and those who were victims of a crime. We measured mental illness and service use at the same time and so cannot determine whether the mental illness was present before becoming part of the specific population being studied or whether the mental illness occurred afterwards.

Compared to women who had not recently given birth, we found that women in the postpartum period had lower rates of mental illness after adjusting for factors that could be linked to mental illness. When compared to their pre-pregnancy mental health, women in the postpartum period had a higher prevalence of psychotic disorders and a similar prevalence of mood and anxiety disorders, substance use disorders and attempted suicide. Although not at a higher risk for mental illness, women in the postpartum period who are suffering from mental illness should be recognized as a potentially vulnerable subgroup and provided with mental health promotion and treatment services as needed.

Healthcare Use and Justice System Involvement among Adults with Mental Illness

People with mental illness used more healthcare services compared to those without mental illness even after controlling for age, sex, income and medical conditions. Notably, the rates of long stay hospitalizations (lasting 14 to 365 days) were three times higher for people with mood and anxiety disorders and almost 14 times higher for those who had attempted suicide compared to those with no mental illness. Emergency department visit rates were almost twice as high for people with mood and anxiety disorders and three time higher for those who had attempted suicide compared to people with no mental illness. People with mental illness were more likely to be accused of a crime or be a victim of a crime compared to people with no mental illness. Those diagnosed with substance use disorders were four times more likely to be accused of a crime or be a victim of a crime compared to people without a diagnosis of mental illness.

Summary of Results: Long-Term Association between Childhood/ Adolescent Mental Illness and Adverse Adult Outcomes

Association between Childhood/Adolescent Mental Illness and Adult Mental Illness

Of the 60,838 people in the 1980/81 to 1984/85 Manitoba birth cohort, 16.5% were diagnosed with a mental illness during their childhood or adolescence. In fact, among those diagnosed with mental illness over their lifetime (at some point from childhood to age 34), a high proportion were first diagnosed before the age of 18. For example, 35% of those diagnosed with mood and anxiety disorders, and 97% of those with attention-deficit hyperactivity disorder were first diagnosed in childhood or adolescence. In addition, we found that having a diagnosed childhood/adolescent mental illness increased the risk of being diagnosed with the same illness in adulthood. For example, those diagnosed with a childhood/adolescent substance use disorder were over three times more likely to also be diagnosed as a young adult compared to those with no diagnosis of substance use disorders in childhood/adolescence.

Association between Childhood/Adolescent Mental Illness and Adverse Adult Outcomes

This study found that having a diagnosed childhood/ adolescent mental illness increased the likelihood of a range of adverse experiences in adulthood, including

suicidal behaviours, not graduating from high school, being accused of a crime, being a victim of a crime, receiving income assistance, and living in social housing. For example, people who were hospitalized for attempted suicide before age 18 were three times more likely to die by suicide and six times more likely to be re-hospitalized for suicide attempts in adulthood. Other childhood factors such as income, living in a two parent family, maternal mental health, child welfare involvement, urban (versus rural) residence and sex explained some of the association between childhood/adolescent mental disorders and adult outcomes, but the association remained strong and statistically significant even when adjustments for these factors were made, suggesting childhood/adolescent mental illness is a very important risk marker.

Recommendations

Based on our report findings, the team proposes the following recommendations to better promote mental health and to prevent and treat mental illness in order to improve the well-being of Manitobans, but also to address the costs of mental illness to health, education and social services. It is hoped that the following recommendations inform the Mental Health and Addictions (MHA) Strategy. In preparing these recommendations, we drew from several jurisdictions who have developed mental health strategies [99–102].

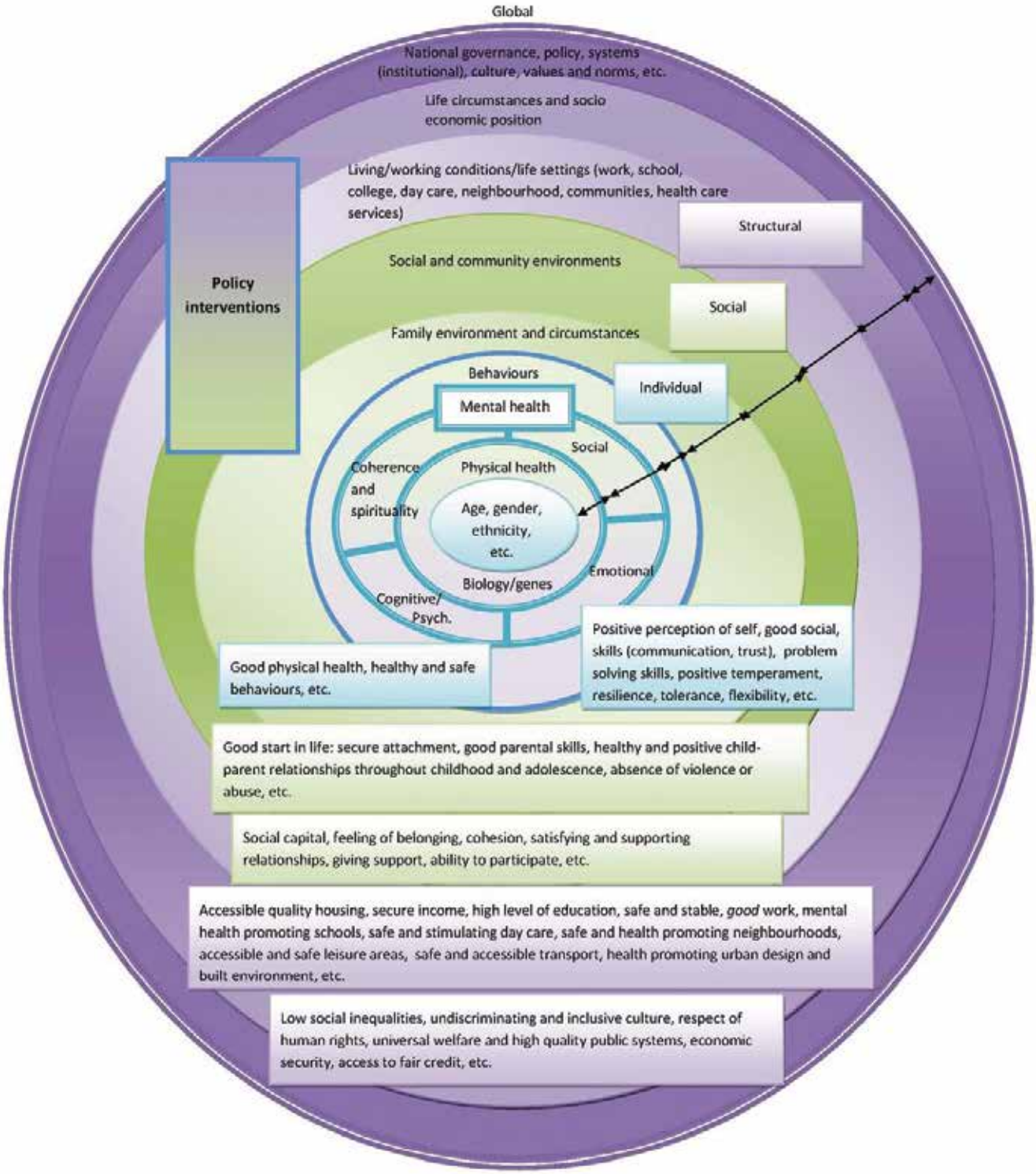
Mental Health Promotion and Mental Illness Prevention

Given the high prevalence of mental illness and the substantial economic and social costs to Manitoba [103,104], a broader approach to the mental health of Manitobans should be adopted. A considerable amount of research has shown that both protective factors and risk factors are associated with mental illness. Some factors, such as genetics, are difficult to change, but many modifiable social and structural factors have also been identified, and these social and structural factors have the potential to promote mental health and prevent mental illness and the associated long-term consequences. Promotion and prevention efforts should be strengthened and scaled up to address the high prevalence of mental illness.

The National Collaborating Centre for Healthy Public Policy proposed a framework that illustrates the layers of factors influencing mental health, and provides policy directions that can influence population mental health [105]. Figure 6.1 illustrates the levels of influence for public policies. Factors associated with mental health are listed at the individual, social and structural levels, as well as areas with potential policy implications.

Figure 6.1: Policy Framework for Mental Health

From the National Collaborating Centre for Healthy Public Policy: Framework for Healthy Public Policy Favouring Mental Health, 2014



This current report illustrates the need for policies that address factors that put children at risk for mental illness and that in turn can address the long-term adverse outcomes in adults. We found that children and adolescents with mental illness were at high risk for being diagnosed with mental illness in adulthood as well as experiencing other adverse social outcomes. Policies could be directed at ensuring nurturing environments for children, including early childhood programs, reducing adverse childhood experiences (poverty, violence, abuse and neglect), and improving parenting skills [106]. Manitoba is currently implementing evidence-based programs that support parents and provide nurturing environments for children. These include the Healthy Baby Prenatal Benefit [107,108], the Families First Home Visiting program [109–111] and the Towards Flourishing program [112]. Other programs in Manitoba include the PAX Good Behaviour Game, a school-based program that has been shown to improve mental health [113,114] and prevent suicide [115–117]. Social housing is also associated with positive outcomes for school-aged children and adolescents [68]. In terms of promotion and prevention efforts for adults, policies could include: employment opportunities, healthy workplaces, accessible quality housing, and health-promoting neighbourhoods, urban designs and built environments.

Enhance Access and Strengthen Mental Health Services

Mental health services include a continuum of services, from prevention to early detection to treatment of mental illness. Increasing the mental health and addictions workforce is crucial, as is developing innovative strategies in delivering services (e.g., Group Cognitive Behaviour Therapy, a psychological therapy provided in a group setting rather than an individual one, or Stepped Care, a service model that provides a continuum of services). Equally important is integrating mental health services with other government services, addressing barriers to care, strengthening services in remote regions, and addressing the mental health needs at sensitive periods in the life course: during the perinatal period, in childhood and in adolescence.

Integrated Care - As shown in this report, people with mental illness utilize services in many sectors. It is therefore suggested that an intersectoral approach be taken to address the needs of people with mental illness. The following are some examples of where government departments directly impact the lives of people with mental illness:

- Education and Training - Employment and vocational opportunities for those living with mental illness. Employment improves mental health, reduces the need for health services, increases financial well-being and creates positive social networks. Access to work for persons with mental illness can be improved through the use of supported employment programs [118].
- Families - Housing for those with mental illness is a challenge. Policies and supports should be in place to ensure adequate housing.
- Justice - The association between mental illness and the justice system has been demonstrated in this report and elsewhere. Dupuis, MacKay and Nicol recommend diversion programs whereby people with mental illness that are about to enter the justice system can be diverted into care with services and supports in the community [119]. A Manitoba program has been shown to reduce criminal accusations among people who have experienced their first episode of psychosis [120].

Addressing Barriers to Care - Some strategies include decreasing stigma by ensuring a sustained and comprehensive stigma reduction strategy, and coordinating primary and specialist care as well as culturally safe practices when working with Indigenous and immigrant people.

Mental Health during Pregnancy and Postpartum - This report found that women in the postpartum period were more likely to be diagnosed with psychotic disorders compared to the period before pregnancy. Given the association between maternal mental health and the health and development of children, ensuring adequate access to mental health services for women during pregnancy and the postpartum period is imperative.

Childhood/Adolescent Mental Health - The findings of this report demonstrate that mental illness has its roots in childhood/adolescence, pointing to the importance of strengthening all levels of mental health services for this group across the continuum from mental health promotion to treatment.

Strengthening Northern Mental Health Services - This report points to higher suicide and attempted suicide rates in the Northern Health Region, as well as northern areas in other health regions. Innovative services such as Telehealth and eMental Health should be explored to bring health services to northern communities. Given that many people living in northern communities are Indigenous, working closely with these communities to address their mental health needs in a culturally safe manner is crucial.

Enhance Access and Strengthen Services for People with Dementia

This report found a high prevalence of diagnosed dementia in Manitoba, particularly for people aged 75 and older. Our findings also suggest that many people with dementia live in personal care homes and in social housing, pointing to areas where services are needed. Other aspects to consider include ensuring training of staff working with people with dementia, assessing and preparing for those with dementia and behavioural challenges, and providing support for caregivers of people with dementia.

Suicide Prevention

Suicide rates were higher in Manitoba compared to the Canadian average. It is imperative to promote mental health, prevent mental illness, and ensure access to mental health services, given that most people who attempted suicide were previously diagnosed with mental illness (see Appendix Table 4.5). Assessing the presence of suicidal thoughts or intent is an important first step. The World Health Organization recommends that all people over the age of 10 with a mental disorder or other risk factor be asked about recent thoughts or plans of self-harm [121]. Suicide hotlines have been shown to reduce distress and suicidal thoughts or intent for the callers over the course of a call [122–124]. The period following discharge from the hospital or the emergency department is a particularly vulnerable time for people with mental illness [125]. Bolton et al. provide a number of clinical guidelines for suicide prevention such as assessing for suicide, treating people with suicidal ideation, and providing follow-up care such as telephone calls, repeat assessments, case management, and caring letters or postcards [125].

Workforce Development

This report found that people with mental illness are using healthcare and social services more often than people without mental illness. Given the high prevalence of mental illness found among people accessing services like social housing, income assistance or the justice system, better training in mental health skills and knowledge should be provided for the workforce across all Manitoba services.

Address Health Inequities

Consistent with previous research, this report found that rates of mental illness increased as area-level income decreased. According to the World Health Organization, mental illness rates are higher among people who experience "rapid social change, stressful work conditions, gender discrimination, social exclusion, unhealthy lifestyle, risks of violence, physical ill-health and human rights violations" [126]. The inequities in mental illness require both social and economic interventions that reduce income inequalities.

Support Research and Evaluation

Our knowledge of mental health and illness has improved dramatically over the last decades, but a better understanding of promotion, prevention, early intervention and treatments is required to fully address the needs of people with mental illness. Research into mental health may not be funded as well as other illnesses [127].

As we implement new models of care in Manitoba, it is crucial that we evaluate them and learn what is working well and what could be improved. A comprehensive set of indicators for evaluating progress related to child, youth and adult mental health and illness over time is needed. The Canadian Alliance on Mental Illness and Mental Health provides examples of service performance indicators that were compared across provinces [83]. Important work on mental health and mental illness indicators has been done by the Canadian Institute for Health Information [128] and the Mental Health Commission of Canada [129]. To evaluate public policy, it is also important to study and regularly report on factors that have a direct and indirect influence on mental health and illness [130]. The Canadian government has proposed a Positive Mental Health Surveillance Indicator Framework to guide surveillance of protective and risk factors for mental health [131].

Concluding Remarks

This report found a high prevalence of mental illness in Manitoba, requiring not only mental health services but also other health and social services. We also found that childhood/adolescent mental health was associated with a range of adverse experiences in adulthood, including suicidal behaviours, use of social services, poor educational outcomes and justice system involvement. Given the profound consequences on the well-being of Manitobans and the impact on long-term services, greater investment in promoting mental health, preventing mental illness and in mental health services throughout the life course is imperative.

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Appendix 1

Appendix Table 1.1: Technical Definitions

Mental Illness Indicators	Definition
Mood and Anxiety Disorders	• One or more hospitalizations with a diagnosis for depressive disorder, affective psychoses, neurotic depression, adjustment reaction, bipolar disorder, an anxiety state, phobic disorders or obsessive-compulsive disorders: ICD-9-CM codes 296, 311, 309, 300 or ICD-10-CA codes F30, F31, F32, F33, F34, F38, F40, F41.0, F41.1, F41.2, F41.3, F41.8, F41.9, F42, F43, F53.0; OR • Two or more physician visits with a diagnosis for depressive disorder or affective psychoses, adjustment reaction or for anxiety disorders (including dissociative and somatoform disorders): ICD-9-CM codes 296, 311, 309, 300.
Substance Use Disorders	• One or more hospitalizations with a diagnosis for alcohol or drug psychoses, alcohol or drug dependence, or nondependent abuse of drugs: ICD-9-CM codes 291, 292, 303, 304, 305 or ICD-10-CA codes F10-F19, F55, Z50.2, Z50.3; OR • One or more physician visits with a diagnosis for alcohol or drug psychoses, alcohol or drug dependence, or nondependent abuse of drugs: ICD-9-CM codes 291, 292, 303, 304, 305.
Psychotic Disorders	• One or more hospitalizations with a diagnosis of psychotic disorders: ICD-9-CM codes 295, 297, 298 or ICD-10-CA codes F11.5, F12.5, F13.5, F14.5, F15.5, F16.5, F18.5, F19.5, F20, F22, F23, F24, F25, F28, F29; OR • One or more physician visits with a diagnosis of psychotic disorders: ICD-9-CM codes 295, 297, 298.
Schizophrenia	• One or more hospitalizations with a diagnosis of schizophrenia: ICD-9-CM code 295 or ICD 10 CA code F20; OR • One or more physician visits with a diagnosis of schizophrenia: ICD-9-CM code 295.
Personality Disorders	• One or more hospitalizations with a diagnosis for personality disorders: ICD-9-CM code 301 or ICD-10-CA codes: F21, F60, F61, F62, F69; OR • One or more physician visits with a diagnosis of personality disorders: ICD-9-CM code 301.
Any Mental Illness	One or more diagnoses for the following mental disorders: • Mood and Anxiety Disorders • Substance Use Disorders • Psychotic Disorders (including Schizophrenia) • Personality Disorders For the analyses in Chapter 5, ADHD and conduct disorder were also included.
Dementia	• One or more hospitalizations with a diagnosis for dementia, including organic psychotic conditions, cerebral degenerations, and senility: ICD-9-CM codes 290, 294, 331, 797, 291.1, 291.2, 292.82 or ICD–10–CA codes F00, F01, F02, F03, F04, F05.1, F10.7, F11.7, F12.7, F13.7, F14.7, F1.57,F16.7, F18.7, F19.7, G30, G31.0, G31.1, R54; OR • One or more physician visits with a diagnosis for dementia: ICD–9–CM codes 290, 294, 331, 797.

Appendix Table 1.1: Continued…

Mental Illness Indicators	Definition
Hospitalizations for Attempted Suicide	• One or more hospitalizations with a diagnosis for self–inflicted injury or poisoning: ICD-9-CM codes E950-E959 or ICD–10–CA codes X60–X84; OR • One or more hospitalizations with a diagnosis code for poisoning of undetermined intent, injury of undetermined intent, or accidental poisoning, only if there is a mental illness code during the hospital stay: ICD-9-CM codes E850-E854, E858, E862, E868 or ICD–10–CA codes Y10–Y34, T39, T40, T42.3, T42.4, T42.7, T43, T50.9, T58, X44, X46, X47.
Suicide	Suicide among adults was defined as having a death record in Vital Statistics data with the following listed as the primary cause of death: Definition 1: self-inflicted injury or poisoning, Definition 2: self-inflicted injury or poisoning, or poisonings of undetermined intent Definition 3: self-inflicted injury or poisoning, poisonings of undetermined intent, or accidental poisonings ICD codes: • Accidental Poisoning: ICD-9-CM coes E8509, E8529, E8502, E8629, E8689, or ICD-10-CA codes X40-X42, X46, X47 • Self inflicted poisoning: ICD-9-CM codes E950-E952, or ICD-10-CA codes X60-X69 • Self inflicted injury: ICD-9-CM codes E953, E954, E955, E956, E957, E958, or ICD-10-CA codes X70-X84 • Late effects of self inflicted injury: ICD-9-CM code E959, or ICD-10-CA codes Y10-Y12, Y16, Y17 , Y87.0
Attention Deficit Hyperactivity Disorder (ADHD)	• One or more hospitalizations with a diagnosis of hyperkinetic syndrome in one fiscal year: ICD-9-CM code 314 or ICD-10-CA code F90; OR • One or more physician claims with a diagnosis of hyperkinetic syndrome in one fiscal year: ICD-9-CM code 314; OR • Two or more prescriptions for ADHD drugs without a diagnosis in the same fiscal year of: - conduct disorder: ICD-9-CM code 312 or ICD-10-CA codes F63, F91, F92; OR - disturbance of emotions: ICD-9-CM code 313 or ICD-10-CA codes F93, F94; OR - cataplexy/narcolepsy: ICD-9-CM code 347 or ICD-10-CA code G47.4; OR • One prescription for ADHD drugs in one fiscal year with a diagnosis of hyperkinetic syndrome in the previous three years: ICD-9-CM code 314 or ICD-10-CA code F90 . The lists of ADH medication used was based on Brownell et al. (2012) found here: http://appserv.cpe.umanitoba.ca/concept/MB_Kids_2012_ADHD_DIN_List_DPIN.pdf
Conduct Disorder	• One or more hospitalizations with a diagnosis of conduct disorder: ICD-9-CM code 312 or ICD-10-CA codes F91 (all except F91.3 (oppositional disorder)); OR • One or more physician visits with a diagnosis of conduct disorder: ICD-9-CM code 312.

Appendix Table 1.1: Continued…

Childhood and Adolescent Factors	Definition
Area-Level Income Quintile	An income quintile is a measure of neighbourhood socioeconomic status that divides the population into 5 income groups (from lowest income to highest income) so that approximately 20% of the population is in each group.
Urban or Rural Residence	Individuals living in Winnipeg or Brandon have an urban residence. Individuals living elsewhere in Manitoba have a rural residence.
Two Parent Family	Two individuals who have registered their marital union with Manitoba Health and who have one or more children under the age of 18.
Number of Children in Family	The number of children registered under the "family head" in the Manitoba Health Registry.
Any Diagnosis of Maternal Mental Illness	Children whose mother had at least one diagnosis of mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) or personality disorders.
Being Taken into Care by Child and Family Services	Children who have been removed from the care of their original families because of a situation where authorities have deemed their family unable or unfit to look after them properly. In some cases, children are voluntarily placed into care by their parents or guardians. Children can come into care for a variety of reasons including abuse, neglect, illness, death of a parent, addiction issues or conflicts in their family, disability, or emotional problems.
Early Adult Outcomes	**Definition**
Not Graduating from High School	Individuals who have not completed grade 12 as determined by the Department of Education data.
Being Accused of a Crime	Individuals who have had contact with the justice system and are identified using the PRISM (Prosecutions Information and Scheduling Management) database as having been accused of a crime.
Being a Victim of a Crime	Individuals who have had contact with the justice system and are identified using the PRISM (Prosecutions Information and Scheduling Management) database as having been a victim of a crime.
Receiving Income Assistance	Individuals who receive financial assistance, administered through Manitoba's Employment and Income Assistance program, to meet basic personal and family needs.
Living in Social Housing	Individuals who reside in publicly assisted non-profit housing often subsidized by government funds. In this report, analysis is limited to people living in social housing that is owned and directly managed by Manitoba Housing.

Appendix 2

Northern Health Region Districts

Zone 1

- The Pas/OCN,Kels (The Pas, Opaskwayak Cree Nation, RM of Kelsey with the exclusion of Cranberry Portage)
- Flin,Snow,Cran,Sher (Flin Flon, Snow Lake, Cranberry Portage, Sherridon/Cold Lake)
- LL/MCFN,LR,O–P(SIL)CN,PN(GVL) (Lynn Lake, Marcel Colomb First Nation, Leaf Rapids, O-Pipon-Na-Piwin (South Indian Lake) Cree Nation, Granville Lake)
- Thompson, Myst Lake (Thompson and the LGD of Mystery Lake)
- Thick,Pik,Wab,Ilf/WLFN,Corm (The Bay Line (Thicket Portage, Pikwitonei, Wabowden, Ilford, War Lake First Nation, Cormorant))
- Gillam, Fox Lake Cree Nation

Zone 2

- GR/MisCN,ML/MosCN,Eas/CheCN (Grand Rapids, Misipawistik Cree Nation, Moose Lake, Mosakahiken Cree Nation, Easterville, Chemawawin Cree Nation, Unorganized Territory)
- Puk/Mat Col CN (Pukatawagan, Mathias Colomb Cree Nation)
- SayD(TL)FN,Bro/BLFN,NoL(Lac)FN (Churchill / Sayisi Dene (Tadoule Lake) First Nation, Brochet, Barren Lands (Brochet) First Nation, Northlands (Lac Brochet) First Nation)
- Nelson House/NCN (Incorporated Community of Nelson House, Nisichawayasihk (Nelson House) Cree Nation)
- Sham,YorkFN,TatCN(SPL) (Shamattawa First Nation, York Factory First Nation, Tataskweyak (Split Lake) Cree Nation)
- Bu(OH)CN,MS(GR)CN,GLN/GLFN (Bunibonibee (Oxford House) Cree Nation, Manto Sipi (God's River) Cree Nation, God's Lake Narrows, God's Lake First Nation)
- Cross Lake/Cross Lake FN (Incorporated Community of Cross Lake, Cross Lake First Nation)
- Norway House/NH CN (Norway House, Norway House Cree Nation)

Zone 3

- IsL/GHFN,RSL/RSLFN,STPFN,WFN (Island Lake, Garden Hill First Nation, Red Sucker Lake, Red Sucker Lake First Nation, St. Theresa Point First Nation, Wasagamack First Nation)

Appendix 3

Mood and Anxiety Disorders

Appendix Table 3.1: Counts and Percents of Adults With Mood and Anxiety Disorders by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	23,814	17.86%	17.68%
Winnipeg RHA	142,171	24.62%	24.73%
Prairie Mountain Health	34,287	26.55%	26.00%
Interlake-Eastern RHA	20,287	20.88%	20.39%
Northern Health Region	7,148	14.78%	14.43%
Manitoba	228,982	23.16%	23.16%

* adjusted for age and sex

Appendix Table 3.2: Counts and Percents of Adults With Mood and Anxiety Disorders by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	985	19.62%	18.83%
Stanley	387	10.36%	10.00%
Altona	1,025	15.46%	14.94%
Hanover	1,248	15.23%	14.54%
Roland/Thompson	239	15.68%	15.10%
Cartier/SFX	1,284	24.11%	23.33%
Niverville/Ritchot	1,662	21.80%	20.96%
Steinbach	2,776	18.94%	18.23%
Winkler	1,595	15.75%	15.42%
Morris	704	19.21%	18.50%
Carman	798	18.52%	17.93%
Ste Anne/LaBroquerie	1,431	19.03%	18.31%
St. Pierre/DeSalaberry	462	14.27%	13.75%
Morden	1,079	15.97%	15.30%
Tache	1,445	22.31%	21.46%
Lorne/Louise/Pembina	983	18.40%	18.00%
MacGregor	378	12.20%	11.85%
Notre Dame/St Claude	656	22.64%	22.30%
Rural East	462	14.76%	14.65%
Rural Portage	817	16.46%	15.92%
Red River South	554	16.27%	15.79%
City of Portage	2,247	19.50%	18.71%
Seven Regions	597	14.21%	13.93%
Prairie Mountain Health			
Bdn South End	2,562	34.11%	32.38%
Bdn West End	3,761	31.91%	30.35%
Turtle Mountain	1,830	23.26%	22.61%
Bdn North Hill	2,070	36.63%	34.86%
Spruce Woods	2,305	19.67%	18.85%
Whitemud	1,637	18.29%	18.06%
Souris River	2,190	19.87%	19.25%
Riding Mountain	1,078	25.23%	25.07%
Little Saskatchewan	2,136	23.55%	23.06%
Asessippi	1,563	16.01%	15.65%
Duck Mountain	873	19.60%	19.35%
Dauphin	2,473	35.94%	34.68%
Agassiz Mountain	1,149	21.54%	21.06%
Bdn East End	1,859	35.34%	33.73%
Swan River	1,291	31.18%	30.41%
Porcupine Mountain	1,910	28.27%	27.54%
Bdn Downtown	3,600	41.41%	39.72%
Manitoba	228,982	23.16%	23.16%

* adjusted for age and sex

Appendix Table 3.2: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	2,032	19.23%	18.44%
Stonewall/Teulon	2,944	20.18%	19.37%
Pinawa/LDB	1,378	20.14%	20.13%
Gimli	1,170	23.00%	22.57%
Wpg Beach/St. Andrews	2,770	20.86%	20.05%
Beausejour	1,470	21.38%	20.67%
Whiteshell	468	16.94%	16.66%
Arborg/Riverton	468	12.92%	12.54%
St. Clements	1,452	22.25%	21.52%
St. Laurent	612	18.24%	17.87%
Eriksdale/Ashern	1,011	20.24%	19.68%
Selkirk	2,190	27.87%	26.82%
Fisher/Peguis	791	17.13%	16.60%
Powerview/PF	1,304	30.99%	29.91%
Northern Remote	227	11.36%	10.82%
Northern Health Region			
Flin,Snow,Cran,Sher	1,056	17.25%	16.67%
Thompson, Myst Lake	1,642	15.64%	14.83%
The Pas/OCN,Kels	1,404	17.59%	16.50%
Gillam, Fox Lake Cree Nation	201	19.98%	19.09%
Thick,Pik,Wab,Ilf/WLFN,Corm	138	14.92%	14.42%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	169	16.65%	15.95%
Cross Lake/Cross Lake FN	321	11.95%	11.30%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	80	8.05%	7.66%
GR/MisCN,ML/MosCN,Eas/CheCN	253	11.26%	10.80%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	213	9.12%	8.72%
Norway House/NH CN	533	15.72%	15.00%
Puk/Mat Col CN	85	9.08%	8.42%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	720	16.25%	15.86%
Sham,YorkFN,TatCN(SPL)	161	8.38%	7.95%
Nelson House/NCN	172	9.24%	8.79%
Manitoba	228,982	23.16%	23.16%

* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.3: Counts and Percents of Adults With Mood and Anxiety Disorders by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	7,861	21.37%	21.49%
Fort Garry N	6,085	22.49%	22.54%
Assiniboine South	7,648	25.63%	25.55%
St. Vital S	7,986	24.85%	24.86%
St. Vital N	5,957	26.66%	26.37%
St. Boniface E	8,227	24.76%	24.66%
St. Boniface W	3,474	26.37%	26.25%
Transcona	7,408	26.01%	25.81%
River Heights W	8,112	26.91%	26.77%
River Heights E	4,871	26.44%	26.28%
River East N	1,601	20.21%	20.19%
River East E	5,300	22.54%	22.26%
River East W	7,912	24.25%	23.69%
River East S	3,535	24.82%	24.49%
St. James - Assiniboia W	8,260	31.01%	30.85%
St. James - Assiniboia E	6,482	28.82%	28.67%
Seven Oaks N	872	21.42%	21.40%
Seven Oaks W	3,731	17.42%	17.49%
Seven Oaks E	7,278	23.48%	23.29%
Inkster W	2,205	14.62%	14.48%
Inkster E	2,430	21.17%	20.96%
Downtown W	7,274	23.46%	23.10%
Downtown E	8,233	28.38%	28.70%
Point Douglas N	5,325	23.47%	23.22%
Point Douglas S	3,997	33.67%	33.56%
Churchill	107	14.50%	13.79%
Winnipeg	142,064	24.64%	24.64%

* adjusted for age and sex

Substance Use Disorders

Appendix Table 3.4: Counts and Percents of Adults With Substance Use Disorders by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	5,956	4.47%	4.41%
Winnipeg RHA	32,208	5.58%	5.59%
Prairie Mountain Health	8,354	6.47%	6.68%
Interlake-Eastern RHA	5,627	5.79%	5.88%
Northern Health Region	5,593	11.57%	10.82%
Manitoba	58,178	5.88%	5.88%

* adjusted for age and sex

Appendix Table 3.5: Counts and Percents of Adults With Substance Use Disorders by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	167	3.33%	3.18%
Stanley	104	2.79%	2.60%
Altona	217	3.27%	3.26%
Hanover	317	3.87%	3.70%
Roland/Thompson	48	3.15%	3.10%
Cartier/SFX	243	4.56%	4.41%
Niverville/Ritchot	289	3.79%	3.58%
Steinbach	650	4.43%	4.36%
Winkler	316	3.12%	3.08%
Morris	112	3.06%	3.06%
Carman	194	4.50%	4.79%
Ste Anne/LaBroquerie	455	6.05%	5.98%
St. Pierre/DeSalaberry	105	3.24%	3.26%
Morden	312	4.62%	4.71%
Tache	318	4.91%	4.59%
Lorne/Louise/Pembina	266	4.98%	5.22%
MacGregor	96	3.10%	3.11%
Notre Dame/St Claude	121	4.18%	4.29%
Rural East	154	4.92%	5.20%
Rural Portage	284	5.72%	5.64%
Red River South	196	5.76%	5.78%
City of Portage	770	6.68%	6.83%
Seven Regions	222	5.28%	5.27%
Prairie Mountain Health			
Bdn South End	452	6.02%	5.98%
Bdn West End	643	5.46%	5.48%
Turtle Mountain	523	6.65%	7.04%
Bdn North Hill	419	7.41%	7.47%
Spruce Woods	575	4.91%	5.16%
Whitemud	404	4.51%	4.60%
Souris River	674	6.12%	6.37%
Riding Mountain	219	5.13%	5.39%
Little Saskatchewan	519	5.72%	5.96%
Asessippi	553	5.66%	5.98%
Duck Mountain	207	4.65%	5.11%
Dauphin	435	6.32%	6.88%
Agassiz Mountain	412	7.72%	8.03%
Bdn East End	439	8.35%	8.48%
Swan River	323	7.80%	8.38%
Porcupine Mountain	676	10.00%	10.09%
Bdn Downtown	881	10.13%	9.89%
Manitoba	58,178	5.88%	5.88%

* adjusted for age and sex

Appendix Table 3.5: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	442	4.18%	4.10%
Stonewall/Teulon	740	5.07%	5.07%
Pinawa/LDB	377	5.51%	6.06%
Gimli	270	5.31%	6.04%
Wpg Beach/St. Andrews	670	5.05%	5.04%
Beausejour	356	5.18%	5.24%
Whiteshell	143	5.18%	5.31%
Arborg/Riverton	104	2.87%	2.93%
St. Clements	368	5.64%	5.62%
St. Laurent	190	5.66%	5.91%
Eriksdale/Ashern	387	7.75%	7.80%
Selkirk	621	7.90%	8.31%
Fisher/Peguis	307	6.65%	6.55%
Powerview/PF	488	11.60%	11.29%
Northern Remote	164	8.21%	7.53%
Northern Health Region			
Flin,Snow,Cran,Sher	460	7.51%	7.51%
Thompson, Myst Lake	1,084	10.32%	9.43%
The Pas/OCN,Kels	666	8.34%	8.05%
Gillam, Fox Lake Cree Nation	137	13.62%	12.25%
Thick,Pik,Wab,Ilf/WLFN,Corm	102	11.03%	10.54%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	232	22.86%	21.80%
Cross Lake/Cross Lake FN	454	16.90%	15.81%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	201	20.22%	18.42%
GR/MisCN,ML/MosCN,Eas/CheCN	187	8.33%	7.75%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	350	14.99%	13.99%
Norway House/NH CN	473	13.95%	12.88%
Puk/Mat Col CN	126	13.46%	12.33%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	432	9.75%	8.89%
Sham,YorkFN,TatCN(SPL)	385	20.04%	18.30%
Nelson House/NCN	304	16.33%	15.01%
Manitoba	58,178	5.88%	5.88%

* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.6: Counts and Percents of Adults With Substance Use Disorders by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	1,076	2.93%	2.89%
Fort Garry N	759	2.81%	2.89%
Assiniboine South	1,170	3.92%	4.09%
St. Vital S	1,131	3.52%	3.58%
St. Vital N	1,296	5.80%	5.92%
St. Boniface E	1,359	4.09%	4.05%
St. Boniface W	896	6.80%	7.04%
Transcona	1,675	5.88%	5.77%
River Heights W	1,246	4.13%	4.23%
River Heights E	1,177	6.39%	6.46%
River East N	296	3.74%	3.72%
River East E	1,269	5.40%	5.39%
River East W	1,670	5.12%	5.49%
River East S	1,251	8.78%	8.46%
St. James - Assiniboia W	1,330	4.99%	5.24%
St. James - Assiniboia E	1,302	5.79%	5.97%
Seven Oaks N	154	3.78%	3.82%
Seven Oaks W	708	3.31%	3.27%
Seven Oaks E	1,558	5.03%	5.09%
Inkster W	457	3.03%	2.93%
Inkster E	933	8.13%	7.96%
Downtown W	2,005	6.47%	6.28%
Downtown E	3,294	11.36%	11.00%
Point Douglas N	1,894	8.35%	8.12%
Point Douglas S	2,193	18.47%	17.97%
Churchill	109	14.77%	13.75%
Winnipeg	32,099	5.57%	5.57%

*adjusted for age and sex

Psychotic Disorders

Appendix Table 3.7: Counts and Percents of Adults With Psychotic Disorders by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	2,076	1.56%	1.65%
Winnipeg RHA	12,654	2.19%	2.24%
Prairie Mountain Health	4,292	3.32%	2.84%
Interlake-Eastern RHA	1,905	1.96%	2.05%
Northern Health Region	913	1.89%	2.59%
Manitoba	23,039	2.33%	2.33%

* adjusted for age and sex

Appendix Table 3.8: Counts and Percents of Adults With Psychotic Disorders by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	36	0.72%	0.92%
Stanley	20	0.54%	0.74%
Altona	105	1.58%	1.63%
Hanover	102	1.24%	1.58%
Roland/Thompson	11	0.72%	0.71%
Cartier/SFX	47	0.88%	1.10%
Niverville/Ritchot	119	1.56%	2.09%
Steinbach	239	1.63%	1.82%
Winkler	165	1.63%	1.71%
Morris	56	1.53%	1.56%
Carman	157	3.64%	3.02%
Ste Anne/LaBroquerie	118	1.57%	1.76%
St. Pierre/DeSalaberry	34	1.05%	1.11%
Morden	102	1.51%	1.41%
Tache	40	0.62%	0.90%
Lorne/Louise/Pembina	118	2.21%	1.94%
MacGregor	40	1.29%	1.38%
Notre Dame/St Claude	61	2.10%	1.88%
Rural East	56	1.79%	1.58%
Rural Portage	59	1.19%	1.44%
Red River South	34	1.00%	1.05%
City of Portage	267	2.32%	2.31%
Seven Regions	90	2.14%	2.21%
Prairie Mountain Health			
Bdn South End	189	2.52%	2.75%
Bdn West End	407	3.45%	3.24%
Turtle Mountain	205	2.61%	2.16%
Bdn North Hill	126	2.23%	2.51%
Spruce Woods	188	1.60%	1.45%
Whitemud	288	3.22%	2.82%
Souris River	254	2.30%	1.97%
Riding Mountain	169	3.96%	3.49%
Little Saskatchewan	299	3.30%	2.95%
Asessippi	272	2.79%	2.21%
Duck Mountain	139	3.12%	2.29%
Dauphin	551	8.01%	5.87%
Agassiz Mountain	127	2.38%	2.24%
Bdn East End	271	5.15%	4.38%
Swan River	134	3.24%	2.74%
Porcupine Mountain	173	2.56%	2.86%
Bdn Downtown	500	5.75%	5.86%
Manitoba	23,039	2.33%	2.33%

* adjusted for age and sex

Appendix Table 3.8: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	133	1.26%	1.50%
Stonewall/Teulon	353	2.42%	2.53%
Pinawa/LDB	135	1.97%	1.79%
Gimli	102	2.01%	1.63%
Wpg Beach/St. Andrews	139	1.05%	1.27%
Beausejour	167	2.43%	2.46%
Whiteshell	71	2.57%	2.65%
Arborg/Riverton	47	1.30%	1.24%
St. Clements	76	1.16%	1.40%
St. Laurent	61	1.82%	1.73%
Eriksdale/Ashern	108	2.16%	2.32%
Selkirk	276	3.51%	3.20%
Fisher/Peguis	106	2.30%	2.59%
Powerview/PF	94	2.23%	2.73%
Northern Remote	37	1.85%	2.66%
Northern Health Region			
Flin,Snow,Cran,Sher	138	2.25%	2.44%
Thompson, Myst Lake	151	1.44%	2.30%
The Pas/OCN,Kels	108	1.35%	1.80%
Gillam, Fox Lake Cree Nation	15	1.49%	2.33%
Thick,Pik,Wab,Ilf/WLFN,Corm	7	0.76%	1.07%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	23	2.27%	3.28%
Cross Lake/Cross Lake FN	56	2.08%	3.12%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	19	1.91%	2.95%
GR/MisCN,ML/MosCN,Eas/CheCN	36	1.60%	2.46%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	70	3.00%	4.07%
Norway House/NH CN	94	2.77%	4.39%
Puk/Mat Col CN	18	1.92%	2.62%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	102	2.30%	3.88%
Sham,YorkFN,TatCN(SPL)	46	2.39%	3.93%
Nelson House/NCN	30	1.61%	2.36%
Manitoba	23,039	2.33%	2.33%

* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.9: Counts and Percents of Adults With Psychotic Disorders by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	497	1.35%	1.59%
Fort Garry N	473	1.75%	1.65%
Assiniboine South	668	2.24%	2.04%
St. Vital S	589	1.83%	1.81%
St. Vital N	532	2.38%	2.41%
St. Boniface E	478	1.44%	1.62%
St. Boniface W	708	5.37%	4.69%
Transcona	305	1.07%	1.22%
River Heights W	695	2.31%	2.13%
River Heights E	487	2.64%	2.74%
River East N	68	0.86%	0.97%
River East E	391	1.66%	1.79%
River East W	718	2.20%	1.89%
River East S	300	2.11%	2.52%
St. James - Assiniboia W	521	1.96%	1.84%
St. James - Assiniboia E	515	2.29%	2.11%
Seven Oaks N	78	1.92%	1.79%
Seven Oaks W	281	1.31%	1.47%
Seven Oaks E	664	2.14%	2.16%
Inkster W	121	0.80%	0.97%
Inkster E	263	2.29%	2.56%
Downtown W	749	2.42%	2.67%
Downtown E	1,427	4.92%	5.51%
Point Douglas N	477	2.10%	2.44%
Point Douglas S	635	5.35%	5.79%
Churchill	14	1.90%	2.68%
Winnipeg	12,640	2.19%	2.19%

* adjusted by age and sex

Schizophrenia

Appendix Table 3.10: Counts and Percents of Adults With Schizophrenia by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	590	0.44%	0.44%
Winnipeg RHA	5,596	0.97%	0.95%
Prairie Mountain Health	947	0.73%	0.74%
Interlake-Eastern RHA	571	0.59%	0.58%
Northern Health Region	476	0.98%	0.94%
Manitoba	9,017	0.91%	0.91%

* adjusted for age and sex

Appendix Table 3.11: Counts and Percents of Adults With Schizophrenia by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	12	0.24%	0.24%
Stanley	7	0.19%	0.18%
Altona	12	0.18%	0.18%
Hanover	35	0.43%	0.42%
Roland/Thompson	s	s	0.13%
Cartier/SFX	21	0.39%	0.39%
Niverville/Ritchot	32	0.42%	0.41%
Steinbach	79	0.54%	0.54%
Winkler	57	0.56%	0.56%
Morris	13	0.35%	0.35%
Carman	23	0.53%	0.54%
Ste Anne/LaBroquerie	37	0.49%	0.49%
St. Pierre/DeSalaberry	s	s	0.18%
Morden	29	0.43%	0.43%
Tache	14	0.22%	0.21%
Lorne/Louise/Pembina	18	0.34%	0.34%
MacGregor	8	0.26%	0.26%
Notre Dame/St Claude	15	0.52%	0.52%
Rural East	24	0.77%	0.73%
Rural Portage	26	0.50%	0.50%
Red River South	7	0.21%	0.20%
City of Portage	89	0.79%	0.79%
Seven Regions	24	0.57%	0.57%
Prairie Mountain Health			
Bdn South End	35	0.47%	0.47%
Bdn West End	48	0.41%	0.41%
Turtle Mountain	25	0.32%	0.32%
Bdn North Hill	36	0.64%	0.64%
Spruce Woods	31	0.26%	0.27%
Whitemud	35	0.39%	0.39%
Souris River	35	0.32%	0.32%
Riding Mountain	48	1.12%	1.12%
Little Saskatchewan	26	0.29%	0.29%
Asessippi	33	0.34%	0.34%
Duck Mountain	41	0.92%	0.93%
Dauphin	136	1.98%	2.03%
Agassiz Mountain	42	0.79%	0.79%
Bdn East End	49	0.93%	0.94%
Swan River	70	1.69%	1.71%
Porcupine Mountain	88	1.30%	1.28%
Bdn Downtown	169	1.94%	1.97%
Manitoba	9,017	0.91%	0.91%

s indicates suppression due to small numbers
* adjusted for age and sex

Appendix Table 3.11: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	35	0.33%	0.33%
Stonewall/Teulon	56	0.38%	0.38%
Pinawa/LDB	26	0.38%	0.38%
Gimli	27	0.53%	0.54%
Wpg Beach/St. Andrews	49	0.37%	0.37%
Beausejour	41	0.60%	0.60%
Whiteshell	10	0.36%	0.36%
Arborg/Riverton	12	0.33%	0.33%
St. Clements	33	0.51%	0.50%
St. Laurent	17	0.51%	0.50%
Eriksdale/Ashern	47	0.94%	0.93%
Selkirk	138	1.76%	1.77%
Fisher/Peguis	26	0.56%	0.56%
Powerview/PF	38	0.90%	0.89%
Northern Remote	16	0.80%	0.78%
Northern Health Region			
Flin,Snow,Cran,Sher	47	0.77%	0.75%
Thompson, Myst Lake	88	0.84%	0.82%
The Pas/OCN,Kels	73	0.91%	0.91%
Gillam, Fox Lake Cree Nation	s	s	0.49%
Thick,Pik,Wab,Ilf/WLFN,Corm	s	s	0.43%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	14	1.41%	1.38%
Cross Lake/Cross Lake FN	24	0.89%	0.88%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	13	1.31%	1.27%
GR/MisCN,ML/MosCN,Eas/CheCN	20	0.89%	0.87%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	49	2.10%	2.04%
Norway House/NH CN	42	1.24%	1.21%
Puk/Mat Col CN	8	0.84%	0.82%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	44	0.99%	0.96%
Sham,YorkFN,TatCN(SPL)	29	1.51%	1.48%
Nelson House/NCN	16	0.86%	0.84%
Manitoba	9,017	0.91%	0.91%

s indicates suppression due to small numbers
* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.12: Counts and Percents of Adults With Schizophrenia by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	218	0.59%	0.60%
Fort Garry N	130	0.48%	0.49%
Assiniboine South	190	0.64%	0.66%
St. Vital S	166	0.52%	0.53%
St. Vital N	212	0.95%	0.97%
St. Boniface E	139	0.42%	0.42%
St. Boniface W	212	1.61%	1.64%
Transcona	141	0.50%	0.50%
River Heights W	243	0.81%	0.83%
River Heights E	246	1.34%	1.38%
River East N	s	s	0.22%
River East E	154	0.65%	0.67%
River East W	254	0.78%	0.80%
River East S	185	1.30%	1.31%
St. James - Assiniboia W	201	0.75%	0.78%
St. James - Assiniboia E	205	0.91%	0.93%
Seven Oaks N	17	0.42%	0.42%
Seven Oaks W	108	0.50%	0.51%
Seven Oaks E	254	0.82%	0.84%
Inkster W	67	0.44%	0.45%
Inkster E	147	1.28%	1.29%
Downtown W	474	1.53%	1.54%
Downtown E	979	3.38%	3.37%
Point Douglas N	248	1.09%	1.10%
Point Douglas S	384	3.23%	3.18%
Churchill	s	s	0.67%
Winnipeg	5,591	0.97%	0.97%

s indicates suppression due to small numbers
* adjusted for age and sex

Personality Disorders

Appendix Table 3.13: Counts and Percents of Adults With Personality Disorders by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	682	0.51%	0.51%
Winnipeg RHA	6,374	1.10%	1.09%
Prairie Mountain Health	1,131	0.88%	0.87%
Interlake-Eastern RHA	456	0.47%	0.47%
Northern Health Region	406	0.84%	0.79%
Manitoba	9,345	0.95%	0.95%

* adjusted for age and sex

Appendix Table 3.14: Counts and Percents of Adults With Personality Disorders by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	34	0.68%	0.69%
Stanley	9	0.24%	0.21%
Altona	27	0.41%	0.39%
Hanover	29	0.35%	0.33%
Roland/Thompson	s	s	0.26%
Cartier/SFX	38	0.71%	0.72%
Niverville/Ritchot	33	0.43%	0.43%
Steinbach	81	0.55%	0.53%
Winkler	48	0.47%	0.45%
Morris	21	0.57%	0.56%
Carman	21	0.49%	0.48%
Ste Anne/LaBroquerie	30	0.40%	0.38%
St. Pierre/DeSalaberry	s	s	0.24%
Morden	31	0.46%	0.44%
Tache	30	0.46%	0.46%
Lorne/Louise/Pembina	35	0.66%	0.65%
MacGregor	10	0.32%	0.32%
Notre Dame/St Claude	24	0.83%	0.81%
Rural East	10	0.32%	0.33%
Rural Portage	20	0.39%	0.38%
Red River South	13	0.38%	0.38%
City of Portage	102	0.90%	0.88%
Seven Regions	24	0.57%	0.55%
Prairie Mountain Health			
Bdn South End	35	0.47%	0.46%
Bdn West End	71	0.60%	0.59%
Turtle Mountain	64	0.81%	0.79%
Bdn North Hill	44	0.78%	0.78%
Spruce Woods	51	0.44%	0.43%
Whitemud	70	0.78%	0.77%
Souris River	51	0.46%	0.45%
Riding Mountain	51	1.19%	1.22%
Little Saskatchewan	39	0.43%	0.43%
Asessippi	34	0.35%	0.34%
Duck Mountain	53	1.19%	1.17%
Dauphin	129	1.87%	1.81%
Agassiz Mountain	61	1.14%	1.14%
Bdn East End	44	0.84%	0.79%
Swan River	61	1.47%	1.42%
Porcupine Mountain	116	1.72%	1.69%
Bdn Downtown	157	1.81%	1.72%
Manitoba	9,345	0.95%	0.95%

s indicates suppression due to small numbers
* adjusted for age and sex

Appendix Table 3.14: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	29	0.27%	0.28%
Stonewall/Teulon	78	0.53%	0.54%
Pinawa/LDB	33	0.48%	0.51%
Gimli	26	0.51%	0.53%
Wpg Beach/St. Andrews	54	0.41%	0.42%
Beausejour	31	0.45%	0.46%
Whiteshell	9	0.33%	0.33%
Arborg/Riverton	8	0.22%	0.22%
St. Clements	29	0.44%	0.46%
St. Laurent	12	0.36%	0.37%
Eriksdale/Ashern	31	0.62%	0.61%
Selkirk	52	0.66%	0.65%
Fisher/Peguis	32	0.69%	0.68%
Powerview/PF	25	0.59%	0.59%
Northern Remote	s	s	0.33%
Northern Health Region			
Flin,Snow,Cran,Sher	35	0.57%	0.58%
Thompson, Myst Lake	99	0.94%	0.91%
The Pas/OCN,Kels	107	1.34%	1.32%
Gillam, Fox Lake Cree Nation	14	1.39%	1.37%
Thick,Pik,Wab,Ilf/WLFN,Corm	13	1.41%	1.38%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	24	2.41%	2.32%
Cross Lake/Cross Lake FN	15	0.56%	0.51%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	7	0.70%	0.66%
GR/MisCN,ML/MosCN,Eas/CheCN	17	0.76%	0.72%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	19	0.81%	0.75%
Norway House/NH CN	13	0.38%	0.33%
Puk/Mat Col CN	9	0.94%	0.86%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	17	0.38%	0.35%
Sham,YorkFN,TatCN(SPL)	14	0.73%	0.69%
Nelson House/NCN	s	s	0.15%
Manitoba	9,345	0.95%	0.95%

s indicates suppression due to small numbers
* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.15: Counts and Percents of Adults With Personality Disorders by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	215	0.58%	0.57%
Fort Garry N	197	0.73%	0.72%
Assiniboine South	269	0.90%	0.90%
St. Vital S	204	0.63%	0.64%
St. Vital N	233	1.04%	1.03%
St. Boniface E	221	0.67%	0.67%
St. Boniface W	174	1.32%	1.29%
Transcona	241	0.85%	0.85%
River Heights W	334	1.11%	1.11%
River Heights E	269	1.46%	1.43%
River East N	s	s	0.58%
River East E	236	1.00%	1.01%
River East W	345	1.06%	1.03%
River East S	189	1.33%	1.32%
St. James - Assiniboia W	347	1.30%	1.29%
St. James - Assiniboia E	265	1.18%	1.17%
Seven Oaks N	79	1.94%	1.96%
Seven Oaks W	149	0.70%	0.71%
Seven Oaks E	248	0.80%	0.79%
Inkster W	64	0.42%	0.42%
Inkster E	169	1.47%	1.46%
Downtown W	406	1.31%	1.29%
Downtown E	854	2.94%	3.03%
Point Douglas N	293	1.29%	1.27%
Point Douglas S	323	2.72%	2.69%
Churchill	s	s	0.68%
Winnipeg	6,369	1.10%	1.10%

s indicates suppression due to small numbers
* adjusted for age and sex

Any Mental Illness

Appendix Table 3.16: Counts and Percents of Adults With Any Mental Illness by Health Region, 2010/11-2014/15

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	28,843	21.63%	21.64%
Winnipeg RHA	164,889	28.56%	28.24%
Prairie Mountain Health	40,674	31.50%	31.34%
Interlake-Eastern RHA	24,656	25.37%	25.09%
Northern Health Region	11,435	23.65%	23.47%
Manitoba	272,607	27.57%	27.57%

* adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.

Appendix Table 3.17: Counts and Percents of Adults With Any Mental Illness by Health Region District, 2010/11-2014/15

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	1,125	22.41%	21.85%
Stanley	479	12.83%	12.57%
Altona	1,223	18.45%	18.07%
Hanover	1,531	18.68%	18.19%
Roland/Thompson	280	18.37%	17.78%
Cartier/SFX	1,482	27.83%	27.21%
Niverville/Ritchot	1,895	24.86%	24.40%
Steinbach	3,264	22.27%	21.74%
Winkler	1,879	18.56%	18.34%
Morris	800	21.83%	21.21%
Carman	1,026	23.81%	23.12%
Ste Anne/LaBroquerie	1,806	24.02%	23.34%
St. Pierre/DeSalaberry	549	16.96%	16.49%
Morden	1,365	20.21%	19.45%
Tache	1,677	25.89%	25.34%
Lorne/Louise/Pembina	1,209	22.64%	22.17%
MacGregor	473	15.27%	14.98%
Notre Dame/St Claude	760	26.22%	25.87%
Rural East	607	19.39%	19.03%
Rural Portage	1,023	20.60%	20.14%
Red River South	715	21.00%	20.50%
City of Portage	2,872	24.92%	24.08%
Seven Regions	803	19.11%	18.90%
Prairie Mountain Health			
Bdn South End	2,882	38.37%	36.95%
Bdn West End	4,273	36.25%	35.16%
Turtle Mountain	2,285	29.04%	28.26%
Bdn North Hill	2,308	40.84%	39.22%
Spruce Woods	2,778	23.71%	22.81%
Whitemud	2,066	23.08%	23.00%
Souris River	2,730	24.77%	24.15%
Riding Mountain	1,294	30.28%	30.08%
Little Saskatchewan	2,633	29.03%	28.79%
Asessippi	2,078	21.28%	20.92%
Duck Mountain	1,056	23.71%	23.13%
Dauphin	2,887	41.96%	40.73%
Agassiz Mountain	1,412	26.47%	25.92%
Bdn East End	2,194	41.71%	39.97%
Swan River	1,447	34.94%	33.81%
Porcupine Mountain	2,244	33.21%	32.34%
Bdn Downtown	4,107	47.24%	45.84%
Manitoba	272,607	27.57%	27.57%

* adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.

Appendix Table 3.17: Continued…

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	2,390	22.62%	21.97%
Stonewall/Teulon	3,675	25.19%	24.84%
Pinawa/LDB	1,679	24.54%	24.47%
Gimli	1,386	27.25%	26.59%
Wpg Beach/St. Andrews	3,240	24.40%	23.60%
Beausejour	1,767	25.71%	25.10%
Whiteshell	608	22.01%	21.72%
Arborg/Riverton	558	15.41%	14.96%
St. Clements	1,716	26.30%	25.72%
St. Laurent	764	22.77%	22.26%
Eriksdale/Ashern	1,249	25.01%	24.34%
Selkirk	2,687	34.19%	32.92%
Fisher/Peguis	1,032	22.35%	21.99%
Powerview/PF	1,529	36.34%	35.27%
Northern Remote	376	18.82%	18.20%
Northern Health Region			
Flin,Snow,Cran,Sher	1,432	23.39%	22.91%
Thompson, Myst Lake	2,380	22.67%	21.92%
The Pas/OCN,Kels	1,869	23.42%	22.45%
Gillam, Fox Lake Cree Nation	298	29.62%	29.05%
Thick,Pik,Wab,Ilf/WLFN,Corm	215	23.24%	22.91%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	350	34.48%	33.72%
Cross Lake/Cross Lake FN	704	26.21%	25.78%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	252	25.35%	24.66%
GR/MisCN,ML/MosCN,Eas/CheCN	393	17.50%	17.28%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	513	21.97%	21.30%
Norway House/NH CN	906	26.72%	26.23%
Puk/Mat Col CN	187	19.98%	18.98%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	1,019	23.00%	22.91%
Sham,YorkFN,TatCN(SPL)	481	25.04%	24.63%
Nelson House/NCN	436	23.42%	22.90%
Manitoba	272,607	27.57%	27.57%

* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.

Appendix Table 3.18: Counts and Percents of Adults With a Mental Illness by Winnipeg Neighbourhood Cluster, 2010/11-2014/15

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	8,655	23.53%	23.68%
Fort Garry N	6,770	25.03%	25.01%
Assiniboine South	8,614	28.87%	28.73%
St. Vital S	8,898	27.69%	27.70%
St. Vital N	6,868	30.74%	30.29%
St. Boniface E	9,199	27.69%	27.56%
St. Boniface W	4,318	32.78%	32.66%
Transcona	8,486	29.80%	29.40%
River Heights W	9,123	30.27%	29.98%
River Heights E	5,705	30.97%	30.73%
River East N	1,822	23.01%	22.90%
River East E	6,240	26.54%	26.24%
River East W	9,209	28.22%	27.36%
River East S	4,319	30.33%	29.94%
St. James - Assiniboia W	9,213	34.59%	34.02%
St. James - Assiniboia E	7,460	33.17%	32.69%
Seven Oaks N	1,028	25.25%	25.08%
Seven Oaks W	4,304	20.10%	20.24%
Seven Oaks E	8,477	27.34%	27.08%
Inkster W	2,549	16.90%	16.80%
Inkster E	3,017	26.28%	26.00%
Downtown W	8,604	27.75%	27.23%
Downtown E	10,221	35.24%	35.49%
Point Douglas N	6,497	28.64%	28.35%
Point Douglas S	5,113	43.07%	42.68%
Churchill	180	24.39%	23.64%
Winnipeg	164,709	28.56%	28.56%

* adjusted for age and sex
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia) and personality disorders.

Dementia

Appendix Table 3.19: Counts and Percents of Adults With Dementia by Health Region, 2010/11-2014/15
Adults aged 55+

Health Region	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud	4,191	9.75%	10.02%
Winnipeg RHA	20,952	10.89%	10.68%
Prairie Mountain Health	5,073	9.95%	8.80%
Interlake-Eastern RHA	2,785	7.24%	8.85%
Northern Health Region	565	5.13%	8.95%
Manitoba	34,912	10.34%	10.34%

* adjusted for age and sex

Appendix Table 3.20: Counts and Percents of Adults With Dementia by Health Region District, 2010/11-2014/15
Adults aged 55+

Health Region District	Count	Crude Percent	Adjusted* Percent
Southern Health-Santé Sud			
MacDonald	74	5.05%	8.30%
Stanley	34	4.07%	7.23%
Altona	217	10.41%	9.66%
Hanover	147	7.07%	8.19%
Roland/Thompson	42	7.43%	7.77%
Cartier/SFX	77	4.56%	7.04%
Niverville/Ritchot	175	9.01%	12.15%
Steinbach	422	10.00%	9.61%
Winkler	445	15.17%	12.92%
Morris	134	10.85%	10.30%
Carman	260	14.22%	11.70%
Ste Anne/LaBroquerie	211	8.47%	9.65%
St. Pierre/DeSalaberry	76	6.53%	6.98%
Morden	314	13.32%	11.15%
Tache	70	4.21%	8.10%
Lorne/Louise/Pembina	242	10.71%	9.56%
MacGregor	83	7.77%	8.03%
Notre Dame/St Claude	133	12.20%	10.57%
Rural East	102	6.79%	7.50%
Rural Portage	99	5.63%	7.91%
Red River South	111	9.03%	9.55%
City of Portage	574	13.75%	12.63%
Seven Regions	149	10.92%	10.39%
Prairie Mountain Health			
Bdn South End	151	6.15%	6.59%
Bdn West End	438	10.99%	9.92%
Turtle Mountain	470	13.53%	12.11%
Bdn North Hill	104	4.95%	6.22%
Spruce Woods	444	8.92%	8.47%
Whitemud	374	10.53%	9.45%
Souris River	421	9.33%	8.15%
Riding Mountain	112	5.63%	5.73%
Little Saskatchewan	226	5.70%	5.88%
Asessippi	367	8.71%	7.16%
Duck Mountain	243	10.99%	8.70%
Dauphin	265	8.56%	6.55%
Agassiz Mountain	245	10.92%	11.11%
Bdn East End	260	15.58%	10.15%
Swan River	337	19.46%	14.80%
Porcupine Mountain	237	9.33%	11.67%
Bdn Downtown	379	16.55%	11.80%
Manitoba	34,912	10.34%	10.34%

s indicates suppression due to small numbers
* adjusted for age and sex

Appendix Table 3.20: Continued…
Adults aged 55+

Health Region District	Count	Crude Percent	Adjusted* Percent
Interlake-Eastern RHA			
Springfield	166	4.52%	6.57%
Stonewall/Teulon	366	6.94%	8.10%
Pinawa/LDB	236	6.10%	7.83%
Gimli	272	8.97%	9.58%
Wpg Beach/St. Andrews	220	4.24%	6.85%
Beausejour	232	8.75%	9.38%
Whiteshell	77	6.57%	8.21%
Arborg/Riverton	114	8.24%	8.01%
St. Clements	116	4.58%	7.16%
St. Laurent	125	8.20%	9.07%
Eriksdale/Ashern	158	8.77%	8.83%
Selkirk	551	17.05%	14.10%
Fisher/Peguis	66	4.54%	5.38%
Powerview/PF	73	5.45%	7.42%
Northern Remote	13	3.87%	5.03%
Northern Health Region			
Flin,Snow,Cran,Sher	153	6.38%	8.16%
Thompson, Myst Lake	63	3.14%	7.11%
The Pas/OCN,Kels	156	6.51%	10.73%
Gillam, Fox Lake Cree Nation	11	5.79%	10.08%
Thick,Pik,Wab,Ilf/WLFN,Corm	13	5.00%	6.42%
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	16	6.48%	11.35%
Cross Lake/Cross Lake FN	27	6.00%	10.52%
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	s	s	2.73%
GR/MisCN,ML/MosCN,Eas/CheCN	17	3.89%	5.51%
Bu(OH)CN,MS(GR)CN,GLN/GLFN	31	7.83%	8.19%
Norway House/NH CN	20	3.31%	6.40%
Puk/Mat Col CN	s	s	1.88%
IsL/GHFN,RSL/RSLFN,STPFN,WFN	23	3.45%	7.61%
Sham,YorkFN,TatCN(SPL)	19	5.85%	11.86%
Nelson House/NCN	9	2.88%	4.83%
Manitoba	34,912	10.34%	10.34%

s indicates suppression due to small numbers
* adjusted for age and sex
The full Northern Health Region district names are provided in Appendix 2.

Appendix Table 3.21: Counts and Percents of Adults With Dementia by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Adults aged 55+

Neighbourhood Cluster	Count	Crude Percent	Adjusted* Percent
Fort Garry S	775	7.53%	9.62%
Fort Garry N	1,230	12.75%	11.04%
Assiniboine South	1,517	12.12%	11.90%
St. Vital S	1,324	11.39%	11.37%
St. Vital N	781	9.56%	9.85%
St. Boniface E	782	7.22%	9.17%
St. Boniface W	772	15.70%	12.74%
Transcona	664	7.66%	9.64%
River Heights W	1,571	14.59%	12.21%
River Heights E	733	12.09%	11.47%
River East N	126	4.33%	7.33%
River East E	793	10.28%	11.58%
River East W	1,706	12.15%	9.86%
River East S	307	8.45%	10.48%
St. James - Assiniboia W	1,151	10.57%	10.07%
St. James - Assiniboia E	1,300	15.70%	13.34%
Seven Oaks N	350	22.29%	20.25%
Seven Oaks W	618	9.34%	11.35%
Seven Oaks E	1,164	10.90%	10.63%
Inkster W	143	3.40%	5.29%
Inkster E	371	11.80%	12.44%
Downtown W	732	8.59%	9.24%
Downtown E	994	13.60%	14.10%
Point Douglas N	455	7.51%	8.82%
Point Douglas S	586	18.60%	17.67%
Churchill	7	3.32%	3.44%
Winnipeg	20,945	10.90%	10.90%

* adjusted for age and sex

Hospitalizations for Attempted Suicide

Appendix Table 3.22: Counts and Rates of Hospitalizations for Attempted Suicide among Adults by Health Region, 2010/11-2014/15
Per 100,000 people

Health Region	Count	Crude Rate	Adjusted* Rate
Southern Health-Santé Sud	280	209.96	208.54
Winnipeg RHA	1,099	190.34	193.99
Prairie Mountain Health	650	503.37	515.86
Interlake-Eastern RHA	200	205.82	215.31
Northern Health Region	330	682.54	613.40
Manitoba	2,592	262.15	262.15

* adjusted for age and sex

Appendix Table 3.23: Counts and Rates of Hospitalizations for Attempted Suicide among Adults by Health Region District, 2010/11 2014/15
Per 100,000 people

Health Region District	Count	Crude Rate	Adjusted* Rate
Southern Health-Santé Sud			
MacDonald	s	s	36.57
Stanley	s	s	90.70
Altona	s	s	69.37
Hanover	10	122.03	106.47
Roland/Thompson	s	s	62.68
Cartier/SFX	16	300.47	284.78
Niverville/Richot	12	157.42	143.18
Steinbach	51	347.93	321.14
Winkler	22	217.31	213.65
Morris	s	s	101.93
Carman	11	255.22	263.17
Ste Anne/LaBroquerie	8	106.40	100.74
St. Pierre/DeSalaberry	s	s	91.10
Morden	17	251.67	246.88
Tache	8	123.49	110.37
Lorne/Louise/Pembina	18	337.02	340.03
MacGregor	s	s	61.75
Notre Dame/St Claude	s	s	101.57
Rural East	s	s	137.90
Rural Portage	14	270.43	256.84
Red River South	17	499.27	462.17
City of Portage	35	309.35	314.82
Seven Regions	13	309.45	293.10
Prairie Mountain Health			
Bdn South End	25	332.80	307.85
Bdn West End	34	288.48	279.34
Turtle Mountain	19	241.48	248.56
Bdn North Hill	14	247.74	239.91
Spruce Woods	21	179.24	181.11
Whitemud	15	167.60	172.89
Souris River	41	372.02	356.18
Riding Mountain	20	468.06	491.57
Little Saskatchewan	35	385.89	396.86
Asessippi	28	286.80	286.94
Duck Mountain	21	471.59	527.45
Dauphin	63	915.56	921.66
Agassiz Mountain	82	1,537.31	1,406.51
Bdn East End	30	570.34	546.60
Swan River	50	1,207.44	1,116.61
Porcupine Mountain	90	1,331.95	1,240.88
Bdn Downtown	62	713.14	704.60
Manitoba	2,592	262.15	262.15

s indicates suppression due to small numbers
* adjusted by age and sex

Appendix Table 3.23: Continued…
Per 100,000 people

Health Region District	Count	Crude Rate	Adjusted* Rate
Interlake-Eastern RHA			
Springfield	12	113.57	110.24
Stonewall/Teulon	25	171.37	172.02
Pinawa/LDB	17	248.50	285.45
Gimli	s	s	70.76
Wpg Beach/St. Andrews	10	75.32	74.76
Beausejour	15	218.21	216.72
Whiteshell	s	s	110.26
Arborg/Riverton	s	s	136.87
St. Clements	9	137.93	139.59
St. Laurent	6	178.78	192.62
Eriksdale/Ashern	24	480.48	444.95
Selkirk	15	190.86	198.69
Fisher/Peguis	16	346.47	313.76
Powerview/PF	24	570.34	523.36
Northern Remote	16	800.80	650.08
Northern Health Region			
Flin,Snow,Cran,Sher	37	604.38	583.54
Thompson, Myst Lake	32	304.79	252.47
The Pas/OCN,Kels	62	776.85	703.24
Gillam, Fox Lake Cree Nation	6	596.42	490.45
Thick,Pik,Wab,Ilf/WLFN,Corm	s	s	97.09
LL/MCFN,LR,O–P(SIL)CN,PN(GVL)	8	804.02	708.21
Cross Lake/Cross Lake FN	8	297.84	243.33
SayD(TL)FN,Bro/BLFN,NoL(Lac)FN	s	s	401.39
GR/MisCN,ML/MosCN,Eas/CheCN	24	1,068.57	898.98
Bu(OH)CN,MS(GR)CN,GLN/GLFN	23	985.01	781.08
Norway House/NH CN	62	1,828.37	1,390.39
Puk/Mat Col CN	8	836.82	668.44
IsL/GHFN,RSL/RSLFN,STPFN,WFN	42	948.08	705.49
Sham,YorkFN,TatCN(SPL)	7	364.39	304.17
Nelson House/NCN	s	s	225.82
Manitoba	2,592	262.15	262.15

s indicates suppression due to small numbers
* adjusted by age and sex

Appendix Table 3.24: Counts and Rates of Hospitalizations for Attempted Suicide among Adults by Winnipeg Neighbourhood Cluster, 2010/11-2014/15
Per 100,000 people

Neighbourhood Cluster	Count	Crude Rate	Adjusted* Rate
Fort Garry S	49	133.23	128.57
Fort Garry N	25	92.42	95.90
Assiniboine South	28	93.84	96.74
St. Vital S	41	127.58	130.33
St. Vital N	43	192.46	196.88
St. Boniface E	46	138.47	137.72
St. Boniface W	23	174.60	182.39
Transcona	29	101.83	102.45
River Heights W	41	136.02	140.51
River Heights E	48	260.56	263.06
River East N	6	75.76	78.31
River East E	32	136.10	133.76
River East W	48	147.11	158.88
River East S	43	301.92	292.41
St. James - Assiniboia W	36	135.16	143.47
St. James - Assiniboia E	44	195.63	206.28
Seven Oaks N	s	s	50.77
Seven Oaks W	20	93.40	94.19
Seven Oaks E	51	164.51	165.30
Inkster W	s	s	38.98
Inkster E	33	287.48	277.58
Downtown W	70	225.75	215.18
Downtown E	179	617.13	608.77
Point Douglas N	65	286.48	274.50
Point Douglas S	78	657.01	633.83
Churchill	13	1,761.52	1,637.58
Winnipeg	1,086	188.33	188.33

s indicates suppression due to small numbers
* adjusted for age and sex

Suicide

Appendix Table 3.25: Counts and Rates of Suicide among Adults by Health Region, 2010/11-2014/15
Per 100,000 people

Health Region	Count	Crude Rate	Adjusted* Rate
Southern Health-Santé Sud	69	51.74	50.86
Winnipeg RHA	492	85.21	85.43
Prairie Mountain Health	99	76.67	78.33
Interlake-Eastern RHA	107	110.11	110.27
Northern Health Region	100	206.83	194.32
Manitoba	872	88.19	88.19

*adjusted for age and sex

Appendix Table 3.26: Counts and Rates of Suicide among Adults by Health Region Zone, 2010/11-2014/15
Per 100,000 people

Health Region Zone	Count	Crude Rate	Adjusted* Rate
Southern Health-Santé Sud			
West	11	32.25	46.61
East	28	58.82	37.82
Mid	9	39.94	83.79
North	21	72.13	182.72
Prairie Mountain Health			
South	43	73.65	95.48
Brandon	31	79.69	95.45
North	25	78.52	67.07
Interlake-Eastern RHA			
South	31	68.96	79.09
East	14	84.97	102.16
West	7	58.02	70.81
Selkirk	14	178.14	216.35
North	28	202.59	232.57
Northern Remote	13	650.65	712.61
Northern Health Region			
Zone 1	37	134.41	149.96
Zone 2	46	280.64	308.86
Zone 3	17	383.75	422.12
Manitoba	872	88.19	88.19

* adjusted for age and sex

Appendix Table 3.27: Counts and Rates of Suicide among Adults by Winnipeg Paired Community Area, 2010/11-2014/15
Per 100,000 people

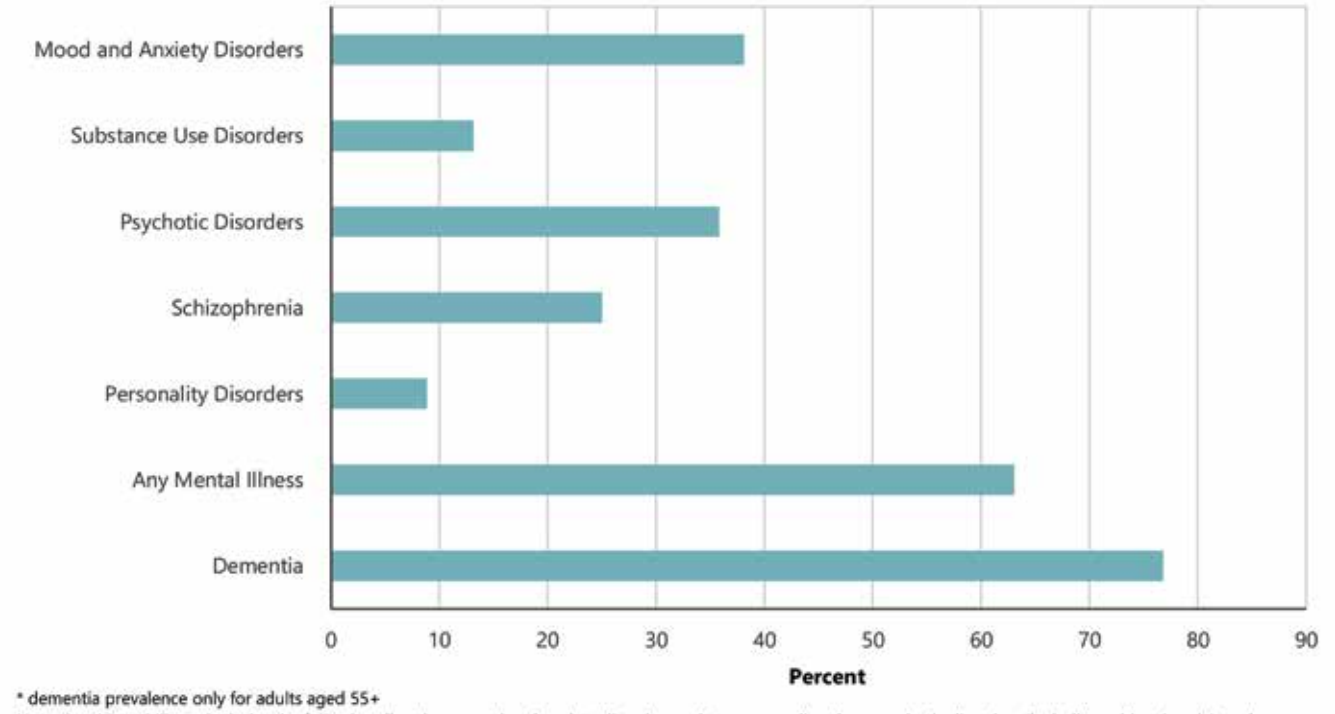
Winnipeg Paired Community Area	Count	Crude Rate	Adjusted Rate
Fort Garry/River Heights	112,394	62.28	63.19
St. James/Assiniboine South	s	s	73.98
St. Vital/St. Boniface	100,873	50.56	50.65
River East/Transcona	106,781	77.73	77.61
Seven Oaks/Inkster	83,052	71.04	70.27
Downtown/Point Douglas	94,574	180.81	176.03
Churchill	s	s	151.89
Winnipeg	576,639	85.15	85.15

s indicates suppression due to small numbers
* adjusted for age and sex

Adults in Care of the Public Trustee

Appendix Figure 3.1 shows the prevalence of mental illness for the small number of adults in care of the Public Trustee. These individuals are included in the overall prevalence of mental illness in Manitoba, but could not be included in the prevalence estimates of geographic regions or income quintiles. The five-year diagnostic prevalence of mental illness and dementia among this group is very high compared to the prevalence found in the Manitoba population overall, as shown for each indicator in Chapter 2. Compared to the Manitoba population, the five-year rate of suicide (149 per 100,000 adults) and attempted suicide (986 per 100,000 adults) was considerably higher for adults in care of the Public Trustee (not shown in graph).

Appendix Figure 3.1: Prevalence of Mental Illness among Adults in Care of the Public Trustee, 2010/11-2014/15
Adults aged 18+* diagnosed with disorder in five-year time period



* dementia prevalence only for adults aged 55+
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Appendix 4

Appendix Table 4.1: Diagnosing Provider Type for Each of the Mental Disorders, 2010/11-2014/15

Mood and Anxiety Disorders	
Provider Type	**Percent**
Psychiatrist	11.8%
Primary Care Provider	87.1%
Other Medical Doctor	1.1%

Substance Use Disorders	
Provider Type	**Percent**
Psychiatrist	11.1%
Primary Care Provider	84.5%
Other Medical Doctor	4.5%

Psychotic Disorders	
Provider Type	**Percent**
Psychiatrist	32.6%
Primary Care Provider	61.0%
Other Medical Doctor	6.4%

Schizophrenia	
Provider Type	**Percent**
Psychiatrist	57.8%
Primary Care Provider	41.0%
Other Medical Doctor	1.3%

Personality Disorders	
Provider Type	**Percent**
Psychiatrist	49.3%
Primary Care Provider	49.4%
Other Medical Doctor	1.3%

Note: The term primary care provider refers to family physicians and nurse practitioners.

Appendix Table 4.2: Characteristics of Longer Term Psychiatric Facilities in Manitoba

	Parkland Regional Mental Health Centre	Selkirk Mental Health Centre	Centre for Adult Psychiatry	Eden Mental Health Centre
Location	Dauphin, MB	Selkirk, MB	Brandon, MB	Winkler, MB
Inpatient or Outpatient	Inpatient	Inpatient	Inpatient	Inpatient
Independent Facility or Located in Hospital	Located in Hospital	Independent Facility	Independent Facility	Independent Facility
Number of Beds	10	252	25	30

Appendix Table 4.3: Sociodemographic Characteristics and prior 12-Month Psychiatric Diagnoses for all Individuals with an Index Diagnosis of Unspecified Psychosis (N=3,289)

Variable	N (%)
Age	
Mean (SD)	36.3 (15.2)
Sex	
Male	1,746 (53.1)
Female	1,543 (46.9)
Region	
Rural	1,087 (33.1)
Urban	2,202 (67.0)
Income Level	
Low*	1,817 (55.2)
Others	1,472 (44.8)
Prior 12-Month Psychiatric Diagnosis	
Substance Use Disorder	458 (13.9)
Personality Disorder	151 (4.6)
Mood or Anxiety Disorder	1,633 (49.6)
Substance-Induced Psychosis	53 (1.6)
Prior 12-Month Hospitalization**	1,159 (35.2)
Prior Diagnosis of Unspecified Psychosis	346 (10.5)
Provider making Index Diagnosis	
Psychiatrist	1,522 (46.3)
Other†	1,767 (53.7)

* low income refers to the lowest 2 quintiles based on neighbourhood income
** includes index date
† includes family physician (42.5%), nurse practitioner (0.3%), or other medical doctor (11.0%)

Appendix Table 4.4: Association of Sociodemographic and Clinical Variables with a Future Diagnosis of Schizophrenia and Adjusted Hazard Ratios (HR) for Diagnostic Change over Time

Variable	No schizophrenia (n = 2,501)	Schizophrenia (n = 788)	Adjusted HR	95% CI	P Value
Age					
Mean (SD)	38.5 (15.0)	29.4 (13.6)	0.98	0.972, 0.983	<0.001
Sex, N (%)					
Male*	1,246 (49.8)	500 (63.5)	1.40	1.209, 1.625	<0.001
Region, N (%)					
Urban**	1,643 (65.7)	559 (70.9)	1.14	0.975, 1.337	0.10
Income Level, N (%)					
Low†	1,356 (54.2)	461 (58.5)	1.09	0.949, 1.262	0.22
Prior 12-Month Psychiatric Hospitalization, N (%)					
	754 (30.2)	405 (51.4)	1	1.083, 1.499	<0.01
Prior Diagnosis of Psychosis Not Otherwise Specified, N (%)					
	252 (10.1)	94 (11.9)	1	0.833, 1.293	0.74
Prior 12-Month Psychiatric Diagnosis, N (%)					
Substance Use Disorder	350 (14.0)	108 (13.7)	0.87	0.698, 1.089	0.23
Mood or Anxiety Disorder	1,243 (49.7)	390 (49.5)	0.82	0.706, 0.949	<0.01
Personality Disorder	100 (4.0)	51 (6.5)	1.22	0.913, 1.624	0.18
Substance-Induced Psychosis	36 (1.4)	17 (2.2)	0.84	0.498, 1.414	0.51
Provider making Index Diagnosis, N (%)					
Psychiatrist ‡	941 (37.6)	581 (73.7)	2.66	2.216, 3.180	<0.001

SD = standard deviation
* reference category is female
** reference category is rural
† this category refers to the lowest 2 quintiles; reference category is high income (top 3 quintiles)
‡ reference is other providers (includes family physicians, nurse practitioners and other medical doctors)

Appendix Table 4.5: Physician Visits within One Year before Hospitalization for Attempted Suicide, 2010/11-2014/15
Adults aged 18+ hospitalized for attempted suicide in five-year time period

Physician Visits	Frequency	Percent
With a Mental Disorder Diagnosis	1,903	74.2%
Without a Mental Disorder Diagnosis	572	22.3%
No Physician Visits	90	3.5%

Appendix 5

Appendix Table 5.1: Demographic Characteristics at Index Date in Perinatal Cohort and among Non-Pregnant Controls

Demographics	Non-Pregnant Cohort	Perinatal Cohort (Postpartum Period)
Age		
Mean (SD)	28.52 (6.69)	28.64 (5.64)
Region, N (%)		
Urban	100,612 (72.02)	27,987 (61.70)
Rural	38,932 (27.87)	17,328 (38.20)
Income Quintiles, N (%)		
1 (lowest)	29,223 (20.92)	11,354 (25.03)
2	28,246 (20.22)	9,357 (20.63)
3	27,350 (19.58)	8,668 (19.11)
4	27,374 (19.59)	9,021 (19.89)
5 (highest)	26,929 (19.28)	6,805 (15.00)
Number of Children		
Median	0	2
Mental Disorder in Past 5 Years, N (%)		
	51,439 (36.82)	20,365 (44.89)
Psychotropic Medication Use in Past 5 Years, N (%)		
	38,616 (27.64)	13,707 (30.22)
History of Child Apprehension		
	2,257 (1.62)	1,464 (3.23)

SD = standard deviation

Appendix Table 5.2: Differences in Prevalence of Mental Disorders and Suicide Attempts Across Perinatal Periods

	Pre-Pregnancy	Pregnancy	Postpartum	Pregnancy vs. Pre-Pregnancy			Postpartum vs. Pre-pregnancy			Pregnancy vs. Postpartum		
	N (%)	N (%)	N (%)	aRR	99% CI	p-value	aRR	99% CI	p-value	aRR	99% CI	p-value
Mood and Anxiety Disorders	7,053 (15.55)	6,136 (13.53)	6,983 (15.39)	0.82	(0.80-0.84)	<0.001	0.96	(0.92-0.97)	<0.001	0.87	(0.85-0.90)	<0.001
Substance Use Disorders	801 (1.77)	582 (1.28)	881 (1.94)	0.67	(0.61-0.74)	<0.001	0.92	(0.87-1.05)	0.33	0.70	(0.64-0.77)	<0.001
Psychotic Disorders	61 (0.13)	58 (0.13)	91 (0.20)	0.86	(0.65-1.14)	0.28	1.61	(1.17-2.21)	0.003	0.53	(0.39-0.72)	<0.001
Hospitalizations for Attempted Suicide	54 (0.12)	12 (0.03)	25 (0.06)	0.22	(0.12-0.40)	<0.001	0.50	(0.30-0.82)	0.01	0.44	(0.21-0.90)	0.02

Note: Adjusted rate ratios (aRR) are adjusted for region, income quintile, mental disorder in past 5 years, use of psychotropic medications in past 5 years, history of child apprehension in the past 5 years, and number of children.

Appendix Table 5.3: Differences in Prevalence of Mental Disorders and Suicide Attempts between Perinatal Periods and Non-Pregnant Women

	Non-Pregnant	Pre-Pregnancy	Pregnancy	Postpartum	Pre-pregnancy vs. Non-Pregnant			Pregnancy vs. Non-Pregnant			Postpartum vs. Non-Pregnant		
	N (%)	N (%)	N (%)	N (%)	aRR	99% CI	p-value	aRR	99% CI	p-value	aRR	99% CI	p-value
Mood and Anxiety Disorders	20,602 (14.75)	7,053 (15.55)	6,136 (13.53)	6,983 (15.39)	1	(0.98-1.03)	0.813	0.82	(0.80-0.84)	<0.001	0.93	(0.91-0.95)	<0.001
Substance Use Disorders	1,860 (1.33)	801 (1.77)	582 (1.28)	881 (1.94)	1.08	(1.00-1.17)	0.06	0.73	(0.66-0.80)	<0.001	1.00	(0.92-1.09)	0.99
Psychotic Disorders	464 (0.33)	61 (0.13)	58 (0.13)	91 (0.20)	0.33	(0.25-0.43)	<0.001	0.28	(0.21-0.37)	<0.001	0.58	(0.46-0.75)	<0.001
Hospitalizations for Attempted Suicide	103 (0.07)	54 (0.12)	12 (0.03)	25 (0.06)	1.17	(0.84-1.64)	0.35	0.25	(0.14-0.46)	<0.001	0.59	(0.38-0.93)	0.02

Note: Adjusted rate ratios (aRR) are adjusted for region, income quintile, mental disorder in past 5 years, use of psychotropic medications in past 5 years, history of child apprehension in the past 5 years, and number of children.

Appendix Table 5.4: Most Common Categories of Criminal Charges by Diagnosed Mental Disorder for Adults who were Accused of a Crime
Adults aged 18+

Mood and Anxiety Disorders	
Category of Charges	Percent
Administrative	37.9%
Violent	24.4%
Highway Traffic Act	18.3%
Property	13.4%
Drug charges	1.0%
Liquor Control Act	0.4%
Auto theft	0.1%
All others	4.5%

Substance Use Disorders	
Category of Charges	Percent
Administrative	44.6%
Violent	25.0%
Property	12.6%
Highway Traffic Act	11.7%
Drug charges	1.1%
Liquor Control Act	0.5%
Auto theft	0.1%
All others	4.1%

Psychotic Disorders	
Category of Charges	Percent
Administrative	46.8%
Violent	25.7%
Property	13.3%
Highway Traffic Act	8.5%
Drug charges	1.0%
Liquor Control Act	s
Auto theft	s
All others	3.8%

Schizophrenia	
Category of Charges	Percent
Administrative	48.0%
Violent	25.3%
Property	13.9%
Highway Traffic Act	7.1%
Drug charges	0.8%
Liquor Control Act	s
Auto theft	s
All others	3.9%

Personality Disorders	
Category of Charges	Percent
Administrative	45.8%
Violent	25.0%
Property	15.2%
Highway Traffic Act	9.0%
Drug charges	0.7%
Liquor Control Act	s
Auto theft	s
All others	3.7%

Any Mental Illness	
Category of Charges	Percent
Administrative	39.6%
Violent	24.8%
Highway Traffic Act	16.9%
Property	12.5%
Drug charges	1.1%
Liquor Control Act	0.5%
Auto theft	0.1%
All others	4.5%

Hospitalizations for Attempted Suicide	
Category of Charges	Percent
Administrative	45.9%
Violent	28.6%
Property	13.4%
Highway Traffic Act	8.2%
Drug charges	0.6%
Auto theft	s
Liquor Control Act	s
All others	2.7%

No Mental Disorders	
Category of Charges	Percent
Administrative	30.3%
Highway Traffic Act	27.1%
Violent	24.5%
Property	9.6%
Drug charges	2.0%
Liquor Control Act	0.7%
Auto theft	0.2%
All others	5.8%

s indicates suppression due to small numbers
Note: Administrative charges are incidents, often as the result of non-action, related to previous court or justice decisions. Examples include "Failure to comply with a court order" and "Failure to attend court".
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Appendix Table 5.5: Most Common Categories of Criminal Charges by Diagnosed Mental Disorder for Adults who were Victims of a Crime
Adults aged 18+

Mood and Anxiety Disorders	
Category of Charges	Percent
Violent	48.2%
Administrative	29.2%
Property	15.0%
Highway Traffic Act	3.3%
Drug charges	0.3%
Liquor Control Act	0.3%
Auto theft	0.3%
All others	3.6%

Substance Use Disorders	
Category of Charges	Percent
Violent	50.5%
Administrative	30.9%
Property	11.9%
Highway Traffic Act	2.4%
Liquor Control Act	0.3%
Drug charges	0.2%
Auto theft	0.2%
All others	3.2%

Psychotic Disorders	
Category of Charges	Percent
Violent	53.6%
Administrative	30.4%
Property	11.5%
Highway Traffic Act	1.5%
Drug charges	s
Liquor Control Act	s
All others	1.6%

Schizophrenia	
Category of Charges	Percent
Violent	51.7%
Administrative	30.1%
Property	12.7%
Highway Traffic Act	2.2%
Drug charges	s
All others	s

Personality Disorders	
Category of Charges	Percent
Violent	52.1%
Administrative	31.1%
Property	11.6%
Highway Traffic Act	1.5%
Drug charges	s
Liquor Control Act	s
All others	2.4%

Any Mental Illness	
Category of Charges	Percent
Violent	48.6%
Administrative	29.0%
Property	15.0%
Highway Traffic Act	3.2%
Drug charges	0.3%
Auto theft	0.2%
Liquor Control Act	0.2%
All others	3.5%

Hospitalizations for Attempted Suicide	
Category of Charges	Percent
Violent	56.4%
Administrative	30.2%
Property	8.9%
Highway Traffic Act	2.1%
Auto theft	s
All others	s

No Mental Disorders	
Category of Charges	Percent
Violent	46.4%
Administrative	22.7%
Property	21.1%
Highway Traffic Act	4.2%
Drug charges	0.4%
Liquor Control Act	0.4%
Auto theft	0.3%
All others	4.5%

s indicates suppression due to small numbers
Note: Administrative charges are incidents, often as the result of non-action, related to previous court or justice decisions. Examples include "Failure to comply with a court order" and "Failure to attend court".
Note: Any Mental Illness includes the following disorders: mood and anxiety disorders, substance use disorders, psychotic disorders (including schizophrenia), and personality disorders.

Appendix 6

Appendix Table 6.1: Types of Drugs Dispensed to Sample of Manitoba Residents without Diagnosed Mental Illness over a One Year Period, 2014/15
Anatomical Therapeutic Chemical Classification System Level 4

Person	Drugs Dispensed
1	• Proton pump inhibitors • Other lipid modifying agents
2	• Imidazoline receptor agonists • HMG CoA reductase inhibitors • Other chemotherapeutics • Thyroid hormones
3	• Macrolides • Glucocorticoids • Leukotriene receptor antagonists • Opium derivatives and expectorants
4	• Progestogens
5	• Thiazides, plain • Beta blocking agents, selective • ACE inhibitors, plain • Fluoroquinolones • Corticosteroids, plain • Anti-inflammatory agents
6	• Proton pump inhibitors • Diuretics and potassium-sparing agents
7	• Glucocorticoids • Penicillins with extended spectrum
8	• Vitamin K antagonists • Corticosteroids • Dopa and dopa derivatives • Fluoroquinolones • Corticosteroids, plain • Anti-inflammatory agents
9	• Progestogens and estrogens
10	• Proton pump inhibitors • Corticosteroids, weak (group I) • Penicillins with extended spectrum • Beta-lactamase sensitive penicillins • Nucleosides and nucleotides • Propionic acid derivatives • Other centrally acting agents • Natural opium alkaloids • Centrally acting sympathomimetics

Person	Drugs Dispensed
11	• Antipropulsives • Biguanides • Ascorbic acid (vitamin C) • Other plain vitamin preparations • Platelet aggregation inhibitors • Organic nitrates • ACE inhibitors • HMG CoA reductase inhibitors • Tetracyclines • First-generation cephalosporins • Combinations of sulfonamides and trimethoprim • Macrolides • Propionic acid derivatives • Other centrally acting agents • Anilides • Benzodiazepine derivatives • Selective beta-2-adrenoreceptor agonists • Anticholinergics
12	• Corticosteroids
13	• Selective beta-2-adrenoreceptor agonists • Adrenergics in combination with corticosteroids
14	• Combinations of sulfonamides and trimethoprim • Fluoroquinolones • Coxibs
15	• HMG CoA reductase inhibitors • Penicillins with extended spectrum • Propionic acid derivatives • Corticosteroids • Leukotriene receptor antagonists
16	• Biguanides • Sulfonylureas • Thiazides • ACE inhibitors • HMG CoA reductase inhibitors
17	• Macrolides
18	• HMG CoA reductase inhibitors • First-generation cephalosporins
19	• Insulins and analogues for injection, fast-acting • Insulins and analogues for injection, long-acting
20	• Benzodiazepine derivatives

Appendix Table 6.2: Ten Most Common Complaints from Emergency Department Visits by Mental Disorder
Adults aged 18+*

Mood and Anxiety Disorders		Substance Use Disorders	
Chief Complaint	**Percent**	**Chief Complaint**	**Percent**
Abdominal Pain	9.4%	Abdominal Pain	8.8%
Shortness of Breath	5.1%	Shortness of Breath	5.0%
Chest Pain with Cardiac Features	4.4%	Chest Pain with no Cardiac Features	3.3%
Chest Pain with no Cardiac Features	3.3%	Back Pain	3.3%
Lower Extremity Pain	3.2%	Depression, Suicide or Deliberate Self Harm	3.2%
Back Pain	3.1%	Localized Swelling / Redness	3.2%
Lower Extremity Pain	3.0%	Lower Extremity Pain	3.1%
General Weakness	2.7%	Substance Misuse / Intoxication	2.9%
Headache	2.6%	Chest Pain with Cardiac Features	2.8%
Laceration / Puncture	2.6%	Laceration / Puncture	2.8%
Psychotic Disorders		**Schizophrenia**	
Chief Complaint	**Percent**	**Chief Complaint**	**Percent**
Shortness of Breath	6.2%	Bizarre / Paranoid Behaviour	7.5%
Abdominal Pain	5.8%	Abdominal Pain	6.5%
Bizarre / Paranoid Behaviour	5.4%	Depression, Suicide or Deliberate Self Harm	6.2%
General Weakness	4.6%	Shortness of Breath	5.3%
Depression, Suicide or Deliberate Self Harm	4.3%	Unspecified Minor Complaints	3.9%
Unspecified Minor Complaints	3.2%	Anxiety / Situational Crisis	3.8%
Lower Extremity Pain	3.1%	Medication Request	3.5%
Lower Extremity Injury	2.9%	Lower Extremity Pain	3.0%
Chest Pain with Cardiac Features	2.8%	Hallucinations / Delusions	2.9%
Anxiety / Situational Crisis	2.7%	Unknown	2.6%
Personality Disorders		**Dementia**	
Chief Complaint	**Percent**	**Chief Complaint**	**Percent**
Abdominal Pain	9.4%	Shortness of Breath	10.1%
Depression, Suicide or Deliberate Self Harm	7.9%	General Weakness	10.0%
Shortness of Breath	4.2%	Lower Extremity Pain	5.0%
Overdose via Ingestion	3.8%	Altered Level of Consiousness	4.8%
Anxiety / Situational Crisis	3.1%	Abdominal Pain	4.6%
Lower Extremity Pain	2.8%	Chest Pain with Cardiac Features	4.0%
Medication Request	2.7%	Lower Extremity Pain	3.9%
Bizarre / Paranoid Behaviour	2.7%	Confusion	3.2%
Chest Pain with no Cardiac Features	2.6%	Extremity Weakness / Cerebrovascular Accident Symptoms	3.0%
Chest Pain with Cardiac Features	2.6%	Head Injury	2.7%
Hospitalizations for Attempted Suicide		**No Mental Disorders**	
Chief Complaint	**Percent**	**Chief Complaint**	**Percent**
Abdominal Pain	12.4%	Abdominal Pain	9.2%
Depression, Suicide or Deliberate Self Harm	7.2%	Laceration / Puncture	4.7%
Overdose via Ingestion	6.1%	Shortness of Breath	4.5%
Shortness of Breath	4.2%	Chest Pain with Cardiac Features	4.0%
Medication Request	4.0%	Lower Extremity Injury	3.9%
Substance Misuse / Intoxication	3.7%	Upper Extremity Injury	3.7%
Headache	2.6%	Lower Extremity Pain	3.6%
General Weakness	2.5%	Localized Swelling / Redness	3.1%
Back Pain	2.5%	Chest Pain with no Cardiac Features	3.0%
Chest Pain with no Cardiac Features	2.3%	Back Pain	2.9%

* Dementia prevalence only for adults aged 55+

Appendix 7

Methods for the Sensitivity Analyses

Recall that for our main analyses, we restricted the birth cohort (April 1, 1980 to March 31, 1985) to 60,838 individuals who lived in Manitoba and were continuously covered by Manitoba Health from birth to age 18 in an effort to capture as many diagnosed cases of mental disorders in children and adolescence as possible. The decision to restrict our birth cohort in this way may have influenced the results because of potential differences in the characteristics of people born in Manitoba and those who moved into the province after birth. We wanted to test whether the study results would be different if we had not restricted our analyses to these 60,838 individuals. Therefore, we conducted the same analyses with a larger, more inclusive cohort; we included an additional 12,209 residents of Manitoba born between April 1, 1980 and March 31, 1985 who had lived in the province continually between the ages of 10 to 18, when the majority of the diagnoses are made [14]. In summary, the sensitivity analyses were conducted on 73,047 individuals who were the same age as the main cohort and were continuously covered by Manitoba Health between ages 10 to 18. The difference between this cohort and the main birth cohort is that some people (12,209) moved into the province before age 10 and were not born in the province.

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