

The Closure of Brandon Mental Health Centre: A Case Study and Ten-Year
Follow-Up of Individuals Discharged From 1990-1998

by

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Abstract

During the last 50 years, there has been a transfer of care for individuals living with mental disorders from predominately institutional settings to predominately community settings. The purpose of this research was to document the closure of Brandon Mental Health Centre (BMHC) and to look at long-term outcomes for discharged individuals. These objectives were met by interviewing key people involved in the closure and through analysis of administrative data. To support individuals after BMHC closed, new services were developed in four priority areas: adult inpatient and crisis response services, adult rehabilitation and consumer support services, psychogeriatric services, and child and adolescent services. Visits to a general practitioner for a mental disorder by individuals discharged from BMHC decreased significantly over the follow-up period while visits to a psychiatrist increased significantly. Mortality rates, physician visits, and hospital admissions were higher in former BMHC residents than in a matched cohort.

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Chapter 1: Introduction

According to the Standing Senate Committee On Social Affairs, Science and Technology (2004), 20% or one in five Canadians are likely to experience a mental health issue in their lifetime. The economic burden of mental illness in Canada (not including substance abuse disorders) was estimated to be \$14.4 billion in 1998. This number includes direct health care costs and indirect costs attributed to a loss in productivity and premature death (Stephens & Joubert, 2001). Stephens and Joubert (2001) also found that hospital care represented 26.9% (or \$3.9 billion) of the total burden of mental illness. The shift in Canada in the last 50 years has been away from institutionalization and towards community integration for individuals living with mental disorders.

Mental Health Care in Manitoba

Organization

In 1997, health care services in Manitoba became regionalized and some of the responsibility for health care shifted from Manitoba Health to 11 newly formed regional health authorities (see Figures 1 and 2 for a map of the province before and after regionalization). *The Regional Health Authorities Act*, which came into effect April 1, 1997, stipulated guidelines for the new structure (Manitoba Health, 2008). In general, the province is accountable for policy development, while the majority of the service delivery is provided by the regions. A key exception is the Selkirk Mental Health Centre. It is funded and managed directly by Manitoba Health.

Services

Selkirk Mental Health Centre is the designated long-term inpatient mental health care facility for the province. It is a 252-bed facility located in Selkirk, Manitoba in the Interlake Regional Health Authority and it is approximately 40 km northeast of Winnipeg. The centre

consists of an acquired brain injury program, acute care program, forensic program, geriatric program, and rehabilitation program (Manitoba Health, 2011).

Inpatient mental health care in the province is also provided through Eden Mental Health Centre (a 40-bed facility in the Central Regional Health Authority), psychiatric units of general hospitals, crisis stabilization units/safe houses, residential care homes, and in some cases, personal care homes (commonly referred to as nursing homes in other jurisdictions) In addition to inpatient care, each Regional Health Authority provides a continuum of community mental health services which may include any number of following: housing supports, case management, proctor services, mobile crisis units, crisis phone line, vocational and educational supports, self-help/family services, and mental health promotion.

Brandon Mental Health Centre

The Brandon Insane Asylum, as it was originally called, first opened its doors in 1891. In 1954, the centre reached a peak population of 1689. In 1993, it was announced that the centre would be closing. Over the next six years, patients were discharged into the community as appropriate resources were made available. The final residents were discharged in 1998 and the centre grounds were vacated by October, 1999. The catchment area for the Brandon Mental Health Centre included the Westman and Parkland regions of Manitoba and the western half of Central region (see Figure 1). In 1988, 71% of the total admissions to BMHC were from the Westman region, 10.5% were from the Parkland region, and 10.5% were from the Central region (Drysdale Consulting, 1990). Representatives from all three areas were involved in the development of new services after the closure of BMHC

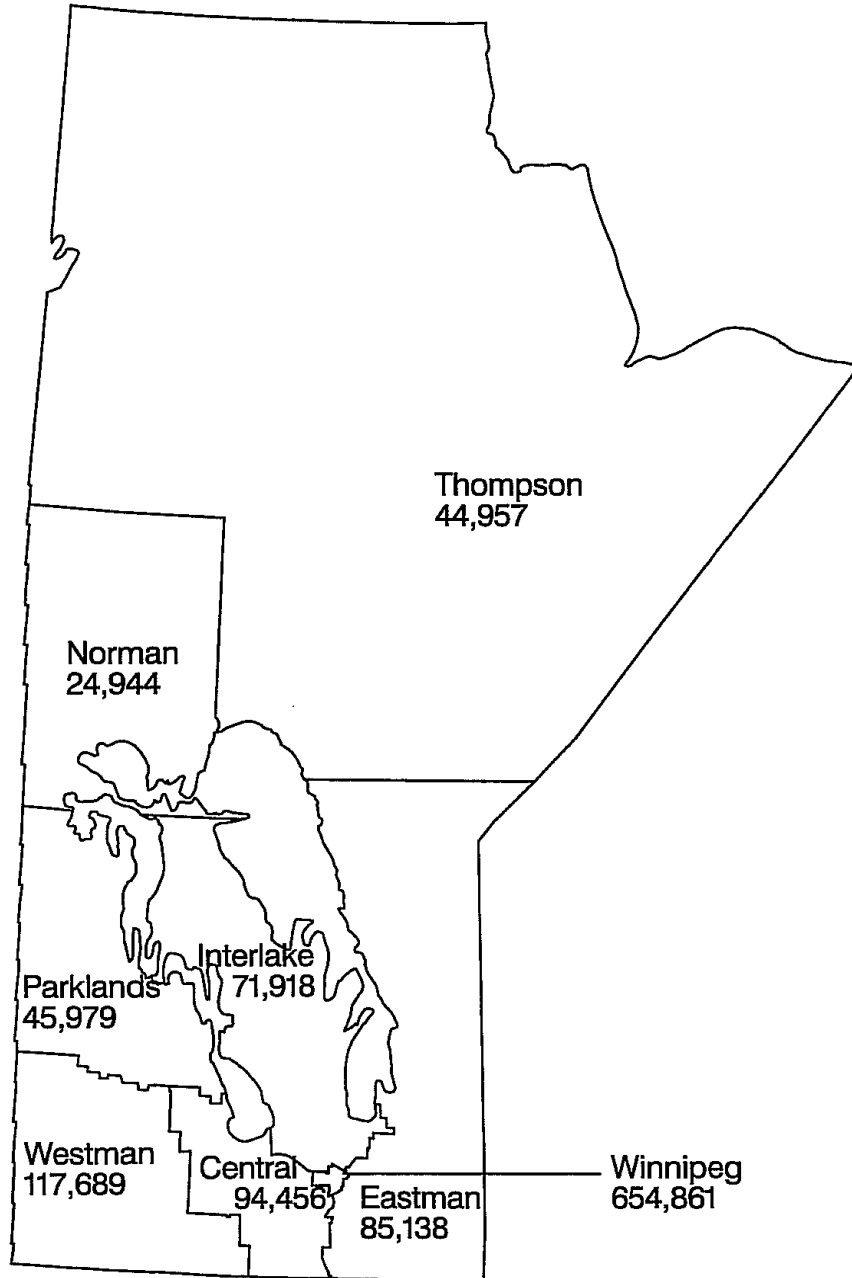


Figure 1. Map of Manitoba in 1991 (before regionalization).

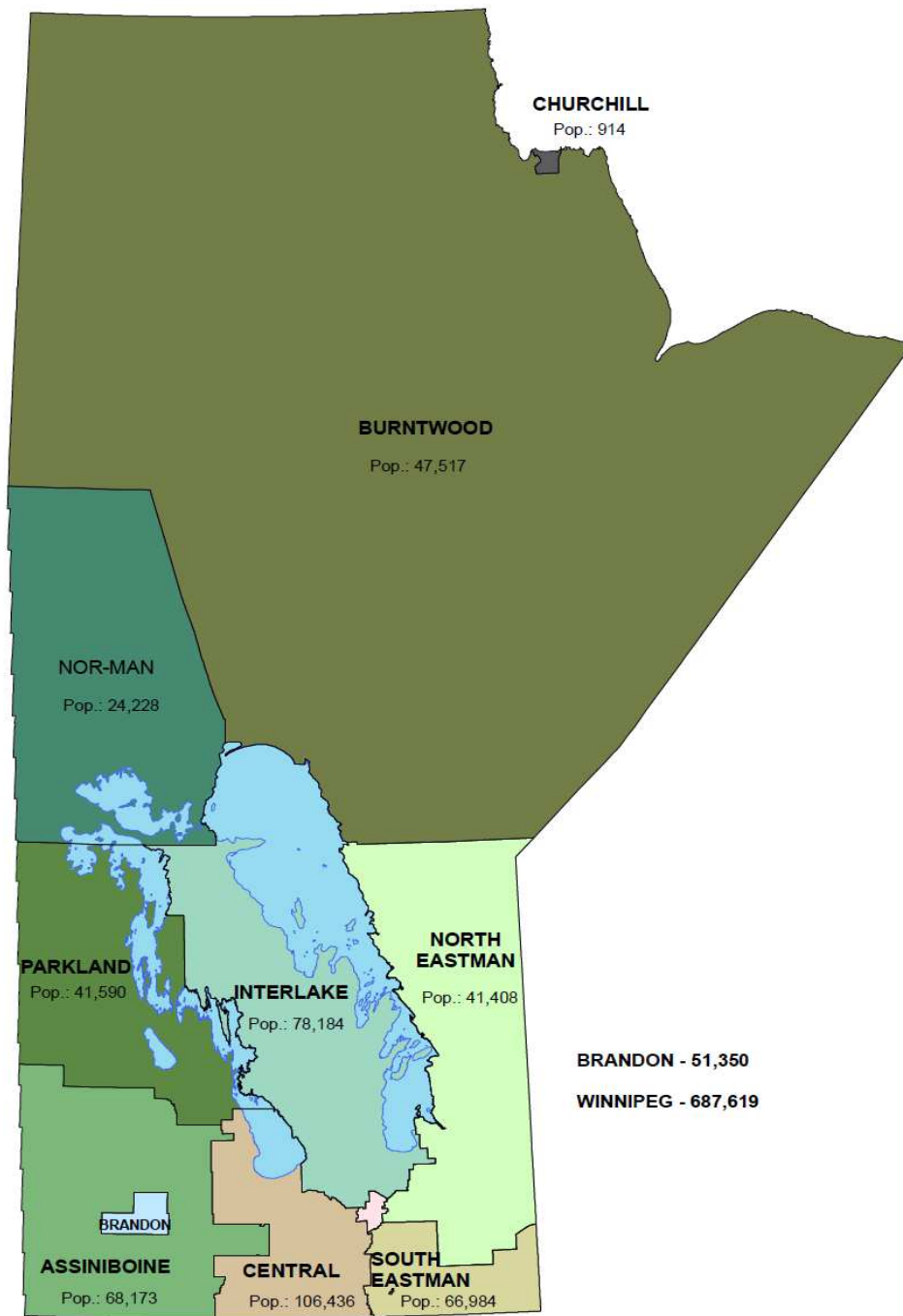


Figure 2. Map of Manitoba in 2009 (after regionalization).

The Proposed Study: Purpose and Research Questions

To date, there has not been an evaluation of any aspect of the closure of BMHC. The purposes of this study are two-fold; (1) to document the closure of Brandon Mental Health Centre; (2) to examine the mortality rate and health care utilization of adults discharged from Brandon Mental Health Centre, compared to the general population. It isn't an objective of this study to determine the overall impact of closing the BMHC. But, this preliminary analysis will offer an opportunity for subsequent evaluation the closure of Brandon Mental Health Centre and it may serve as a blueprint for other jurisdictions implementing mental health reform.

Research Questions

Question one is qualitative in nature;

1. (a) How was the closure of Brandon Mental Health Centre carried out?
- (b) What were the key events in the closure?
- (c) What challenges were encountered?

Questions two, three, and four concern adults discharged from BMHC between 1990 and 1998 and are quantitative in nature;

2. To where did the BMHC cohort relocate after their final discharge?
3. (a) What were the rates of overall mortality, cause-specific mortality, suicide, and attempted suicide in the BMHC cohort during the ten-year follow-up period?
- (b) How did these rates compare to a matched cohort of the general population?
4. (a) What were the rates of physician visits and hospital admissions in the BMHC cohort?
- (b) Did these rates change over the ten-year follow-up period?
- (c) How did these rates compare to a matched cohort of the general population?

Justification for the Study

Other jurisdictions would benefit from the documentation of the closure of BMHC. By gaining an understanding of which programs were developed, how funds were allocated, and how challenges were overcome, other jurisdictions may choose to use the Brandon example to assist them in their own mental health reform. The few examples in the literature that have documented elements of the closure of a psychiatric hospital have been done in the United States (Milner & Hassall, 1990; Rothbard & Kuno, 2000) or in Europe (Rothbard & Kuno, 2000). Within Canada, Morrow et al. (2010) have described the downsizing of Riverview Hospital in British Columbia but no known Canadian studies have described the complete closure of mental health centre. This study used multiple sources of data (i.e., interviews and documents) to summarize the closure of BMHC to help fill the research gap.

This study also used the Population Health Research Data Repository housed at the Manitoba Centre for Health Policy (MCHP). This Repository contains de-identified administrative data on all individuals registered with Manitoba Health. There have only been a small number of studies that have used administrative data to examine the long-term outcomes of discharged psychiatric patients. The ones that have been conducted have focused almost exclusively on mortality and potential years of life lost (Hansen, Jakobsen, & Arnesen, 2001; Miller, Paschall, & Svendsen, 2006). This study will build on previous research and provide a Canadian example of the outcomes of mental health centre closure.

Chapter 2: Review of the Literature

Evolution of the Psychiatric Hospital

Individuals living with a mental disorder were largely cared for in jails, workhouses, and poorhouses until the middle of the nineteenth century. They were mostly the responsibility of local communities. Near the beginning of the nineteenth century, several individuals began to advocate better treatment for individuals with a mental disorder. They argued for the construction of mental hospitals as a place to provide care for these individuals. This movement was largely led by Dr. Phillippe Pinel and William Tuke in Europe and by Dorothea Dix in North America (Allodi & Kedward, 1977). Emphasis was placed on the moral treatment of patients. The new facilities were to be spacious, humane, and pleasant (Allodi & Kedward, 1977). Restraints and straitjackets were to be used sparingly. Dorothea Dix was able to secure funds from the American government to purchase land and build new buildings in the United States (Allodi & Kedward, 1977). She was also directly involved in the construction of mental hospitals in two Canadian provinces. By the 1860s, eleven mental hospitals were in place in six Canadian provinces (Roberts, 1988).

Regrettably, within 20 to 30 years of the establishment of mental hospitals, the original vision of Pinel, Tuke, and Dix was all but gone. Hospitals often became centres for custodial care. The influx of new patients, general population growth, and low discharge rates led to extreme overcrowding (Allodi & Kedward, 1977). Conditions rapidly deteriorated as staff struggled to keep up with the increasing demands placed on the hospitals. The situation would not begin to change until the emergence of the community psychiatry movement and the push towards deinstitutionalization.

Theory of Deinstitutionalization

Deinstitutionalization can be defined as, “the replacement of long-stay psychiatric hospitals with smaller, less isolated community-based alternatives for the care of the mentally ill”, (Lamb & Bachrach, 2001, p. 1039). Therefore, in theory, deinstitutionalization includes three components; (a) the preparation of individuals in psychiatric hospitals and their release to the community, (b) the diversion of potential new admissions to other facilities, and (c) the development of community services for individuals living with mental disorders (Lamb & Bachrach, 2001). The basic assumption is that the treatment and rehabilitation of individuals with severe mental disorders can be best carried out in the community, and not mental hospitals.

Factors that Influenced Deinstitutionalization

Several factors have been proposed as having contributed to the deinstitutionalization of individuals living with mental disorders. These include: the development of new medications, social psychiatry, conditions in facilities, the legal/consumer movement, and economics.

Pharmacological Advancements

Before the 1950s, biological treatment for individuals living with mental disorders in psychiatric institutions included: electroconvulsive therapy, insulin shock, subcoma therapies, and lobotomies (Greenland, Griffin, & Hoffman, 2001). These treatments often produced significant and dangerous side effects in patients. The 1950s saw the introduction of chlorpromazine and other neuroleptics that were able to control psychosis and severe mood disorders. Dr. Heinz Lehmann, a Canadian psychiatrist, was awarded the Lasker Prize for Medicine by the American Public Health Association for the discovery of the antipsychotic effects of chlorpromazine (López-Muñoz, Alamo, Cuenca, Shen, Clervoy, & Rubio, 2005). This antipsychotic was first introduced in North America in 1953 at a Montreal hospital by Dr.

Lehmann who gave chlorpromazine to 71 patients with varying psychiatric conditions (López-Muñoz et al., 2005). With the development of oral medication to control psychiatric symptoms that would presumably be taken voluntarily by patients, it was anticipated that individuals could now be treated in the community on an outpatient basis instead of in an institution. Some held the belief that these new “wonder drugs” could work alone, in the absence of comprehensive community mental health services (Jones, 1999).

Social Psychiatry

After World War II, psychiatry began to focus its attention on the social and environmental dimensions of mental health. Much of this new way of thinking can be credited to lessons learned from the war. By the end of WWII, 1.8 million of the 4.8 million men called to military service were rejected due to mental or neurological disorders and 40% of all military discharges for medical reasons were psychological in nature (Kolb, Frazier, & Sirovatka, 2000). These findings, coupled with the discovery that soldiers treated for psychological distress improved much faster at the aid station near the front line than those treated in isolated facilities, led to the conviction that environmental stress played a major role in mental health issues and that treatment should be provided in community settings rather than isolated facilities (Grob, 1991).

Conditions in the Institutions

Beginning in the 1950s, several critiques of the policy and effects of institutionalization began to emerge. Some began to believe that not only was institutionalization not helpful for individuals living with mental disorders, but it was also often detrimental. Researchers began to theorize that there existed a direct relationship between an individual’s environment and the course of his/her illness. Goffman (1961) described a condition, which he called “disculturation”.

He stated that disculturation occurs when long-term institutional care renders individuals incapable of managing certain features of daily living once outside the institution. Goffman also coined the term “total institutions”, where individuals were removed from the community and had all areas of their lives regulated by others. It was felt that total institutions denied freedom and autonomy and created barriers between an individual and society (Goffman, 1961). Furthermore, it was thought by many that these institutions isolated patients from their families and often only provided basic necessities such as food and shelter.

Legal/Consumer Movement

In the late 1960s and early 1970s, patients and former patients began to speak out about what they considered to be the shortcomings of the mental health system. They advocated on many fronts, including civil rights, involuntary treatment, economic security, and housing (Cutler, Bevilacqua, & McFarland, 2003). A series of major judicial rulings affirmed the rights of patients to receive adequate care and treatment (Williams, Bellis, & Wellington, 1980).

Economics

A final factor thought to be connected to the downsizing of psychiatric institutions was the high cost associated with maintaining facilities that were in many cases outdated and in poor condition (Davis, 2006). In Canada, psychiatric institutions were funded and governed by provincial governments to control standards and costs. There was no direct community involvement at this time. Many people began to believe that it would be more cost-effective to treat individuals living with mental disorders outside of the institution.

Deinstitutionalization in Canada

Greenland, Griffin, and Hoffman (2001) estimated there to be 66,000 patients in Canadian psychiatric hospitals in 1950. Few outpatient services existed at this time for individuals living

with severe mental disorders. Psychiatric hospitals were 70% over their planned occupancy (Greenland et al., 2001). According to Baker (1960), the cost to care for one patient per day in 1958 was \$3.69 in a mental hospital compared to \$15.11 in a general hospital. Because of their much lower costs in comparison to general hospitals, mental hospitals were often viewed as the preferred care setting for individuals living with a mental disorder. In 1952, there were psychiatric units in only 11 Canadian general hospitals and none of these units were in rural areas (Greenland et al., 2001).

Stages of Change

The process of deinstitutionalization of individuals living with mental disorders in Canada occurred in three stages. First, there was the downsizing/closing of psychiatric institutions and the relocation of individuals living with mental disorders to psychiatric units of general hospitals in the 1960s. Secondly, there was the expansion of care in the community and the provision of community supports. The third stage of deinstitutionalization is currently taking place in Canada; the integration and improved effectiveness of various mental health services (The Standing Senate Committee on Social Affairs, Science and Technology, 2004).

From 1960 to 1976, beds in Canadian psychiatric hospitals decreased from 47,633 to 15,011 (Bachrach, Goering, & Wasylenki, 1994) and beds in the psychiatric units of general hospitals increased from 844 to 5,836 (Minister of Public Works and Government Services Canada, 2006). There was great variation among the provinces in provincial hospital bed reductions from 1965 to 1981, from a low of 34% in Prince Edward Island to a high of 84% in Quebec (Sealy & Whitehead, 2004). At first, both psychiatric institutions and general hospitals were opposed to the transfer of patients to general hospitals; some general hospitals were worried about an influx of psychiatric patients and psychiatric institutions were concerned that their resources were being

dramatically reduced.

For the most part, general hospital psychiatric units were used on a voluntary basis by middle and upper class individuals who had been referred to them by private practice psychiatrists (The Standing Senate Committee on Social Affairs, Science and Technology, 2004). Psychiatric institutions continued to treat poorer individuals and those admitted involuntarily. Thus, a two-tiered mental health system was created; the patient populations served by the general hospitals and by the psychiatric institutions rarely overlapped. Furthermore, adequate funding was not provided at the community level for individuals requiring support and services outside the hospital. The absence of proper community resources resulted in the “revolving door syndrome” (patients were discharged into the community after hospital admission and treatment, only to relapse and return to the hospital), increased homelessness, and increased criminal behaviour and incarceration (Davis, 2006).

In the 1970s and 1980s, the shift from care in an institutional setting to care in the community continued, with increased funding from provincial governments for community mental health services. There was an increased focus on a variety of community services (e.g., residential services, income support, vocational rehabilitation programs) to support individuals with severe mental disorders living in the community. By the late 1980s, although mental health services and supports existed in most provinces, they were highly fragmented. Psychiatric institutions, psychiatric units of general hospitals, and community mental health clinics continued to operate in isolation.

In the third stage of deinstitutionalization (from the 1990s to the present), individuals living with mental disorders and their families have continued to put pressure on provincial governments to provide better community supports and services. This phase has focused on the

development and implementation of best practice models (Wasylenki, 2001).

Government Initiatives

In 1948, the federal government introduced the National Health Grants program and the Dominion Mental Health Grants were the largest of the established grants (Roberts, 1988). The Mental Health Grants allocated \$6.2 million in the first year of the program. This money was used for public awareness and mental health promotion initiatives (Greenland et al., 2001). In the 1950s, the Canadian Mental Health Association encouraged the federal government to increase their involvement in mental health. By the late 1950s, there were early attempts at community treatment for individuals living with mental disorders. For example, mobile mental health clinics were attached to provincially-run psychiatric hospitals (Greenland et al., 2001).

In 1956, when the federal government was preparing legislation for national hospital insurance, it announced that it would not provide monetary support for services that were already being provided by the provinces (Roberts, 1988). Consequently, funding for psychiatric services was left out of preliminary drafts of the legislation. Effective liaison between the Department of National Health and Welfare, the Canadian Psychiatric Association, and the Canadian Mental Health Association (CMHA) led to the modification of the legislation; all psychiatric services, with the exception of mental hospitals, were included in the revised policy plan (Roberts, 1988). In 1958, The Hospital Insurance and Diagnostic Services Act (HIDSA) was introduced by the federal government. This act established a cost-sharing program that enabled provinces to establish universal hospital insurance programs. The Federal government would pay fifty percent of the costs, 40% would be paid by premiums, and the provinces would pay the remaining 10%. By 1961, hospital insurance programs were in place in all provinces. The increased funding by the federal government to the provinces through HIDSA enabled the provinces to expand

psychiatric units of general hospitals.

Two key documents released in the 1960s helped direct the course of mental health reform in Canada for years to come. The document “*More for the Mind*” was published in 1963 by CMHA. Major recommendations of this report included: downsizing psychiatric hospitals, increasing use of psychiatric units in general hospitals, and community treatment and continuity of care (Tyhurst et al, 1963). This document stressed the need for a multidisciplinary approach to mental health reform which would integrate the perspectives of professionals, consumers, and families. In 1964, the Royal Commission on Health Services, chaired by Justice Emmett Hall, recommended that patients capable of receiving care in general hospitals should be moved there from psychiatric institutions. It was further suggested by the commission that these patients receive acute care in the hospital when necessary and then be integrated into the community (Wasylenki, 2001). Medically-oriented psychiatric care was made available, without user fees, to the Canadian public with the introduction of The Medical Care Act in 1968.

Negative Impacts of Deinstitutionalization

Because individuals were often discharged into the community without proper supports and resources in place (Lamb & Bachrach, 2001), several unfortunate consequences of deinstitutionalization emerged. The following three consequences will be studied in detail in the following section: stigma, homelessness, and the criminalization of individuals with mental disorders.

Increased Stigma/Community Resistance

The issue of prejudice and discrimination against individuals living with mental disorders is not a new phenomenon. Hendrie and Varsamis (1971) note that, in 1918, one of the top objectives of the newly developed Winnipeg Psychopathic Hospital was “to minimize the stigma

attached to mental illness” (p. 185). Individuals living with mental disorders are arguably among the most stigmatized and disadvantaged groups in society. Some stereotypes associated with people living with mental disorders are that they are dangerous (their behaviour is unpredictable and they could easily become violent), that they are to blame for their disabilities (which arose from a weak character), and that they are incompetent (not capable of real work or making important decisions) (Corrigan & Shapiro, 2010).

Stigma and discrimination towards individuals with a mental disorder is a widespread problem in Canada. In a 2008 online poll of 2204 Canadian adults, 46% of individuals polled thought that the term “mental illness” was used as an excuse for bad behaviour, the majority polled would not go to a physician (61%) or hire a lawyer (58%) with a mental illness, 55% would not marry someone with a mental illness, and 27% responded that they are fearful of being around individuals with mental disorders (Spurgeon, 2008). The Mental Health Commission of Canada interviewed people across Canada and found that 38% of parents would not tell others if their child had a mental illness. (Mental Health Commission of Canada, 2011)

The consequences of public stigma towards individuals with mental disorders can be grouped into the following categories: withholding help, avoidance, segregation, and coercion (Corrigan et al, 2000). There are certain power groups that may hold prejudiced beliefs which have the potential to drastically affect those living with a mental disorder. These include, but are not limited to: landlords, employers, healthcare providers, criminal justice professionals, policy makers, and the media (Corrigan, 2004). The Standing Senate Committee on Social Affairs, Science and Technology (2006) collected personal stories of individuals living with a mental disorder. It was found that people were most often discriminated against in the following four ways: difficulties in finding safe and adequate housing, stigma and discrimination from health

care professions, difficulties in entering workforce or returning to work, and the negative attitudes toward mental illness at all levels of society.

Stigma is one of the main reasons why people living with mental disorders delay or avoid seeking treatment. One study carried out in Israel found that 80% of patients who were referred to a psychiatrist by their family doctor refused to see the psychiatrist because of the stigma attached to receiving psychiatric care (Ben Noun, 1996). The Canadian Community Health Survey found that 60% of those reporting symptoms of anxiety, mood, or substance-use disorders had not received treatment (Davis, 2006). Eighteen percent of respondents who indicated that they needed treatment, but had not obtained it, said they had not sought treatment because they were afraid of what others would think (Statistics Canada, 2003). This study did not include questions on psychotic symptoms – such as those experienced with schizophrenia – which are arguably the most stigmatized mental disorders. It is likely that the number of respondents who had not sought treatment because of the opinion of others would be much higher had questions related to psychosis been asked.

The last 30 years has seen the proliferation of community housing, supervised apartments, group homes, and hostels for individuals living with severe mental disorders. This growth in housing support has resulted in many problems. These include: poor integration of deinstitutionalized individuals back into the community, “ghettoization”, and negative reactions from community residents (Piat, 2000). Several studies have investigated cases of community opposition towards former psychiatric patients living in their neighbourhood. Researchers have identified specific variables that they feel contribute to the “not in my backyard” (NIMBY) phenomenon. These include: perceived personal safety concerns (Rabkin, Muhlin, & Cohen, 1984), perceived declining property values (Mambort, Thomas, & Few, 1981), and perceived

negative effects on neighbourhood businesses and quality of life (Eynon, 1989). Several studies have examined whether community housing for individuals living with mental disorders negatively impacts the real estate value of homes in the vicinity. Researchers have not found support for this widely held opinion (Arens, 1993; Gelman, Epp, Downing, Twark, & Eyerly, 1989).

Homelessness

An unfortunate consequence of how the deinstitutionalization of individuals living with mental disorders was implemented is that many former patients became homeless (Lamb & Bachrach, 2001). It is difficult to establish a causal relationship between mental disorders and homelessness. It is possible that living with a mental disorder leads to homelessness but it is also conceivable that the trauma associated with being homeless could lead to the development of a mental disorder or exacerbate an existing one. Some contend that, while although living with a mental disorder may contribute to homelessness, there are likely many structural and individual factors involved.

Many researchers cite poverty (Morrell-Bellai, Goering, & Boydell, 2000; Sullivan, Burnam, & Koegel, 2000), unemployment (Morrell-Bellai, Goering, & Boydell, 2000), a lack of affordable housing (Nelson, Lord, & Ochocka, 2001; Forchuk et al., 2007), and inadequate community supports (Stuart & Arboleda-Florez, 2000; Street Health, 2007) as the main structural factors leading to homelessness among individuals living with a mental disorder. Individual factors including substance abuse (Morrell-Bellai et al., 2000; Sullivan, Burnam, & Koegel, 2000) and a history of abuse (Street Health, 2007) have also been linked to increased homelessness in this population.

Acorn (2003) found that one in five users of emergency shelters in Vancouver met the

DSM (American Psychiatric Association's Diagnostic and Statistical Manual) criteria for schizophrenia, bipolar disorder, or major depression. In another study, Street Health (2007) interviewed 368 homeless individuals in Toronto between November, 2006 and February, 2007. Approximately 66% of the homeless in their study had experienced serious depression in their lifetime (56% in the past year) and 64% had experienced serious anxiety in their lifetime (55% in the past year). Furthermore, 25% of the sample had tried to commit suicide in their lifetime and 10% had attempted suicide within the past year. Based on the study's findings, the authors recommended the creation and expansion of community-based mental health services (e.g., outreach and peer support services).

In 1987, the City of New York initiated a program to address the health care needs of its homeless population living with severe mental disorders. The program, Homeless Emergency Liaison Project (Project HELP) consisted of a mobile unit of psychiatrists, nurses, and social workers. Psychiatrists were empowered to order police to involuntarily transport individuals who met the program's criteria (i.e., need of hospital care, a mental disorder, and risk of self-harm due to neglect of essential needs) to hospital emergency rooms (Marcos, Cohen, Nardacci, & Brittain, 1990). After being seen at an emergency room, if necessary, this individual was admitted to an acute intensive care psychiatric unit, a long-term care facility, or a transitional living rehabilitation unit. In addition to these facilities, patients were also given access to existing community resources, adult homes, and ambulatory supports. Follow-up contact with program participants two years later revealed that 55% of them were either living in the community or under institutional care (Marcos et al., 1990). While methodological flaws (much of the patient data was collected retrospectively from records and was limited in scope, follow-up contacts were brief, and there was no comparison group) limit the conclusions that can be drawn

regarding the success of this program, the New York program is an example of mental health professionals and policy makers working together to target this often neglected population.

A more recent housing model, Housing First, has proven effective in reducing homelessness in individuals living with a mental disorder (Gulcur, Stefancic, Shinn, Tsemberis, & Fischer, 2003; Greenwood, Schaefer-McDaniel, Winkel, & Tsemberis, 2005; Stefancic & Tsemberis, 2007). The aim of the Housing First model is to remove barriers to housing. Individuals are given immediate access to housing and supportive services without being required to first seek psychiatric treatment or sobriety (Gulcur et al., 2003). Housing First programs have made progress in reducing the rates of homelessness in individuals living with mental disorders but there is still a lot work to be done in this area.

Criminalization

There is concern that many individuals living with mental disorders who formally would have been treated in psychiatric institutions now end up being involved in the criminal justice system. Borzecki and Wormith (1985) identify several factors that potentially contributed to the criminalization of this population. These include: increased prevalence of severe mental disorders in the community, inability of individuals living with mental disorders to gain access to necessary resources, and the way police handle persons with a mental disorder.

As early as 1939, it was suggested that there existed an inverse relationship between the number of individuals with mental disorders in mental institutions and the number of these individuals in jails (Penrose, 1939). It was theorized that these individuals were often treated in whichever institution was more accessible at the time. Abramson (1972) was one of the first to revisit this idea decades later. He speculated that, when thousands of mental hospital beds closed, many of these individuals ended up in the criminal justice system because hospital beds had

become sparse.

Several studies have investigated the link between deinstitutionalization of individuals living with mental disorders and an increase in the proportion of individuals living with mental disorders in jail. Allodi, Kedward, and Robertson (1977) found that the downsizing of psychiatric inpatient facilities in Toronto between 1969 and 1973 was associated with significant increases in the number of inmates with previous psychiatric hospitalizations. Hodgins and Cote (1990) found the prevalence of schizophrenia, bipolar disorder, and major depression among penitentiary inmates in Quebec to be 7.5%, 4.8%, and 16.9 %, respectively. These figures are much higher than the rates of these disorders in the general population. Between 1997 and 2001, the percentage of new federal inmates in Canada with a mental disorder when admitted increased from 6% to 8.5% (a 40% increase) (The Standing Senate Committee on Social Affairs, Science and Technology, 2004). Also, the number of new offenders on psychotropic medication when admitted increased from 10% to 18% (an 80% increase).

More recently, Steadman, Osher, Clark Robbins, Case, and Samuels (2009) estimated the prevalence rates of serious mental illnesses in five U.S. jails during 2002-2003 and 2005-2006. The authors administered the Structured Clinical Interview for DSM-IV to all newly admitted inmates during the two time points. They found the average prevalence rates of serious mental disorders to be 14.5% for male inmates and 31.0% for female inmates. The authors concluded that these high prevalence rates of mental disorders in jails suggest that the resources allocated to treatment in jails and the community for individuals with a mental disorder who are involved in the criminal justice system needs to be re-examined.

The police play a crucial role in determining how individuals with mental disorders will be handled during the interface with the criminal justice system. This situation is problematic for

a variety of reasons. It has been found that, in many areas, police officers' knowledge about mental disorders is no better than that of the general population (Deane, Steadman, Borum, Veysey, & Morrissey, 1999). In many jurisdictions, there is a lack of specialized training for police officers and they often lack insight into the symptoms of mental disorders (Davis, 2006). The Canadian Mental Health Association, BC Division (2003) pointed out numerous reasons why, given the choice, police are more likely to process individuals through the criminal justice system instead of the mental health system. Among the reasons given were: long wait times in emergency rooms, the quick discharge of admitted patients, and lack of information about treatment options.

The Vancouver Police Department (2008) sought to determine the prevalence of police calls that involved an individual with a mental disorder and to identify the factors that contributed to police call frequency regarding this population. All calls to the Department were monitored for a 16-day period in September, 2007. In total, 1,154 service calls were documented and, out of those, 31% involved at least one individual living with a mental disorder. The authors estimated that approximately \$9 million is spent annually in Vancouver on police resources to respond to calls related to mental disorders (this figure does not include costs related to follow-up activities). The authors suggested that inadequate resources after the closure of mental hospitals, as well as lack of collaboration and information-sharing between resources, are largely responsible for the elevated number of police calls involving this population.

Outcomes of Deinstitutionalization

Several studies have looked at various outcomes of shifting the care of individuals living with severe mental disorders into the community. These studies have focused on evaluating the cost-effectiveness of community care versus institutional care by tracking service use. They have

also focused on assessing an individual's community and clinical functioning after discharge and documenting residential mobility and mortality. Overall, these studies have concluded that, when planned properly, community care is superior to institutional care on a wide array of measures.

Cost-effectiveness/service use

Rothbard, Kuno, Schinnar, Hadley, and Turk (1999) examined the mental health service utilization and cost to treat in the hospital versus cost to treat in community for 321 patients discharged from the Philadelphia State Hospital. They found that, in the three-year follow-up, 20-30% of the former patients required hospitalization, for an average of 76 days in year one and 91 days in year three. All of the former patients in this study received some form of outpatient psychiatric care during the three-year period. The authors estimated that the cost per person each of the three years after discharge was approximately \$60,000 (this estimate did not include contacts with the social welfare system), compared to estimates of \$130,000 if the person had remained in the hospital. Furthermore, they found no evidence of cost-shifting between the psychiatric and health care sectors, though they noted a reallocation of funds from institutional beds operated by the state to residential beds operated by the private sector.

Reinharz, Lesage, and Contandriopoulos (2000) looked at a retrospective matched-pair cohort sample of psychiatric patients (one member of the pair was in a psychiatric institution and the other member was living in the community) over a ten-year period. They found that the overall care-associated costs were higher for the hospitalized group (\$34,455 annually compared to \$31,696 for the community-based group) over the ten-year period. In another study, Kamis-Gould, Synder, Hadley, and Casey (1999) used administrative data to examine the impact of closing a state psychiatric hospital on service utilization costs. They concluded that replacing inpatient services with community services resulted in significant cost reduction and that these

savings offset the initial funds used to invest in community programs. Overall, a net savings of \$3.4 million over a three-year period was found for a cohort of 2,240 discharged psychiatric patients.

Community and Clinical Functioning

McGrew, Wright, Pescosolido, and McDonel (1999) tracked 303 patients discharged from Central State Hospital in Indiana for two years after it shut down. Every two months the case manager or therapist of these individuals was contacted to gather information. Consistently, enhanced quality of life and improved level of functioning were found in these individuals. Also, the researchers found that fewer than 27% of the individuals discharged into the community had been re-hospitalized (McGrew et al., 1999). The authors concluded that individuals hospitalized for long periods can function well in the community after discharge.

Another study that looked at social and clinical outcomes of discharged long-stay psychiatric patients was completed by Leff and Trieman (2000). They assessed 670 patients eight times in the five-year period following the closure of a London psychiatric hospital. The authors concluded that the quality of life was better for these individuals in the community, although they did have trouble becoming socially integrated. They also concluded that these individuals were able to acquire the necessary skills to function well in the community.

Residential Mobility

Lix et al. (2006) used population-based administrative data to compare the residential mobility of individuals with schizophrenia to that of the general population over a 3-year period. Thirty-four percent of the individuals with schizophrenia moved during that time compared to 21.6% of the general population. In another study, Trieman, Leff, and Glover (1999) looked at residential mobility and hospital readmissions in former psychiatric inpatients. They found that

during the five-year follow-up period, 38% of the individuals followed had been re-admitted at least once to a psychiatric ward and, at the end of the five-year period, 10% were inpatients. Seventy-eight percent of the patients were initially sent to live in staffed residential homes, 7% relocated to unstaffed group homes, 10% moved to independent apartments, and 4% went to live with family. After five years in the community, of the 523 fully followed-up individuals, 89% were living in the community, and of those, 59% were still in their original placement. These findings of this study demonstrate the potential success of former psychiatric patients in obtaining stable housing if adequate alternative resources are available.

Mortality

A plethora of research has looked at mortality rates in individuals with mental disorders. Harris and Barraclough (1998) conducted a comprehensive review of the mortality associated with mental disorders. The authors reviewed 152 studies on all-cause mortality and 249 on suicide. They concluded that all mental disorders, across all ages and all settings, were associated with an increased risk of premature mortality. Several studies have found the mortality rates of long-term psychiatric patients to be between 2 and 4 times higher than the general population (Hansen et al., 2001; Miller, Paschall, & Svendsen, 2006; Zilber, Schufman, & Lerner, 1989).

Chapter Summary

The transfer of care for individuals living with mental disorders has shifted from predominately institutional settings to mainly community settings. Because of inadequate planning and supports, this change has resulted in a number of challenges including increased stigma, homelessness, and criminalization. Research has found that individuals discharged from psychiatric facilities can successfully reintegrate into the community when sufficient resources are available.

Chapter 3: Qualitative Methods and Analysis

Design

Research Questions

1. a) How was the closure of Brandon Mental Health Centre carried out?
- b) What were the key events in the closure?
- c) What challenges were encountered?

Case Study Methodology

The purpose of the qualitative component of this study was to document the closure of Brandon Mental Health Centre. Patton (2002) attests that qualitative approaches are more appropriate than quantitative ones to study the dynamics and developments of a transformative process. It is suitable to apply case study methodology to study a phenomenon over which the investigator has little or no control and where a “why” or “how” research question is being asked (Yin, 2009). As Patton (2002) notes, “A case can be a person, an event, a program, an organization, a time period, a critical incident, or a community” (p. 55).

One of the first steps in designing a qualitative study is identifying the unit of analysis. Yin (2009) recommends that a researcher generate a study’s primary research questions and then let the questions guide the determination of the “case”. In this study, the case to be examined was the closure of Brandon Mental Health Centre.

It was decided to use a single case as opposed to multiple cases for this study. The main reason behind this choice was feasibility. There has only been the closure of one mental health centre in Manitoba. It was beyond the scope of this study to travel elsewhere in search of more cases. Furthermore, Yin (2009) states that one rationale for using a single case is when the phenomenon needs to be studied at multiple points of time. The closure of BMHC was a phased

process that occurred over several years.

Theory

This case study is holistic in nature. A holistic design is ideal when the theory itself is global in nature (Yin, 2009). A new theory was not developed but, instead, an existing theory, deinstitutionalization, and its underlying assumptions were tested (see Chapter 2 for a comprehensive look at this theory). The closure of BMHC was analyzed within the context of mental health reform in Manitoba and, more broadly, deinstitutionalization. Yin (2009) contends that the overall aim of a case study should be analytical generalization, where “a previously developed theory is used as a template with which to compare the empirical results of the case study” (p. 38). The closure of BMHC can provide useful information about the theory of deinstitutionalization; the context in which it occurs, the ways it is carried out, and challenges that often arise.

Data Collection

Case study research often involves the use of multiple sources of data (Yin, 2009). In this study, two types of sources, interviews and documentation, were used.

Key Informants

Potential interviewees were chosen by a method called snowball or chain sampling, an approach used to locate key informants (Patton, 2002). A few well-situated people were asked with whom they would suggest speaking regarding the closure of BMHC. Several names were mentioned repeatedly and these recommended individuals were contacted by phone. These individuals are what Patton (2002) calls “information-rich cases.” The 11 informants chosen were anticipated to have different perspectives about the closure of BMHC. They are individuals with experience and expertise in policy analysis, government, and service provision. All

individuals who were approached agreed to be interviewed. Participants were fully informed of the purpose of the study and written informed consent was obtained prior to the interviews being conducted (see Appendix A).

Interviews

All interviews were conducted by the researcher from October-December, 2010. The location of the interviews was chosen by the informants. Seven of the interviews were conducted in Brandon, three were done in Winnipeg, and one took place over the phone. The interviews ranged in length from 34 minutes to 141 minutes. A semi-structured interview guide was created prior to the first interview and was modified as necessary during data collection as new ideas emerged. The interview guide is included in Appendix B.

The interviews were tape-recorded and transcribed. The tapes and transcripts are kept in a locked filing cabinet at the Manitoba Centre for Health Policy. The tapes will be kept for seven years, at which time they will be destroyed. Ethics approval to conduct the interviews was obtained from the University of Manitoba's Health Research Ethics Board of the Faculty of Medicine and the Brandon Regional Health Authority in the summer and fall of 2009 respectively.

Documentation

The main purpose of documents in a case study is to corroborate and supplement evidence from other sources (Yin, 2009). During this study, documents were gathered at various points in the research process. Before data collection commenced, a search was conducted using the University of Manitoba library database. The following terms, in various combinations, were used to search titles: Brandon, Manitoba, mental, health, services, reform, psychiatric, and hospital. Then, during the interviews, informants were asked if they had any material that they

thought would be useful for this study. Four of the 11 informants provided the researcher with documents. Finally, during the analysis phase, extra documents were sought when gaps in the case study were identified.

Data Analysis

After the interviews had been transcribed and documents gathered, the next step was to analyze the information. Two forms of analysis, coding and memo writing were used. Coding is a process of organizing data where meaning is assigned to segments of text (Miles & Huberman, 1994). Memo writing provides an opportunity for the researcher to reflect upon the data and coding during analysis (Neuman, 1997).

Coding

Descriptive codes were used to organize the transcripts. Before the interviews were conducted, an initial coding scheme was developed based on the research questions and theoretical framework (see Table 1). After the initial coding scheme was applied to the data, two new codes were added and one existing code was revised. The code REF was added to group information related to general mental health reform in Manitoba and any related Manitoba Health documents. The code PAT-SUR was added to group information about a patient needs survey that was conducted in 1991. Also, the code CHAN which had originally been used to group information regarding changes at the centre from 1980-1991 was revised to only include changes from 1984-1991, as these dates were a better fit for the data. Once information gaps were identified, relevant documents were analyzed using the same coding scheme.

Memo Writing

Memos were typed, kept separate from the interview data, and grouped by date and corresponding code (s). The memos helped guide analysis and identify gaps or uncertainties.

Informants were often contacted for further information based on questions that arose during memo writing.

Table 1

Initial Interview Coding Scheme Adopted

Topic	Definition	Code
BMHC pre-1980	Relating to any important information about the centre before 1980	HIST
Changes at BMHC from 1980-1991	Relating to any notable changes to the centre from 1980-1991	CHAN
Decision to Close	Relating to the decision to close BMHC	DEC
Closure Preparation	Relating to planning in advance of closure (e.g., committee formation)	PREP
Reactions to Closure	Relating to the reactions about the closure by various groups	REACT
Funding	Relating to the financing of newly developed services	FUND
Employment	Relating to staffing of newly developed services and employment for former BMHC employees	EMPLOY
Newly Developed Services	Relating to new community services for former BMHC patients and newly diagnosed individuals with severe mental disorders	NEW-SER
Challenges	Relating to any issues or areas of opportunity that were identified to be a result of the closure	CHAL

Trustworthiness

Various methods may be used to improve the trustworthiness of qualitative research. The strategies utilized in this study, triangulation and member-checking, are summarized below.

Triangulation

Denzin (1978) identified four different types of triangulation: data, investigator, theory, and methodological. Data triangulation (the comparison of multiple sources) was used in this study. According to Guba (1981), analyzing multiple sources of data helps to compensate for individual limitations. For example, in this study informants were often asked to recall events that may have occurred over 20 years ago. Documents were used to help verify the information obtained through the interviews and to reduce recall error. Also, a wide range of informants were interviewed to verify the information received from other interviews but also to capture unique perspectives and rich anecdotal evidence.

Member-checking

Member-checking is the process of seeking feedback from informants regarding data credibility and researcher interpretations (Creswell & Miller, 2000). Guba (1981) considers member-checking the most important technique to increase a study's credibility. Member-checking occurred in three ways in this study. First, the interview transcription notes were sent to each informant for review in the fall of 2010. The informants had the opportunity to clarify any of the interview material at that time. Four of the 11 informants made minor clarifications to their transcriptions; none of the informants deleted any material. Second, at several times throughout the analysis process between December, 2010 and April, 2011, informants were emailed and asked to expand upon or explain a particular part of their transcription. Third, in July, 2011 the case study report was sent to all informants. They were given the opportunity to provide feedback and to clarify, supplement, or challenge any of the material. Six of the informants provided feedback and all of their suggestions were incorporated into the final case study report.

Chapter 4: A Case Study of the Closure of Brandon Mental Health Centre

The objective of this chapter was to answer the following three qualitative questions:

- 1) How was the closure of Brandon Mental Health Centre carried out?
- 2) What were the key events in the closure?
- 3) What challenges were encountered?

This chapter contains a brief history of BMHC, as well as important information concerning the closure of the facility and the development of community resources. The material for this chapter was gathered through interviews with 11 key informants and through relevant documents.

Inception-1984

The Brandon Insane Asylum opened its doors May 1, 1891, moving into a building that had originally been a reformatory for boys. The first “inmates” arrived there July 14, 1891 and, by the end of the year, the asylum had reached its intended capacity of 50 patients (Refvik, 1991). In the next several years, the institution expanded rapidly and its population grew substantially because of the large increase in immigrants settling on the prairies; by 1909, there was an average daily population of 557 patients occupying the facility. There were almost twice as many males as females admitted at this time due to the large proportion of males among prairie-settling immigrant populations. At this time the institution only had 420 beds, resulting in excessive overcrowding. Extra beds were placed on stair landings, in hallways, and in the assembly hall. In 1910, a fire devastated the Brandon Insane Asylum and the more than 700 patients and staff were forced to evacuate. Patients were housed at the Winter Fair Building for two years while new buildings were constructed on the old asylum grounds.

The new institution opened in 1912 and was renamed the Brandon Hospital for the Insane

(Refvik, 1991). After World War I, a more humane approach was taken to caring for individuals living with mental disorders. The name “Hospital for the Insane” was seen as unsympathetic to patients and was not supported by the public. Thus, the institution underwent its third name change in 1919 and became the Brandon Hospital for Mental Diseases. There were 130 beds added in two new buildings in the early 1920s and, by 1930 the average daily population of the institution was 1155. In 1921, there was an acute shortage of doctors at the hospital and it was reported that, at times, there was only one physician to care for approximately 800 patients. In 1926, the facility began conducting experimental drug treatments. One of the first studies involved providing 50 to 300 grains of sodium bromide to agitated and overactive patients. It was suggested by the Medical Officer at the centre that the results from this therapy were “encouraging”. He conceded, however, that it was too early to draw any definitive conclusions about the drug’s long term effects.

In 1921, The Training School for Nurses opened at the centre. The graduating class of 1923 was the first in Western Canada to have a diploma in Mental Nursing. By the end of 1926, 39 female nurses and 11 male attendants had received their diplomas (Refvik, 1991). The Training School eventually evolved to become the School of Nursing, Psychiatric Nursing program.

The overcrowded conditions in the institution continued into the 1930s. At times there were 150 more patients at the hospital than could be comfortably accommodated (Refvik, 1991). It was recalled by former patients and staff that there were only 5 bath towels per 20 patients, the bath water was changed every 2 to 3 patients, and patients who worked outside on the farm and piggery were given only one bath a week.

In the 1930s and 1940s, several new treatments were introduced at the Brandon Hospital

for Mental Diseases. These included: water deprivation or dehydration, insulin and Metrazol shock therapy, electro-convulsive therapy, and pre-frontal leucotomies. A pre-frontal leucotomy, also referred to as a lobotomy, was a surgical procedure that involved cutting the white matter area of each pre-frontal lobe of the brain (Refvik, 1991). Schultz, Henderson, Clarke, and Fisher (1958) compared the discharge rates of patients treated with electric shock, insulin shock, both electric and insulin shock, or leucotomy to those who had received some other form of treatment (occupational therapy, hydro-therapy, sedation, etc). The authors found that from 1943-1947, the first group was 1.5 times more likely to be discharged than the second group. The last leucotomies were performed at the facility in 1957, with 311 surgeries performed in all.

Starting in 1949, with the help of mental health grants provided by the federal government, an array of projects and improvements to the facility were undertaken. These included the establishment of a training school for medical technologists, new surgical equipment, formation of a dental service, the creation of a beauty parlour, and several research projects, including one on cholesterol (Refvik, 1991). Starting in 1953, clinical drug trials were conducted at the Brandon Hospital for Mental Diseases. Chlorpromazine was the first drug to be introduced. In 1955, more than 400 patients were treated with the drug. A study examining the effectiveness of chlorpromazine at the institution from 1954 to 1957 concluded that 40% of the patients treated with it were much improved, 30% were improved, and 30% were unimproved or worse (Refvik, 1991). In 1954, the population reached an all-time high of an average of 1689 patients. Because of the overcrowding conditions at the facility, some patients were forced to sleep on mattresses in ward dayrooms.

The 1960s saw the introduction of formal behaviour modification techniques at the institution. The most common technique used was aversive conditioning therapy. In 1967,

because of the increased use of psychiatric drugs, insulin shock therapy was discontinued (Refvik, 1991). The increased use of drugs to treat patients and the evolving philosophy that patients should be cared for in the community were primarily responsible for a significant decrease in the hospital's population. The inpatient population was reduced to 1142 in 1966 and to 741 in 1971. In 1971, 43% of the patients were 65 years or older (Clarkson, Prefontaine, & Potter, 1973).

In 1972, the name of the facility was changed again and it became the Brandon Mental Health Centre (BMHC). In 1973, Clarkson, Prefontaine, and Potter prepared a report for the provincial government titled *Mental Health and Retardation Services in Manitoba*. According to the report, in 1972-73, 54% of the \$19.4 million spent on mental health went to Brandon Mental Health Centre and Selkirk Mental Health Centre. At that time, BMHC employed 657 workers. The authors interviewed several of the staff and discovered that many of the employees felt that BMHC was isolated from the community and that the hospital was providing a poor, inferior service.

In 1972, there were a few community mental health workers but they operated exclusively out of BMHC. After discharge, former patients were often relocated in close proximity to the hospital because any follow-up or further treatment had to be done at the hospital. As one informant put it, "there was an outpatient department at BMHC, which those of us working in the main building knew nothing about, like it was just another little entity out there, not a big part of care" (informant E). It wasn't until 1974 that community mental health workers began to be located in the surrounding areas and provide support outside of a hospital setting.

Clarkson et al. (1973) calculated that there were 1,561 acute psychiatric beds in the

province at that time and they believed that only 400 beds were needed. They felt that a large number of patients who were being treated in large mental health centres would be better cared for in nursing homes or other care homes. The report concluded that Manitoba's mental health system was heavily weighted towards providing care in an institutional setting, that there was a lack of leadership, and that there was no comprehensive plan for development. It was recommended that provincial mental health services be shifted from the large institutions to the community.

Changes at BMHC from 1984-1991

The population at BMHC continued to decrease during this time. The average daily population was reduced from 449 patients in 1985 to 250 patients in 1991 (See Figure 3 for a comparison of the average daily population at BMHC from 1954-1991) (Refvik, 1991). During these years, several adjustments were made at the centre. The major ones are summarized below.

Relocation of the Adult Day Treatment Program

In 1985, this program was relocated from BMHC to Dinsdale Personal Care Home. At that time, the role of program was mostly to assist former residents with their medication and to provide them with a place to socialize with others. One informant estimated that approximately 105-110 people went there, anywhere from daily to once a month, to receive injectable medication (informant C). At around the same time, clozapine was introduced and it was envisioned that the role of adult day treatment program would change, as fewer people would rely on the program to receive injectable medications.

McTavish Manor

In 1986, a transitional housing facility, McTavish Manor, opened for rehabilitation residents from BMHC. The supported living facility could accommodate up to 10 individuals at

a time and provided 24 hour staffing.

Psychogeriatric Assessment Unit

Also in 1986, a 12-bed unit opened in the Valleyview building at BMHC. One informant said the following about the new unit:

“Because historically older individuals that were having trouble in the community, for confusion, wandering would be admitted and placed and that was sort of, that was the focus of the assessment. So by having an assessment unit, then people could be referred from personal care homes or from their own homes and we could take a good look at the underlying causes. So that was sort of the start of a trend to doing something different” (informant E).

In November 1988, the Psychogeriatric Assessment Unit was moved to the 4th floor of the Assiniboine Centre at the Brandon General Hospital. It remained a 12-bed unit and BMHC leased the space from the hospital. It was initially thought that the average length of stay on the unit would be 21 days, but many people ended up staying there longer because they were difficult to treat. There were many reasons for the move. These included: the Valleyview building was old and in need of repair, the move was seen as a way to reduce mental health stigma, and many of the geriatric patients had medical problems that were thought to be more easily treated at the general hospital. After the unit opened, one informant described the following experience: “...and then we brought our patients in and the first day that your evening snack comes up they send the cookies labeled ‘Mrs. Smith psycho’ and ‘Mr. Jones psycho’. And nobody in the dietary department could see a problem with that. We sent them all back and said ‘re-label these, we can’t accept them’” (informant E).

Rideau Park Personal Care Home

In 1982, the provincial government committed \$2.4 million to improving BMHC; \$1.4

million would be used to construct a new laundry facility and \$1 million would be used to construct a new 100-bed personal care home in an effort to provide better treatment for the overwhelmingly geriatric population at the centre (Refvik, 1991). The new unit, which was constructed off the BMHC grounds and called Rideau Park Personal Care Home, was finished in 1988. A hundred long-stay geriatric patients were paneled (to be moved to Rideau Park, a resident had to have been at BMHC for a minimum of two years) and then transferred to the new facility in 1988. Each resident had their own room and bathroom, a big change from the 8-bed dorm rooms at BMHC. Both the residents and the staff had to adjust to changes in care (e.g., providing some residents with the opportunity to bathe independently).

The new personal care home was under the auspice of BMHC and it was restricted to admissions from the mental health centre. One informant estimated that a total of 150-200 residents were transferred from BMHC to Rideau Park Personal Care Home from 1988-1998 (informant K). It wasn't until the fall of 1998 that residents from the general population were accepted into the personal care home.

Inpatient Adolescent Unit

On January 1, 1991 a 10-bed inpatient unit for adolescents (between the ages of 12 and 17) opened at BMHC. The objectives of the new unit were to provide a mechanism for assessment of adolescents who couldn't be assessed on an outpatient basis and to provide a place for adolescents who needed longer treatment (Brandon Mental Health Centre, 1991).

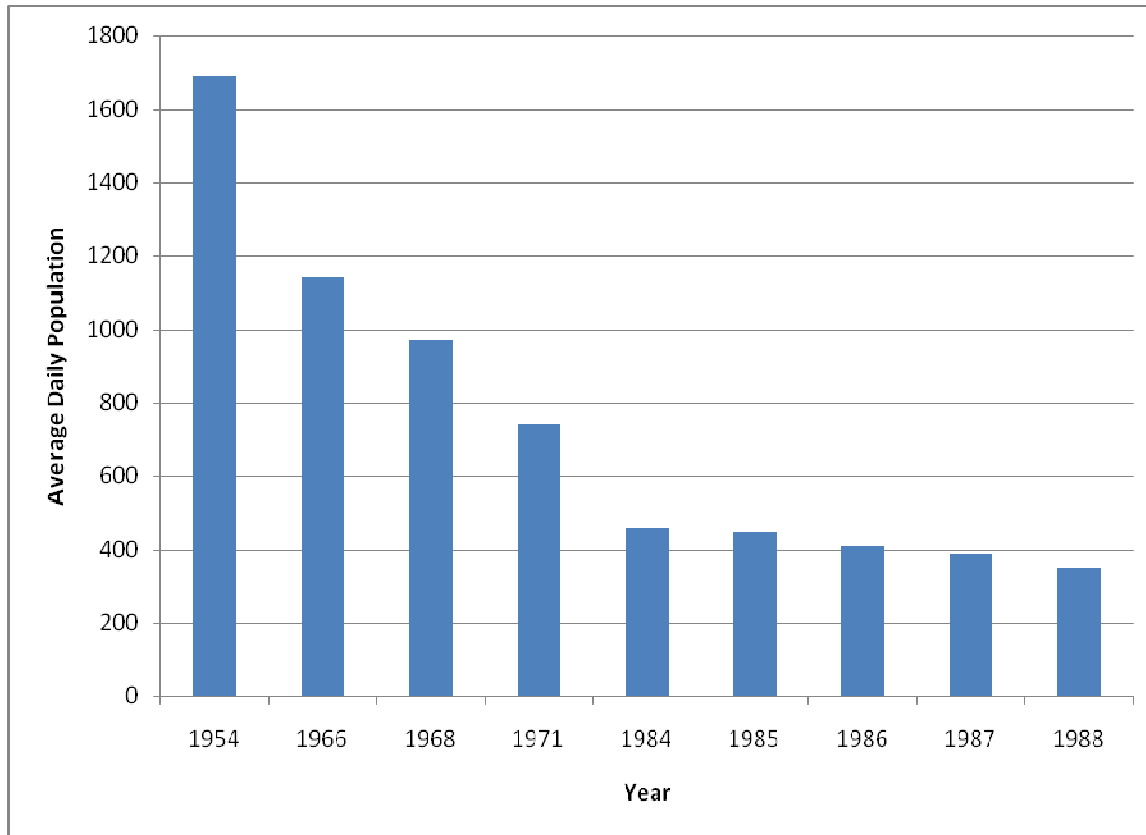


Figure 3. Average daily population at BMHC from 1954-1988. Note: Uneven time intervals are due to limited data availability.

The Context for Closure

In 1982, the Department of Health commissioned a 13-member group to analyze mental health services in Manitoba and make recommendations to improve the system. The Pascoe Report, as it became known, suggested that the role of the mental health centres in the province be re-evaluated (Mental Health Working Group, 1983). The report recommended that the facilities in Brandon and Selkirk be phased out by 1990 and replaced with smaller, regional centres. Although the Health Minister endorsed the overall thrust of the report, he indicated that he had no intention of closing either facility at that time (Refvik, 1991). It was also noted in the report that, in 1982-83, only 3.5% of all mental health expenditures were used for community mental health services. The report recommended hiring 40 additional community mental health workers to supplement the province's 67 workers (Mental Health Working Group, 1983).

In 1988, 1990, and 1992, Manitoba Health released three framework documents on the future of mental health in the province. These reports served as a guideline for reform during the transition period that followed. The first report, *A New Partnership for Mental Health in Manitoba* (Manitoba Health, 1988a), highlighted deficiencies in the current system, acknowledged that mental health services in Manitoba had long been neglected and stressed the importance of collaboration in moving forward. In the report, it was recognized that the organizational structure of Manitoba Health was part of the problem. There was no clear locus of accountability for mental health. Therefore, it was proposed that a Mental Health Division be created within Manitoba Health to assume the responsibility for mental health services in Manitoba.

Also in 1988, regional Mental Health Councils were formed in all eight health regions in Manitoba. Each council was made up of consumers, families, service providers, and community

members. The newly established councils were responsible for advising the Assistant Deputy Minister of Mental Health on the planning and provision of mental health services in their region (Manitoba Health, 1988b).

The second Manitoba Health document, *Vision for the Future: Guiding Principles and Policies for Mental Health Services* (Manitoba Health, 1990), built on the first report by identifying key principles and policies envisioned in a reformed mental health system in Manitoba. It is noted in this report that the system had been studied extensively and that similar findings and recommendations were always found; it was time to use this wealth of information to generate change. The following were among the 16 fundamental principles outlined in this report: minimum disruption of life, services close to home, continuum of services, partner participation, consumer involvement, and a single responsibility centre. In order to be consistent with these principles, 15 policies were recommended. The document defined the role of Brandon and Selkirk Mental Health Centres as “long-term care and rehabilitation facilities for those individuals whose needs cannot be adequately met by community based alternatives” (p. 8). The report then went on to state that resources should be reallocated from the mental health centres to develop and improve community supports (with the help of bridge funding), with the eventual plan of relocating individuals back into the community and closing beds.

The third report, *Building the Future of Mental Health Services in Manitoba* (Manitoba Health, 1992), outlined how mental health reform in the province could advance and identified potential barriers to change. The report mentioned that an Advisory Committee on Mental Health Reform had been established. The committee was made up of the Assistant Deputy Minister – provincial mental health services, a representative from each Mental Health Council, and recipients of mental health services, among others (Manitoba Health, 1992). The committee was

mandated to address all issues related to mental health reform in Manitoba, including matters related to the redirection of services, as well as facilitating integration and coordination of services (Manitoba Health, 1993). It was stated that provincial mental health reform would begin in Western Manitoba. The core of reform for this area was to be the closure of Brandon Mental Health Centre and the relocation of patients to the community. It was stressed that relocations would not begin until proper alternative supports were in place.

The report indicated that a community-based model of service provision, founded on several values, would be followed. These values included an emphasis on consumer choice; collaboration between consumers, families, service providers, and the government; and a multidisciplinary approach to service provision (Manitoba Health, 1992). The report went on to identify the major components of a community-based mental health model. The components identified were: assessment, acute care, crisis services, supportive housing, support programs, psychosocial rehabilitation, intensive case management, long-term care, and prevention/promotion services (Manitoba Health, 1992).

The report identified two major barriers to past reform: (a) a lack of integrated management of mental health services and, (b) a lack of mechanisms for cooperation within the mental health community. In an attempt to eliminate the first barrier, all aspects of the mental health system were to be planned and managed by the Ministry of Health. The local Mental Health Councils would provide the opportunity for organizations and individuals to participate in the reform process. With these changes, it was stipulated that the reform was ready to proceed (Manitoba Health, 1992).

The closure of Brandon Mental Health Centre and other changes to the mental health system in Western Manitoba was one of four identified areas of reform for the province. Changes

were also proposed for Winnipeg, Northern Manitoba, and Selkirk Mental Health Centre (Manitoba Health, 1992). For Winnipeg, it was recommended that 20 acute care beds be taken out of service and that community resources be augmented. For Northern Manitoba, the plan called for creating acute care beds in general hospitals and enhancing community services in the area (e.g., crisis services and supportive housing). The report noted that the role of Selkirk Mental Health Centre would be modified as the reform progressed in other areas of the province (Manitoba Health, 1992). A forensic mental health unit was also planned for Selkirk Mental Health Centre.

Dr. Paul Carling, who was at the time the Executive Director of the Centre for Community Housing and Support at the University of Vermont, was consulted on mental health reform in the province. Carling was an advocate of community care for individuals living with a mental disorder and of increased consumer involvement. While speaking at a conference in Brandon in September, 1991, Carling had the following to say about community-based care for individuals living with a mental disorder, “I believe regardless of any differences or labels they have, they belong in a community” (Gibbons, 1991, p. 5).

1991 Patient Survey

In the summer of 1991, the Mental Health Division of Manitoba Health, with help from the staff at BMHC, reviewed the records of all the individuals living at the hospital. They created a summary of the demographics and service needs of each unit. The results of this survey were used to start identifying which community services these individuals would require if discharged. Information on each of the separate units is summarized below (BMHC, 1991).

Admissions unit. At the time of the survey, there were 34 residents on the 40-bed acute-care unit. Survey information was gathered for 30 of these residents. The average age of these residents

was 33.5 years, the average length of the current admission was 71 days, the average number of admissions to the centre per individual was 4.2, and the average time spent at BMHC was 1.3 years. It was concluded that the needs of many of these individuals could be met in the community. The establishment of a mobile crisis team, a crisis stabilization unit, and an acute-care psychiatric ward at the general hospital were seen to be necessary services for this cohort.

Inpatient adolescent unit. Information was gathered on all individuals admitted to the unit between when it opened (January 1, 1991) and the date of the survey (August 28, 1991). There were 38 patients admitted to the unit during that time. Seven of them had more than one admission and 33 of them were voluntary admissions. The mean age of the patients was 15.5 years. It was stressed that not all the data for this unit had been analyzed and that specific discharge needs of this group were not yet well understood.

Rehabilitation unit. At the time of the survey, there were 54 residents (all under the age of 59) on the rehabilitation unit. The average age of these residents was 43.3 years, the average length of the current admission was 6.2 years, the average number of admissions to the centre per individual was 6.0, and the average time spent at BMHC was 10.8 years. It was determined that the majority of these residents could be accommodated in the community with the help of residential and vocational supports. Other supports thought to be needed by this group included: intensive case management, a mobile crisis team, a crisis stabilization unit, and an inpatient facility.

Adult long-term care unit. At the time of the survey, 143 of the 269 residents (53%) at BMHC were over the age of 59 and living on this unit. The average age of these residents was 74.3 years, the average length of the current admission was 15.5 years, the average number of admissions to the centre per individual was 2.7, and the average time spent at BMHC was 18.5

years. Almost half these residents were living with schizophrenia and a third of them had dementia. The largest areas of physical care needed for this group were bathing, dressing, and elimination. It was thought that the majority of these residents would have to be transferred to a personal care home, with many of them requiring a maximum level of care.

The Announcement

The formal announcement that BMHC would be closing came in April, 1993. By then, most of the employees and residents at BMHC, as well as the public, were aware that the facility would be closing. There were mixed reactions about the impending closure. The responses of these three groups are summarized below.

Employees. Many informants said that the feelings among the employees were mixed and that everyone had an opinion. As one informant put it, “It was totally polarized. Nobody was neutral. You were either for or against it” (informant K). Some employees were optimistic about the development of community resources and retaining a job. Others were anxious about the instability of their future and the future of the residents.

Residents. There were also varying opinions among the residents about the closure. Some residents were ready to depart BMHC and were enthusiastic about the possibility of community supports. Many others were anxious about leaving. One informant recalled the following story: “I remember one particular gentleman who had been there for probably 25 or 30 years and he just simply said no, he’s not going anywhere; he was going to die at Brandon Mental Health Centre...and all of a sudden one day after we placed a number of people in the community and he came and said, ‘I’m ready to go’. And he went as soon as we were able to find him a placement” (informant C).

Community. One informant mentioned that some members of the community were dubious about the closure (informant B). They feared that there were “200 axe-bearing killers at BMHC.” Others were worried that the closure signaled a reduction in the workforce. A mental health educator was hired on a two-year contract in 1993. A lot of work was done educating the community about the mental health reform and about the nature of mental disorders.

The Implementation Plan

After the report *Building the Future of Mental Health Services in Manitoba* was released at the beginning of 1992, the Mental Health Division worked closely with the Mental Health Councils in the Westman, Parkland, and Central regions (BMHC had served all three regions). In the first six months of 1992, the councils consulted with service providers, consumers, families, and businesses to identify service needs in each area (Manitoba Health, 1995). In June, 1992 the councils presented their findings to the Advisory Committee on Mental Health Reform. These findings, along with the services identified in *Building the Future of Mental Health Services in Manitoba*, provided the Advisory Committee on Mental Health Reform with a conceptual framework to begin planning services.

In 1993, the Western Implementation Committee was formed. The role of the committee was to oversee the implementation of new services in Western Manitoba that had been identified as essential by the Advisory Committee on Mental Health Reform and the local Mental Health Councils (a detailed description of which services were developed can be found in the section “*The Implementation of New Services*”). That same year, a Coordinator for Mental Health, Westman Region was hired. The Coordinator was a central administrative position responsible for the development of new programs. The Coordinator worked closely with all of the committees.

Funding

The funding for the development of community supports came primarily from three sources, namely money that was already directed to BMHC, money saved from closing acute care beds in Winnipeg, and bridge funding. Savings from closing a mental hospital don't happen all at once. Therefore, it is imperative to have bridge (or transition) funding available while the two systems are operating at the same time (The Standing Senate Committee On Social Affairs, Science and Technology, 2004). The provincial government provided \$2 million in bridge funding for mental health reform in Manitoba. This bridge money was used to start building new infrastructure in Western Manitoba while BMHC was still in operation. Most of the capital, which was in excess of 20 million dollars with absolute closure, remained in Western Manitoba, although some of it went to Northern Manitoba.

Employment

The administration at BMHC worked closely with the Manitoba Government and General Employees' Union (MGEU). Together, they set up a Workforce Adjustment Committee. The role of the Workforce Adjustment Committee was to develop a comprehensive plan for individuals faced with potential job loss and to help them transition into new positions as quickly as possible (Rural Development Institute, 2001). Several measures were taken to help staff at BMHC secure employment in a reformed system.

As the planning of new services progressed, program and job descriptions were developed and put into a big binder. By the time the formal closure announcement was made, 100 position descriptions had been formulated. Initially, the newly created positions were only available to BMHC employees. The jobs weren't publically posted unless they couldn't be filled by existing BMHC employees. All employees at BMHC had to reapply for a position, if they

wished to continue working in the mental health field. The key management positions were filled first and then the newly hired managers were involved in the hiring of subsequent staff.

It had been several years since many of the employees at BMHC had participated in a job interview. The Human Resources department put on workshops to teach people how to write good resumes and how to prepare for interviews. There was anxiety and ambivalence among the employees about the interview process. One informant recalled the following experience, "...and I remember one person coming in and saying, 'What job am I applying for?' I remember another person coming in and when, we started asking questions, this person's response was, 'I don't know the answer to that question. I guess I'll find out when I get the job'" (informant C).

There were also early retirement incentive packages offered to people who didn't want to apply for a new position or who weren't qualified for any of the new jobs. There were several positions at BMHC that would no longer fall under the Mental Health Act in the reformed system (e.g., the maintenance and housekeeping positions). Work was done with the Brandon General Hospital to try to protect dietary and housekeeping positions for former BMHC employees. One informant estimated that, in the end, there were fewer than 25 people (out of a staff of over 500) who wanted a job in the new system and were not able to secure one (informant B).

The Implementation of New Services

The four priorities areas identified for mental health reform in Western Manitoba after the closure of BMHC were: adult inpatient and crisis response services, adult rehabilitation and consumer support services, psychogeriatric services, and child and adolescent services. Each of these areas will be described in detail in the sections that follow. See Table 2 for a comparison of services at BMHC and services in the community.

Adult Inpatient and Crisis Response Services

Adult Inpatient. Adult inpatient acute care services are a necessary element of the system.

However, the goal is to keep the length of stay as short as possible without impairing patient outcomes (Health Systems Research Unit, Clarke Institute of Psychiatry, 1997). In 1998, a 25-bed acute-care unit, the Centre for Adult Psychiatry (CAP), opened up at the Brandon General Hospital/Brandon Regional Health Centre. The same year, a 10-bed acute-care unit was also constructed at the Dauphin General Hospital (a city of approximately 8,000 people located two hours outside of Brandon in the Parkland region). Also, Eden Mental Health Centre expanded its role to provide inpatient services to all of Central Region, whereas previously it had mostly served the southern portion of the region. One informant told the following story after residents from BMHC were transferred to the new unit at the Brandon General Hospital in 1998, “It was really interesting to watch patients. I remember, “This is for me?”, “I have my own bathroom?” Staff would speak about how they thought patients took better care. They would say that people received more flowers, because that’s what you do in general hospitals” (informant D). The average length of stay at CAP is 16 days (Brandon Regional Health Authority, 2010a).

Crisis response services. These services have been identified as a key component in any community mental health system. They help individuals resolve crises using the least intrusive option available and are intended to minimize inpatient hospitalizations (Health Systems Research Unit, Clarke Institute of Psychiatry, 1997). Mobile crisis services were developed in Brandon, Dauphin, and Portage la Prairie (in Central region). The mobile crisis service in Brandon began operation in 1996. The 24-hour service provides: crisis intervention, telephone consultation, links and referrals to other services, short-term follow-up, and support to family members/concerned others (Brandon Regional Health Authority, 2010b).

An eight-bed crisis stabilization unit was established in Brandon and began operation in 1997. A four-bed crisis stabilization unit was also constructed in Swan River in 1996 (in Parkland region) but, because of a lack of funding, was converted into a Safe House (providing a safe place to stay but no clinical services) in 2001 (Robinson, 2005). The Brandon crisis stabilization unit provides: crisis intervention; links to other resources; and help with medication adjustments, social skills, and coping skills (BRHA, 2010b). The Crisis Stabilization Unit in Brandon serves approximately 22 clients a month, with an average length of stay of five days (Robinson, 2005). Crisis services were initially operated by the Salvation Army under contract to the Brandon Regional Health Authority (BRHA) but the service is now operated directly by the BRHA.

Adult Rehabilitation and Consumer/Community Support Services

Case management, vocational/educational supports, and a range of housing options are essential parts of any mental health system. They have been found to improve quality of life and reduce hospitalizations (Health Systems Research Unit, Clarke Institute of Psychiatry, 1997). The purpose of the Psychosocial Rehabilitation (PSR) Program in Brandon is to aid in recovery (as defined by the individual) and the attainment of personal goals (Brandon Regional Health Authority, 2010c). The PSR Program in Brandon serves approximately 160 individuals (Robinson, 2005) and provides the following services: intensive case management, employment development counselors, the Mental Health Promotion Clinic, the Proctor Program, residential supports, Community Support Services, and Ventures. The components of the program are summarized below.

Intensive case management. Intensive case managers (ICMs) were hired in September of 1994. Five positions were filled for Brandon and two positions each for Portage la Prairie, Dauphin,

and Swan River, respectively. An intensive case manager was envisioned as having a caseload of between 15 and 20 clients. The role of the ICMs was to work with individuals to develop and practice skills in the areas of coping, medication management, housing, and activities of daily living to individuals living with a mental disorder in the community (informant C). In 1995, three employment development counselors were hired. Their role was similar to that of an ICM but with a larger focus on working with individuals to prepare and support them in employment and volunteer roles.

In 1994, Manitoba Health hired a trainer with a master's degree in psychiatric rehabilitation from Boston University to provide training to all incoming intensive case managers and employment development counselors. Then, in 1995, instead of paying a trainer to come back every time someone new was hired, several individuals in Manitoba were certified as psychiatric rehabilitation trainers. This training helped ensure that all new employees were operating within the same theoretical framework and that they shared a common language. In addition, in 1996 the Mental Health Promotion Clinic was established in Brandon. The clinic provides individual counseling and supports around medication, housing, and skill development (BRHA, 2010c). The clinic also undertakes mental health promotion initiatives targeted at consumers, families, and the community.

Proctor Program. The Resource Developer, who administers the Proctor Program in Brandon and the surrounding area, was hired in 1996. The Resource Developer, Community Mental Health Worker, Proctor, and the consumer work together to create an individualized approach to support for the consumer. The goal of the program is to enhance the consumer's quality of life and to connect them to community resources (Robinson, 2005).

Supportive housing. The Psychosocial Rehabilitation (PSR) Program in Brandon operates

McTavish Manor, a 10-bed 24-hour transitional housing unit that opened in 1986. In 1998, a clustered apartment building also managed by the PSR program opened. The clustered apartment program consists of eight units in a large apartment block in Brandon. Individuals have their own units and staff operate out of a separate apartment unit to provide support, guidance, and skill development as needed on a long-term basis. Several non-profit organizations in Brandon also provide housing for individuals living with mental disorders (see Table 3 for a complete list). Community Support Services. Community Support Service staff with an activity instructor background work with individuals and groups of individuals to plan, organize, and host social recreational activities of interest in community-based sites (e.g., an annual holiday party). Skills developed and/or promoted through this service include self awareness, social, interpersonal, planning, budgeting, and personal responsibility.

Supported employment. The Ventures program, a vocational skills assessment and training day program, was the last service to be relocated from BMHC. The program and the building out of which it operated were relocated to the Brandon Regional Health Centre grounds in October of 1999. In 1983, Brandon Community Welcome Clubhouse was established. The Clubhouse is a not-for-profit, registered charitable organization offering skill development through social, recreational, educational, and vocational programming to persons living with chronic mental disorders. The clubhouse, through their Transitional Employment Program, connects individuals with mental disorders to potential employers. The service also provides resume support and job preparation.

Adult Community Mental Health. The Adult Community Mental Health (ACMH) Program in Brandon is separate from the PSR program. The individuals in the ACMH Program have fewer needs and require less intensive supports. The community mental health workers in the program

have caseloads of 60-70 and provide assessment and a variety of treatment options.

Evaluation of the PSR Program. In 2000, an Evaluation of Psychosocial Rehabilitation Services in Brandon, Assiniboine, Central and Parkland regions was undertaken by Prairie Research Associates (PRA Inc., 2001). They conducted interviews with PSR clients, family members, PSR staff, and other key informants. All of the staff and key informants interviewed believed that participation in the PSR program had led to improvements for individuals with mental disorders. The majority of clients reported that after they started receiving PSR services, their life was better (68%), they felt safer where they lived (70%), and they had increased ability to solve their own problems (60%) (PRA Inc., 2001). The greatest challenges noted by clients were the lack of safe, adequate, and affordable housing, issues related to transportation, and a shortage of employment opportunities.

Psychogeriatric services

Due to increased life expectancy and a decreased birth rate, seniors represent an increasingly larger segment of the general population. The mental health service needs of seniors are unique and complex. Services for this population should be comprehensive and strive to promote autonomy and enhance the quality of life. A thorough and broad-based assessment process is the cornerstone of an effective psychogeriatric system (Health and Welfare Canada, 1988).

In 1998, the 12-bed Psychogeriatric Assessment Unit was expanded to 22 beds and was renamed the Centre for Geriatric Psychiatry. The centre is an acute care facility that provides a range of services for Parkland, Assiniboine, Brandon, and half of the Central Region. Services offered at the centre for individuals 65 years and older include: assessment and diagnosis, a health and safety information group, activity and recreation therapy, and discharge planning.

Community mental health support for the elderly is provided by a multidisciplinary team of professionals through the Mental Health Services for the Elderly Program in Brandon. The Community Resource Team provides assessment, treatment, consultation, and education to the elderly with mental disorders in the Assiniboine and Brandon regions (Brandon Regional Health Authority, 2010d). A social and recreational day program, the Prime Time Day Program, runs five days a week and serves 40 elderly mental health clients in Brandon. The program is targeted for individuals who lack support, are at risk for recurring mental disorders, and who are extensive users of mental health services (Seniors Psychosocial Interest Group, 2004).

Personal care homes/group homes

Because of the large number of geriatric patients at BMHC, planning was done with personal care homes in the surrounding area to prepare them for former BMHC residents. Incentives were given to personal care homes (PCHs) that took individuals from BMHC. For example, personal care homes that took 10 former BMHC residents were provided with a full-time, permanent registered psychiatric nurse (paid for by the reform) to help with the adjustment. Additional mental health supports (e.g., community mental health workers) were made available upon request to PCHs who admitted former residents

Originally, there were six elderly women who were placed in a group home after leaving BMHC because they needed 24-hour supervision but didn't meet the criteria for a personal care home. The group home was staffed with two nurses, two activity instructors, and two health care aides. The home closed a few years later after all the women had either been placed in personal care homes, gone to live with family, or had passed away (informant E).

Child and Adolescent Services

It is imperative to provide a full range of services for mental disorders in children, as

these disorders typically continue into adulthood. Kessler et al. (2005) estimated that one-half of lifetime mental disorders begin before the age of 14 and three-fourths begin before the age of 24. The education sector is often the entry point and main provider of mental health services for children and adolescents (Farmer, Burns, Phillips, Angold, & Costello, 2003). Therefore, collaboration between the education system and the mental health system is crucial for this population.

In November, 1998, The Child and Adolescent Treatment Centre opened in Brandon. The centre is comprised of a 10-bed acute care unit, a community services (out-patient) program, a day program, and a small school (for up to eight students). The centre provides services to the Brandon, Central, Parkland, and Assiniboine regions of Manitoba. In 2005, the acute care unit was converted into a crisis stabilization unit because both of the centre's child psychiatrists resigned. The facility was no longer able to operate the acute care unit under the Mental Health Act which requires a 24-hour on-call psychiatrist. In 2010, 178 children were admitted to the crisis stabilization unit and the average length of stay in the unit was seven days (personal communication, Liz McLeod).

The day component at the centre is composed of two programs. The morning only program is for children ages 7-11. The children spend four days a week at the centre working on social skill development and communication. The full-day program operates five days a week and is for children ages 11-14. The children attend school at the centre in the morning (and complete work provided by their home school) and spend the afternoon working on skill development. Both of these programs run for 12 weeks at a time, three times a year, and each program can accommodate up to eight students. The centre's staff works closely with the child's home school and family to provide comprehensive support and to ensure continuity of care.

Table 2

Comparison of Services at BMHC (pre-closure) and in the Brandon Community (post-closure)

Population	Brandon Mental Health Centre	Brandon Community
Adult - Short-term	Assessment/intake acute care unit	Centre for Adult Psychiatry Crisis Stabilization Unit Mobile Crisis Service
Adult - Rehabilitation	Long-term unit Adult Outpatient Program Day Treatment Program Ventures Program Group home	Psychosocial Rehabilitation Program Adult Community Mental Health Day Treatment Program Ventures Program Employment/recreational/housing supports
Psychogeriatric	Psychogeriatric Assessment Unit Long-term unit Rideau Park Personal Care Home	Centre for Geriatric Psychiatry Rideau Park Personal Care Home Other personal care homes Mental Health Services for the Elderly
Child/adolescent	Long-term unit Day program Pine Ridge School	Child and Adolescent Treatment Centre

Challenges

Housing

As is often the case after the closure of a mental health centre, Brandon and the surrounding areas lacked sufficient safe, affordable housing for those with mental disorders after BMHC shut down. Nonetheless, mental health organizations in Brandon have worked hard over the years to help secure housing for individuals with mental disorders. The major barriers that have stood in their way include a low vacancy rate, an influx of immigrants, and the marginal housing budget granted to those on employment and income assistance.

Initially, when the closure of BMHC was announced, the plan was to construct 20 group homes to which residents would relocate. However, the plan changed when, in 1991, 52 individuals living with mental disorders in Brandon and the Westman Region were interviewed about their housing preferences. The respondents were a combination of BMHC inpatients and individuals residing in alternative community housing. Patients were asked where they wanted to live after they left BMHC. When asked about their ideal living situation, only 4% of respondents indicated that their preferred residential choice was in a staffed group home (Gibson & Grindey, 1991). The majority of the respondents (69%) wanted to live in an apartment or house. Respondents indicated that the most important components of an ideal living situation were independence, freedom, and interpersonal relationships. Based on the results from the 1991 survey, the decision was made not to build 20 group homes and to focus instead on helping individuals locate independent housing in the community.

Upon leaving BMHC, patients who were planning to live independently in the community were allocated up to \$500 by the Employment and Income Assistance (EIA) program for relocation costs. The majority of this money was used to buy second-hand furniture, bedding,

cooking supplies, and food. One of the staff initiatives during this time was to accept donations of furniture and household goods from community members that were to be used to assist clients being discharged from inpatient services to establish their new homes in the community. One informant said the following:

“And at the end of the day when we were closing BMHC and Pine Ridge building in 1999, I remember all of us donning these white suits and masks and gloves and going down and getting rid of all of this excess garbage. Because when you ask people for furniture, it isn’t always the best furniture and so we ended up storing all of this stuff in the basement of Pine Ridge and then of course when we were closing BMHC, it all had to be moved” (informant C)

Several informants described initial reluctance on the part of landlords to rent to individuals with mental disorders. One informant mentioned that a lot of work had to be done working with landlords because the overarching view was that these individuals were not reliable and, therefore, not good tenants (informant F). Another informant made the following comments: “The other thing that happened is the workers were out in the community and developing relationships with landlords and, as time passed, the landlords saw that the workers were going to be there to support the clients and if there was a problem they knew who to call. We actually developed really good relationships with private landlords” (informant C).

In 1992, the Social Allowances Act in Manitoba was amended. As a result of an amendment, local jurisdictions no longer had the authority to set allowance rates based on the local needs (Government of Manitoba, 1992). Instead, the provincial shelter allowance rate was enforced across the province. As a result of the meager shelter allowance provided (individuals only received \$271 a month), many of the individuals leaving BMHC ended up in less than desirable units. Several individuals moved into local hotels because that was all they could afford

at the time. According to the Canadian Mental Health Association, Westman Region (2010), there were only two available apartments in Brandon for \$285 a month, three apartments for \$286-300 a month, and nine apartments for \$310-325 a month in 1997.

In 2004, a Maple Leaf Consumer Foods facility opened in Brandon. Between 2004 and 2009, the Maple Leaf facility employed over 1700 workers (Economic Development Brandon, 2010). The population in Brandon increased from 39,715 in 2001 to 41,511 in 2006, an increase of 4.5% (Statistics Canada, 2007). In comparison, the average population growth in the province of Manitoba was 2.6% during the same time period. These new residents competed for the city's already limited low-cost housing and, by increasing demand, drove up the cost of housing. Recognizing the increasing demands being placed on Brandon's housing market, several local groups took the initiative to help by developing partnerships, launching new organizations, and developing new units. The Canadian Mental Health Association has been relentless in their efforts to aid individuals with mental disorders secure adequate housing by renovating old, decrepit buildings and turning them into affordable, safe apartments. Another organization that has been developing quality new housing in Brandon is the Brandon Neighbourhood Renewal Corporation. The organization was founded in June, 2000. It receives funding yearly from both the provincial and federal governments to undertake new community housing projects.

Another positive development was the introduction of the portable housing benefit by the provincial government in 2008. The benefit money is provided to the individual, regardless of where they are living; if they move, the money moves with them. Any individual who is on EIA because of a mental disability and who has an unstable housing situation that is interfering with their treatment and participation in community life qualifies for the supplement (Government of Manitoba, 2008). In order to be eligible to receive disability payments from EIA, an individual

must provide an assessment by their doctor stating that their disability is likely to last longer than 90 days and that they can't work or support themselves because of their disability (Manitoba Family Services and Housing, 2002). Their case is then reviewed by a medical panel. There are now 65 individuals in Brandon receiving the monthly supplement, up from 25 individuals in 2009.

Despite the hard work of the mental health community in Brandon, there still remains a shortage of safe, affordable housing in the city. According to the Canada Mortgage and Housing Corporation (2010), the apartment vacancy rate in Brandon was 0.0% for a bachelor apartment and 0.5% for a 1-bedroom apartment in 2010. Furthermore, in that same year, the average rent for a bachelor apartment in Brandon was \$433 and a 1-bedroom was \$541 (\$148 and \$256 higher than the basic shelter allowance, respectively). Therefore, many individuals with mental disorders continue to struggle to afford rent, provided that they are fortunate enough to even find a relatively affordable apartment. Refer to Table 3 for a complete list of housing supports in Brandon for individuals living with a mental disorder.

Table 3

Housing Supports in Brandon for Individuals Living with a Mental Disorder

Organization	Number of beds (type of housing)	Services offered	Population served
Brandon Community Welcome Co-op Inc. & Grey Owl Non-Profit Housing, 1036 Louise Ave, 1983 (5 suites) and 1996 (9 suites)	14 apartment rentals (long-term supportive)	Transitional Employment Program, recreational activities	Individuals living with a mental disorder
Brandon Friendship Centre, 258-12 th Street, pre-1980	7 units (transitional)	Support, referrals	Aboriginals living with a mental disorder or addiction issues who are homeless or at risk of becoming homeless
Clustered Apartment Program, 1030-26th Street, 1998	8 units (long-term supportive)	24 hour treatment and supervision, skill development, referrals	Individuals living with severe and persistent mental disorders
CMHA Supportive Housing Complex, 1202 Rosser Ave (opened July, 2004)	3 units (emergency), 13 apartments (transitional), 13 apartments (affordable renting)	Apartments: Support and skill development	Emergency units: any homeless adult in need Apartments: Individuals with low-to-moderate income
Massey Building ^a , 638 Pacific Ave, to be completed in 2011	58 units total ^b : 25 owned by CMHA (affordable renting)		Individuals living with a mental disorder and individuals with low-to-moderate income
McTavish Manor, 602/604-13th Street (opened in 1986)	8 units (originally contained 10 units) (long-term supportive)	24 hour treatment and supervision, skills development, referrals	Individuals living with severe and persistent mental disorders
Westman Opportunities, 1544-10th Street, pre-1985	7 bed group home (long-term supportive)	24-hour support and skill development	Individuals living with a mental or physical disability; families who require respite
YWCA Meredith Place Residence, 148-11 th Street (family units opened October, 2006)	3 family units and 21 rooms (emergency, transitional)	Meals, skills development, referrals	Individuals living with a mental disorder, individuals in recovery, individuals on day parole, travelers, and others in need of safe housing

^aOwned jointly by CMHA, Brandon Friendship Centre, and Habitat for Humanity Brandon

^bHabitat for Humanity Brandon will own 14 units (sold to qualified households), Brandon Friendship Centre will own 14 units (rented to low-to-moderate income Aboriginal households, CMHA will own 25 units, and there will be 5 emergency shelter units

Long-term Care in the Community

Another challenge identified by several informants was a gap in long-term care in the community for individuals whose conditions were not expected to improve over time and who required on-going, intensive support (informants E, G, and K). After BMHC closed, Selkirk Mental Health Centre or a personal care home became the main long-term care options. Informants felt there was a small population of individuals living with severe and persistent mental disorders who could be supported in the community with specialized 24-hour care. However, as Brandon and the surrounding area aren't properly resourced to support community mental health clients requiring this level of care, these individuals may be admitted to Selkirk Mental Health Centre and away from their support system.

Lack of Evaluation

Manitoba Health (1992) listed "management and accountability for mental health services" (p. 5) as one of the main principles for mental health reform in Manitoba. It was stated that all mental health services would be subjected to regular outcome evaluation, with the effectiveness and cost-effectiveness of the services forming the basis of the evaluation. Originally, there had been bridge funding set aside for an evaluation of the reform process in Western Manitoba (of which, closing BMHC and developing community supports in its place was the central focus). The funding was to be used to complete an evaluation on patient safety and service continuity, as well as the effectiveness of the community mental health models (Manitoba Health, 1993). However, those funds ended up being used as part of the implementation process and, unfortunately, a detailed and comprehensive evaluation of the reform was never completed. As one informant remarked, "it would have been really terrific to find out what are the true impacts, the true outcomes for people, as well as for the systemic level

but certainly at the person-level...if you want other people to start coming to find out what you're doing, you have to write" (Informant H).

Chapter 5: Quantitative Methods and Analysis

Research Questions

1. To where did the BMHC cohort relocate after their final discharge?
2. (a) What were the rates of overall mortality, cause-specific mortality, suicide, and attempted suicide in the BMHC cohort during the ten-year follow-up period?
(b) How did these rates compare to a matched cohort of the general population?
3. (a) What were the rates of physician visits and hospital admissions in the BMHC cohort?
(b) Did these rates change over the ten-year follow-up period?
(c) How did these rates compare to a matched cohort of the general population?

Hypotheses

1. The rates of suicide, attempted suicide, and mortality would be higher in the BMHC cohort than in a matched cohort.
2. Physician visits and hospital admissions in the BMHC cohort would decrease over the follow-up period.
3. The rates of all types of physician visits and hospital admissions would be higher in the BMHC cohort than in a matched cohort.

Design

This study consisted of a retrospective cohort design. According to Rothman and Greenland (2008), in a cohort study, "...there is at least one cohort thought of as the exposed cohort – those individuals who have experienced the putative causal event or condition – and another cohort thought of as the unexposed, or reference cohort." (p. 73). In this study, the identified event or condition was being an inpatient at Brandon Mental Health Centre.

Matching was done to make the unexposed (matched) cohort similar to the exposed (BMHC) cohort in respect to potential confounding variables. The matching ratio used in this study was three matches for every individual in the BMHC cohort. Using a matching ratio of more than 1:1 has been found to improve study precision by increasing sample size, and thus reducing sampling error (Rothman & Greenland, 1998).

BMHC Cohort

Inclusion Criteria.

1. Individuals discharged from Brandon Mental Health Centre from April 1, 1990 to April 30, 1998 whose final BMHC hospitalization was a minimum of 90 days.

Exclusion Criteria.

1. Individuals under the age of 18 at the time of their final discharge from BMHC.
2. Individuals who died while hospitalized at BMHC.
3. Individuals who left the province within 90 days post-final discharge or who were not a Manitoba resident while at BMHC (an individual treated in a mental health centre in Manitoba can possess a Manitoba personal health identification number without having Manitoba eligibility/registration).
4. Individuals who had a primary diagnosis of dementia (ICD-9-CM code 290) at the time of their final BMHC admission.

Matched Cohort

The matched cohort was comprised of randomly selected individuals in Manitoba who were matched 3:1 to the BMHC cohort. The follow-up period for each individual in the matched cohort began at the same time as the individual they were matched to in the BMHC cohort. Individuals in the general population who were residing in an institution (e.g., personal care

home) at the start of the follow-up period were excluded as potential matches. Individuals who had a diagnosis of dementia (ICD-9-CM code 290) prior to the start of the follow-up period, as identified by either the medical claims or hospital abstracts database, were also excluded as potential matches.

The matched cohort was matched to the BMHC cohort by the following variables:

1. **Age** at final BMHC discharge
2. **Sex**
3. First known **Regional Health Authority District** of residence following final BMHC discharge. District was determined by municipal code and postal code. Individuals belonged to one of 52 districts. The districts were broken down in the following way: nine Central region districts, six Assiniboine districts, six North Eastman districts, five Parkland districts, four South Eastman districts, four Interlake districts, four Norman districts, eleven Burntwood districts, one Churchill district, one Brandon district, and one Winnipeg district (see Figure 4).

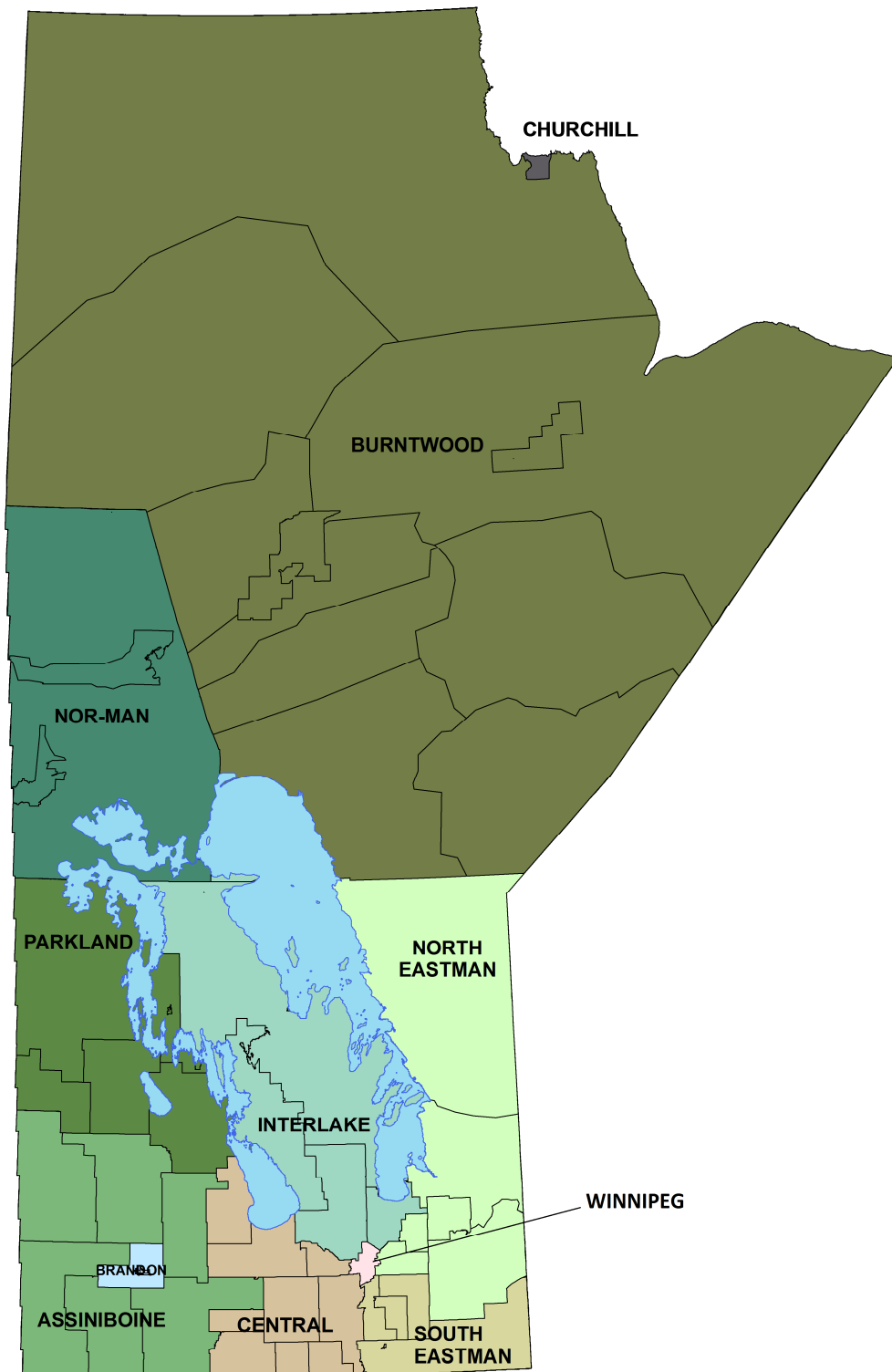


Figure 4. Map of Manitoba showing the division of Regional Health Authority Districts in this study

Study Period

The BMHC cohort was followed for up to ten years after their final discharge from BMHC. The matched cohort was also followed for up to ten years. Depending on the final BMHC discharge date, the observation period began between April 1, 1990-April 30, 1998 and ended between April 1, 2000 – April 30, 2008 (or earlier).

Data Source

The Population Health Research Data Repository, which contains de-identified administrative data on all individuals registered with Manitoba Health, is housed at the Manitoba Centre for Health Policy (MCHP). The databases used for this study were: the Manitoba Health Insurance Registry, Vital Statistics, Mental Health Management Information System, Medical Claims (Physician Billings), Hospital Abstracts, and Long-term Care (See Table 4 for a description of variables obtained from each of these databases).

The Insurance Registry contains demographic information on all individuals registered to receive health services in Manitoba. In the registry, each individual is assigned an encrypted Personal Health Identification Number (PHIN), making it possible to link information contained in the registry to other databases that also contain encrypted PHINs (see Figure 5). The Insurance Registry is updated twice a year, in June and December, from the Manitoba Health registry file. Mortality information (cause of death and death date) obtained from the Vital Statistics database is added to the Insurance Registry once the data is at MCHP.

The Mental Health Management Information System (MHMIS) contains information on services provided at the two mental health centres and through community mental health programs. There are three levels of data in the MHMIS database: client, case, and encounter (Martens et al., 2004). Client data is associated with a specific individual within a region/facility.

An individual may have more than one client file if they received services in multiple regions/facilities. The MHMIS client data includes: date of birth, sex, postal code, legal status, and marital status. Case data documents a specific client's use of inpatient, partial hospitalization, outpatient, and/or community mental health services. Encounter information describes any contact with a mental health care provider. Encounter data has been shown to be inconsistent across facilities and/or incomplete (Martens et al., 2004). Therefore, only client and case data was analyzed in this study.

Most physicians in Manitoba work on a fee-for-service basis, and in order to be reimbursed for services, they submit a medical claim. Claims are filled out for each visit and the ICD-9-CM diagnostic code that was most responsible for the visit is indicated. Some of the province's physicians are salaried, but most of them also submit medical claims (shadow billing). This information is included in the Medical Claims database. Emergency room (ER) visits were excluded from this study. ER visits aren't adequately captured in the database because not all hospitals report these visits.

The hospital abstracts database contains information on all acute care and chronic care hospitalizations. It includes both inpatient hospitalizations and day surgeries. Abstracts are compiled at the time of hospital discharge. Either ICD-9-CM codes (before April 1, 2004) or ICD-10-CA codes (after April 1, 2004) are used to identify the cause of hospitalization. Only inpatient hospitalizations were analyzed in this study.

The long-term care database is made up of two kinds of files, namely utilization history and minimum data set (MDS) assessment. The MDS assessment file contains Activities of Daily Living assessment information and biopsychosocial health data for all personal care homes in Winnipeg (Manitoba Centre for Health Policy, 2011a). The utilization dataset contains

information on the use of personal care homes in Manitoba. For this study, only utilization history data was analyzed.

Table 4

Specific Administrative Databases Analysed in This Study

Database	Database type	Fields of interest
Manitoba Health Insurance Registry	Registries	Birth date, sex, municipal code, postal code, residence start and end dates, registry coverage end date, registry cancellation code
Vital Statistics	Registries	Death date, cause of death
Mental Health Management Information System	Health	Marital status, legal status, hospital code, open date, close date, length of stay, primary diagnosis, casetype
Medical Claims (Physician Billings)	Health	Date of service, type of physician, tariff prefix, diagnosis
Hospital Abstracts	Health	Date of admission, date of discharge, length of stay, most responsible diagnosis
Long-term Care	Health	Date of admission, personal care home code

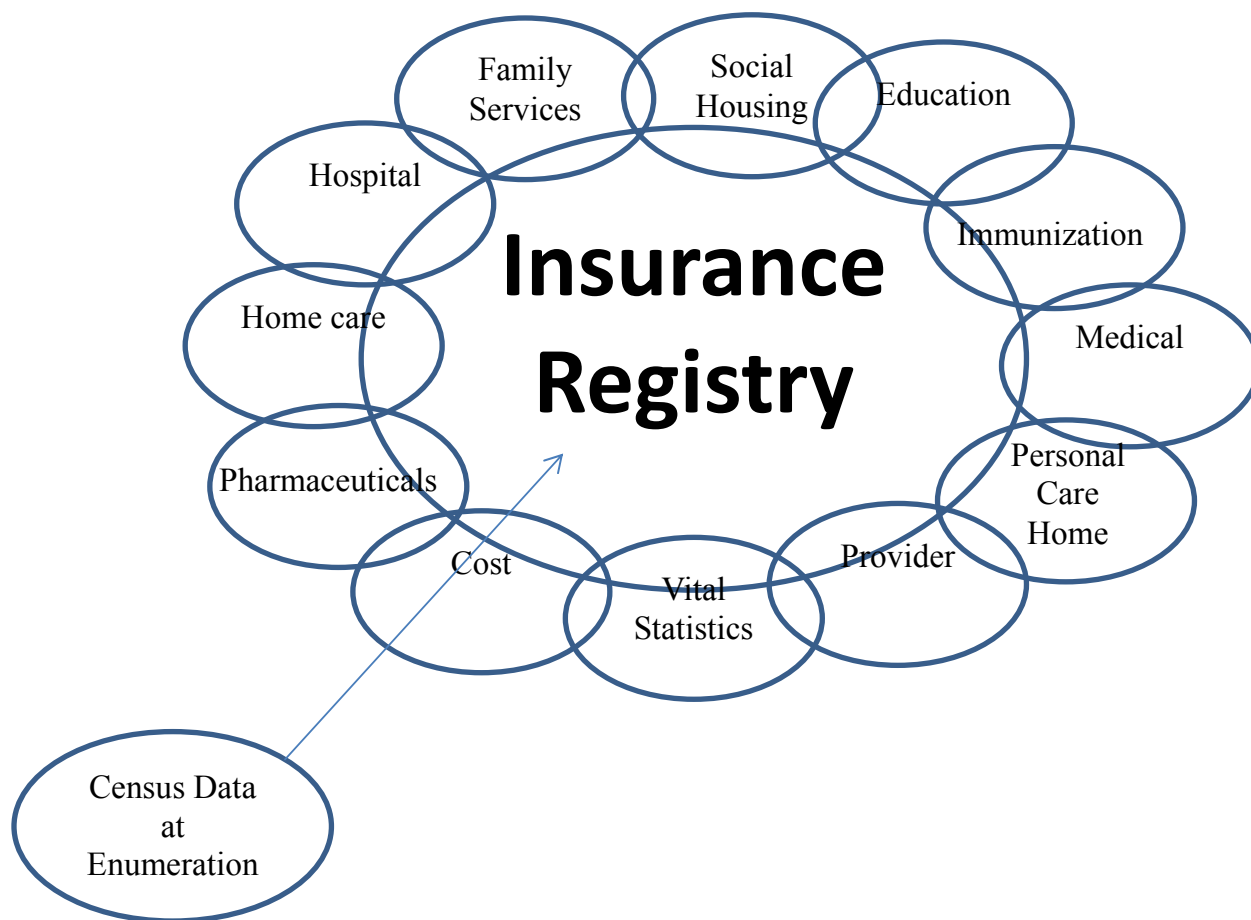


Figure 5. Administrative data housed at Manitoba Centre for Health Policy. Adapted from “Policy analysis in an information-rich environment.” by L. L. Roos, V. Menec, and R. J. Currie, 2004, *Social Science and Medicine*, 58, p. 2234.

Extensive quality checks have been conducted on the data contained in the administrative databases. These checks link the research registry to other administrative databases to assess data quality. Examples of data checks that have been done include: comparisons of hospital abstracts and physician claims for a number of surgical procedures (98% agreement), comparisons between hospital abstracts and hospitals charts for most responsible hospital diagnosis (95% agreement), and comparisons between the research registry and the vital statistics database for reported deaths (99% agreement) (Roos et al, 1993; Roos & Nicol, 1999). Roos and Nicol (1999) note that the true error rate in data linkage studies completed by MCHP is difficult to measure but, based on the results of several studies, they estimate it to be less than 1%.

Ethical approval to use the Population Health Research Data Repository was obtained from the University of Manitoba's Health Research Ethics Board and the Health Information Privacy Committee (HIPC). Permission to use Mental Health Management Information System files was obtained from the Medical Directors at Selkirk Mental Health Centre and Eden Mental Health Centre. The Medical Director at Selkirk Mental Health Centre provided consent for the use of data from BMHC. In accordance with Manitoba Centre for Health Policy regulations, only results with a minimum of six individuals were presented.

Procedure

Outcome Variables

1) Mortality

a. Overall mortality

- Mortality from any cause as indicated by the presence of an ICD-9-CM (up to December 31, 1999) or ICD-10-CA (January 1, 2000 and later) code in the Vital Statistics database.

b. Cause-specific mortality

- Indicated by the ICD-9-CM or ICD-10-CA codes contained in the Vital Statistics database.
- All ICD chapters in which a minimum of six BMHC cohort deaths occurred were described. In accordance with ICD-9-CM and ICD-10-CA classification, cause of death was separated into the following categories: cancer, mental disorder, central nervous system disease, circulatory disease, respiratory disease, digestive disease, and suicide (see Table 5 for a description of ICD-9-CM and ICD-10-CA codes associated with each category).

c. Suicide

- See Table 5 for the ICD-9-CM and ICD-10-CA codes associated with a completed suicide.

d. Suicide attempts

- Excludes completed suicides categorized in **c**.
- Suicide attempts were identified in the following ways (first described in Martens, et al., 2004).

i. A hospitalization with a code for self-inflicted injury.

-ICD-9-CM codes E950-E959 or ICD-10-CA codes X60-X84.

OR

ii. A hospitalization with a code for accidental poisoning, but only if there is a physician visit with an accidental poisoning code and an accompanying psychiatric code either during hospitalization or within the first 30 days after discharge (MCHP, 2010).

-ICD-9-CM codes 965, 967, 969, 977.9, 986, E850-E854, E858, E862, E868.

-ICD-10-CA codes T39, T40, T42.3, T42.4, T42.7, T43, T50.9, T58, X40-X42, X44, X46, X47, Y10-Y12, Y16, Y17.

-Psychiatric tariff codes 8444, 8446, 8472, 8475, 8476, 8503, 8504, 8553, 8554, 8580, 8581, 8584, 8587, 8588, 8589, 8596.

2) Physician Visits

Physician visits included all office visits and walk-in clinic visits. The six types of physician visits analyzed were:

- All physician visits to a general practitioner. A general practitioner was defined as “a physician who operates a general or family practice, and is not certified in another specialty in Manitoba,”(MCHP, 2011b).
- Physician visits to a general practitioner for a non-mental disorder (ICD-9-CM codes excluding 290-319).
- Physician visits to a general practitioner for a mental disorder (ICD-9-CM codes 290-319).
- Physician visits to a psychiatrist.
- Physician visits to a specialist. Specialists included: obstetrics & gynecology, medical specialists, general surgeons, and surgical specialists. This group did not include psychiatrists.
- All physician visits.

3) Hospital Admissions

Only inpatient hospitalizations (where the patient was admitted for a minimum of

one day) were included. Mental health centre hospitalizations (Selkirk Mental Health Centre and Eden Mental Health Centre) were described in text but were not broken down by year. The three types of hospitalizations analyzed were:

- General hospital admissions, without a mental disorder diagnosis as the most responsible diagnosis (ICD-9-CM codes excluding 290-319; ICD-10-CA codes F01-F99).
- General hospital admissions, with a mental disorder as the most responsible diagnosis (ICD-9-CM codes 290-319; ICD-10-CA codes F01-F99).
- All general hospital admissions.

Explanatory Variables

1) Time

- Differences in the trend of physician visits and hospital admissions over the ten-year follow-up period were analyzed. The unit of time used in the study was years.

2) Cohort

- Individuals in this study were either part of the BMHC cohort or part of the matched cohort. Differences in mortality, physician visits, and hospital admissions between the two cohorts were analyzed.

Table 5

Description of ICD-9-CM and ICD-10-CA Codes for Cause of Death Categories

Cause of death	ICD-9-CM codes	ICD-10-CA codes
Cancer	140-239	C00-D48
Mental disorder	290-319	F00-F99
Central nervous system disease	330-337; 340-349	G00-G13; G35-G37
Circulatory disease	390-459	I00-I99
Respiratory disease	460-519	J00-J99
Digestive disease	520-579	K00-K93
Suicide	E850-E854, E858, E862, E862, E868, E950-E959	X40-X42, X46, X47, X70-X84

Data Analysis

All analyses were conducted using SAS version 9.2 (see Appendix D for a description of the SAS codes used) (SAS Institute Inc., 1999). First, all individuals who met the inclusion criteria (and no exclusion criteria) were identified in the Mental Health Management Information System database (Brandon Mental Health Centre hospital code = 0047, case type = 1 or inpatient). Basic descriptive statistics were used to characterize the social-demographics of the BMHC cohort as well as information related to admission, discharge, diagnosis, time spent at BMHC, and personal care home use. Originally, means and standard deviations were calculated but because many of the standard deviations were very large (indicating a non-normal data distribution), medians were reported, along with the mean, and 25th percentile and 75th percentile for some of the results. As per Manitoba Centre for Health Policy regulations, results between 1 and 5 were suppressed.

Location After Final Discharge

The first known Regional Health Authority where an individual in the BMHC cohort was located after their final discharge was determined. If an individual died within a month of their final discharge, they were considered located in the Brandon Regional Health Authority. If an individual was directly transferred into a personal care home (commonly referred to as nursing homes in other jurisdictions) or a mental health centre, the RHA where that facility was located was used as their location. The number of individuals admitted in a personal care home over the follow-up period, as well as the RHA in which the facility was located, was also analyzed.

Mortality

Descriptives. Overall mortality and cause of death in both the BMHC cohort and the matched cohort were calculated, as well as suicides and suicide attempts in the BMHC cohort. Suicides and attempts in the matched cohort could not be reported because of their low frequency. The age at death in both cohorts was calculated and a between-groups t-test was used to test for a statistically significant difference between the cohorts. The potential years of life lost (PYLL), a measure of pre-mature mortality, was determined for both cohorts. For individuals who died before the age of 75, their PYLL was computed using the following formula: $75 - \text{age at death}$. If an individual died after the age of 75, their PYLL was 0.

Survival analysis. A survival curve is used to measure follow-up time from a specific start point to the occurrence of a defined event (Bewick, Cheek, & Ball, 2004). In this study, a survival analysis plotting time to death after the start of the follow-up period for the BMHC cohort and the matched cohort was conducted using the SAS procedure LIFETEST. The log-rank test was used to determine if there was a statistically significant difference in time to death between the two survival curves (SAS Institute Inc., 1999). The null hypothesis for the log-rank test is that there is no difference in the survival curves of the two cohorts (in other words, the probability of dying at any point during the follow-up period is the same in the BMHC cohort and the matched cohort) (Tinazzi, Scott, & Compagnoni, 2008).

The analysis was censored for those who were still alive at the end of the follow-up period as well as those who were lost to follow-up for a reason other than death (e.g., left the province). Bewick, Cheek, and Ball (2004) state that, “A survival time is described as censored when there is a follow-up time but the event has not yet occurred or is not known to have occurred.” (p. 389). It is assumed that those who were censored at some point during the follow-

up period had the same survival distribution as those who continued to be followed (Tinazzi et al., 2008).

Comparison between the BMHC Cohort and Matched Cohort. The differences between the BMHC cohort and the matched cohort were calculated for the following categories: death (all causes), circulatory disease, respiratory disease, and cancer. The number of deaths for all other causes was too low to compare the two cohorts. To test for differences in mortality in the BMHC cohort and matched cohort, generalized linear models (GLM), an extension of multiple regression, was used. GLM allows for multiple variables to be included in the model and can be used to analyze normal and non-normal data (McCullagh & Nelder, 1989). Logistic regression, a type of GLM, is a widely used method for describing the relationship between a binary outcome and a group of explanatory variables (Hedeker & Gibbons, 2006). This model produces an odds ratio (OR) and the link function used is logit. For each category of mortality, a binary variable (1 = died, 0 = did not die) was created and analyzed using the SAS procedure GENMOD. To account for correlations between the individual in the BMHC cohort and their matches, the generalized estimating equation (GEE), an extension of GLM, was introduced by including a REPEATED statement (as first described by Liang & Zeger, 1986). Age at the start of the follow-up period was included in the model as a covariate.

Person-time at risk

Person-time at risk for each individual in the BMHC cohort and in the matched cohort was calculated before the physician visit and hospital admission analyses were conducted (see Appendix E). The unit of person-time used in this study was person-years. Time at risk for each individual ended when they died, left the province, no longer possessed Manitoba health coverage, entered a personal care home, or reached the end of their ten-year follow-up period.

Time spent in a mental health centre was not included as time at risk. The person-time at risk for individuals in the matched cohort also ended if their match in the BMHC cohort's time at risk ended. Because they are matched sets of individuals, the cases (BMHC cohort) or matches can only be included in a regression analysis where at least one member of each cohort is present in the dataset. If there is no BMHC individual in the set, or no matches, the remaining observations will not contribute to the estimation of parameters in a regression model.

Physician Visits

Descriptives. The following outcomes were reported for all ten years of follow-up for each type of physician visit in the BMHC cohort: the total number of visits, the percentage of the cohort with at least one visit, the mean number of visits per user, and cohort visit rate. The percentage of the cohort who had at least one physician visit in each year was calculated by dividing the number of individuals who had a visit that year by the number of individuals who had time at risk that year. The mean number of visits per user was obtained by dividing the total number of visits in that year by the number of individuals who had at least one visit in that year. And finally, to get the yearly visit rate in the cohort, the total number of visits for each year was divided by the total person-time at risk in the cohort for that year. For the matched cohort, only the percentage of the cohort with at least one visit and the cohort visit rate were reported for each type of physician visit.

Trend over Time in the BMHC Cohort. To analyze the trend over time in the percentage of the cohort visiting a physician, a binary variable was created (1 = at least one visit in that year, 0 = no visits that year) for each type of physician visit. Age each year was included in the logistic regression model as a covariate. The REPEATED statement was also included to account for correlations in physician visits over time in each individual (making this a GEE model). This

model produced an odds ratio per year of follow-up.

Three types of visits, general practitioner visits without a mental disorder diagnosis, all general practitioner visits and all physician visits combined, were also analyzed using a Poisson regression analysis (link function = log). The other types of physician visits were not analysed this way because of the low yearly visit rates in the cohort. These models produce a relative rate per year and were used to test the differences over time in the cohort visit rate. The log of person-years for each year was added as an OFFSET in the model to obtain the visit rate, instead of the visit count. The visit count for each individual was modeled as a function of time (i.e., year) using the SAS procedure GENMOD. Age was still included in the model as a covariate, as well as the REPEATED statement.

Comparison between the BMHC Cohort and Matched Cohort. Similar to the trend over time in the BMHC cohort analyses, logistic regression was used to analyze the difference in the percentage of people visiting a physician between the BMHC cohort and the matched cohort. Age each year was included in the model as a covariate, and the REPEATED statement was included to account for correlations in physician visits between the individual in the BMHC cohort and their matches (making this a GEE model). A group by year interaction was included in the model to analyze whether the difference between the two cohorts changed significantly over time.

Three types of visits, general practitioner visits without a mental disorder diagnosis, all general practitioner visits, and all physician visits combined, were also compared using a Poisson regression analysis (link function = log) to look at the differences in the cohort visit rate between the two cohorts. The log of person-years for each year was added as an OFFSET in the model to obtain the visit rate, instead of the visit count. Age was still included in the model as a covariate,

as well as the REPEATED statement. A group by year interaction was included in the model to analyze whether the difference between the two cohorts changed significantly over time.

Hospital Admissions

Descriptives. The following yearly outcomes were calculated for each type of hospital admission in the BMHC cohort: the total number of admissions, the percentage of the cohort with at least one admission, the median length of stay, and the admission rate in the cohort. The percentage of the cohort who had at least one admission in each year was calculated by dividing the number of individuals who had a hospital admission that year by the number of individuals who had time at risk that year. The yearly cohort admission rate was obtained by dividing the total number of hospital admissions each year by the total person-time at risk for that year. Because of the low yearly rates of mental health centre hospitalizations (Selkirk Mental Health Centre and Eden Mental Health Centre) in the BMHC cohort, these hospitalizations were described in the text but yearly outcomes were not reported.

For the matched cohort, only the percentage of the cohort with at least one admission and the admission rate in the cohort were reported for each year. Because of the low yearly rates of general hospital admissions for a mental disorder in the cohort, these hospitalizations were described in the text but yearly outcomes were not reported. Mental health centre hospitalizations in the matched cohort were not discussed at all because of the low total frequency.

Trend over Time in the BMHC Cohort. Logistic regression was used to analyze these data because of the low hospital admission rates in the cohort. A binary variable was created (1 = at least one admission that year, 0 = no admissions that year) and modeled to produce an odds ratio (per year) for the trend over time in the percentage of individuals in the BMHC cohort admitted to hospital, for the three types of hospitalizations. Age each year was included in the model as a

covariate, and the REPEATED statement was used to introduce the GEE model.

Comparison between the BMHC Cohort and Matched Cohort. Because of the low frequency of hospitalizations for a mental disorder in the matched cohort, only admissions to a general hospital without a mental disorder and all general hospital admissions were compared between the two cohorts. Similar to the trend over time in the BMHC cohort analyses, logistic regression was used to analyze the difference in the percentage of people admitted to hospital between the BMHC cohort and the matched cohort. Age each year was included in the model as a covariate, and the REPEATED statement was used to introduce the GEE model. A group by year interaction was included in the model to analyze whether the difference between the two cohorts changed significantly over time.

Chapter 6: Quantitative Results

This chapter begins with a descriptive analysis of the BMHC cohort. Next, mortality in the BMHC cohort and the matched cohort is described and the results of the survival analysis and the comparative mortality analyses are discussed. After that, physician visits in the BMHC cohort over time is presented and then compared to the matched cohort. Finally, hospital admissions in the BMHC cohort over time is looked at and compared to the matched cohort.

Brandon Mental Health Centre Cohort

Initially, 639 adults were identified as having a final inpatient stay of at least 90 days at Brandon Mental Health Centre (BMHC) between April 1, 1990 and April 30, 1998. Sixty of these individuals died while at BMHC and were excluded from all further analyses. Another eight individuals either left the province within 90 days of their final discharge or were not Manitoba residents at the time of discharge (an individual treated in a mental health centre can possess a Manitoba personal health identification number without having Manitoba eligibility/registration). These individuals were also excluded from analysis.

The cohort contained 104 individuals with a primary diagnosis of dementia at the time of their final admission to BMHC. Ninety-two percent of these individuals were admitted into a PCH during the follow-up period and 91% of the 104 individuals died within ten years of their final BMHC discharge. The mean age at discharge for these individuals was 78.0 ($SD = 7.8$) and the median total years spent at BMHC was 1.2 ($Mean = 2.8, P25 - P75 = 0.5 - 3.0$). These 104 individuals were removed from all further analyses. The final BMHC cohort was comprised of 467 individuals.

Descriptive Analysis

Social-Demographics. Sex, age, marital status, and legal status information for the BMHC cohort is presented in Table 6. Fifty-two percent of the cohort was male and 48% was female. The majority of the cohort was single (75.8%), over the age of 51 at the time of their final discharge

from the centre (59.1%), and were admitted to BMHC voluntarily (68.5%). The mean age at first admission to the centre was 50.0 years ($SD = 19.3$) and the mean age at final discharge from the centre was 55.6 years ($SD = 18.6$).

Table 6

Social-Demographic Characteristics of the BMHC Cohort

Variable	Category	N	%
Sex	Male	241	51.6
	Female	226	48.4
Age ^a	<30	60	12.9
	31-40	64	13.7
	41-50	67	14.4
	51-60	58	12.4
	61-70	91	19.5
	71-80	89	19.1
	>80	38	8.1
Marital status ^b	Single or unknown	359	76.9
	Married/common-law	108	23.1
Legal status ^b	Admitted voluntarily	320	68.5
	Admitted involuntarily	147	31.5

^aAt time of final discharge from Brandon Mental Health Centre.

^bAt time of final admission to BMHC.

Brandon Mental Health Centre. See Table 7 for a description of lifetime admissions to BMHC and total time spent at the centre. Most of the BMHC cohort ($n = 327$, 70.0%) had one or two lifetime admissions to the centre, while a small number ($n = 36$, 7.7%) had six or more lifetime admissions. Seven individuals had ten or more lifetime admissions to the centre. The median length of time spent at BMHC was 1.2 years ($M = 5.9$, $P25 - P75 = 0.5 - 3.1$). The majority of the cohort spent a total of five years or less at the centre ($n = 374$, 80.1%), though there was a small percentage that had spent over 20 years there ($n = 42$, 9.0%). There were 11 individuals who had spent a total of 50 years or longer at the centre. The majority of these 11 individuals were admitted to BMHC with a diagnosis of schizophrenia (90.9%) and were admitted involuntarily (81.8%). The primary diagnosis at the time of the last admission to BMHC for the whole cohort is shown in Table 8. The most prevalent diagnoses in the cohort were schizophrenia (36.9%) and mood disorder (28.3%).

Table 7

The Number of Lifetime Admissions and Total Time Spent at BMHC by the BMHC Cohort

Variable	Category	N	%
Number of lifetime admissions	1	229	49.0
	2	98	21.0
	3-5	104	22.3
	6 or more	36	7.7
Total years at BMHC	0.25-0.49	108	23.1
	0.50-0.99	97	20.8
	1.0-1.99	90	19.3
	2.0-4.99	79	16.9
	5.0-9.99	30	6.4
	10.0-19.99	21	4.5
	20 +	42	9.0

Table 8

Primary Diagnosis for the BMHC Cohort at the Time of Final BMHC Admission

Diagnosis	N	% of cohort	Median total years at BMHC ^a (Mean, P25 - P75)
Schizophrenia	172	36.9	2.6 (11.1, 1.1 – 11.3)
Mood disorder	132	28.3	0.7 (1.5, 0.4 – 1.6)
Other psychosis	52	11.1	1.4 (5.9, 0.5 – 3.3)
Drug or alcohol abuse	27	5.7	0.9 (1.1, 0.4 – 2.0)
Other diagnosis	32	6.8	0.9 (2.9, 0.6 – 1.9)
Mental retardation	17	3.6	1.5 (7.5, 0.7 – 4.4)
Anxiety disorder	15	3.2	0.6 (1.2, 0.4 – 1.5)
Adjustment disorder	11	2.5	1.5 (1.5, 0.5 – 2.4)
Unknown diagnosis	9	1.9	1.1 (3.2, 1.1 – 3.6)

Final Discharge from BMHC. Table 9 and Figure 6 show the distribution of the number of individuals discharged for the final time from BMHC each year (1990 to 1998). There was an increase in the number of people discharged in 1992 ($n = 65$), the year before the announcement to close BMHC was made, compared to the two previous years (1990, $n = 41$ and 1991, $n = 48$). Discharges continued to increase in 1993 ($n = 69$) and 1994 ($n = 68$) and then declined from 1995 ($n = 53$) until complete closure of the centre at the end of 1998 ($n = 28$).

Table 9

Number Discharged Each Year and Total Years Spent at BMHC in the BMHC Cohort

Year of discharge	Number discharged	Median total years at BMHC (Mean, P25 - P75)	Mean age at final discharge (SD)
1990	41	0.9 (1.7, 0.4 - 1.6)	53.8 (17.8)
1991	48	0.6 (2.7, 0.4 - 2.2)	55.6 (19.1)
1992	65	1.3 (6.8, 0.5 - 2.4)	58.8 (17.7)
1993 ^a	69	2.1 (13.3, 0.7 - 16.3)	59.2 (19.4)
1994	68	1.2 (5.7, 0.5 - 4.1)	58.6 (19.2)
1995	53	1.5 (5.4, 0.6 - 4.0)	53.3 (18.0)
1996	44	1.4 (4.2, 0.7 - 3.2)	51.1 (17.8)
1997	51	0.9 (3.8, 0.6 - 3.0)	53.8 (17.9)
1998	28	1.4 (4.6, 0.7 - 2.7)	49.4 (18.6)

^aThe year that the decision was made to close BMHC.

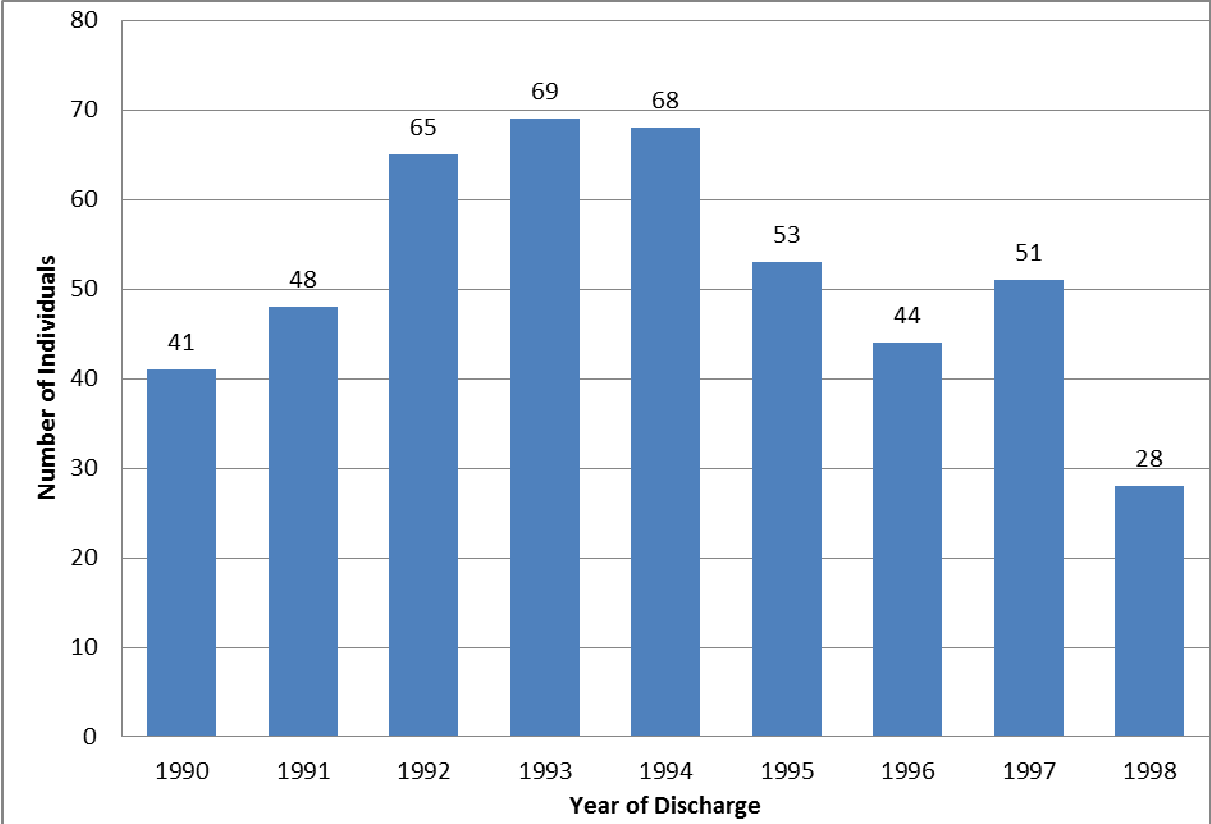


Figure 6. Yearly discharges between 1990 and 1998 in the BMHC cohort.

Location after Final Discharge

Figure 7 shows the first known Regional Health Authority (RHA) of residence for individuals in the BMHC cohort after their final discharge from BMHC. Forty-eight percent of the cohort remained in the Brandon RHA immediately following their final discharge. Another 43% of the cohort relocated into the neighbouring RHAs of Assiniboine, Parkland, and Central. Individuals who died within 30 days of their final discharge ($n = 7$) were considered to be located in the Brandon Regional Health Authority. If an individual was directly transferred into a personal care home ($n = 142$) or a mental health centre ($n = 10$), the RHA where that facility was located was used as their location. Table 10 describes the location of the BMHC cohort immediately after their final discharge, as well as 10 years post-discharge.

Table 10

Location of the BMHC Cohort at Discharge and 10 Years after Discharge

Location	At discharge (%)	10 years after discharge
Personal care home	142 ^b (30%)	63 (13%)
Other ^a	308 (66%)	208 (45%)
Mental Health Centre	10 ^c (2%)	s ^d
Deceased	7 ^b (1%)	185 (40%)
Left province	N/A	11 (2%)

^aCategory includes: independent community living, group home, incarceration, or any other living situation.

^bWithin 30 days of discharge.

^cWithin 10 days of discharge.

^dAs per Manitoba Centre for Health Policy regulations, values between 1 and 5 cannot be reported and therefore must be suppressed. These individuals are included in the “Other” category.

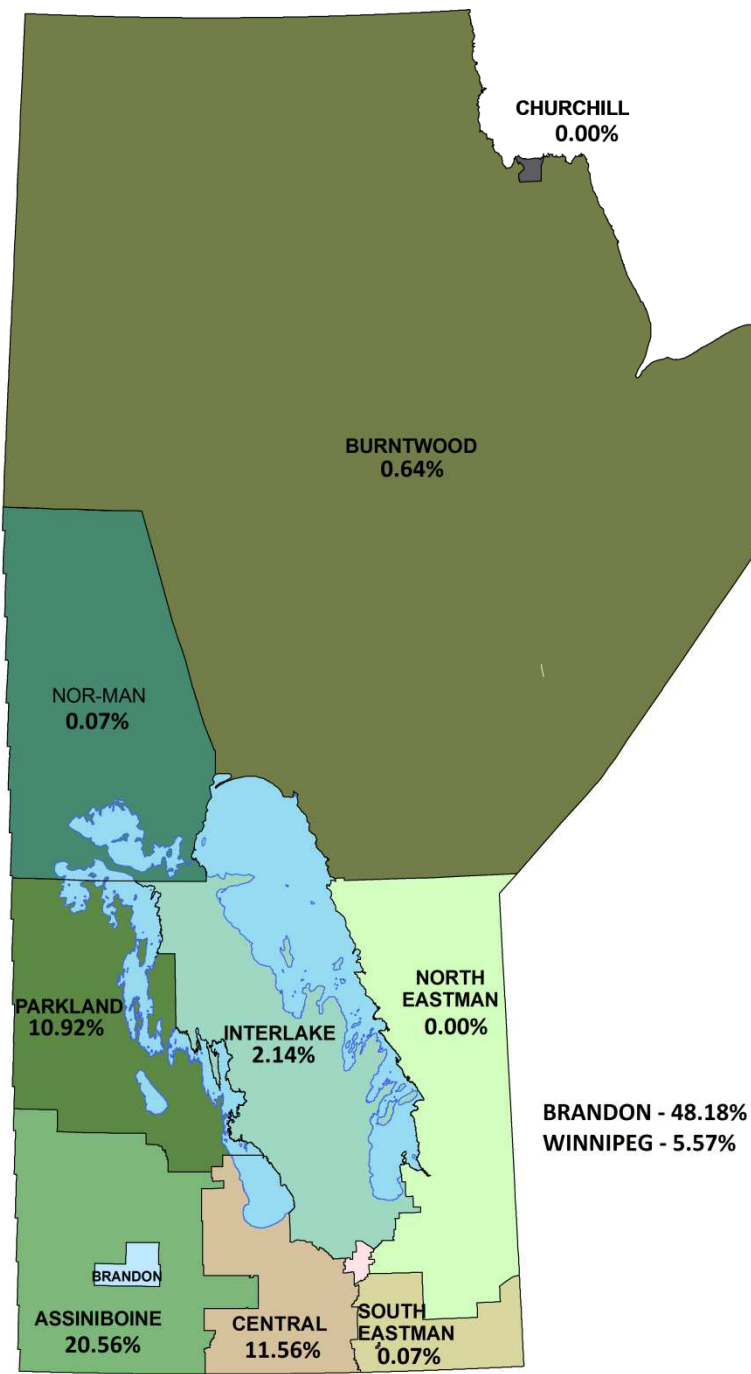


Figure 7. Geographic Location of the BMHC cohort after final discharge from Brandon Mental Health Centre.

Personal Care Home Use

Personal care home (PCH) use admissions in the BMHC cohort are presented in Table 11 and the region in which the PCHs were located is presented in Table 12. During the ten-year follow-up period, 206 individuals in the BMHC cohort (44%) were admitted into a PCH. One hundred and forty-two (69%) of these admissions occurred within the first 30 days of the individual's final discharge from BMHC and 26% of these individuals were under the age of 65. The level of care required indicated at the time of admission was '1' or '2' (minimal or average) for 118 of the 206 individuals, '3' (above average) for 63 individuals, and '4' (intensive) for 25 individuals.

The mean age at the time of PCH admission over the ten-year period was 72.1 years ($SD = 9.6$). Twenty-four percent of the individuals admitted to a PCH during the follow-up period ($n = 49$) were under the age of 65 at the time of the PCH admission. Overall, individuals who were admitted into a personal care home spent a median of 1.9 total years at BMHC. Seventy-four percent of the PCH admissions were to facilities in either the Brandon Regional Health Authority or the Assiniboine Regional Health Authority. In comparison, there were 92 individuals in matched cohort (6%) admitted into a PCH during the follow-up period. The median age at admission for these individuals was 84 years.

Table 11

Personal Care Home Use in the BMHC Cohort

Time to PCH admission	N	Mean Age at PCH admission (SD)	Median Years at BMHC (Mean, P25 – P75)
Directly (within 30 days ^a)	142	71.5 (9.3)	2.4 (13.2, 1.1 – 19.3)
31 days-0.99 years	21	77.6 (7.5)	0.5 (3.0, 0.4 – 0.7)
1 year-4.99 years	22	73.2 (10.5)	1.0 (4.3, 0.4 – 5.1)
5 years-9.99 years	21	69.9 (10.9)	0.8 (2.6, 0.5 – 1.9)
Total	206	72.1 (9.6)	1.9 (10.1, 0.7 – 9.6)

^aIf admission date was within six months before the final BMHC discharge date or within 30 days post-final discharge. In some cases, PCH beds were reserved and held for individuals until they were ready to be discharged from BMHC.

Table 12

Regional Distribution of Personal Care Home Use in the BMHC Cohort

Region	Number admitted to a PCH	% of those admitted
Brandon ^a	115	56
Assiniboine	37	18
Central	25	12
Parkland	20	10
Winnipeg	8	4

^aOf those admitted to a PCH in the Brandon Regional Health Authority, 79 individuals went to Rideau Park Personal Care Home, 18 went to Hillcrest Place Personal Care Home, and 7 went to Fairview Home.

The BMHC Cohort and the Matched Cohort

The matched cohort consisted of three individuals from the general population matched to each individual in the BMHC cohort by age, sex, and health district. The median age in both cohorts at the start of follow-up was 58 years, and 51.6% were male. Because of the low frequency of individuals in many health districts, individual districts could not be discussed. Therefore, results were aggregated to the Regional Health Authority level (refer to Figure 8 for the percentage of individuals from both cohorts in each Regional Health Authority at the start of the follow-up period).

Mortality

Overall Mortality in the BMHC Cohort

One hundred and eighty-five individuals in the BMHC cohort (39.6%) died within 10 years of their final discharge. The mean age at death was 73.6 years ($SD = 13.4$) and the median time spent at BMHC by those who died was 1.4 years ($M = 9.3$, $P25 - P75 = 0.6 - 6.0$). Seven people died within the first month of their final discharge and twenty-six people died within the first year (see Table 13 for a complete description of time to death in the BMHC cohort). The median potential years of life lost in the BMHC cohort was 7.1 years ($M = 12.2$, $P25 - P75 = 4.7 - 18.4$). Eighty-eight of the individuals who died (48%) were under the age of 75, 27 (15%) were under the age of 60, and 11 (6%) were less than 50 years old.

Overall Mortality in the Matched Cohort

Two hundred and sixty-three individuals in the matched cohort (18.8%) died during the follow-up period. The mean age at death in the cohort was 79.8 ($SD = 10.2$). There was a significant difference in age at death between the BMHC cohort and the matched cohort ($p < .001$). The median potential years of life lost in the matched cohort was 7.6 ($M = 9.1$, $P25 - P75$

= 3.1 – 12.9). Sixty-seven of the individuals in the matched cohort who died (25%) were under the age of 75 and 12 (5%) were under the age of 60.

Table 13

Mortality in the BMHC Cohort – Time to Death

Time to death	N	% of BMHC cohort	Mean age at death (SD)	Median years at BMHC (Mean, P25 - P75)
0-30 days	7	1.5	74.9 (13.4)	1.4 (17.0, 1.1 - 42.1)
31 days-0.99 years	19	4.1	68.7 (17.9)	1.6 (9.2, 0.8 – 9.6)
1 year–4.99 years	86	18.4	73.7 (12.6)	1.4 (10.5, 0.6 – 8.7)
5 years-9.99 years	73	15.6	74.7 (12.9)	1.2 (7.2, 0.6 – 5.3)
Total	185	39.6	73.6 (13.4)	1.4 (9.3, 0.6 – 6.0)

Survival Analysis

Figure 8 shows the survival curves for time to death in the BMHC cohort and the matched cohort. The estimated mean survival time in the BMHC cohort was 7.6 years while the estimated mean survival time in the matched cohort was 9.1 years. The test of equality indicated that there was a statistically significant difference in mean survival times between the two cohorts ($\chi^2 = 90.64, p < 0.01$). In other words, at any point in time during the follow-up period, an individual in the BMHC cohort was more likely to die than an individual in the matched cohort.

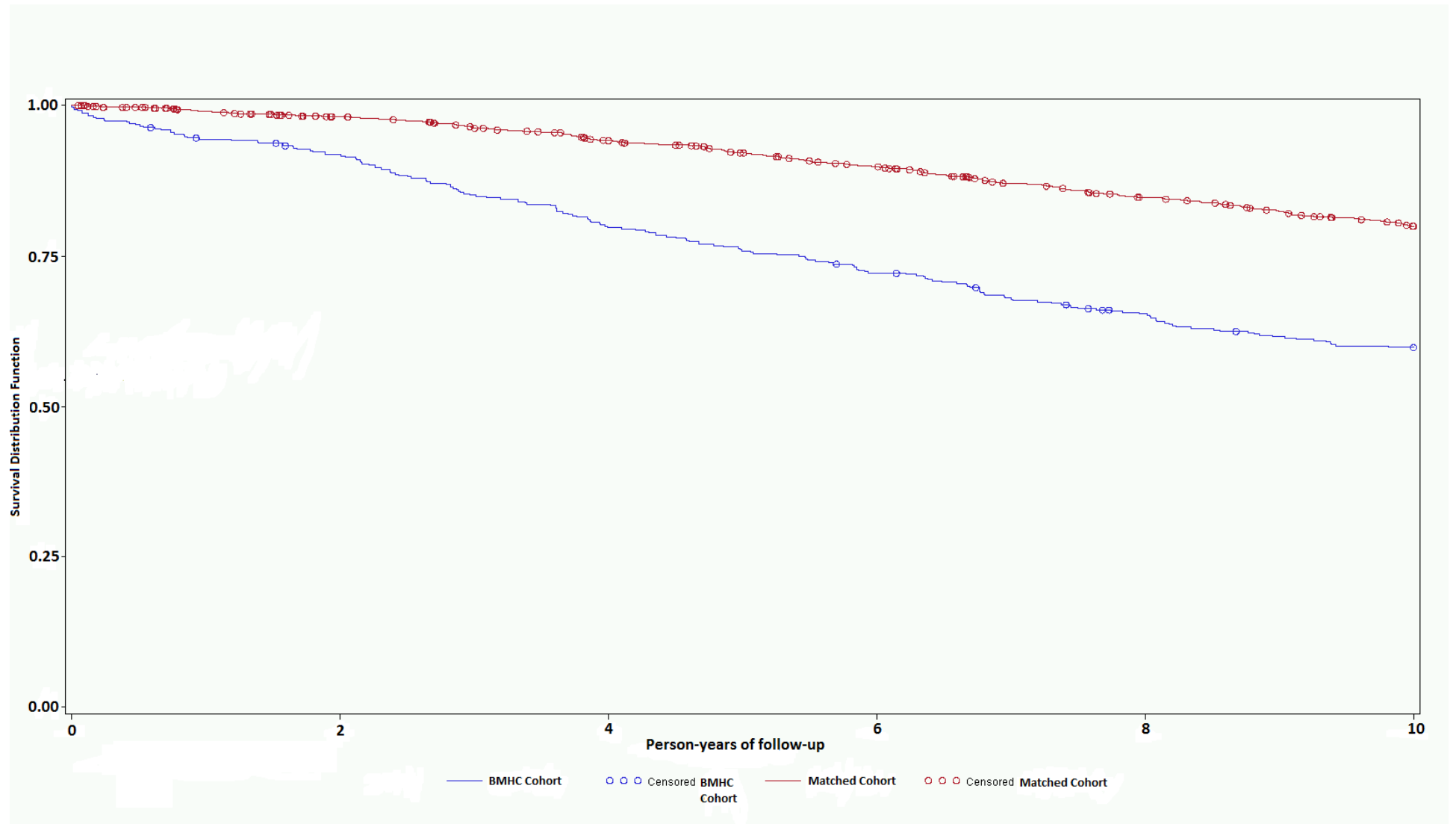


Figure 8. Survival analysis of time to death in the BMHC cohort and the matched cohort.

Cause-Specific Mortality in the BMHC Cohort

The main causes of death in the BMHC cohort were circulatory disease ($n = 49$, 26.5% of those who died), respiratory disease ($n = 33$, 17.8%), and cancer ($n = 27$, 14.6%). There were seven identified suicides (mean age at death was 38.1) during the follow-up period. All seven of these individuals had spent less than a total of one year at BMHC. There were also 41 identified suicide attempts during the follow-up period by 23 individuals (mean age at first attempt was 40.8). Nine of the individuals who attempted suicide (39%) made more than one suicide attempt during the follow-up period and eight of the individuals (35%) who attempted suicide made their first attempt within the first year of their final discharge from BMHC. The median length of time after final discharge that the suicide or first suicide attempt occurred was 4.7 and 1.8 years, respectively. The suicide rate per 1,000 person-years of follow-up was 2.9 and the suicide attempt rate per 1,000 person-years of follow-up was 16.9. See Table 14 for a description of mortality in both cohorts and see Table 15 for a description of suicides and suicide attempts in the BMHC cohort.

Cause Specific Mortality in the Matched Cohort

The main causes of death in the matched cohort were also circulatory disease, respiratory disease, and cancer (33.5%, 13.3%, and 29.3% of those who died). The number of suicides, suicide attempters, and suicide attempts in the matched cohort were less than six cannot be reported as per the Manitoba Centre for Health Policy regulations.

Mortality Differences between the BMHC Cohort and the Matched Cohort

Table 16 shows the risk in both cohorts, as well as the odds ratios and 95% confidence intervals, for overall mortality, circulatory disease mortality, respiratory disease mortality, and cancer mortality. The age-adjusted odds of dying from any cause was much higher in the BMHC cohort than in the matched cohort ($OR = 4.8$, $p < 0.01$, $CI = 3.6 - 6.4$). The odds of dying from

circulatory disease and respiratory disease was also higher in the BMHC cohort than in the matched cohort ($OR = 1.9, p < 0.01, CI = 1.3 - 2.8$; $OR = 3.2, p < 0.01, CI = 2.0 - 5.2$). There were no statistically significant differences between the groups in cancer mortality.

Table 14

Cause-Specific Mortality in the BMHC Cohort and Matched Cohort

Cause of death	<i>BMHC Cohort</i>		<i>Matched Cohort</i>	
	Number who died	% of those who died	Number who died	% of those who died
Circulatory disease	49	26.5	88	33.5
Respiratory disease	33	17.8	35	13.3
Cancer	27	14.6	77	29.3
Mental disorder	16	8.7	7	2.7
Central nervous system disease	13	7.0	6	2.3
Digestive disease	8	4.3	9	3.4
Other cause	39	21.1	41	15.6
Total	185	100.0	263	100.0

Table 15

Suicide and Suicide Attempts in the BMHC Cohort

Variable	Suicide	Suicide attempters
Number of people	7	23
Number of attempts	N/A	41
Male (%)	s ^a	10 (43%)
% of BMHC cohort	1.5	4.9
Mean age (SD)	38.1 (7.1)	40.8 ^b (16.1)
Median years at BMHC (M, P25 - P75)	0.4 (0.6, 0.3 – 0.9)	1.2 (1.3, 0.4 – 1.9)
Median time ^c (M, P25 - P75)	4.7 (3.2, 0.8 – 5.0)	1.8 (3.1, 0.4 – 6.5)

^aAs per Manitoba Centre for Health Policy regulations, values between 1 and 5 cannot be reported and therefore must be suppressed.

^bAge at time of first suicide attempt.

^cNumber of years after final release from BMHC that the suicide or first suicide attempt occurred.

Table 16

Mortality Comparison between the BMHC Cohort and the Matched Cohort

Variable	Risk in BMHC cohort	Risk in matched cohort	Odds ratio	95% CI
Overall mortality	0.40	0.19	4.8*	3.6 – 6.4
Cause-Specific mortality				
Circulatory disease	0.10	0.06	1.9*	1.3 – 2.8
Respiratory disease	0.07	0.02	3.2*	2.0 – 5.2
Cancer	0.06	0.05	1.04	0.7 – 1.7

* $p \leq 0.01$.

Physician Visits

Trend over Time in the BMHC Cohort

Physician visits in the BMHC cohort in the first, fifth, and tenth year after final BMHC discharge, as well as the odds ratios for differences over time, are presented in Table 17 (See Table 18 for the differences in the cohort visit rates over time and see Tables 19-24 for a complete year-by-year description of physician visits in the cohort). The most common type of physician visit in the BMHC cohort was to a general practitioner for a non-mental disorder. Eighty percent saw a general practitioner for a non-mental disorder related reason in the first year after final discharge (the visit rate was 6.2 per person-year of follow-up), 82% saw one in year five (visit rate was 5.8), and 83% in year ten (visit rate was 6.6). There wasn't a statistically significant change over time in the percentage of individuals who saw a general practitioner for a non-mental disorder reason (OR per year = 1.01, $p = 0.56$) or in the cohort visit rate over time (RR per year = 1.01, $p = 0.27$).

The percentage of individuals who saw a general practitioner for a mental disorder decreased over the ten year follow-up period (OR per year = 0.93, $p < 0.01$). Fifty-eight percent had at least one a general practitioner visit with a mental disorder diagnosis in year one (cohort visit rate was 3.9), 45% at least one visit in year five (visit rate was 2.8), and 42% in year ten (visit rate was 2.0). The least common type of physician visit was to a psychiatrist. Thirteen percent saw a psychiatrist in their first year of follow-up (visit rate was 0.9), though that number increased to 24% in year five (visit rate was 1.5) and 37% in year ten (visit rate was 2.5). There was a statistically significant increase over time in the percentage of individuals who saw a psychiatrist (OR per year = 1.20, $p < 0.01$).

When combining all types of physician visits, 92% of the cohort had at least one visit in year one (visit rate was 13.3), 92% in year five (visit rate was 12.0), and 93% in year ten (visit

rate was 13.0). There was not a statistically significant change over time in the percentage of individuals who saw any type of physician (OR per year = 1.02, $p = 0.57$) or in the cohort visit rate over time (RR per year = 1.00, $p = 0.68$).

Table 17

Trend over Time in the Percentage of the BMHC Cohort Visiting a Physician

Type of physician visit	% of cohort – Year 1	% of cohort – Year 5	% of cohort – Year 10	Odds ratio ^a	95% CI
General Practitioner					
Non-mental disorder	80	82	83	1.01	0.97-1.05
Mental disorder	58	45	42	0.93*	0.90-0.96
Total	87	88	86	1.00	0.95-1.04
Psychiatrist	13	24	37	1.20*	1.15-1.25
Specialist	52	48	47	0.96*	0.93-0.99
All visits	92	92	93	1.02	0.96-1.08

^aPer year of follow-up.

* $p \leq 0.01$.

Table 18

Trend over Time in the Cohort Physician Visit Rate in the BMHC Cohort

Type of physician visit	Cohort visit rate ^a – Year 1	Cohort visit rate – Year 5	Cohort visit rate – Year 10	Relative Rate ^b	95% CI
General Practitioner					
Non-mental disorder	6.2	5.8	6.6	1.01	0.99 – 1.03
Total	10.1	8.4	8.6	0.99	0.97 – 1.01
All visits	13.3	12.0	13.0	1.00	0.99 – 1.02

^aVisits per person-year of follow-up.

^bPer year of follow-up

* $p \leq 0.01$.

Table 19

Physician Visits in the BMHC Cohort – General Practitioner for a Non-Mental Disorder

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	1,849	80	7.0	6.2
Year 2	1,569	82	6.8	5.6
Year 3	1,555	79	7.2	5.8
Year 4	1,338	80	6.5	5.3
Year 5	1,397	82	6.9	5.8
Year 6	1,374	82	7.1	5.9
Year 7	1,415	79	7.7	6.2
Year 8	1,420	83	7.8	6.6
Year 9	1,302	83	7.5	6.3
Year 10	1,300	83	7.6	6.6
Total	14,519	93 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 20

Physician Visits in the BMHC Cohort – General Practitioner for a Mental Disorder

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	1,160	58	6.1	3.9
Year 2	926	54	6.1	3.3
Year 3	832	48	6.4	3.1
Year 4	770	49	6.0	3.0
Year 5	649	45	5.8	2.8
Year 6	629	48	5.5	2.7
Year 7	625	45	6.1	2.7
Year 8	621	43	6.5	2.9
Year 9	480	38	6.0	2.3
Year 10	396	42	4.6	2.0
Total	7,088	83 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 21

Physician Visits in the BMHC Cohort – General Practitioner (Total)

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	3,009	87	10.6	10.1
Year 2	2,495	88	10.1	9.0
Year 3	2,387	86	10.2	9.0
Year 4	2,108	87	9.3	8.3
Year 5	2,046	88	9.4	8.4
Year 6	2,003	88	9.7	8.6
Year 7	2,040	85	10.4	8.9
Year 8	2,041	88	10.5	9.5
Year 9	1,782	90	9.5	8.6
Year 10	1,696	86	9.5	8.6
Total	21,607	95 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 22

Physician Visits in the BMHC Cohort – Psychiatrist

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	279	13	6.8	0.9
Year 2	295	17	6.3	1.1
Year 3	341	19	6.7	1.3
Year 4	311	18	6.6	1.2
Year 5	374	24	6.2	1.5
Year 6	398	33	5.2	1.7
Year 7	436	33	5.7	1.9
Year 8	427	37	5.2	2.0
Year 9	476	37	6.1	2.3
Year 10	496	37	6.5	2.5
Total	3,833	53 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 23

Physician Visits in the BMHC Cohort – Specialist

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	690	52	4.1	2.3
Year 2	543	51	3.7	2.0
Year 3	468	45	3.8	1.8
Year 4	486	50	3.7	1.9
Year 5	495	48	4.2	2.0
Year 6	424	40	4.5	1.8
Year 7	538	49	4.8	2.6
Year 8	342	40	3.8	1.6
Year 9	403	43	4.8	1.9
Year 10	392	47	4.1	2.0
Total	4,781	86 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 24

Physician Visits in the BMHC Cohort – All Visits

Follow-up period	Total number of visits	% of cohort	Mean visits per user	Cohort visit rate ^a
Year 1	3,978	92	13.2	13.3
Year 2	3,333	93	12.7	12.0
Year 3	3,196	92	12.7	12.0
Year 4	2,905	95	11.8	11.4
Year 5	2,915	92	12.8	12.0
Year 6	2,825	93	12.9	12.1
Year 7	3,014	92	14.2	13.2
Year 8	2,810	93	13.6	13.1
Year 9	2,661	93	13.5	12.8
Year 10	2,584	93	13.5	13.0
Total	30,221	97 ^b		

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Comparison between the BMHC Cohort and Matched Cohort

The odds of visiting a physician as well as the cohort visit rate was higher in the BMHC cohort than in the matched cohort for all types of physician visits ($OR = 1.4 - 14.6$, $RR = 1.3 - 2.1$). The differences in the percentage of individuals visiting a physician in the two cohorts is presented in Table 25 and the differences in the cohort visit rates are shown in Table 26 (see Tables 27-32 for a complete year-by-year description of physician visits in the two cohorts). The biggest difference between the cohorts was seen in the percentage of individuals visiting a general practitioner for a mental disorder ($OR = 14.6$, $p < 0.01$). The smallest differences were found in the percentage of individuals visiting a general practitioner for a non-mental disorder and the percentage visiting a specialist ($OR = 1.4$, $p < 0.01$).

The difference in the percentage of individuals visiting a general practitioner for a mental disorder between the cohorts decreased over time ($p < 0.01$). The percentage in the BMHC cohort decreased from 58% in year one to 42% in year ten while the percentage in the matched cohort increased from 8% in year one to 13% in year ten. The difference between the cohorts increased over time for psychiatrist visits ($p < 0.01$). The percentage in the BMHC cohort increased from 13% in year one to 37% in year ten while the percentage in the matched cohort remained between 1-3% for the whole follow-up period. There was not a statistically significant change between the cohorts over time for any other type of physician visit.

Table 25

Comparison of the Percentage of the BMHC Cohort and Matched Cohort Visiting a Physician

Type of physician visit	Year 1		Year 5		Year 10		Comparison	
	% of BMHC cohort	% of Matched cohort	% of BMHC cohort	% of Matched cohort	% of BMHC cohort	% of Matched cohort	Odds ratio	95% CI
General Practitioner								
Non-mental disorder	80	72	82	74	83	76	1.4*	1.1 – 1.9
Mental disorder	58	8	45	10	42	13	14.6*	11.2 – 19.2
Total	87	73	88	75	86	77	2.3*	1.7 – 3.1
Psychiatrist	13	2	24	2	37	1	10.3*	6.1 – 17.2
Specialist	52	43	48	39	47	41	1.4*	1.1 – 1.8
All visits	92	78	92	79	93	80	3.0*	2.1 – 4.2

* $p \leq 0.01$.

Table 26

Comparison of the Cohort Physician Visit Rates in the BMHC Cohort and Matched Cohort

Type of physician visit	Year 1		Year 5		Year 10		Comparison	
	CVR ^a - BMHC cohort	CVR - Matched cohort	CVR - BMHC cohort	CVR - Matched cohort	CVR - BMHC cohort	CVR - Matched cohort	Relative Rate	95% CI
General Practitioner								
Non-mental disorder	6.2	4.4	5.8	4.3	6.6	4.4	1.3*	1.1 – 1.5
Total	10.1	4.7	8.4	4.6	8.6	4.9	2.1*	1.8 – 2.4
All visits	13.3	6.3	12.0	6.2	13.0	6.8	2.0*	1.7 – 2.4

^aCohort visit rate (visits per person-year of follow-up).

* $p \leq 0.01$

Table 27

Physician Visits in the BMHC Cohort and the Matched Cohort – General Practitioner for a Non-Mental Disorder

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	80	6.2	72	4.4
Year 2	82	5.6	75	4.2
Year 3	79	5.8	77	4.3
Year 4	80	5.3	75	4.3
Year 5	82	5.8	74	4.3
Year 6	82	5.9	75	4.3
Year 7	79	6.2	78	4.5
Year 8	83	6.6	76	4.3
Year 9	83	6.3	77	4.3
Year 10	83	6.6	76	4.4
Total	93 ^b		89 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 28

Physician Visits in the BMHC Cohort and the Matched Cohort – General Practitioner for a Mental Disorder

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	58	3.9	8	0.27
Year 2	54	3.3	11	0.23
Year 3	48	3.1	9	0.26
Year 4	49	3.0	9	0.27
Year 5	45	2.8	10	0.25
Year 6	48	2.7	12	0.33
Year 7	45	2.7	13	0.31
Year 8	43	2.9	12	0.36
Year 9	38	2.3	14	0.37
Year 10	42	2.0	13	0.43
Total	83 ^b		35 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 29

Physician Visits in the BMHC Cohort and the Matched Cohort – General Practitioner (Total)

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	87	10.1	73	4.7
Year 2	88	9.0	77	4.4
Year 3	86	9.0	78	4.5
Year 4	87	8.3	76	4.6
Year 5	88	8.4	75	4.6
Year 6	88	8.6	75	4.6
Year 7	85	8.9	79	4.8
Year 8	88	9.5	77	4.7
Year 9	90	8.6	80	4.7
Year 10	86	8.6	77	4.9
Total	95 ^b		89 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 30

Physician Visits in the BMHC Cohort and the Matched Cohort – Psychiatrist

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	13	0.9	2	0.08
Year 2	17	1.1	1	0.04
Year 3	19	1.3	1	0.03
Year 4	18	1.2	2	0.08
Year 5	24	1.5	2	0.05
Year 6	33	1.7	2	0.10
Year 7	33	1.9	3	0.13
Year 8	37	2.0	2	0.12
Year 9	37	2.3	2	0.15
Year 10	37	2.5	1	0.11
Total	53 ^b		6 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 31

Physician Visits in the BMHC Cohort and the Matched Cohort – Specialist

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	52	2.3	43	1.5
Year 2	51	2.0	44	1.6
Year 3	45	1.8	42	1.5
Year 4	50	1.9	41	1.7
Year 5	48	2.0	39	1.6
Year 6	40	1.8	41	1.7
Year 7	49	2.6	40	1.8
Year 8	40	1.6	39	1.7
Year 9	43	1.9	43	1.9
Year 10	47	2.0	41	1.8
Total	86 ^b		74 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Table 32

Physician Visits in the BMHC Cohort and the Matched Cohort – All Visits

Follow-up period	% of BMHC cohort	Cohort visit rate	% of matched cohort	Cohort visit rate ^a
Year 1	92	13.3	78	6.3
Year 2	93	12.0	82	6.1
Year 3	92	12.0	82	6.1
Year 4	95	11.4	81	6.3
Year 5	92	12.0	79	6.2
Year 6	93	12.1	80	6.4
Year 7	92	13.2	81	6.7
Year 8	93	13.1	79	6.5
Year 9	93	12.8	82	6.7
Year 10	93	13.0	80	6.8
Total	97 ^b		90 ^b	

^aVisits per person-year of follow-up.

^bPercentage of the cohort with a visit at some point during the follow-up period.

Hospital Admissions

Trend over Time in the BMHC Cohort

General hospital admissions in the BMHC cohort in the first, fifth, and tenth year after final BMHC discharge, as well as the trend in the number of people admitted over time, is presented in Table 33 (see Tables 34-36 for a complete year-by-year description of hospital admissions in this cohort). Sixteen percent of the cohort was admitted to a general hospital, where the primary reason for the admission was not a mental disorder, in the first year after their final discharge. There was not a statistically significant change over time in the percentage of individuals admitted for this type of hospitalization (*OR* per year = 0.97, *p* = 0.22). Fifty-two percent of the cohort was admitted to hospital with a non-mental disorder diagnosis, sometime over the ten-year follow-up period. One hundred of the 171 individuals admitted over the follow-up period (58%) were admitted more than once, 33 individuals (19%) had more than five admissions, and 9 people had more than ten admissions (5%).

Forty-four percent of the cohort was admitted to a general hospital for a mental disorder at some point during the follow-up period. The highest rate of admissions was in the first year of follow-up (79 admissions, cohort admission rate was 0.27). There were 11 admissions in the cohort within the first 30 days of discharge. There wasn't a statistically significant change over time in the percentage of individuals admitted for this type of hospitalization (*OR* per year = 1.02, *p* = 0.47). Ninety-one of the 144 individuals admitted over the follow-up period (63%) were admitted more than once, 37 individuals (26%) had more than five admissions, and 11 people had more than ten admissions (8%).

There were also 35 hospitalizations in a mental health centre (10 were at Eden Mental Health Centre and 25 were at Selkirk Mental Health Centre) during the follow-up period by 24 individuals in the BMHC cohort. Fourteen of the 25 Selkirk Mental Health Centre

hospitalizations were for longer than one year. Ten individuals were transferred directly (within five days of their final BMHC discharge) to Selkirk Mental Health Centre; none were directly transferred to Eden Mental Health Centre. The median age of those directly transferred to Selkirk Mental Health Centre was 70.0 and median length of time spent at BMHC was 9.8 years. The median length of stay at Selkirk Mental Health Centre for these ten individuals was 2.76 years ($M = 4.35$).

Table 33

Trend over Time in the Percentage of the BMHC Cohort Admitted to a General Hospital

Type of hospitalization	% of cohort – Year 1	% of cohort – Year 5	% of cohort – Year 10	Odds ratio ^a	95% CI
General hospital					
Non-mental disorder	16	12	14	0.97	0.92 – 1.02
Mental disorder	13	12	12	1.02	0.97 – 1.07
All	25	21	24	1.00	0.96 – 1.04

^aPer year of follow-up.

* $p \leq 0.01$

Table 34

Hospital Admissions in the BMHC Cohort – General Hospital, Non-Mental Disorder

Follow-up period	Total number of admissions	% of cohort	Median length of stay (Mean)	Cohort admission rate ^a
Year 1	84	16	4.0 (30.1)	0.28
Year 2	84	16	7.0 (16.6)	0.30
Year 3	65	12	4.0 (10.9)	0.24
Year 4	31	8	5.0 (6.8)	0.12
Year 5	43	12	4.0 (30.2)	0.18
Year 6	35	7	6.0 (8.2)	0.15
Year 7	49	14	6.0 (13.1)	0.21
Year 8	36	10	3.5 (8.6)	0.17
Year 9	42	13	5.5 (10.0)	0.20
Year 10	42	14	5.0 (9.0)	0.21
Total	511	52 ^b		

^aAdmissions per person-year of follow-up.

^aPercentage of the cohort with an admission at some point during the follow-up period.

Table 35

Hospital Admissions in the BMHC Cohort – General Hospital, Mental Disorder

Follow-up period	Total number of admissions	% of cohort	Median length of stay (Mean)	Cohort admission rate ^a
Year 1	79	13	9.0 (20.3)	0.27
Year 2	51	10	9.0 (26.8)	0.18
Year 3	68	13	7.5 (22.5)	0.26
Year 4	53	10	9.0 (23.5)	0.21
Year 5	40	12	9.0 (17.5)	0.16
Year 6	36	10	14.5 (20.8)	0.15
Year 7	56	14	13.0 (28.8)	0.25
Year 8	48	14	15.5 (24.3)	0.22
Year 9	45	13	23.0 (37.4)	0.22
Year 10	50	12	12.0 (22.6)	0.25
Total	526	44 ^b		

^aAdmissions per person-year of follow-up.

^bPercentage of the cohort with an admission at some point during the follow-up period.

Table 36

Hospital Admissions in the BMHC Cohort – General Hospital, All

Follow-up period	Total number of admissions	% of cohort	Median length of stay (Mean)	Cohort admission rate ^a
Year 1	163	25	7.0 (25.4)	0.55
Year 2	135	23	7.0 (20.5)	0.48
Year 3	133	22	5.0 (16.8)	0.50
Year 4	84	15	7.0 (17.3)	0.33
Year 5	83	21	6.0 (24.1)	0.34
Year 6	71	18	7.0 (14.6)	0.30
Year 7	105	26	10.0 (21.5)	0.46
Year 8	84	22	8.5 (17.6)	0.39
Year 9	87	23	11.0 (24.1)	0.42
Year 10	92	24	7.5 (16.4)	0.46
Total	1037	71 ^b		

^aAdmissions per person-year of follow-up.

^bPercentage of the cohort with an admission at some point during the follow-up period.

Comparison between the BMHC Cohort and Matched Cohort

The odds of being admitted to a general hospital for a non-mental disorder reason was higher in the BMHC cohort than in the matched cohort during the follow-up period ($OR = 1.7$, $CI - 1.2 - 2.4$, $p < 0.01$). There was not a statistically significant change in the difference between the two cohorts over time ($p = 0.20$). A description of yearly admissions in both cohorts is presented in Table 37. There were 135 general hospital admissions, with a mental disorder diagnosis by 70 individuals (7%) in the matched cohort during the follow-up period compared to 526 admissions by 144 individuals (44%) in BMHC cohort.

During the follow-up period, 71% of the individuals in the BMHC cohort were admitted to a general hospital for any reason, compared to 38% in the matched cohort. When comparing all general hospital admissions, the odds of being admitted was higher in the BMHC cohort than in the matched cohort during the follow-up period ($OR = 2.9$, $CI - 2.2 - 3.9$, $p < 0.01$). There was not a statistically significant change in the difference between the two cohorts over time ($p = 0.66$). The descriptions for each year are shown in Table 38.

Table 37

Hospital Admissions in the BMHC Cohort and the Matched Cohort – General Hospital, Non-Mental Disorder

Follow-up period	% of BMHC cohort	Cohort admission rate	% of matched cohort	Cohort admission rate ^a
Year 1	16	0.28	9	0.17
Year 2	16	0.30	11	0.15
Year 3	12	0.24	9	0.14
Year 4	8	0.12	9	0.15
Year 5	12	0.18	7	0.12
Year 6	7	0.15	9	0.14
Year 7	14	0.21	8	0.13
Year 8	10	0.17	11	0.15
Year 9	13	0.20	11	0.16
Year 10	14	0.21	10	0.16
Total	52 ^b		37 ^b	

^aAdmissions per person-year of follow-up.

^bPercentage of the cohort with an admission at some point during the follow-up period.

Table 38

Hospital Admissions in the BMHC Cohort and the Matched Cohort – General Hospital, All

Follow-up period	% of BMHC cohort	Cohort admission rate	% of matched cohort	Cohort admission rate ^a
Year 1	25	0.55	10	0.17
Year 2	23	0.48	11	0.15
Year 3	22	0.50	9	0.15
Year 4	15	0.33	10	0.16
Year 5	21	0.34	7	0.12
Year 6	18	0.30	9	0.14
Year 7	26	0.46	8	0.14
Year 8	22	0.39	11	0.16
Year 9	23	0.42	11	0.17
Year 10	24	0.46	11	0.17
Total	71 ^b		38 ^b	

^aAdmissions per person-year of follow-up.

^bPercentage of the cohort with an admission at some point during the follow-up period.

Chapter 7: Discussion

In this chapter, the quantitative results will be critically analyzed and compared to previous studies. Next, policy implications, study limitations, and directions for future research will be discussed. The last section of this chapter contains a summary of the study's main findings and conclusions.

Location after Final Discharge

The majority of the BMHC cohort relocated in Brandon or one of the adjacent Regional Health Authorities after their final discharge. This finding is not surprising considering that the catchment area for the Brandon Mental Health Centre included the Westman and Parkland regions of Manitoba and the western half of Central region (the areas of the province closest to the centre). Also, according to several interview informants, many individuals chose to stay in Brandon after their final discharge because there were more accessible mental health services there than in their home communities.

During the follow-up period, 44% of the individuals in the BMHC cohort were admitted to a personal care home (PCH). The majority of these admissions were within 30 days of an individual's final discharge. The transfer of care from psychiatric facilities to personal care homes (often referred to as nursing homes in other jurisdictions) for elderly individuals living with a mental disorder is not a new phenomenon. In the United States in 1960s and 1970s, the number of elderly individuals in psychiatric institutions declined by approximately 40%, while at the same time, the number of individuals with mental disorders in nursing homes rose by over 100% (Aschbrenner, Grabowski, Cai, Bartels, & Mor, 2011). By the late 1970s, nursing homes had become the largest provider of mental health care in the United States, accounting for an estimated 29% of the direct cost of mental disorders (Scull, 1985). These findings have led some

researchers to assert that, in many cases, elderly individuals with severe mental disorders have not been de-institutionalized but instead trans-institutionalized (Scull, 1985; Aschbrenner, Grabowski, Cai, Bartels, & Mor, 2011).

Studies have also found that a high percentage of individuals with severe mental disorders under the age of 65 are admitted into PCHs. Aschbrenner, Cai, Grabowski, Bartels, and Mor (2011) found that in 2008, 60% of the individuals with schizophrenia ($n = 9,755$) admitted into nursing homes in the United States were under the age of 65. The authors suggested that these results may indicate a gap in the community services for non-elderly adults living with schizophrenia. In the current study, 24% of the individuals admitted to a PCH were less than 65 years. As indicated in the '*challenges*' section of Chapter 4, several informants felt that there was a gap in long-term care options for some individuals discharged from BMHC who required more intensive support. It is possible that some of these younger individuals were admitted to a PCH because of the absence of a long-term care alternative. As noted by Aschbrenner, Grawbowski, Cai, Bartels, and Mor (2011), there is limited research looking at best-practice community-based models to support individuals with very severe mental disorders in order to avoid personal care home admissions. Each individual's requirements are unique and it is likely that a mix of long-term supportive housing, home care, psychosocial rehabilitation, and smaller long-term psycho-geriatric care units are needed.

Because of the high percentage of individuals with mental disorders residing in PCHs, it is imperative that appropriate resources are in place in these facilities. Specialized training for staff, an appropriate staff to resident ratio, and a suitable physical environment are needed to ensure the proper care of individuals with and without mental disorders in PCHs (Martens et al., 2007, Aschbrenner, Grawbowski, Cai, Bartels, & Mor, 2011).

Mortality

The excess mortality among those with a mental disorder has been well documented. A comprehensive meta-analysis reviewing 152 papers on all-cause mortality and 249 papers on suicide concluded that individuals with a mental disorder are at higher risk of premature death (Harris & Barraclough, 1998). Previous studies comparing mortality in a population living with a mental disorder and the general population have found standardized mortality ratios ranging from 1.7-5.0 depending on the type and severity of disorder and the type of setting included (Dembling, Chen, & Vanchon, 1999). In this study, the odds of dying from any cause were 4.8 times higher in the BMHC cohort than in the matched cohort. This ratio is at the high end of the range previously reported and is possibly due the fact that the BMHC cohort was a formerly institutionalized population.

Consistent with previous findings, the odds of dying from circulatory disease and respiratory disease in this study were higher in the BMHC cohort than in the matched cohort (Politi, Piccinelli, Klersy, Madini, Lusignani, Fratti, et al. 2002; Hiroeh, Kapur, Webb, Dunn, Mortensen, & Appleby, 2008). Several explanations for the increased mortality from these two causes in psychiatric populations have been suggested. Adverse lifestyle factors such as smoking, alcohol abuse, poor diet, and low physician activity are more prevalent in individuals with a mental disorder than in the general population (Hiroeh et al., 2008; Lawrence, Kisely, & Pais, 2010). These behaviours are known risk factors for many chronic health conditions. Furthermore, poor housing and unemployment, circumstances that are linked to poor health, are higher in individuals with mental disorders (Politi et al., 2002; Hiroeh et al., 2008). Another possible reason for the increased mortality risk is the difference in the level of health care received. Mitchell, Malone, & Doebbeling (2009) conducted a systematic review of 34 studies

looking at the quality of medical care received by individuals with a mental disorder compared to the general population. They concluded that inequalities in health care between the two populations exist, but noted that the degree of discrepancy varied by study. It is also speculated that the side effects of psychotropic medications (e.g., weight gain) may play a role in the early mortality of psychiatric patients, though it is difficult to establish a direct causal relationship (Hiroeh et al., 2008; Lawrence et al., 2010).

In the current study, no significant difference in the odds of dying from cancer between the two cohorts was found. There is no clear consensus in the literature on whether individuals with a mental disorder are at an increased risk of death from cancer. Some studies have found a higher risk (Politi et al. 2002; Kisely, Sadek, MacKenzie, Lawrence, & Campbell, 2008) while others have found no difference or a lower risk (Dembling et al., 1999; Hiroeh et al., 2008). It has been proposed that a lower risk of cancer of mortality in individuals with a mental disorder (and particularly schizophrenia) may be due to a) the protective or buffer effects of some psychiatric medications, b) a tumour suppressor gene, and c) because of a reduced life expectancy, a lower chance of being diagnosed with cancers that are more typically found in older individuals (Dembling et al., 1999; Lawrence et al., 2010).

There were seven identified suicides in the BMHC cohort during the follow-up period and another 23 identified suicide attempters. Suicides and attempted suicides in the matched cohort were too low to report. In general, studies looking at suicide risk in discharged patients have included sample sizes larger than 20,000. These studies have found that the risk of completing or attempting suicide is much higher in individuals discharged from a psychiatric facility than in the general population (Goldacre, Seagroatt, & Hawton, 1993; Geddes, Juszczak, O'Brien, & Kendrick, 1997; Harris & Barraclough, 1998) and that the risk is highest within the

first year of discharge (Goldacre, Seagroatt, & Hawton; Geddes, Juszczak, O'Brien, & Kendrick, 1997; Christiansen & Jensen, 2009). Consistent with the latter finding, thirty-five percent of the suicide attempts in the BMHC cohort occurred within a year of final discharge from BMHC. This result suggests that there may have been a gap in services for some individuals during the period immediately following discharge.

Physician Visits

Research has found that individuals living with a severe mental disorder have frequent contact with a general practitioner (Johnstone, Owens, Gold, Crow, & Macmillan, 1984; Kendrick, Burns, Freeling, & Sibbald, 1994; Reilly, Planner, Hann, Reeves, Nazareth, & Lester, 2012). For example, Kendrick, Burns, Freeling, and Sibbald (1994) reported that 93% of individuals in London, UK with a long-term mental disorder had visited a general practitioner in the previous year. In the current study, general practitioner visits were also high. Eighty-seven percent of the BMHC cohort saw a general practitioner in their first year after discharge and 95% of the cohort visited a general practitioner at some point during the follow-up period. In comparison, only 13% of the cohort saw a psychiatrist in the first year after discharge.

The percentage of individuals in the BMHC cohort visiting a general practitioner for a mental disorder decreased significantly over time while the percentage of the cohort seeing a psychiatrist increased significantly. It is possible that at some point the general practitioner, another care provider, or the individual in the BMHC cohort decided that the individual's primary mental health care would best be managed by a psychiatrist. It is also possible that the severity of an individual's mental disorder(s) increased over time. Because it is not possible in the administrative data to identify visits to other community mental health providers (e.g., psychiatric nurses, social workers, mental health workers), it is not known what other mental

health services an individual was accessing and whether visits to these providers changed over time. But, regardless of this limitation, these results do suggest that for the cohort as a whole, there was some transfer of primary mental health care from general practitioners to psychiatrists over time.

Both the percentage of individuals seeing a physician and the rate of use were higher in the BMHC cohort than in the matched cohort for all types of physician visits. These differences remained stable over time, except for general practitioner visits for a mental disorder and psychiatrist visits (due to changes in use in the BMHC cohort). These results are consistent with previous findings. Studies comparing general practitioner visits by individuals with a mental disorder to a control group of the general population have found higher visit rates in the former group (Nazareth, King, Haines, See Tai, & Hall, 1993; Kendrick et al., 1994; Martens et al., 2004). Nazareth et al. (1993) found that between April and September in 1990, individuals in London, England with schizophrenia were 1.9 times more likely to visit a general practitioner for a physical illness and 21.83 times more likely to visit a general practitioner for a mental disorder than a control group of randomly selected individuals from a practice registry. There is a lack of research looking at the difference in specialist visits between a population of individuals with a mental disorder and a control population.

Hospital Admissions

The percentage of individuals who were readmitted to a psychiatric unit during the follow-up period is lower than reported in previous studies. In this study, 13% of the BMHC cohort was admitted to a general hospital for a mental disorder during the first year of follow-up. Other studies have reported percentages between 16-30% in the first year post-discharge (Thornicroft, Gooch, & Dayson, 1992; McGrew et al., 1999; Rothbard et al., 1999).

There are many potential reasons for the lower readmission rate in the current study. Thornicroft et al. (1992) examined factors related to hospital readmission in former psychiatric inpatients discharged in London, England. They found that individuals under the age of 54 and individuals with 10 or more previous psychiatric hospital admissions were significantly more likely to be readmitted. In the current study, the median age at final discharge was 58 and only a very small percentage of the cohort (1.5%) had been admitted to BMHC more than ten times.

It is also probable that the lower readmission rate is at least, partly attributable to thorough pre-closure planning. By developing a continuum of coordinated community services and not discharging residents until appropriate alternative supports were in place, the need for inpatient services after discharge was likely reduced.

During the follow-up period, the odds of being admitted to a general hospital for a non-mental disorder reason was 1.7 times higher in the BMHC cohort than in the matched cohort and these odds did not change significantly over time. This finding is consistent with prior research. Fogarty, Sharma, Chetty, & Culpepper (2008) found that the odds of a self-reported hospitalization for a non-psychiatric reason were 2.54 times higher in individuals with a mental disorder. Martens et al. (2004) found that the hospitalization rate for a physical illness in individuals with a “cumulative mental disorder” (individuals with one or more of the following: depression, anxiety disorder, substance abuse, schizophrenia, and personality disorder) was almost double the rate of individuals without a mental disorder. The current study is the first to the author’s knowledge that looks at the differences over time in a formerly institutionalized cohort and a matched cohort.

Policy Implications/Recommendations

The findings from the mortality, physician visits, and hospitalization analyses in this study add to the literature on the physical health disparities in individuals with severe mental disorders and provide evidence that these disparities persist over time. Thornicroft (2011) attests that if these health differences were observed in a less stigmatized population, society would protest these injustices and declare them socially unacceptable. De Hert et al. (2011) advise that the first step in addressing the issue is designating individuals with severe mental disorders as a health disparity population. The authors then propose the following system level changes to target the health disparities: education and training of the health care community, access to care improvements, reduction of stigma and discrimination, and the integration of physical and mental health care in a coordinated and collaborative system. The individual level recommendations from De Hert et al. (2011) for health care providers (including psychiatrists) include: take responsibility for the health of the patient, adopt ongoing screening and surveillance practices, introduce lifestyle modifications into education and treatment programs, and create strong relationships with medical specialists and other health professionals. The adoption of these recommendations would improve the medical care of individuals with severe mental disorders and help to reduce health inequalities.

As previously recommended by Martens et al. (2004), Manitoba requires a comprehensive mental health database. The inability to describe community mental health services in the current study (aside from physician visits and hospitalizations) reaffirms this need. The mechanism is already in place (the Mental Health Management Information System) and money and resources are used to maintain and add new data to the database. The issue is that many data entry fields are optional and therefore remain blank, many community agencies do not

report into the MHMIS, and there are not standard definitions and reporting practices across Regional Health Authorities (Martens et al., 2004). These issues need to be addressed to ensure the integrity of the data and to allow future research to be conducted using the MHMIS.

Finally, this study can help guide future mental health reform in Manitoba and in other areas of the Canada. Based on the results of this study, I am proposing the following four policy recommendations regarding the closure of a long-term mental health centre:

1. **Residents should not be discharged from hospital until a continuum of appropriate services are in place in the community.** In the case of the closure of BMHC, bridge funding provided by the provincial government and by mental health reform in other areas of the province made it possible to run two parallel systems (hospital and community) for several years until complete closure of the centre.
2. **Discharge planning and service implementation should reflect both evidence-based research and individual and local needs.** Chart reviews and resident interviews were conducted by the Mental Health Division of Manitoba Health and the staff at BMHC. This information was then used to guide service development. For example, after resident interviews regarding housing preferences revealed that most individuals did not want to live in a group home after discharge, the original plan to construct several group homes was revised and instead the focus shifted to helping individuals locate independent housing.
3. **Continuity of care in the community must be maintained.** An individual's long-term service needs begin prior to discharge and may not diminish (in fact they may increase) over time. The first year after discharge has been found to be a particularly high risk period for suicide and suicide attempts. Specialized supports should be targeted at

individuals who may be at an increased risk of suicide ideation (e.g., those with a prior history of attempts).

4. **A transparent administrative structure that oversees the planning, implementation, and evaluation of the closure is crucial.** Before mental health reform in Manitoba began, it was recognized that the structure of Manitoba Health required reorganizing. To ensure accountability for mental health services in the province, the Mental Health Division was created and was responsible for the reform. Although, initially an evaluation of the reform was planned, it did not occur, therefore limiting the conclusions that can be made about its impact.

Study Limitations

There are limitations in this study related to the use of administrative data. First, only a single diagnosis is recorded for each visit in the physician claims database, regardless if an individual receives care for both a physical illness and a mental disorder in the same visit. It has been suggested that general practitioners may “down-code” (code mental disorder visits as physical illness visits) because of the stigma associated with mental disorders (Tataryn, Mustard, & Derksen, 1994; Holley, 1998). On the other hand, because the longevity and severity of the mental disorders in the BMHC cohort as a whole compared to the general population, it is possible that some of their visits were “up-coded” (physical illness visits were coded as a mental disorder visit). This potential problem would not impact total general practitioner results in this study, but it is possible that the visits attributed to a physical illness or mental disorder are underrepresented or overrepresented.

Second, not all salaried physicians in the province submit shadow billing for every visit. Visits where shadow billing is not completed are not captured in the administrative data.

Therefore, it is possible that the number of physician visits in this study is underestimated. According to Katz, De Coster, Bogdanovic, Soodeen, and Chateau (2004), in 2001, only 4% of general practitioners in Brandon (where 48% of the subjects in this study were initially located after final discharge) were salaried. The authors suggest that up to 20% of the visits from these physicians may not be captured in the physician claims database. Based on the low percentage of salaried physicians, it is unlikely that this issue would greatly impact the rates of physician visits in this study.

A third limitation of this study is that only suicide attempts where an individual is hospitalized or seen by a physician are captured in administrative data. It has been estimated that only 50-60% of individuals who attempt suicide seek/receive medical care in relation to the attempt (Kjoler & Helweg-Larsen, 2000). It is possible that the actual prevalence of suicide attempts in this study is underestimated. It is also possible that the numbers of suicides were over or underestimated. As noted by Martens et al. (2004), the proper identification of suicide using administrative data depends on the accuracy of the cause of death codings obtained from the Vital Statistics database.

Future Research

There are many directions for future research. More detailed analyses using the current results could be conducted. For example, for all outcome variables, gender, diagnosis, and age differences could be examined. Previous research has found differences between males and females in mortality rates (Harris & Barraclough, 1998) and the likelihood of psychiatric hospital readmission (Thornicroft et al., 1992). It would be interesting to determine if these findings were similar for individuals discharged from BMHC.

In Chapter 1, it was stated that this study is not an evaluation of the closure of the Brandon Mental Health Centre. If in the future, a comprehensive evaluation of the centre is planned, there are many other outcomes that need to be analyzed. There are no clear guidelines as to what constitutes “successful closure”, but commonly reported outcomes in evaluation studies include: hospital readmission rates, social and clinical functioning, mortality, use of community mental health services, cost of care, and post-discharge location (see Chapter 2 for a more detailed description of the results of outcome studies).

Due to a lack of clinical data, it is not possible to look at community adaption and social functioning in the BMHC cohort in the first few years after discharge. That being said, useful anecdotal information could still be gathered by interviewing former inpatients (methodological issues such as recall bias, notwithstanding). Because many community mental health services are not reliably captured in administrative data (Martens, et al, 2004), and therefore not analyzed in this study, many mental health services used by the BMHC cohort were not described. Community mental health services are an important component of care and the inability to describe their use limits the conclusions that can be made regarding the overall impact of closing BMHC.

In 2002, Riverview Hospital, a long-term psychiatry facility, in British Columbia began downsizing. Since then, 119 residents have been transferred into a variety of newly development community placements (Morrow, et al., 2010). The majority of these individuals were initially transferred to a psychiatric tertiary care facility before re-entering the community. To date, interviews and focus groups with stakeholders and former Riverview residents have been conducted. The number one challenge mentioned by study participants was the lack of an appropriate range of housing options (Morrow et al., 2010). Further research could compare and

contrast the experience of mental health centre reform and community resource development in two Canadian provinces.

Conclusions

In this study, a mixed methods approach was used to document the closure of Brandon Mental Health Centre and report numerous health-related outcomes in individuals discharged from the centre. First, interviews were conducted and archival documents examined to create a comprehensive case study of the process of closure. In order to fund the closure and ensure that services were put into place before individuals were discharged from the centre, bridge funding was provided by the provincial government. New services were centered on four priority areas: adult inpatient and crisis response services, adult rehabilitation and consumer support services, psychogeriatric services, and child and adolescent services. Informants identified three primary challenges/areas of opportunity related to the closure: safe and affordable housing options, long-term community support, and the lack of an evaluation.

After the key elements of the closure were described, it was possible to analyze long-term outcomes of individuals discharged from the centre and understand the context in which they occurred. The majority of the discharged cohort relocated in and around the Brandon area. A substantial proportion of the cohort was admitted into a personal care home during the follow-up period. There were seven identified suicides and 41 identified suicide attempts in the cohort during the follow-up period. Physician visits to a general practitioner for a mental disorder decreased over time while visits to a psychiatrist increased. Mortality, physician visits, and hospital admissions were higher in the BMHC cohort than in a matched cohort of the general population.

This research highlights the need to address physical health disparities in individuals with a severe mental disorder. There are many system and individual level changes that are required to address this problem. Another recommendation of this study is the overhaul of the Mental Health Management Information System. Although the MHMIS provided crucial information for this study, there are many issues that must be resolved in order to conduct future research on the use of community mental health services in the province. This study has provided preliminary findings on the closure of Brandon Mental Health Centre and will hopefully lead to future research projects.

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Appendix A

Research Participant Information and Consent Form

Title of Study: The Process and Outcome of Psychiatric
Deinstitutionalization in a Canadian City

Principal Investigator: Rachel Carr, B.A. (Hons). Department of Community Health Sciences,
University of Manitoba, (204) 771-1454

You are being asked to participate in a research study. Please take your time to review this consent form and discuss any questions you may have with the study staff. You may take your time to make your decision about participating in this study and you may discuss it with your friends and/or family before you make your decision. This consent form may contain words that you do not understand. Please ask the study staff to explain any words or information that you do not clearly understand.

Purpose of the study

This research study is being conducted to create an historical documentation of the closure of Brandon Mental Health Centre. Specifically, the following information is sought:

- a) How was the process of psychiatric deinstitutionalization carried out in Brandon?
- b) What were the key events in the closure of Brandon Mental Health Centre?
- c) What community programs were put in place?
- d) What existing programs, if any, were utilized?

A total of 10-15 individuals will be contacted to participate in this study.

Study procedures

The principal investigator, Rachel Carr, will come to a location of your choice and conduct an interview with you. The interviews will be tape-recorded and transcribed. You will be asked a series of questions about the closure of Brandon Mental Health Centre. For example, you will be asked “What were the deciding factors in the decision to close Brandon Mental Health Centre?” and “What was your role in the closure of Brandon Mental Health Centre?” Participation in the study will take 1-2 hours. If necessary, the interviewer may also need to conduct a follow-up telephone call or email with you to clarify any issues arising from transcription and analysis of your interview. Your participation in this study is completely voluntary and you can stop participating at any time.

Risks and benefits

There are no direct risks to participating in this study. You may or may not find any personal benefit from your participation in the study. Discussion with others about your experiences or perspectives may assist you in sorting through issues that are not always easily discussed elsewhere although there can be no guarantee of this. You will receive no payment or reimbursement for any expenses related to taking part in this study.

Confidentiality

All information provided by you and other study participants will be treated with the utmost respect. Specific measures will be taken to protect your privacy and ensure that identifying information is kept confidential. All tapes, transcripts and consent forms will be identified by code and kept on a password-protected computer or in a locked filing cabinet in the project offices at the Manitoba Centre for Health Policy. The Principal investigator is the only person who will have access to the data. The tapes will be destroyed after they are transcribed and the transcripts will be destroyed after one year. Information gathered in this research study may be published or presented in public forums, however your name and other identifying information will not be used or revealed. All efforts will be made to ensure that your personal comments will not be identifiable. Despite efforts to keep your personal information confidential, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law.

Please be aware that due to the small sample size and specificity of the interviews, some informants occupy very visible or unique roles, and therefore may be identifiable as a result of their distinct position and/or views despite every effort to ensure confidentiality is maintained. You will have the opportunity to read and highlight information that is particularly sensitive and/or potentially identifiable, ensuring that specific passages will not be used in publication. The final decision regarding anonymity will rest with you, the interviewee, to ensure that individual comments are not identifiable.

Your decision to take part in this study is voluntary. You may refuse to participate or you may withdraw from the study at any time. For questions about your rights as a research participant, you may contact The University of Manitoba, Bannatyne Campus Research Ethics Board Office at (204) 789-3389. Do not sign this consent form unless you have had a chance to ask questions and have received satisfactory answers to all of your questions. You are free to ask any questions that you may have about your rights as a research participant. If any questions come up during or after the study contact Rachel Carr at (204) 771-1454.

I have read this consent form. I have had the opportunity to discuss this research study with Rachel Carr. I have had my questions answered by her in language I understand. The risks and benefits have been explained to me. I believe that I have not been unduly influenced by any study team member to participate in the research study by any statements or implied statements. Any relationship (such as employer, supervisor or family member) I may have with the study team has not affected my decision to participate. I understand that I will be given a copy of this consent form after signing it. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

I understand that information regarding my personal identity will be kept confidential, but that confidentiality is not guaranteed. By signing this consent form, I have not waived any of the legal rights that I have as a participant in a research study.

Participant signature _____ Date: _____
(day/month/year)

Participant printed name: _____

Appendix B
Semi-structured Interview Questions

1. What was/were your job title(s) from 1985-2000?
2. What is your current job title?
3. What were the deciding factors in the decision to close Brandon Mental Health Centre?
4. a) What planning was done in advance of the closure?
b) What were the principles/philosophies that guided the planning?
5. What services/programs were put in place to accommodate the former patients in the community?
6. What was your role in the closure of Brandon Mental Health Centre?
7. Can you take me through the timeline of events highlighting your role in the closure process?
8. What is your current involvement (if any) in providing services to the patients who were discharged from Brandon Mental Health Centre when it closed?

Appendix C

Timeline of Important Events in the Closure of BMHC and the Development of Alternative Community Resources

- 1954 The centre reached a peak population of 1689 residents
- 1973 *Mental Health and Retardation Services in Manitoba* is released by Clarkson, Prefontaine, and Potter
- 1974 Community Mental Health Workers were relocated to rural Manitoba communities
- 1983 The Mental Health Working Group released the report “*Mental health services in Manitoba: A review and recommendations.*” (It would become commonly referred to as the *Pascoe Report*)
- Brandon Community Welcome Clubhouse was established
- 1985 The adult day treatment program at BMHC relocated to Dinsdale Personal Care Home
- 1986 McTavish Manor, a 10-bed transitional housing unit opened
- A 12-bed Psychogeriatric Assessment Unit opened at BMHC
- 1988 Manitoba Health released the document “*A New Partnership for Mental Health in Manitoba*”
- Regional Mental Health Councils were formed in all eight health regions in Manitoba
 - Manitoba Health consulted Dr. Paul Carling from the University of Vermont about the development of a vision for mental health services in Manitoba
 - Rideau Park Personal Care Home opened – 100 geriatric patients from BMHC were transferred to the new facility
 - The Psychogeriatric Assessment Unit at BMHC was relocated to the Brandon General Hospital

- 1989 The Advisory Committee on Mental Health Reform was established
- 1990 Manitoba Health released the document “*Vision for the Future: Guiding Principles and Policies for Mental Health Services*”
- 1991 A 10-bed adolescent in-patient unit opened at BMHC
- Manitoba Health conducted a survey of patient needs after discharge at BMHC
 - The Canadian Mental Health Association, Westman Region conducted a housing needs survey with BMHC residents and other individuals living with mental disorders in the community
- 1992 Manitoba Health released the document “*Building the Future of Mental Health Services in Manitoba*”
- The Mental Health Councils in the Westman, Central, and Parkland regions consulted with community members regarding local mental health service needs
- 1993 April, formal announcement that BMHC would be closing was made
- The Westman Implementation Committee was formed
 - The Coordinator, Mental Health Westman Region was hired
- 1994 Program Managers for the new community services were hired
- 1994- Staff hired for each program
1998
- 1995 The diploma-based Psychiatric Nursing program (which had been operated by the Centre for Psychiatric Nursing Education in conjunction with BMHC) was relocated and reconfigured to become the Bachelor of Psychiatric Nursing program at Brandon University
- 1996 Mobile Crisis Services in Brandon began operation
- Mental Health Promotion Clinic opened in Brandon

- Resource Developer for the Proctor Program hired
- 1997 An eight-bed crisis stabilization unit opened in Brandon
 - regionalization of health care services in Manitoba
- 1998 April, the Centre for Geriatric Psychiatry opened at a 22-bed acute and extended stay treatment unit at renovated site at the Brandon General Hospital.
 - April, the Centre for Adult Psychiatry opened a 25-bed acute care unit a newly constructed site at the Brandon General Hospital
 - November, the Child and Adolescent Treatment Centre opened. The newly constructed facility consisted of a 10-bed in-patient unit, a day treatment program, an educational program, and community-based services
- 1999 October, VENTURES program (vocational assessment and training) relocated to 700 Frederick St, Brandon
 - October, BMHC grounds vacated

Appendix D

SAS Codes Used for the Quantitative Data Analysis

Survival analysis:

```
Proc lifetest data=survival plots=survival;  
Time person_years_2 * death (0);  
Strata group / test = logrank;  
Run;
```

Difference in mortality between the BMHC cohort and matched cohort:

```
Proc genmod data = x desc;  
Class group case_phin;  
Model died = group age_at_release/link = logit d=b;  
Repeated subject = case_phin;  
run;
```

Difference over time in physician use in BMHC cohort:

```
Proc genmod data = x desc;  
Class phin;  
Model count = year age_that_year/link = logit d=b;  
Repeated subject =phin;  
run;
```

```
Proc genmod data = x;  
Class phin;  
Model number_of_visits= year age_that_year/link = log d=p offset=  
log_of_person_years (for that year);  
Repeated subject =phin;  
run;
```

Difference in physician use between the BMHC cohort and matched cohort:

```
Proc genmod data = x desc;  
Class case_phin  
Model count = group year group*year age_that_year /link = logit d=b ;  
Repeated subject = case_phin;  
run;
```

```
Proc genmod data = x;  
Class group case_phin;  
Model number_of_visits = group year year*group age/link = log d=p offset=  
log_of_person_years (for that year);
```

```
Repeated subject = case_phin;  
Run;
```

Difference over time in hospitalizations in BMHC cohort:

```
Proc genmod data = x desc;  
Class phin;  
Model count of visits = year age_that_year/link = logit d=b ;  
Repeated subject = phin;  
run;
```

Difference in hospitalizations between the BMHC cohort and matched cohort:

```
Proc genmod data = x desc;  
Class case_phin  
Model count = group year group*year age_that_year /link = logit d=b ;  
Repeated subject = case_phin;  
run;
```

Appendix E

Person-Years of Follow-up in the BMHC Cohort (n = 467) and the
Matched Cohort (n =1401) for the Physician Visit and Hospital Admission Analyses

Follow-up period	Person-years of follow-up -BMHC	N ^a	Person-years of follow-up - matched	N ^a
Year 1	298.01	327	878.74	977
Year 2	278.37	283	800.78	822
Year 3	266.55	273	750.75	776
Year 4	254.37	260	700.79	725
Year 5	242.83	248	651.74	672
Year 6	233.83	236	617.31	628
Year 7	228.15	231	589.49	606
Year 8	214.42	221	542.21	563
Year 9	207.75	210	515.69	524
Year 10	198.28	206	483.01	509
Total	2,422.56	327	6,530.51	977

^aNumber of individuals with some amount of person-time at risk in that year.