Predictors of Alternate Level of Care within Mental Health Inpatient Units across Ontario

by

Jerrica Little

A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Master of Science

in Health Studies and Gerontology

Waterloo, Ontario, Canada, 2015

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Purpose: The main purpose of this study was to identify clinical predictors of alternate level of care (ALC) status within inpatient mental health units across Ontario. In addition, the distribution of ALC days among designated patients, the proportion of patient episodes designated ALC over time, and the demographic and clinical characteristics of mental health inpatients are also described.

Methods: This project was conducted via a secondary data analysis of data obtained from the Resident Assessment Instrument – Mental Health (RAI-MH). RAI-MH data was provided by the Ontario Mental Health Reporting System (OMHRS) for the years 2005 to 2014, including information on ALC days. Furthermore, an additional ALC variable was obtained from the Wait Time Information System (WTIS) for the years 2011 to 2013. All analyses were performed using admission episodes only. For the descriptive statistics, rates of ALC designations and odds ratios (OR) were examined across several characteristics, providing a basis for variable selection in the multivariate modeling stage. To determine the clinical predictors of ALC status, a multivariate logistic regression was performed in OMHRS using a 30+ ALC day cut-point. Once the model was ascertained in OMHRS, it was tested again in WTIS and adjusted accordingly, providing a final model for 30+ ALC days.

Results: The proportion of ALC episodes designated as ALC over time was low (~3% for 1+ ALC days and ~1% for 30+ ALC days), but the distribution of ALC days across patients was comparatively large (*Median* = ~20 days). The final logistic regression model for 30+ ALC days identified several predictors of ALC status, including IADL, ADL and cognitive impairment, social isolation, aggression, older age, male sex, speaking a primary foreign language, greater lifetime admissions to a psychiatric hospital, symptoms of depression, positive psychosis and social withdrawal, disorders of childhood/adolescence, intellectual disabilities, and substance use.

Conclusions: There are a multitude of risk factors implicated in ALC designations among mental health inpatients in Ontario, indicating that their needs are varied and complex. Policy makers and mental health care practitioners may utilize early predictors of ALC status to introduce treatment interventions and policies that reduce the risk of ALC designations in mental health settings.

Acknowledgements

First of all, I would like to thank my supervisor, Dr. John P. Hirdes, who graciously took me in when I was a lost Master's student. Thank you for introducing me to the world of interRAI; I have learned more about health care service delivery and research than I thought possible. I look forward to learning more about mental health care (and data analysis in SAS) as I continue my PhD with you.

Secondly, I must express my gratitude to my committee members – Dr. Christopher Perlman and Dr. Samantha Meyer. Thank you for all of your assistance, feedback and support; it has been greatly appreciated.

There are several members of the interRAI team that deserve plenty of praise and acknowledgement. Without Julie Koreck, there surely would have been many tears throughout the past year; thank you for always making sure I got the support and time that I needed. To Jonathan Chen and Micaela Jantzi, who made analyzing data in SAS the least painful that it could have been. Special thanks must be given to Jonathan, who was incredibly patient with me as I wrestled with linking the data sets for this thesis. Finally, I would like to thank Nancy Curtin-Telegdi, who has taught me what all the books did not – I enjoyed learning from you!

I would like to acknowledge both the financial and research assistance given to me by the Ontario Hospital Association. In particular, I would like to thank Enza Ferro, Imtiaz Daniel, Lou Reidel, and Michelle Caplan. Your patience and feedback has been invaluable throughout this project.

Lastly, I would like to acknowledge my family and friends, who tolerated too many "sorry, I can't right now, I have to work on my thesis!" excuses from me. Special thanks to my partner, Larkin Sararus, who provided me with much needed love (and chocolate!) on the most stressful of nights.

I dedicate this thesis to my parents, Sheila and Terry Little. Without you, none of this would have been possible (obvious birthing conditions aside).

Table of Contents

List of Figures

List of Tables

INTRODUCTION

Alternate Level of Care

Alternate level of care (ALC) is a clinical term that is currently used in Ontario to identify patients who receive resources or services they no longer require while awaiting transfer to an alternate care setting (Canadian Institute for Health Information [CIHI], 2009). Beginning in 2009, Ontario implemented a provincial guideline for designating ALC status, which all acute and post-acute hospitals are expected to use when assessing patients' health status and treatment goals (Cancer Care Ontario [CCO], 2011). In Ontario, ALC designations occur when a physician or delegate determines that a patient's care goals have been met in their current setting, their progress cannot proceed any further, or they have been admitted because the services they require are not available in the community (CCO, 2011).

Adverse experiences are more common among those with ALC designations in hospitals, likely due to the insufficient resources of acute and post-acute hospitals for supporting rehabilitation and long-term health management (Walker, 2011). ALC status among inpatients has been linked with accelerated declines in independence, social engagement, and resilience to illness and disease (Costa, Poss, Peirce, & Hirdes, 2012), especially hospital-based infections (Walker, 2011). In addition, there is concern that ALC patients may become accustomed to the structured environment of the hospital, leading to problems with over-reliance on institutions and more difficult transitions into other settings (Glasby & Lester, 2004). Among older adults specifically, ALC status is related to declines in function and activities of daily living (ADLs), as well as increases in the risk of falls (Barnable, Welsh, Lundrigan, & Davis, 2014; Walker 2011).

Overall, a variety of detrimental consequences are associated with ALC designations among hospital inpatients.

In addition to patients, hospital systems are also negatively affected by large volumes of ALC patients. One of the primary consequences for hospitals may be the restriction of available inpatient beds for other patients awaiting acute or post-acute care. This may translate to access-to-care issues within emergency departments and acute care units (Costa et al., 2012). Other notable effects of ALC designations on hospital systems include avoidable monetary costs associated with ongoing treatment, congested patient flow through the hospital facility, and cancellation or prolongment of services and available treatments (Barnable et al., 2014). At high rates, ALC designations may reduce the efficiency of care and increase the cost of operations among hospital systems.

Altogether, there are several negative outcomes that may occur following ALC designations for both patients and hospital systems. As a result, prevention and treatment strategies that reduce the duration and incidence of ALC should be implemented. However, before interventions can begin development, several factors need to be taken into account, such as the prevalence and distribution of ALC days across health care settings, as well as the clinical characteristics and other risk factors that lead to ALC status. Additionally, it might be expected that the attributes and needs of an ALC population will vary based on the care setting they are in, meaning that multifaceted intervention strategies will need to be devised for different care settings. Within Ontario, mental health units have the third largest proportion of ALC patients, following acute care and complex continuing care (CCC), respectively (Access to Care, 2014). As part of an initiative by the Ontario Hospital Association (OHA) to reduce ALC designations

within CCC and mental health settings across the province, this project focused on ALC in mental health, with ongoing input from members of the OHA and other health care professionals.

Mental Health Inpatient Units

Mental health units provide supervision, care, and treatment of persons with mental illness in hospital settings (Mental Health Act [MHA], 1990). Inpatient programs are intended for patients who require high intensity observation and treatment, usually for acute psychiatric symptoms, or in cases where outpatient treatment has been ineffective (eMentalHealth, 2015). Typically, patients will remain in the unit until their symptoms improve enough for discharge back to the home or to an outpatient or community setting (eMentalHealth, 2015), although some patients may be designated ALC instead. To understand how ALC designations occur, it is useful to consider the admission process to an inpatient mental health setting, as well as how and when discharge planning is initiated.

The most common form of admission to a mental health unit is voluntary admission (Centre for Addiction and Mental Health [CAMH], 2012), wherein the patient has agreed of their own volition to be admitted into the unit (Ontario Hospital Association [OHA], 2012). Patients may be voluntarily admitted through the emergency department of a hospital, a local distress centre or through a doctor's recommendation (CAMH, 2012). Another type of admission is informal admission, in which a substitute decision maker has consented to admission on the patient's behalf, following the principles set out by the Health Care Consent Act (HCCA) (OHA, 2012). Patients who do not consent to admission, but who have been assessed by a psychiatrist and have been found to fulfill specific criteria contained in the MHA, may be involuntarily admitted to the unit (OHA, 2012). Lastly, a patient may be admitted to a mental health unit

through a court order, in compliance with the guidelines contained in the MHA (OHA, 2012). A patient may transition from being a voluntary to an involuntary patient, and vice versa, at any point during their stay (OHA, 2012).

Once the patient is admitted to a mental health unit in Ontario, they are assessed within three days for their presenting symptoms, challenges and needs (Gibbons et al., 2008). Since a patient is admitted because of the need for treatment, ALC is not diagnosed at this time (although risk of future ALC status may be evident at this time). After the initial assessment, a patient will begin treatment that may involve the services of various health professionals, such as psychiatrists, psychologists and social workers (eMentalHealth, 2015). During the patient's stay, those overseeing their care will begin to form a discharge plan, which is designed to help determine the optimal discharge location for the patient and assist in preparing the patient for their transition out of the unit (Alghzawi, 2012). Once the condition stabilizes and the patient is well enough to return to the community, a final discharge assessment is completed prior to release from the unit. However, some patients will remain in the unit rather than being discharged, prompting an ALC designation. While there is limited research on how and when ALC designations are made, there is some evidence that discussions about ALC should be incorporated into discharge planning, preferably before the designation is made.

According to a review on discharge planning in psychiatric settings, discharge plans are most effective when initiated at the time of admission, and ideally include input from the patient, the patient's family, hospital staff, and representatives from aftercare providers (Alghzawi, 2012). A report from CAMH corroborated this finding, adding that conversations about health and social support needs should also be included in early discharge planning, as well as any anticipated delays (Butterill et al., 2009). For patients with ALC designations, early discharge

planning may be essential, as failure to communicate with outside mental health agencies is considered a potential reason for delays in discharge (Alghzawi, 2012; Butterill et al., 2009). In order to support effective discharge planning, the possibility of ALC should be examined at the time of admission to afford mental health professionals the time to manage the risk factors and initiate an early discharge plan.

LITERATURE REVIEW

Search Strategy

The literature search on ALC in mental health settings was conducted using the PubMed PsycINFO, and Google Scholar research databases, in consultation with a librarian liaison from the University of Waterloo, who assisted in selecting the databases and search terms used. Since the research question contains two core concepts – ALC and mental health inpatient units – two separate search lines were constructed for each. Search terms were discovered by entering 'patient discharge' and 'mental health' into the MeSH and Term Finder applications of Pubmed and PsycINFO, respectively, as well as searching relevant articles for authors' keywords. Appendix A displays a table of all the search terms that were used, as well as the final search lines that were constructed for each database.

Only a few inclusion criteria were placed on the literature search, where available. Inclusion criteria included the following: articles published in English (all), journal publications (PsycINFO), and articles published in 1995 onwards (Google Scholar), due to the lack of other inclusion options available in that particular database. With these search restrictions in place, PubMed retrieved 1158 articles, while PsycINFO retrieved 345. Google Scholar retrieved 17,200

articles – too many to look through individually. Instead, publications were sorted by relevance, and the first 100 articles of Google Scholar were examined. Additionally, among the articles that were selected for the final review, an additional search was performed via the citation function, which retrieves a list of articles that have cited the one selected. By using the citation function, additional relevant articles were discovered.

After reviewing the titles and abstracts of all potential articles, 14 were selected from PubMed, 4 from PsycINFO, and 12 from Google Scholar. After removing duplicates from the list, 17 original research articles were chosen for review, plus three extra articles that mentioned delays only in passing: one article focused on aggression (Barlow, Grenyer, & Ilkiw-Lavalle, 2000), another on hearing impairments (Baines, Patterson, & Austen, 2010), and one specific to individuals with alcohol-related dementia (MacPhail, McDonough, & Ibrahim, 2013).

Distinguishing between Alternate Level of Care, Delayed Discharges and Long-stays

As noted in the introduction, Ontario has adopted an official definition for ALC, which was used in the current study as the dependent variable. To reiterate, a physician or delegate designates ALC status for patients who have fulfilled all of their treatment goals, cannot progress any further, and/or have been admitted because supportive services are not available in the community (CCO, 2011). Ontario's definition of ALC is designed to be flexible, allowing for differences in patient progress, treatment program and physician assessment to be taken into account, while also avoiding too much ambiguity, so that physicians are able to gain as much utility from the term as possible. Research on the validity and reliability of Ontario's ALC definition in mental health settings could not be found.

The term 'ALC' is not well established in the literature, as it is mostly used within the province of Ontario. The closest alternative to ALC is the term 'delayed discharge,' which also describes patients who no longer require the services of their current care setting but are unable to be discharged. The difference between ALC and delayed discharge is that ALC specifically cites a need for a more appropriate care setting, while delayed discharge generally refers to a state of discharge readiness. In some cases, long-stay patients are used as a proxy for ALC or delayed discharges (Lorenzo, Formicola, Carra, Piemonte, & Ferri, 2013), although the majority of studies included in this review define long-stay patients by their length of stay, rather than appropriateness of care.

Due to the small number of articles that dealt directly with delayed discharges in mental health settings, and because long-stays have been correlated with delayed discharges in the past (Koffman et al., 1996; Tanioka et al., 2013), this review included research on long-stay patients in an attempt to identify potential risk factors for ALC. In light of this decision, it is important to note that while delayed discharges are similar to ALC, long-stay patients can differ in important ways, making a generalization from this literature a challenge. The most crucial difference to note is that while both ALC and delayed discharges require that a patient be ready for discharge, a long-stay patient may not be ready for discharge because intense services are still needed. Thus, while long-stay patients may also be ALC patients, they are not always equivalent, so some caution is needed when interpreting long-stay data within an ALC context.

Even in cases where the definition of delayed discharge or long-stay is similar to ALC, there may be substantial differences in operationalization for delayed discharge or long-stay across studies. For instance, the conditions or cut-offs that constitute long-stay or delayed discharge may differ between researchers, leading to variations in the populations examined. In a

review of delayed discharges in mental health settings, Glasby and Lester (2004) noted that one of the limitations in compiling their research was the lack of a consistent measurement for delayed discharge, with many studies relying on physician or nurse opinions about discharge readiness. Without a specific operational definition for delayed discharge or long-stay, it is difficult to draw consistent conclusions across the literature. Only three studies were identified that made attempts to formally measure delayed discharge, each of which relied on different tools to do so.

The first study to standardize measurement of delayed discharges accomplished this by using the Discharge Readiness Inventory (DRI), which was initially created for use with long-stay psychiatric patients (Kelly, Watson, Raboud, & Bilsker, 1998). The DRI assesses two major aspects of discharge readiness –psychopathology and community adjustment – by incorporating the Manifest Psychopathology and Belligerence scales and the Community Adjustment Potential instrument. Patients who scored as 'discharge ready' on the DRI but continued to remain in the facility were labeled as 'delayed discharges'. A problem with the DRI is that it inherently assumes that psychopathology and community adjustment are the measures that should be used to determine discharge readiness, but these variables might be best considered as independent predictors of ALC status rather than dependent variables in their own right.

A second study used the Time-Sample Behavioural Checklist (TSBC) to assess discharge readiness in mental health units, which relies on trained observers to code inpatient behaviour across all waking hours, for a period of seven days per week (Springer & Paul, 2008). By examining patterns of adaptive and maladaptive behaviour over time, measured using various scales, the TSBC is reported to successfully predict discharge outcomes within two weeks of assessment. Although the TSBC has good psychometric properties, it requires extensive

observation and resources to conduct, making it infeasible for use on an ongoing basis within hospitals. Further, many of the scales reference specific behaviours, such as bizarre behaviour, which may lead to problems with measurement sensitivity if several of the predictors for ALC are not detected by such scales. Thus, the TSBC would be ill-suited to the purposes of the present study, which sought to identify the characteristics leading to ALC status in a cost effective and efficient manner.

The last study obtained information on ALC from the Resident Assessment Instrument – Mental Health (RAI-MH) (Butterill et al., 2009), which is the same tool that the present study utilized. The RAI-MH contains an item that asks the assessor to fill out the number of days that a patient has been designated ALC, in accordance with the provincial guidelines described earlier in the introduction. As previously mentioned, no research was discovered that tested Ontario's ALC definition in mental health settings. Validity and reliability of the RAI-MH as a whole will be further discussed in the methods section.

Prevalence and Distribution of ALC Days

As of August 2015, Access to Care of CCO (2015) found that 13.8% of all inpatient hospital beds in Ontario were occupied by ALC patients. Among the ALC population, 11.0% were mental health inpatients, and together, they occupied 10.0% of all mental health beds available. Additionally, Access to Care (2015) reported that in September 2015, there were 15.0% more ALC patients waiting in mental health beds than there were in September 2014. While it is beneficial to contrast the ALC prevalence estimates over one year, it would be equally useful to track these differences over several years. As such, this would allow for a more complete understanding of trends in ALC rates within mental health units across Ontario.

Estimates of the distribution of ALC days in mental health units specifically have not yet been reported. However, among all ALC patients between 2011 and 2013, the majority were considered "short-stay" patients, with an average of eight ALC days (Health Analytics Branch [HAB], 2014). Conversely, "long-stay" patients had an average of 74 ALC days. Although long-stay patients only represented 13.9% of ALC stays, they were responsible for 60.1% of all ALC days.

Individual Characteristics Potentially Related to ALC

Psychiatric Disorders

One of the most prominent psychiatric disorders to be linked to ALC is schizophrenia – a psychotic disorder characterized by positive symptoms (i.e. hallucinations and delusions), negative symptoms (i.e. flat affect and avolition), and/or disorganized speech and behaviour (APA, 2014). For example, in a recent UK study, mental health inpatients experiencing delayed discharges were examined, along with long-stay patients, on key variables such as demographic attributes, diagnosis, and history of psychiatric service use (Poole, Pearsall, & Ryan, 2014). Psychotic disorders were found to contribute significantly to both delayed discharges and long-stay visits, especially among younger adult in-patients.

In Canada, a cross-sectional survey of 12 adult psychiatry units in the Greater Vancouver Regional Hospital District (GVRD) used the Brief Psychiatric Rating Scale (BPRS) and the DRI to investigate variables associated with delayed discharge among long-stay mental health patients (Kelly et al., 1998). Patients with a delayed discharge were more likely to have a diagnosis of schizophrenia and to experience more severe symptoms of mental illness. However, because the DRI includes items on psychopathology, the study examined symptoms of psychosis

in both the independent and dependent variables. A second Canadian study, which utilized a less biased set of measures, also found that patients with ALC designations were more likely to have a diagnosis of schizophrenia (Butterill et al, 2009). In contrast, a study based in Montreal found that positive symptoms of psychosis did not differentiate between ALC patients and non-ALC patients; rather, hallucinations and delusions were positively predictive of lengths of stay lasting 30 days or more (Afilalo et al., 2015). A potential explanation for the differences in the results is that one study examined acute psychiatry units within tertiary hospitals (Afilalo et al., 2015), while the other obtained data on all mental health units across the province (Butterill et al., 2009).

While research on delayed discharges in mental health settings is relatively limited, there is ample evidence demonstrating the link between schizophrenia and long hospital stays. For instance, schizophrenia was shown to lead to greater lengths of stay in mental health units across Germany (Stevens, Hammer, & Buchkremer, 2001), Brazil (Hallak, Crippa, Vansan, & Zuardi, 2003), Canada (Kelly et al., 1998), and England (Commander & Rooprai, 2008; Lelliot et al., 1992; Poole et al., 2014; Tulloch, Khondoker, Fearon, & David, 2012). Further, schizophrenia been shown to predict long stays in both inpatient mental health units and psychiatric emergency settings (PES) (Park et al., 2008). For instance, one PES located in the US contrasted the characteristics of patients with a stay of >24 hours against a group of patients with a stay of <24 hours, in an effort to understand the predictors of long lengths of stay. Among those with a stay of >24 hours, psychotic disorders were considered a significant, independent risk factor. Overall, the evidence that schizophrenia is associated with longer lengths of stay is consistent across continents and psychiatric settings. Combined with the previous studies on delayed discharges,

there is sufficient reason to believe that schizophrenia may predict ALC designations in inpatient mental health units across Ontario.

Although schizophrenia appears to be associated with both long stays and delayed discharges, there is some evidence to suggest that the symptoms of schizophrenia are not the reason for this relationship. For example, a Japanese study of discharges among long-stay psychiatric patients with schizophrenia compared patients who had been discharged between 2004 and 2007 with those who were still in hospital (Tanioka et al., 2013). Contrary to what might be expected, the severity of psychiatric symptoms were not found to differ significantly between the discharged group and the hospitalized group. Instead, family agreement over discharge, disability, and age predicted discharge status.

Further research into the discharge outcomes of long-stay psychiatric patients supports the notion that symptoms of schizophrenia itself are not necessarily a barrier to being placed in the community. For example, the Team for the Assessment of Psychiatric Services (TAPS) investigated the long-term outcomes and discharge status of long-stay psychiatric patients affected by hospital closures. They reported that schizophrenia was not a barrier to being discharged into the community, even though the symptoms either remained stable or worsened over time (Leff & Trieman, 2000; Trieman & Leff, 2002). Similarly, the Sasagawa Project followed a group of long-stay hospital patients with schizophrenia over 24 months after they were transferred to a community facility following a hospital closure. After two years, only 5% of patients were re-admitted to the hospital due to mental health concerns (Ryu et al., 2006). However, the symptoms of schizophrenia did significantly improve among relocated patients, unlike the patients in the TAPs study. At this point, it appears that symptoms of psychosis may

not be predictors of ALC status in and of themselves, but perhaps are correlated with other factors involved in schizophrenia that are related to ALC, such as disability and social relations.

Another psychiatric disorder that has commonly been associated with ALC designations is dementia – a clinical diagnosis encompassing several neuropathological conditions that often lead to progressive cognitive deterioration (APA, 2014). Since the risk for developing dementia increases with age (APA, 2014), it is not surprising that it is often implicated in ALC designations amongst older adults. For example, Poole et al. (2014) investigated patients located in urban mental health trusts who either had long lengths of stay or delayed discharges. Compared to older adult long-stay patients and younger adult delayed patients, older adults experiencing delayed discharges had significantly higher rates of dementia. Two other studies that examined delayed discharges in geriatric mental health inpatient settings also found that dementia was the most common psychiatric diagnosis leading to delays (Hanif & Rathod, 2008; Paton, Fahy, & Livingston, 2004). The results of these studies are meaningful, because they suggest that there are not enough community resources in place to accommodate older persons with dementia.

While most studies focused on general diagnoses of dementia among older adults, one research group reviewed the literature on delayed discharges among persons with alcohol-related dementia specifically (MacPhail, 2013). Among these patients, complex needs were reported as a predominant reason for delayed discharges, including cognitive impairment, aggression, low familial support, substance abuse, homelessness, and poor physical and mental health. Further, MacPhail et al. (2013) noted that there is little access to services for young and middle-aged adults with dementia, who are often inappropriately referred to aged-care facilities by default.

Thus, it is not only essential to provide adequate resources for older adults living with dementia, but also for younger and middle-aged adults, especially those with alcohol-related dementia.

In summary, among all the psychiatric disorders present in the mental health population, schizophrenia and dementia are the two that have most commonly been associated with delayed discharges and long-stays. Given these findings, it was hypothesized that schizophrenia and dementia would be risk factors for ALC status among mental health inpatients across Ontario. However, even though schizophrenia and dementia are the most frequently cited psychiatric disorders implicated in ALC, it is still necessary to consider the possible contributions of other mental health diagnoses. Moreover, psychiatric diagnoses that lead to a lower risk of ALC status are also important to identify, because they may provide clues about the factors that lead to efficient discharges among that population specifically (e.g. level of community resources needed to maintain timely discharges).

Age

Age has frequently been investigated as a factor in delayed discharges and long lengths of stay among mental health patients. A 1992 UK national audit of long-stay psychiatric patients (defined as 6 months to 3 years) had the objective of identifying variables that led to long lengths of stay (Lelliot, Wing, & Clifford, 1994). The authors found that age was important for two distinct sub-groups of patients: a) younger long-stay patients (18-34), who were more likely to be single men, have a diagnosis of schizophrenia, and to have a history of violence or dangerous behaviour, and b) older long-stay patients (55-67), who were more likely to be married or previously married women, have a diagnosis of dementia or a mood disorder, exhibit poor personal and social functioning, and display increased risk of non-deliberate self-harm. In this

context, age itself was not a predictor of long lengths of stay in mental health units, but served to distinguish between two kinds of long-stay patients.

Another UK study compared the clinical characteristics and outcomes of younger and older adult mental health inpatients with delayed discharges (Poole et al., 2014). Older adults facing delayed discharges were found to have shorter hospital stays, less prior contact with the mental health system, and lesser need of psychiatric rehabilitation than younger patients. In contrast, a study based in South London reported that older age was associated with incremental increases in length of stay among patients admitted to acute psychiatric units (Tulloch et al., 2012). It is possible that the reason for the difference in findings between the two studies is that Poole and colleagues (2014) compared length of stay among older and younger patients facing delayed discharges, while Tulloch and colleagues (2012) examined all patients admitted to acute psychiatry units.

Although the evidence is mixed regarding the effects of age on length of stay among mental health patients, there is more decisive evidence that older age is associated with greater odds of a delayed discharge. For example, both Kelly et al. (1998) and CAMH (Butterill et al., 2009) found that older age was associated with higher odds of being designated ALC among mental health inpatients in Canada, while Tanioka et al. (2013) reported that older age led to lower odds of timely discharge among long-stay mental health inpatients with schizophrenia in Japan.

Three UK studies explored delayed discharges within geriatric mental health units, disclosing a common set of risk factors for ALC. Koffman et al. (1996) drew their sample from older adults located in acute geriatric psychiatry beds, as did Paton et al. (2004), who noted that

46% of patients experienced a delayed discharge during the course of the study. Hanif & Rathod (2008) focused specifically on delayed discharges in an older adult psychiatry unit containing two wards: one for "functional" patients, and one for patients with dementia. Among all three studies, the main reasons for delay were typically that a destination placement catering to older adults was not available, or there was a delay in the caregiver being able to accommodate the patient. Lack of funding, lack of specialized services, delays in transition between settings, and access to adequate homecare were other reasons for delayed discharges. In summary, the lack of personal and community resources available to accommodate older adults are probable risk factors for being designated ALC in geriatric mental health units.

Age has also been investigated as a risk factor in clinical outcomes among delayed discharge patients who have been discharged into community homes. For instance, Leff and Trieman (2000) indicated that older long-stay patients showed greater improvements relative to younger patients in terms of delusions, hallucinations, negative symptoms and behaviours, as well as affect and speech; however, younger patients displayed greater gains in social relationships, activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Further, older patients were more often placed into larger homes with greater restrictions due to disabilities, but were just as likely to rate their current living situation as positive. Thus, not only does age predict delayed discharges, but also the outcomes of being discharged into the community following an ALC designation.

Disability/Functional Impairment

Whether disability is measured directly, or simply alluded to as a barrier preventing discharge, it is widely discussed in the literature on delayed discharges and long-stays in mental

health settings. For example, several studies have noted that a need for specialized services is one of the main reasons for delayed discharges among mental health inpatients (Kelly et al., 1998; Koffman et al., 1996; Paton et al., 2004; Lewis & Glasby, 2006), indicating that the presence of a disability requiring supervision is a risk factor for ALC. However, the term 'specialized services' is vague; it does not indicate the types of disabilities that lead to delays or which services are needed. Depending on whether the disabilities that lead to delays are behavioural, cognitive, and/or functional, the resulting services and policies that should be implemented will vary considerably.

Most research on the impact of disabilities in relation to delayed discharges in mental health settings referred to functional impairments, with the exception of one study that did not specify its measure of disability (Poole et al., 2014). For instance, Tanioka et al. (2013) showed that disability was one of the main predictors of discharge among long-stay patients with schizophrenia. In this case, disability was measured using the Psychiatric Symptoms and Disability Biaxial Evaluation Score, a 5-item Likert scale in which higher scores indicate greater functional and social disability. The mean level of disability was higher in the hospitalized group than the discharged group and, with each increasing level of disability, the number of hospitalized patients increased while the number of discharged patients decreased. However, the time point(s) of measurement in Tanioka and colleagues' study was unclear. Given that disability can change from one point of time to another, and that the rate of decline and/or improvement can vary by patient, it is important to know exactly when disability is being recorded, and that any progression is taken into account (unless a specific time period is of interest, such as admission).

Paton et al. (2004) measured disability with the Abbreviated Bristol ADL scale, which reflects various degrees of capacity for everyday living, including the ability to dress and bathe oneself, as well as instrumental activities like food preparation and house chores. In this study, information on ADLs were gathered at one point in time for both regular patients and patients experiencing delayed discharges. Compared to the regular group, the patients with delays in discharge experienced greater levels of ADL impairment. Masters et al. (2014) measured in mental health settings using the Global Assessment of Functioning (GAF) scale. The GAF is used to rate an individual's social, occupational, and psychological ability on a scale of 1-100, with higher scores indicating greater functional capacity. GAF scores were measured at admission and discharge, with the means from both time periods used to predict length of stay in a multivariate analysis. The results demonstrated that lower GAF scores led to longer lengths of stay, corroborating the theory that disability and functional impairment negatively affect discharge outcomes in mental health units.

The CAMH report assessed disability using items in the RAI-MH related to ADL and IADL impairment - as well as cognitive and social functioning - which were all more frequent among the ALC group compared to the non-ALC group (Butterill et al., 2009). Finally, the last study investigated the relationship between length of stay and disability by utilizing the cognitive impairment, ADL impairment, and physical illness and disability items in the Health of the Nation Outcome Scales (HoNOS) tool (Tulloch et al., 2012). All three measures of disability were independently related to longer lengths of stay among mental health patients, indicating that multiple different types of disability are implicated in long stays.

Overall, disability appears to play an important role in delayed discharges and long lengths of stay within mental health units, although the exact nature of the disability (i.e.

cognitive, functional, and behavioural), as well as the types of services that are necessary to support such disabilities, has not always been clearly delineated. In general, it seems that functional and social impairments are the most common disabilities to be measured, particularly ADLs.

Aggression

Aggression has often been associated with long-stays and delayed discharges amongst mental health patients. For instance, a cross-sectional study in Australia (Barlow et al., 2000), a retrospective study in Italy (Lorenzo et al., 2013), and three longitudinal studies across England (Commander & Rooprai, 2008) and Canada (Afilalo et al., 2015; Butterill et al., 2009) all found that violence and threatening behaviour were significantly related to long lengths of stay in mental health units. Lorenzo et al. (2013) reported that aggression was the strongest predictor of delayed discharge among long-stay mental health inpatients, while Commander and Rooprai (2008) reported that 30% of patients with a moderate to high risk of violence were considered ready for discharge, corresponding with the UK national audit completed 15 years earlier (Lelliot et al., 1994). Thus, while many long-stay patients with verbal and/or physical aggression may still require inpatient services, a considerable proportion of them do experience delays in discharge, suggesting that aggression may play a role in the incidence of ALC cases.

In addition to general mental health units, aggression was also examined as a risk factor among patients presenting to a PES (Park et al., 2008). Homicidal ideation was one of the variables found to have strong, independent associations with extended stays in the PES. While homicidal ideation is more extreme than aggression in general, it still serves as an indicator for the role of violence and aggression in predicting long stays.

While research suggests that aggression contributes to long lengths of stay and delayed discharges, its effects may possibly be moderated by other variables. For instance, a prospective study in Illinois examined the impact of aggression, measured by the Hostile-Belligerence Index (HBI) and a supplementary "Dangerousness Index", on time-to-independent-release in mental health units across the state (Springer & Paul, 2008). Among inpatients who were considered dangerous, those who were responsive to psychotropic drugs showed relatively quick rates of discharge following assessment, whereas those who were not responsive to medication had significantly longer lengths of stay. In summary, aggression likely has some independent effects on length of stay and delayed discharges; however, it also appears to be moderated by other variables such as drug therapy, which should be taken into account in order to provide a better understanding of the whole relationship.

One study was unable to replicate the finding that aggression is related to delayed discharges. Kelly et al. (1998) surveyed mental health hospitals located in Vancouver, and found that risk of violence was not a significant factor in delayed discharges. One possible explanation for the difference in study findings is that Kelly and colleagues used the DRI as their primary measure of discharge readiness, whereas other studies used physician assessment. Since the DRI focuses mainly on community adjustment and psychopathology, it is possible that aggression would not have a strong association with this measure. Moreover, Kelly and colleagues looked at risk of violence, whereas other studies have looked at aggregated instances of verbal or physical violence, which may predict discharge outcomes differently.

Facilities that have targeted aggressive behaviour for treatment have shown some initial signs of reducing length of stay and delays within this population. For example, the TAPS project monitored the outcomes of long-stay psychiatric patients who were considered too

volatile to be placed into the community, but who required transfers to other facilities after the widespread closure of psychiatric institutions throughout London (Trieman & Leff, 2002). The study found that while there were no differences in aggressive behaviour after one year, there were significant declines in aggression after five years. Further, successful discharges at five years were significantly associated with reductions in aggression (as well as improvements in ADLs), reinforcing the relationship between aggression and delays in discharge.

In conclusion, the majority of studies that have studied aggression in relation to long stays and delayed discharges have found a positive association between the two (Barlow et al., 2000; Butterill et al., 2009; Commander & Rooprai, 2008; Lorenzo et al., 2013), though one study pointed to the interaction effects of drug therapy on the likelihood of an aggressive patient becoming long-stay (Springer & Paul, 2008). Additionally, treatment interventions that help to reduce aggressive behaviour also have the potential to reduce delayed discharges among long-stay mental health patients, further suggesting the influence of aggression on delays in discharge (Trieman & leff, 2002).

Other characteristics

Several other variables have been linked to ALC status within inpatient mental health units, though they are not as well studied as diagnosis, age, disability, and aggression. Among such variables, interpersonal dysfunction, social isolation and family conflict have been associated with delays in discharge and longer hospital stays (Afilalo et al., 2015; Butterill et al., 2009; Lelliot et al., 1994; Paton et al., 2004; Poole et al., 2014; Springer & Paul, 2008; Tanioka et al., 2013), suggesting the importance of social factors in determining discharge outcomes. In particular, Tanioka et al. (2013) noted that older adults were especially socially isolated, with

few surviving relatives who were willing or able to accommodate them. The presence of supportive family members or friends is likely to have an impact on timely discharges, especially when alternative community resources are scarce or unaffordable. Improving family relations through group therapy, or encouraging isolated individuals to establish new friendships, may be a strategy for reducing future instances of ALC.

Another variable that is thought to contribute to delayed discharges and long-stays is lack of income and unemployment (Butterill et al., 2009; Commander & Rooprai, 2008; Masters et al., 2014; Park et al., 2008; Stevens et al., 2001), as well as homelessness and residential mobility (Tulloch et al., 2012). This can be difficult to address clinically, as income is not a treatable property of an individual. The closest treatment targeted at improving SES is vocational rehabilitation, which was used in the Sasagawa project (Ryu et al., 2006). Through job coaching and interpersonal skill training, some patients were able to obtain sheltered jobs as janitors or cooking assistants. Investigating SES as a risk factor for ALC status would assist in predicting the likelihood of it occurring for a patient, as well as encourage the implementation of vocational rehabilitation and income support as a means of reducing that likelihood.

A UK study examined the difference in length of stay among patients in an acute general psychiatric ward with patients admitted to a mental health hospital for deaf individuals (Baines et al., 2010). The deaf inpatients had an average length of stay that was twice as long as the hearing inpatients, with a greater percentage of deaf inpatients experiencing a length of stay over 12 months. The primary reason cited for long lengths of stay among the deaf inpatients was a lack of services in the community that were accessible to them.

Finally, mental health history is another factor that has been investigated as a precursor to ALC status, consisting of mental illness duration, prior contact with mental health services, and number of mental health inpatient admissions. In terms of mental illness duration and prior contact with mental health services, Masters et al. (2014) found that longer periods of mental illness were positively associated with longer hospital stays, while prior contact with mental health services were shown to act as risk factors for delayed discharges (Commander & Rooprai, 2008; Poole et al., 2014). Taken together, these results would suggest that a history of mental health issues is predictive of ALC in inpatient mental health settings; however, research on the effects of number of previous psychiatric admissions is in conflict with this theory. For example, studies that focused on delayed discharges found that a greater number of previous hospitalizations were inversely related to delays (Kelly et al., 1998; Tanioka et al., 2013). While it appears that more extensive mental health histories increase the odds of being designated ALC, this may not apply to lifetime psychiatric admissions specifically.

Summary of Study Findings

There are several potential risk factors for ALC status. In terms of psychiatric diagnoses, schizophrenia and dementia have been frequently associated with long-stays (Afilalo et al., 2015; Commander & Rooprai, 2008; Hallak et al., 2003; Lelliot et al., 1992; Masters et al., 2014; Park et al., 2008; Stevens et al., 2001; Tulloch et al., 2012) and delayed discharges (Butterill et al., 2009; Kelly et al., 1998; Koffman et al., 1996; MacPhail et al., 2013; Paton et al., 2004; Poole et al., 2014). Older age has also been cited as a positive risk factor for long-stays and delayed discharges (Butterill et al., 2009; Kelly et al., 1998; Koffman et al., 1996; Tanioka et al., 2013; Tulloch et al., 2012), although one study found that older age was negatively related to such outcomes (Poole et al., 2014). Among the studies that have concentrated on delayed discharges

within geriatric mental health settings, it was reported that a lack of personal and community resources that are able to accommodate older adults' needs were the most common reasons for delays in this population (Hanif & Rathod, 2008; Koffman et al., 1996; Paton et al., 2004).

In addition to psychiatric diagnoses and age, disabilities, or functional impairments, have also been significantly associated with long-stays (Masters et al., 2014; Tulloch et al., 2012) and delayed discharges (Butterill et al., 2009; Kelly et al., 1998; Koffman et al., 1996; Lewis & Glasby, 2006; Paton et al., 2004; Poole et al., 2014; Tanioka et al., 2014). While the definition for disability was not often provided, the studies that did provide an operationalization for disability referred largely to impairments in ADLs and social functioning, suggesting a range of impairments that may be implicated in ALC. Another variable that may act as a precipitant of ALC status is aggression, although the evidence behind this relationship is somewhat mixed, with some researchers reporting a positive effect of aggression on delayed discharges or long-stays (Barlow et al., 2000; Butterill et al., 2009; Commander & Rooprai, 2008; Lorenzo et al., 2013; Park et al., 2008), while another group reported no effect at all (Kelly et al., 1998). In one study, it was found that only treatment-resistant aggression leads to long-stays (Springer & Paul, 2008), pointing to a possible interaction between the efficacy of drug treatments and aggression.

Lastly, various other characteristics were identified that showed an association with ALC in a small number of studies, such as social relationships and interpersonal dysfunction (Butterill et al., 2009; Lelliot et al., 1994; Paton et al., 2004; Poole et al., 2014; Springer & Paul, 2008; Tanioka et al., 2013), SES (Butterill et al., 2009; Commander & Rooprai, 2008; Masters et al., 2014; Park et al., 2008; Stevens et al., 2001), hearing impairments (Baines et al., 2010), and mental health history (Commander & Rooprai, 2008; Masters et al., 2010; Poole et al., 2014), with the exception of lifetime psychiatric admissions (Kelly et al., 1998; Tanioka et al., 2013).

Taken altogether, the literature on delayed discharges and long-stays in mental health settings suggests that: a) delayed discharges in inpatient mental health settings are a problem that affects patients and hospitals alike, yet little research has been conducted that examines this issue in-depth, b) several risk factors have been identified that may be involved in long-stays and delayed discharges, although replication of these risk factors in different regions is required, and c) statistical models that predict ALC designations specifically, rather than long-stays or delayed discharges, have yet to be investigated for mental health settings within Canada.

Strengths and Limitations of Current Research

Among the 16 studies that were identified, only one investigated ALC, while five others examined delayed discharges; the remaining articles focused solely on length of stay. As mentioned previously, long-stays have been associated with delayed discharges in the past (Koffman et al., 1996; Tanioka et al., 2013), and so it is reasonable to suspect that they may share a common set of risk factors. However, it is possible that a risk factor may predict long-stays but not delays, meaning that articles focusing on length of stay are not ideal. Thus, one of the first limitations of the research is the lack of studies that focus on ALC in mental health.

As a supplement to this part of the review, Appendix A provides a list of all the studies that were included, with details on the methodological considerations discussed below.

Study sample

Several studies contained sample sizes within the range of dozens to hundreds of participants, with some studies recruiting around a thousand or more (Butterill et al., 2009; Koffman et al., 1996; Lorenzo et al., 2013; Park et al., 2008; Stevens et al., 2001). The only

study with a sample size of less than 60 participants was a prospective longitudinal study of long-stay acute psychiatric patients in one facility (Commander & Rooprai, 2008). Overall, the sample sizes for many of the studies reviewed were relatively small, especially compared to the present study, which represents participants from an entire province over several years.

The majority of study participants were long-stay mental health patients, rather than patients with delayed discharges, which would have been more ideal for studying the history of ALC. Regardless of whether a patient was long-stay or delayed, study participants were all identified by contacting inpatient mental health settings, which is an appropriate method of selecting participants because they comprise the population that is of interest (mental health inpatients). Further, many studies had access to more than one inpatient mental health setting, improving both the sample size and the external validity of the study sample.

The range of geographical representation across studies is fairly wide, including countries such as England, Japan, Brazil, Italy, Germany, Canada, and the United States. However, the country that has produced the most research on delayed discharges and long-stays in mental health units is the UK. Three Canadian studies were discovered in the course of this review; one was conducted two decades ago in Vancouver (Kelly et al., 1998), another six years ago in Ontario (Butterill et al., 2009), and the last one was published within the past year in Montreal (Afilalo et al., 2015). Only one study performed a national audit of mental health inpatients (Lelliot et al., 1994), whereas the majority of studies relied on information from as many mental health units as they could gather within a given region.

Study design

One of the most common study designs in the literature is the cross-sectional design, which examines all independent and dependent variables at one point in time. The advantages of cross-sectional designs include economic feasibility, the ability to gather large sample sizes, and the capability of including several independent variables in the analysis. The major disadvantage of a cross-sectional design is that temporal order and causality cannot be determined, so one cannot say whether a certain factor actually causes long stays or delays in discharge. Another limitation is that, depending on the time period of the study, the ALC population may be different, due to changes in the community resources that are available, or progression in the treatment of certain disorders (i.e. introduction of third-generation antipsychotics). In essence, cross-sectional designs are useful for establishing the prevalence of a characteristic in a population, and can generate hypotheses about the variables that may be related to outcomes like ALC status.

Another frequent study design utilized in the literature is the retrospective cohort design, which obtains information that has already occurred to predict the odds of an outcome (delayed discharge or long-stays). Unlike a cross-sectional design, it can make determinations about the odds or the relative risk of experiencing a delayed discharge or long-stay. Another benefit of a retrospective study design is that it requires less time and resources to complete than a prospective cohort design, because delayed or long-stay patients have already been identified. However, since RAI-MH data is continuously in the process of being collected, the time and expense normally associated with a prospective design was not a problem for this project. In most regards, retrospective designs are similar to prospective ones, with the major limitation of a retrospective study being that they are less able to detect confounding variables, since the risk

factors and the outcome have already been collected. Thus, prospective cohort designs are the most ideal for studying ALC outcomes, although retrospective designs are capable as well.

In conclusion, the study designs in the literature reflect the growing stages of research in the field of delayed discharges and long-stays in mental health settings. Many studies included in the review have used cross-sectional designs to generate hypotheses about potential risk factors for delayed discharges or long-stays, while other studies have begun to conduct retrospective or prospective cohort designs to test the strength of such risk factors. Given that there are already several cross-sectional studies that have proposed possible risk factors, the logical next step is to continue conducting longitudinal studies that test the associations between variables and ALC outcomes.

Measurements

The different ways in which ALC, delayed discharges, and long-stays have been defined and measured by various researchers has already been discussed, so the focus of this section will be on the independent variables used. Psychiatric disorders are the most consistently measured predictor in the literature, as most psychiatrists follow either the ICD or DSM codes for diagnosing patients, which is how researchers obtained their information about diagnoses. Both the ICD (WHO, 2014) and the DSM (APA, 2014) are reliable and valid measures for diagnosing mental health patients, and so there are no major limitations to how psychiatric diagnoses have been measured. Similarly, most demographic characteristics, such as age, are relatively straightforward to measure, although there may be some misclassification errors depending on whether the information recorded is reported directly by the patient, or whether a health care professional filled in the information on their own.

Assessments of disabilities and impairments have been inconsistent across studies examining ALC. For instance, some researchers cited a need for specialized services as a proxy for impairment (Kelly et al., 1998; Koffman et al., 1996; Lewis & Glasby, 2006), while others measured difficulties with social and/or everyday functioning (Butterill et al., 2009; Masters et al., 2014; Paton et al., 2004; Tanioka et al., 2013). Secondly, only one study measured disability at admission and discharge (Masters et al., 2014), ensuring that baseline scores were available to avoid confounding with length of hospitalization. Specifying the time(s) at which disability is measured, and making sure to include baseline assessments, is essential for appropriately describing the relationship between disabilities and ALC status.

Aggression has been measured inconsistently across all the studies reviewed. The most ambiguous measure of aggression was coded as either being absent or present in one study, without reference to whether the aggression was verbal and/or physical (Lorenzo et al., 2013). Another vague definition of aggression involved the use of homicidal ideation as a proxy (Park et al., 2008). Although it was significant, it is a particularly extreme facet of aggression that does not represent the overall behaviour. A more appropriate measure of aggression was employed by Springer and Paul (2008), who used the HBI and a Dangerousness Index, which includes physical and verbal confrontations, as well as dangerousness to self and others and the destruction of property. The report by CAMH also included various indicators of aggression, including verbal and physical aggressive behaviours (Butterill et al., 2009). The rest of the studies that examined aggression in relation to long-stays or delayed discharges in mental health settings used observations made by nurses to gather information on physical and/or verbal threats or incidences (Barlow et al., 2000; Commander & Rooprai, 2008; Kelly et al., 1998).

Lastly, a major weakness of the literature is that all but one group of researchers did not have access to a single comprehensive, valid, reliable tool. Relying on multiple different measures has two major disadvantages, one being that the time it takes to fill out various tools may inconvenience hospital staff members, who are busy carrying out day-to-day operations, causing researchers to rely on a select number of tools that can be completed quickly. The second disadvantage is that the reliability and validity of various tools may not be the same, meaning that some information will be of higher quality than others. In addition, because these tools are not widely used, translating the research into clinical practice may be difficult.

Health Care Utilization Model

The theoretical framework used to guide this project was the behavioural model for health care utilization, created by Andersen and Newman (1973). The most recent version of the model is designed to predict individuals' health care use through four major categories, each of which contains multiple sub-components (Andersen, 1995). Figure 1, shown below, illustrates the different categories and sub-components involved in the model.
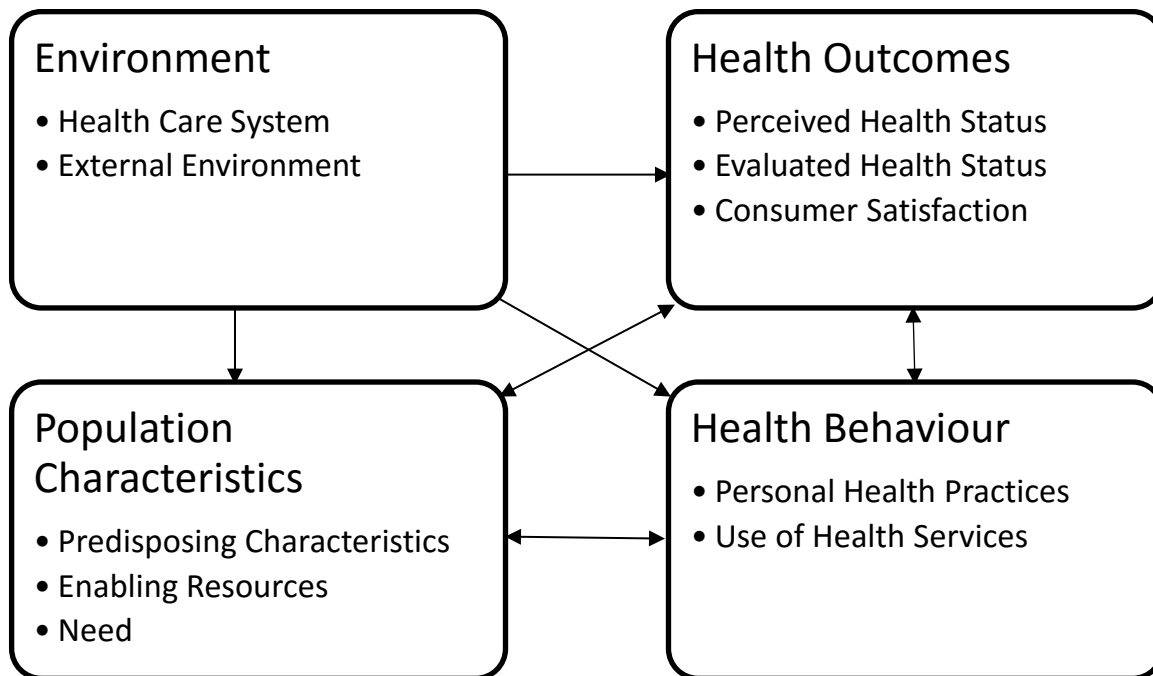
Figure 1. Behavioural model for health care utilization, adapted from Andersen (1995).

The four major categories in the Andersen-Newman model encompass both person and system-level determinants, which function together to explain health care utilization. To further emphasize the relationship between the individual and the system, the model contains several interacting pathways between categories, acknowledging that outcomes of health care utilization can feedback into predisposing characteristics, perceived needs and health behaviours (Andersen, 1995). Although all of the categories and moderating pathways are vital considerations when explaining health care use, for the purpose of this project, only population characteristics will be elaborated on (for a full description of the model, please refer to the paper by Andersen, 1995).

While the Andersen-Newman model was not devised specifically for mental health services, it has been used previously to describe mental health care utilization across several studies (Fleury, Ngui, Bamvita, Grenier, & Caron, 2014). However, this project did undertake a novel approach to the Andersen-Newman model by predicting discharge from a care setting,

31

rather than consumption of health care resources. By testing the applicability of the Andersen-Newman model in predicting ALC status, it is possible to expand upon the present utility of the model.

Since the vast majority of independent variables contained in this study fall under the 'population characteristics' category, each sub-component of this category will be explained in detail.
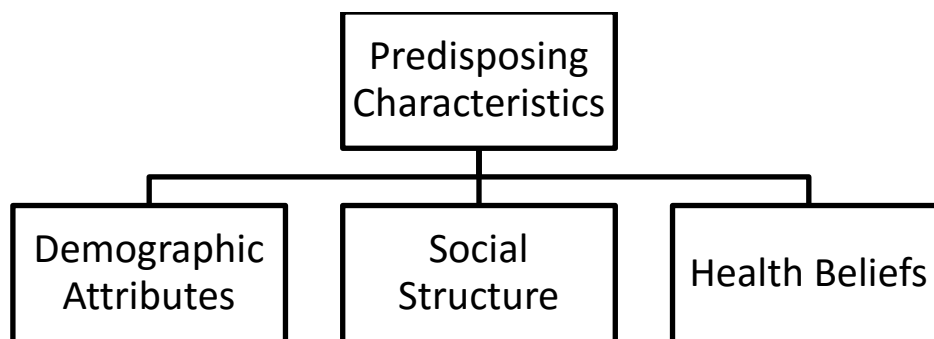
Figure 2. List of the factors included in 'predisposing characteristics', adapted from Andersen (1995).

Beginning with predisposing characteristics, as depicted in Figure 2, there are three main factors involved. Demographic attributes refer to biological and socioeconomic features of the individual, such as age, gender, and marital status. Although they are mostly non-modifiable, demographic information can provide insight into the sub-groups of patients that are most vulnerable to ALC designations. Social structure represents the social status of an individual in their community, as well as the resources at their disposal. Examples of social structure variables include education, occupation, and social networks. Finally, health beliefs are an individual's education and disposition towards health care services, which affects their judgment regarding their own health needs and the likelihood that they pursue health services to act on these needs.
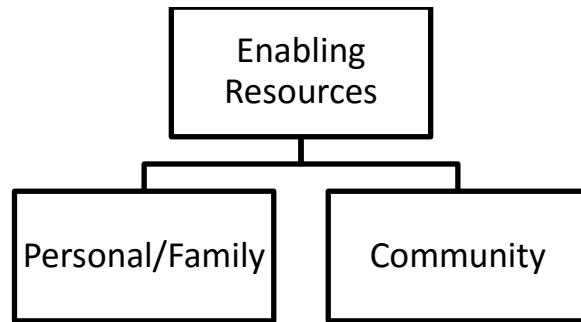
Figure 3. List of the factors included in 'enabling resources', adapted from Andersen (1995).

Within enabling resources, as shown above in Figure 3, there are two main types of resources that are implicated in an individual's accessibility to health care services. The first one, personal/family resources, describes the individual assets that must be in place for one to receive health services, such as income, health insurance, transportation, and even a regular family doctor. For personal resources, the current project contains a proxy for personal resources – economic trade-offs – that is included in the statistical model for ALC.

Enabling community resources are the health structures and personnel that are in place for people to access, such as hospitals, inpatient and outpatient programs, specialist units and doctors, residential services, and so on. Community resources are essential for effectively treating individuals with mental illness, in addition to accommodating patients with ALC designations.
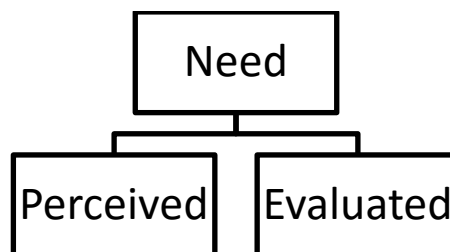
Figure 4. List of all the factors included in 'need', adapted from Andersen (1995).

Lastly, need is separated into perceived need (what the patient believes their health care needs are), and evaluated needs (what a health care professional believes the health care needs of the patient are). For this project, most of the independent variables selected from the RAI-MH are classified under evaluated needs, as they represent characteristics that contribute to mental illness and that may require clinical supervision. However, some variables that are categorized as an evaluated need may also belong in another category. For instance, the social supports for discharge (SSDIS) CAP is not only an evaluated need, but also a personal/family resources variable. In cases where variables could be categorized under both evaluated needs and another category, evaluated needs was the preferred category, as it is more relevant for the purposes of this project (describing the needs and clinical characteristics of the ALC population).

Taken altogether, population characteristics reflect the behaviour, traits and attitudes of the individual, as well as the structure of the environment that they live in. When examining ALC designations, population characteristics can help predict which patients will become ALC, and can also identify some of the needs of the ALC population as a whole. Additionally, organizing the independent variables in this study using the Andersen-Newman framework confers a better understanding of where each variable fits, and the pathway through which it influences ALC outcomes. In keeping with this framework, each independent predictor in this project is categorized by where it fits into the model (e.g. predisposing characteristics: demographic attribute, need: evaluated, etc.).

STUDY RATIONALE

There were two major reasons for conducting this study, one of which was related to research advancement, and the other to practical applications. In terms of research, this project addresses several existing gaps in the literature on ALC status in inpatient mental health settings. For instance, the number of studies that have focused on ALC or delayed discharges in mental health is fairly small, meaning that there is little validation of the risk factors leading to ALC designations. By replicating the risk factors reported by previous studies, as well as testing new ones, this project contributes to the validity of ALC research overall. Additionally, this is the first study in the field to have access to a fully representative sample over a period of several years, producing the largest sample size to date. This project is also the first to statistically predict ALC designations with the use of a comprehensive, mandated clinical assessment tool, improving the methodological reliability of ALC research.

The practical purpose for this study was to work with the OHA in their initiative to reduce ALC designations across multiple health settings in Ontario. As part of this initiative, monthly consultations were held with members of the OHA, who provided feedback on the methods and interpretation of results. Further, two presentation sessions were coordinated by the OHA, in which health care professionals and stakeholders were invited to comment on the results of the project and to provide additional feedback and support. At the conclusion of this project, an extensive education session on ALC was held by the OHA, allowing the results of this project to be disseminated to mental health care professionals, policy makers and stakeholders.

Based on the existing limitations of the research, as well as the concerns of health care professionals and policy makers in Ontario, three primary objectives were formulated:

1. Determine the proportion of patient episodes that have been designated ALC in mental health settings over time, as well as the average number and distribution of ALC days

2. Describe the demographic and clinical characteristics of ALC patients in mental health beds

3. Identify risk factors at admission that predict future ALC designations

The prevalence of ALC episodes over time and the average distribution of ALC days were of interest because they indicate the extent of ALC in mental health settings across Ontario, as well as trends over time. Additionally, this information is useful for research on ALC in general, as different researchers may want to compare rates of delays/ALC between provinces/countries.

Describing the demographic and clinical characteristics of ALC patients serves two functions. One, it shows how frequently certain characteristics occur in the ALC population, which can be used alongside regression models to determine their most pressing needs. Second, by observing differences in the proportion of ALC designations among certain variables, as well as examining bivariate odds ratio values, the list of variables to include in multivariate models can be narrowed down more efficiently.

Lastly, the main objective of this study was to predict ALC designations based on characteristics present at admission. By identifying risk and protective factors early, health care providers will be able to pre-emptively manage such factors to reduce the possibility of an ALC designation. Based on the literature review, it was hypothesized that the following variables will increase the odds of being designated ALC, based on findings from the literature review: schizophrenia, dementia, older age, disabilities/impairments, aggression, interpersonal dysfunction, low SES, extensive mental health histories, and hearing disabilities.

METHODS

Ethics

The Office of Research Ethics at the University of Waterloo provided ethics clearance for the secondary data analysis of interRAI assessment instruments on May 15, 2014, under ORE file number 18228. A copy of the ethics clearance for this project is provided in Appendix B.

Study Design

This study conducted a secondary data analysis using information provided by two different data sources. The primary data source consisted of RAI-MH assessments contained in the Ontario Mental Health Reporting System (OMHRS), which collects and maintains mental health data submitted to the Canadian Institute for Health Information (CIHI). OMHRS was implemented provincially in 2005, when the Ministry of Health and Long-term Care mandated the use of the RAI-MH within inpatient psychiatry. Since its development, OMHRS has gathered RAI-MH assessments from 68 participating hospitals across Ontario. At the time of data analysis, RAI-MH assessments were available from March 2005 to March 2014.

The secondary data source for this project was the Wait Time Information System (WTIS) database, managed by Cancer Care Ontario (CCO). The WTIS database is dedicated to collecting information on ALC, such as the number of days that a patient has been designated ALC, as well as specialized needs and barriers to discharge. Several mental health units across Ontario adopted the WTIS system in 2011, with data available up to the year 2013. At present, WTIS collects data from all mental health units but two. Based on patient and episode ID,

variables related to ALC status were selected from WTIS and linked to the OMHRS dataset for the years 2011 to 2013.

The reason that two different data sources were used to analyze ALC outcomes is because to date, there has been little validation of ALC designations in Ontario. Since OMHRS and WTIS were linked using patient episode ID, it became possible to determine how consistently ALC was reported between the two different systems. Further, this project provided an excellent opportunity to bring the two reporting systems together, as there is potential interest in having the systems work collaboratively together in the future.

Study Sample and Setting

As this study relied on secondary data, no participants were recruited specifically for this project. The study sample contained in the OMHRS database is derived from the population of mental health inpatients that have been assessed with the RAI-MH, beginning in 2005 and ending 2014. The study sample within WTIS was gathered from participating hospitals across Ontario from 2011 to 2013. As previously stated, the RAI-MH was mandated for use in inpatient psychiatry in 2005. Since its authorization, all adult mental health inpatients that have had a length of stay of at least three days are assessed with the RAI-MH, with their assessment information submitted to CIHI and compiled in OMHRS. The resulting sample is not only representative of the adult mental health inpatient population within Ontario, but it is also well-protected against loss-to-follow-up, as all inpatients receive discharge assessments before they leave the hospital.

The only exclusion criteria that were applied to the study population were short-stay status, defined as a stay of three days or less, and status as a forensic patient. Short-stay patients

were removed from the analysis because their length of stay was too short to merit any ALC designations. Forensic patients were removed because, although there is the potential for them to be designated ALC, the factors that contribute to their delay could be due to legal or administrative reasons rather than clinical care needs. Without a way to distinguish clinical factors from legal/administrative restrictions, the interpretation of the characteristics leading to ALC status becomes too obscure. All other patients were retained in the sample.

For statistical procedures, patient episodes were selected as the unit of analysis, allowing an individual to be represented in the analysis multiple times. The justification for choosing patient episodes over patients are: a) episodes provide a better understanding of the prevalence of ALC over time and, b) even when patient episodes are nested within the same person, each episode is an independent instance of ALC, and analyzing them can elucidate the risk factors that lead to ALC in that instance. Within OMHRS, the number of ALC episodes that occurred in inpatient mental health settings from 2005 to 2014 is 10,390. Within WTIS, the number of ALC episodes from 2011 to 2013 is 2074.

Measurements

The RAI-MH is a comprehensive, standardized mental health assessment tool that is designed to appraise an individual's needs, challenges, and strengths across a variety of domains, with the primary goal of assisting clinicians through person-centered assessment (Martin et al., 2009). The RAI-MH incorporates several different types of information into one tool, including demographic characteristics, clinical variables, scales, and Clinical Assessment Protocols (CAPs). Scales and CAPs, which are generated based on the scores assigned to relevant items embedded in the RAI-MH, are designed to alert clinicians to areas where an individual might be

experiencing serious or imminent problems, i.e. risk of harm. The reliability and validity of the

RAI-MH have been previously established in a variety of studies (Foebel et al., 2013; Gibbons et

al., 2008; Hirdes et al., 2008; Jones, Perlman, Hirdes, & Scott, 2010; Martin et al., 2009;

Neufeld, Perlman & Hirdes, 2012; Perlman et al., 2013).

Independent variables

Several independent variables were tested for their association with ALC status, based on

the results of the literature review on ALC in mental health settings, as well as the clinical

experience of various mental health care providers that were consulted on this project (i.e.

members of OHA, hospital staff). The independent variables chosen were then organized by the

categories contained in Andersen and Newman's (1995) model of health care utilization (e.g.

population characteristics - predisposing characteristics – demographic attributes). Note that

while scales and CAPs are included under 'evaluated need,' for ease of reading, a separate table

describes all of the scales and CAPs included in this project.

Table 1

Independent variables classified as population characteristics – predisposing characteristics

Category	Variables
Demographic Attributes	Sex, age, language, Aboriginal origin, who lived with at admission, homelessness
Social Structure	Married, visit from a social relation, contact with a social relation, persistently hostile towards or critical of family/friends, persistently hostile towards or critical of others or staff, staff reports persistent frustration in dealing with person, presence of support person who is positive towards discharge, indicates preference to return to the community

Table 2

Independent variables related to population characteristics – need

Category	Variables
Perceived Need	Self-rated health status
Evaluated Need	Insight into mental health, history of sexual violence as perpetrator, behaviour disturbance indicators, extreme behaviour disturbance, hearing, vision, extra-pyramidal signs and symptoms, bladder continence, bowel continence, DSM-IV-TRV diagnoses, comorbid diagnoses, intellectual disability, scales, and CAPs

Note. Independent variables are organized according to their best fit in the Andersen-Newman framework (1995).

Table 3

Independent variables related to health behavior – use of health services

Category	Variables
Use of health services	Number of psychiatric admissions (lifetime), previous contact with community mental health services

Note. Independent variables are organized according to their best fit in the Andersen-Newman framework (1995).

It is worth noting that several items in the RAI-MH ask clinicians to record the observed frequency of the item within the last three days. The reason that the RAI-MH relies on three-day observation periods is to ensure that the current state of the patient's episode is captured accurately at that point in time, allowing a patient's progress to be tracked throughout their stay. Further, by asking clinicians to assess patient behaviour over three days, there is a reduction in the potential for recall bias, which would affect the validity of the information obtained.

Finally, several of the scales and CAPs contained in the RAI-MH were analyzed for their impact on ALC status because they represent clinical factors that are modifiable. The list of scales and CAPS embedded in the RAI-MH are presented in Table 4, provided below. For

detailed explanations of all the scales and CAPs included in the project, please consult Appendix

B. Note that the scores for the scales indicate greater severity of the problem as they increase,

while CAPs contain trigger levels.

Table 4

List of interRAI Scales and mental health CAPS included in the analysis – evaluated need

Name of CAP/Scale	Cut-Off Points (scales only) and Trigger Level (CAPs only)
Self-Care Index (scale)	0, 1-2, 3-6
Risk of Harm to Others (scale)	0, 1-2, 3-6
Severity of Self-harm (scale)	0, 1-2, 3-6
Cognitive Performance Scale (scale)	0, 1-2, 3-6
ADL Hierarchy (scale)	0, 1-2, 3-4, 5-7, 8-16
IADL Hierarchy (scale)	0, 1-3, 4-9, 10-18, 19-30
Aggressive Behaviour Scale (scale)	0, 1-3, 4-6, 7-12
Social Withdrawal (scale)	0, 1-4, 5-8, 9-12
Mania (scale)	0, 1-3, 4-8, 9-20
Positive Symptoms Scale – Long (scale)	0, 1-3, 4-8, 9-24
Depressive Severity Index (scale)	0, 1-3, 4-7, 8-15
Social Relationships (CAP)	Not Triggered (0) Triggered to improve close friendships and family functioning (1) Triggered to reduce social isolation and family dysfunction (2)
Interpersonal Conflict (CAP)	Not Triggered (0) Triggered to reduce conflict within specific relationships (1) Triggered to reduce widespread conflict (2)
Traumatic Life Events (CAP)	Not Triggered (0) Triggered to reduce the impact of prior traumatic life events (1) Triggered to address immediate safety concerns (2)
Personal Finances (CAP)	Not Triggered (0) Triggered due to inability to manage finances (1) Triggered due to economic hardship (2)
Rehospitalization (CAP)	Not Triggered (0) Triggered due to moderate risk of rehospitalization (1) Triggered due to high risk of rehospitalization (2)
Social Supports for Discharge (CAP)	Not Triggered (0) Triggered (1)

Medication Management and Adherence (CAP)	Not Triggered (0)
	Triggered for having previously stopped taking medication due to side effects (1)
	Triggered for problems with medication management and adherence related to cognitive deficits and positive symptoms (2)
Substance Use (CAP)	Not Triggered (0)
	Triggered due to prior history of problematic substance use (1)
	Triggered due to current problematic substance use (2)
Weight Management (CAP)	Not Triggered (0)
	Triggered for problematic eating behaviours (1)
	Triggered for body composition (2)
Exercise (CAP)	Not Triggered (0)
	Triggered to increase physical activity but requires additional consideration due to a health condition (1)
	Triggered to increase physical activity among persons who are capable of being physically active (2)
Sleep Disturbance (CAP)	Not Triggered (0)
	Triggered due to current sleep disturbance and no worse than moderate cognitive impairment (1)
	Triggered due to current sleep disturbance and severe cognitive impairment (2)
Pain (CAP)	Not Triggered (0)
	Triggered at medium priority level (1)
	Triggered at high priority level (2)
Education and Employment (CAP)	Not triggered (0)
	Triggered to support employment or educational participation (1)
	Triggered to reduce the risk of unemployment or dropping out of school (2)
Control Interventions (CAP)	Not triggered (0)
	Triggered to eliminate control interventions – persons not in a psychiatric emergency situation (1)
	Triggered to eliminate the need for control interventions – persons in a psychiatric emergency situation (2)

Note. Scales were grouped according to Canadian-Finnish guidelines for categorizing scales.

Dependent variable

The dependent variable for this project was ALC status, which was measured separately within OMHRS and WTIS. The ALC variable in OMHRS was taken directly from the RAI-MH, and was defined as the number of days that a patient was designated ALC, either from the beginning of their episode (2005-2009), or since their last assessment (2009-present). WTIS measured ALC days as the total number of days a patient was designated ALC throughout their stay. For a patient to be designated ALC in either database, a physician must assess them according to the provincial guidelines set out by CCO (2011), which include the following:

- The patient cannot progress any further in their current care setting

- The patient has fulfilled all of their treatment goals

- The patient is admitted because the services they require are not available in the community

For the purpose of this study, two different cut-points were selected for ALC status. The first cut-point was simply one ALC day, such that patients with any ALC days were compared to patients with no ALC days. The second cut-point was 30 or more days - chosen because it is the standard cut-point used by CCO to define long-stays for ALC (CIHI, personal communication, October 1, 2014) – meaning that patients with 30 or more ALC days were compared to patients with 29 or less ALC days. Each cut-point was analyzed separately for OMHRS and for WTIS, totaling four distinct groups overall (OMHRS: Any ALC, WTIS: Any ALC, OMHRS: 30+ Days ALC, & WTIS: 30+ Days ALC).

RESULTS

All statistical analyses performed in this thesis were conducted using SAS® software, version 9.4 of the SAS system for Windows.

Agreement over ALC Status between OMHRS and WTIS

As a first step in the data analysis, agreement rates for ALC status were assessed between OMHRS and WTIS, which were linked together via patient episode ID. One analysis was performed for patient episodes containing 1 or more ALC days, and another analysis was conducted for patient episodes with 30 or more ALC days. Table 5a displays the binary agreement rate, and Table 5b displays the 30+ agreement rate.

Table 5a

Agreement rate between OMHRS and WTIS for any ALC, 2011-2013 (N =76,184)

OMHRS	WTIS	
	0	1
0	96.4% (73,452)	1.0% (773)
1	0.9% (658)	1.7% (1301)

Note. 0 = No ALC; 1= 1+ ALC days. Between OMHRS and WTIS, 1.7% of identified cases are in agreement and 1.9% in disagreement. Inter-rater agreement is $\kappa = 0.64$.

Table 5b

Agreement rate between OMHRS and WTIS for 30+ ALC, 2011-2013 (N =76,184)

OMHRS	WTIS	
	0	1
0	98.6% (75,126)	0.3% (254)
1	0.2% (157)	0.8% (647)

As can be seen in Tables 5a and 5b, OMHRS and WTIS demonstrated high rates of agreement when patient episodes contained either no ALC days or less than 30 ALC days. However, in cases where ALC was identified, OMHRS and WTIS displayed comparable rates of agreement and disagreement. To formally test the extent of inter-rater agreement, Cohen's kappa coefficients were obtained for both levels of ALC. For any ALC, κ = 0.64, and for 30+ days of ALC, κ = 0.76. The Cohen's kappa coefficients for both levels were high, especially for 30+ days of ALC.

Since each patient would have been declared ALC by the same overseeing physician within both OMHRS and WTIS, it was presumed that disagreement over ALC status was a function of random coding errors rather than systematic errors in designating ALC. To test this hypothesis, odds ratios (OR) of ALC status was calculated for several variables within OMHRS and WTIS. The reason for comparing OR values is that if disagreement over ALC status occurred systematically, one would expect to see differences in ORs between OMHRS and WTIS, reflecting an inconsistency in designating ALC between systems. However, if the ORs are similar, then it is likely that ALC was coded improperly in one system or the other, but both remain consistent in identifying the ALC population. Variables for this test were selected based on the results of the literature review, since variables unrelated to ALC might show no difference in OR values between the data systems, especially considering that instances of no ALC were often agreed upon.
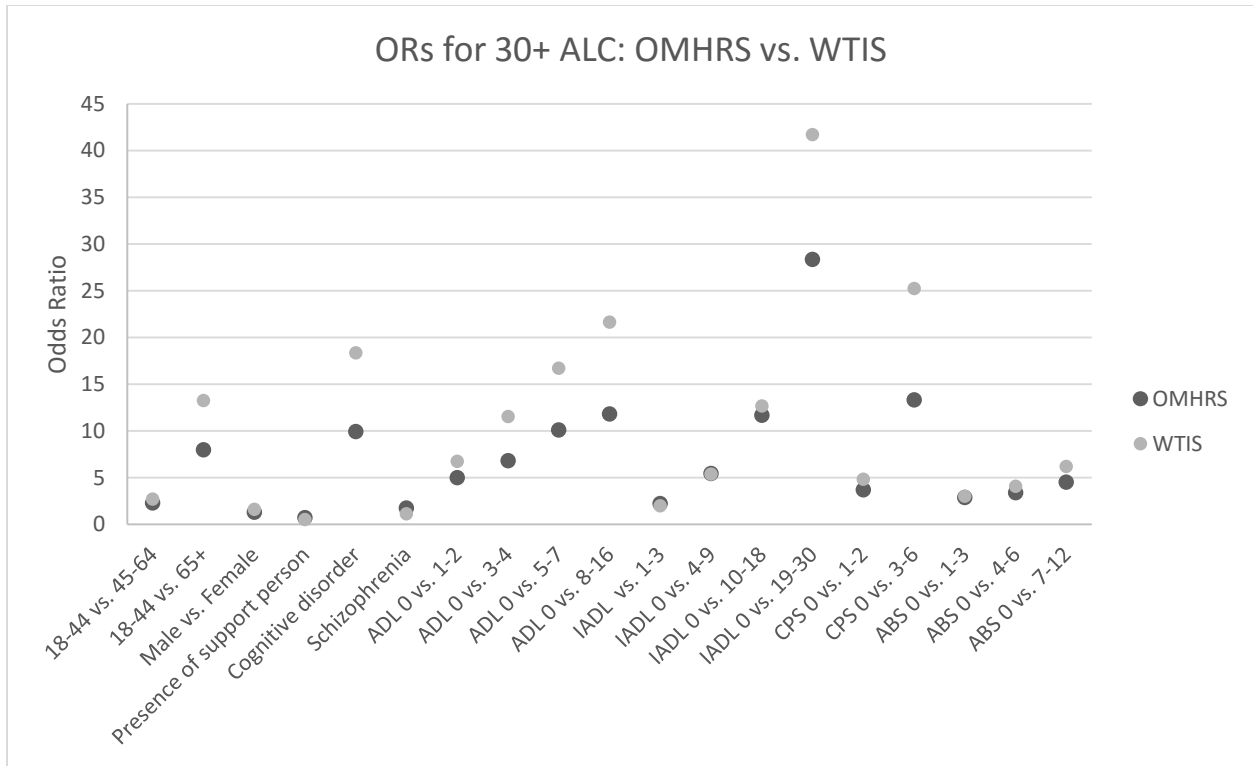
Figure 5. OR = odds ratio. OR values for 30+ days of ALC were compared across several RAI-MH variables in OMHRS and WTIS, to assess whether ALC populations between datasets were similar or different.

In Figure 5, the majority of ORs show a similar pattern in terms of the direction of the effect, but many variables have higher ORs in WTIS than in OMHRS. It is possible that larger ORs may mean that some variables are significant in WTIS but not in OMHRS, although this is unlikely, as the ORs for these variables in OMHRS are still well above one. In general, the pattern of OR values in Figure 5 indicates that disagreement over ALC status was most likely due to random coding errors, as the risk factors for ALC were the same across both datasets. Nonetheless, as a precautionary measure, and because of differences in the amount of time that data were collected, ALC groups will be analyzed separately for OMHRS and WTIS.

Prevalence of ALC episodes and distribution of ALC days

To determine the prevalence of ALC episodes across mental health units, frequency distributions were obtained for each variant of the dependent variables. Table 6 displays the percentage of patient episodes that were designated either any ALC or 30+ ALC across both OMHRS and WTIS.

Table 6

Percentage of patient episodes with either 1+ ALC days or 30+ ALC days in OMHRS (2005-14) and WTIS (2011-13)

ALC Group	Percentage (N) - ALC	Percentage (N) – No ALC
1+ ALC Days vs. 0 ALC days (OMHRS)	3.4% (10,384)	95.7% (293,731)
1+ ALC Days vs. 0 ALC Days (WTIS)	2.7% (2074)	97.3% (74,110)
30+ ALC Days vs. <30 ALC Days (OMHRS)	1.2% (3659)	98.8% (300,456)
30+ ALC Days vs. <30 ALC Days (WTIS)	1.2% (901)	98.8% (75,283)

Note. The percentage of patient episodes that were designated with 1+ ALC days and 30+ ALC days between 2011 and 2013 is displayed for both OMHRS and WTIS.

As can be seen in Table 6, the percentage of patient episodes with an ALC designation is relatively small for each variant of the dependent variable, especially when using the 30 day cut-point (which had the same value for both OMHRS and WTIS). Although the overall frequency is low, patient episodes with 30 or more ALC days constitute one third of the entire ALC sample (1.2% out of 3.4%).

To determine the distribution of ALC days across patient episodes, a univariate analysis was performed using episodes that contained at least one ALC day. Figure 6 displays the number of ALC days that occur at different percentiles of the ALC sample. In addition to the percentile distribution, it is also useful to consider the mean and median number of ALC days and see whether or not they differ from one another.
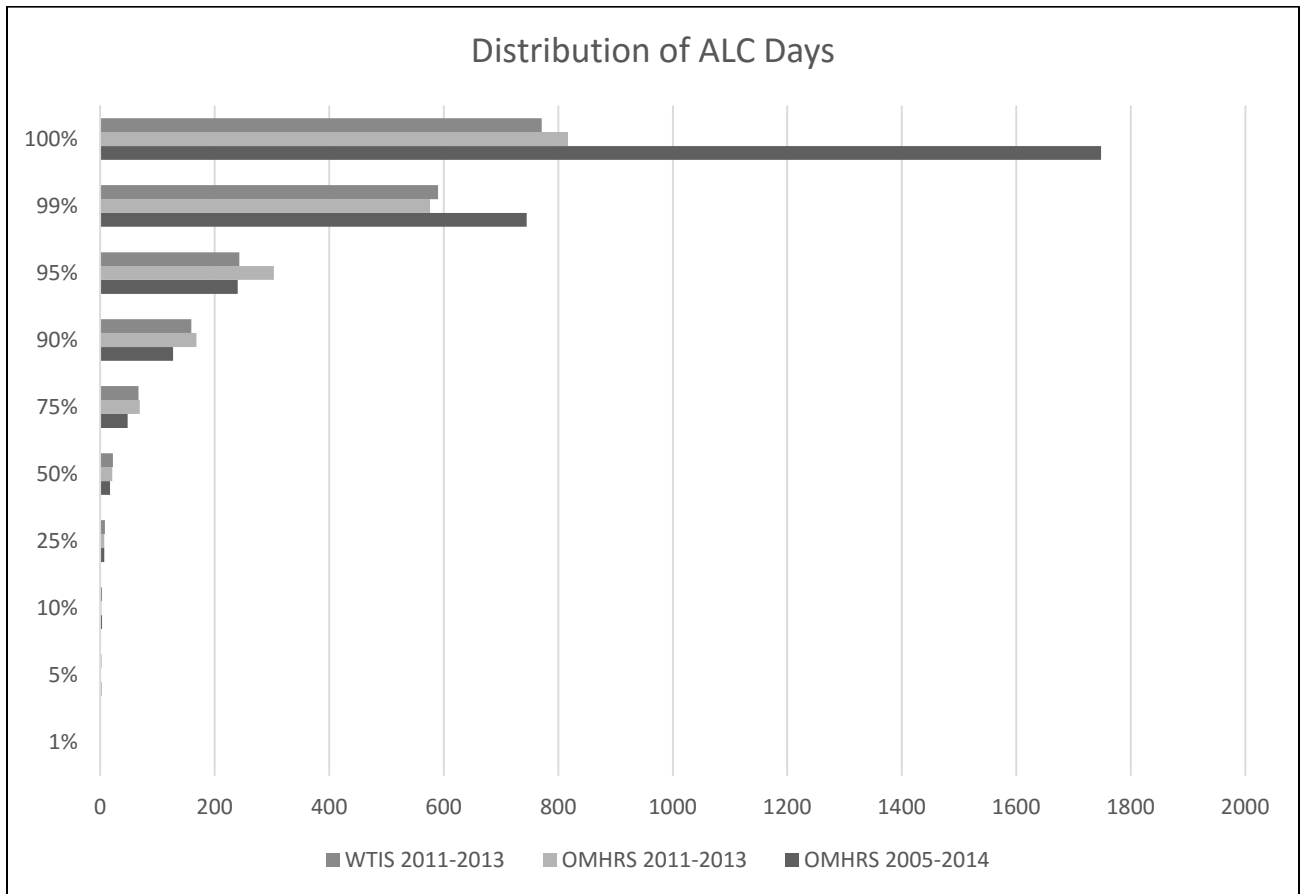
Figure 6. Distribution of ALC days in OMHRS (2005-2014), OMHRS (2011-2013), and WTIS (2011-2013). Each percentile denotes the maximum number of ALC days that were accrued by that percentage of the ALC population, e.g. 75% of patients experienced 69 days of ALC or less.

As can be seen in Figure 6, the range of ALC days across patient episodes is fairly wide, with a maximum of 1748 days between 2005 and 2014 in OMHRS, and 817 days and 771 days between 2011 and 2013 in OMHRS and WTIS, respectively. The variability in the range of ALC

days is also reflected by the differences in the mean (OMHRS 2005-14: Mean=59.0, SD=140.0; OMHRS 2011-13: Mean=63.0, SD=108.0; WTIS: Mean= 60.0, SD =100.0) and the median (OMHRS 2005-14: Median=17.0; OMHRS 2011-13: Median=21.0; WTIS: Median=22.0), with a higher mean score reflecting the effects of especially long ALC stays at the high end of the distribution.

Descriptive Statistics

In this section, data for all the independent variables selected from the RAI-MH are presented. Variables are organized into tables according to the categories in the Andersen-Newman framework, with two distinct sections for 1+ and 30+ days of ALC. Each table includes data on the ALC groups for both OMHRS and WTIS, with two separate columns of information each. In the first column, the percentage of patients who were designated ALC within each level of the independent variables is displayed. For example, if the reported percentage for males is higher than that of females, this indicates that men had a higher rate of being designated ALC relative to women. Each table also shows the bivariate OR and the 95% confidence interval (CI), as well as asterisks denoting their significance level. Missing data for all bivariate analyses were handled via deletion, as only a small number of cases were missing for the vast majority of variables (<1% for OMHRS and WTIS).

The purpose of the descriptive statistics in this project was largely exploratory, but it was also used as a basis for choosing the variables to be entered into the multivariate modeling process. To select variables for the multivariate model, the difference in column percentages, OR values and statistical significance were all considered. Given both the large sample size and number of comparisons, any p values that were above .01 were generally disregarded to account

for the possibility of a Type 1 error. Further, if a variable had a 95% CI overlapping 1.00, it was excluded from the model, unless there was a strong theoretical reason to leave it in. Variables with comparatively high column percentage differences and OR values were selected for evaluation in the multivariate modeling stage. For variables that contained a p value above .01 but had only weak associations, the literature review and previous discussions with clinicians were used to provide extra guidance for variable selection.

Table 7a

Any ALC designations by demographic characteristics among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	**OR (95% CI)**	**% (N)**	**OR (95% CI)**
Age Group	***18-44***	2.2 (3419)	Reference	1.1 (430)	Reference
	45-64	3.2 (3327)	1.48 (1.41-1.55)***	2.4 (630)	2.15 (1.90-2.44)***
	65+	9.5 (3492)	4.74 (4.51-4.97)***	10.6 (979)	10.56 (9.40-11.85) ***
Sex	***Female***	3.2 (4997)	Reference	2.4 (912)	Reference
	Male	3.7 (5384)	1.15 (1.10-1.19)***	3.1 (1162)	1.33 (1.22-1.46)***
Language other than English/French	***No***	3.4 (9627)	Reference	2.6 (1917)	Reference
	Yes	4.8 (608)	1.46 (1.34-1.59)***	4.7 (157)	1.82 (1.54-2.14) ***
Aboriginal origin	***No***	3.4 (10096)	Reference	2.7 (2014)	Reference
	Yes	3.1 (288)	0.89 (0.79-1.00)	2.6 (60)	0.93 (0.72-1.21)
Homeless	***No***	3.4 (10026)	Reference	2.7 (2003)	Reference
	Yes	3.9 (358)	1.16 (1.04-1.29)**	3.3 (71)	1.21 (0.95-1.54)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001.

Table 7b

30+ ALC designations by demographic characteristics among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Age Group	*18-44*	0.5 (845)	Reference	0.4 (153)	Reference
	45-64	1.2 (1269)	2.28 (2.09-2.48)***	1.1 (283)	2.70 (2.22-3.29)***
	65+	4.1 (1524)	7.99 (7.34-8.70) ***	5.0 (461)	13.24 (11.02-15.93) ***
Sex	*Female*	1.1 (1650)	Reference	0.9 (355)	Reference
	Male	1.4 (2009)	1.29 (1.21-1.38) ***	1.5 (546)	1.61 (1.40-1.84)***
Language other than English/French	*No*	1.1 (3307)	Reference	1.1 (811)	Reference
	Yes	2.3 (291)	2.02 (1.79-2.28) ***	2.7 (90)	2.45 (1.96-3.05) ***
Aboriginal origin	*No*	1.2 (3567)	Reference	1.2 (878)	Reference
	Yes	1.0 (92)	0.81 (0.65-0.99)*	1.0 (23)	0.82 (0.54-1.25)
Homeless	*No*	1.9 (720)	Reference	1.2 (873)	Reference
	Yes	1.2 (3567)	1.08 (0.90-1.30)	1.3 (28)	1.09 (0.75-1.60)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001.

Tables 7a and 7b show the descriptive statistics for various demographic characteristics. Age group displayed large differences in ALC rates and OR values across all ALC groups. Compared to adults between the ages of 18-44, adults aged 45-64 had twice the odds of experiencing 30 or more ALC days, and adults aged 65 and over had between 7.99-13.24 greater odds. Despite the increased risk of ALC status for older adults, it is important to note that most individuals in the any ALC group and half in the 30+ group were not aged 65 years or older, meaning that younger and middle-aged adults are also at risk for being designated ALC.

Following age, speaking a primary language other than English and French had the second strongest association of the demographic characteristic for all groups, with foreign speakers showing twice the odds of being in the 30+ ALC group. Males had slightly higher odds than females of being designated ALC across all groups. Homelessness was insignificant across all groups, except for any ALC within OMHRS, while Aboriginal origin was insignificant across all groups.

Table 8a

Any ALC designations by social structures among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Married	*No*	3.5 (7979)	Reference	2.7 (1565)	Reference
	Yes	3.2 (2405)	0.92 (0.88-0.97)**	2.9 (509)	1.07 (0.97-1.19)
Lived alone	*No*	3.4 (6961)	Reference	2.7 (1385)	Reference
	Yes	3.5 (3423)	1.02 (0.98-1.06)	2.8 (689)	1.05 (0.95-1.15)
Persistently hostile towards family/friends	*No*	3.4 (8952)	Reference	2.7 (1834)	Reference
	Yes	3.7 (1431)	1.11 (1.05-1.18)**	2.8 (240)	1.05 (0.91-1.20)
Persistently hostile towards others/staff	*No*	3.3 (9340)	Reference	2.6 (1858)	Reference
	Yes	4.9 (1043)	1.50 (1.41-1.61) ***	4.5 (216)	1.78 (1.54-2.05) ***
Staff reports frustration in dealing with person	*No*	3.3 (9493)	Reference	2.6 (1887)	Reference
	Yes	4.7 (890)	1.44 (1.34-1.54) ***	4.2 (187)	1.62 (1.39-1.89) ***
Visit by long-standing social relation	*<3 days*	3.0 (6083)	Reference	2.4 (1222)	Reference
	<7 days	3.1 (1602)	1.04 (0.98-1.10)	2.5 (312)	1.04 (0.92-1.18)
	<30 days	4.2 (1091)	1.39 (1.30-1.48)***	3.6 (228)	1.52 (1.32-1.75) ***
	30+ days	6.1 (1606)	2.09 (1.98-2.21)***	5.3 (312)	2.28 (2.01-2.59) ***
Telephone or email contact with long-standing social relation	*< 3 days*	2.8 (6376)	Reference	2.1 (1204)	Reference
	<7 days	3.8 (1394)	1.36 (1.29-1.45)***	3.3 (285)	1.59 (1.39-1.81) ***
	<30 days	4.8 (879)	1.73 (1.61-1.86)***	4.4 (194)	2.15 (1.84-2.51) ***
	30+ days	7.7 (1733)	2.88 (2.72-3.04)***	8.0 (391)	4.08 (3.63-4.60) ***
Indicates preference to return to community	*No*	4.2 (2770)	Reference	3.8 (610)	Reference
	Yes	3.2 (7612)	0.75 (0.72-0.78)***	2.4 (1464)	0.64 (0.58-0.70) ***
Has a support person who is positive towards discharge	*No*	4.3 (3292)	Reference	4.3 (777)	Reference
	Yes	3.1 (7090)	0.71 (0.68-0.74)***	2.2 (1297)	0.51 (0.47-0.56) ***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001.

Table 8b

30+ ALC designations by social structures among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Married	*No*	1.25 (2897)	Reference	1.16 (677)	Reference
	Yes	1.01 (762)	0.81 (0.74-0.87)***	1.26 (224)	1.09 (0.94-1.27)
Lived alone	*No*	1.2 (2542)	Reference	1.2 (624)	Reference
	Yes	1.1 (1117)	0.91 (0.85-0.97)**	1.1 (277)	0.93 (0.81-1.07)
Persistently hostile towards family/friends	*No*	1.0 (404)	Reference	0.8 (83)	Reference
	Yes	0.7 (682)	1.11 (1.01-1.22)*	0.7 (133)	0.90 (0.72-1.11)
Persistently hostile towards others/staff	*No*	1.2 (3477)	Reference	1.2 (869)	Reference
	Yes	2.0 (182)	1.87 (1.70-2.07)***	2.2 (32)	2.09 (1.71-2.56)***
Staff reports frustration in dealing with person	*No*	1.0 (2678)	Reference	0.9 (597)	Reference
	Yes	3.1 (175)	1.85 (1.67-2.06)***	2.8 (43)	1.99 (1.61-2.46)***
Visit by long-standing social relation/family member	*<3 days*	0.9 (1862)	Reference	0.9 (483)	Reference
	<7 days	1.1 (575)	1.22 (1.11-1.34)***	1.1 (141)	1.19 (0.99-1.44)
	<30 days	1.7 (438)	1.81 (1.63-2.01)***	1.6 (100)	1.68 (1.35-2.08)***
	30+ days	3.0 (784)	3.29 (3.03-3.58)***	3.0 (177)	3.25 (2.73-3.87)***
Telephone or email contact with long-standing social relation/	*<3 days*	0.8 (1829)	Reference	0.8 (451)	Reference
	<7 days	1.5 (537)	1.83 (1.66-2.01)***	1.6 (136)	2.01 (1.66-2.44)***
	<30 days	2.1 (385)	2.62 (2.34-2.92)***	2.1 (95)	2.78 (2.23-3.48)***
	30+ days	4.0 (908)	5.15 (4.75-5.58)***	4.5 (219)	5.96 (5.06-7.02)***
Indicates preference to return to community	*No*	1.8 (1209)	Reference	1.8 (282)	Reference
	Yes	1.0 (2450)	0.56 (0.52-0.60)***	1.0 (619)	0.59 (0.51-0.67)***
Has a support person who is positive towards discharge	*No*	1.8 (1391)	Reference	2.1 (373)	Reference
	Yes	1.0 (2268)	0.54 (0.51-0.58)***	0.9 (528)	0.44 (0.39-0.50)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001.

Tables 8a and 8b display descriptive statistics for social structure variables. Three variables displayed relatively higher rates and OR values across all groups. For example, the longer the amount of time since the last visit from a social relation, the higher odds of becoming ALC. Individuals who had not been visited by a social relation in the past month had two to three times greater odds of being in the ALC group than individuals visited in the last three days. Another strongly associated variable was telephone or email contact with a long-standing social relation. Those who spent more time without having phone or email contact with a social relation were more likely to become ALC, with no contact in the past month leading to 2.88-5.96 greater odds of being ALC than contact in the last three days. Lastly, presence of a support person positive towards discharge was associated with approximately half the odds of being in the ALC group compared to individuals with no support person.

Other notable variables in the social structure category include persistent hostility towards others/staff and staff reporting frustration in dealing with person, both of which demonstrated up to twice the odds of being in the ALC group if the answer was in the 'yes' category. Indicating a preference to return to the community was significantly associated with lower odds of experiencing ALC, especially within the 30 day groups. Persistent hostility towards family/friends and being married were only significant within the OMHRS groups. Living alone prior to admission were insignificant across all ALC groups, with the exception of the 30 day group in OMHRS.

Table 9a

Any ALC designations by use of health services among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Number of lifetime psychiatric admissions	*None*	3.5 (3082)	Reference	3.0 (679)	Reference
	1-3	3.0 (3264)	0.85 (0.81-0.89)***	2.3 (653)	0.76 (0.69-0.85)***
	4-5	3.6 (1507)	1.02 (0.96-1.09)	2.6 (268)	0.84 (0.72-0.97)*
	6+	4.0 (2531)	1.16 (1.10-1.23)***	3.1 (474)	1.01 (0.89-1.13)
Contact with community mental health	*>1 year*	3.3 (3952)	Reference	2.8 (824)	Reference
	>31 days	3.4 (1838)	1.03 (0.97-1.09)	2.7 (390)	0.96 (0.85-1.09)
	<30 days	3.6 (4594)	1.09 (1.04-1.14)***	2.7 (860)	0.96 (0.87-1.06)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001.

Table 9b

30+ ALC designations by use of health services among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Number of lifetime psychiatric admissions	*None*	1.1 (977)	Reference	1.3 (293)	Reference
	1-3	1.0 (1080)	0.89 (0.81-0.97)**	1.0 (278)	0.76 (0.64-0.89)**
	4-5	1.3 (548)	1.17 (1.05-1.30)**	1.1 (112)	0.81 (0.65-1.01)
	6+	1.7 (1054)	1.53 (1.40-1.67)***	1.4 (218)	1.07 (0.90-1.28)
Contact with community mental health	*>1 year*	1.1 (1328)	Reference	1.2 (347)	Reference
	>31 days	1.2 (655)	1.09 (0.99-1.20)	1.2 (177)	1.04 (0.87-1.25)
	<30 days	1.3 (1676)	1.18 (1.10-1.27)***	1.2 (377)	1.00 (0.87-1.16)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Both the percentage of patients and the odds of being designated ALC varied by number of lifetime admissions to a psychiatric hospital across all groups. Within OMHRS, the majority of admission levels were significant, whereas in WTIS, only one to three admissions were significant. Previous contact with community mental health services was generally insignificant, with the exception of contact in less than 30 days within OMHRS.

Table 10a

Any ALC designations by perceived need among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-Reported Health (Poor Health)	*No*	3.3 (8266)	Reference	2.3 (772)	Reference
	Yes	4.0 (1673)	1.21 (1.15-1.28)***	3.2 (138)	1.38 (1.15-1.65)**

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Table 10b

30+ ALC designations by perceived need among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-Reported Health (Poor Health)	*No*	1.2 (2929)	Reference	0.7 (243)	Reference
	Yes	1.2 (526)	1.07 (0.97-1.17)	1.0 (43)	1.35 (0.98-1.90)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Responding 'yes' to having poor health was significant only among the any ALC groups, such that persons with poor self-rated health had greater odds of having at least one ALC day..

The majority of the independent variables that were examined in this project were categorized as evaluated needs, and so for ease of reading, they are separated into smaller tables. Tables are titled according to the sections in which the variables are located in the RAI-MH.

Table 11a

Any ALC designations by evaluated need – personal/mental indicators - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Insight into mental health	*Full*	2.0 (1289)	Reference	1.1 (166)	Reference
	Limited	3.0 (5118)	1.48 (1.39-1.58)***	2.2 (1007)	2.09 (1.77-2.46)***
	None	6.4 (3976)	3.39 (3.18-3.62)***	6.1 (901)	6.00 (5.08-7.09)***
History of sexual violence as perpetrator	*No*	3.4 (10003)	Reference	2.7 (2017)	Reference
	Yes	4.2 (380)	1.24 (1.12-1.38)***	4.0 (57)	1.49 (1.14-1.95)**

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Table 11b

30+ ALC designations by evaluated need – personal/mental indicators - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Insight into mental health	*Full*	0.4 (240)	Reference	0.2 (38)	Reference
	Limited	0.9 (1622)	2.51 (2.19-2.87)***	0.9 (406)	3.66 (2.62-5.10)***
	None	2.9 (1797)	8.04 (7.03-9.21)***	3.1 (457)	12.98 (9.32-18.09)***
History of sexual violence as perpetrator	*No*	1.2 (3477)	Reference	1.2 (869)	Reference
	Yes	2.0 (182)	1.72 (1.48-1.99)***	2.2 (32)	1.94 (1.36-2.77)**

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Beginning with Tables 11a and 11b, both limited and no insight into mental health had higher rates of ALC designations than full insight, as well as greater OR values, for all ALC groups. Notably, those with no insight into mental health had 8.04-12.98 greater odds of being in the 30+ group than individuals with full insight. History of sexual violence also led to significantly higher odds of ALC status than no such history across all groups.

Table 12a

Any ALC designations by evaluated need – behaviour disturbance - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Wandering	*>3 days*	3 (8227)	Reference	2.2 (1493)	Reference
	>3 days, but present	7.0 (395)	2.44 (2.20-2.71)***	5.1 (79)	2.40 (1.90-3.03)***
	1-2 of <3 days	5.2 (761)	1.78 (1.65-1.92)***	5.8 (204)	2.74 (2.36-3.18)***
	Everyday <3 days	9.2 (1000)	3.27 (3.05-3.50)***	11.6 (298)	5.87 (5.15-6.69)***
Inappropriate public sexual behaviour	*>3 days*	3.3 (9791)	Reference	2.6 (1929)	Reference
	>3 days, but present	7.7 (194)	2.42 (2.09-2.81)***	8.0 (49)	3.23 (2.40-4.34)***
	1-2 of <3 days	4.7 (241)	1.44 (1.27-1.65)***	4.6 (58)	1.79 (1.37-2.34)***
	Everyday <3 days	7.1 (157)	2.21 (1.88-2.61)***	7.1 (38)	2.86 (2.05-3.99)***
Elopement attempts/threats	*>3 days*	3.2 (9017)	Reference	2.5 (1747)	Reference
	>3 days, but present	6.0 (393)	1.92 (1.73-2.13)***	6.9 (101)	2.91 (2.36-3.58)***
	1-2 of <3 days	4.9 (616)	1.53 (1.41-1.67)***	4.5 (135)	1.87 (1.56-2.23)***
	Everyday <3 days	7.2 (357)	2.33 (2.09-2.60)***	8.4 (91)	3.62 (2.91-4.51)***
Extreme behaviour disturbance	*No*	3.3 (8567)	Reference	2.5 (1693)	Reference
	>7 days	4.3 (928)	1.32 (1.24-1.42)***	3.8 (157)	1.50 (1.27-1.77)***
	<7 days	3.9 (888)	1.18 (1.10-1.27)***	4.4 (224)	1.75 (1.52-2.02)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

Table 12b

30+ ALC designations by evaluated need – behaviour disturbance - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Wandering	*>3 days*	1.0 (2678)	Reference	0.9 (597)	Reference
	>3 days, but present	3.1 (175)	3.25 (2.78-3.80)***	2.8 (43)	3.23 (2.36-4.42)***
	1-2 of <3 days	2.1 (304)	2.16 (1.91-2.43)***	2.9 (101)	3.33 (2.69-4.13)***
	Everyday <3 days	4.6 (502)	4.87 (4.42-5.37)***	6.2 (160)	7.53 (6.30-9.01)***
Inappropriate public sexual behaviour (or public disrobing)	*>3 days*	1.1 (3374)	Reference	1.1 (823)	Reference
	>3 days, but present	4.4 (111)	3.98 (3.28-4.83)***	4.4 (27)	4.08 (2.76-6.03)***
	1-2 of <3 days	1.8 (95)	1.64 (1.33-2.01)***	2.3 (29)	2.08 (1.43-3.03)***
	Everyday <3 days	3.5 (79)	3.17 (2.53-3.98)***	4.1 (22)	3.82 (2.48-5.88)***
Elopement attempts/threats	*>3 days*	1.1 (3101)	Reference	1.1 (739)	Reference
	>3 days, but present	3.0 (196)	2.76 (2.39-3.20)***	3.3 (49)	3.26 (2.43-4.38)***
	1-2 of <3 days	1.6 (210)	1.50 (1.31-1.73)***	2.0 (61)	1.97 (1.52-2.57)***
	Everyday <3 days	3.0 (152)	2.82 (2.39-3.33)***	4.8 (52)	4.78 (3.58-6.37)***
Extreme behaviour disturbance	*No*	1.1 (2957)	Reference	1.1 (720)	Reference
	>7 days	1.7 (363)	1.5 (1.34-1.67)***	1.9 (80)	1.79 (1.42-2.26)***
	<7 days	1.5 (339)	1.3 (1.16-1.46)***	2.0 (101)	1.84 (1.49-2.27)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

In Tables 12a and 12b, wandering showed the greatest differences in ALC rates and OR values, especially if it had occurred daily over the last three days compared to not at all (3.27-7.53 higher odds of ALC status). Generally, when any of the behaviour disturbance indicators had occurred daily over the last three days versus not at all, there were more than twice the odds that the patient would be in the ALC group. Extreme behaviour disturbance was significant across all groups, but had only modest OR values and ALC rates.

Table 13a

Any ALC designations by evaluated need – communication/vision and health conditions - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Hearing (last 3 days)	*Adequate*	3.2 (9360)	Reference	2.5 (1802)	Reference
	Minimal difficulty	8.2 (706)	2.71 (2.50-2.94)***	9.7 (200)	4.28 (3.67-4.99)***
	Hears in special situations only	11.5 (164)	3.94 (3.35-4.65)***	12.5 (35)	5.70 (3.99-8.15)***
	Highly impaired	8.9 (152)	2.97 (2.51-3.51)***	10.2 (37)	4.51 (3.20-6.36)***
Vision (last 3 days)	*Adequate*	3.2 (9089)	Reference	2.5 (1778)	Reference
	Impaired	7.2 (867)	2.37 (2.20-2.54)***	7.4 (200)	3.16 (2.72-3.68)***
	Moderately impaired	7.5 (272)	2.49 (2.20-2.82)***	8.0 (63)	3.46 (2.67-4.50)***
	Highly impaired	9.2 (77)	3.11 (2.46-3.93)***	9.6 (15)	4.23 (2.48-7.21)***
	Severely impaired	11.9 (77)	4.14 (3.26-5.26)***	11.4 (18)	5.11 (3.12-8.37)***
Bladder continence (last 3 days)	*Continent*	3.0 (8462)	Reference	2.1 (1537)	Reference
	Control with catheter	7.4 (110)	2.62 (2.15-3.18)***	8.4 (32)	4.22 (2.92-6.08)***
	Infrequent continence	9.7 (377)	3.52 (3.15-3.92)***	10.3 (103)	5.28 (4.28-6.51)***
	Episode of incontinence	8.0 (187)	2.85 (2.45-3.31)***	8.5 (45)	4.27 (3.13-5.82)***
	Occasionally incontinent	10.3 (284)	3.77 (3.33-4.27)***	10.3 (66)	5.23 (4.04-6.79)***
	Frequently incontinent	13.8 (412)	5.26 (4.73-5.85)***	17.0 (112)	9.4 (7.63-11.59)***
	Incontinent	15.0 (547)	5.82 (5.30-6.39)***	20.2 (178)	11.62 (9.79-13.81)***
	Did not occur	2.9 (3)	0.99 (0.31-3.11)	16.7 (1)	9.17 (1.07-78.52)*
Bowel continence (last 3 days)	*Continent*	3.1 (9175)	Reference	2.3 (1718)	Reference
	Control with ostomy	5.1 (43)	1.67 (1.23-2.27)**	5.9 (12)	2.61 (1.45-4.69)**
	Infrequent continence	12.9 (221)	4.61 (3.99-5.31)***	16.3 (69)	8.16 (6.28-10.61)***
	Episode of incontinence	11.6 (153)	4.06 (3.42-4.81)***	10.2 (30)	4.75 (3.25-6.95)***
	Occasionally incontinent	12.5 (143)	4.43 (3.71-5.28)***	17.8 (47)	9.09 (6.61-12.51)***
	Frequently incontinent	12.9 (133)	4.59 (3.82-5.52)***	16.1 (37)	8.05 (5.64-11.48)***
	Incontinent	15.9 (430)	5.86 (5.27-6.50)***	21.4 (140)	11.46 (9.45-13.89)***
	Did not occur	9.1 (84)	3.09 (2.47-3.88)***	11.5 (21)	5.48 (3.47-8.65)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Table 13b

30+ ALC designations by evaluated need – communication/vision and health conditions - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	**OR (95% CI)**	**% (N)**	**OR (95% CI)**
Hearing (last 3 days)	*Adequate*	1.1 (3218)	Reference	1.0 (766)	Reference
	Minimal difficulty	3.5 (304)	3.30 (2.93-3.72)***	4.9 (101)	4.90 (3.96-6.06)***
	Hears in special situations only	4.5 (65)	4.30 (3.34-5.53)***	5.4 (15)	5.39 (3.19-9.12)***
	Highly impaired	4.2 (72)	3.96 (3.12-5.03)***	5.2 (19)	5.24 (3.29-8.37)***
Vision (last 3 days)	*Adequate*	1.1 (3111)	Reference	1.0 (754)	Reference
	Impaired	2.9 (358)	2.79 (2.49-3.11)***	3.5 (94)	3.41 (2.74-4.24)***
	Moderately impaired	3.4 (122)	3.19 (2.66-3.84)***	4.3 (34)	4.30 (3.03-6.11)***
	Highly impaired	4.4 (37)	4.22 (3.03-5.88)***	4.5 (7)	4.46 (2.08-9.55)***
	Severely impaired	4.7 (31)	4.58 (3.19-6.58)***	7.6 (12)	7.80 (4.31-14.12)***
Bladder continence (last 3 days)	*Continent*	0.9 (2643)	Reference	0.8 (595)	Reference
	Control with catheter	2.7 (41)	3.02 (2.21-4.13)***	3.2 (12)	3.91 (2.19-6.99)***
	Infrequent continence	4.8 (190)	5.47 (4.70-6.36)***	6.0 (60)	7.68 (5.84-10.09)***
	Episode of incontinence	3.4 (81)	3.82 (3.05-4.78)***	4.9 (26)	6.22 (4.16-9.29)***
	Occasionally incontinent	5.1 (143)	5.83 (4.91-6.93)***	4.5 (29)	5.66 (3.87-8.28)***
	Frequently incontinent	7.4 (222)	8.61 (7.47-9.92)***	10.5 (69)	14.06 (10.82-18.27)***
	Incontinent	9.1 (338)	10.87 (9.66-12.24)***	12.4 (109)	16.97 (13.67-21.06)***
	Did not occur	1.0 (1)	1.05 (0.15-7.55)	16.7 (1)	24.0 (2.80-205.72)**
Bowel continence (last 3 days)	*Continent*	1.0 (2992)	Reference	0.9 (692)	Reference
	Control with ostomy	2.8 (24)	2.84 (1.89-4.27)***	2.0 (4)	2.10 (0.78-5.68)
	Infrequent continence	6.6 (114)	6.90 (5.69-8.37)***	9.4 (40)	11.01 (7.88-15.38)***
	Episode of incontinence	5.0 (67)	5.13 (4.00-6.57)***	6.1 (18)	6.87 (4.24-11.13)***
	Occasionally incontinent	6.2 (72)	6.47 (5.08-8.23)***	9.9 (26)	11.55 (7.65-17.43)***
	Frequently incontinent	7.7 (80)	8.14 (6.46-10.25)***	9.6 (22)	11.18 (7.16-17.46)***
	Incontinent	10.0 (276)	10.87 (9.55-12.37)***	13.5 (88)	16.47 (13-20.87)***
	Did not occur	3.6 (34)	3.69 (2.62-5.21)***	6.0 (11)	6.80 (3.68-12.57)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

With each increase in visual impairment, the proportion of ALC designations and the odds of ALC status became significantly higher for all ALC groups. Within hearing, there was an upwards trend in the proportion of ALC designations and OR values for each ascending level of impairment, though hearing in special situations only had the highest odds. Similarly, trouble with bladder and bowel continence generally led to significantly higher odds of ALC status among all groups, although a consistent linear pattern was not observed.

Table 14a

Any ALC designations by evaluated need – extra-pyramidal signs and symptoms - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Akathisia (last 3 days)	*No*	3.4 (10060)	Reference	2.7 (2027)	Reference
	Yes	4.4 (322)	1.30 (1.16-1.45)***	3.6 (47)	1.33 (0.99-1.78)
Dyskinesia (last 3 days)	*No*	3.4 (10168)	Reference	2.7 (2043)	Reference
	Yes	7.6 (214)	2.37 (2.05-2.72)***	5.6 (31)	2.13 (1.48-3.06)***
Tremor (last 3 days)	*No*	3.4 (9789)	Reference	2.7 (1946)	Reference
	Yes	4.9 (593)	1.49 (1.37-1.62)***	4.7 (128)	1.83 (1.52-2.19)***
Rigidity (last 3 days)	*No*	3.4 (10077)	Reference	2.7 (1996)	Reference
	Yes	8.0 (305)	2.51 (2.23-2.82)***	8.7 (78)	3.47 (2.74-4.40)***
Slow, shuffling gait (last 3 days)	*No*	3.2 (9423)	Reference	2.5 (1805)	Reference
	Yes	9.2 (959)	3.06 (2.86-3.28)***	10.9 (269)	4.85 (4.24-5.55)***
Bradykinesia (last 3 days)	*No*	3.4 (10042)	Reference	2.7 (2018)	Reference
	Yes	8.0 (340)	2.50 (2.23-2.80)***	6.6 (56)	2.56 (1.94-3.36)***
Dystonia (last 3 days)	*No*	3.4 (10253)	Reference	2.7 (2050)	Reference
	Yes	6.0 (129)	1.83 (1.53-2.19)***	5.5 (24)	2.07 (1.37-3.13)**

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

Table 14b

30+ ALC designations by evaluated need – extra-pyramidal signs and symptoms - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	**OR (95% CI)**	**% (N)**	**OR (95% CI)**
Akathisia (last 3 days)	*No*	1.2 (3537)	Reference	1.2 (875)	Reference
	Yes	1.6 (122)	1.38 (1.15-1.66)**	2.0 (26)	1.70 (1.14-2.52)**
Dyskinesia (last 3 days)	*No*	1.2 (3558)	Reference	1.2 (883)	Reference
	Yes	3.6 (101)	3.13 (2.56-3.83)***	3.2 (18)	2.83 (1.76-4.55)***
Tremor (last 3 days)	*No*	1.2 (3418)	Reference	1.1 (839)	Reference
	Yes	2.0 (241)	1.72 (1.51-1.96)***	2.3 (62)	2.03 (1.56-2.64)***
Rigidity (last 3 days)	*No*	1.2 (3526)	Reference	1.2 (862)	Reference
	Yes	3.5 (133)	3.03 (2.54-3.62)***	4.3 (39)	3.90 (2.81-5.41)***
Slow, shuffling gait (last 3 days)	*No*	1.1 (3213)	Reference	1.0 (761)	Reference
	Yes	4.2 (446)	4.03 (3.64-4.46)***	5.7 (140)	5.74 (4.77-6.90)***
Bradykinesia (last 3 days)	*No*	1.2 (3519)	Reference	1.2 (868)	Reference
	Yes	3.3 (140)	2.85 (2.40-3.39)***	3.9 (33)	3.46 (2.43-4.93)***
Dystonia (last 3 days)	*No*	1.2 (3605)	Reference	1.2 (890)	Reference
	Yes	2.5 (54)	2.14 (1.63-2.81)***	2.5 (11)	2.15 (1.18-3.93)*

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.
* p <.05, ** p < .01, ***p < .0001

In Tables 14a and 14b, presence of extra-pyramidal signs and symptoms were all associated with significantly higher odds of ALC status, as well as larger proportions of ALC designations. Among them, slow, shuffling gait had the largest percentage of ALC designations and OR values for all groups, with ORs ranging from 3.06-5.74.

Table 15a

Any ALC designations by evaluated need – DSM-IV-TR diagnoses - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Disorders of childhood/adolescence	*No*	3.4 (9994)	Reference	2.7 (1976)	Reference
	Yes	6.4 (390)	1.98 (1.78-2.20)***	5.9 (98)	2.29 (1.86-2.82)***
Delirium, dementia and amnestic and other cognitive disorders	*No*	2.7 (7701)	Reference	1.7 (1217)	Reference
	Yes	15.3 (2683)	6.54 (6.24-6.85)***	20.1 (857)	14.61 (13.3-16.05)***
Mental disorders due to general medical conditions	*No*	3.3 (9953)	Reference	2.7 (1996)	Reference
	Yes	9.1 (431)	2.90 (2.62-3.21)***	8.0 (78)	3.18 (2.51-4.02)***
Substance-related disorders	*No*	3.9 (8899)	Reference	3.1 (1822)	Reference
	Yes	2.0 (1485)	0.52 (0.49-0.55)***	1.4 (252)	0.44 (0.39-0.50)***
Schizophrenia and other psychotic disorders	*No*	3.0 (6029)	Reference	2.7 (1323)	Reference
	Yes	4.2 (4355)	1.40 (1.34-1.45)***	2.8 (751)	1.05 (0.96-1.15)
Mood disorders	*No*	4.5 (6479)	Reference	4.0 (1434)	Reference
	Yes	2.4 (3905)	0.52 (0.50-0.54)***	1.6 (640)	0.40 (0.36-0.44)***
Anxiety disorders	*No*	3.6 (9458)	Reference	2.9 (1932)	Reference
	Yes	2.4 (926)	0.67 (0.62-0.71)***	1.4 (142)	0.46 (0.38-0.54)***
Somatoform disorders	*No*	3.4 (10341)	Reference	2.7 (2069)	Reference
	Yes	2.8 (43)	0.81 (0.60-1.10)	1.3 (5)	0.46 (0.19-1.12)
Factitious disorders	*No*	3.4 (10374)	Reference	2.7 (2073)	Reference
	Yes	5.0 (10)	1.47 (0.78-2.78)	2.2 (1)	0.81 (0.11-5.90)
Dissociative disorders	*No*	3.4 (10362)	Reference	2.7 (2070)	Reference
	Yes	2.0 (22)	0.59 (0.39-0.90)*	1.6 (4)	0.56 (0.21-1.51)
Sexual and gender identity disorders	*No*	3.4 (10357)	Reference	2.7 (2068)	Reference
	Yes	5.1 (27)	1.53 (1.04-2.25)*	4.4 (6)	1.66 (0.73-3.78)
Eating disorders	*No*	3.4 (10312)	Reference	2.8 (2066)	Reference
	Yes	1.6 (72)	0.45 (0.36-0.57)***	0.7 (8)	0.25 (0.12-0.49)***
Sleep disorders	*No*	3.4 (10303)	Reference	2.7 (2064)	Reference
	Yes	4.3 (81)	1.28 (1.02-1.60)*	2.8 (10)	1.02 (0.55-1.92)
Impulse-control disorders not classified elsewhere	*No*	3.4 (10163)	Reference	2.7 (2031)	Reference
	Yes	4.8 (221)	1.44 (1.26-1.65)***	4.3 (43)	1.62 (1.19-2.21)**

Adjustment disorders	*No*	3.5 (10074)	Reference	2.8 (2029)	Reference
	Yes	2.3 (310)	0.66 (0.59-0.75)***	1.3 (45)	0.47 (0.35-0.64)***
Personality disorders	*No*	3.5 (9639)	Reference	2.8 (1936)	Reference
	Yes	2.5 (745)	0.70 (0.65-0.75)***	1.9 (138)	0.69 (0.58-0.82)***
Comorbid disorders	*No*	3.5 (6197)	Reference	2.9 (1288)	Reference
	Yes	3.0 (4185)	0.96 (0.92-1.00)	2.5 (786)	0.88 (0.81-0.96)**
Intellectual disability	*No*	3.2 (9383)	Reference	2.5 (1844)	Reference
	Yes	8.4 (992)	2.77 (2.59-2.98)***	8.1 (230)	3.40 (2.95-3.92)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* $p < .05$, ** $p < .01$, ***$p < .0001$

Table 15b

30+ ALC designations by evaluated need – DSM-IV-TR diagnoses - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Disorders of childhood/adolescence	*No*	1.2 (3450)	Reference	1.1 (844)	Reference
	Yes	3.4 (209)	3.03 (2.63-3.49)***	3.4 (57)	3.08 (2.35-4.05)***
Delirium, dementia and amnestic and other cognitive disorders	*No*	0.8 (2330)	Reference	0.6 (455)	Reference
	Yes	7.5 (1329)	9.94 (9.27-10.65)***	10.5 (446)	18.34 (16.03-20.99)***
Mental disorders due to general medical conditions	*No*	1.1 (3450)	Reference	1.2 (866)	Reference
	Yes	4.4 (209)	3.94 (3.42-4.55)***	3.6 (35)	3.18 (2.26-4.49)***
Substance-related disorders	*No*	1.4 (3304)	Reference	1.4 (822)	Reference
	Yes	0.5 (355)	0.34 (0.30-0.38)***	0.4 (79)	0.31 (0.25-0.39)***
Schizophrenia and other psychotic disorders	*No*	1.0 (1907)	Reference	1.1 (560)	Reference
	Yes	1.7 (1752)	1.76 (1.65-1.88)***	1.3 (341)	1.13 (0.99-1.30)
Mood disorders	*No*	1.9 (2704)	Reference	1.9 (688)	Reference
	Yes	0.6 (955)	0.31 (0.29-0.33)***	0.5 (213)	0.28 (0.24-0.32)***
Anxiety disorders	*No*	1.3 (3430)	Reference	1.3 (857)	Reference
	Yes	0.6 (229)	0.46 (0.40-0.52)***	0.4 (44)	0.32 (0.24-0.44)***
Somatoform disorders	*No*	1.2 (3647)	Reference	1.2 (900)	Reference
	Yes	0.8 (12)	0.64 (0.36-1.14)	0.3 (1)	0.21 (0.03-1.52)
Factitious disorders	*No*	1.2 (3655)	Reference	1.2 (901)	Reference
	Yes	2.0 (4)	1.66 (0.62-4.49)	0.0 (0)	0
Dissociative disorders	*No*	1.2 (3651)	Reference	1.2 (900)	Reference
	Yes	0.7 (8)	0.62 (0.31-1.23)	0.4 (1)	0.32 (0.05-2.31)
Sexual and gender identity disorders	*No*	1.2 (3646)	Reference	1.2 (897)	Reference
	Yes	2.4 (13)	2.08 (1.20-3.60)**	3.0 (4)	2.56 (0.94-6.93)
Eating disorders	*No*	1.2 (3635)	Reference	1.2 (898)	Reference
	Yes	0.5 (24)	0.43 (0.29-0.64)***	0.3 (3)	0.22 (0.07-0.67)**
Sleep disorders	*No*	1.2 (3632)	Reference	1.2 (898)	Reference
	Yes	1.4 (27)	1.20 (0.82-1.75)	0.8 (3)	0.70 (0.23-2.20)

Impulse-control disorders not classified elsewhere	*No*	1.2 (3553)	Reference	1.2 (879)	Reference
	Yes	2.3 (106)	1.97 (1.62-2.40)***	2.2 (22)	1.91 (1.24-2.92)**
Adjustment disorders	*No*	1.2 (3594)	Reference	1.2 (890)	Reference
	Yes	0.5 (65)	0.39 (0.31-0.50)***	0.3 (11)	0.27 (0.15-0.48)***
Personality disorders	*No*	1.3 (3464)	Reference	1.2 (858)	Reference
	Yes	0.6 (195)	0.51 (0.44-0.59)***	0.6 (43)	0.49 (0.36-0.66)***
Comorbid disorders	*No*	1.2 (2220)	Reference	1.3 (583)	Reference
	Yes	1.1 (1437)	0.92 (0.86-0.99)*	1.0 (318)	0.79 (0.69-0.90)**
Intellectual disability	*No*	1.1 (3147)	Reference	1.1 (768)	Reference
	Yes	4.3 (509)	4.13 (3.75-4.54)***	4.7 (133)	4.62 (3.83-5.58)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

Among the provisional and DSM-IV-TR diagnoses, cognitive disorders had the highest designation rates and OR values for ALC status across all groups. Conversely, mood disorders had the lowest designations rates and OR values for ALC status across all groups; individuals with a diagnosis of a mood disorder had less than half the odds of becoming ALC. Other DSM-IV-TR diagnoses with significant, positive OR values include: disorders of childhood adolescence, mental disorders due to general medical conditions, schizophrenia (OMHRS only), sexual and gender identity disorders (OMHRS only), and impulse-control disorders. DSM-IV-TR diagnoses with significant ORs below 1.00 include: substance-related disorders, anxiety disorders, eating disorders, adjustment disorders, and personality disorders. Comorbid disorders, defined as two or more DSM-IV-TR diagnoses, had modestly significant lower odds of ALC status for all groups except any ALC in OMHRS. Finally, presence of an intellectual disability demonstrated higher odds of ALC status for all groups, with OR values ranging from 2.77-4.62.

Table 16a

Any ALC designations by evaluated need – RAI-MH scales - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-care Index (SCI)	*0*	1.7 (1349)	Reference	0.9 (189)	Reference
	1	1.9 (1306)	1.16 (1.08-1.25)**	1.0 (165)	1.12 (0.91-1.38)
	2	5.2 (3675)	3.24 (3.04-3.45)***	4.8 (824)	5.65 (4.82-6.63)***
	3	3.4 (329)	2.08 (1.84-2.35)***	2.3 (52)	2.65 (1.94-3.61)***
	4	4.6 (1843)	2.85 (2.65-3.06)***	4.1 (422)	4.77 (4.01-5.67)***
	5	4.5 (737)	2.80 (2.55-3.07)***	3.6 (156)	4.18 (3.37-5.17)***
	6	6.6 (1144)	4.23 (3.9-4.58)***	6.9 (266)	8.25 (6.83-9.98)***
Severity of Self-harm scale (SoS)	*0*	2.2 (1408)	Reference	1.3 (211)	Reference
	1	7.8 (3218)	3.80 (3.56-4.05)***	9.0 (752)	7.33 (6.27-8.56)***
	2	3.2 (2362)	1.48 (1.38-1.58)***	2.3 (437)	1.73 (1.47-2.04)***
	3	9.1 (758)	4.47 (4.08-4.89)***	11.1 (195)	9.17 (7.49-11.21)***
	4	2.3 (998)	1.04 (0.96-1.13)	1.5 (151)	1.14 (0.92-1.41)
	5	2.3 (1376)	1.07 (0.99-1.15)	1.9 (231)	1.41 (1.16-1.70)**
	6	1.9 (263)	0.88 (0.77-1.01)	1.2 (26)	0.87 (0.57-1.30)
Risk of Harm to Others scale (RHO)	*0*	2.8 (2412)	Reference	2.2 (504)	Reference
	1	2.4 (1956)	0.86 (0.81-0.92)***	1.7 (330)	0.77 (0.67-0.89)**
	2	3.7 (1835)	1.34 (1.26-1.42)***	3.0 (320)	1.42 (1.23-1.63)***
	3	5.2 (917)	1.90 (1.76-2.05)***	4.2 (151)	2.01 (1.67-2.42)***
	4	4.0 (1248)	1.45 (1.36-1.56)***	3.3 (207)	1.53 (1.30-1.80)***
	5	5.8 (1530)	2.14 (2.00-2.28)***	5.9 (165)	2.87 (2.39-3.43)***
	6	3.9 (485)	1.40 (1.27-1.55)***	3.9 (42)	1.84 (1.33-2.54)**
Social withdrawal scale	*0*	3.5 (4189)	Reference	2.9 (907)	Reference
	1-4	3.5 (2587)	1.00 (0.95-1.05)	2.6 (481)	0.90 (0.81-1.01)
	5-8	3.1 (1919)	0.88 (0.83-0.93)***	2.3 (341)	0.80 (0.70-0.90)**
	9-12	3.4 (1688)	0.95 (0.89-1.00)	2.9 (345)	0.98 (0.87-1.12)
Mania scale	*0*	2.9 (3909)	Reference	2.1 (737)	Reference
	1-3	3.8 (2976)	1.30 (1.24-1.37)***	3.2 (619)	1.51 (1.35-1.68)***

	4-8	3.9 (2485)	1.35 (1.29-1.42)***	3.5 (516)	1.65 (1.47-1.85)***
	9-20	3.4 (1013)	1.18 (1.10-1.26)***	2.9 (202)	1.35 (1.16-1.59)**
Positive Symptoms Scale – Long(PSSL)	*0*	2.7 (3515)	Reference	2.1 (693)	Reference
	1-3	4.1 (2550)	1.53 (1.45-1.61)***	3.3 (512)	1.58 (1.41-1.78)***
	4-8	4.0 (2666)	1.47 (1.40-1.55)***	3.3 (562)	1.60 (1.43-1.80)***
	9-24	3.7 (1652)	1.38 (1.30-1.46)***	2.8 (307)	1.35 (1.18-1.55)***
Instrumental Activities of Daily Living scale (IADL)	*0*	1.6 (2916)	Reference	1.0 (445)	Reference
	1-3	2.5 (974)	1.51 (1.41-1.63)***	1.5 (156)	1.54 (1.28-1.85)***
	4-9	4.3 (1668)	2.69 (2.53-2.86)***	3.3 (293)	3.47 (2.99-4.03)***
	10-18	7.1 (1796)	4.55 (4.28-4.83)***	6.1 (347)	6.67 (5.78-7.70)***
	19-30	13.4 (3029)	9.23 (8.75-9.73)***	16.5 (833)	20.16 (17.89-22.72)***
Activities of Daily Living scale (ADL)	*0*	2.4 (6308)	Reference	1.5 (1006)	Reference
	1-2	6.4 (1458)	2.72 (2.57-2.89)***	6.5 (329)	4.52 (3.98-5.14)***
	3-4	8.7 (845)	3.82 (3.55-4.12)***	10.7 (219)	7.73 (6.63-9.01)***
	5-7	12.5 (677)	5.70 (5.24-6.20)***	15.5 (190)	11.9 (10.07-14.06)***
	8-16	13.5 (1095)	6.25 (5.84-6.69)***	18.3 (330)	14.49 (12.66-16.58)***
Depressive Severity Index (DSI)	*0*	4.4 (3299)	Reference	3.6 (733)	Reference
	1-3	3.9 (3905)	0.88 (0.84-0.92)***	3.1 (759)	0.86 (0.77-0.95)**
	4-7	2.6 (1982)	0.59 (0.56-0.62)***	2.2 (409)	0.60 (0.53-0.68)***
	8-15	2.3 (1197)	0.52 (0.49-0.55)***	1.4 (173)	0.38 (0.33-0.45)***
Cognitive Performance Scale (CPS)	*0*	2.0 (3806)	Reference	1.1 (526)	Reference
	1-2	4.4 (3662)	2.31 (2.20-2.42)***	3.6 (733)	3.44 (3.07-3.85)***
	3-6	11 (2915)	6.22 (5.91-6.54)***	13.6 (815)	14.73 (13.15-16.49)***
Aggressive Behaviour Scale (ABS)	*0*	2.6 (5743)	Reference	1.9 (1093)	Reference
	1-3	5.1 (2309)	1.99 (1.90-2.10)***	4.0 (444)	2.12 (1.89-2.37)***
	4-6	5.7 (1428)	2.26 (2.13-2.40)***	5.4 (320)	2.86 (2.52-3.25)***
	7-12	6.9 (903)	2.76 (2.57-2.97)***	7.2 (217)	3.91 (3.37-4.55)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

Table 16b

30+ ALC designations by evaluated need – RAI-MH scales - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-care Index (SCI)	*0*	0.3 (226)	Reference	0.2 (41)	Reference
	1	0.4 (280)	1.48 (1.24-1.77)***	0.3 (49)	1.53 (1.01-2.32)*
	2	2.2 (1603)	8.29 (7.21-9.53)***	2.5 (422)	13.11 (9.51-18.08)***
	3	1.2 (117)	4.38 (3.50-5.48)***	1.1 (25)	5.84 (3.54-9.62)***
	4	1.6 (659)	5.97 (5.13-6.95)***	1.6 (170)	8.70 (6.18-12.24)***
	5	1.7 (282)	6.29 (5.28-7.50)***	1.5 (64)	7.78 (5.25-11.53)***
	6	2.8 (492)	10.52 (8.98-12.33)***	3.4 (130)	18.05 (12.68-25.68)***
Severity of Self-harm scale (SoS)	*0*	0.6 (380)	Reference	0.4 (70)	Reference
	1	3.7 (1517)	6.44 (5.75-7.22)***	4.9 (405)	11.47 (8.89-14.81)***
	2	1.1 (834)	1.92 (1.70-2.17)***	1.0 (187)	2.22 (1.69-2.93)***
	3	4.0 (342)	7.15 (6.17-8.29)***	5.8 (103)	13.91 (10.23-18.92)***
	4	0.6 (256)	0.99 (0.84-1.16)	0.5 (48)	1.09 (0.76-1.58)
	5	0.5 (287)	0.82 (0.71-0.96)*	0.6 (69)	1.26 (0.90-1.76)
	6	0.3 (43)	0.53 (0.39-0.73)***	0.1 (3)	0.30 (0.10-0.96)*
Risk of Harm to Others scale (RHO)	*0*	0.9 (757)	Reference	0.9 (205)	Reference
	1	0.6 (460)	0.65 (0.58-0.73)***	0.5 (97)	0.56 (0.44-0.71)***
	2	1.4 (715)	1.66 (1.49-1.83)***	1.5 (154)	1.67 (1.36-2.06)***
	3	2.0 (354)	2.30 (2.03-2.61)***	2.0 (71)	2.30 (1.75-3.02)***
	4	1.6 (493)	1.82 (1.63-2.04)***	1.6 (100)	1.81 (1.42-2.30)***
	5	2.6 (689)	3.02 (2.73-3.36)***	2.9 (81)	3.40 (2.62-4.41)***
	6	1.5 (191)	1.74 (1.49-2.05)***	1.7 (18)	1.92 (1.18-3.12)**
Social withdrawal scale	*0*	1.4 (1655)	Reference	1.3 (419)	Reference
	1-4	1.2 (870)	0.85 (0.78-0.92)**	1.2 (221)	0.90 (0.76-1.06)
	5-8	1.0 (596)	0.69 (0.63-0.76)***	1.0 (140)	0.71 (0.58-0.86)**
	9-12	1.1 (538)	0.76 (0.69-0.84)***	1.0 (121)	0.74 (0.61-0.91)**
Mania scale	*0*	0.9 (1251)	Reference	0.9 (297)	Reference
	1-3	1.4 (1102)	1.50 (1.38-1.63)***	1.5 (285)	1.71 (1.46-2.02)***

	4-8	1.5 (938)	1.59 (1.46-1.73)***	1.5 (223)	1.76 (1.48-2.09)***
	9-20	1.2 (368)	1.33 (1.18-1.50)***	1.4 (96)	1.59 (1.26-2.01)***
Positive Symptoms Scale – Long (PSSL)	*0*	0.9 (1127)	Reference	0.9 (297)	Reference
	1-3	1.5 (929)	1.73 (1.58-1.88)***	1.4 (223)	1.60 (1.34-1.90)***
	4-8	1.4 (968)	1.66 (1.52-1.80)***	1.5 (249)	1.65 (1.39-1.95)***
	9-24	1.4 (635)	1.64 (1.49-1.81)***	1.2 (132)	1.35 (1.10-1.66)**
Instrumental Activities of Daily Living scale (IADL)	*0*	0.3 (475)	Reference	0.2 (110)	Reference
	1-3	0.6 (235)	2.23 (1.91-2.61)***	0.5 (50)	1.99 (1.43-2.79)***
	4-9	1.4 (560)	5.45 (4.82-6.16)***	1.3 (114)	5.39 (4.14-7.01)***
	10-18	3.0 (775)	11.68 (10.41-13.11)***	2.9 (167)	12.65 (9.93-16.12)***
	19-30	7.0 (1614)	28.35 (25.57-31.43)***	9.1 (460)	41.69 (33.78-51.44)***
Activities of Daily Living scale (ADL)	*0*	0.6 (1642)	Reference	0.5 (339)	Reference
	1-2	3.1 (709)	5.00 (4.57-5.46)***	3.4 (169)	6.73 (5.58-8.11)***
	3-4	4.2 (405)	6.81 (6.10-7.61)***	5.6 (115)	11.52 (9.28-14.30)***
	5-7	6.0 (330)	10.09 (8.93-11.39)***	7.9 (97)	16.70 (13.23-21.09)***
	8-16	7.0 (573)	11.80 (10.71-13.02)***	10 (181)	21.63 (17.94-26.08)***
Depressive Severity Index (DSI)	*0*	1.9 (1411)	Reference	1.7 (362)	Reference
	1-3	1.4 (1418)	0.75 (0.69-0.80)***	1.4 (346)	0.79 (0.68-0.92)**
	4-7	0.7 (558)	0.39 (0.35-0.43)***	0.8 (141)	0.42 (0.35-0.51)***
	8-15	0.5 (272)	0.28 (0.24-0.32)***	0.4 (52)	0.24 (0.18-0.32)***
Cognitive Performance Scale (CPS)	*0*	0.4 (854)	Reference	0.3 (155)	Reference
	1-2	1.6 (1333)	3.69 (3.39-4.02)***	1.5 (308)	4.84 (3.99-5.88)***
	3-6	5.5 (1472)	13.31 (12.22-14.5)***	7.3 (438)	25.22 (20.95-30.35)***
Aggressive Behaviour Scale (ABS)	*0*	0.7 (1644)	Reference	0.7 (387)	Reference
	1-3	2.1 (959)	2.86 (2.64-3.10)***	2.1 (226)	3.02 (2.56-3.56)***
	4-6	2.5 (623)	3.39 (3.09-3.73)***	2.8 (164)	4.08 (3.39-4.91)***
	7-12	3.3 (433)	4.52 (4.06-5.03)***	4.1 (124)	6.19 (5.04-7.61)***

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

The majority of the interRAI scales were consistently significant across all groups. For example, the IADL scale was associated with strikingly high rates of ALC status and OR values for all groups, with each increase in impairment leading to greater odds of being designated ALC. Compared to no impairment, the highest level of IADL impairment led to 28.35 greater odds of having 30 or more ALC days in OMHRS, and 41.69 greater odds in WTIS. Similarly, the ADL scale displayed a significant upwards trend for both proportion of ALC designations and OR values. It should be noted that among the WTIS ALC groups, variability around the 95% CIs was much larger than it was for the OMHRS groups.

Along with the IADL and ADL scales, the CPS was one of the most significant scales to positively predict ALC status. Those who scored as the most impaired had 13.31 greater odds of having 30+ ALC days in OMHRS, and 25.22 greater odds in WTIS (once again, variability around the 95% CIs was considerably wider for WTIS). Other scales that demonstrated greater odds of ALC status, in descending order of strength of association, include the SCI, ABS, PSS-L, and Mania scales. The RHO also displayed significant OR values, but the proportion of ALC designations and OR values did not show a linear pattern.

The DSI was the most negatively associated scale in relation to ALC status. Each increase in score on the DSI resulted in incrementally lower odds of being in any of the ALC groups. Those who had the most severe depressive symptoms were approximately 75% less likely to have 30 days of ALC than those who had no symptoms. Higher scores on the SoS also led to lower odds of becoming ALC, albeit less so than scores on the DSI. Higher scores on the social withdrawal scale led to significantly lower odds of being in the 30+ ALC groups, but were insignificant amongst the any ALC groups.

Table 17a

Any ALC designations by evaluated need – InterRAI MH CAPs - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (Any ALC)		WTIS (Any ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-Harm CAP	*0*	4.1 (7746)	Reference	3.6 (1595)	Reference
	1	2.3 (998)	0.54 (0.51-0.58)***	1.5 (151)	0.42 (0.36-0.5)***
	2	2.3 (1639)	0.54 (0.51-0.57)***	1.8 (257)	0.49 (0.43-0.56)***
Harm to Others CAP	*0*	2.8 (5883)	Reference	2.1 (1133)	Reference
	1	4.4 (2485)	1.58 (1.51-1.66)***	3.7 (406)	1.75 (1.56-1.96)***
	2	5.2 (2015)	1.88 (1.79-1.98)***	5.4 (207)	2.6 (2.24-3.03)***
Self-Care CAP	*0*	1.8 (2655)	Reference	0.9 (354)	Reference
	1	4.8 (6584)	2.78 (2.66-2.91)***	4.3 (1454)	4.75 (4.22-5.34)***
	2	6.6 (1144)	3.94 (3.67-4.23)***	6.9 (266)	7.85 (6.67-9.23)***
Social Relationships CAP	*0*	3.6 (4968)	Reference	2.7 (963)	Reference
	1	2.7 (2304)	0.75 (0.72-0.79)***	2.4 (500)	0.90 (0.81-1.01)
	2	3.8 (3112)	1.05 (1.01-1.10)*	3.1 (611)	1.15 (1.04-1.28)**
Social Supports for Discharge (SSDIS) CAP	*0*	3.0 (6105)	Reference	2.0 (1070)	Reference
	1	4.4 (4279)	1.50 (1.44-1.56)***	4.2 (1004)	2.12 (1.94-2.31)***
Interpersonal Conflict CAP	*0*	3.0 (5427)	Reference	2.3 (1090)	Reference
	1	4.0 (3225)	1.36 (1.30-1.42)***	3.3 (643)	1.47 (1.33-1.62)***
	2	4.5 (1731)	1.54 (1.46-1.63)***	4.0 (341)	1.81 (1.60-2.05)***
Traumatic Life Events CAP	*0*	3.6 (9197)	Reference	2.9 (1836)	Reference
	1	2.0 (504)	0.55 (0.51-0.61)***	1.5 (111)	0.52 (0.43-0.63)***
	2	3.0 (683)	0.83 (0.77-0.90)***	2.3 (127)	0.80 (0.67-0.96)*
Personal Finances CAP	*0*	2.1 (4851)	Reference	1.4 (777)	Reference
	1	9.7 (4998)	4.92 (4.72-5.13)***	10.1 (1164)	8.09 (7.37-8.88)***
	2	2.0 (535)	0.95 (0.86-1.03)	1.7 (133)	1.28 (1.06-1.54)*
Education & Employment CAP	*0*	4.2 (8454)	Reference	3.6 (1779)	Reference
	1	2.1 (771)	0.49 (0.46-0.53)***	1.4 (151)	0.38 (0.32-0.45)***
	2	1.8 (1159)	0.41 (0.38-0.43)***	0.9 (144)	0.25 (0.21-0.30)***
Rehospitalization CAP	*0*	3.1 (5554)	Reference	2.5 (1097)	Reference

	1	3.9 (3301)	1.25 (1.20-1.31)***	3.0 (653)	1.24 (1.13-1.37)***
	2	3.7 (1528)	1.20 (1.13-1.27)***	3.2 (324)	1.30 (1.15-1.48)***
Control Interventions CAP	*0*	3.1 (7472)	Reference	2.4 (1502)	Reference
	1	4.5 (1466)	1.47 (1.38-1.55)***	3.4 (276)	1.39 (1.22-1.59)***
	2	4.9 (1446)	1.61 (1.52-1.71)***	4.7 (296)	1.97 (1.74-2.24)***
Medication Management and Adherence CAP	*0*	2.0 (3238)	Reference	1.1 (484)	Reference
	1	1.4 (172)	0.70 (0.60-0.82)***	1.2 (37)	1.01 (0.72-1.41)
	2	5.6 (6974)	2.97 (2.84-3.10)***	5.1 (1553)	4.67 (4.21-5.17)***
Substance Abuse CAP	*0*	4.4 (7307)	Reference	3.7 (1538)	Reference
	1	3.3 (573)	0.73 (0.67-0.79)***	2.7 (118)	0.73 (0.60-0.88)**
	2	2.1 (2504)	0.46 (0.44-0.48)***	1.4 (418)	0.36 (0.33-0.40)***
Weight Management CAP	*0*	3.4 (6307)	Reference	2.8 (1340)	Reference
	1	4.0 (677)	1.18 (1.09-1.28)***	3.5 (128)	1.24 (1.03-1.49)*
	2	3.4 (3400)	1.00 (0.96-1.04)	2.4 (606)	0.87 (0.79-0.95)**
Exercise CAP	*0*	2.7 (6259)	Reference	2.3 (1362)	Reference
	1	7.2 (1619)	2.78 (2.63-2.94)***	6.4 (281)	2.92 (2.56-3.33)***
	2	4.8 (2504)	1.81 (1.73-1.90)***	3.6 (431)	1.58 (1.41-1.76)***
Sleep Disturbance CAP	*0*	3.6 (6745)	Reference	3.0 (1443)	Reference
	1	2.8 (3092)	0.76 (0.73-0.79)***	1.8 (470)	0.59 (0.53-0.66)***
	2	11.8 (547)	3.58 (3.27-3.93)***	16.1 (161)	6.27 (5.25-7.48)***
Pain CAP	*0*	3.5 (9154)	Reference	2.7 (1779)	Reference
	1	3.2 (1028)	0.92 (0.86-0.98)*	3.2 (257)	1.22 (1.07-1.39)**
	2	2.9 (202)	0.83 (0.72-0.96)**	2.4 (38)	0.90 (0.65-1.24)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

Table 17b

30+ ALC designations by evaluated need – InterRAI MH CAPs - among mental health inpatients in Ontario, 2005-14 (OMHRS) and 2011-13 (WTIS)

		OMHRS (30+ Days ALC)		WTIS (30+ Days ALC)	
		% (N)	OR (95% CI)	% (N)	OR (95% CI)
Self-Harm CAP	*0*	1.6 (3073)	Reference	1.7 (765)	Reference
	1	0.6 (256)	0.35 (0.31-0.40)***	0.5 (48)	0.28 (0.21-0.38)***
	2	0.5 (330)	0.27 (0.25-0.31)***	0.5 (72)	0.29 (0.23-0.37)***
Harm to Others CAP	*0*	0.9 (1818)	Reference	0.8 (447)	Reference
	1	1.7 (961)	1.96 (1.81-2.12)***	1.8 (194)	2.10 (1.78-2.49)***
	2	2.2 (880)	2.63 (2.42-2.85)***	2.6 (99)	3.11 (2.49-3.87)***
Self-Care CAP	*0*	0.3 (506)	Reference	0.2 (90)	Reference
	1	1.9 (2661)	5.81 (5.28-6.39)***	2.0 (681)	8.60 (6.90-10.71)***
	2	2.8 (492)	8.63 (7.61-9.77)***	3.4 (130)	14.64 (11.17-19.19)***
Social Relationships CAP	*0*	1.3 (1815)	Reference	1.2 (420)	Reference
	1	0.9 (735)	0.66 (0.61-0.72)***	0.9 (193)	0.80 (0.68-0.95)*
	2	1.3 (1109)	1.02 (0.95-1.10)	1.5 (288)	1.25 (1.07-1.45)**
Social Supports for Discharge (SSDIS) CAP	*0*	0.9 (1868)	Reference	0.8 (438)	Reference
	1	1.8 (1791)	2.04 (1.91-2.18)***	2.0 (463)	2.36 (2.07-2.69)***
Interpersonal Conflict CAP	*0*	0.9 (1738)	Reference	0.9 (449)	Reference
	1	1.5 (1239)	1.63 (1.51-1.75)***	1.5 (288)	1.59 (1.37-1.85)***
	2	1.7 (682)	1.88 (1.72-2.06)***	1.9 (164)	2.09 (1.75-2.51)***
Traumatic Life Events CAP	*0*	1.3 (3327)	Reference	1.3 (807)	Reference
	1	0.5 (135)	0.41 (0.35-0.49)***	0.7 (47)	0.50 (0.38-0.68)***
	2	0.9 (197)	0.67 (0.58-0.77)***	0.9 (47)	0.68 (0.50-0.91)**
Personal Finances CAP	*0*	0.5 (1107)	Reference	0.4 (236)	Reference
	1	4.7 (2422)	10.03 (9.34-10.78)***	5.4 (621)	13.63 (11.72-15.86)***
	2	0.5 (130)	1.01 (0.84-1.21)	0.6 (44)	1.39 (1.00-1.91)
Education & Employment CAP	*0*	1.6 (3209)	Reference	1.6 (803)	Reference
	1	0.5 (183)	0.31 (0.27-0.36)***	0.5 (50)	0.28 (0.21-0.37)***
	2	0.4 (267)	0.25 (0.22-0.28)***	0.3 (48)	0.19 (0.14-0.25)***
Rehospitalization CAP	*0*	1.0 (1730)	Reference	1.0 (449)	Reference

	1	1.5 (1291)	1.57 (1.46-1.68)***	1.4 (297)	1.38 (1.19-1.60)***
	2	1.5 (638)	1.61 (1.47-1.76)***	1.5 (155)	1.52 (1.27-1.83)***
Control Interventions CAP	*0*	1.1 (2578)	Reference	1.0 (633)	Reference
	1	1.6 (520)	1.50 (1.36-1.64)***	1.6 (127)	1.52 (1.25-1.84)***
	2	1.9 (561)	1.80 (1.64-1.97)***	2.2 (141)	2.21 (1.84-2.65)***
Medication Management and Adherence CAP	*0*	0.4 (613)	Reference	0.3 (131)	Reference
	1	0.3 (34)	0.74 (0.52-1.04)	0.1 (4)	0.40 (0.15-1.09)
	2	2.4 (3012)	6.64 (6.08-7.24)***	2.5 (766)	8.35 (6.93-10.05)***
Substance Abuse CAP	*0*	1.8 (2983)	Reference	1.8 (727)	Reference
	1	1.2 (212)	0.66 (0.58-0.76)***	1.4 (61)	0.81 (0.62-1.05)
	2	0.4 (464)	0.21 (0.19-0.23)***	0.4 (113)	0.21 (0.17-0.26)***
Weight Management CAP	*0*	1.2 (2221)	Reference	1.2 (587)	Reference
	1	1.4 (240)	1.18 (1.03-1.35)*	1.5 (57)	1.26 (0.95-1.65)
	2	1.2 (1198)	1.00 (0.93-1.07)	1.0 (257)	0.84 (0.72-0.97)*
Exercise CAP	*0*	0.9 (2096)	Reference	0.9 (563)	Reference
	1	2.8 (641)	3.20 (2.92-3.50)***	3.1 (134)	3.30 (2.72-3.99)***
	2	1.8 (922)	1.97 (1.82-2.13)***	1.7 (204)	1.80 (1.53-2.11)***
Sleep Disturbance CAP	*0*	1.3 (2505)	Reference	1.3 (626)	Reference
	1	0.8 (862)	0.57 (0.53-0.62)***	0.7 (179)	0.52 (0.44-0.62)***
	2	6.2 (292)	4.93 (4.35-5.59)***	9.6 (96)	8.13 (6.50-10.18)***
Pain CAP	*0*	1.2 (3286)	Reference	1.2 (783)	Reference
	1	1.0 (337)	0.84 (0.75-0.94)**	1.3 (104)	1.12 (0.91-1.37)
	2	0.5 (36)	0.41 (0.30-0.57)***	0.9 (14)	0.75 (0.44-1.28)

Note. OR = odds ratio; CI = confidence interval. % indicates the percentage of patients designated ALC by each level of the independent variable. Variations in sample size are due to the deletion of missing cases.

* p <.05, ** p < .01, ***p < .0001

Tables 17a and 17b display the descriptive data for all of the interRAI mental health CAPs. In this paragraph, only those CAPs that contained significant, positive ORs will be discussed. Trigger level two of the Self-Care CAP had the highest proportion of ALC designations and OR values in this category, with 8.63 greater odds of having 30 or more ALC days in OMHRS and 14.64 greater odds in WTIS. Triggering level one of the Personal Finances CAP had a similarly high value, though level two was insignificant within the OMHRS groups. CAPs with more modest OR values include Harm to Others, Social Supports for Discharge, Control Interventions, Exercise, Interpersonal Conflict, Rehospitalization, and Medication Management (level one only). Trigger level two of the Sleep Disturbance CAP led to significantly higher odds of an ALC designation, although it is likely that this is due to the cognitive impairment specification unique to level two, as trigger level one had significantly lower odds of ALC.

In addition to CAPs that were positively associated with ALC status, there were CAPs that were negatively associated. For instance, both trigger levels of the Self-Harm CAP contained roughly equal proportions of ALC designations - which were lower than that of the non-triggered level – as well as OR values that were significantly negative. Other such CAPs include Sleep Disturbance (level one), Substance Use, Education & Employment, Traumatic Life Events, and Pain (OMHRS only).

Additional Descriptive Statistics

This section includes additional descriptive statistics that were conducted throughout the project to answer questions and comments received during presentations with the Ontario Hospital Association (OHA) and other stakeholders.
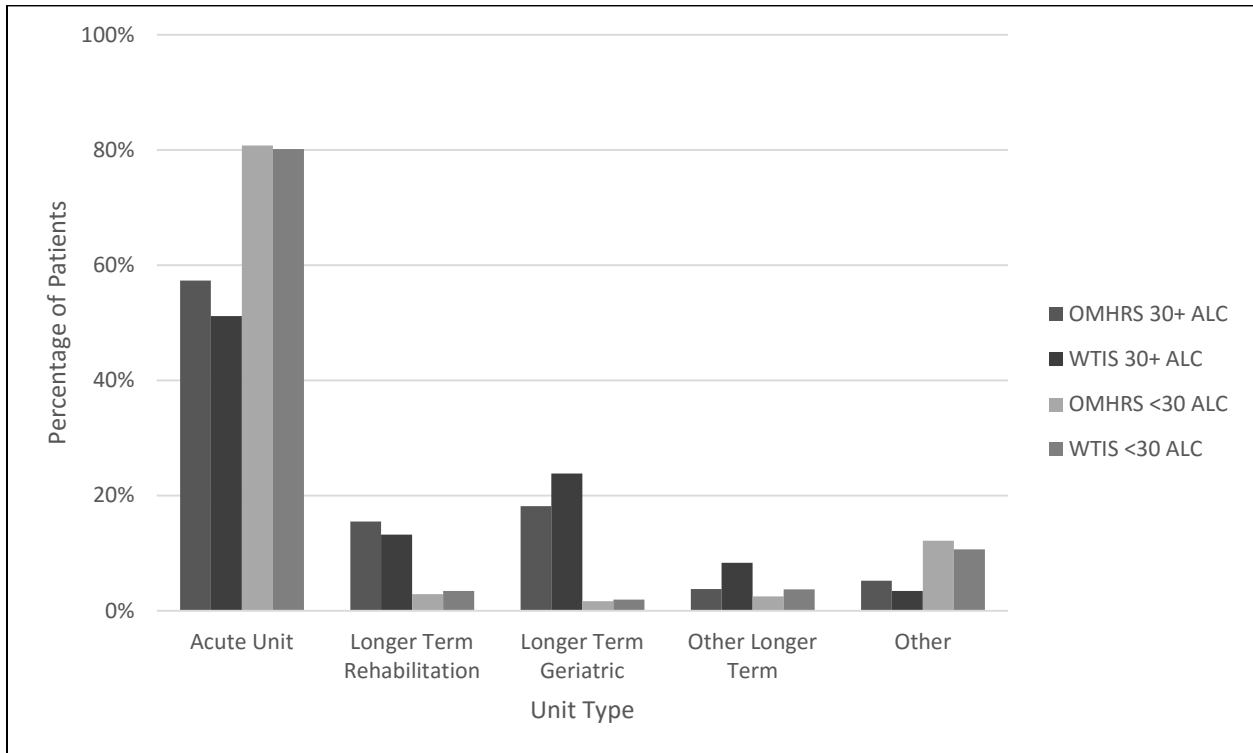

Figure 7. Percentage of patients that were admitted to each unit type within the 30+ and <30 ALC day groups in OMHRS and WTIS, 2011-2013.

Figure 7 shows the percentage of patients that were admitted to each type of unit within the 30+ ALC group, as well as the <30 ALC group. For both the 30+ and <30 ALC groups, the most common unit to be admitted to was an acute unit. However, more patients in the 30+ ALC groups were admitted to longer term rehabilitation units, longer term geriatric units, and other longer term units. Other unit types, including psychiatric crisis units and addiction units, were more prevalent among the <30 ALC groups.
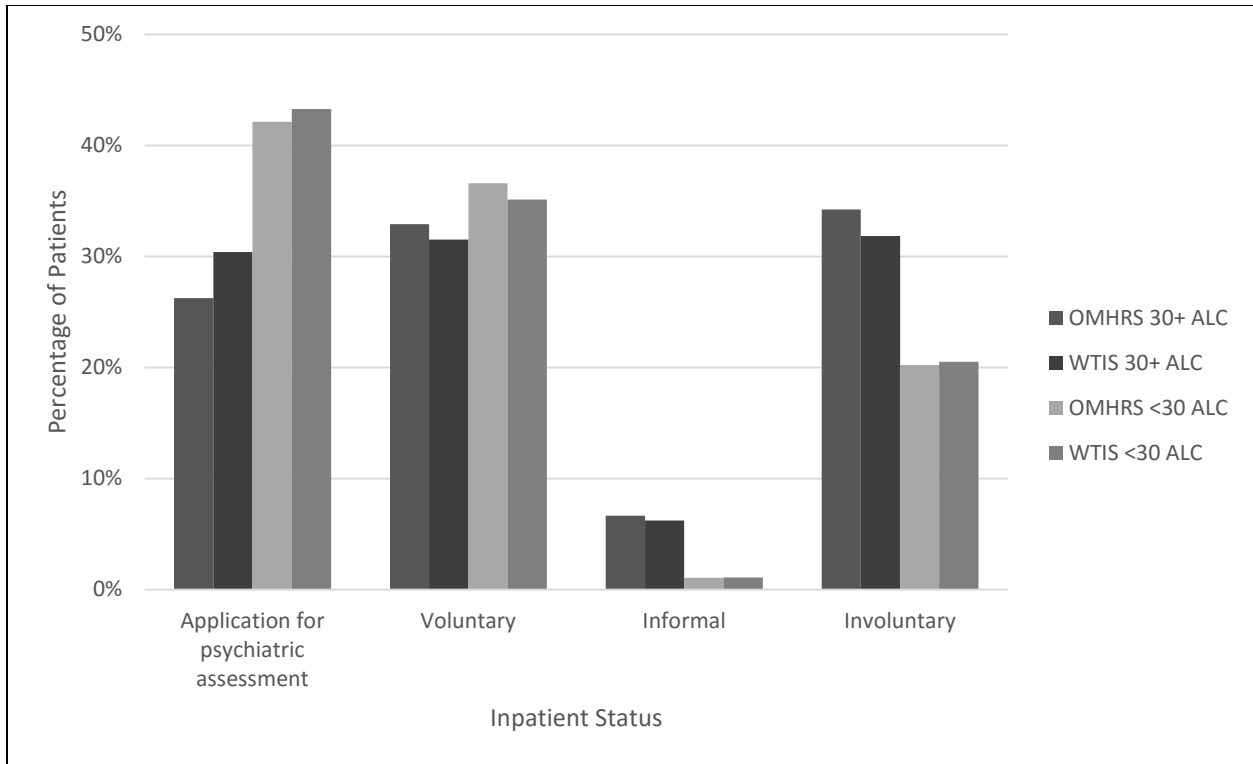
Figure 8. Percentage of patients that were admitted by each inpatient status type within the 30+ and <30 ALC days groups in OMHRS and WTIS, 2011-2013.

Figure 8 shows the percentage of patients that were classified as requiring an application for a psychiatric assessment, or as a voluntary admission, informal admission, or involuntary admission, within both the 30+ and <30 ALC groups. The majority of patients in the <30 ALC groups were admitted for an application for a psychiatric assessment, whereas the majority of patients in the 30+ ALC groups were admitted either as voluntary or involuntary patients. Relative to the <30 ALC group, more patients in the 30+ ALC group were classified as informal and involuntary admissions.
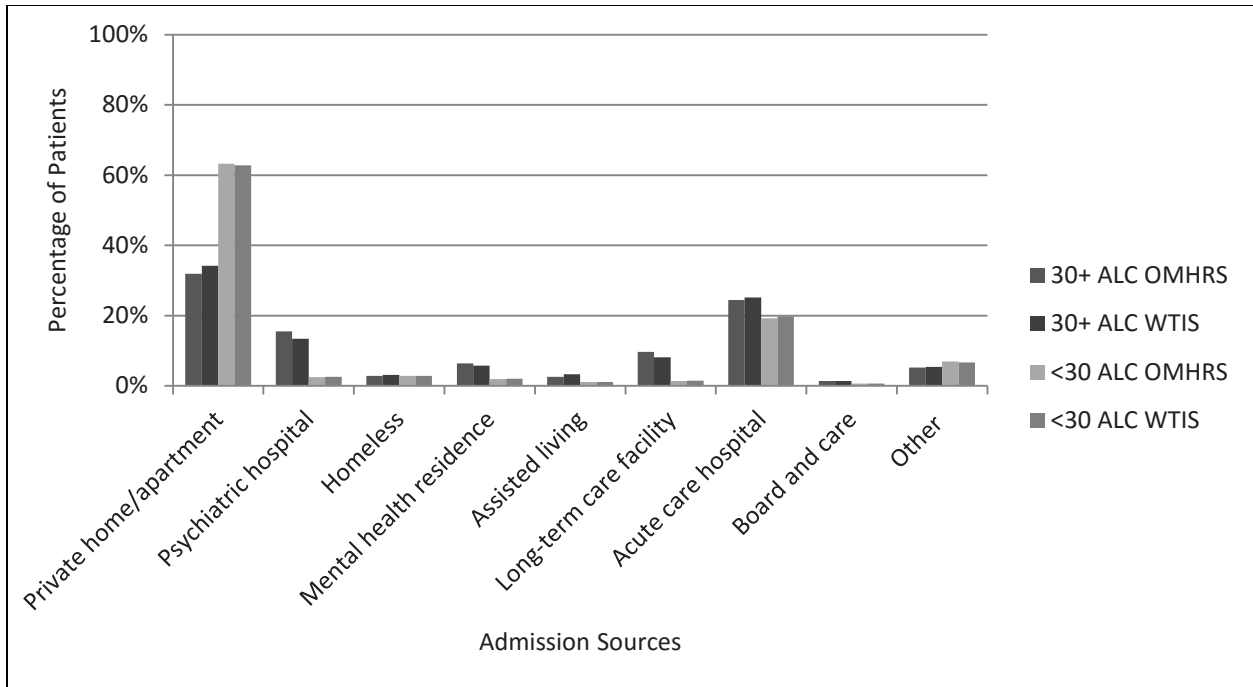
Figure 9. Percentage of admission sources within the 30+ and <30 ALC day groups in OMHRS and WTIS, 2011-2013.

Figure 9 shows the percentage of different admission sources between 2011 and 2013 for the 30+ ALC and <30 ALC groups in OMHRS and WTIS. The most common source of admission for both ALC groups was a private home or apartment, followed by an acute care unit or hospital. Relative to the <30 ALC group, more individuals in the 30+ ALC group were admitted from another psychiatric hospital (~14%) or a long-term care facility (~9%).
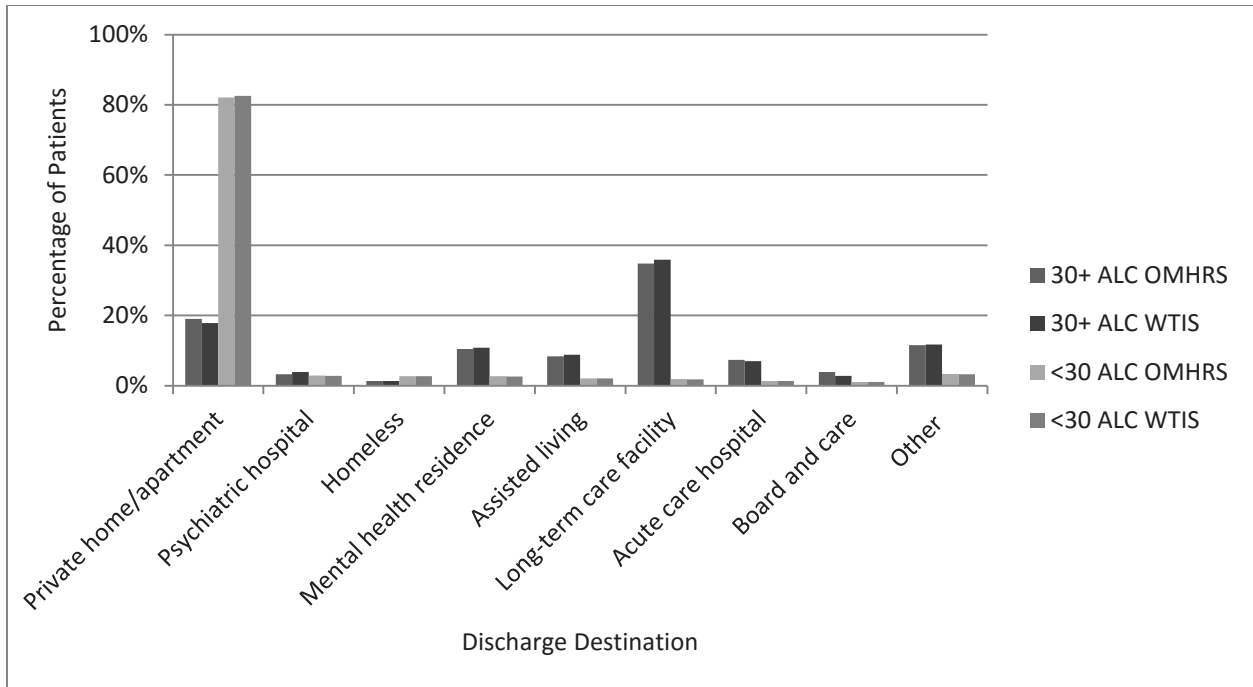
Figure 10. Percentage of discharge destinations within the 30+ and <30 ALC day groups in OMHRS and WTIS, 2011-2013.

Figure 10 displays the percentage of discharge destinations between 2011 and 2013 for the 30+ ALC and the <30 ALC groups in OMHRS and WTIS. While the vast majority of the <30 ALC group were discharged home (82%), the most common discharge destination for the 30+ ALC group was a long-term care facility (~35%). Overall, the 30+ ALC group were discharged to a wider variety of destinations than the <30 ALC group, indicating that those with 30 or more ALC days require many different services in the community to accommodate their needs.
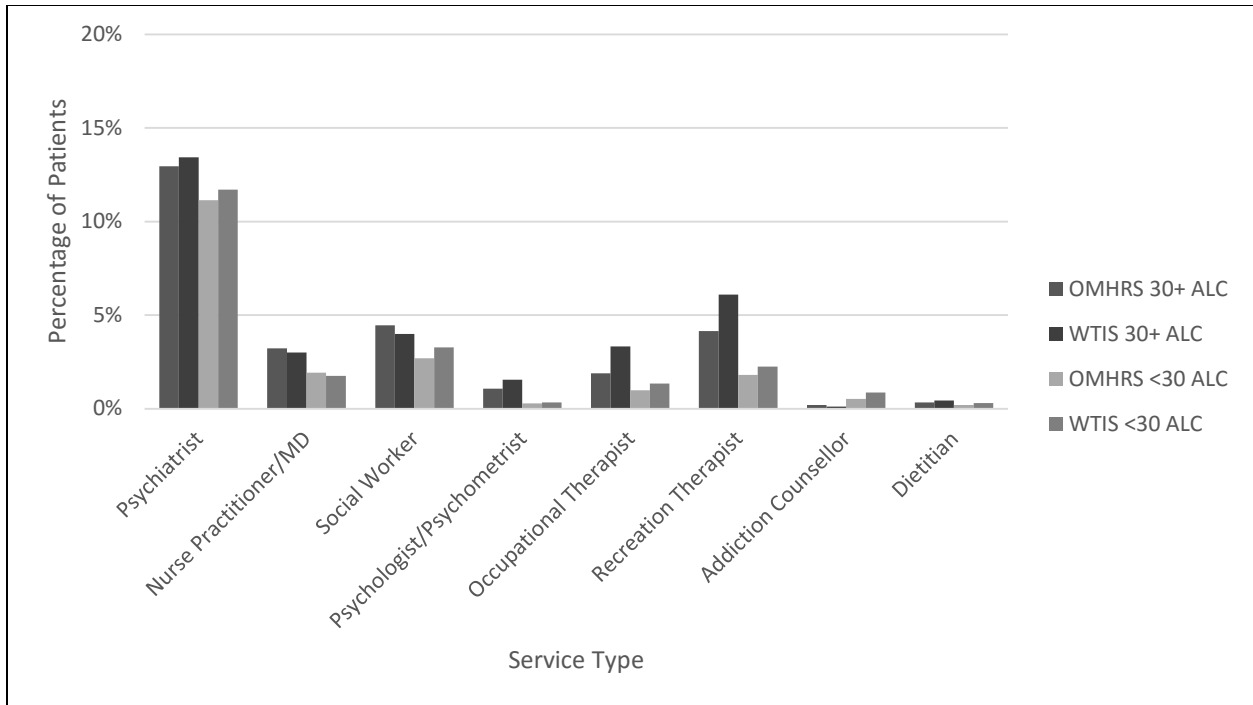
Figure 11. Percentage of patients within the 30+ and <30 ALC day groups that received at least 15 minutes of contact on 4 or more days of the past week by each professional service in OMHRS and WTIS, 2011-2013.

Figure 11 displays the percentage of patients who received at least 15 minutes of contact with each professional service on four or more days during the week prior to admission within the 30+ and <30 ALC groups. The most common type of service that was received by all groups of patients was that of a psychiatrist (~11% for <30 ALC group and ~13% for 30+ ALC group). Compared to the <30 ALC group, more patients in the 30+ ALC group received services from psychologists (~1-2%), occupational therapists (~2-3%) and recreational therapists (~4-6%).
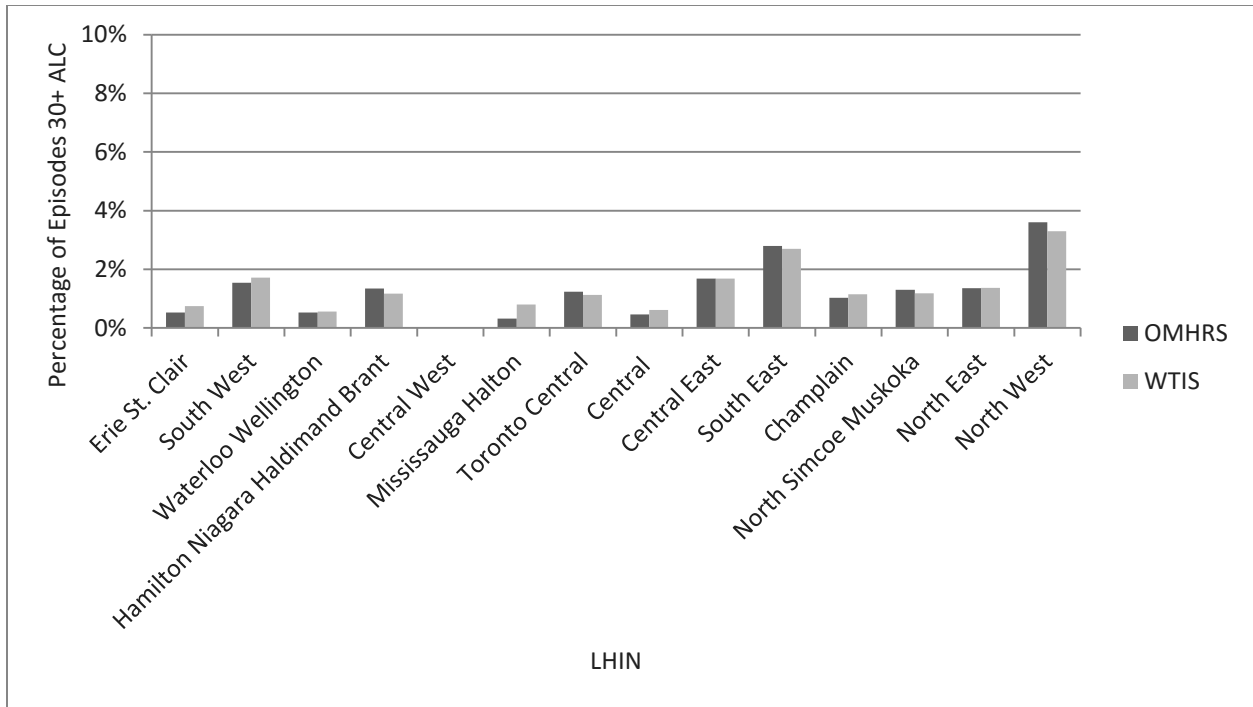
Figure 12. Graph displaying the percentage of patients that were designated with 30+ ALC days by each LHIN in OMHRS and WTIS, 2011-2013.

Figure 12 shows the percentage of patient episodes between 2011 and 2013 that were designated with 30+ ALC days by Local Health Integration Network (LHIN). Among the LHINs, Central West had the smallest percentage of 30+ ALC episodes (0%), while North West had the greatest percentage (3%).

Multivariate Logistic Regression

In this section, two multivariate logistic regression models will be presented that include the predictors of experiencing 30 or more days of ALC at the time of admission; one for OMHRS and one for WTIS. Since the intention of the WTIS model was to confirm the findings of the OMHRS model, only the OMHRS model was generated from the beginning; the final OMHRS model was then entered into WTIS and adjusted accordingly.

Independent variables for the models were selected based on the results of the descriptive statistics provided above. If a variable contained more than one level, it was collapsed into one variable if no linear relationship existed (i.e. same risk regardless of level). Otherwise, variables were separated into distinct categories with '0' as the reference group.

Prior to running the initial model, CAPs that contained one or more of the RAI-MH scales as part of their algorithm were removed and tested in a separate model, since both could not be analyzed simultaneously. If both the scale and the CAP were significant in their respective models, the one that had the highest OR and significance values, or that produced the highest change in the c statistic, was selected for the next round of modeling.

To begin, variables that were not expected to correlate highly with others were entered into the model (e.g. sex, foreign language, and lifetime admissions to a psychiatric hospital). Following this step, variables were retained if they were significant, approaching significance, or if a theoretical reason existed to leave it in. The c statistic was also taken into consideration as variables were added and deleted. After refining the model, groups of variables that were known to inter-correlate were entered into the model sequentially. As before, variables were retained based on significance values and/or guiding theory. The process was repeated until all variables had been tested, and only significant variables remained. Once the model for the OMHRS model was finalized, it was applied to the WTIS database. Any variables that were highly insignificant were removed first, followed by any variables that did not become significant once the previous variables were removed. The final models for both OMHRS and WTIS are presented in tables 18 and 19, shown below.

Table 18

Multivariate logistic regression model predicting 30+ ALC days for mental health inpatients in Ontario, OMHRS 2005-2014 (N=296,720)

Variable	Group Level	Parameter Estimate (SE)	OR (95% CI)	χ^2 p value
Age group	18-44 (ref)	-	-	-
	45-64	0.56 (0.05)	1.75 (1.59-1.92)	<.0001
	65+	0.82 (0.06)	2.27 (2.02-2.56)	<.0001
Sex	Female (ref)	-	-	-
	Male	0.16 (0.04)	1.17 (1.09-1.26)	<.0001
Primary language	English/French (ref)	-	-	-
	Other	0.19 (0.07)	1.22 (1.07-1.38)	0.003
Marital status	Unmarried (ref)	-	-	-
	Married	-0.33 (0.07)	0.72 (0.66-0.79)	<.0001
Insight into mental health	Full (ref)	-	-	-
	Limited	0.27 (0.07)	1.31 (1.14-1.51)	0.0003
	None	0.38 (0.08)	1.47 (1.26-1.71)	<.0001
Lifetime admissions to a psychiatric hospital	0 (ref)	-	-	-
	1-3	0.18 (0.05)	1.12 (1.09-1.32)	0.0002
	4-5	0.39 (0.06)	1.48 (1.31-1.67)	<.0001
	6+	0.49 (0.06)	1.63 (1.46-1.82)	<.0001
History of sexual violence as perpetrator	No (ref)	-	-	-
	Yes	0.42 (0.08)	1.52 (1.30-1.79)	<.0001
Akathisia (last 3 days)	No	-	-	-
	Yes	-0.22 (0.10)	0.80 (0.66-0.97)	0.03
Rigidity (last 3 days)	No	-	-	-
	Yes	-0.25 (0.10)	0.78 (0.64-0.94)	0.01
Visit from a social relation	<3 days (ref)	-	-	
	<7 days	0.08 (0.06)	1.08 (0.97-1.21)	0.2
	<30 days	0.26 (0.07)	1.30 (1.14-1.48)	<.0001
	30+ days	0.38 (0.06)	1.46 (1.29-1.66)	<.0001

Telephone or email contact with social relation	<3 days (ref)	-	-	-
	<7 days	0.10 (0.06)	1.10 (0.98-1.24)	0.1
	<30 days	0.02 (0.07)	1.02 (0.89-1.17)	0.8
	30+ days	0.15 (0.06)	1.16 (1.03-1.31)	0.02
Disorder of childhood/adolescence	No (ref)	-	-	-
	Yes	0.66 (0.09)	1.93 (1.62-2.30)	<.0001
Delirium, dementia and amnestic and other cognitive disorders	No (ref)	-	-	-
	Yes	0.82 (0.06)	2.27 (2.04-2.53)	<.0001
Mental disorders due to general medical conditions	No (ref)	-	-	-
	Yes	0.57 (0.08)	1.77 (1.52-2.07)	<.0001
Schizophrenia and other psychotic disorders	No (ref)	-	-	-
	Yes	0.35 (0.05)	1.42 (1.29-1.56)	<.0001
Mood disorders	No (ref)	-	-	-
	Yes	-0.28 (0.05)	0.76 (0.69-0.83)	<.0001
Impulse-control disorders not classified elsewhere	No (ref)	-	-	-
	Yes	0.38 (0.11)	1.46 (1.17-1.81)	0.0008
Intellectual disability	No (ref)	-	-	-
	Yes	0.34 (0.06)	1.40 (1.24-1.57)	<.0001

Social withdrawal scale	0 (ref)	-	-	-
	1-4	-0.07 (0.05)	0.93 (0.86-1.02)	0.1
	5-8	-0.18 (0.05)	0.84 (0.76-0.93)	0.0007
	9-12	-0.19 (0.06)	0.83 (0.74-0.92)	0.0006
Positive Symptoms Scale – Long (PSSL)	0 (ref)	-	-	-
	1-3	-0.00 (0.05)	1.00 (0.91-1.09)	0.9
	4-8	-0.21 (0.05)	0.81 (0.74-0.90)	<.0001
	9-24	-0.39 (0.06)	0.68 (0.60-0.80)	<.0001
Cognitive Performance Scale (CPS)	0 (ref)	-	-	-
	1-2	0.31 (0.05)	1.36 (1.23-1.51)	<.0001
	3-6	0.41 (0.06)	1.50 (1.32-1.70)	<.0001
Instrumental Activities of Daily Living scale (IADL)	0 (ref)	-	-	-
	1-3	0.44 (0.08)	1.55 (1.32-1.83)	<.0001
	4-9	1.04 (0.07)	2.84 (2.48-3.24)	<.0001
	10-18	1.46 (0.07)	4.32 (3.79-4.94)	<.0001

	19-30	1.67 (0.08)	5.30 (4.57-6.15)	<.0001
Activities of Daily Living hierarchy (ADL)	0 (ref)			
	1-16	0.25 (0.05)	1.29 (1.17-1.41)	<.0001
Depressive Severity Index (DSI)	0 (ref)	-	-	-
	1-3	-0.13 (0.04)	0.88 (0.81-0.95)	0.001
	4-7	-0.27 (0.06)	0.78 (0.70-0.86)	<.0001
	8-15	-0.32 (0.08)	0.74 (0.64-0.87)	0.0001
Severity of Self-Harm scale (SOS)	0 (ref)	-	-	-
	1-3	-0.06 (0.08)	0.94 (0.82-1.09)	0.4
	4-6	-0.25 (0.08)	0.78 (0.67-0.91)	0.002
Aggressive Behaviour Scale (ABS)	0 (ref)	-	-	-
	1-12	0.15 (0.04)	1.17 (1.08-1.26)	0.0001
Substance use CAP	Not triggered (ref)	-	-	-
	Triggered for past use	0.15 (0.08)	1.16 (1.00-1.34)	0.05
	Triggered for current use	-0.56 (0.06)	0.57 (0.51-0.64)	<.0001

Pain CAP	Not triggered (ref)	-	-	-
	Triggered for medium priority level	-0.16 (0.06)	0.86 (0.76-0.96)	0.01
	Triggered for high priority level	-0.62 (0.18)	0.54 (0.39-0.76)	0.0003
Social Supports for Discharge (SSDIS) CAP	Not triggered (ref)	-	-	-
	Triggered	0.27 (0.04)	1.31 (1.22-1.40)	<.0001

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group. C stat = 0.87.

Table 19

Multivariate logistic regression model predicting 30+ ALC days for mental health inpatients in Ontario, WTIS 2011-2013 (N=74,732)

Variable	Group Level	Parameter Estimate (SE)	OR (95% CI)	χ^2 p value
Age group	18-44 (ref)	-	-	-
	45-64	0.68 (0.12)	2.01 (1.62-2.49)	<.0001
	65+	1.03 (0.13)	2.89 (2.24-3.73)	<.0001
Sex	Female (ref)	-	-	-
	Male	0.36 (0.07)	1.42 (1.23-1.65)	<.0001
Primary language	English/French (ref)	-	-	-
	Other	0.34 (0.12)	1.40 (1.11-1.78)	0.006
Marital status	Unmarried (ref)	-	-	-
	Married	-0.33 (0.09)	0.71 (0.59-0.85)	0.0002
Insight into mental health	Full (ref)	-	-	-
	Limited	0.64 (0.18)	1.89 (1.34-2.67)	0.0003
	None	0.65 (0.18)	1.92 (1.34-2.76)	0.0004
Lifetime admissions to a psychiatric hospital	0 (ref)	-	-	-
	1-3	0.16 (0.09)	1.18 (0.98-1.41)	0.08
	4-5	0.30 (0.13)	1.35 (1.06-1.73)	0.02
	6+	0.47 (0.11)	1.60 (1.29-2.00)	<.0001
Visit from a social relation	<3 days (ref)	-	-	-
	<7 days	0.11 (0.10)	1.12 (0.92-1.36)	0.3
	<30 days	0.21 (0.12)	1.24 (0.98-1.56)	0.07
	30+ days	0.50 (0.10)	1.66 (1.36-2.01)	<.0001
Disorder of childhood/adolescence	No (ref)	-	-	-
	Yes	0.85 (0.18)	2.38 (1.69-3.36)	<.0001
Delirium, dementia and amnestic and other cognitive disorders	No (ref)	-	-	-
	Yes	1.14 (0.11)	3.11 (2.53-3.83)	<.0001

Mood disorders	No (ref)	-	-	-
	Yes	-0.41 (0.09)	0.66 (0.56-0.79)	<.0001
Intellectual disability	No (ref)	-	-	-
	Yes	0.49 (0.12)	1.65 (1.30-2.10)	<.0001
Social withdrawal scale	0 (ref)	-	-	-
	1-4	0.05 (0.09)	1.05 (0.88-1.25)	0.6
	5-8	-0.11 (0.11)	0.90 (0.73-1.11)	0.3
	9-12	-0.30 (0.12)	0.74 (0.60-0.93)	0.01
Positive Symptoms Scale – Long (PSSL)	0 (ref)	-	-	-
	1-3	-0.07 (0.10)	0.93 (0.77-1.13)	0.5
	4-8	-0.07 (0.10)	0.93 (0.77-1.13)	0.5
	9-24	-0.39 (0.12)	0.69 (0.54-0.87)	0.002
Cognitive Performance Scale (CPS)	0 (ref)	-	-	-
	1-2	0.51 (0.12)	1.61 (1.29-2.02)	<.0001
	3-6	0.69 (0.14)	1.90 (1.45-2.48)	<.0001

Instrumental Activities of Daily Living scale (IADL)	0 (ref)	-	-	-
	1-3	0.35 (0.18)	1.41 (0.98-1.94)	0.07
	4-9	0.93 (0.15)	2.35 (1.76-3.14)	<.0001
	10-18	1.29 (0.15)	3.21 (2.40-4.30)	<.0001
	19-30	1.45 (0.16)	3.81 (2.79-5.21)	<.0001
Activities of Daily Living scale (ADL)	0 (ref)	-	-	-
	1-16	0.44 (0.10)	1.55 (1.28-1.87)	<.0001
Depressive Severity Index (DSI)	0 (ref)	-	-	-
	1-3	-0.14 (0.08)	0.87 (0.74-1.02)	0.09
	4-7	-0.34 (0.11)	0.72 (0.58-0.89)	0.002
	8-15	-0.57 (0.17)	0.57 (0.41-0.78)	0.0008
Aggressive Behaviour Scale (ABS)	0 (ref)	-	-	-
	1-12	0.16 (0.08)	1.17 (1.00-1.38)	0.05
Substance use CAP	Not triggered (ref)	-	-	-
	Triggered for past use	0.48 (0.15)	1.62 (1.22-2.15)	0.0008

	Triggered for current use	-0.39 (0.11)	0.68 (0.54-0.85)	0.0006
Social Supports for Discharge (SSDIS) CAP	Not triggered (ref)	-	-	-
	Triggered	0.43 (0.07)	1.53 (1.33-1.77)	<.0001

Note. SE = standard error; OR = odds ratio; CI = confidence interval; ref = reference group. C stat = 0.91.

To determine the final models' goodness of fit, the c statistic was examined. The c statistics for the OMHRS and WTIS models are 0.87 and .91 respectively, indicating that both models are excellent at identifying those in the 30+ and <30 ALC groups.

As illustrated in tables 18 and 19, the predictor with the highest odds of 30+ ALC days in both models is impairment on the IADL scale, followed by a diagnosis of a cognitive disorder and older age. Notably, having a diagnosis of a mood disorder, as well as greater symptoms on the DSI, are strong negative predictors of 30+ ALC days. Variables that were predictive in the OMHRS model but not in the WTIS model are as follows: history of sexual violence as a perpetrator, akathisia, rigidity, telephone or email contact with a social relation, mental disorders due to a general medical condition, schizophrenia and other psychotic disorders, impulse control disorders not classified elsewhere, the severity of self-harm scale (SOS), and the pain CAP.

DISCUSSION

The primary goal of this thesis was to examine ALC designations in mental health hospitals and units across Ontario, as part of an OHA initiative to reduce ALC across the province. To investigate ALC in mental health, three main research questions were proposed. The first two questions were exploratory in nature, and did not posit any a priori predictions. The first of these questions concerned the proportion of patient episodes that have been designated ALC over time, as well as the average number and distribution of ALC days among designated patients. The second exploratory question addressed the clinical and demographic attributes of the ALC population. The third question, which did contain specific hypotheses, sought to identify clinical predictors of ALC status at the time of admission. In this section, interpretations of the results for each of the questions will be presented, in the order that they were written.

Prevalence of ALC Episodes and Distribution of ALC Days

The proportion of patient episodes that have been designated ALC over time was remarkably low, with approximately 3% of patient episodes containing at least one ALC day, and only 1.2% containing 30 or more ALC days. Although the proportion of ALC designations was small, the average number of ALC days and the distribution across patients was comparatively large. For instance, the median number of ALC days ranged from 17 to 22 days, depending on the time period and dataset being examined, while the mean number of ALC days ranged from 59 to 63. Recalling that the prevalence estimate for ALC beds in mental health units across Ontario was 10% in September 2015 (Access to Care, 2015), the mean and median are crucial because they explain why the monthly prevalence is higher than the rate over time. That is, the small number of patients who are designated ALC experience such long stays that the monthly prevalence of

ALC beds in mental health units is increased. Thus, although it may seem that ALC designations are inconsequential based on the low prevalence over time, the large number of ALC days that accrue have meaningful effects on the mental health care system in Ontario.

Another interesting finding is the considerable different between the mean and the median. Unlike the median, the mean value is affected by the positive skew in the distribution of ALC days (maximum of 1748 days between 2005 and 2014, and approximately 800 days between 2011 and 2013). Although the very long-stay population was too small to examine for the purpose of this study, an interesting prospect for future research would be to examine the characteristics and needs of this population to see how they differ from other patients who are designated ALC.

Descriptive Statistics

The clinical and demographic characteristics were investigated among four groups of ALC patients: any ALC in OMHRS, any ALC in WTIS, 30+ ALC in OMHRS, and 30+ ALC in WTIS. The reason that two different ALC cut-points were investigated was to determine whether or not the pattern of characteristics differed between them. Similarly, although OMHRS and WTIS were previously shown to have similar OR values for several variables, they were presented separately in the event that any characteristics did differ. By investigating whether or not substantial differences exist in the pattern of characteristics among cut-points, conclusions can be made regarding the utility of using either a binary or a 30+ cut-point for ALC.

The pattern of ALC designation rates, OR values and significance levels for the independent variables were mostly similar among the cut-points and data sets. In general, the magnitude of ALC designation rates and OR values for significant variables was greater among the 30+ ALC

groups than the any ALC groups, as well as for WTIS compared to OMHRS. The most

appreciable differences in variables between OMHRS and WTIS were for schizophrenia and

other psychotic disorders, the pain CAP, marital status, and living alone prior to admission, all of

which were significant in OMHRS but not WTIS. Between the any ALC and 30+ ALC groups,

notable differences included self-reported poor health, which was significant for the any ALC

groups but not the 30+ ALC groups, and the anhedonia scale, which was significant only among

the 30+ ALC groups. Overall, the pattern of characteristics among the ALC population was

largely stable regardless of the cut-point or data set used, suggesting that the results of the 30 day

analysis may be effectively applied to patients with any ALC days.

The majority of OR values among significant variables were relatively modest in size. The

variable that contained the highest odds of an ALC designation for all groups was the IADL

impairment scale, which was unanticipated given the results of the literature review. Several

other variables showed remarkably strong associations with ALC status at the bivariate level,

such as age, insight into mental health, wandering behaviour, bladder and bowl incontinence,

cognitive disorders, the ADL, CPS and DSI scales, and the self-care CAP. However, even

though a variable appears to be strongly associated with ALC at the bivariate level, it may only

be related to ALC because it is correlated with another relevant predictor variable. As a result,

the designation rates and OR values at the bivariate level were useful as a guideline for selecting

variables to be tested in the multivariate regression models, but are not accurate indicators of risk

on their own.

While the actual risk values associated with ALC status are highly informative, especially in

regards to the logistic regression models, it is also necessary to examine the frequency of

characteristics within the ALC group itself. For instance, while there are higher odds of

experiencing an ALC designation among older adults, they comprise less than half of the ALC population overall. Thus, if service providers were to ignore younger and middle-aged adults due to their lower risk status, they would essentially be dismissing half of the ALC population overall. Following this line of reasoning, it is imperative to recognize that many ALC patients experience depressive symptoms and mood disorders, are not severely cognitively impaired, and are not aggressive. Thus, while it is beneficial to incorporate high-risk characteristics into preventative strategies for ALC, it is also important not to overlook patients who do not meet the criteria for one or more risk indicators. ALC risk factors are multidimensional in nature, requiring attention to a large range of risk factors.

The additional descriptive statistics that were performed throughout the course of the project also provide some essential information on the ALC population, even though they were not initially apart of the project. For instance, one question that was raised during an OHA presentation concerned the unit types that mental health inpatients are located in, and whether this differs for patients with and without ALC designations. Regardless of ALC status, the majority of inpatients were located in acute psychiatric units, suggesting that acute units are a prime target for ALC interventions. However, there were also more ALC patients in longer term rehabilitation and longer term geriatric units than non-ALC patients, indicating that there is a greater challenge in discharging patients within these types of units. In summary, focusing on acute units would result in the greatest reduction to ALC designations overall, but concentrating on longer term rehabilitation and geriatric units would assist the areas that have the greatest need for ALC interventions.

Another question of interest involved the admission status of inpatients (i.e. voluntary, involuntary, and informal admissions). It was speculated that ALC patients may be more likely

to have been admitted involuntarily than non-ALC patients, since many patients who voluntarily admit themselves to a mental health unit are able to leave if they wish to do so (although a patient who was admitted voluntarily may have their status changed to involuntary at any point during their stay, and vice versa). As suspected, involuntary admission was one of the most common status types among ALC patients, although it was equal with voluntary admissions. Notably, both involuntary and informal admissions were higher among ALC patients than non-ALC patients. To summarize, most patients who did not become ALC were admitted for psychiatric assessments, whereas patients who did become ALC experienced a greater variation in types of admission, including more informal and involuntary admissions.

Admission and discharge destinations were also of interest to stakeholders, as this question involves community resources and their impact on ALC status more directly. In terms of admission sources, it was theorized that more ALC patients would be admitted from long-term care and nursing homes, given that older adults were at higher risk of ALC status. Examining the frequency of admission sources by patients with and without 30 days of ALC, there were indeed more patients with ALC designations being admitted from long-term care settings, but not as many as expected. Instead, most ALC patients were admitted from a private home or apartment, followed by an acute care hospital or unit (the same pattern as non-ALC patients). That more ALC patients were admitted from an acute care unit than non-ALC patients is likely related to the finding that more ALC patients are located in longer term rehabilitation and geriatric units.

While the pattern of admission sources was not drastically different between the 30+ and <30 ALC groups, the pattern of discharge destinations were. Whereas 80% of patients without an ALC designation were discharged home, less than 20% of patients with an ALC designation were discharged home. The most common discharge destination for patients with an ALC

designation was a long-term care facility (~35%), which is likely due to the high number of older adults and patients with cognitive disorders that become ALC. In general, the types of discharge destinations were more variable for patients with an ALC designation, ranging from assisted living to mental health residences. The variability in discharge destinations among ALC patients demonstrates that their needs are heterogeneous and complex, and are unlikely to be solved by any one type of community service. Further, since so many different services are required to accommodate ALC patients, not only will these services need to be available in the community, but hospitals will also need to establish relationships with all of these services to allow for more efficient and effective discharge planning.

During the week prior to admission, patients who eventually became ALC received more contact with almost all professional services than patients who did not become ALC, with the exception of addiction counsellors. The fact that patients who became ALC actually received more services at the beginning of their stay than other patients is interesting, because it demonstrates that a lack of treatment is not the reason that patients become ALC. Rather, the content of the services that are received, as well as the available resources in the community, are more likely implicated in ALC designations than the actual amount of treatment itself.

Finally, one of the most commonly asked questions raised by stakeholders dealt with the proportion of ALC designations across LHINs. Between 2011 and 2013, Central West had the lowest proportion of ALC designations (approximately 0.0%), and North West had the highest proportion (approximately 3.0%). Although the proportion of ALC designations is intriguing, caution should be exercised when interpreting the differences among LHINs. Future research could explain the differences in ALC designations between LHINs using multi-level models.

Multivariate Logistic Regression

Based on the results of the literature review, it was expected that the following variables would be highly associated with ALC status: schizophrenia, dementia, age, disability and impairment, aggression, social dysfunction, poor socioeconomic status, hearing impairment, and previous contact with mental health services. Among the variables stated in the hypothesis, the following were significantly predictive of ALC status in both the OMHRS and WTIS logistic multivariate models: dementia and other cognitive disorders, older age, ADL, IADL and cognitive impairment, social isolation, and aggression. In contrast with the prediction that it would be the strongest predictor of ALC status, schizophrenia and other psychotic disorders were only significant in the OMHRS model. Lastly, poor socioeconomic status, hearing impairment and previous contact with mental health services were all insignificant predictors of ALC status in both models.

Variables that were significantly predictive of ALC status in both models, but which were not hypothesized a priori to have strong associations, were male sex, depressive symptoms, mood disorders, disorders of childhood and adolescence, intellectual disabilities, speaking a primary foreign language, insight into mental health, and substance use. In the OMHRS model, unexpected predictors of ALC status include akathisia and rigidity, mental disorders due to general medical conditions, impulse control disorders, the severity of self-harm scale, and the pain CAP.

The remaining two variables in the regression models contradicted the results of the literature review. Previous admissions to a psychiatric hospital, which were reported in the literature review to be inversely related to delays in discharge (Kelly et al., 1998; Tanioka et al., 2013),

were positively predictive of ALC status in this project. Secondly, whereas positive symptoms of psychosis were noted as irrelevant to discharge in previous studies (Afilalo et al, 2015; Leff & Trieman, 2000; Tanioka et al., 2013; Trieman & Leff, 2002), they were negatively associated with ALC status in this project.

Disability, Impairment and Social Isolation

The finding that IADL impairment was the strongest predictor of ALC status was surprising, as it was only briefly described in one study as being more common in the ALC group than the non-ALC group (Butterill et al., 2009). Additionally, each increase in impairment led to higher odds of becoming ALC, indicating a gradation in risk level. A potential explanation for why increasing IADL impairment is so strongly predictive of ALC status could be that IADLs are not commonly covered in treatments for mental health inpatients, as they are not mental health symptoms, and so they are left unattended despite their association with ALC. Further, IADLs may be more predictive than ADLs because they are less conspicuous indicators of disability, and so it is possible that ADLs are more often included in decisions about discharge destinations than IADLs are. Assuming that these explanations are correct, two approaches to reducing the effects of IADL impairment on ALC outcomes would be to reduce impairments in IADLs in the hospital itself, as well as to include IADLs during discussions about discharge destinations, so that patients have better opportunities of being referred to appropriate care settings.

While less predictive than IADLs, ADL impairment was also significantly predictive of ALC status. Unlike IADLs, however, all levels of ADL impairment conferred equal odds of ALC status. The finding that ADL impairment leads to greater odds of ALC status is consistent with previous research, which reported that ADLs were associated with delayed discharges (Butterill

et al., 2009; Paton et al., 2004; Tanioka et al., 2013) and long stays (Tulloch et al., 2012). One

reason that ADLs may be predictive of ALC status is because discharging these patients home, at

least without support, is not usually a viable option. Appropriate community resources must be in

place before patients with ADL impairments can be safely discharged, but combined with other

complex needs and behaviours, locating these resources may become a challenge.

Another form of impairment that was predictive of ALC status was cognitive impairment,

which has also been previously associated with both ALC (Butterill et al., 2009) and longer stays

(Tulloch et al, 2012). Since cognitive disorders and older age were both included in the logistic

model, it can be concluded that the effects of cognitive impairment on the risk of ALC are not

solely due to its correlations with these variables. Similar to ADLs, it may be that discharging a

patient with cognitive impairment home is not feasible, and community resources must be

secured before the patient can safely leave the hospital. In the case of both ADLs and cognitive

impairment, providing treatments and supports that manage the symptoms as best as possible,

while also having the necessary community resources available, is a reasonable method of

reducing the risk of becoming ALC.

While social dysfunction was occasionally included in previous studies as a form of

impairment (Masters et al., 2014; Tanioka et al., 2013), the results of this study suggest that

social isolation specifically is related to ALC, rather than interpersonal conflict. For instance,

while social variables such as marriage, visit from a social relation, and the SSDIS CAP were

predictive of ALC in the final model, interpersonal conflict variables such as persistent hostility

towards others and the interpersonal conflict CAP were not. When included as an independent

variable, social isolation was consistently associated with delayed discharges and long stays

across various other studies as well (Afilalo et al., 2015; Butterill et al., 2009; Lelliot et al., 1994;

Paton et al., 2004; Poole et al., 2014; Springer & Paul, 2008; Tanioka et al., 2013). It is rational that social isolation is predictive of ALC status, since the presence of at least one support person may translate into resources for discharge, such as a physical place to live and extra assistance with treatment (e.g. transportation to outpatient therapy, reminders to take medications). To reduce the risk of ALC for patients who are socially isolated, it may be advantageous to offer group therapy for estranged family members, or to provide opportunities for patients to establish new friendships and supports.

Psychiatric disorders and mental health symptoms

As previously mentioned, cognitive disorders were a significant predictor of ALC status in both models, holding older age and cognitive impairment constant. Although this project encompassed several different types of cognitive disorders in its definition, the majority of studies focused specifically on dementia (Hanif & Rathod, 2008; Paton et al., 2004; Poole et al., 2014), and in one case, alcohol-related dementia (MacPhail, 2013), which invariably led to delays in discharge. Cognitive disorders are often progressive and incurable, but acute changes in cognitive function may be amenable to treatment. As with ADLs, it may be difficult to discharge cognitively impaired patients home without supports. Once again, managing the symptoms as best as possible, while also ensuring that community supports are in place, is likely the best method of reducing ALC risk among this population.

Another psychiatric disorder that was expected to predict ALC status was schizophrenia. However, even though schizophrenia was consistently reported to be associated with delayed discharges (Kelly et al., 1998; Butterill et al., 2009; Poole et al., 2014) and longer stays (Commander & Rooprai, 2008; Hallak et al., 2003; Kelly et al., 1998; Lelliot et al., 1992; Park et

al., 2008; Poole et al., 2014; Stevens et al., 2001; Tulloch et al., 2012), the present study found that schizophrenia was only predictive of ALC in the OMHRS data set, and not in WTIS. Due to the conflicting results surrounding schizophrenia and ALC, it may be advisable to consider the presence of schizophrenia and other psychotic disorders when determining overall risk of ALC, but it should not be relied upon in the absence of more significant factors. As an aside, schizophrenia may still lead to longer stays, but not necessarily to ALC, which illustrates the disadvantages of using length of stay as a proxy for delays in discharge.

In some studies, positive symptoms of psychosis were tested separately from a diagnosis of schizophrenia. In one case, hallucinations and delusions were positively predictive of length of stay, but were unrelated to ALC itself (Afilalo et al., 2015). Three other studies reported that positive symptoms of psychosis had no appreciable connection to discharge (Leff & Trieman, 2000; Tanioka et al., 2013; Trieman & Leff, 2002), while one final study showed improvements in positive symptoms among long-stay patients with schizophrenia who had been relocated (Ryu et al., 2006). In the present study, having a few positive symptoms was insignificant in predicting ALC, as in several other studies (Leff & Trieman, 2000; Tanioka et al., 2013; Trieman & Leff, 2002). However, in contrast to all of the prior studies, this project found that having a greater number of positive symptoms led to significantly lower odds of becoming ALC. One possible account for the negative association between positive symptoms and ALC status is that patients require treatment to the extent that they are unlikely to stop needing the services of the hospital until they are discharged, and/or community resources are more dedicated to accommodating patients with schizophrenia who have more severe needs.

As with positive symptoms of psychosis, having a greater number of depressive symptoms also led to lower odds of becoming ALC, in addition to being diagnosed with a mood

disorder. Once more, it is reasonable that patients who are severely depressed are at lower risk of becoming ALC because they require intensive treatment throughout the duration of their stay. However, it may also be the case that depressed patients are better able to be discharged home than other patients, and/or there are more sufficient outpatient and drug therapy options available to depressed patients, both of which would reduce the need to wait for an alternate care setting.

While symptoms of social withdrawal are not traditionally considered to be mental health related, they appear to function in the same way as positive symptoms of psychosis and depressive symptoms – decreasing the odds of ALC at higher symptom levels - rather than as a complement to the social isolation variables. In other words, social withdrawal may be indicative of a greater need for mental health services, as with the PSSL and DSI, and so patients who score highly in this area would likely need the intensity of the services that they are receiving throughout their stay. Conversely, social isolation is more indicative of resources than clinical need, and so social withdrawal would have less in common with these variables than it does with the PSSL and DSI.

Other psychiatric disorders that were significantly predictive of ALC status included disorders of childhood and adolescence and intellectual disabilities. Given that both of these disorders are typically diagnosed early in life (APA, 2013), it might have been expected that adequate support systems would be in place by the time of adulthood, reducing the likelihood of becoming ALC in hospital. However, the results of this project demonstrate that this is not necessarily the case, and that patients who are diagnosed with either an intellectual disability or a disorder of childhood and adolescence require ongoing support into adulthood.

Aggression and substance use

The ABS was associated with higher odds of ALC status, with all levels of aggressive behaviour conferring similar risk, suggesting that any amount of aggressive behaviour can lead to delays. Aggression has previously been linked to long-stays and delayed discharges across several studies (Afilalo et al., 2015; Barlow et al., 2000; Butterill et al., 2009; Commander & Rooprai, 2008; Lorenzo et al., 2013), although it was not as strongly associated in this study as it was in the others. While not tested here due to a restriction on admission assessments, Springer and Paul (2008) discovered that drug therapy decreased length of stay among aggressive patients who were responsive to medication, and so it could also be a solution for diminishing the risk of ALC for some patients. However, it is possible that in this study, patients who were responsive to medications did receive them and thus were not represented in the final ALC population, meaning that another treatment strategy would also need to be devised.

The substance use CAP exhibited a unique pattern, wherein one trigger level was positively predictive of ALC status and the other was negatively predictive. The trigger that led to lower odds of becoming ALC was current substance abuse, which is likely due to the availability of addiction rehabilitation centres for discharge. Conversely, history of substance abuse was associated with significantly higher odds of ALC in WTIS, which is a more difficult result to interpret. Since the substance use itself occurred in the past, it is probable that unidentified clinical and/or environmental characteristics that correlate with substance abuse are implicated.

Demographic characteristics and lifetime admissions to a psychiatric unit

Demographic characteristics that were associated with greater odds of ALC status include older age, male sex and speaking a primary language other than English or French. In particular,

it was expected that older age would lead to greater odds of ALC status, as several previous studies have found an association between older age and delayed discharges (Butterill et al., 2009; Kelly et al., 1998; Tanioka et al., 2013). Moreover, it is probable that several older adults who experienced ALC were located in longer term geriatric units, which were more frequent among the ALC population than the non-ALC population. In this case, the research performed on delayed discharges in geriatric units is especially useful, as the most common risk factors leading to delays for older adults have been described (Hanif & Rathod, 2008; Koffman et al., 1996; Paton et al., 2004).

Unlike needs-based variables, demographic characteristics are not treatable properties of an individual, and so they cannot be used to inform hospital-based treatment interventions for ALC. However, it may still be useful to examine the reasons why demographic characteristics are associated with higher risk, especially if those reasons are grounded in community resources. For instance, it may be that too few community services can accommodate persons who do not speak fluent English or French, and this may be contributing to delays.

Lastly, having a greater number of lifetime admissions to a psychiatric unit were associated with higher odds of ALC status. Although this variable is not reversible among patients who have already been admitted several times, future effort can be concentrated on preventing readmissions to the hospital, which in turn may reduce the rate of future ALC designations.

Variables significant in OMHRS but not WTIS

There were several variables that were significantly predictive of ALC status in OMHRS but not in WTIS, the most surprising of which was schizophrenia and other psychotic disorders.

It is difficult to determine why certain variables were associated with ALC in the OMHRS dataset but not in WTIS, which is discussed further in the strength and limitations section.

Strengths and Limitations

One of the major strengths of this study is the inclusion of a fully representative sample of mental health inpatients in Ontario (with the exception of forensic and short-stay patients). By ensuring that all mental health inpatients across the province were included in the analysis, more accurate conclusions could be drawn from the results, as there was no subset of the population that was missing. Further, because ALC designations rarely occur among mental health inpatients, it was imperative to obtain as many designated patients as possible, otherwise the statistical power to detect relationships may have been insufficient.

Another strength of this study was that it contained a wide variety of demographic and clinical needs as independent variables. Due to the large sample size of the study, several independent variables were able to be examined simultaneously as predictors of ALC status, affording a more complete understanding of the risk and protective factors that lead to delays. Additionally, all of the interRAI scales and mental health CAPs were included as potential predictors of ALC status. The scales and CAPs are especially informative variables, as they contain multiple indicators of a general factor. For instance, the ABS is composed of several different indicators of aggression, such as verbal, physical and threatening behaviour. Whereas previous studies may have only been able to analyze one or two facets of aggression, this study was able to incorporate several, which is true for all of the scales and CAPs included. By improving the validity of the measures used to predict ALC, this study has contributed to the field of research on ALC in mental health overall.

The literature review conducted as part of this thesis revealed only a small number of studies that investigated ALC or delayed discharge in mental health settings. Although long-stays have been associated with delayed discharges in other studies (Koffman et al., 1996; Tanioka et al., 2013), there are disadvantages to using long-stays as a proxy for delays, and so research that explicitly measures ALC/delays is needed. Further, among the studies that did examine delayed discharges in mental health, only one performed a predictive regression analysis (Kelly et al., 1998), which more useful than descriptive statistics in determining the risk and protective factors implicated in delays. Thus, this study has helped in advancing the field of research on delayed discharges/ALC in mental health settings by contributing a predictive, longitudinal analysis on ALC status.

Due to the limited amount of research on ALC designations in mental health hospitals and units, no standard cut-point for ALC has been firmly established in this setting, though a general cut-point of 30 days has been posited by CCO (2011) for research on ALC. By comparing descriptive statistics for the 30 day cut-point to a cut-point of only one day, this study was able to test the validity of the 30 day cut-point in mental health settings, which had not been evaluated previously. Overall, the differences in the characteristics of ALC patients between cut-points were fairly minor, suggesting that the 30 day cut-point may be somewhat arbitrary in mental health settings.

Despite the strengths inherent in this study, there are some limitations that must also be noted. One limitation of this study is the rate of disagreement over ALC status between the OMHRS and WTIS datasets. Despite that disagreement was determined to have occurred due to random coding errors, and not systematic errors in designation, it still represents inconsistency in how ALC is being recorded and measured. To correct the measurement issues surrounding ALC

118

designations in Ontario, it has been proposed that the agencies managing OMHRS and WTIS collaborate with one another in the future to establish a more integrated and reliable coding system.

Another limitation related to the use of both OMHRS and WTIS is the difference in the time periods that were examined. While OMHRS contained data from January 2005 to March 2014, WTIS only had available data from January 2011 to March 2013. Since OMHRS consisted of approximately seven more years of data than WTIS, it is logical that some variables would be significant only in the OMHRS model, given two primary reasons. The first reason is that the sample size in OMHRS is much larger than in WTIS, meaning that there is greater power to detect significant relationships in OMHRS (as well as a greater likelihood of falsely identifying significant relationships). The second reason is that OMHRS may reflect variables that were significant in the past, but as of 2011, no longer predict ALC status. For example, it could be that treatments for characteristics such as schizophrenia have advanced in the last several years, or that greater community resources have been made available, eventually reducing the risk of ALC. It is hard to distinguish whether a variable was significant in OMHRS because of the sample size and/or a diminishing risk over time, which is why the time difference between data sets is a limitation.

A further limitation involving the timeframe of the dependent variable is the introduction of the provincial definition for ALC status in 2009. Between 2005 and 2009, the guidelines for designating ALC status were less explicit; a physician or delegate would declare ALC status when they believed the patient was ready for discharge and no longer required the services of the hospital (CIHI, 2009). By refining the definition to account for treatment progress and personal goals, it is possible that ALC was designated more precisely from 2009 onwards. However, the

basic concept behind ALC status remained unchanged in the provincial definition, and so it is likely that ALC designations made prior to 2009 were not substantially different from those made later on. Further, by discarding four years of data, the sample size of the project would have been reduced, which would have been a larger limitation than minor variability in designating ALC status.

Lastly, it can be considered both a strength and a limitation that admission episodes were used as the unit of analysis for this project. In terms of its advantages, using admission episodes to predict ALC status allows clinicians to identify risk and protective factors as soon as the patient begins their stay, which affords them as much time as possible to manage these factors before an ALC designation occurs. However, analyzing admission episodes alone can also be construed as a weakness, because the patient's status on independent variables and level of risk may change throughout the course of their stay. Despite its limitations, isolating admission episodes as the unit for analysis is a necessary first step for research on ALC in Ontario, as it provides the most immediate clinical utility by identifying risk factors as early as possible.

Implications of Research

The primary contribution of this project is that it informs mental health care policy makers and practitioners about the risk factors implicated in ALC, which has already begun via several conferences and education sessions hosted by the OHA throughout the course of this project. By providing policy makers with information about the needs of ALC patients and their barriers to discharge, preventative strategies can be devised that reduce the risk of ALC designations.

Attempts to reduce ALC designations must occur at two levels: the hospital and the community. Policy makers have the ability to influence the services that are available in the community for individuals with mental illness, but until this point, the types of resources that were needed for patients with ALC designations were unknown. By identifying various risk factors and their frequency among the ALC population, this project is able to provide insight into the services that patients require. Mainly, services that can accommodate patients with ADL, IADL, and cognitive impairment, as well as social isolation and perhaps aggression, would likely result in the largest decrease in ALC. Additionally, resources that specialize in caring for individuals with disorders of childhood/adolescence and intellectual disabilities are also required, as they were identified as being at greater risk for ALC as well.

Ensuring that resources are available in the community is necessary, but building relationships between the hospital and these services is crucial as well. Two reports that discussed discharge planning in mental health hospitals, including one published by CAMH, argued that a lack of communication between the hospital and aftercare providers is one of the largest contributors to delays in discharge (Alghzawi, 2012; Butterill et al., 2009). The present study corroborates these findings by demonstrating that patients with ALC designations were discharged to a wide variety of destinations, whereas the majority of non-ALC patients were discharged home. Establishing strong relationships between hospitals and community services would lead to faster and more effective transitions for patients, and so this must be a priority for policy makers invested in mental health service delivery.

At the level of the hospital, health care practitioners may also benefit from this research by utilizing information on early risk factors for ALC status, although this would require an extension in the scope of the services that are traditionally provided by mental health care

practitioners. For instance, encouraging social relationships, managing aggressive behaviour, and improving symptoms of IADLs at the time of admission may lead to decreases in ALC designations, even though these characteristics are not usually a focus of treatment. Additionally, incorporating risk factors for ALC status into discussions on early discharge planning would inform practitioners about the probability that a patient will become ALC, affording them extra time to plan for barriers to discharge and to mitigate the risks.

Another implication of this project that is specific to the RAI-MH is the applicability of the interRAI mental health CAPs for use in clinical practice. To reiterate, CAPs are designed to assist in clinical care planning and decision-making by using the information contained in the RAI-MH to identify patient needs, strengths and preferences across a variety of domains. Further, each domain contains a section that outlines evidence-based treatments and service options that are available to patients who trigger these domains. Two CAPs were significantly predictive of ALC status in the OMHRS and WTIS regression models – substance use and the SSDIS. By making the interRAI CAPs available in hospital, clinicians would have easy access to information that may help them to manage the relevant issues and reduce the probability of ALC. Additionally, other variables that were significant in the regression models are also covered in certain CAPs, such as ADLs and IADLs (self-care CAP) and aggression (risk of harm to others CAP), increasing the utility of the CAPs even further.

Regarding research implications, this study was able to replicate findings from previous studies and contribute new information as well, which is especially important considering the small amount of research on ALC/delayed discharges in mental health settings. In particular, specific distinctions must be made between this study and the report published by members of CAMH, which also used information from the RAI-MH to examine patients with ALC

designations (Butterill et al., 2009). One major difference is that this study analyzed data over several years, while the CAMH report only examined the fiscal year 2007/2008. Since the data in this study is also more recent, it is more indicative of the needs of ALC patients in Ontario at the present time. Another notable contrast between this study and CAMH's is the use of different statistical procedures. While the CAMH study compared the frequencies of various characteristics between ALC/long-stay patients and other mental health patients, this study assessed the risk of ALC status through the use of a multivariate logistic regression. The ability to actually predict ALC ahead of time offers extra utility to health care professionals and policy makers.

A second research implication of this thesis concerns the utility of the Andersen-Newman (1995) model for health care utilization. Although it was intended to explain individuals' consumption of health care resources, this project successfully used the 'population characteristics' section of the Andersen-Newman framework to predict discharge from mental health care settings. By demonstrating the applicability of the Andersen-Newman model in predicting ALC status, a precedent has been established for its use in other research projects that also seek to explain discharge from health care settings.

Since only a small proportion of patient episodes have been designated ALC over the past several years, it is worth deliberating whether or not ALC will become an historical artifact in the near future. Looking at the distribution of ALC days among designated patients, the majority of the population is fairly well distributed around the 30 day cut-point, which is located around the 60th percentile. As such, the results of this project could potentially be used to design interventions that target the majority of ALC patients, which may result in the number of ALC designations decreasing close to zero. However, while ALC may soon become an artifact for

most ALC patients, it is unclear whether this is true for the 99th percentile of ALC patients, who had lengths of stay ranging up to several years. It is conceivable that the longest staying patients are qualitatively different from all other ALC patients and may be far less amenable to discharge.

Future Research

Future research within the interRAI organization could focus on developing a screening algorithm for ALC status based on items contained in the RAI-MH. By incorporating such an algorithm into the RAI-MH, early identification of a potential ALC designation would be possible, allowing health care practitioners to proactively manage the risk factors before ALC can occur. An ALC risk algorithm could also be efficacious in the discharge planning process, since patients at high risk for ALC may require specialized community resources such as high support housing, which often take a greater effort to locate and set-up than less specialized settings (Butterill et al., 2009). Finally, because it is already mandated that health care practitioners in inpatient mental health settings use the RAI-MH, building in an extra screening algorithm would be a convenient and inexpensive option for assessing risk of ALC.

Another topic for future research would involve examination of ALC status in relation to components of the Andersen-Newman (1995) model other than population characteristics, which were the primary focus of this project. For example, it would be valuable to conduct an analysis on the association between environmental structures and ALC status, including a description of the community services that are available to mental health patients by LHIN, and the types of services that are actually required. As a starting point for such a project, the risk and protective factors for ALC status that were discovered in this study could be used to form hypotheses about the types of services that ALC patients in mental health need in the community. Additionally, a

multilevel analysis of ALC could be performed using variables pertaining to both population characteristics and environmental structures, which would identify how much variance in ALC designations is due to individual characteristics and to health care structures. This type of multilevel analysis would be a logical next step, as ALC was considered only from the perspective of the individual in this project; investigating ALC as a health system issue would likely reveal some fundamental structural issues that lead to systematic delays.

A potential project for the research group at interRAI would involve linking RAI-MH assessments to subsequent interRAI LTCF assessments for ALC patients who were discharged to a long-term care facility. The advantage of connecting RAI-MH and LTCF assessments is the ability to analyze whether or not ALC patients share the same characteristics as other residents of long-term care facilities. If ALC patients are substantially different from other residents of long-term care facilities, this would suggest that ALC patients may have been inappropriately placed, and that other types of services are required. Conversely, differences between ALC patients and other residents of long-term care facilities could also indicate a bias against accepting patients with certain characteristics, even if it is the most appropriate setting for them to be placed. Finally, if there are no differences between patients designated ALC and other residents, it is probable that there is not enough capacity within existing long-term care facilities to accommodate all those who need them, leading to delays in hospital.

Considering the previously described limitations of using admission episodes as the sole unit of analysis, another avenue for future research would be to examine how risk of ALC status changes over the course of a patient's stay. A more longitudinal analysis would be useful, since it is possible that some variables become more or less predictive of ALC at different times during a patient's stay, or that length of stay itself becomes associated with ALC at a certain point.

Likewise, a survival analysis could be performed on the time to ALC designation, which would reveal how long it takes on average before a patient is designated ALC, as well as which variables increase and decrease the probability of ALC occurring. Similarly, an analysis of the rate of ALC designations and the associated risk factors could be examined separately by each individual year, which would reveal how the ALC population as a whole has changed over time.

Conclusion

In summary, a number of clinical and demographic characteristics were implicated in ALC designations that occurred in mental health settings across Ontario, demonstrating that the needs of this this population are varied and complex. Policy makers and health care practitioners involved in mental health service delivery may benefit from the early identification of ALC risk factors reported in this study, and may begin to design treatment interventions and policies that reduce the probability of ALC designations. However, more work needs to be completed that addresses the environmental factors involved in ALC status, as the availability of appropriate resources in the community is crucial for reducing ALC designations across the province.

References

Access to Care - Alternate Level of Care Informatics, Cancer Care Ontario (CCO). *Provincial Monthly Alternate Level of Care Performance Summary; September 2015*. Toronto, Ontario.

Afilalo, M., Soucy, N., Xue, X., Colacone, A., Jourdenais, E., & Boivin, J.F. (2015). Characteristics and needs of psychiatric patients with prolonged hospital stay. *Canadian Journal of Psychiatry, 60*(4), 181-188.

Alghzawi, H.M. (2012). Psychiatric discharge process. *International Scholarly Research Network (ISRN) Psychiatry, 2012,* 1-7. doi:10.5402/2012/638943

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed). Arlington, VA: American Psychiatric Association.

Andersen, R. & Newman, J.F. (1973). Societal and individual determinants of medical care utilization in the United States. *The Milbank Memorial Fund Quarterly: Health and Society, 51*(1), 95-124.

Andersen, R. (1995). Revisiting the behavioural model and access to medical care: Does it matter? *Journal of Health and Social Behaviour, 36,* 1-10.

Baines, D., Patterson, N., & Austen, S. (2010). An investigation into the length of hospital stay for deaf mental health service users. *Journal of Deaf Studies and Deaf Education, 15*(2), 179-184.

Barlow, K., Grenyer, B., & Ilkiw-Lavalle, O. (2000). Prevalence and precipitants of aggression

    in psychiatric inpatient units. *The Australian and New Zealand Journal of Psychiatry, 34*(6),

    967–74. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11127627

Barnable, A., Welsh, D., Lundrigan, E., & Davis, C. (2014). Analysis of the influencing factors

    associated with being designated alternate level of care. *Home Health Care Management &*

    Practice, 1-10. doi: 10.1177/1084822314539164.

Butterill, D., Lin, E., Durbin, J., Lunsky, Y., Urbanoski, K., & Soberman, H. (2009). *From*

    hospital to home: The transitioning of alternate level of care and long-stay mental health

    clients. Toronto, ON: Health Systems Research and Consulting Unit, Centre for Addiction

    and Mental Health. Retrieved from the Ontario Mental Health Foundation website:

    http://www.omhf.on.ca/_files/file.php?fileid=fileZxrqSZFHTJ&filename=file_ALC_Report

    _FINAL4.pdf

Cancer Care Ontario (CCO). (2011, October 7). *Alternate level of care*. Retrieved December 5,

    2014, from https://www.cancercare.on.ca/ocs/alc/

Canadian Institute for Health Information (CIHI). (2009). *Analysis of care in Canada*. Retrieved

    December 5, 2014, from

    http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_1751_E&cw_

    topic=1751&cw_rel=AR_2610_E#media. Accessed 2009 Jul 7.

Centre for Addiction and Mental Health (CAMH). (2012). *Understanding your rights:*

    Challenges & Choices: Finding mental health services in Ontario. Retrieved August 12,

    2015, from

http://www.camh.ca/en/hospital/visiting_camh/rights_and_policies/Pages/Understanding-your-rights.aspx

Commander, M. & Rooprai, D. (2008). Survey of long-stay patients on acute psychiatric wards. *Psychiatric Bulletin, 32,* 380-383.

Costa, A. P., Poss, J. W., Peirce, T., & Hirdes, J. P. (2012). Acute care inpatients with long-term delayed-discharge: evidence from a Canadian health region. *BMC Health Services Research*, *12*(1), 172. doi:10.1186/1472-6963-12-172.

eMentalHealth (2015, Aug 4). *Mental Health Facilities.* Retrieved from http://www.ementalhealth.ca/Ontario/Mental-Health-Facilities/index.php?m=heading&ID=229

Fleury, M.J., Ngui, A.N., Bamvita, J.M., Grenier, G., & Caron, J. (2014). Predictors of healthcare service utilization for mental health reasons. *International Journal of Environmental Research and Public Health, 11*(10), 10559-10586.

Foebel, A. D., Hirdes, J. P., Heckman, G. A., Kergoat, M. J., Patten, S., & Marrie, R. A. Diagnostic data for neurological conditions in interRAI assessments in home care, nursing home and mental health care settings: a validity study. (2013). *BMC Health Services Research, 13*(1), 457.

Gibbons, C., Dubois, S., Ross, S., Parker, B., Morris, K., Lim, T., & Bédard, M. (2008). Using the Resident Assessment Instrument-Mental Health (RAI-MH) to determine levels of care

for individuals with serious mental illness. *Journal of Behavioral Health Services Research, 35*(1), 60-70.

Glasby, J. & Lester, H. (2004). Delayed hospital discharge and mental health: the policy implications of recent research. *Social Policy & Administration, 38*(7), 744-757.

Hallak, J.E.C., Crippa, J.A.S., Vansan, G., & Zuardi, A.W. (2003). Diagnostic profile of inpatients as a determinant of length of stay in a general hospital psychiatric unit. *Brazilian Journal of Medical and Biological Research, 36*(9), 1233-1240.

Health Care System Quarterly Reporting for Ministry Senior Management. *The Quarterly, 11*, 2014.

Hirdes, J.P., Ljunggren, G., Morris, J.N., Frijters, D.H.M., Finne-Soveri, H., Gray, L., Björkgren, & M., Gilgen, R. (2008) Reliability of the interRAI suite of assessment instruments: A 12-country study of an integrated health information system. *BMC Health Services Research, 8*, 27.

InterRAI. (2015). *Scales: Status and Outcome Measures*. Retrieved December 5, 2014, from http://www.interrai.org/scales.html

Jones, K., Perlman, C.M., Hirdes, J.P., & Scott, T. Screening cognitive performance with the Resident Assessment Instrument for Mental Health (RAI-MH) Cognitive Performance Scale. (2010). *Canadian Journal of Psychiatry 55*(11), 736-740.

Kelly A, Watson D., Raboud J., & Bilsker D. (1998). Factors in delays in discharge from acute-care psychiatry. *Canadian Journal of Psychiatry*, *43*, 496-501.

Koffman, J., Fulop, N.J., Pashley, D., & Coleman, K. (1996). No way out: The delayed discharge of elderly mentally ill acute and assessment patients in North and South Thames regions. *Age and Ageing, 25,* 268-272.

Leff, J. & Trieman, N. (2000). Long-stay patients discharged from psychiatric hospitals: Social and clinical outcomes after five years in the community. The TAPS Project 46. The British Journal of Psychiatry, 176(3), 217–223. doi:10.1192/bjp.176.3.217

Lelliott, P., Wing, J., & Clifford, P. (1994). A national audit of new long-stay psychiatric patients. I: Method and description of the cohort. *The British Journal of Psychiatry, 165*(2), 1601-69.

Lewis, R. & Glasby, J. (2006). Delayed discharge from mental health hospitals: results of an English postal survey. *Health & Social Care in the Community, 14*(3), 225-230.

Lorenzo, R.D., Formicola, V., Carra, E., Piemonte, C., & Ferri, P. (2013). Risk factors for long-stay in an Italian acute psychiatric ward: a 7-year retrospective analysis. *Journal of Nursing Education and Practice, 4*(1), 68-80.

MacPhail, A., McDonough, M., & Ibrahim, J. E. (2013). Delayed discharge in alcohol-related dementia: consequences and possibilities for improvement. *Australian Health Review*, *37*(4), 482-487.

Martin, L., Hirdes, J.P., Morris, J.N., Montague, P., Rabinowitz, T., Fries, B.E. (2009). Validating the Mental Health Assessment Protocols (MHAPs) in the Resident Assessment

Instrument Mental Health (RAI-MH). *Journal of Psychiatric and Mental Health Nursing,*
16(7), 646-653.

Masters, G.A., Baldessarini, R.J., Öngür, D. & Centorrino, F. (2014). Factors associated with
length of psychiatric hospitalization. *Comprehensive Psychiatry, 55*(3), 681-687.

Mental Health Act, R.S.O (1990 c. M.7). Retrieved from the Government of Ontario website:
http://www.ontario.ca/laws/statute/90m07

Neufeld, E., Perlman, C. M., & Hirdes, J. P. Predicting inpatient aggression using the interRAI
Risk of Harm to Others clinical assessment protocol. (2012). *Journal of Behavioral Health*
Services & Research, 39(4), 472-480.

Ontario Hospital Association (OHA). (2012). *A practical guide to mental health and the law in*
Ontario. Retrieved from
https://www.oha.com/KnowledgeCentre/Library/Toolkits/Documents/Final%20-
%20Mental%20Health%20and%20the%20Law%20Toolkit.pdf

Ontario Hospital Association (OHA). (2014). Proceedings from an OHA Roundtable Discussion:
Using data to drive patient-centred care for alternate level of care (ALC) patients with
mental health, addiction and behavioural requirements in Ontario. Retrieved from
http://www.oha.com/CurrentIssues/Documents/ALC%20Roundtable%20Summary%20of%
20Proceedings.pdf

Paton, J.M., Fahy, M.A., & Livingston, G.A. (2004). Delayed discharge - a solvable problem? The place of intermediate care in mental health care of older people. *Aging and Mental Health, 8*(1), 34-39.

Perlman, C. M., Hirdes, J. P., Barbaree, H., Fries, B. E., McKillop, I., Morris, J. N., & Rabinowitz, T. Development of mental health quality indicators (MHQIs) for inpatient psychiatry based on the interRAI mental health assessment. (2013). *BMC Health Services Research, 13*(1), 15.

Poole, R., Pearsall, A., & Ryan, T. (2014). Delayed discharges in an urban in-patient mental health service in England. *Psychiatric Bulletin, 38,* 66-70.

Ryu, Y., Mizuno, M., Sakuma, K., Munakata, S., Takebayashi, T., Murakami, M., … Kashima, H. (2006). Deinstitutionalization of long-stay patients with schizophrenia: the 2-year social and clinical outcome of a comprehensive intervention program in Japan. *The Australian and New Zealand Journal of Psychiatry, 40*(5), 462–70. doi:10.1111/j.1440-1614.2006.01823.x

Springer, J.R. & Paul, G.L. (2008). Predicting time-to-independent-release from current level of functioning for psychiatric inpatients: A "survivor" analysis. *Journal of Behavioral Health Services & Research, 35*(3), 315-333.

Stevens, A., Hammer, K., & Buchkremer, G. (2001). A statistical model for length of psychiatric in-patient treatment and an analysis of contributing factors. *Acta Psychiatrica Scandinavica, 103*(3), 203-211.

Tanioka, T., Onishi, Y., Kataoka, M., Kawamura, A., Tomotake, M., Williams, C.L., … Mifune, K. (2013). Factors associated with discharge of long-term inpatients with schizophrenia in Japan: A retrospective study. *Issues in Mental Health Nursing, 34,* 256-264.

Tulloch, A.D., Khondoke, M.R., Fearon, P., & David, A.S. (2012). Associations of homelessness and residential mobility with length of stay after acute psychiatric admission. *BMC Psychiatry, 12*(1), 121.

Trieman, N. & Leff, J. (2002). Long-term outcome of long-stay psychiatric in-patients considered unsuitable to live in the community: TAPS Project 44. *The British Journal of Psychiatry, 181*(5), 428–432. doi:10.1192/bjp.181.5.428

Walker, D. (2011). Caring for our aging population and addressing alternate level of care. *Report submitted to the Minister of Health and Long-Term Care*.

World Health Organization. (2014). *International Classification of Diseases (ICD).* Retrieved December 5, 2014, from http://www.who.int/classifications/icd/en/

Appendix A: Literature Search Terms

Database	Alternate level of care	Mental Health Inpatient Unit
General Author Keywords:	Alternate level of care; Delayed discharge; Length of stay; Bed blocking	Mental health; Mental illness; Mental health inpatient; Psychiatric hospital
Subject Headings: (MeSH - PubMed)	Patient discharge; Length of stay	Hospitals, psychiatric; Psychiatric department, hospital
Subject Headings: (Term Finder – PsycINFO)	Psychiatric hospital discharge; Treatment duration	Psychiatric hospitals; psychiatric units

PubMed:
("alternate level of care" OR (delay*[tiab] AND discharg*) OR (patient discharge[mesh] AND (delay OR delayed OR delays OR length of stay[mesh])) OR "discharge planning" OR delayed patient* OR "bed blocking")
AND
(((psychiatric* OR mental disorders[mesh] OR mental health OR mental illness[mesh]OR hospitals, psychiatric OR psychiatric department, hospital[mesh])))

PsycINFO:
(Title:("mental health" OR "mental illness*" OR psychiatric*) OR Abstract:("mental health" OR "mental illness*" OR psychiatric*) OR Index Terms:("mental health" OR "mental illness*" OR psychiatric*))
AND
(Index Terms:("psychiatric hospital discharge" AND "treatment duration") OR Any Field:(delay* AND discharge*) OR Any Field:("discharge planning" OR "alternate level of care" OR "bed blocking"))

Google Scholar:
"alternate level of care" OR delayed discharge OR "length of stay"
AND
Mental health OR psychiatric hospital OR psychiatric unit

Appendix B: Summary of Literature Review

Authors, Year	Sample Size	Study Sample	Method	Analysis	Positive Variables	Negative Variables
Lelliot et al. 1994	N=905 patients	Long-stay psychiatric patients (6 months-3 years)	Cross-sectional: National audit of UK mental health patients	Descriptive statistics; chi-square analysis	Schizophrenia, violence, dementia, poor social skills	
Koffman et al. 1996	N=1510 patients	Delayed discharge, older adult acute mental health unit	Cross-sectional study: patient form, ICD codes, nurse assessment of delayed discharge	Descriptive statistics; chi-square analysis	Older age, male gender, dementia, high supervision required, hospital stay >3 months	
Kelly et al. 1998	N=327 patients	Delayed discharge, acute-care psychiatry	Cross-sectional study: BPRS, DRI	Descriptive statistics, Kruskal–Wallis test, logistic regression	Schizophrenia, low community adjustment potential, service requirements, residential placement waitlist	Previous psychiatric hospitalization, younger age, high risk of suicide
Stevens et al. 2001	N=4706 admissions	Psychiatric inpatients (length of stay)	Retrospective study: ICD codes, 64-item survey	Cox regression, model fit analyses (linear vs. logarithmic)	Schizophrenia, depression, previous psychiatric admissions (<3), welfare status, foreign status	Substance abuse, university degree
Hallak et al. 2003	N=61 patients (prospective study only)	Psychiatric inpatients (length of stay)	Retrospective study/Prospective study: ICD codes/DSM-III-R codes, BPRS	Descriptive statistics, ANOVA	Schizophrenia, affective disorder	Decline in BPRS during first 2 weeks of admission
Paton et al. 2004	N=91 patients	Delayed discharge, older adult mental health units	Cross-sectional study: CANE, NPI, Bristol ADL, doctor and nurse assessment of delayed discharge	Descriptive statistics	Dementia, low ADL and NPI scores, family conflict, specialized services required	
Lewis & Glasby, 2006	N=35 mental health trusts	Delayed discharge, mental health units	Cross-sectional study: NHS survey regarding delayed discharges	Descriptive statistics	Older age, learning difficulties, specialized services required	
Commander & Rooprai, 2008	N=38 patients	Long-stay acute psychiatric	Prospective longitudinal study: survey,	Descriptive statistics	Schizophrenia, previous mental health service	Marriage, employment

		patients (>6 months)	FACE, nurse assessment of delayed discharge		use, violence and threatening behaviour	
Park et al. 2008	N=5421 patients	Emergency psychiatry patients (length of stay)	Retrospective study: medical records, hospital visit records	Wilcoxon Signed Ranks test, logistic regression	Homelessness, psychotic disorder, suicidal ideation, homicidal ideation, past psychiatric hospitalizations, psychiatric co-morbidity, substance abuse	Health insurance, female gender
Springer & Paul, 2008	N=362 patients	Psychiatric inpatients (length of stay)	Prospective longitudinal study: TSBC	Descriptive statistics, Cox proportional hazard regression	Bizarre facial and verbal expressions	Adaptive interpersonal skills, perceived dangerousness (with psychotropic medication)
Butterill et al., 2009	N=5189 patients	ALC patients & long-stay patients	Longitudinal study: RAI-MH	Descriptive statistics	Psychotic disorders, dual-diagnosis, physical disorders, aggression, older age, poor cognition, ADL dependence, admission from assisted living or shelter	Employment, insight into mental health, social supports, medication adherence, female gender
Tulloch et al. 2012	N=4885 patients	Acute psychiatric inpatients (length of stay)	Cross-sectional study: electronic patient records	Log-linear regression	Older age, homelessness, residential mobility, schizophrenia, cognitive impairment, ADL impairment, physical illness/disability	Self-harm, short (vs. none & long) psychiatric admission in past 2 years
Lorenzo et al. 2013	N=3981 admissions	Long-stay acute psychiatric patients (>27 days)	Retrospective study: descriptive survey, ICD-9 codes	Descriptive statistics, log-rank test, logistic regression	Aggression, female gender, older age, rehabilitation use, psychiatric diagnosis (except anxiety)	Organic co-morbidity
Tanioka et al. 2013	N=70 patients	Long-stay psychiatric	Retrospective study: PSDBES,	Descriptive statistics,	Older age, higher levels of	Family agrees with discharge

		patients with schizophrenia	family agreement over discharge (1-6)	Mann-Whitney U-test	disability	
Masters et al. 2014	N=589 patients	Psychiatric inpatients	Cross-sectional study: medical records	Descriptive statistics, t-tests, relative risk, linear regression	Schizophrenia, longer illness duration, low GAF scores, complex drug treatments at discharge	Marriage, employment, private insurance
Poole et al. 2014	N=67 patients	Delayed discharge, mental health units	Cross-sectional study: medical records, questionnaire for patient's care program approach coordinator	Descriptive statistics, Mann-Whitney test	Psychotic disorder, organic cerebral disorder, previous mental health use, social isolation, high levels of disability	Older age, white ethnicity
Afilalo et al., 2015	N=262 patients	Long-stay (>30 days) and delayed discharge, acute mental health units – tertiary hospitals	Prospective longitudinal study: chart reviews, interviews with health care team	Descriptive statistics, chi-square analysis	Long-stay: delusions, hallucinations, inability to manage medication, aggression Delayed discharges: near significance = fewer admitting diagnoses	Delayed discharges: near significance = family support

Appendix C: Descriptions for Scales and CAPS

Scales

Using the information collected in the RAI-MH, clinicians are able to produce various types of 'scales.' Scales work by synthesizing portions of the data into a single coherent variable, allowing clinicians to more easily identify the strengths and needs of a patient. For example, the ADL scale takes all of the information pertaining to ADLs and combines it into one, so that clinicians can evaluate a patient's overall ADL needs. This section describes what each of the scales represent, which variables go into their algorithm, and what the range of resulting scores are.

All of the descriptions for the scales were adapted from interrai.org (InterRAI, 2015).

Activities of Daily Living (ADL) Hierarchy

The ADL is a clinical scale that is generated to determine an individual's level of functional capacity for more basic daily living. The ADL is calculated based on the following items in the RAI-MH: personal hygiene, locomotion (walking/wheeling), toilet use, and eating. The scale ranges from 0-16, with higher scores signifying greater dependence on a variety of ADLs.

Aggressive Behaviour Scale (ABS)

The ABS is a clinical scale that is generated to determine an individual's level of aggressive behaviour. The ABS is calculated based on the following items in the RAI-MH: verbal abuse, physical abuse, socially disruptive behaviour, and resistance of care. The scale ranges from 0-12, with higher scores signifying more frequent and more varied aggressive behaviour.

Cognitive Performance Scale (CPS)

The CPS is a clinical scale that is generated to determine an individual's level of cognitive impairment. The CPS is calculated based on the following items in the RAI-MH: short term memory, cognitive skills for daily decision making, making self understood, and ADL self-performance – eating. The scale ranges from 0-6, with higher scores signifying greater cognitive impairment.

Depressive Severity Index (DSI)

The DSI is a clinical scale that is generated to determine an individual's level of depressive symptoms. The DSI is calculated based on the following items in the RAI-MH: sad/pained facial expression, negative statements, self-deprecation, guilt/shame, and hopelessness. The scale ranges from 0 to 15, with higher scores signifying more depressive symptoms.

Instrumental Activities of Daily Living (IADL)

The IADL is a clinical scale that is generated to determine an individual's level of functional capacity for more complex daily living. The IADL is calculated based on the following items in the RAI-MH: meal preparation, managing finances, managing medications, transportation, and phone use. The scale ranges from 0-30, with higher scores signifying greater dependence on a variety of IADLs.

Mania

The mania scale is generated to determine an individual's level of manic symptoms. The mania scale is calculated based on the following items in the RAI-MH: inflated self-worth, hyperarousal, irritability, increased sociability/hypersexuality, pressured speech, labile affect, and sleep problems due to hypomania. The scale ranges from 0-20, with higher scores signifying more manic symptoms.

Positive Symptom Scale – Long Version (PPSL)

The PSSL is a clinical scale that is generated to determine an individual's level of positive psychotic symptoms. The PSSL is calculated based on the following items in the RAI-MH: hallucinations, command hallucinations, delusions, abnormal thought process, inflated self-worth, hyperarousal, pressured speech, and abnormal movements. The scale ranges from 0-24, with higher scores signifying more positive symptoms.

Risk of Harm to Others (RHO)

The RHO is a clinical algorithm that is designed to assess an individual's risk for harming others. The RHO is calculated based on both individual items in the RAI-MH, as well as another scale. The following criteria for RHO are: delusions, insight into mental health, difficulty falling asleep, sleep problems due to hypomania, violence towards others, intimidation, violent ideation, extreme behaviour disturbance, police intervention for violent crime, and score on the ABS. The scale ranges from 0-6, with higher scores representing increased risk for harming someone else.

Self-Care Index (SCI)

The SCI is a clinical algorithm based on psychiatric symptoms that is designed to assess an individual's inability to care for self. The SCI is calculated based on the following items in the RAI-MH: daily decision making, insight into mental health, decreased energy, abnormal thought process, and making self understood. The scale ranges from 0-6, with higher scores representing decreased ability to care for self.

Severity of Self-Harm (SoS)

The SoS is a clinical algorithm that is designed to assess an individual's risk for harming themselves. The SoS is calculated based on both individual items in the RAI-MH, as well as three other scales (one of which is based on the Emergency Screener for Psychiatry [ESP]). The following criteria for SoS are: most recent self-injurious attempt, intent of any self-injurious attempt was to kill themselves, family/others concerned about person's risk for self-injury, suicide plan, score on the DSI, score on the CPS, and score on the ESP version of the PSS - short. The scale ranges from 0-6, with higher scores representing increased risk for harming oneself.

Social Withdrawal

The social withdrawal scale is generated to determine an individual's level of withdrawal from social activities. Social withdrawal is calculated based on the following items in the RAI-MH: anhedonia, withdrawal, lack of motivation, and reduced social interaction. The scale ranges from 0-12, with higher scores signifying greater social withdrawal.

CAPs

CAPs were developed to support clinicians in using evidence-based information to evaluate patient care needs and service planning, including areas like exercise and interpersonal conflict. To do this, CAPs use variables contained in the RAI-MH to create predictive algorithms that distinguish between different "trigger levels." Trigger levels denote either varying levels of risk (e.g. moderate versus high), or different contexts that are relevant to the risk in question (e.g. with or without accompanying cognitive deficits). Trigger levels help clinician's identify patient's strengths and needs, and provide them with prevalence estimates and potential

treatment strategies. This section describes what each CAP represents, what the trigger levels are, and what variables go into determining trigger levels.

Control Interventions

The control interventions CAP identifies patients who have experienced control interventions, while taking into consideration the reasons that led to the interventions. This CAP includes triggers for eliminating the need for control interventions among persons in a psychiatric emergency situation, and eliminating control interventions among persons not in a psychiatric emergency setting. The following items from the RAI-MH are used to determine trigger levels: mechanical restraint, chair prevents rising, physical/manual restraint by staff, confinement to unit, confinement to room, seclusion room,

Education and Employment

The education and employment CAP informs clinicians about an individual's participation in school and/or employment. This CAP includes triggers for reducing the risk of unemployment or dropping out of school, and supporting employment or educational participation. The following items and scales from the RAI-MH are used to determine trigger levels: insight into mental health, failed education program, employment status, increase in absenteeism, poor productivity, intent to quit work, persistent unemployment, age, ADL scale, ABS, CPS, and PSSL.

Exercise

The exercise CAP informs clinicians about an individual's level of physical activity. This CAP contains triggers for increasing physical activity among persons who are capable of being physically active, and increasing physical activity but requires additional consideration due to a health condition. The following items and scales from the RAI-MH are used to determine trigger

levels: hours exercise, falls, dizziness, unsteady gait, chest pain, vomiting, peripheral edema, emergent conditions, dyspnea, dyskinesia, bradykinesia, rigidity, slow shuffling gait, ADL, and CPS.

Interpersonal Conflict

The interpersonal conflict CAP informs clinicians about an individual's dysfunctional interpersonal relationships and behaviours. This CAP includes triggers for reducing widespread conflict, and reducing conflict within specific relationships. The following items from the RAI-MH are used to determine trigger levels: anger, conflict with staff/others, conflict with family/friends, staff reports frustration in dealing with person.

Medication Management and Adherence

The medication management CAP informs clinicians about an individual's capacity to manage and adhere to their medication needs. This CAP includes triggers for problems with medication management and adherence related to cognitive deficits and positive symptoms, and for having previously stopped taking medication due to side effects. The following items and scales from the RAI-MH are used to determine trigger levels: easily distracted, disorganized speech, mental function varies over day, difficulty sleeping, too much sleep, capacity for managing medications, dizziness, unsteady gait, constipation, diarrhea, vomiting, nausea, dry mouth, appetite change, daytime drowsiness, emergent conditions, fatigue, self-rated health, akasthisia, dyskinesia, tremors, bradykinesia, rigidity, dystonia, slow shuffling gait, difficulty with sexual functioning, refused medications, stopped psychotropic medications, CPS, and PSSL.

Pain

The pain CAP informs clinician's about an individual's current level of experienced pain. This CAP includes triggers for medium priority level and high priority level. The pain scale is used to determine the trigger level for this CAP, which itself incorporates items on pain frequency and pain intensity.

Personal Finances

The personal finances CAP informs clinicians about an individual's current financial situation. This CAP includes triggers for trouble due to economic hardship, and inability to manage finances. The following items from the RAI-MH are used to determine trigger levels: competent to manage property, finance – capacity, economic trade-offs, and loss of income.

Rehospitalization

The rehospitalization CAP informs clinicians about an individual's history of mental health hospitalization as well as their current risk of readmission. This CAP includes trigger levels for moderate risk and high risk of rehospitalization. The following items and scales from the RAI-MH are used to determine trigger levels: living arrangement, insight into mental health, number of psychiatric admissions in last 2 years, CPS, and PSSS.

Sleep Disturbance

The sleep disturbance CAP informs clinicians about dysfunctions in an individual's sleeping patterns. This CAP includes triggers for current sleep disturbance and no worse than moderate cognitive impairment, and current sleep disturbance and severe cognitive impairment. The following items and scale from the RAI-MH are used to determine trigger levels: difficulty sleeping, too much sleep, and CPS.

Social Relationships

The social relationships CAP informs clinicians about an individual's experiences of social isolation. This CAP includes triggers for reducing social isolation and family dysfunction, and improving close friendships and family functioning. The following items from the RAI-MH are used to determine trigger levels: withdrawal, reduced social interactions, social activities, visit with family member, other interaction with family member, family overwhelmed by person's illness, dysfunctional family relationship, presence of confidant, and conflict-laden relationship.

Social Supports for Discharge (SSDIS)

The SSDIS CAP informs clinicians about post-discharge difficulties that an individual may experience due to lack of supportive resources. This CAP includes a trigger for possible difficulties. The following items from the RAI-MH that are used to determine trigger level: reason for assessment, residence admitted from, support person positive about discharge, help with child care available, supervision for personal safety available, crisis support available, ADL/IADL support available, living status after discharge.

Substance Use

The substance use CAP informs clinicians about an individual's past and current history of substance abuse. This CAP includes triggers for current problematic substance abuse, and history of problematic substance abuse. The following items from the RAI-MH are used to determine trigger levels: intentional misuse of medications, number of alcoholic drinks in last 14 days, inhalant use, hallucinogen use, cocaine use, stimulant use, opiate use, cannabis use, injection drug use, told to cut down use, bothered by criticism about alcohol/drug use, guilt about drinking/drug use, starts morning with alcohol/drugs, and social environment encourages use.

Traumatic Life Events

The trauma CAP informs clinicians about an individual's history and experience of traumatic life events. This CAP includes triggers for immediate safety concerns, and reducing the impact of prior traumatic life events. The following items from the RAI-MH are used to determine trigger levels: intense fear, serious accident, death of a family member, lived in war zone, witnessed severe accident, victim of crime, victim of sexual assault, victim of physical assault, victim of emotional abuse, fearful of family member, concerns for safety, and family history of abuse.

Weight Management

The weight management CAP informs clinicians about an individual's health surrounding their weight. This CAP includes triggers for body composition and problematic eating behaviours. The following items from the RAI-MH are used to determine trigger levels: weight loss, one or fewer meals a day, weight gain, decrease in food or fluids, binge-eating/purging/bulimia, fear of weight gain, fasting, and body mass index.

Appendix D: Ethics Clearance

ORE OFFICE USE ONLY

ORE # 18228

APPLICATION FOR ETHICS REVIEW OF RESEARCH INVOLVING HUMAN PARTICIPANTS

Please remember to PRINT AND SIGN the form and forward with all attachments to the Office of Research Ethics, Needles Hall, Room 1024.

A. GENERAL INFORMATION

1. Title of Project: Secondary Analyses of Anonymized interRAI Data from the Data Sharing Agreement with the Canadian Institute for Health Information

2. a) Principal and Co-Investigator(s)

NEW As of May 1, 2013, all UW faculty and staff listed as investigation must complete the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Tutorial, 2nd Ed. (TCPS2) prior to submitting an ethics application. The tutorial takes at least three hours; it has start and stop features.

Name	Department	Ext:	e-mail:
John Hirdes (faculty)	School of Public Health and Health Systems	32007	hirdes@uwaterloo.ca

2. b) Collaborator(s)

NEW As of May 1, 2013, all UW faculty and staff listed as investigation must complete the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Tutorial, 2nd Ed. (TCPS2) prior to submitting an ethics application. The tutorial takes at least three hours; it has start and stop features.

Name	Department	Ext:	e-mail:

3. Faculty Supervisor(s)

NEW As of May 1, 2013, all UW faculty and staff listed as investigation must complete the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Tutorial, 2nd Ed. (TCPS2) prior to submitting an ethics application. The tutorial takes at least three hours; it has start and stop features.

Name	Department	Ext:	e-mail:

4. Student Investigator(s)

Name	Department	Ext:	e-mail:	Local Phone #:

5. Level of Project: Faculty Research   **Specify Course:**
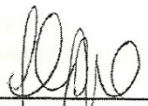
Research Project/Course Status: New Project\Course

6. Funding Status (If Industry funded and a clinical trial involving a drug or natural product or is medical device testing, then Appendix B is to be completed):

INVESTIGATORS' AGREEMENT

I have read the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, 2nd Edition (TCPS2) and agree to comply with the principles and articles outlined in the TCPS2. In the case of student research, as Faculty Supervisor, my signature indicates that I have read and approved this application and the thesis proposal, deem the project to be valid and worthwhile, and agree to provide the necessary supervision of the student.

NEW As of May 1, 2013, all UW faculty and staff listed as investigators must complete the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Tutorial, 2nd Ed. (TCPS2) prior to submitting an ethics application. Each investigator is to indicate they have completed the TCPS2 tutorial. If there are more than two investigators, please attach a page with the names of each additional investigator along with their TCPS2 tutorial completion information.

_____   ___5/15/14_____

Print and Signature of Principal   Date
Investigator/Supervisor

Completed TCPS2 tutorial:
___YES ___NO ___ In progress

_____   _____

Print and Signature of Principal   Date
Investigator/Supervisor

Completed TCPS2 tutorial:
___YES ___NO ___ In progress

Each student investigator is to indicate if they have completed the Tri-Council Policy Statement, 2nd Edition Tutorial (http://pre.ethics.gc.ca/eng/education/tutorial-didacticiel/). If there are more than two student investigators, please attach a page with the names of each additional student investigator along with their TCPS2 tutorial completion information.

_____   _____

Signature of Student Investigator   Date

Completed TCPS2 tutorial:
___YES ___NO ___ In progress

_____   _____

Signature of Student Investigator   Date

Completed TCPS2 tutorial:
___YES ___NO ___ In progress

FOR OFFICE OF RESEARCH ETHICS USE ONLY: