An Epidemiological Analysis of Smoking and Smoking Cessation among Persons Undergoing Inpatient Treatment for Psychiatric Illness

by

S. Wajid Ahmed, MBBS, MAS

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, 2007

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

Background:

Tobacco use increases the odds of suffering and dying prematurely from a host of chronic disease, including heart disease, stroke, cancer, lung diseases, and mental illness. There is limited published data especially from Canada on the prevalence, etiology, consumption patterns and treatment of tobacco use among persons with mental illness.

Objectives:

First, understand the social epidemiology and describe the characteristics of a typical smoker with mental illness. Second, understand the likelihood of receiving smoking cessation interventions in mental health institutions of Ontario.

Methods:

Secondary analysis of the data obtained using the Ontario Mental Health Reporting System (OMHRS). Census level data collected from all the individuals admitted to mental health institutions in Ontario during the period of October 2005 and September 2006. Cross tabs were used to analyze the social epidemiology of smokers. Odds ratios were calculated for the likelihood of the psychiatric diagnosis and receiving smoking cessation intervention.

Results:

Forty-seven percent of the individuals admitted in mental health beds during the study duration were smokers. The mean age of smokers was lower as compared to non-smokers. Individuals with the diagnosis of substance use disorder were the most likely to be smokers as compared to the reference group. Smokers scoring higher on CAGE score or having a diagnosis of substance use disorder and had more than 5 drinks of alcohol in the last 14 days are more likely to receive the intervention as compared to other smokers.

Conclusion:

The results of this study suggest that significantly huge populations of individuals in mental health institutions are smokers. The smoking prevalence is higher in males and these males are also more likely to have a diagnosis of substance-related disorder. There is a lack of smoking cessation interventions in mental health facilities.

Acknowledgements

I would like to thank these individuals for their valuable contribution toward the completion of this thesis.

* My co-supervisor - Dr. Paul McDonald for his tremendous support and guidance in every step of my Master's degree. As I was a newcomer to Canada and coming with a background of clinical medicine, Dr. McDonald was the one who helped me made the transition easily and successfully.

* My co-supervisor - Dr. Trevor Smith who helped me in the development of this thesis.

* Dr. John Hirdes for his valuable contribution in the completion of my thesis and for allowing me to use the dataset for my thesis and also in helping me refine my research strategies.

* Drs. Peter Selby and Sandra Bullock for their extended support in highlighting the complex issues related to health research, tobacco smoking and mental illness. Without their support, I wouldn't be able to complete this research.

* Dr. Jeff Poss (Ideas for Health) for his support in setting up the OMHRS database and helping me answer tough questions related to the dataset.

I would also like to acknowledge the Canadian Institute for Health Research for their training grant, i.e., Strategic Training Program for Tobacco Research (STPTR)

Dedication

I would like to dedicate this thesis to my family members, especially Rashid Ahmed who encouraged me and pushed me hard to take up the challenge of getting a Master's degree from the University of Waterloo. My lovely wife Sana and my beautiful boy Adi supported me a lot and waited patiently throughout the duration of my studies. My Mom and Dad, my sister and my brothers Khalid, Zahid and Shahid all helped me in various ways to complete my thesis. Thank you all.

Table of Contents

List of Tables

List of Figures

1.0 Introduction

Tobacco use increases the odds of suffering and dying prematurely from a host of chronic diseases, including heart disease, stroke, cancer, lung diseases, and mental illness (US Department of Health and Human Services, 2004). The costs associated with tobacco use are borne by individuals, families, employers, and entire communities. Tobacco-related death and illness deprives families of breadwinners and nations of a healthy workforce by killing people at the height of their productivity. In a report released by the Canadian Centre on Substance Abuse, loss of productivity accounts for the largest share of the total costs related to tobacco (over 73%), followed by direct health care costs (almost 26%) in Ontario (Rehm et al., 2006).

Although the prevalence of cigarette smoking has dropped in Canada and developed nations more generally, rates remain unacceptably high. Results from representative national surveys indicate that, between 1985 and 2006, smoking prevalence rates in Canada have fallen from 35% to 19% (Health Canada, 2006). Despite this, over 5 million Canadians continue to smoke, and tobacco use remains the primary cause of preventable death among Canadians (Canadian Tobacco Use Monitoring Survey, 2006). For nations such as Canada, the United States, and the UK, who have set a goal to reduce disparities in health status, it is a particular concern that the prevalence of tobacco use varies widely across various overlapping subpopulations, including aboriginals, those with mental illness, young and middle-aged adults, as well as those with low socio-economic status.

Tobacco use among persons with mental illness is of particular concern for at least two reasons. First, compared with other populations, very little is known about the prevalence, etiology, consumption patterns, and treatment of tobacco use among persons with mental illness.

The little we do know suggests that tobacco use among this group may be a significant problem. For example, available data suggests that up to 60% of individuals with psychiatric disorders are smokers (Leonard et al., 2001); prevalence rates range from 30-50% in patients with mood disorders and exceed 70% in patients with schizophrenia and substance-related disorder (Hennigfield, Clayton, and Pollin 1990; Hughes, Hatsukami, Mitchell, and Dahlgren 1986; Patkar et al. 2002). Second, per capita consumption may be greater among persons with mental illness. Although less than twenty percent of Canadians will personally experience a mental illness during their lifetime (Health Canada, 2002), estimates suggest that in countries like the United States and Canada, 44% of the cigarettes smoked are consumed by individuals with a psychiatric or substance abuse disorder (Lasser et al., 2000). Other studies have reported that this population is two to three times more likely to be tobacco dependent than the general population (Lohr & Flynn, 1992; WHO, 2001). Collectively, these data suggest that tobacco use is a significant problem in persons with mental illness. Understanding more about tobacco use and tobacco cessation in this group would be highly beneficial since it has the potential to improve the health of these individuals. It will also increase the knowledge about the broader tobacco epidemic.

The thesis is organized by first providing a brief review of what is currently known about tobacco usage and its relation to psychiatric diagnosis, etiology, patterns of consumption, etc. Based on the review of the literature, research questions are then outlined. Following the research questions, the methods used to answer the research questions will be explained. Results will follow, and finally the discussion section will summarize the findings, importance of the findings, and future directions.

The purpose of this thesis is to use an available data source of individuals hospitalized for mental illness to learn more about the use of tobacco. More specifically, this thesis seeks to understand the social epidemiology of institutionalized smokers by looking at the relationship with respect to basic demographic factors such as age, sex, race, marital status, level of education, sources of income, etc. It is also designed to further understand the factors which make a person more likely to receive smoking cessation programs being offered in mental health institutions in Ontario.

2.0 Literature Review

While the prevalence and consumption rates for tobacco use among persons with mental illness are higher than those in the general population, there are variations in consumption patterns among those with psychiatric illnesses. A more detailed understanding of these variations may shed light on the etiology of tobacco use for persons with mental illness and/or how to more effectively assist them to stop smoking.

One potentially important variation in prevalence rates appears to be related to the type of psychiatric diagnosis. For example, a recent paper summarizing the recent literature on the use of tobacco among individuals with mental illness or an addiction reported that the rate of cigarette smoking is highest among individuals with psychotic and substance-use disorders (Williams and Ziedonis, 2004). The types of psychotic disorders most closely linked with tobacco use included schizophrenia, schizoaffective disorder, schizophreniform disorder and brief psychotic disorder. They also reported that the rate remains high for depression, anxiety, and personality disorders as well.

There are over 4,000 components in tobacco. Among the various components, nicotine acts directly by binding to the specific receptors in the body. These receptors, when stimulated, alter the levels of neurotransmitters and produce different effects depending on the area where the receptors are located. The specific location of the nicotinic receptors in the brain had been the topic of discussion. It is difficult to generalize the specific locations from animal brain to human brain. According to more limited studies done on human brain tissue, nicotinic receptors appear to be widely distributed in the central nervous system, with high concentrations in the thalamus, striatum, hippocampal formation, cerebral cortex, basal ganglia and cerebellum (Breeze, Adams,

Logel, Drebing, Rollins & Barnhart, 1997). Positron-emission tomography using radioactive nicotine as the tracer ligand confirms the widespread distribution of these receptors (Nordberg, 1995).

It is thought that several neurotransmitters are involved in the pathogenesis of psychiatric and substance-related disorders (Kalman et al., 2005). For example, it is known that patients with the diagnosis of depression have low levels of serotonin and nor-epinephrine. The imbalance of these neurotransmitters, whether resulting from or due to mental illness alone or in combination with cigarette smoking, suggests that the prevalence and consumption of cigarette smoking may be different according to the particular psychiatric diagnosis.

2.1 Tobacco and psychiatric diagnosis

The prevalence of smoking differs with the psychiatric diagnosis of the individual. The literature review suggests individuals with the diagnosis of schizophrenia and mood disorders (including depression, bipolar disorders, mania, etc.) represent a major proportion of the smoker population with mental illness. Among individuals diagnosed with schizophrenia, higher rates of smoking were found in various clinical as well as population-based samples (Kalman et al., 2005).

In a study by Diwan and colleagues (1998), a very high current smoking rate (up to 86%) was reported among individuals with the diagnosis of schizophrenia. The rate was three to four times higher than the general population. However, the low statistical power of the data and the study participants coming from a circumscribed population (male veterans) were the major limitations of the study. The study was conducted in an outpatient clinic using a smoking

questionnaire administered to 99 patients with primary non-substance-use Axis I diagnoses.

Using a variety of methodological techniques, the smoking rate was found to be 50% among individuals with mood disorders (Glassman, 1998; Glass et al., 1992; Adlaf, Paglia & Ivis, 1999; Poirier et al., 2002). In individuals with alcohol and substance-related disorders, rates of smoking range from 70 to 90% (Battjes, 1998; Berger & Schweigler, 1972; Glassman et al., 1990; Williams et al., 2005). Another study found that the initiation rate of daily smoking among individuals diagnosed with schizophrenia was higher as compared to the individuals with the diagnosis of mood disorders or controls after the age of 20 years (De Leon, 2002). In contrast to persons with schizoaffective, depressive and/or substance-related disorders, persons with other psychiatric diagnoses smoke at rates equal to or lower than those seen in general non-psychiatric populations (Poirier et al., 2002; Tanskanen et al., 1997). It should be noted that the sample sizes in these studies were relatively small, but even so, the high rates of cigarette smoking in this group compared to the general non-psychiatric population, is a definite cause for concern.

The high prevalence of cigarette smoking among persons with only certain types of mental illness potentially sheds light on the etiology of tobacco use and how to treat it more effectively. Some of the researchers have postulated that individuals with schizophrenia may smoke cigarettes to improve their psychiatric symptoms, cognitive functions and/ or alleviate the effects of medications. This is reinforced by a review of the literature which suggests that individuals with schizophrenia who smoke have lower rates of neuroleptic-induced Parkinsonism (Decina et al., 1990; Menza et al., 1991). Much research has shown that cigarette smoking has been also used to reduce depressive symptoms (Glassman et al., 1990; Khantzian, 1997). Animal models of depression suggest that nicotine (one of the main ingredients of tobacco smoke) can

have long-term antidepressant-like properties and nicotinic receptors are mediating these effects (Quattrocki, Baird and Yurgelum-Todd, 2000). While review of the literature suggests that smoking is used to reduce depressive symptoms, it also has been hypothesized or shown to increase the likelihood of suffering from depression (Quattrocki, Baird, and Yurgelum-Todd, 2000). Irrespective of the mechanism/ action, the co-occurrence of smoking and depression has been found in other studies as well.

The correlation of smoking and depression, and the discovery of antidepressant-like properties of nicotine have led to the use of antidepressant medications to treat nicotine dependence. For example, antidepressant medication Bupropion is being used as an approved first line therapy to treat nicotine dependence.

The use of antipsychotic medications in different psychiatric diagnoses is also affected by the smoking status of those individuals. Research has shown that the pharmacology of antipsychotic differs in smokers compared to non-smokers. This is probably due to the fact that cigarette smoke contains monoamine oxidase (MAO) inhibitors which degrade catecholamine neurotransmitters, e.g., serotonin, dopamine, epinephrine and nor-epinephrine. Many of the antipsychotic exert their effect by altering the level of these neurotransmitters; therefore, the MAO inhibitors from cigarette smoke affect the level of these neurotransmitters. As a result of these alterations, the pharmacology of antipsychotic change with respect to the smoking habits of the individuals. For example, it was found that ad libitum smoking increases after initiation of haloperidol, relative to baseline rates when patients are free of antipsychotic medications (McEvoy et al., 1995a; McEvoy et al., 1995b). There is also evidence to support that those individuals who were treated with clozapine, risperidone or olanzapine (all atypical

antipsychotic), smoked fewer cigarettes when treated with conventional antipsychotic medications.

This review of literature clearly shows that the prevalence of smoking is very high especially in individuals with the diagnoses of schizophrenia and mood disorders. It also found that rates vary within the diagnosis as well. To better understand these differences and the smoking pattern, further research is needed to fill the knowledge gaps in this area.

2.2 Severity of illness and its relationship to cigarette smoking

Severity of mental illness is thought to be directly related with cigarette smoking. A study conducted in Ireland found a relationship between mood disorders, smoking, and heavy smoking with history of psychotic symptoms (Corvin et al., 2001). The study found that smoking is associated with increased severity of psychotic symptoms in the study population.

In a population-based prevalence study, persons with multiple lifetime psychiatric diagnoses were found to have higher rates of smoking, and they smoked more heavily than persons with only one DSM-III-R diagnosis (Lasser, 2000). Multiple lifetime psychiatric diagnoses were used as a measure of the severity of psychiatric illness. However, it is difficult to conclude whether smoking was the reason for the multiple psychiatric admissions or whether multiple psychiatric admissions led to the higher smoking rates, but certainly the association of these two conditions is a cause of concern.

On the other hand, Dixon et al. (2007) reported no relationship between smoking severity and the Brief Psychiatry Rating Scale (BPRS). Study participants included a relatively large group of individuals with the diagnosis of schizophrenia. It is possible that further inclusion of other

individuals with a wide range of psychiatric diagnosis may show different results. More data is needed to understand the association in various diagnostic groups.

2.3 Various forms of tobacco usage

Tobacco can be consumed in various forms, such as smokeless tobacco, cigarettes, cigars, pipes etc. Studies have shown that the pulmonary absorption is more efficient than oral or nasal absorption (the mechanism used in other forms of tobacco). This is due to the fact that nicotine is immediately absorbed and transported to the brain by way of the carotid artery within 7 – 10 seconds due to the large surface area of the lungs.

Canadian Tobacco Usage Monitoring Survey (CTUMS) data show that the prevalence of recent use (i.e., use in the last 30 days) of smokeless tobacco (i.e., chewed or oral snuff) was 0.6% among those aged 15 or older in 2005. A review of the literature did not find any significant data on the pattern of tobacco usage in individuals with mental illness compared to the general population. Therefore, based on the available research and the recent trend of tobacco usage, it is difficult to conclude whether or not individuals with mental illness use the same forms of tobacco in comparison to general population. However, for the purpose of this thesis, the term tobacco usage and cigarette smoking will be used synonymously.

2.4 The relationship between smoking initiation and mental illness

There is limited evidence to address causality between smoking initiation and mental illness. However, research has shown that the age of onset for both of these conditions are very close to each other. In a pilot study, it was found that 50% of patients had started daily smoking

before the onset of the first schizophrenic psychosis (de Leon, 1996). The study found that the mean difference between the initiation of regular smoking and the onset of psychiatric disorder was significantly lower than that among subjects with other psychoses or those with non-psychotic disorders. Another study found a close relationship between the age of initiation of regular smoking and age of onset of mental disorder (Riala et al., 2005). The study found a mean difference between the initiation of regular smoking and the onset of psychiatric disorder among patients with schizophrenia was 2.3 (SD 6.6) years, which was statistically significantly lower than that among subjects with other psychoses or those with non-psychotic disorders. The mean difference among patients with schizophrenia also remained lower when compared with specific diagnostic groups, namely, non-psychotic mood disorders and substance use disorder. On the other hand, the same study found that the mean age of initiation of regular smoking among patients with schizophrenia did not differ statistically significantly from that of the control group.

Recent studies have shown that the age of onset of psychiatric illnesses among smokers and non-smokers is not statistically different (Kelly and McCreadie, 1999; Beratis et al., 2002). However, there is some evidence to suggest the association between early onset of mental illness and smoking status of the individual. For example, individuals having a history of cigarette smoking and later being diagnosed with schizophrenia, presented with an earlier onset of symptoms as compared to those without a smoking history (Sandyk and Kay, 1991; Goff et al., 1992).

In other studies, initiation of smoking occurred before the onset of symptoms in approximately 86% - 90% of the patients (Beratis et al., 2001; Kelly and McCreadie, 1999). It was also found in the same study that the mean age of smoking onset preceded the onset of

schizophrenia by 11 years.

The review of literature also found evidence suggesting that smoking initiation may lead to developing depression. For example, it was found that smoking does not appear directly to cause depression but the likelihood of suffering from depression is correlated with nicotine dependence and the number of cigarettes consumed. Kendler and colleagues also concluded that smoking does not induce depression nor does depression induce smoking (Kendler et al., 1993). Another study found that smokers with a history of depression are more likely to fail at quitting as compared with those without a history of depression (Glassman, 1993; Covey, Glassman, Stetner, 1997).

Similar association was found with heavy cigarette smoking during adolescence with an increase in various anxiety disorders at age 22 even after controlling for confounding factors (Johnson, 2000). In the same study, agoraphobia, generalized anxiety disorders and panic disorder, was also found associated with past history of cigarette smoking, but obsessive-compulsive or social anxiety disorder was not associated with past history of cigarette smoking. In contrast to earlier studies, this study finds that adolescents with anxiety disorders may not be at elevated risk for chronic smoking during early adulthood. On the other hand, smoking abstinence was actually found to reduce the anxiety level of the individuals (West & Hajek, 1997). This suggests that anxiety disorder was associated with past history of cigarette smoking and the anxiety decreased after the person stopped smoking cigarettes.

In addition to the social factors, few studies have evaluated the genetic factors as determinants of co-morbid rates of smoking in psychiatric disorders and substance-use disorders (Kendler et al., 1993; Swan et al., 1996). For example, Leonard and Bertrand reported fewer

nicotinic receptors in individuals with schizophrenia and they postulated that it is due to abnormal genes that relate to neuronal nicotine receptors resulting in higher rate of cigarette smoking in these individuals (Leonard and Bertrand, 2000). Another common genetic predisposition to both smoking and depression was found in a large female twin study (Kendler, 1993), which strongly suggests the biological vulnerability of smoking with mental illness. In addition to cigarette smoking, the genetic vulnerability is also cited as the main reasons for the co-morbidity to many psychiatric and substance- use disorders (Kendler et al., 2003).

In summary, there is some evidence to support the likelihood of developing anxiety disorder or schizophrenia with cigarette smoking. However, the risks of developing mental illness with tobacco use or vice versa are highly debatable. More research is needed in this area to establish a causal relationship between these two conditions.

2.5 Prevalence of cigarette smoking in different age groups

The review of available literature failed to find the data on the prevalence of cigarette smoking among different age groups in individuals with mental illness. However, as discussed earlier, a close association exists between the age of initiation of cigarette smoking and the onset of mental illness. It was also noted that the quit rates in individuals with mental illness is low. Therefore, we can expect that the prevalence of cigarette smoking among different age group will be proportionally similar to all of the population. The data obtained from Canadian Tobacco Usage Monitoring Survey (CTUMS) in 2006 showed that the highest prevalence of cigarette smoking is between the ages of 20 and 24. The prevalence of smokers by age group is shown below in Table 1.

Table 1. Percentage of Smokers in different age groups in both sexes, Source Canadian Tobacco Usage Monitoring Survey, 2006

Age Group	Percentage of Smokers
15 ~ 19	14.8
20 ~ 24	27.3
25 ~ 34	23.9
35 ~ 44	19.8
45 ~ 54	22.0
55 +	11.1

The smoking prevalence among different age groups shows that the proportion of smokers increases up to the age of 24 and then declines slowly. It peaks again between the age of 45 ~ 54 and then declines to the lowest after the age of 55 years. There are various reasons attributed to the peaks and falls of the smoking prevalence among general population, however, we have almost no data to understand how this prevalence is affected in smokers with mental illness. It will be interesting to compare the age-related prevalence of smoking among these individuals.

2.6 Relationship between cigarette smoking, mental illness, social factors, and cultural disadvantage

There is a gradient in cigarette smoking prevalence with respect to occupational class, lone parents, unemployment and mental illness (Jarvis, 2006). Various studies have found a connection between current cigarette smoking and all these factors individually. Smoking prevalence is higher among the poorest and lowest among the most affluent (Jarvis, 2006). A deprivation score was calculated using General Household Survey data from the UK and by assigning a score of 1 for each of the following: occupational class, rented housing, no car, unemployed, living in crowded conditions. The resulting index had a score ranging from 0, among the affluent, to 5 among the poor. It was found that the level of nicotine dependence (calculated by saliva cotinine) was directly related with a higher deprivation score. For a deprivation score of 0, the level of cotinine was found 250ng/ml and it increases to 280, 300 and 320ng/ ml for a deprivation score of 1, 2 and 3 respectively.

Individuals with mental illness, as with any other chronic illness, are more likely to score high on the deprivation score used by Jarvis. It is due to the fact that the score is further compounded by the mental illness of the individuals and their smoking status. The association of mental disorders with low socio-economic status is not new. In a book by Shaw & McKay (1942), a consistent pattern of association was found between juvenile delinquency rates and poor housing, poverty, concentration of foreign-born, prevalence of tuberculosis, and prevalence of mental disorders. Another study carried out in New Zealand found that social and childhood factors were closely related to either nicotine dependence or depression (Fergusson et al., 1996). The study was carried out in a cohort of 16-year-old New Zealanders, and it examined

depression and nicotine dependence and prospectively measured risk factors including socio-demographics, family history of criminality, life events, etc. These findings suggest that there may be some connection between likelihood of mental illness and cigarette smoking with factors such as occupation, class, and other living conditions as well. The relationship is far more complex than it seems, however, at present there is limited data to understand the true association between these two factors i.e., tobacco smoking and mental illness with social factors. More research is needed to further explain these associations.

2.7 Cigarette smoking and cognition

The effect of cigarette smoking exerted by nicotine is thought to improve the psychiatric symptoms of some of the individuals. In a study it was shown that the cognitive functioning of people with dementia improved after a short term of nicotine administration (Le Houezec, 1998). In the same study, improvement of Tourette's syndrome was also demonstrated following nicotine administration. Similarly, in another study, the long-term nicotine administration in the form of nicotine patch improved the symptoms of Parkinson's disease (Le Houezec, 1998). These findings suggest that cigarette smoking is also being used to overcome some of the psychiatric symptoms, whether due to the use of antipsychotic medications or due to their psychiatric diagnosis. There is still very limited evidence to support these effects and more research is needed in this area.

2.8 Tobacco use as a means of socialization

Cultural acceptability is another major issue that is linked to smoking in many health institutions. Traditionally, psychiatric institutions condoned smoking, by using cigarettes as incentives, rewards, or punishments (McNeill, 2001). Some individuals use cigarette smoking as a means to socially interact with each other. Research has also shown that smoking is a form of social activity in mental health facilities and some of the staff even smoke with patients as a way of social interaction and to facilitate communication (Smoke free London, Mentality and ASH symposium, 2001). As a result of that interaction with staff as a condoned social activity, some individuals were introduced to smoking. As a result, they enter the facility as a non-smoker but leave as a smoker. Therefore, it is possible that, as a result of this social interaction, the prevalence of cigarette smoking may be higher in these individuals.

2.9 Tobacco control policies in mental health settings

The issue of tobacco control warrants attention, in terms of policies for individuals with mental illness, due to its strong correlation with specific mental illnesses and health conditions of the individuals. Despite the scope of this problem, tobacco use is largely ignored, deferred, or discouraged in the mental-health and addiction-treatment settings (Foulds, 1999; Rustin, 1998). The issue of cigarette smoking, unlike any other acute psychiatric symptom or addiction, has raised limited concerns especially at the policy level. It is likely that the issue is ignored because of lack of research and limited knowledge about the complexities surrounding tobacco usage in this group. Earlier studies have shown that rather than working effectively for tobacco control, some treatment settings have promoted the use of cigarettes as a behavioral reinforcement to

reward appropriate behaviors (Williams & Ziedonis, 2004).

Canadian Federal Tobacco Control Strategy (FTCS) has identified key strategy areas for effective tobacco control in Canada. The FTCS has four mutually reinforcing components: protection, prevention, cessation, and harm reduction. The FTSC is supposed to target all Canadians, and the high risk groups identified are youth (smoking rate is 25%), young adults (32%), Inuit people (72%), First Nations people (62%) and other aboriginal groups (FTSC, 2002). The prevalence rate in individuals with mental illness exceeds the national average and in some of the cases also exceeds the high risk groups identified in FTSC.

Lack of advocacy for this group has also been a major factor in attempting to control tobacco usage in this population. Families and treatment providers have been ambivalent and showed little interest in tobacco control efforts on behalf of their loved ones and clients (Williams & Ziedonis, 2004). Mental health facilities and the policies governing them have been reluctant to address this issue despite these problems (Himelhoch & Daumit, 2003; Hughes, 1997). Tobacco rations were an assumed part of day-to-day life in many such institutions (Shlomowitz, 1990). Some of the researchers have suggested that the mental health professionals have expressed various concerns while addressing the issue of cigarette smoking among individuals with mental illness (Hughes, 1997; Covey, Glassman & Stetner, 1997). They postulated that the mental health professionals do not accept the fact that mental health patients can succeed in quitting smoking. This could be either due to the fear of exacerbation of symptoms during nicotine withdrawal or due to the fear of reimbursement (Hughes, 1997; Covey, Glassman, & Stetner, 1997). As a result of these factors, this group is more exposed to environmental tobacco smoke as compared to the general non-psychiatric population.

Cigarette smoking is a deeply rooted issue that has grown over the centuries with the development of asylums and their evolution into current psychiatric in-patient facilities. The immediate and long term benefits of addressing tobacco dependence among individuals with mental illness are often underestimated, and as a result, individuals with mental illness continue to smoke cigarettes. Strong public health policies should be developed to create environments conducive to the reduction of smoking rates in this group.

2.10 Quit rates among individuals with mental illness

Based on the available findings and review of the literature, addressing the issue of controlling tobacco usage in individuals with mental illness is among the lowest of priorities for the mental health professionals. In one of the studies, the spontaneous cessation rate for people with mental illness and addictions was found to be extremely low (Ziedonis and George, 1997). Interestingly, there is also some evidence to indicate that many individuals with mental illness and addictions want to reduce the amount that they smoke, or stop smoking altogether (Addington et al., 1997; Carosella et al., 1999; Forchuk et al., 2002; Goldberg et al., 1996). In support of this finding, another study found that individuals with schizophrenia recognize smoking as a problem and they are also interested in attending smoking cessation groups and appear to be appropriately motivated (Addington et al., 1997; Ziedonis et al., 1997).

In contrast to the above findings, some of the research has shown that despite the willingness to attend smoking cessation programs, quit rate among individuals with mental illness is low as compared to the general non-psychiatric population. For example, the National Comorbidity Survey data from the USA shows that persons with a history of mental disorder

such as depression, anxiety, or substance-use disorder, and especially those who had a mental disorder during the last four weeks, comprised a higher percentage of current smokers with lower quit rates (Lasser et al., 2000). Similar to this finding, a population-based survey found that smokers with higher depression scores (Center for Epidemiological Studies Depression Scale, CES-D) were less likely to quit nine years later compared to smokers who were non-depressed at baseline (Anda et al., 1990).

The quit rate is also dependent on the concurrent use of addictive drugs in this group. The review of literature shows that individuals with concurrent addictions have more extensive histories with cigarettes, express attitudes reflecting less readiness to quit, and have higher rates of co-morbid psychological problems than those without addictions (Burling et al., 1996; Fogg et al., 2001). The likely explanation for this finding is the prolonged exposure and a higher dependency of tobacco. Another plausible explanation for the low quit rates in individuals with concurrent substance-use disorder the fact that this population represents a qualitatively or quantitatively different subset of smokers for whom specialized population-specific smoking treatments are needed (Burling et al., 1997). The review of the research in this particular area is somewhat inconclusive. The main drawback of this research was the non-availability of smoking cessation programs specially designed for this population.

The pertinent issue associated with tobacco smoking, in individuals with mental illness, is the dilemma between the desire to quit, availability of cessation programs, biological dependence, and success rates for quitting. The result of this dilemma is high smoking prevalence among these individuals. At the individual level, these individuals have similar concerns as the general population, such as addiction, fear of withdrawal, weight gain, and

failure (Goldberg et al., 1996; Killen et al., 1996; Orleans & Hutchinson, 1993). The additional challenges associated with the fear and success of quitting can be attributed to their psychiatric symptoms. In a case series, smokers with mental illness experienced an exacerbation of psychiatric symptoms while trying to quit or cut down (Dalack & Meador-Woodruff, 1996). On the other hand, most controlled study has found no change in the level of psychotic symptoms during smoking cessation treatment (Evins et al., 2001; Weiner et al., 2001; Ziedonis et al., 2003). The other important contributory factor in failure of the cessation can be attributed to nicotine dependence and its effect on the body in terms of affecting neurotransmitters throughout the body.

Although there is limited evidence to support the availability of smoking cessation programs especially designed for these individuals, the available literature also suggests that the mental health professionals have expressed their specific concerns while addressing the issue of smoking cessation. For example, they are concerned whether psychiatric patients can be prevented from smoking without major behavioral consequences (Geller & Kaye, 1990). For them, patients are generally viewed as too anxious and agitated while in acute psychiatric distress to be able to tolerate the added stress and frustration of nicotine withdrawal (Bronaugh & Frances, 1990). Mental health staffs view smoking-related problems as inappropriate attention seeking behavior, increase in surreptitious smoking, and other disruptive behavior (Patten, Martin, & Owen, 1996). Treatment staff frequently anticipates an increased need for seclusion, restraints, and PRN (as needed) medications (Beemer, 1993). Staff also sympathize with patients who have already had everything taken away, and they don't want to take the only pleasurable activity (smoking) away from them (Beemer, 1993). However, in a meta-analysis conducted by

Lawan & Pols, it was shown that these staff members anticipated more problems after enforcing such restriciton on tobacco-dependent individuals (Lawn and Pols, 2005). The study also found that there was no increase in aggression, discharge against medical advice, or increased use of as-needed medication following the ban.

The lack of research in this area is related to various factors discussed earlier, but most importantly, it is the lack of attention and consequently a lack of knowledge about this special group at different levels. More research is needed in this area to understand the characteristics of the individuals that would help them quit smoking, so that appropriate cessation program can be developed for them.

2.11 Tobacco control in Ontario

The acute care hospitals in Ontario have already placed a complete ban on cigarette smoking within their premises. On the other hand, individuals are allowed to smoke cigarettes in designated spaces within some of the nursing homes, long term care facilities, and mental health facilities. Beginning June 2006, the province of Ontario has implemented a smoke-free act which enforces a complete ban on smoking in all enclosed public facilities. Although the policy still has some provisions that exclude psychiatric facilities if they meet certain conditions, it is thought to be the first step towards addressing the issue in a broader perspective. The exclusion of psychiatric facilities, with certain provisions, actually points out that despite this evidence (discussed earlier), mental health professionals have their concerns towards enforcing a complete smoking ban within the facilities.

Some mental health facilities in Ontario are working hard for tobacco control on behalf of

these individuals. Some are even providing assistance to help these individuals quit cigarete smoking. It is essential to put a system in a place to help individuals, in the best possible ways, to achieve better health outcomes.

2.12 Summary of knowledge and current research questions

In summary, it is clear that there are strong relationships between tobacco use and mental illness, and that this relationship has important implications for the health of the individual with mental illness as well as the general population of smokers (since persons with mental illness constitute a large proportion of tobacco control burden). However, it is also clear that there is much to learn. There are several significant gaps in our current knowledge. This thesis has been designed to address several of these gaps. Specifically, it will examine the following research questions.

Q1. Who are the smokers within mental health institutions in Ontario?

Understanding the social epidemiology of smokers can help in identifying the characteristics of a typical smoker admitted to a mental health facility in Ontario. These characteristics include

i. Distribution of smokers

ii. The effect of gender on smoking status

iii. The effect of marital status on smoking status

iv. The effect of age on smoking status

v. The effect of being an aboriginal with smoking status

vi. The type of mental health units and the distribution of smokers

vii. The reasons for admission

viii. Area of primary residence

ix. Level of education

x. The relationship between psychiatric diagnosis and smoking status

xi. The relationship between various types of anxiety and the individual's smoking status

xii. Social support available to smokers

xiii. Social events and their relationship to smoking status

xiv. Health complaints exhibited by individuals with respect to smoking status.

xv. Hospitalization history and its relationship to smoking status

xvi. Level of aggression in smokers and non-smokers

xvii. Pain scale, positive symptoms scale, negative symptoms scale, and cognitive performance scale and its relationship with smoking status.

Q2. Who receives smoking cessation programs? What are the determinants of receiving smoking cessation help?

After developing controls for alcohol/ drug dependence and mental health facilities, characteristics of the individuals who were offered the treatment for "alcohol/ drug treatment/ smoking cessation" was explored. These characteristics may include the social epidemiologic

variables as well as other indicators such as health conditions, activity of daily living (ADL), violence, anger, mental state indicators, behavior disturbance, cognitive performance, etc.

3.0 Methods

Secondary data analysis on the Ontario Mental Health Reporting System (OMHRS) was used to answer the research questions. The study received ethics clearance from the Office of Research Ethics, University of Waterloo, (ORE # 13824).

3.1 Ontario Mental Health Reporting System (OMHRS)

The Ontario Mental Health System (OMHRS) is a new system that includes clinical, administrative, and resource information to support inpatient mental health services planning in facilities with adult inpatient mental health beds in Ontario. It is used in every psychiatric bed throughout the province of Ontario. The system incorporates the Resident Assessment Instrument-Mental Health © (RAI-MH) instrument designed by interRAI (www.interrai.org), as well as admission and discharge tracking-related elements. The complete Ontario Mental Health System (OMHRS) data intake form is provided in Appendix A.

RAI-MH © is a unique standardized data collection system for mental health that is designed to include care planning, outcome measurement, quality improvement and case mix-based funding applications. The instrument includes a Minimum Data Set for Mental Health © (MDS-MH) with approximately 250 data elements. The distribution of these data elements helps to assess the various clinical domains, such as:

- 28 items for Mental Health Assessment Protocols © (MHAPs) for care-planning
- 32 items for Quality Indicators for Mental Health (QIMHs)
- System for classification of In-Patient Psychiatry (SCIPP), the case-mix methodology

developed for use with the MDS-MH data.

- Other outcome measures, such as Cognitive Performance Scale, Depression Rating Scale, Negative Symptoms Scale, Anxiety Scale, etc.

The MHAPs, selected outcome measures, and QIMHs are described in Appendix B, C, and D, respectively.

The psychometric properties of the interRAI outcome measures have been validated in different studies (InterRAI). These scales have been clearly researched to ensure that the measures are comparable to industry "gold standard" scales (InterRAI). The RAI-MH can be used to compare the needs of the mental health patients with individuals in other health care sectors, such as long-term care and home care, and allowing an integrated system for improved care. The triggering mechanism embedded in the RAI-MH can help identify imminent threat to the individuals, thus improving the care of the person.

3.2 OMHRS and Tobacco Control

The Resident Assessment Instrument has potential for research at many levels, starting from simple treatment issues up to the level of policy formulation. The instrument can also be used to understand the issues linked to cigarette smoking and mental illness. In addition to other clinical information and other variables, the OMHRS dataset includes variables to assess the smoking status of the individuals under section C5 (see Appendix A for the complete questionnaire). The specific question asked is:

C5	Smoking	Patient smoked or chewed tobacco daily	
		0 – Daily	1 – Not in the last 3 days, but is a daily smoker
		2 - Yes	

Although the measure of smoking status is very crude, it can still be used to find the answers for many issues that are closely interrelated with cigarette smoking and mental illness. The principles underlying the development of this dataset are to focus on a broad range of needs that affect functioning and independence of the individuals. It also helps to measure the need and to organize information relevant to functioning in a way that supports, rather than replaces, clinical decision-making by mental health professionals (Hirdes, et al., 2000). It is also a broad screening instrument rather than an exhaustive assessment of any single clinical issue. Hence, although the instrument includes a series of items covering a broad range of common problems encountered in mental health, it is not intended to be a definitive assessment for addictions, eating disorders or post-traumatic stress disorder, for example (Hirdes, et al., 2000).

3.2.1 The Assessments Periods for OMHRS reporting

The following record types and timeframes for assessment are required for OMHRS reporting: Figure 1 shows an illustration of the assessment periods.

Admission Record	Within first 72 hours of admission to the adult mental health bed
Short Stay Record	When the total length of stay is less than 72 hours
Changes in Status Record	Any major physical, mental, or social change that renders the last assessment data and care plan invalid
Quarterly Record	Within 92 days of the most recent admission, quarterly, or change in assessment
Discharge Record	Assessment at 72 hours before the patient leaves the inpatient bed and when there is no indication that the individual will be returning (that is, not a leave of absence)

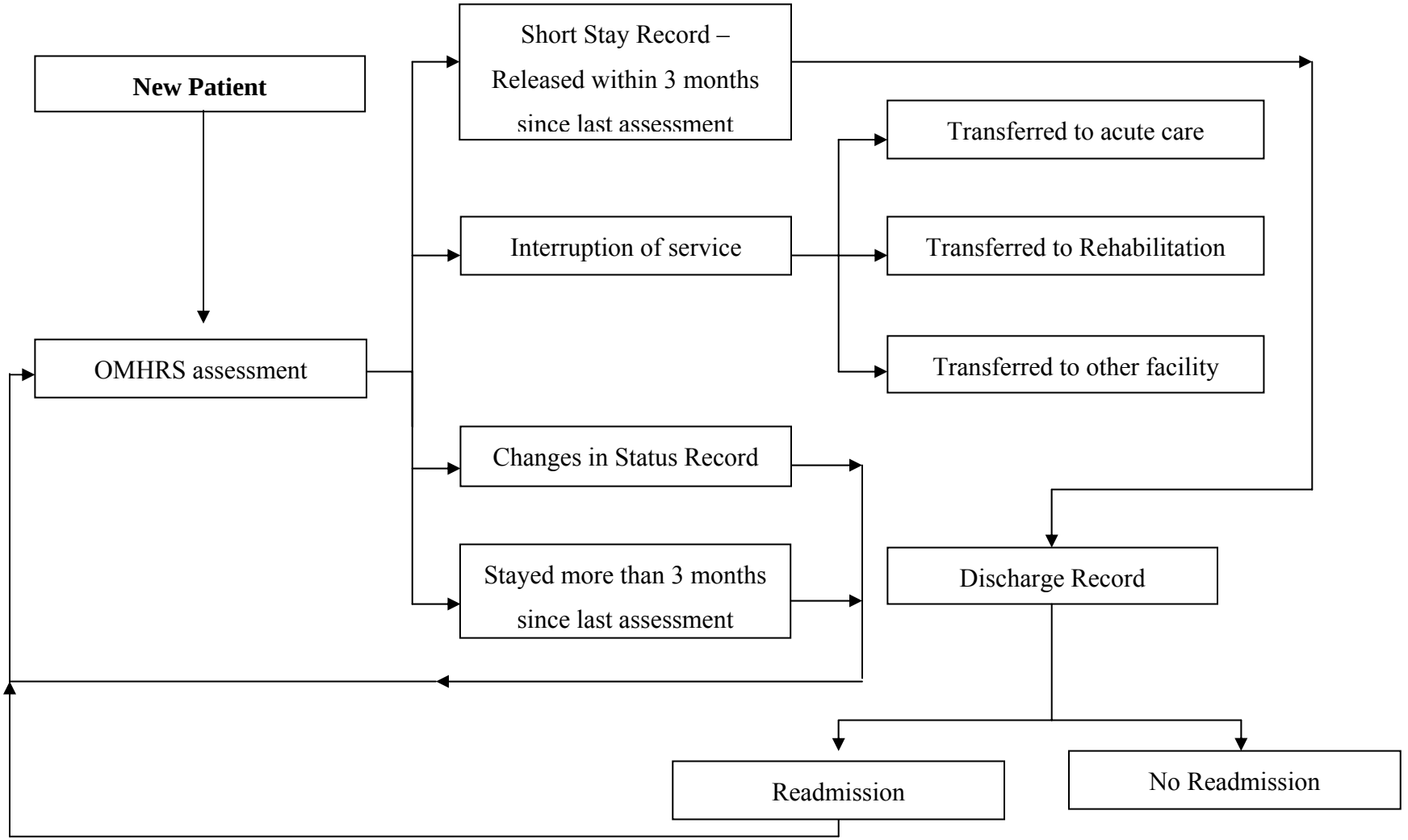

Figure 1: Life cycle of Ontario mental health reporting system

3.3 Participants

All of the records of patients admitted in mental health institutions since 2005 are stored using the OMHRS. There were more than 80,000 assessments in the OMHRS database. Based on the study questions, only the first time assessment data (N=32449) was selected. The assessments were carried out during the period of October 2005 and September 2006. The analysis was carried out on the data information that was complete on variable C5, i.e., smoking status. However, even with the first assessment, there were some individuals who were admitted multiple times during the data collection period. Data was sorted, and all data was removed for the individuals who were admitted more than once (N=27282).

C5	Smoking	Patient smoked or chewed tobacco daily	
		0 – No	1 – Not in the last 3 days, but is a daily smoker
		2 - Yes	

3.4 Independent Variables

Embedded within OMHRS are a number of outcome measures that cover clinical domains, ranging from clinical data to socio-demographic and administrative information. Based on the literature review and available socio-demographic information, the following variables were specifically analyzed.

- Psychiatric diagnostic information (Q1) - Based on DSM-IV Provisional diagnostic category. The categories are ranked as “1” for most important diagnosis, “2” for the second most important, “3” for the third most important.

- Aggressive behavior scale (ABS_MH2) – The aggressive behavior scale is an indicator of the prevalence of aggressive behavior in the population being assessed. The scale is based on four items from the MDS-MH2 whose values range from 0 to 3. The scale is a summation of these items with a range of 0 to 12, where a higher score indicates a higher degree of aggressive behavior

ITEMS	**DESCRIPTION**
E1b	Verbal abuse
E1c	Physical abuse
E1d	Socially inappropriate or disruptive behavior
E1f	Resists Care

- Indicator of Anxiety (B1O, B1P, B1Q, B1R, B1S, B1T) – specifically looking at the indicator exhibited within the last 3 days.

SCORE	**DECRIPTION**	**DESCRIPTION**
0	No pain	I8a=0
1	Less than daily pain	I8a=1
2	Daily pain, but not severe	I8a=2 or 3 AND I8b=1 or 2
3	Severe daily pain	I8a=2 or 3 AND 18b=3 or 4

- Pain (pain_MH2) – The scale uses two items on the (I8a and I8b) to create a score that ranges from 0 to 3

- CAGE (CAGE_MH2) – The CAGE is a simple four-question yes/no screen that focuses on the consequences of drinking, rather than on the quantity or frequency of alcohol consumption. Every positive answer to this question is coded as 1 and then added together to give a final CAGE score. The questions are:

  C Have you ever tried to CUT DOWN on your drinking?

  A Have people ever ANNOYED you by criticizing your drinking?

  G Have you ever felt GUILTY because of something you did when you have been drinking?

  E Have you ever had a morning EYE-OPENER? (Taken a drink first thing in the morning?)

- Social support networks (P1A-P1D) – This is described as the presence of one or more family members (or close friends) who are willing and able to provide the following types of support after discharge from formal care programs/ setting.

DESCRIPTION	**ITEM**
Help with child care, other dependents	P1a
Supervision for personal safety	P1b
Crisis support	P1c
Support with ADLs or IADLs	P1d

- Health complaints (B1CC) – This is described as, repetitive health complaints (e.g., persistently seeks medical attention; excessive concerns with bodily functions)

- Psychotic symptoms scale (PSS_MH2) or positive symptoms of schizophrenia – It is based on four indicators of psychosis in OMHRS. These include hallucinations (item B1u), command hallucinations (item B1v), delusions (item B1w), and abnormal thought processes/ forms (item B1x). Each item is first coded as below, and then summed to give the positive/ psychotic symptoms scale (range 0 – 8). The higher scale indicates the severity of psychotic symptoms.

ITEM VALUE	**PSS SCORE**
0,1	0
2	1
3	2

- Negative symptoms of schizophrenia (NSS_MH2) – This is based on the negative symptom items in OMHRS. These include anhedonia (item B1y), loss of interest (item B1z), lack of motivation (item B1aa), and reduced interaction (item B1bb). Each item is first coded in the same manner as items in the positive/ psychotic symptoms scale, and then items are summed to give the negative symptoms scale (range 0 -8).

- Cognitive performance scale (CPS_MH2) – The cognitive performance scale is a hierarchical index, used to rate the cognitive status of clients, and has been validated

against the Mini Mental State Examination and the Test for Severe Impairment (Morris et al., 1994; Hartmaier et al., 1995).

CPS_MH2 is based on the scores of four items: F1a (short-term memory); F2 (cognitive skills for daily decision making); H3 (expressive communication); G1e (eating self-performance). Based on the individual's impairment level on these four items, a CPS scale ranging from 0-6 is derived. To calculate the CPS score, first an impairment count (impairment in table below) is created in which the score can take on values of 0, 1, 2 or 3, depending on how many of the following conditions are met:

- F2 = 1, 2 or 3
- H3 = 1, 2, 3 or 4 and F1a = 1

Next, a severe impairment score ('severe impairment' in table below) is calculated and it can take on values of 0, 1 or 2 depending on how many of the following are met:

- F2 = 2 or 3 and H3 = 3 or 4

CPS SCORE	DESCRIPTION	SPECIFICATION
0	Intact	F2 = 0, 1, 2, 3 AND impairment = 0
1	Borderline Intact	F2 = 0, 1, 2, 3 AND impairment = 1
2	Mild Impairment	F2 = 0, 1, 2, 3 AND impairment = 2, 3 AND severe impairment = 0
3	Moderate Impairment	F2 = 0, 1, 2, 3 AND impairment = 2, 3 AND severe impairment = 1
4	Moderate/ severe impairment	F2 = 0, 1, 2, 3 AND impairment = 2, 3 AND severe impairment = 2
5	Severe impairment	F2 = 4 AND H2g = 0, 1, 2, 3, 4, 5
6	Very severe impairment	F2 = 4 AND H2g = 6,8

3.5 Data Cleaning

The OMHRS database uses an electronic data entry system. The entry software has data checks that require the assessment items to be in the specified range of acceptable values (so an item that must be 0, 1 or 2 cannot have a response of 3).

Completeness of the questionnaire is also considered, that is, questions cannot be left

unanswered. However, in spite of these procedures, it is difficult to conclude what is correct. Therefore, the study was restricted to assume that the recorded values are plausible. The major transcription error was minimized by using electronic data entry system software.

Logical checks, (checking the data when the value of variables are reasonable and they depend on the value of some other variable), was conducted only in the case where observed values fail to satisfy our understanding about the outcome measures. Despite these checks, there was at least one assessment in which the age of the individual seemed doubtful, so individual assessments were removed from our analysis when age was our variable of interest.

3.6 Data Analysis

Question 1 – Who are the smokers?

Dependent variable – Smoking Status (No, Yes, Not in the last 3 days but a daily smoker)

The smoking data gathered using OMHRS cannot specifically separate current smokers from former smokers. The question related to smoking status asks whether the person smoked cigarettes daily, in last 3 days (but is a daily smoker), or did not smoke daily. The admission record (initial assessment) is done within 72 hours of admission to the adult mental health bed in Ontario. Based on the admission record, if a person was smoking a cigarette right before he got admitted, and had not had a chance to smoke since admission, and had not smoked in the last three days, he would be put into the category of a daily smoker. Based on clinical understanding, an individual who is admitted into a psychiatric unit in acute condition and requires prompt clinical action will find it difficult to smoke even if he or she wants to. For these reasons, both

these groups were collapsed into one single group and called smokers.

- A range of univariate analysis was conducted (depending on the type of variables) on all the variables of interest.
- Frequency tables were generated as a first step, to describe the distribution of data.
- The frequency distribution obtained on all the variables of interest was carefully observed.
- Bivariate analysis using cross tabs and χ^2 test was used to explore the social epidemiology of smokers in relation to other variables of interest.
- In addition to analyzing the difference between smokers and non-smokers in socio-epidemiologic variables, the data was also analyzed to observe the differences in other variables of interests (described in earlier section) to specifically answer the study question.
- Most of the variables were discrete and we used cross-tabulations, and chi-square to describe smokers' and non-smokers' socio-epidemiologic characteristics as well as other variables of interest.
- Odds ratios were calculated using logistic regression modeling techniques to answer the research questions (psychiatric diagnosis)

Question 2 - Who receives smoking cessation programs? What are the determinants of receiving smoking cessation help?

- As a first step, the confounding effect of substance-related disorder was controlled.
- It was further controlled using diagnostic specific information (variable Q1D).
- The concurrent substance use and excessive behaviors (variables C1, C2a, C2b, C2c, C2d, C2e, and C2f) was also controlled.
- Exploratory analysis was done using socio-demographic information, psychiatric facility information, health conditions, activity of daily living (ADL), violence, anger, mental state indicators, behavior disturbance, cognitive performance, etc.
- A similar statistical technique described earlier was used to answer the research questions.

All the analyses were performed in SAS 9.1.3 version.

4.0 Results

A total of 27,282 assessments were analyzed, based on their admission record data (intake form). Out of these assessments, 10,264 smoked or chewed tobacco daily (37.6%), whereas 2,381 individuals were assessed as daily smokers who had not smoked or chewed tobacco in last 3 days (8.7%) (Figure 2). The OMHRS admission record asks questions about the use of tobacco both in the form of smoke or chewed tobacco. According to Canadian Tobacco Use Monitoring Survey (CTUMS), the prevalence of recent use (i.e., use in the last 30 days) of smokeless tobacco (i.e., chewed or oral snuff) was 0.6% among those aged 15 or older in 2005. While it is acknowledged that tobacco use includes smokers as well as smokeless tobacco users, throughout this thesis the term smokers will be used interchangeably with the notion of tobacco use because the proportion of smokeless users is so modest.

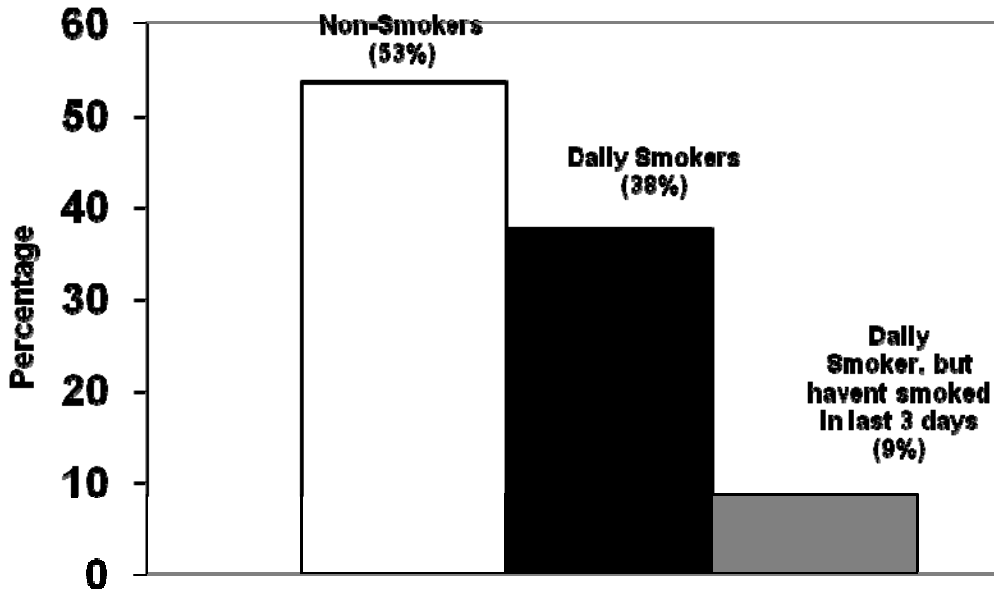

Figure 2: Smoking status of all individuals assessed at admission (N=27282)

The smoking data gathered using OMHRS cannot specifically separate current smokers

from former smokers. The question related to smoking status asks whether the person smoked cigarettes daily, in last 3 days (but is a daily smoker) or did not smoke daily. The admission record (initial assessment) is done within 72 hours of admission to the adult mental health bed in Ontario. Based on the admission record, if a person was smoking a cigarette right before he or she was admitted and had not had a chance to smoke since admission, they would be placed into the category of a daily smoker, even if they had not smoked in last 3 days. Based on clinical understanding, an individual admitted into a psychiatric unit in an acute condition which requiring prompt clinical action, will find it difficult to smoke even if he or she wants to. For these reasons both these groups were collapsed to one single group and called smoker.

The prevalence of smoking among individuals with mental illness who are admitted to mental health facilities in Ontario was significantly higher than the overall general population. After collapsing both types of smokers, the smoking prevalence was found to be extraordinarily high, (i.e., 46% of individuals within mental health institutions are smokers). The proportion of these individuals within mental health institutions is significantly higher than the national proportion of these individuals.

4.1 Demographics

Demographic data were analyzed using all the variables of interest to understand the demographic characteristics of all the individuals admitted to mental health institutions/facilities within Ontario between October 2005 and September 2006. The results of our demographic analysis were consistent with our expectations, based on our literature review and our understanding of the issues related to the relationship of smoking behavior in individuals with

mental illness.

Gender

Admission were equally distributed by gender within the mental health institutions (i.e., approximately 50% of admission were male). There were 14 individuals who were labeled as 'Other' in the gender category. Since these individuals are very low in number, about 0.04% of all the individuals (throughout the province of Ontario), and for the purpose of confidentiality, they were removed for all subsequent analyses.

Smoking rates differed by gender. Specifically, 58% of males were smokers, compared to 42% of females (a ratio of 1.38). The fact that a larger proportion of males smoked is consistent with the patterns seen throughout the general Canadian population of adults where males are 1.42 times more likely to smoke than females.

Marital Status

Marital status of the sample is presented in Table 2. Forty eight per cent of individuals were never married, and they constituted the largest group. The data was stratified to show the effect of gender on marital status and smoking status. A higher proportion of males in the 'never married' category were smokers. Females who were married and widowed were least likely to be smokers, 30% and 20% respectively. In terms of males, divorced and widowed were least likely to smoke, 9% and 28% respectively.

Table 2. Smoking status by marital status

Marital Status	Smokers		
	N	Female N (%)	Male N (%)
Never Married	13142	5168 (44.8)	7974 (56.4)
Married	7068	4040 (30.4)	3028 (39.9)
Partner/ Significant Other	930	500 (56.0)	430 (61.6)
Widowed	1379	1067 (19.6)	312 (27.9)
Separated	2168	1092 (52.7)	1076 (60.6)
Divorced	2595	1508 (46.4)	1087 (57.8)

Age

The distribution of age within the data ranged from a minimum of 13 to a maximum of 106 years of age. There was one observation of age shown as 0.5 showing a transcription error or data entry error. As of result of that error, it was removed from the calculation of mean age. The mean age of the remaining individuals was 45 years with a standard deviation of 16.6. In terms of smoking status and age, the mean age of smokers (41 years) was significantly lower than non-smokers (48)($p<0.001$)). To look into the relationship of smoking status and age, the data was stratified into different age groups to see the proportion of smokers in respective age ranges (Figure 3).

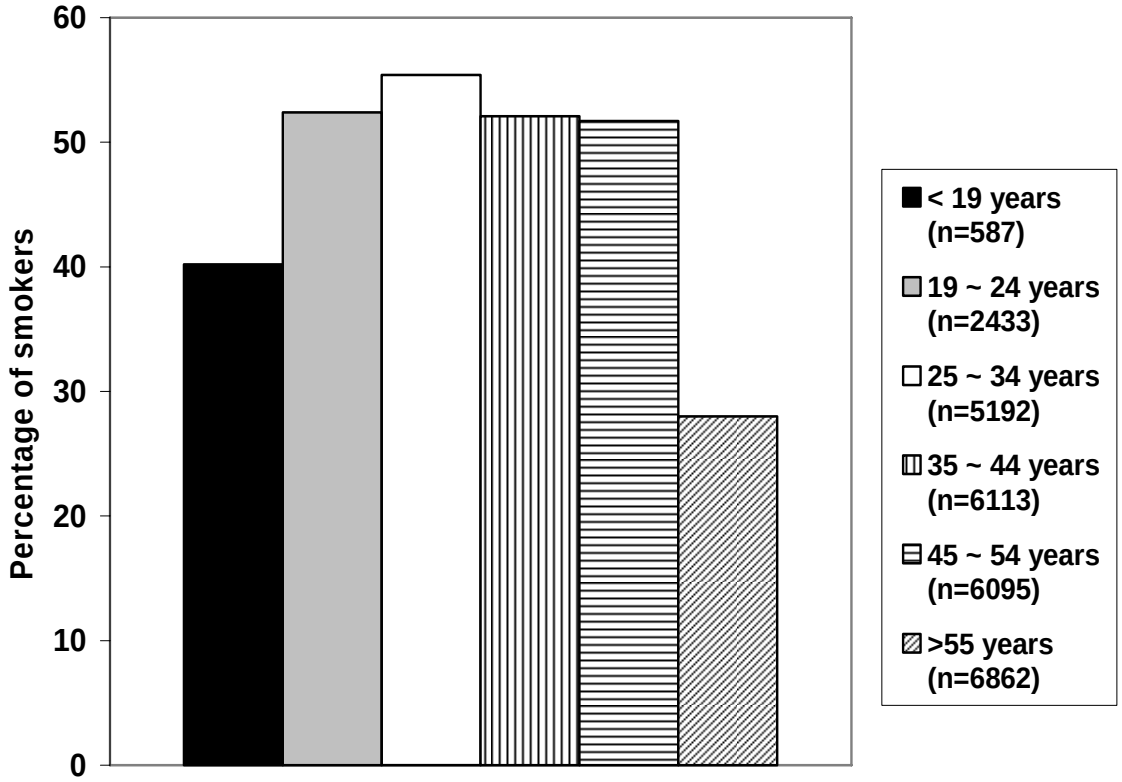

Figure 3: Smoking status by age group

Data was further stratified in terms of gender and is shown below in Table 3. Between the ages of 18 and 54 years, male smokers represented the largest group. The overall trend of smoking prevalence among male smoker increases steadily up to the age of 34 years and then it decreases with the increase in age. However, the prevalence of smoking among females up to the age of 64 years doesn't differ much, with a decline in prevalence with increasing age.

Table 3. Smoking status by age group stratified by gender

Age Group		Smokers (%)	
	N	Female	Male
Less than 19 years	587	36.0	43.9
19 ~ 24 years	2433	47.1	55.6
25 ~ 34 years	5192	48.6	60.6
35 ~ 44 years	6113	45.8	57.9
45 ~ 54 years	6095	44.8	59.0
55+ years	6862	24.0	33.2

Aboriginal Status

The data was analyzed to evaluate the smoking prevalence among individuals with aboriginals status (i.e., originated from Inuit, Metis, or North American Indian). The result of the analysis is shown in Figure 4. Among all those admitted, 3% were classified as having aboriginal status. For individuals with aboriginal status, the smoking prevalence was found to be 72%, which was higher than individuals without the aboriginal status.

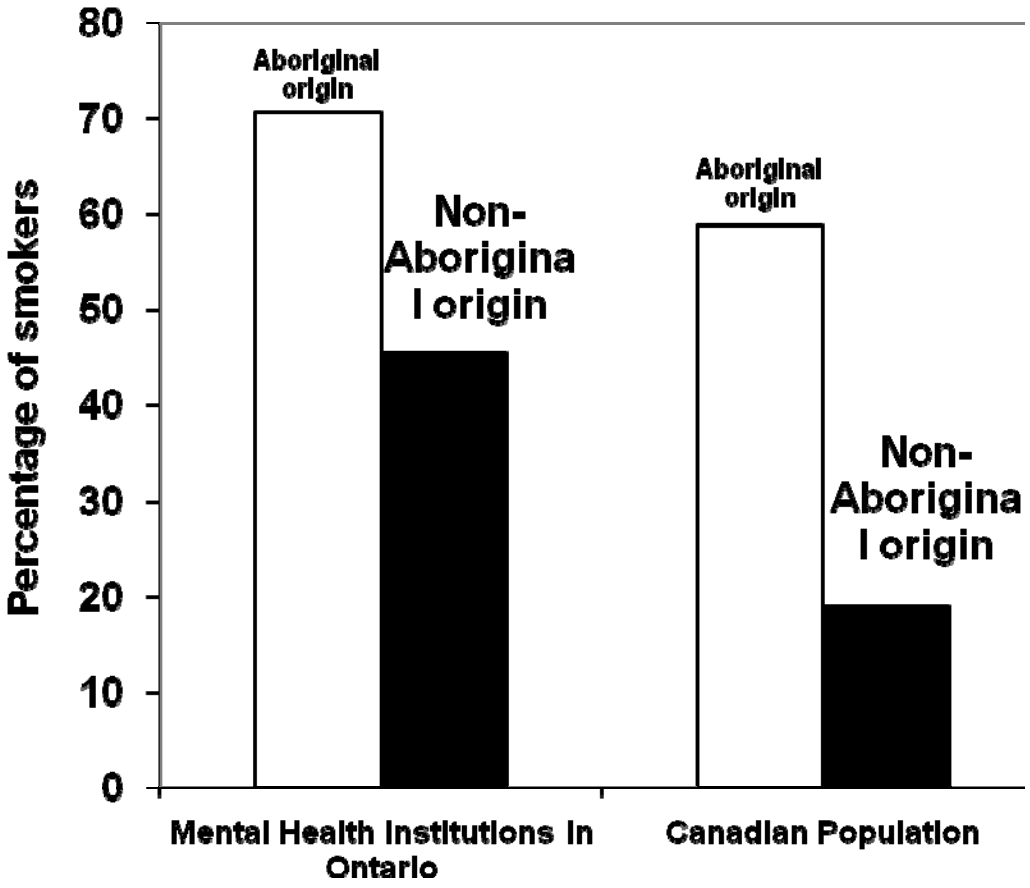

Figure 4: Smoking status by self identified Aboriginal origin (N=27282)

Type of Mental Health Unit

Mental health units in Ontario are divided into six different types. The distribution of individuals within these units was analyzed and is presented in Figure 5. Eighty one percent of individuals were admitted to Acute Units, and out of them, 45% of them were smokers. As expected, within the addiction unit, a higher percentage of individuals (75%) were smokers. These individuals made up 5% of all the admitted individuals in mental health facilities in Ontario.

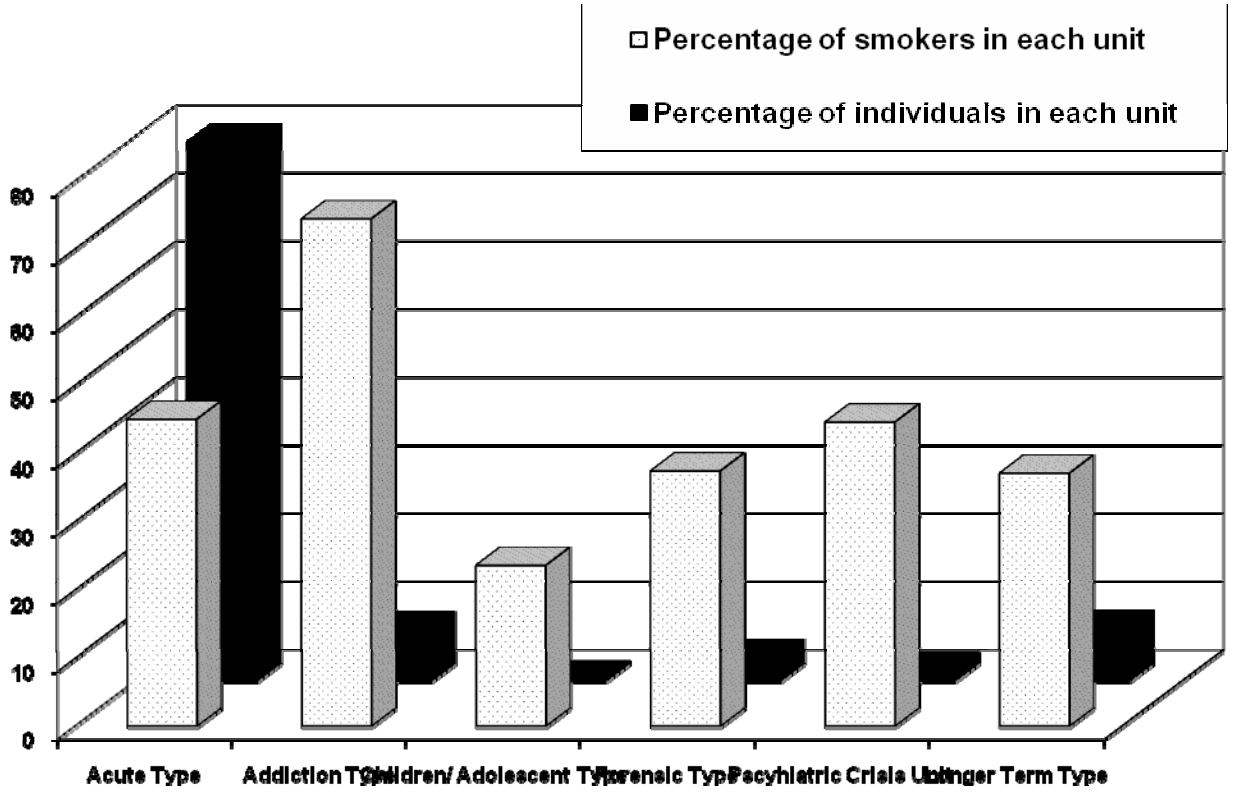

Figure 5: Smoking status by type of mental health unit

Reason for Admission

Data was analyzed to find the reason for admission of these individuals. Specific psychiatric symptoms (e.g., depression, hallucination, medication side effects) were the main reasons for admission in both the smokers and the non-smokers. Involvement with criminal justice system was the least likely reason for admission in both of the groups. Significant differences were found in reasons for admission in relation to an individual's smoking status. Further data analysis was conducted after stratifying the data by gender. The result of the

analysis shows that, even after controlling for gender effect, significant differences still exist in almost all the reason for being admitted into mental health institutions. The result of this analysis is presented in Figure 6.

More females were admitted due to a threat or danger to self, inability to care for self due to mental illness, and specific psychiatric symptoms as compared to males. On the other hand, threat or danger to others, problems with addiction/ dependency, involvement with the criminal justice system, and others were the main reasons for admission among males.

Threat or danger to self, and problems with addiction/ dependency, were the main reasons for admission among both male and female smokers. On the other hand, involvement with the criminal justice system and problems with addiction/ dependency was higher among female smokers. Similarly, among male smokers, problems with addiction/ dependency, threat or danger to self, involvement with the criminal justice system, and specific psychiatric symptoms was higher as compared to male non-smokers.

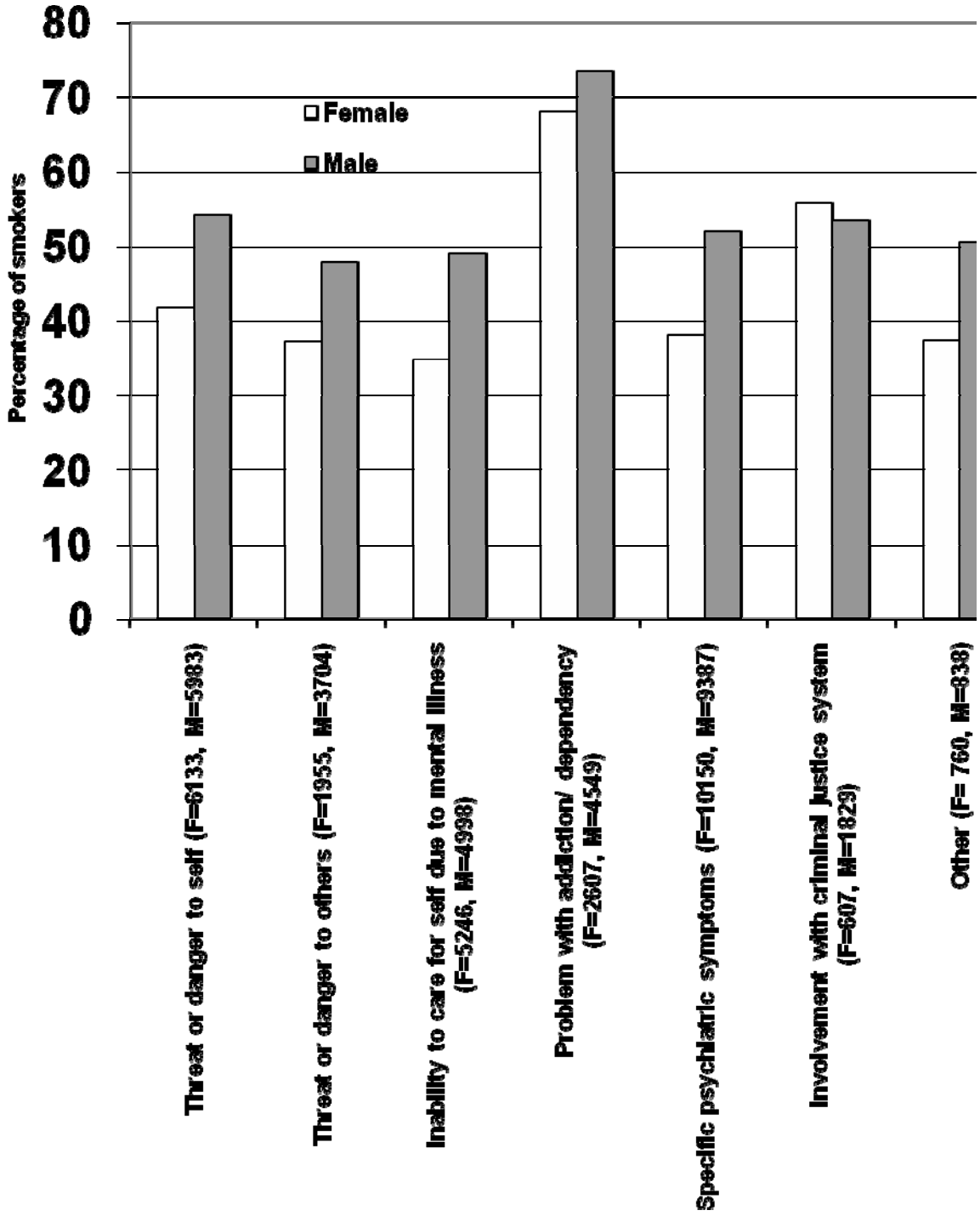

Figure 6: Smokers reasons for admission by gender (N=27,282)

Area of Primary Residence

Individuals were admitted to mental health facilities from across Ontario. In the analysis, primary area of residence was divided into five regions of Ontario based on the first three digits of their postal code. The result is presented in Table 4.

The highest number of individuals (28%) came from Central Ontario, which consists of Parry Sound, Muskoka, Haliburton, Simcoe, Dufferin, Kawartha Lakes, Northumberland, Peterborough, Hastings, and Prince Edward counties. The result also shows the distribution of smokers is highest in Northern Ontario and lowest in Toronto, Ontario.

Table 4. Smoking status by area of primary residence

Area	N	Smokers (%)
Eastern Ontario	3120	47.0
Central Ontario	7677	44.8
Toronto, Ontario	5738	39.0
Southern Ontario	6373	48.9
Northern Ontario	1716	59.4
Non-Ontarians	2658	51.4

Level of Education

The smoking prevalence among individuals who had completed a graduate degree was low. On the other hand, those individuals who went to high schools and graduated have the highest smoking prevalence. Data was stratified by age to assess the potentially confounding effect of geriatric population in various age groups. The result of the analysis is presented in Table 5.

Table 5. Smoking status by level of education

Level of education	**Smokers** N (%)	**< 65 years of age** N (%)	**>65 years of age** N (%)
No Schooling	403 (37.9)	380 (94.3)	23 (5.7)
8th Grade or less	766 (41.2)	661 (86.3)	105 (13.7)
9 ~ 11 grades	3181 (58.3)	3069 (96.5)	112 (3.5)
High Schools	3181 (49.3)	3088 (97.1)	93 (2.9)
Technical or trade school	378 (47.7)	362 (95.8)	16 (4.2)
Some College/ university	2033 (45.1)	1994 (98.1)	39 (1.9)
Diploma/ Bachelors degree	1040 (37.6)	1007 (96.8)	33 (3.2)
Graduate Degree	212 (28.2)	195 (92.0)	17 (8.0)
Unknown	1451 (39.9)	1355 (93.4)	96 (6.6)

4.2 Psychiatric Diagnosis

Psychiatric diagnosis was based on DSM-IV criteria (American Psychiatrist Association, 2000) determined by the psychiatrists/ attending physicians and ranked in order of importance as factors contributing to this admission. Among both the groups, that is, smokers and non-smokers, the highest number of individuals had mood disorders as the most important diagnosis, followed by schizophrenia and substance-related disorders. The most common primary diagnosis within these individuals is presented in Figure 7, stratified by smoking status.

In terms of differences in diagnosis (i.e., both most important diagnosis & any diagnosis) due to their smoking status, significant differences were found in most of the categories. The highest difference was found in substance-related disorders as expected, due to high correlation of smoking and other addictive disorder.

Many individuals admitted to mental health institutions presented with multiple clinical issues and had multiple diagnoses. At the time of admission, the diagnosis that caused the individual to seek medical attention is more likely to be labeled as the most important or primary diagnosis. Data was analyzed to find out the diagnoses found in these individuals, irrespective of the level of importance identified by the psychiatrist or attending physicians. The result of this analysis is presented in Table 6.

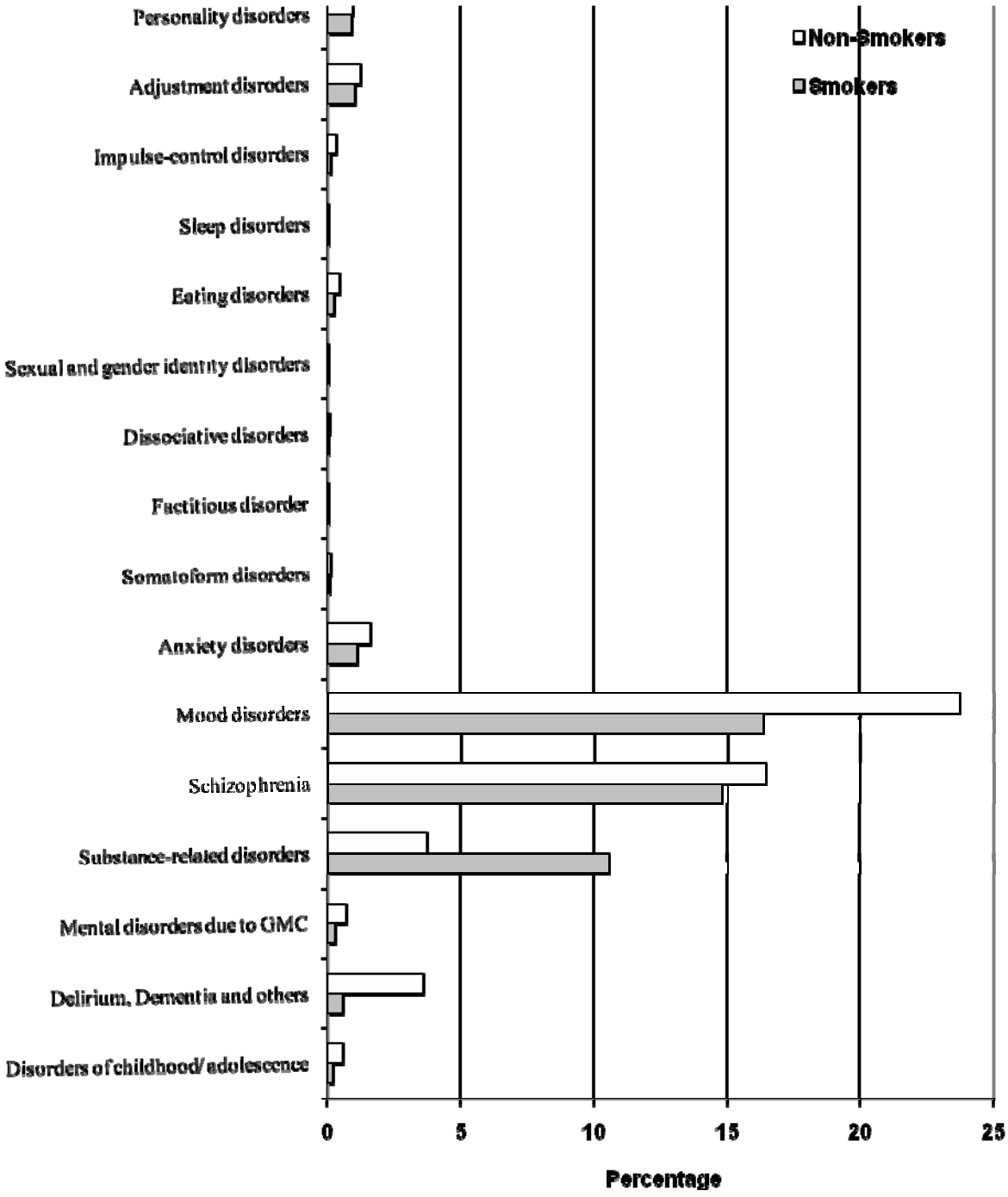

Figure 7: Most common primary diagnosis by smoking status

Table 6. Smoking status by psychiatric diagnosis stratified by gender

Diagnosis	Primary Diagnosis		Any Diagnosis	
	Female Smokers N(%)	Male Smokers N(%)	Female Smokers N(%)	Male Smokers N(%)
Disorders of childhood/ adolescence[1, 2]	84 (29.8)	134 (26.9)	175 (33.1)	321 (36.8)
Delirium, Dementia and other related conditions[1, 2]	525 (11.1)	610 (16.1)	881 (13.7)	876 (20.4)
Mental disorders due to general medical condition[1, 2]	108 (28.7)	158 (26.6)	300 (31.7)	373 (32.7)
Substance-related disorders[1, 2]	1335 (73.4)	2552 (74.4)	2525 (70.1)	4769 (72.9)
Schizophrenia and other psychotic disorders	3490 (37.5)	5018 (54.3)	3922 (37.6)	5517 (54.2)
Mood disorders[2]	6499 (36.5)	4427 (47.0)	8065 (38.5)	6019 (49.9)
Anxiety disorders[1, 2]	422 (38.9)	329 (43.2)	1843 (38.4)	1325 (46.5)
Somatoform disorders	33 (36.4)	24 (45.8)	122 (38.5)	84 (47.6)
Factitious disorders	3 (33.3)	4 (25.0)	10 (40.0)	12 (41.7)
Dissociative disorders	26 (34.6)	12 (25.0)	93 (41.9)	30 (50.0)
Sexual and gender identity disorders	0 (0)	22 (40.1)	9 (44.4)	75 (42.7)
Eating disorders	188 (35.6)	7 (14.3)	416 (37.3)	31 (35.5)
Sleep disorders	3 (33.3)	3 (66.7)	129 (44.2)	109 (44.0)
Impulse-control disorders[1, 2]	46 (26.1)	84 (32.1)	227 (41.9)	358 (50.3)
Adjustment disorders	323 (39.3)	303 (52.5)	717 (40.7)	628 (49.7)
Personality disorders[1]	290 (48.3)	220 (47.7)	1593 (47.6)	1284 (59.8)

[1] indicates significant difference in primary diagnosis due to smoking status after controlling gender effect by Cochrane-Mantel statistics. [2] indicates significant difference in any diagnosis due to smoking status after controlling gender effect by Cochrane-Mantel statistics

Significant differences in primary diagnosis, as well as any diagnosis with respect to an individual's smoking status, were observed in the results. Interestingly, the diagnosis of delirium, dementia, and other related disorders including Impulse-control disorders, are more common in individuals who did not smoke, irrespective of their gender. On the other hand, substance-related disorder is more common in individuals who smoke cigarettes, irrespective of their gender.

Logistic regression modeling technique was used to calculate the odds of smoking with respect to a particular psychiatric diagnosis. The model was adjusted to control the effect of gender and age. The reference group for this model was individuals with the diagnosis of Delirium, dementia, and other related disorders. This reference group was selected because the smoking prevalence was very close to the national average. Clinically, an individual with adjustment disorder does not differ much with the general population. However, in this study the smoking prevalence was very high compared to the national average.

The model shows that individuals with the diagnosis of substance-related disorder are four times more likely to smoke cigarette as compared to the reference group. The result of the analysis is presented in Table 7 which includes childhood, delirium & dementia, mental disorder due to general medical condition, mood disorders, anxiety disorders and impulse control disorders.

Table 7. Probability of being a smoker with respect to their psychiatric diagnosis

Diagnosis	Odds ratio	95% CI	Significance
Delirium, Dementia and others (reference group)	1.000	-	-
Disorders of childhood/ adolescence[1, 2]	0.965	0.679 – 1.372	0.8434
Mental disorders due to general medical condition[1, 2]	1.438	1.039 – 1.990	0.0286
Substance-related disorders[1, 2]	8.987	7.422 – 10.882	<0.0001
Schizophrenia and other psychotic disorders	2.863	2.384 – 3.438	<0.0001
Mood disorders[2]	2.569	2.144 – 3.078	<0.0001
Anxiety disorders[1, 2]	2.415	1.917 – 3.043	<0.0001
Somatoform disorders	2.493	1.413 – 4.398	0.0016
Factitious disorders	1.404	0.264 – 7.470	0.6907
Dissociative disorders	1.674	0.820 – 3.417	0.1575
Sexual and gender identity disorders	1.967	0.819 – 4.725	0.1304
Eating disorders	1.580	1.112 – 2.243	0.0106
Sleep disorders	2.440	0.481 – 12.374	0.2817
Impulse-control disorders[1, 2]	1.306	0.858 – 1.990	0.2134
Adjustment disorders	2.700	2.124 – 3.432	<0.0001
Personality disorders[1]	2.870	2.231 – 3.693	<0.0001

* Adjusted for gender and age

4.3 Other psychosocial correlates

Indicators of Anxiety

Indicators of anxiety included anxious complaints, fears/ phobias, obsessive thoughts, compulsive behavior, intrusive thoughts/ flashbacks and episode of panic. The data were analyzed to specifically look at the indicators of anxiety, if they were exhibited in the last 3 days.

Except for anxious complaints and Intrusive thoughts/ flashbacks, smokers did not exhibit anxiety in the last 3 days, which was found to be significant based on their chi-square statistics. The data were stratified to control the effect of gender (Table 8). The analysis showed that male smokers in general had more anxious complaints as compared with female smokers. Indicators of anxiety were significantly different in smokers and non-smokers even after controlling the effect of gender for fears/ phobias and compulsive thoughts. On the other hand, the significant difference due to smoking was also found among males for anxious complaints and Intrusive thoughts/ flashbacks. Among females, they also differ significantly for obsessive thoughts.

Available Social Support

Data was analyzed to assess the social support from one or more family members (or close friends) who are willing and able to provide assistance especially with childcare, personal safety, crisis support, and support with Activities of daily living (ADL) or Instrumental activities of daily living (IADL). Overall, less support was available for smokers in all the categories. More specifically, a low level of social support was available for smokers on a regular as well as occasional basis. The result of the analysis is presented below in Table 9.

Table 8. Smoking status by indicators of anxiety stratified by gender

Indicators of Anxiety	Female		Male	
	N	Smoker (%)	N	Smoker (%)
Anxious complaints[1]	5291	40.7	4182*	55.1
Fears/ phobias[1]	2957*	35.6	2135*	50.3
Obsessive thoughts[1]	2615*	36.6	2379*	50.8
Compulsive thoughts[1]	699*	35.5	700*	45.9
Intrusive thoughts/ flashbacks[1]	1912	41.1	1489*	57.1
Episodes of panic	1705	38.9	1059	52.12

[1] – Significant differences in smoking status after controlling gender effect based on Cochrane-Mantel-Haenszel statistics

* - $p<0.05$ in their respective categories

Table 9. Proportion of smokers by Available social supports

Available Social Supports	Not Needed % Smokers	Regular % Smoker	Occasional % Smokers	No % Smokers
Help with child care, other dependents	46.4	46.2	43.9	47.7
Supervision for personal safety[1]	50.0	37.1	47.5	48.8
Crisis support[1]	47.3	42.7	47.8	49.1
Support with ADLs or IADLs[1]	49.6	33.6	43.7	47.2

[1] – $p<0.0001$ based on chi-square statistics

Social Relationships

Data was also analyzed to understand the social relationship of the individuals that occurred in various time periods, i.e., in last 3 days, last week, last month, or more than one month ago. Significant differences were observed between smokers and non-smokers in all three types of social relationships. Generally, smokers experienced limited social contacts of long-standing interest, especially in last 3 days. The result of the analysis is shown in Table 10.

Table 10. Smoking status by Social relationship activities

Social relationship activities	Last 3 days N (%)	Last week N (%)	Last month N (%)	>1 month ago N (%)
Participation in social activities of long-standing interest (p<0.0001)	8255 (46.0)	4208 (50.3)	5938 (46.8)	8881 (44.6)
Visit by a long-standing social relation/ family member (p<0.0001)	16400 (43.2)	4506 (51.0)	2605 (51.3)	3771 (51.1)
Telephone or email contact with long-standing social relation/ family member (p=0.001)	18536 (46.2)	3574 (49.0)	1931 (46.4)	3241 (44.2)

Health Complaints

Data was analyzed to observe the differences in smokers and non-smokers in terms of their health complaints (e.g., persistently seeking medical attention; excessive concerns with bodily functions). Initial analysis showed that smokers have fewer health complaints in the last 3 days as compared to non-smokers (p=0.0692). Data was stratified and analyzed using Cochrane-Mantel-Haenszel statistics to control the effect of gender. The result showed that male smokers

had more health complaints as compared to non-smokers, but the results was non-significant (p=0.92). On the other hand, female smokers exhibited fewer health complaints. The result of the analysis is shown in Table 11.

Table 11. Smoking status by Health complaints exhibited in last 3 days stratified by gender

Health complaints	Female		Male	
	N	Smoker (%)	N	Smoker (%)
Not exhibited in the last 3 days	10086	39.7	11437	52.8
Not exhibited in the last 3 days, but is reported to be present	396	35.1	389	53.2
Exhibited 1 – 2 of the last 3 days	1438	41.2	1063	54.1
Exhibited daily in the last 3 days	1455	39.1	1018	51.5

Hospitalization History

In terms of using resources, the data was analyzed to see how smokers differ from non-smokers. Data analysis was carried out to discover the number of psychiatric admits (recent), number of psychiatric admits (lifetime), time since last discharge, amount of time hospitalized, contact with community mental health, and age at first hospitalization,. The result of these analyses is presented in tables 12, 13, 14 and 15.

Table 12. Smoking status by Number of recent psychiatric admissions

Number of Psychiatric Diagnoses (Recent)	Female		Male	
	N	Smoker (%)	N	Smoker (%)
None	6950	36.3	7256	49.0
1 ~ 2	4390	41.5	4692	54.4
3 or more	2035	47.4	1959	62.9

$p<0.0001$

The results of the analysis show that male smokers have a significantly higher number of recent psychiatric admissions as compared to male non-smokers. However, female smokers have fewer numbers of recent psychiatric admissions.

The lifetime duration of hospitalization, including time since last admission, in psychiatric hospital/ unit in the last 2 years, and contact with community mental health centres, all show similar patterns, as described in recent psychiatric admissions. Male smokers had more history of using mental health services. On the other hand, female smokers used relatively less mental health services. All the results were significant after controlling for gender effect, based on Cochrane-Mental-Haenszel statistics.

Table 13. Smoking status by Number of psychiatric admissions (lifetime)

Number of psychiatric admissions (lifetime)	FEMALE		MALE	
	N	Smoker (%)	N	Smoker (%)
None	4408	34.2	4941	46.5
1 ~ 3	4638	38.4	4910	52.8
4 ~ 5	1751	41.5	1782	57.1
6 or more	2578	50.2	2274	63.0

p<0.0001

Table 14. Smoking status by Time since last discharge

Time Since Last Discharge	Female		Male	
	N	Smoker (%)	N	Smoker (%)
More than 1 year	4565	40.1	4359	54.0
31 days to 1 year	3067	44.1	3146	58.2
30 days or less (from other facility)	889	45.3	980	57.9
30 days or less (from this facility)	446	47.8	481	60.5
Not applicable	4408	34.2	4941	46.5

p<0.0001

Table 15. Smoking status by Duration of hospitalization

Duration of hospitalization	Female		Male	
	N	Smoker (%)	N	Smoker (%)
No other admission in last 2 years	6950	36.3	7256	49.0
30 days or less	3682	43.7	3772	58.3
31 days to 1 year	2385	43.2	2416	56.2
More than 1 year	358	40.8	463	48.8

p<0.0001

Table 16. Smoking status by Contact with Community Mental Health

Contact with community mental health	Female		Male	
	N	Smoker (%)	N	Smoker (%)
No contact in last year	5943	37.7	6715	49.9
31 days ore more	2375	43.7	2532	56.0
30 days or less	5057	40.1	4660	55.1

p<0.0001

Data analysis, in terms of age at first psychiatric hospitalization and current smoking status, showed an interesting pattern. The current smoking status of males who had their first psychiatric admission between the ages of 15 ~ 44 are proportionally higher as compared to non-smoking males. On the other hand, no particular trend is noted among female current smokers and early psychiatric hospitalization. However, with female smokers, the highest proportion of

female smokers had their first admission between the ages of 15 and 24. It is also worth noticing in all the age groups that the mean age of smokers is lower as compared to the non-smokers. The result of the analysis is presented in Table 17.

Table 17. Smoking status by age of first psychiatric hospitalization

Age of first psychiatric hospitalization	Female			Male		
	Smokers % (N)	Mean Age Smokers (SD)	Mean Age Non-Smokers (SD)	Smokers % (N)	Mean Age Smokers (SD)	Mean Age Non-Smokers (SD)
0 ~ 14 years	42.2% (1000)	37.8 (13.8)	43.7 (18.6)	47.2% (1101)	36.6 (12.7)	42.5 (18.4)
15 ~ 24 years	47.9% (3580)	35.1 (12.8)	35.4 (14.6)	58.3% (4529)	32.3 (11.5)	32.1 (13.0)
25 ~ 44	42.9% (5583)	43.3 (10.2)	45.8 (12.7)	58.3% (5414)	41.8 (9.5)	43.2 (11.1)
45 ~ 64	31.1% (2213)	55.1 (7.2)	59.5 (9.9)	45.0% (2012)	54.2 (6.4)	57.9 (8.8)
65 +	8.8% (999)	71.0 (10.3)	79.2 (7.4)	13.4% (851)	73.8 (7.7)	78.1 (7.3)

$p<0.0001$

Outcome Scales

The data was analyzed to see how smokers differ from nonsmokers in terms of various outcomes scales embedded within OMHRS. Specifically aggressive behavior scale, positive/ psychotic symptoms scale, negative symptoms scale, pain scale, cognitive performance scale, and depression rating scale were analyzed. The result of the analysis is shown in Table 18, 19, 20, 21 and 22.

Table 18. Smoking status by Aggressive behavior scale

Aggressive Behavior Scale	Female		Male	
	N	Smoker (%)	N	Smoker (%)
No aggression to mild aggression (0 ~ 4)	12058	39.6	12566	53.2
Severe (5+)	1317	40.5	1341	48.8

p=0.08

Results of the analysis shows a consistent trend, i.e., 90% of the individuals are classified as ranging from no aggression to mild aggression in both the genders. However, a gender effect was found in the scale. Among those classified as having no aggression to mild aggression, male smokers were slightly higher in proportion (53%) as compared to female smokers (40%). Similarly among those classified as having severe aggression (5+), male smokers were in higher proportion as compared to female smokers (49%).

In terms of pain, proportionally, male smokers had more pain in all scale categories as

compared to male nonsmokers. However, comparing the proportion of individuals who experienced less than daily pain to severe daily pain, males experienced less pain as compared to the females.

Table 19. Smoking status by Pain scale

Pain Scale	Female		Male	
	Percentage (N=13375)	Smoker (%)	Percentage (N=13907)	Smoker (%)
No pain	73.8	37.3	79.8	50.9
Less than daily pain	11.5	43.8	8.8	57.2
Daily pain, but not severe	11.5	48.2	8.8	61.4
Severe daily pain	3.2	49.7	2.6	66.1

$p<0.0001$

In terms of positive symptoms scale, 15% of the individuals were in a moderate to severe scale. Within those in the moderate to severe category, 46% were smokers as compared to 54% of non-smokers. The stratified analysis of data, with respect to gender, shows that the proportion of male smokers is higher, with moderate to severe positive symptoms, as opposed to the female smokers, whose proportion is less in a moderate to severe positive symptoms scale. The result of the analysis is shown in Table 20.

Table 20. Smoking status by Positive symptoms scale

Positive Symptoms Scale	Females		Males	
	N	Smoker (%)	N	Smoker (%)
None to Mild (0 ~ 3)	11420	40.4	11676	52.5
Moderate to severe (4 ~ 8)	1955	35.7	2231	54.4

p=0.1646

The relationship of smoking status with the negative symptoms scale is also pretty much consistent with the positive symptoms scale. However, 27% of the individuals had moderate to severe negative symptoms. Within the group of individuals with moderate to severe negative symptoms, 42% were smokers. The gender stratified analysis of the individual shows that 35% of the female smokers were in a moderate to severe category as compared to 49% of male smokers. The result of the analysis is shown in Table 21.

Table 21. Smoking status by Negative symptoms scale

Negative Symptoms Scale	Females		Males	
	N	Smoker (%)	N	Smoker (%)
None to Mild (0 ~ 3)	9389	41.6	10471	53.9
Moderate to severe (4 ~ 8)	3986	35.0	3436	49.4

p<0.0001

In terms of the cognitive performance scale, a majority of the individuals scored low, i.e., their cognition is intact. However, when it is stratified by gender and smoking status, high proportions of smokers have better cognition level as compared to non-smokers. As the level of impairment increase, the proportion of smokers decreases. The overall effect is the same for males and females, but the effect is more pronounced among male smokers. The result of the analysis is shown in Table 22.

Table 22. Smoking status by Cognitive performance scale

Cognitive Performance Scale	Female		Male	
	N	Smoker (%)	N	Smoker (%)
Intact	8263	43.2	8732	56.6
Borderline Intact	2586	39.4	2699	52.6
Mild Impairment	612	38.1	622	48.7
Moderate Impairment	1235	28.1	1162	44.8
Moderate/ severe impairment	183	24.0	181	30.9
Severe impairment	414	20.1	416	20.0
Very severe impairment	82	13.4	95	14.7

P<0.0001

4.4 Who gets the alcohol/ drug treatment/ smoking cessation treatment

The second major question in this thesis is to assess who gets the alcohol/ drug treatment/ smoking cessation treatment in mental health institutions in Ontario. In the OMHRS dataset, there is only one question that asks about focus of treatment intervention. In the case of the research questions, it was Alcohol/ drug treatment/ smoking cessation. Since the question, doesn't differentiate whether the person is getting an intervention for alcohol, drug treatment or smoking cessation, in order to remove the confounding effects, new dataset was created with different combinations to see how the pattern changes.

First the data was analyzed after deleting the entries for those who drink alcohol and those with drug problems. The result of the analysis shows that there was no focus of intervention for alcohol/ drug treatment/ smoking cessation for the majority of the smokers (without any co-existing substance use or alcohol problem). The data was further analyzed to find a focus for intervention (alcohol/drug treatment/ smoking cessation) in relation to smoking status, by combining data from all the individuals, irrespective of their smoking, drug, or alcohol problem. The study found that 88.9% of the smokers, with or without co-existing drug or alcohol problem, didn't have a focus of intervention directed towards alcohol/ drug treatment/ smoking cessation. Similarly, 76% of the smokers without alcohol problems, and 69% of the smokers without drug problem, did not receive any alcohol /drug treatment/ smoking cessation intervention. Table 23, 24, 25 and 26 shows the results of these analyses.

Table 23. Focus of Intervention (Individuals without any alcohol or drug problems)

Treatment modalities	Female		MALE	
	Non-Smoker N=6460 (%)	Smoker N=2338 (%)	Non-Smoker N=4428 (%)	Smoker N=2204 (%)
No Intervention of this type	97.6	92.1	96.4	88.9
Offered, but refused	0.3	1.2	0.3	1.8
Received in last 7 days	1.5	5.6	2.6	7.9
Not received, but scheduled to start within 7 days	0.6	1.0	0.8	1.5

Table 24. Focus of Intervention (Individuals without any drug problems)

Treatment modalities	Female		MALE	
	Non-Smoker N=7325 (%)	Smoker N=3205 (%)	Non-Smoker N=5298 (%)	Smoker N=3411 (%)
No Intervention of this type	95.5	85.2	92.8	79.1
Offered, but refused	0.5	1.8	0.6	2.5
Received in last 7 days	3.2	11.1	5.5	15.5
Not received, but scheduled to start within 7 days	0.8	2.0	1.1	3.0

Table 25. Focus of Intervention (Individuals without any alcohol problems)

Treatment modalities	Female		MALE	
	Non-Smoker N=6913 (%)	Smoker N=3384 (%)	Non-Smoker N=5180 (%)	Smoker N=4058 (%)
No Intervention of this type	96.3	84.6	93.9	79.1
Offered, but refused	0.4	1.8	0.5	2.2
Received in last 7 days	2.6	10.9	4.5	15.6
Not received, but scheduled to start within 7 days	0.7	2.7	1.1	3.1

Table 26. Focus of Intervention (Irrespective of their alcohol or drug problems)

Treatment modalities	Female		MALE	
	Non-Smoker N=8069 (%)	Smoker N=5306 (%)	Non-Smoker N=6568 (%)	Smoker N=7339 (%)
No Intervention of this type	93.6	76.1	88.9	68.5
Offered, but refused	0.6	2.3	0.9	3.4
Received in last 7 days	4.7	17.7	8.5	23.4
Not received, but scheduled to start within 7 days	1.1	3.9	1.7	4.8

Further data analysis was conducted to find other correlates that may affect the focus of intervention, especially for alcohol/ drug treatment/ smoking cessation programs. Another dataset was created which included only smokers. Bivariate analysis was conducted to see the effect of potential variables in receiving the intervention. The results of all these analyses are presented in Tables 27 and 28.

In terms of gender, more males were offered, received or scheduled to receive this intervention as compared to females ($p<0.0001$). There was almost no difference in interventions with respect to a person's aboriginal status. In terms of marital status, more individuals who had a partner or significant others received the intervention as compared to other groups. Clearly, those who were widowed and never married were less likely to receive the intervention.

In terms of activities of daily living, individuals who were independent were offered, received, or scheduled to receive the intervention as compared to those who either require minimal supervision or were dependent on others. Interestingly, those who were totally dependent were offered, received, or scheduled to receive the intervention. Similarly, individuals who scored 'zero to mild' on an aggressive behavior scale, positive symptoms scale, and negative symptoms scale were offered, received or scheduled to receive this intervention as compared to those individuals who were categorized as severe in all these scales.

When it comes down to the relationship of provisional psychiatric diagnosis and intervention, substance-related disorder was the most likely group to receive the intervention, followed by adjustment disorders. However, the most common diagnosis among all the

Table 27. Smoking cessation intervention and possible correlates - I

Variable		No Intervention	Offered, but refused	Received in last 7 days	Scheduled to start in 7 days
Gender (p<0.0001)	Female (N=5306)	76.1	2.3	17.7	3.9
	Male (N=7339)	68.5	3.3	23.4	4.8
Alcohol >5 drinks in any single sitting (p<0.0001)	No (N=9662)	73.6	2.5	15.8	3.1
	Yes (N=2983)	49.3	4.4	37.8	8.5
Aboriginal (p=0.03)	No (N=12086)	71.6	2.9	21.1	4.3
	Yes (N=559)	72.8	2.9	17.9	6.4
Activities of Daily Living (p<0.0001)	Independent (N=11258)	70.3	2.9	22.3	4.5
	Supervision required (N=697)	84.7	2.6	9.3	3.4
	Limited Impairment (N=265)	79.6	3.0	14.0	3.4
	Extra assistance required(I) (N=247)	85.4	3.6	8.1	2.8
	Extra assistance required(II) (N=97)	87.6	3.1	7.2	2.1
	Dependent (N=41)	90.2	0.0	2.4	7.3
	Total Dependence (N=40)	50.0	7.5	35.0	7.5
Aggressive Behavior Scale (p<0.0001)	None to Mild (N=11457)	70.6	2.8	22.1	4.5
	Severe (N=1188)	81.8	4.3	10.0	3.9
Positive Symptoms Scale (p<0.0001)	None to Mild (N=10733)	69.5	2.9	23.1	4.5
	Severe (N=1912)	84.1	3.2	9.2	3.6

Table 28. Smoking cessation intervention and possible correlates - II

Variable		No Intervention	Offered, but refused	Received in last 7 days	Schedule to start in 7 days
Negative Symptoms Scale (p<0.0001)	None to Mild (N=9551)	71.1	2.8	21.9	4.2
	Severe (N=3094)	73.4	3.2	18.3	5.2
Marital Status (p<0.0001)	Never married (N=6812)	73.2	3.0	19.0	4.8
	Married (N=2437)	69.9	2.3	24.3	3.5
	Parent/ significant other (N=545)	65.7	1.3	27.5	5.5
	Widowed (N=296)	79.7	2.4	15.9	2.0
	Separated (N=1227)	66.6	3.4	25.0	5.0
	Divorced (N=1328)	72.5	3.9	19.8	3.8
Selected Diagnosis (N>100)	Delirium, Dementia and other (N=176), p=0.64	72.2	4.0	21.0	2.8
	Mental disorder due to gen. med. condition (N=217)*	86.2	1.8	9.7	2.3
	Substance disorders (N=5249)*	47.9	3.8	41.1	7.2
	Schizophrenia (N=4463)*	84.16	3.3	9.5	3.0
	Mood disorders (N=6112)*	75.6	2.7	16.6	5.1
	Anxiety disorders (N=1324), p=0.5	70.9	3.0	20.9	5.2
	Adjustment disorders (N=275), p=0.01	66.5	5.1	22.9	5.5
	Personality disorders (N=1526)*	76.9	3.7	14.4	5.1
Cage Addiction Score (p<0.0001)	Non-dependent (N=7449)	89.1	2.1	6.7	2.1
	Dependent (N=5196)	46.8	4.1	41.5	7.7

individuals in mental health institutions in Ontario were mood disorders and schizophrenia. These members were among the lowest diagnostic group/least likely to receive the intervention.

Individuals who had more than (>) 5 drinks of alcohol in any single sitting episode were offered, received, or scheduled to receive the intervention as compared to those who had less than 5 drinks. Similarly, individuals who scored higher on the CAGE addiction scale were proportionally higher in number to be offered, received or scheduled to receive the intervention.

Data was also analyzed to seek the most common facility level for obtaining smoking cessation help; ten out of sixty-four of the facilities had no intervention at all for smokers (without any co-existing alcohol or drug problem). Different combinations of variables were used to understand the focus of intervention offered to these individuals by using smokers with co-existing drug problem, smokers with co-existing alcohol problem and smokers having both drug and alcohol problem.

Logistic regression modeling technique was used to further analyze the relationship of smoking and intervention offered to individuals. Since the research questions were developed specifically for the smokers and we were interested in smokers only,, the model was designed to select individuals with current smoking status. Intervention options were analyzed by dividing them into two groups: no intervention or any intervention. Result of the analysis is presented below in Table 29.

Clearly, it can be seen from the model that smokers who scored on CAGE addiction scale were four times more likely to receive the intervention as compared to those who didn't score. A one point increase in the aggressive behavior scale will make a person 4% less likely to receive

the intervention. Similarly, an individual is 7% less likely to receive the intervention for a one point increase in activity based on the daily living scale, and 7% less likely to receive the intervention for a one point increase in positive symptom scale. On the other hand, it is 30% more likely for an individual to receive the intervention for a one point increase in negative symptoms scale.

Table 29. Probability of receiving cessation intervention in smokers only

Variable	Estimate	Odds Ratio	Con. Interval
Intercept	-2.42		
Aggressive Behavior Scale	-0.04	0.96	0.938 – 0.986
Activity of daily living	-0.08	0.93	0.867 – 0.990
CAGE score	1.40	4.06	3.645 – 4.525
Positive Symptoms Scale	-0.07	0.93	0.907 – 0.962
Negative Symptoms Scale	0.03	1.031	1.012 – 1.050

An interaction effect was found between smokers who were diagnosed with Substance-use disorder and those who had five or more drinks in one sitting. The odds ratio calculated, based on their interaction effect, is shown in Figure 8. It shows that the smokers who had more

than five drinks in one sitting without any substance-use disorder are less likely (OR=0.53) to receive the intervention. On the other hand, smokers with substance-use disorder who didn't have more than five drinks in one sitting are more likely (OR=1.37) to receive the intervention. However, the odds of receiving the intervention are extremely high for smokers who had both these problems.

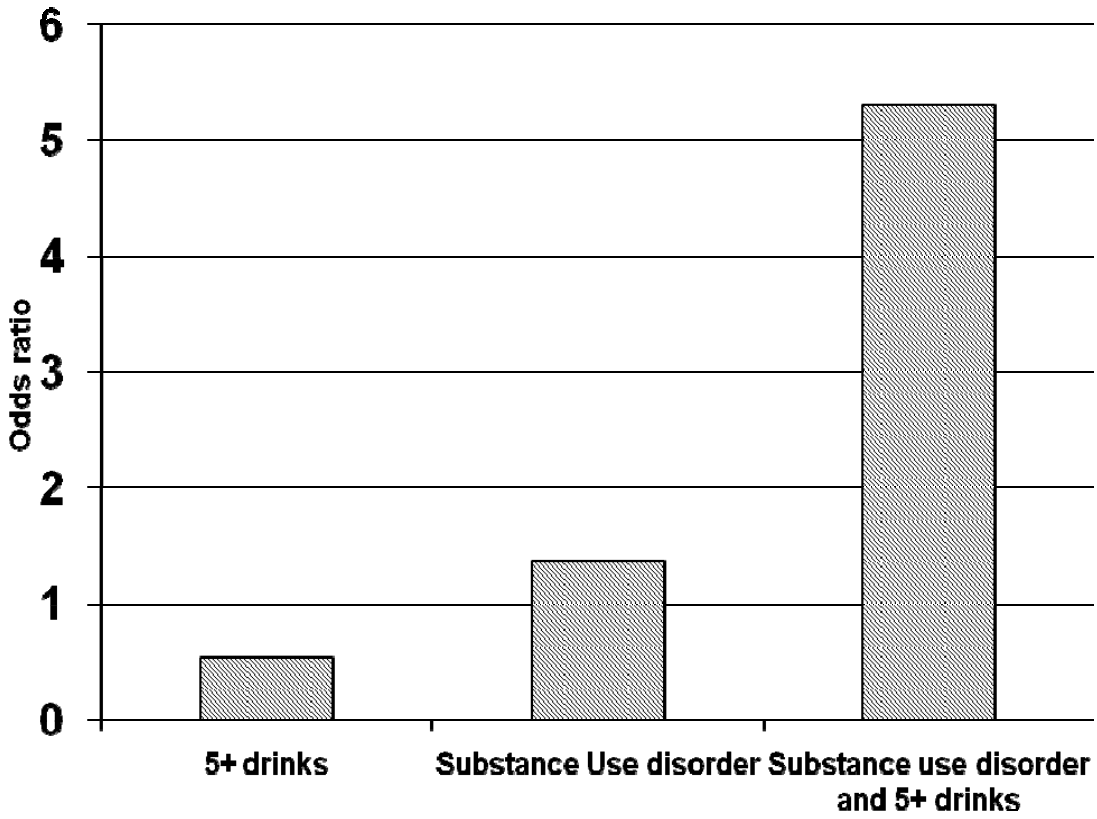

Figure 8: The odds of receiving cessation intervention considering the interaction effect of having five or more alcoholic drinks and being diagnosed with substance use disorder (reference group is individual without substance use disorder and not having 5+ drinks in one sitting in last 14 days)

5.0 Discussion

To the best of our knowledge, this thesis is the single largest study not only in Canada but probably in the world to understand the characteristics of smokers in mental health institutions. This study is unique in the sense that it uses census data (with the exception of very few individuals) from all of the individuals who were admitted and stayed for at least 3 days in a designated mental health bed throughout the province of Ontario. The collected data can be considered as census level data, with some warnings. Since the dataset used for this study started at the beginning of the mandatory implementation, some of the facilities were delayed in getting up to full speed; therefore, it may be marginally different from a true census dataset in that the earlier months may exclude a few facilities. The other important consideration for this data is that it only assesses individuals who stayed as inpatients in psychiatric beds 3 days or longer, therefore, shorter term admissions were absent from this dataset. Despite these considerations, this is the most comprehensive and multidisciplinary mental health assessment data.

The issue of tobacco control has gained significant attention throughout the world after the Surgeon General's report. Various steps were taken since then to reduce the harmful effects of cigarette smoking. Results from representative national surveys indicate that the smoking prevalence rates have fallen from 35% to 19%. Despite this, over 5 million Canadians continue to smoke, and tobacco use remains the primary cause of preventable deaths among Canadians. The prevalence of tobacco use varies widely across various overlapping subpopulations. This is especially true for the individuals with mental illness where smoking prevalence is very high. The true extent of this problem has not received its due attention, probably due to limited research and lack of knowledge about the prevalence, etiology, consumption patterns and

treatment of tobacco.

Some of the earlier studies have shown a wide range of smoking prevalence ranging from 50% -90% among individuals with mental illness or addiction. The studies have also shown that rates vary according to co-occurring disorder diagnosis and setting of the study. Using the census level data for the analysis, the present study found smoking prevalence at 47%. This is in contrast to some of the earlier claims that found very high smoking rates in this population. The important methodological considerations between the present study and earlier study were the sample size, study population, and smoking measures.

Ontario Mental Health Reporting System (OMHRS) was developed as a broad screening instrument rather than an exhaustive assessment of any single clinical issue. Hence, although the instrument includes a series of items covering a broad range of common problems encountered in mental health, it is not intended to be a definitive assessment for any single clinical issue. The data item for smoking status asks whether the patient smoked or chewed tobacco daily. There were three possible responses to that question: “1) No 2) not in last 3 days, but is a daily smoker and 3) Yes”. According to Canadian Tobacco Use Monitoring Survey (CTUMS) the prevalence of recent use (that is, use in the last 30 days) of smokeless tobacco (i.e., chewed or oral snuff) was at 0.6% among those aged 15 or older. There was no specific prevalence data of smokeless tobacco among individuals with mental illness. Because the prevalence rate of smokeless tobacco was very low for the purpose of this research, individuals were all classified as cigarette smokers. On a clinical note, while the health risks are lower than for cigarettes, a number of serious health consequences are associated with smokeless tobacco use, including an increased risk for oral cancer, and possibly other head and neck cancer (US Department of Health and

Human Services, 1992), soft tissue lesions including leukoplakia, and periodontal disease (Critchley J.A., 2003). Therefore, classifying these individuals in the category of cigarette smoker should not affect the conclusion of this research.

The prevalence of smoking in this study was slightly lower (47%) compared to previous studies which showed a huge variation in smoking prevalence. This could be due to various factors, for example, since OMHRS uses a self-identified definition of smoker if the patient admits to smoking or chewing tobacco daily, the actual prevalence could be higher than the estimated prevalence. Another important consideration is the use of data from inpatients only. Most of the earlier studies have used the data from outpatient clinics. The other possible factor is the training of the interviewer completing the assessment and the interviewer understanding of the definition of smoker. However, the inter-rater reliability of OMHRS is pretty good, but as mentioned earlier, it is designed for broad screening rather an exhaustive assessment of any single clinical issue. As a result of this screening, it is more likely that the measure of smoking status is conservative and that the actual prevalence would have been higher if there were comprehensive questions specific to smoking-related problems.

The other possible reasons for the low prevalence could be due to the type of mental health units. The majority of the individuals (81%) were admitted to acute units, followed by addiction units. The main reason for admission among these individuals was specific psychiatric symptoms followed by threat or danger to self. Based on the clinical understanding, it is likely that these individuals were in a state of psychosis and many of them were sedated, therefore, it is less likely for them to smoke and also for the interviewer to obtain correct information from them. All these factors points to the data in OMHRS as a conservative measure of the smoking

status among these individuals. Despite the conservative measure, the smoking prevalence is still three times higher than the general population. This very fact highlights the importance of taking appropriate measures for smoking cessation among these individuals.

The high prevalence of tobacco smoking among individuals with mental illness is linked with other correlates of tobacco smoking and mental illness. This study tried to explain the correlates of tobacco smoking among these individuals. The demographic characteristics, social factors, and psychiatric diagnoses were studied.

Population Demographic Characteristics

The distribution of smokers among different age groups showed that the prevalence of smoking increases with age up to the age of 44 and decreases in later age groups. The mean age of the smokers was found significantly lower, i.e., 41 years as compared to non-smokers, which was 48 years. Similarly, the majority of the individuals in higher age groups, i.e., 55 years and older were nonsmokers. It is possible that the lower mean age and low proportion of smokers in higher age group can result in smokers dying early, either due to tobacco smoking alone or due to combination of other correlating factors linked to their smoking status. The relationship of age and smoking status among individuals with mental illness suggests that some kind of relationship exists between these two correlates.

The demographic data from these individuals were analyzed, and it was found that both male and female are distributed pretty much equally in each category. There were 14 or 0.04% individuals who were classified as ‘Others’ in their gender. Data from these individuals were removed from the analysis to maintain confidentiality. Further data analysis was conducted after

removing these individuals from our dataset.

The smoking status stratified by gender is consistent with the national average, but more pronounced in this study. This analysis showed that approximately 43% of females were smokers and 57% of males were smokers, as compared to the national data of 17% and 20% respectively for both females and males. The results clearly suggest a strong positive relationship of male gender with the smoking status of these individuals which is consistent with other similar studies.

The majority of the individuals (49%) in this study were classified as 'never married'. The analysis also showed that 26% of these individuals were married, and within the group 40% of the males were smokers and 30% of the females were smokers. These differences in smoking prevalence due to marital status highlight the importance of social factors in tobacco smoking.

The relationship of education with smoking status of the individual didn't differ much with the general population. Smoking prevalence was highest in individuals who went to High schools (grades 9~11) or finished high school. The proportion of smokers decreases in individuals with higher education with the lowest percentage of individuals with a graduate degree. These findings suggest that specific factors increase the likelihood of cigarette smoking, according to their level of education.

The proportion of individuals admitted in mental health institutions in Ontario, showed that the majority of the individuals belong to Central Ontario. On the other hand, Northern Ontario represents the lowest number of individuals. Within the regions, smoking prevalence was highest in Northern Ontario as expected, due to large number of aboriginals living in that

area. The prevalence was lowest in the region of Toronto. These results are also consistent with the smoking prevalence in the general population.

According to Statistics Canada, aboriginals constitute 3.26% of the Canadian population. Interestingly, the study also found that they constitute 2.97% of all the individuals admitted in the mental health institutions in Ontario. The study found that among aboriginal people, 72% of them were smokers, which was significantly higher than those who were non-aboriginals. This finding is consistent with the national data where smoking prevalence among these individuals was approximately 59%. This study reinforces the importance of addressing the issue of tobacco control especially in aboriginals.

The majority of individuals were admitted due to specific psychiatric symptoms. The proportion of male smokers was higher in almost all the categories for admission as compared to non-smoking males. On the other hand, among female smokers, the proportion was lower in all the reasons for admission, as compared to non-smoking females, with the exception of problems with addiction/dependency, and involvement with the criminal justice system. The proportion of male and female smokers admitted with involvement in criminal justice system did not differ much (approximately 52 – 53% in each category). This suggests that the environmental and other social demographic variables that make an individual susceptible to smoke cigarette are affecting both the genders in the similar way. However, more research is needed to understand these factors that was beyond the scope of this study.

Psychiatric Diagnosis

The psychiatric diagnosis of the individuals in this study showed that Mood disorder was the most common diagnosis, followed by schizophrenia and substance-related disorders. The

study found a very strong correlation of substance-related disorder, schizophrenia and personality disorder with the smoking status of the individual, as determined by their primary (or most important) diagnosis.

Earlier studies have shown that individuals with the diagnosis of schizophrenia smoke at nearly three times the rate of the general population. Some of the research has shown the rate increased to 86% in these individuals. However, the present study found the prevalence at three times the rate of the general population which is consistent with the overall prevalence in these individuals. The inpatient nature of the individuals and the conservative smoking status measure could have been the reason for this lower than expected prevalence in individuals with the diagnosis of schizophrenia. The nicotine dependence in these individuals may be very different than the individuals with a diagnosis other than schizophrenia, as earlier research has shown, but due to the lack of appropriate assessment measure for nicotine dependence in OMHRS, the study could not highlight this fact.

The correlation of psychiatric diagnosis and smoking status differs much with respect to gender as well. The proportion of male smokers was considerably higher in individuals with the diagnosis of schizophrenia, mood disorders, anxiety disorder, somatoform disorders, sleep disorders, and personality disorders. This difference in proportion of smokers, due to their gender, can simply be a result of high smoking prevalence in overall smokers. Cochrane-Mantel Haenszel (CMH) statistics were used to find the difference in psychiatric diagnosis due to smoking status, after controlling the gender effect. The CMH statistics found significant difference in psychiatric diagnosis due to smoking status, after controlling the gender effect. The finding suggests that the prevalence of smoking among males is particularly high in substance-

related disorders, personality disorders and schizophrenia. On the other hand, the highest prevalence of smoking among females was associated with personality disorder and substance-related disorders; unlike male smokers, the prevalence of smoking is lower in females with the diagnosis of schizophrenia as compared to the non-smoking females. Our initial literature review did not find a strong correlation of personality disorder and female gender. However, a study conducted in Finland (Tanskanen, 1997) found high smoking rates among females diagnosed with personality disorders. Since the data from our research can be comparable to census level data, it highlights the importance of this disorder in female smokers.

Based on the correlation of psychiatric diagnosis and smoking status of the individual, the logistic regression model was used to calculate the odds ratio for being a smoker with respect to their psychiatric diagnosis, after controlling for gender and age. The study found that the odd of being a smoker is particularly high, i.e., 3.7 in individuals with substance-related disorder and 1.2 in individuals with personality disorders. However, it will be very important to mention that these odds ratios are calculated for the individuals who are admitted in the mental health institutions in Ontario, rather than the general population. The odds ratio obtained for other diagnoses, such as mood disorders, anxiety disorders, etc., suggests that individuals with these diagnoses are less likely to be smokers, after controlling for age and gender.

Social Support

The results of our study suggested that smokers have less available social support and had fewer meaningful social relationships recently. Based on the available questions, in terms of indicators of anxiety, females had more anxiety-related issues as compared to males. However, within the group, male smokers had more problems with anxiety-related issues as compared to

male non-smokers. On the other hand, female smokers had fewer problems with anxiety-related issues as compared to female non-smokers. These results point out that some kind of social stigmatization exists due to smoking status of these individuals.

In terms of psychiatric resource use, male individuals used more psychiatric resources than females, in terms of number of psychiatric admissions (both recent and lifetime). The number of admissions was higher among male smokers as compared to non-smoking males. On the other hand, the number of admissions was lower among female smokers as compared to non-smoking females.

In general, only 26% of the individuals exhibited any health complaints in the last 3 days. Proportionally, females exhibited more health complaints as compared to the males. However, the proportion of male smokers was high in exhibiting health complaints in the last 3 days. This is an interesting finding because, although smokers differ from non-smokers in many of the variables analyzed in this study, significant differences also exist due to gender. This needs to be explored further for better understanding of differences due to gender.

Among those who were discharged within 30 days to 1 year, the proportion of male smokers was higher as compared to male non-smokers. In contrast to this, but similar to our earlier findings, the proportion of female smokers is less as compared to female non-smokers, in terms of time since last discharge within 30 days to 1 year.

Among female smokers, the majority of them (48%) were admitted for the first time between the age of 15 ~ 24 years, followed by 43% at the age of 25 ~ 44 years of age. Similar trends exist for female non-smokers, but the proportion is higher. The proportion of smokers is

lower among those individuals in both genders who were first admitted after the age of 45 years. This suggests that either the non-smoking status of the individuals actually protected the individuals from their first psychiatric hospitalization or because they were not hospitalized, and as a result of that, they did not start to smoke. More research is needed in this area to find the true association between early of psychiatric hospitalization and the smoking status of the individual.

Outcome Scales

The outcome scales embedded in OMHRS shows that, proportionally, male smokers scored higher in almost all the scales as compared to female smokers. Although the majority of the scales being used in OMHRS are validated, more research is needed in this area to draw conclusions from these scales.

In terms of cognitive performance, 67% of the smokers had intact cognition as opposed to 58% of the non-smokers. The overall trend shows that on cognitive performance scale smokers scored lower, i.e., they had better cognition, as compared to non-smokers. It could be either that the cognitively impaired persons forget to smoke cigarettes and quit early or it may be possible that the cigarette smoking may actually improve the cognition of the individuals. It is also worth mentioning that the mean age of the smokers is low, therefore, as a result of their lower age, they are cognitively better than the non-smokers.

Alcohol/ Drug treatment/ Smoking cessation

OMHRS uses only one question to identify smoking cessation as a focus of intervention. Since this question overlaps with alcohol and drug treatment as well, this study used a different

combination of variables in the analysis to answer the question, specifically about smokers.

Overall, 73% of the individuals were not offered, did not receive, nor were scheduled to receive this intervention. Among smokers only, without any alcohol or drug problems, 89% of the individuals were not offered, had not received, nor were scheduled to receive this intervention. Gender stratified analysis also shows a similar trend. With respect to facilities, 10 out of 64 facilities didn't have this intervention at all.

The odds ratio for getting the treatment suggested that the likelihood of getting this intervention is higher if a person has been diagnosed with a substance-use disorder. However, if a person has been diagnosed with a substance-use disorder in combination with being a smoker, the likelihood actually decreases. Similarly, the probability also decreases for individuals with a diagnosis of substance-use disorder in combination with alcohol use. On the other hand, if a person is diagnosed with a substance-use disorder in combination with both smoking and alcohol use, the odds of receiving the treatment increase slightly.

The result of this analysis points to the fact that substance-use disorders are the main determinant for a person to receive an intervention focused at cessation of smoking/ alcohol or drug problems. However, the overlapping nature and the lack of standardized intervention make it difficult to understand the true nature of these interventions in various facilities. Earlier research has shown that smoking is not seen as a problem in individuals with mental illness. The findings from this study somehow validated this concept.

Study Limitations and Methodological Consideration

The limitations of this study include:

1) Crude measure of smoking status – OMHRS questionnaires have only one measure of smoking status of the individuals, while ignoring other important questions such as nicotine dependence, number of cigarette smoked, etc.

2) Crude measure of provisional diagnosis – Since provisional diagnosis is mostly used for the current problem at the time of admission, and tends to ignore other problems which did not cause the problem that led to the admission.

3) The data from this study was collected from various mental health facilities. These facilities have different regulations for smokers such as designated smoking areas, enclosed smoking spaces, and also how much control is exerted over the use of tobacco in their facilities.

4) The dataset is representative of only the institutionalized individual (census level data) rather than the total population of individuals with mental illness within the province of Ontario. There is a possibility that these individuals may be slightly different from those who are not institutionalized.

Policy Implications & Future Directions

The Ontario Ministry of Health and Long-Term Care (MOHLTC) implemented the Smoke-Free Ontario Act on May 31, 2006. This act essentially put a complete ban on smoking in all enclosed public facilities, which also included psychiatric facilities. Despite the high smoking prevalence (three times the general population), differences in demographic characteristics and

differences in diagnosis, there are some provisions in the Act that allow smoking within these facilities, if certain conditions are met. This study not only validated earlier research that also found unusually high number of smokers admitted with mental illness, but also the use of census level data has highlighted the importance of taking appropriate action to reduce the smoking related consequences among these individuals.

Even before the implementation of the Smoke-Free Ontario Act, some of the health facilities were actively working towards the reduction of the high smoking prevalence. These actions not only included enforcing a complete ban on smoking within the premises but they also offered programs or interventions to help these individuals quit smoking, based on DSM-IV guidelines. However, there are still many health units where more emphasis is given on the acute problem rather than paying attention to the smoking or providing interventions to help these individuals quit smoking. The reluctance to confront the smoking problem in individuals with mental illness has stemmed from beliefs such as exacerbation of symptoms during nicotine withdrawals, failure to succeed in quitting smoking, and the lack of skills to provide smoking treatment. From the policy perspective, addressing the issue of cigarette smoking in these individuals will not only reduce the health consequences associated with smoking, but rather it will decrease the likelihood of smoking initiation in these institutions. There are some unique advantages of smoking cessation programs among these individuals, for example, since the smoking prevalence is very high, the impact can be huge. The withdrawal effects can also be actively treated without any additional resources, because the individuals are institutionalized and already undergoing treatment for their psychiatric illness and so the facility can provide the perfect environment to help quit smoking. Mental health professionals have strong interviewing

techniques, and they are familiar with behavior change methods that are an essential part of the smoking cessation therapies. Having these skills increases the effectiveness of the smoking cessation programs and increases the odds of quitting.

In the light of these findings, it is necessary to formulate better strategies for tobacco control, especially for these individuals. This issue hasn't received attention it should have, due to concerns of the mental health professionals, families of the individuals, and policy makers. For most of them, smoking is a lesser evil as compared to the psychiatric problems and in this vein, many people believe that smoking is the only remaining pleasure in the lives of these mentally afflicted people and there is little desire to take away this last pleasure. On the other hand, a social stigma already exists for the individuals with mental illness. People tend to isolate these individuals and avoid them. With the growing attention towards tobacco control and increased awareness of the harmful effects of tobacco smoking in Canada, a social stigma exists for the smokers as well. People tend to stay away from these individuals and save themselves from second hand smoke. When an individual diagnosed with a mental illness tends to be a smoker, this stigmatization increases. In order to avoid this extreme stigmatization, effective tobacco control policies should be used to address the high prevalence of tobacco smoking among these individuals.

Mental health units should not only enforce the Smoke Free Ontario Act, but the ministry should also support the facilities in developing a standardized intervention to help these individuals quit smoking. While the spontaneous cessation rate for people with mental illness and addiction was found extremely low (Ziedonis, 1997), there is also some evidence to indicate that many individuals with mental illness and addictions want to reduce the amount they smoke,

or stop smoking altogether (Addington et al., 1997; Carosella et al., 1999; Forchuk et al., 2002; Goldberg et al., 1996). The appropriate measures, in terms of increasing the availability and standardized delivery of the smoking cessation intervention, have huge potential of reducing the high prevalence of smoking in these individuals.

Recommendations for InterRAI group

Ontario Mental Health Reporting System is a unique tool developed mainly to support inpatient mental health services planning in mental health institutions. It uses minimum data that contains variables that can be used to screen various health problems. The outcomes scale and quality indicators have huge potential for research. Specifically, for smoking-related problems, the quality indicator "Prevalence of smoking/ tobacco addiction without an offer of therapy" should be used as a measure to increase the tobacco control strategies in the respective facilities. Despite the limitations, in terms of adding more data items in OMHRS, the addition of the number of cigarettes smoked and nicotine-dependence measures could provide valuable information with the goal of providing appropriate treatment for these individuals. However, OMHRS is especially developed for the province of Ontario, and since this study has found an unusually high prevalence of cigarette smoking in these groups, the addition of smoking-related details can certainly help the provincial government take strong measures in this particular area.

Recommendations for future research

Future work should focus on more data on the smoking status of the individual, such as the number of cigarettes smoked and information on nicotine dependence, etc. The measure of smoking should be improved to identify former smokers from current smokers. The details of smoking cessation intervention and the regulations to control cigarette smoking in the facilities

should be studied. Longitudinal data analysis should be carried out to assess the cause and effect phenomena in many of the study variables.

Conclusion

Tobacco smoking is highly prevalent among individuals with mental illness in Ontario. The prevalence of smoking is particularly high in individuals with mood disorders, schizophrenia, and personality disorders. Males are more prone to smoking and smokers are more likely to have less social support as compared to non-smokers.

Smokers are less likely to receive an intervention focused on alcohol/ drug/ and tobacco cessation. Smokers with a diagnosis of substance-use disorders and alcohol use are 5 times more likely to receive this intervention, as compared to those smokers who do not have any of these problems. Smokers scoring high on positive symptoms scale are less likely to receive the cessation.

Concentrated efforts are needed to control cigarette smoking in this population. The availability of smoking cessation intervention is needed in many of the facilities.

References

Acierno, R., Kilpatrick, D., & H, R. (1996). Violent assault, post-traumatic stress disorder, and depression: Risk factors for cigarette use among women. *Behavior Modification, 20*, 363-384.

Addington, J., el-Guebaly, N., Addington, D., Hodgins, D. (1997). Readiness to stop smoking in schizohprenia. *Canadian Journal of Psychiatry,* 42, 49 – 52

Anda, R. F., Willamson, D. F., Escobedo, L. G., Mast, E. E., Giovino, G. A., Remington, P. L. (1990). Depression and the dynamics of smoking. A national perspective. *Journal of American Medical Association.* 264, 1541 – 1545

Agency for health care policy and research. (1996). The Agency for health care policy and research smoking cessation clinical practise guideline. *Journal of American Medical Association, 275*, 1270 - 1280.

American Psychiatric Association. (1996). Practice guidelines for the treatment of patients with nicotine dependence. *America Journal of Psychiatry, 153* (Supplementary), 1 - 31.

Beemer, B. R. (1993). Hospital psychiatric units: Nonsmoking policies. *Journal of Psychosocial Nursing and Mental Health Services, 31*, 12 - 14.

Benwell, M., D, B., & Anderson, J. (1988). Evidence that tobaco smoking increases the density of (-)-[3H] nicotinic binding sites in human brain. *Journal of Neurochemistry, 50*, 1243-1247.

Beratis, S., Katrivanou, A., Gourzis, P. (1991). Factors affecting smoking in schizophrenia. *Comrehensive Psychiatry* 42, 393 - 402

Breeze, C., Adams, C., Logel, J., Drebing, C., Rollins, Y., & Barnhart, M. (1997).

Comparison of the regional expression of nicotinic receptors alpha-7 mRNA and [125I]-alpha-bungartoxin binding in human postmortem brain. *Jounral of comparative neurology, 387*, 385-398.

Breslau, N., Kilbey, M. M., Andreski, P. (1993). Nicotine dependence and major depression. New evidence from a prospective investigation. *Archives of General Psychiatry*. 50, 31 – 35

Breslau, N., Peterson, E. L., Schultz, L. R., Chilcoat, H. D., Andreski, P. (1998). Major depression and stages of smoking. A longitudinal investigation. *Archives of General Psychiatry*. 55, 161 – 166

Bronaugh, T. A., & Frances, J. J. (1990). Establishing a smoke-free inpatient units: Is it possible? *Hospital and Community Psychiatry, 31*, 1303 - 1305.

Brown, S., Inskip, H., & Barraclough, B. (2000). Causes of the excess mortality of schizophrenia. *British Journal of Psychiatry, 177*, 212 - 217.

Burrows, A.B., Morris, J.N., Simon S.E., Hirdes J.P., Phillips, C. (2000). Development of a minimum data set-based depression rating scale for use in nursing homes. *Age and Ageing.* 29(2): 165 - 72.

Canadian Institute of Health Informatics. (n.d.). *Ontario Mental Health Reporting System.* Retrieved January 6, 2007, from Canadian Institute of Health informatics: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=services_omhrs_e

Canadian Tobacco Use Monitoring Survey. (2004). *Trends in Smoking 2003.* Health Canada.

Corvin, A., O' Mahony, E., O' Regan, M., Comerford, C., O'Connel, R., Carddock, N., Gill, M.

(2001). Cigarette smoking and psychotic symptoms in bipolar affective disorder. *British Journal of Psychiatry*, 179, 35 – 38.

Covey, L. S., Glassman, A. H., & Stetner, F. (1997). Major depression following smoking cessation. *American Journal of Psychiatry, 154*, 263 - 265.

Covey, L. S., Hughes, D. C., Glassman, A. H., Blazer, D. G., & George, L. K. (1994). Ever-smoking quitting and psychiatric disorders: Evidence from the Durham, North Carolina, Epidemiological Catchment Area. *Tobacco Control,* 3, 222 - 227.

Critchley J.A., Unal B. (2003). Health effects associated with smokeless tobacco: a systematic review. *Thorax.* 58, 435 – 43.

Dallac, G.W., Becks, L., Hill, E., Pomerleau, O.F., Meador-Woodruff J.H. (1999). Nicotine withdrawal and psychiatric symptoms in cigarette smokers with schizophrenia. *Neuropscyhopharmacology* 21, 195 – 202.

de Leon, J. (1996). Smoking and vulnerability for schizophrenia. *Schizophrenia bulletin*, 22, 405 – 409.

de Leon, J., Dadvand, M., Canuso, C., White, A. O., Stanilla, J. K., & Simpson, G. M. (1995). Schizophrenia and smoking: An epidemiological survey in a state hospital. *American Journal of Psychiatry, 152* (3), 453 - 455.

de Leon, J., Diaz, F. J., Rogers, T., Browne, D., Dinsmore, L. (2002). Initation of daily smoking and nicotine dependence in schizophrenia and mood disorders. *Schizophrenia Research* 56, 47 - 54

Decina, P., Caracci, G., Sandik, R., Berman, W., Mukherjee, S., & Scapicchio, P. (1990). Cigarette smoking and neuroleptic-induced Parkinsonism. *Biological Psychiatry, 28*, 502 - 508.

Degenhardt, L., Hall W., Lynskey, M., 2001. Alcohol, cannabis and tobacco use among Australians: a comparison of their association with other drug use and use disorders, affective and anxiety disorders, and psychosis. *Addiction* 96, 1603 - 1614

Diaz, A., Simantov, E., & Rickert, V. (2002). Effect of abuse on health: results of a national survey. *Archives of Pediatric and Adolescence Medicine, 156*, 811-817.

Diwan, A., Castine, M., Pomerleau, C. S., Meador-Woodruff, J. H., Dalack, G. W. (1998). Differential prevalence of cigarette smoking in patients with schizophrenic vs mood disorders. *Schizophrenia Research*, 33, 113 – 118.

Dixon, L., Postrado, L., Delahanty, J., Fischer, P. J., & Lehman, A. (1999). The association of medical comorbidity in schizophrenia with poor physical and mental health. *Journal of Nervous and Mental Disease, 187* (8), 496 - 502.

Ebeling, H., Moilanen, I., Linna, S. L., Tirkkonen, T., Ebeling, T., Piha, J., et al. (1998). Smoking and drinking habits in adolescence - links with psychiatric disturbance at the age of 8 years. *European Child Adolescent Psychiatry, 8* (Supplementary 4), 68 - 76.

El-Guebaly, N., Cathcart, J., Currie, S., Brown, D., & Gloster, S. (2002). Public health and therapeutic aspects of smoking bans in mental health and addiction settings. *Psychiatric Services, 53*, 1617-1622.

Farnam, C. R., Zipple, A. M., Tyrell, W., & Chittinanda, P. (1999). Health status risk factors of

people with severe and persistent mental illness. *Journal of Psychosocial Nursing and Mental Health Services, 37* (6), 16 - 21.

Fergusson, D. M., Lynskey M. T., Horwood, L. J. (1996). Co-morbidity between depressive disorders and nicotine dependence in a cohort of 16-year olds. *Archives of General Pscyhiatry*; 53: 1043 – 7

Foulds, J. (1999). The relationship between tobacco use and mental disorders. *Current opinion in Psychiatry, 12*, 303 - 306.

Freedman, R., Leonard, S., Gault, J. M., (2001). Linkage disequilibrium for schizophrenia at the chromosome 15q13-1alpha7-nicotine acetylcholine receptor subunit gene (CHRNA7). *American Journal of Genetics,* 105, 20 – 22.

Geller, J. I., & Kaye, N. (1990). Smoking in Psychiatric hospitals: A historical view of a hot topic. *Hospital and Community Psychiatry, 41*, 1349 - 1350.

George, T.P., Krystal J.H. (2000). Comorbidity of psychiatric and substance abuse disorders. *Current Opinion in Psychiatry* 13, 327 – 331.

George, T. P., Ziedonis, D. M., Feingold, A., Pepper, W. T., Satterburg, C. A., Winkel, J., et al. (2000). Nicotine transdermal patch and atypical antipsychotic medications for smoking cessation in schizophrenia. *American Jounral of Psychiatry, 157*, 1835 - 1842.

George, T., & J, K. (2000). Comorbidity of psychiatric and substance abuse disorders. *Current opinion in psychiatry, 13*, 327-331.

Glassman, A.H. (1993). Cigarette smoking: implications for psychiatric illness (see comments;

Review, 74 refs) *American Journal of Psychiatry*, 15, 546 – 53.

Goff, D. C., Henderson, D. C., & Amico, E. (1992). Cigarette smoking in schizophrenia: relationship to psychopathology and medication side effects. *American Jounral of Psychiatry, 149* (9), 1189 - 94.

Goff, D., Henderson, D., & Amico, E. (1992). Cigarette smoking in schizophrenia: relationship to psychopathology and medication side effects. *American Journal of Psychiatry, 149*, 1189-1194.

Health Canada (2007). *Canadian Tobacco Use Monitoring Survey 2006.* Retrieved July 18, 2007, from World Wide Web: http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2006/index_e.html

Health Canada. *Canadian Tobacco Use Monitoring Survery (CTUMS 2000 – 2005): Wave 1: February to June, Wave 2: July to December*. Ottawa, ON: Health Canada; 2001 – 2006. [cited 2006 October 31]. Available from http://www.hc-sc.gc.ca/hl-vs/tobac/research-recherche/stats/ctums-escutc/index_e.html.

Henningfield, J., Miyasato, K., & Jasinki, D. (1985). Abuse liability and pharmacodynamic characteristics of intravenous and inhaled nicotine. *Journal of Pharmacology and Experimental Therapeutics, 234*, 1-12.

Henningfield, J.E., Clayton, R., Pollin, W. (1990). Involvement of tobacco in alcoholism and illicit drug use. *British Journal of Addiction*, 85, 279 – 291.

Himelhoch, S., & Daumit, G. (2003). To who do psychiatrists offer smoking-cessation

counselling? *American Journal of Psychiatry, 160*, 2228 - 2230.

Hirdes, J. P., Marhaba, M., Smith, T. F., Clyburn, L., Mitchell, L., Lemick, R. A., et al. (2000). Development of the Resident Assessment Instrument - Mental Health (RAI-MH). *Hospital Quarterly, 4* (2), 44-51.

Le Houezec, J. L. (1998). Nicotine: abused substance and therapeutic agent. *Journal of Psychitry and Neuroscience.* 23, 95 - 108

Health Canada, (2002). A report on Mental illness in Canada, Ottawa, Canada.

Hughes, J. R. (1997). Treating nicotine dependence in mental health settings. *Journal of Practical Psychiatry and Behavioral Health*, 250-254.

Hughes, J. R., Hatsukami, D. K., Mitchell, J. E., & Dahlgren, L. A. (1986). Prevalence of smoking among psychiatric outpatients. *American Journal of Psychiatry, 143*, 993-997.

Hurt, R. D., Eberman, K. M., Slade, J. D., & Karan, L. (1993). *Treating nicotine addiction in patients with other addictive disorders, in nicotine addiction: principles and management.* New York: Oxford University Press.

InterRAI. (n.d.). *InterRAI Outcome Measurement.* Retrieved January 7, 2007, from InterRAI Web site: http://www.interrai.org/section/view/?fnode=28

Jarvis, M., Wardle, M., (1999). Social Patterning of health behaviors: the case of cigarette smoking. In: Scoial determinants of health: Eds: Marmot M, Willinown R. OUP, Oxford 1999. Pp 2240-55.

Johnson, J. G., Cohen, P., Klein, D. F., Kasen, S., & Brook, J. S. (2000). Association between

cigarette smoking and anxiety disorders during adolescence and early childhood. *Journal of American Medical Association, 284*, 2348 - 2351.

Katon, W., Roy-Byme, P.P. (1988). Antidepressants in the medically ill: diagnosis and treatment in primay care. *Clinical Chemistry,* 1988; 34: 829-836.

Kelly, C., McCreadie, R.G. (1999). Smoking habits, current symptoms, and pre-morbid characteristics of schizophrenic patients in Nithsdale, Scotland. *Schizophrenia Research* 56: 47 – 54.

Kendler, K. S., Neale, M. C., Maclean, C. J., Heath A. C., Eaves, L. J., Kessler, R. C. (1993). Smoking and major depression. A causal analysis. *Archives of General Psychiatry,* 50, 36 – 43

Kendler, K. S., Prescott, C. A., Myers, J., Neale, M. C. (2003). The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of General Psychiatry.* 60, 929 – 937

Lasser, K., Boyd, J. W., Woolhandler, S., Himmelstein, D., McCormick, D., & Bor, D. (2000). Smoking and Mental Illness: a population based prevalence study. *JAMA*(284), 2606-2610.

Lawn, S. (2001). Systemic factors that perpetuate smoking among community and institutionalised public mental health service populations. *Unpublished PhD thesis - University of South Australia*.

Lindstorm, J., Anand, R., Gerzanich, V., Peng, X., Wang, F., & Wells, G. (1996). Structure and functions of neuronal nicotinc acetylcholine receptors. *Progress in Brain Research, 109*, 125-137.

Le Houezec, J. (1998). Nicotine: abused substance and therapeutic agent. *Journal of Psychiatry Neuroscience.* 23, 95 – 108.

Leonard, S., Bertrand, D. (2000). Neuronal nicotinic receptors: from structure to function. *Nicotine and Tobacco Research.* 3, 203 - 223

Lohr, J. B., Flynn, K. (1992). Smoking and schizophrenia. *Schizophrenia Research*, 8, 93 – 102.

Mc Neill, A. (2001). *Smoking and mental health: a review of the literature. Smoke Free London Programme.* London: London Region National Health Service.

McEvoy, J. P., & Brown, S. (1999). Smoking in first-episode patients with schizophrenia. *American Journal of Psychiatry, 156* (7), 1120 - 1121.

McEvoy, J. P., Freudenreich, O., Levin, E. D., & Rose, J. E. (1995). Haloperidol increase smoking in patients with schizophrenia. *Psychopharmacology, 119*, 124 - 126.

McEvoy, J., Freudenreich, O., McGee, M., VanderZwaag, C., Levin, E., & Rose, J. (1995). Clozapine decreses smoking in patients with chronic schizophrenia. *Biological Psychiatry, 37* (8), 550 - 552.

Menza, M. A., Grossman, N., Van Horn, M., Cody, R., & Forman, N. (1991). Smoking and movement disorders in psychiatric patients. *Biological Psychiatry, 30*, 109 - 115.

Nichols, H., & Harlow, B. (2004). Childhood abuse and risk of smoking onset. *Journal of Epidemiology and Community Health, 58*, 402-406.

Nordberg, A. (1995). Imaging of nicotinic receptors in human brain. In *Brain imaging of nicotine*

and tobacco smoking (pp. 45-47). Ann Arbor: NPP Books.

Orleans, C.T., Hutchinson, D. (1993). Tailoring nicotine addiction treatments for chemical dependency patients. Journal of Substance Abuse Treatment 10: 197 – 208.

Patkar, A. A., Lundy, A., Leone, F.T., Weinstein, S.P., Gottheil, E., and Weinstein, S.P. (2002). Tobacco and alcohol use and medical symptoms among cocaine dependent patients. *Substance Abuse*, 23, 105 – 113.

Patten, C. A., Martin, J. E., & Owen, N. (1996). Can psychiatric and chemical dependency treatment units be smoke free. *Journal of Substance Abuse and Treatment, 13* (2), 107 - 118.

Quattrocki, E., Baird, A., & Yurgelun-Todd, D. (2000). Biological aspects of the link between smoking and depression. *Harvard Review of Psychiatry, 8* (3), 99-110.

Rehm, J., Baliumas, D., Brochu, S., Fischer, B., Gnam, W., Patra, J., Popova, S., Sarnocinka-Hart, Taylor, B. (2006). The cost of substance abuse in Canada, 2002. Ottawa: Canadian Centre on Substance Abuse.

Riala, K., Hakko, H., Isohanni, M., Pouta, A., Rasanen, P. (2005) Is initation of smoking associated with prodormal phase of schizophrenia?. *Journal of Pscyhatiry Neuroscience.*30 (1): 26-32

Rustin, T. (1998). Incorporating nicotine dependence into addiction treatment. *Journal of Addictive Diseases, 17* (1), 83 - 108.

Sandyk, R., Kay, S. R. (1991). Tobacco addiction as a marker of age at onset of schizophrenia. *International Journal of Neuroscience*. 59: 259 – 62

Shaw, C.R., McKay, H.D. (1942). Juvenile delinquency and Urban Areas: A study of the rates of delinquents in relation to differential characteristics of local communities in American cities. Chicago: Univ. Chicago Press. 451 pp.

Shlomowitz, E.A. (1990). The treatment of mental illness in South Australia 1852 – 1884: from care to custody. Unpublished doctoral dissertation. Flinders University of South Australia, Adelaide, Australia.

Simantov, E., Schoen, C., & Klein, J. (2000). Health-comprising behaviors: Why do adolescents smoke or drink? Identifying underlying risk and protective factors. *Archives of Pediatrics and Adolescence Medicine, 154*, 1025-1033.

Sivilotti, L., & Coloquhoun, D. (1995). Acetylcholine receptors: too many channels, too few functions. *Science, 269*, 1681-2.

Smoke Free London, Mentality and ASH (2001). *Symposium Report: Smoking and Mental Health,* 9 November 2000

Springs, F., & Friedrich, W. (1992). Health risk behaviors and medical sequelae of childhood sexual abuse. *Mayo Clinical Practise, 67*, 527-532.

Swan, G.E., Carmelli, D., Cardon, L.R. (1996). The consumption of tobacco, alcohol, and coffee in Caucasian male twins: a multivariate genetic analysis. *Journal of Substance Abuse*. 8, 19 – 31

Tanskanen, A., Vinamaki, H., Koivumaa-Honkanen, H. T., Jaaskelainen, J., Lehtonen, J. (1997). Smoking among psychiatric patients. *The european journal of psychiatry*. 11, 179 - 188

The World Health Report (2001). Mental Health: New Understanding, New Hope. Box 2.3.

Switzerland: World Health Organization.

Tsuang, M. T., Bar, J. L., Harley, R. M., Lyons, M. J. (2001). The Harvard twin study of substance abuse: what we have learned. *Harvard Review of Psychiatry* 9, 267 - 279

US department of Health and Human Services. (2004). *The health consequences of smoking: A report of the US Surgeon General.* U.S. Department of Health and Human Services, Centers for disease control and prevention, National center for chronic disease prevention and health promotion, Office on smoking and health. Washington DC: US Government Printing Office.

US department of Health and Human Services, Public Health Service, National Institute of Health. *Smokeless Tobacco or Health: An International Perspective*. Smoking and Tobacco Control Monograph 2. National Institutes of Health, 1992, reprinted May 1993 (NIH Publication number 93-3461).

Watt, J., & Hocking, B. (1996). Mental illness and smoking cessation: an urgent public health issue (Symposium). *QUIT and Vic health* . Melbourne.

West, R., Hajek, P. (1997). What happens to anxiety levels on giving up smoking? *American Journal of Psychiatry.* 154, 1589 – 1592.

Williams, J., & Ziedonis, D. (2004). Addressing tobacco among individuals with a mental illness or an addiction. *Addictive Behaviors, 29*, 1067-1083.

Wonnacott, S. (1990). The paradox of nicotinic acetylcholine receptors upregulation by nicotine. *Trends in Pharmacological Sciences, 11*, 216-219

Wu, L-T, Anthony, J.C. (1999). Tobacco smoking and depressed mood in late childhood and

early adolescence. *American Journal of Public Health.* 89, 1837 – 40

Wyckham R. G. (1999). Smokeless in Canada. Deterring market development. *Tobacco Control*., 9, 411-20

Yu, Z., & Wecker, L. (1994). Chronic nicotine administration differentially affects neurotransmitter release from rat striatal slices. *Journal of Neurochemistry, 63*, 186-194.

Ziedonis, D. M., George, T. P. (1997). Schizophrenia and nicotine use: report of a pilot smoking cessation program and review of neurobiological and clinic issues. *Schizophrenia Bulletin,* 23, 247 – 254

Ziedonis, D. M., Kosten, T. R., Glazer, W. M., & Frances, R. J. (1994). Nicotine Dependence and schizophrenia. *Hospital and Community Psychiatry, 45*, 204 - 206.

Appendix A

MINIMUM DATA SET FOR MENTAL HEALTH (MDS-MH)©

Addressograph

SECTION AA. NAME AND IDENTIFICATION NUMBERS

1	NAME OF PATIENT	a. (Last/Family Name) b. (First Name) c. (Middle/Initial)
X10	COUNTRY OF RESIDENCE	1. Canada 3. Other 2. USA 4. Unknown
X20	PROV/TERR ISSUING HEALTH CARD NO	
2	HEALTH CARD NUMBER	
X30	CHART NUMBER	
3	CASE RECORD NUMBER	
4	FACILITY NUMBER	Prov/Terr Facility Number (See manual for province/territory codes.)
5	UNIT IDENTIFIER	25 Mental Health—Acute Unit 45 Mental Health—Addiction Unit 50 Mental Health—Children/Adolescent 55 Mental Health—Forensic Unit 90 Mental Health—Psychiatric Crisis Unit 95 Mental Health—Longer Term

SECTION BB. PERSONAL ITEMS *(Complete at Intake Only)*

1	SEX	M. Male F. Female O. Other
2	BIRTH-DATE	Year Month Day
X40	ESTIMATED BIRTH-DATE	If patient's birthdate is an estimate code 1. 0. No 1. Yes
3	MARITAL STATUS	1. Never married 4. Widowed 2. Married 5. Separated 3. Partner/significant other 6. Divorced
4	LANGUAGE	Primary language (see manual for additional codes). eng = English fra = French
5	EDUCA-TION	1. No schooling 6. Some college/university 2. 8th grade/less 7. Diploma/Bachelor's degree 3. 9–11 grades 8. Graduate degree 4. High school 9. Unknown 5. Technical or trade school

SECTION BB. PERSONAL ITEMS cont'd *(Complete at Intake Only)*

6	SOURCES OF INCOME	0. No	1. Yes
		a. Employment	d. Social assistance
		b. Employment insurance	e. Disability insurance
			f. Other
		c. Pension	g. No income
X50	RESPON-SIBILITY FOR PAYMENT	0. No	1. Yes
		a. Provincial/territorial responsibility	
		b. Workers' Compensation (WCB/WSIB)	
		c. Other province/territory (resident of Canada)	
		d. Department of Veterans Affairs (DVA)	
		e. First Nations and Inuit Health Branch (FNIHB)	
		f. Other Federal Government (RCMP, Canadian Armed Forces, federal penitentiary inmate, refugee)	
		g. Canadian resident (self pay)	
		h. Other country (self pay)	
		i. Unknown	
7	ABOR-IGINAL ORIGIN	Patient's origin is Inuit, Metis or North American Indian. 0. No 1. Yes	

SECTION CC. REFERRAL ITEMS *(Complete at Intake Only)*

1	DATE STAY BEGAN	Year Month Day
2	REASONS FOR ADMIS-SION	0. No 1. Yes
		a. Threat or danger to self
		b. Threat or danger to others
		c. Inability to care for self due to mental illness
		d. Problem with addiction/dependency
		e. Specific psychiatric symptoms (e.g. depressed, hallucination, medication side effects)
		f. Involvement with criminal justice system, forensic admission
		g. Other
X60	POSTAL CODE OF PRIOR RESIDENCE	Postal Code
3	WHO LIVED WITH AT ADMIS-SION	1. Lived alone 2. Lived with spouse only 3. Lived with spouse and other(s) 4. Lived with child (not spouse) 5. Lived with other(s) (not spouse or children) 6. Lived in group setting with non-relative(s)

CIHI April 2005 © Government of Ontario; Ontario Hospital Association; interRAI Page 1 of 10

SECTION CC. REFERRAL ITEMS cont'd *(Complete at Intake Only)*

4	PRIOR RESIDENTIAL STATUS	1. Private home/apartment 2. Rented room 3. Board and care/assisted living/group home/mental health residence 4. Facility for those with an intellectual disability 5. Psychiatric hospital or unit 6. Homeless (with or without shelter) 7. Long-term care facility (nursing home) 8. Rehabilitation unit/hospital 9. Hospice 10. Acute unit/hospital 11. Correctional facility 12. Other
X65	REFERRED FROM FACILITY NUMBER	Prov/Terr ____ Facility Number ____ (See manual for province/territory codes.)
5	RESIDENTIAL STABILITY	Prior to admission, most recent residence was temporary (e.g. shelter). 0. No 1. Yes

SECTION DD. MENTAL HEALTH SERVICE HISTORY

1	NUMBER OF PSYCHIATRIC ADMISSIONS (RECENT)	Record the number of recent **(last 2 years)** psychiatric admissions. Do not include this admission. 0. None 1. 1–2 2. 3 or more
2	NUMBER OF PSYCHIATRIC ADMISSIONS (LIFETIME)	Record the number of lifetime mental health admissions. Do not include this admission. 0. None 1. 1–3 2. 4–5 3. 6 or more
3	TIME SINCE LAST DISCHARGE	Time since discharge from last mental health admission. 1. More than 1 year 2. 31 days to 1 year 3. 30 days or less (from other facility) 4. 30 days or less (from this facility) 8. Not applicable
4	AMOUNT OF TIME HOSPITALIZED	Amount of time in psychiatric hospital/unit in the **last 2 years.** Do not include this admission. 0. No other admissions in last 2 years 1. 30 days or less 2. 31 days to 1 year 3. More than 1 year
5	CONTACT WITH COMMUNITY MENTAL HEALTH	Time since last contact with a community mental health agency or mental health professional (e.g. psychiatrist, social worker) in the past year. 0. No contact in last year 1. 31 days or more 2. 30 days or less
6	AGE AT FIRST HOSPITALIZATION	Age at first overnight stay in a psychiatric hospital/unit. 1. 0–14 4. 45–64 2. 15–24 5. 65+ 3. 25–44

SECTION A. ASSESSMENT INFORMATION

1	ASSESSMENT REFERENCE DATE	Year ____ Month ____ Day ____
2	REASON FOR ASSESSMENT	TYPE OF ASSESSMENT 1. Initial assessment 2. Routine assessment at fixed interval 3. Review prior to discharge from program 4. Review upon return to unit/hospital 5. Change in status 6. Other

SECTION A. ASSESSMENT INFORMATION (cont'd)

3	CURRENT INPATIENT STATUS	STATUS AT TIME OF ASSESSMENT 1. Application for psychiatric assessment (exclude forensics) 2. Voluntary 3. Informal 4. Involuntary 5. Forensic (including forensic assessment, unfit to plead, not criminally responsible) 6. Other
4	CAPACITY/ COMPETENCY	Presence of formal decisions regarding patient capacity/competence. 0. No 1. Yes
		a. Patient incapable to consent to treatment
		b. Patient incapable to manage property
		c. Patient incompetent to disclose information related to clinical record
		d. Patient has a legal guardian/substitute decision-maker
5	HISTORY OF INVOLVEMENT WITH THE CRIMINAL JUSTICE SYSTEM	Police intervention for participation in criminal activity (include arrests, but exclude civil litigation). Code for most recent instance. 0. Never 1. Any instance prior to the last year 2. Within the last year 3. Within the last month 4. Within the last 7 days
		a. Violent crime
		b. Non-violent crime

SECTION B. MENTAL STATE INDICATORS

1 (Code for indicators observed in the last 3 days)
0. Indicator not exhibited in the **last 3 days**
1. Indicator not exhibited in the last 3 days but it is reported to be **present**
2. Indicator exhibited **1–2 of the last 3 days**
3. Indicator exhibited **daily in the last 3 days**

INDICATORS OF MOOD DISTURBANCE

a. Facial Expression	Sad, pained, worried facial expression (e.g. furrowed brow)
b. Tearfulness	Crying, tearfulness
c. Decreased Energy	Statements of decrease in energy level (e.g. "I just don't feel like doing anything"; "I have no energy")
d. Made Negative Statements	Patient made negative statements (e.g. "Nothing matters"; "I would rather be dead"; "What's the use"; "Let me die"; regrets having lived so long)
e. Self-Deprecation	Self-deprecation (e.g. "I am nothing"; "I am no use to anyone")
f. Guilt/ Shame	Expressions of guilt or shame (e.g. "I've done something awful", "This is all my fault"; "I am a terrible person")
g. Hopelessness	Statements of hopelessness (e.g. "There's no hope for the future"; "Nothing's going to change for the better")
h. Inflated Self-Worth	Exaggerated self-opinion; arrogance; inflated belief about one's own ability, etc.
i. Hyper-Arousal	Motor excitation; increased reactivity; exaggerated startle response
j. Irritability	Marked increase in being short-tempered or easily upset
k. Increased Sociability or Hypersexuality	Marked increase in social or sexual activity; unusually high activity
l. Pressured Speech/ Racing Thoughts	Rapid speech or rapid transition from topic to topic
m. Labile Affect	Affect fluctuates frequently with or without an external explanation
n. Flat or Blunted Affect	Indifference, nonresponsiveness, hard to get to smile, etc.

SECTION B. MENTAL STATE INDICATORS (cont'd)

1		**INDICATORS OF ANXIETY**	
	o. Anxious Complaints	Repetitive anxious complaints (non-health related) (e.g. persistently seeks attention/reassurance)	
	p. Fears/ Phobias	Expression (including non-verbal) of what appear to be unrealistic fears (e.g. fear of being abandoned, of being left alone, of being with others) or intense fear of specific objects or situations	
	q. Obsessive Thoughts	Unwanted ideas or thoughts that cannot be eliminated	
	r. Compulsive Behaviour	Hand washing, repetitive checking of room, counting, etc.	
	s. Intrusive Thoughts/ Flashbacks	Disturbing memories, nightmares or images that intrude into patient's thoughts; unwanted recall of adverse events	
	t. Episodes of Panic	Patient unexpectedly overwhelmed by sense of panic	
		INDICATORS OF PSYCHOSIS	
	u. Hallucin-ations	False sensory perception, of any type, with or without insight, without corresponding stimuli (e.g. auditory, visual, tactile, olfactory, gustatory hallucinations), excluding command hallucinations	
	v. Command Hallucin-ations	Hallucination directing the patient to do something or to act in a particular manner (e.g. to harm self or others)	
	w. Delusions	Fixed false beliefs (e.g. grandiose, paranoid, somatic), excluding beliefs specific to patient's culture or religion	
	x. Abnormal Thought Process/ Form	Loosening of associations, blocking, flight of ideas, tangentiality, circumstantiality, etc.	
		NEGATIVE SYMPTOMS	
	y. Anhedonia	Statements that indicate a general lack of pleasure in life (e.g. "I don't enjoy anything anymore")	
	z. Loss of Interest	Withdrawal from activities of interest or from long-standing social relations (e.g. no interest in long-standing activities or being with family/friends)	
	aa. Lack of Motivation	Absence of spontaneous goal-directed activity	
	bb. Reduced Interaction	Reduced social interaction	
		OTHER INDICATORS	
	cc. Health Complaints	Repetitive health complaints (e.g. persistently seeks medical attention; excessive concerns with bodily functions)	
	dd. Anger	Persistent anger with self or others (e.g. easily annoyed; anger at care received)	
	ee. Unusual or Ab-normal Physical Movements	Unusual facial expressions or mannerisms, peculiar motor behaviour or body posturing	
	ff. Hygiene	Unusually poor hygiene, unkempt, disheveled	
	gg. Sleep Problems	Any sleep problems present, including awakening earlier than desired, difficulty falling asleep, restless or nonrestful sleep, interrupted sleep, too much sleep	
2	INSIGHT INTO MENTAL HEALTH	Degree of patient insight into his/her mental health problem. 0. Full 1. Limited insight 2. None	

SECTION C. SUBSTANCE USE AND EXCESSIVE BEHAVIOURS

1	ALCOHOL	Number of drinks in any single sitting episode **in last 14 days**. Code for highest number. 0. None 1. One 2. Two to four 3. Five or more	

SECTION C. SUBSTANCE USE AND EXCESSIVE BEHAVIOURS (cont'd)

2	SUBSTANCE USE	Time since any use of the following substances. 0. Never or more than one year ago 1. Within the last year 2. Within the last 3 months 3. Within the last month 4. Within the last 7 days 5. Within the last 3 days	
		a. Inhalants (e.g. glue, gasoline, paint thinners, and solvents)	
		b. Hallucinogens (e.g. phencyclidine or "angel dust", LSD or "acid", "magic mushrooms", Ecstasy)	
		c. Cocaine and crack	
		d. Stimulants (e.g. amphetamines, "uppers", "speed", methamphetamine)	
		e. Opiates (e.g. heroin)	
		f. Cannabis	
3	WITHDRAWAL SYMPTOMS	Severity of signs or symptoms possibly indicative of withdrawal from alcohol or drugs. Code for most severe level in **last 3 days**. 0. NONE PRESENT 1. MILD—symptoms typical of early stages of withdrawal (e.g. agitation, "jitters", craving, gastrointestinal upset, anxiety, hostility, vivid dreaming) 2. MODERATE—increased severity of early indicators, weakness, sweating, hot flashes, fainting, muscle twitching 3. SEVERE—symptoms typical of late stages of withdrawal (e.g. exhaustion, seizures, tremors, tachycardia, disorientation, hyperventilation)	
4	PATTERNS OF DRINKING OR OTHER SUBSTANCE USE	Presence of behavioural indicators of potential substance related addiction, **in last 3 months.** 0. No 1. Yes	
		a. Patient felt the need or was told by others to cut down on drinking or drug use, or others were concerned about patient's substance use	
		b. Patient has been bothered by criticism from others about drinking or drug use	
		c. Patient has reported feelings of guilt about drinking or drug use	
		d. Patient had to have a drink or use drugs first thing in the morning to steady nerves (e.g. an "eye opener")	
5	SMOKING	Patient smoked or chewed tobacco daily. 0. No 1. Not in last 3 days, but is a daily smoker 2. Yes	
6	GAMBLING	Patient gambled excessively or uncontrollably during **the last 3 months.** 0. No 1. Yes	

SECTION D. HARM TO SELF OR OTHERS

1	SELF-INJURY	a. Self-injurious attempt (code for most recent instance) 0. Never 2. Attempt in the last year 1. Attempt more than 1 year ago 3. Attempt in the last 7 days 4. Attempt in the last 3 days	
		b. Intent of any self-injurious attempt was to kill him/herself 0. No-OR-No attempt 1. Yes	
		c. Considered performing a self-injurious act in the **last 30 days** 0. No 1. Yes	
		d. Family/caregiver/friend/staff expresses concern that patient is at risk for self-injury 0. No 1. Yes	

SECTION D. HARM TO SELF OR OTHERS (cont'd)

2	VIOLENCE	Code for most recent instance. 0. Never 1. Any instance prior to the last year 2. Any instance in the last year 3. Instance in the last 7 days 4. Instance in the last 3 days	
		a. Violence to others—acts with **purposeful, malicious, or vicious intent**, resulting in physical harm to another (e.g. stabbing, choking or beating)	
		b. Intimidation of others or threatened violence (e.g. threatening gestures or stance with no physical contact, shouting angrily, throwing furniture, explicit threats of violence)	
		c. Violent ideation—reports of premeditated thoughts, statements, or plans to commit violence	
3	SEXUAL VIOLENCE	Any history of sexual violence/assault. 0. No 1. Yes	

SECTION E. BEHAVIOUR DISTURBANCE

1	BEHAVIOUR SYMPTOMS	Behaviour symptom frequency in the last 3 days. 0. Indicator not exhibited in the last 3 days 1. Indicator not exhibited in the last 3 days, **but it is reported to be present** 2. Exhibited on 1–2 of last 3 days 3. Exhibited daily in last 3 days	
		a. Wandering (moved with no rational purpose, seemingly oblivious to needs or safety)	
		b. Verbal abuse (e.g. others were threatened, screamed at, cursed at)	
		c. Physical abuse (e.g. others were hit, shoved, scratched, sexually abused)	
		d. Socially inappropriate/disruptive behaviour (e.g. made disruptive sounds, noisiness, screaming, smeared/threw food/feces, hoarding, rummaged through others' belongings)	
		e. Inappropriate public sexual behaviour (or public disrobing)	
		f. Resists care (e.g. taking medications/injections, ADL assistance, or eating)	
		g. Elopement attempts/threats	
2	EXTREME BEHAVIOUR DISTURB-ANCE	Prior history of extreme behaviours that suggests **serious** risk of harm to self (e.g. severe self-mutilation) or others (e.g. fire setting, homicide). 0. No 1. Yes, **not** exhibited in the **last 7 days** 2. Yes, exhibited in the **last 7 days**	

SECTION F. COGNITION

1	MEMORY/ RECALL ABILITY (Over last 3 days)	Code for recall of what was learned or known. 0. Yes, memory OK 1. Memory problem	
		a. Short-term memory OK—seems/appears to recall after 5 minutes	
		b. Procedural memory OK—can perform all or almost all steps in a multitask sequence without cues for initiation	
2	COGNITIVE SKILLS FOR DAILY DECISION-MAKING (Over last 3 days)	Making decisions regarding tasks of daily life (e.g. when to get up or have meals, which clothes to wear or activities to do). 0. INDEPENDENT—decisions consistent/ reasonable/safe 1. MODIFIED INDEPENDENCE—some difficulty in new situations only 2. MINIMALLY IMPAIRED—in specific situations, decisions become poor or unsafe and cues/ supervision necessary at those times 3. MODERATELY IMPAIRED—decisions consistently poor or unsafe, cues/supervision required at all times 4. SEVERELY IMPAIRED—never/rarely makes decisions 5. NO DISCERNABLE CONSCIOUSNESS	

SECTION F. COGNITION (cont'd)

3	INDICATORS OF DELIRIUM—PERIODIC DISORDERED THINKING/ AWARE-NESS	(Note: Accurate assessment requires conversations with staff and family who have direct knowledge of patient's behaviour over this time.) 0. Behaviour not present 1. Behaviour present, not of recent onset 2. Behaviour present over the last 3 days AND the behaviour appears different from the patient's functioning 2 weeks ago (e.g. new onset or worsening)	
		a. EASILY DISTRACTED (e.g. episodes of difficulty paying attention; gets sidetracked)	
		b. PERIODS OF ALTERED PERCEPTION OR AWARENESS OF SURROUNDINGS (e.g. moves lips or talks to someone not present *excluding prayers*; believes he or she is somewhere else; confuses night and day)	
		c. EPISODES OF DISORGANIZED SPEECH (e.g. speech is nonsensical, irrelevant, or rambling from subject to subject; loses train of thought)	
		d. PERIODS OF RESTLESSNESS (e.g. fidgeting or picking at skin, clothing, napkins, etc.; frequent position changes; repetitive physical movements or calling out)	
		e. PERIODS OF LETHARGY (e.g. sluggishness; staring into space; difficult to arouse; little body movement)	
		f. MENTAL FUNCTION VARIES OVER THE COURSE OF THE DAY (e.g. sometimes better, sometimes worse, behaviours sometimes present, sometimes not)	
4	COGNITIVE DECLINE	Now more impaired in decision-making than 90 days ago (or since last assessment). 0. No or unsure 1. Yes, more impaired today	

SECTION G. SELF-CARE

1	**3 DAY ADL SELF-PERFORMANCE** *(CODE for performance over full 24 hour periods, considering all occurrences of the activity OVER LAST 3 DAYS.)* 0. INDEPENDENT—no help, setup, or supervision—OR—help, setup or supervision provided only 1 or 2 times during period (with any task or subtask). 1. SETUP HELP ONLY—article or device provided or placed within reach of patient 3 or more times 2. SUPERVISION—oversight, encouragement or cueing provided 3 or more times OR supervision (1 or more times) plus physical assistance provided only 1 or 2 times during period, for a total of 3 or more episodes of help or supervision 3. LIMITED ASSISTANCE—patient highly involved in activity, received physical help in guided maneuvering of limbs or other non-weight bearing assistance 3 or more times OR combination of non-weight bearing help with more help provided only 1 or 2 times during period, for a total of 3 or more episodes of physical help 4. EXTENSIVE ASSISTANCE patient performed part of activity on own (50% or more of subtasks) BUT help from one person of following type(s) provided 3 or more times: - weight-bearing support (e.g. holding weight of limb, trunk) - full performance some of time of a task or discrete subtask by others 5. MAXIMAL ASSISTANCE patient involved but completed less than 50% of subtasks on own (includes 2 + person assist), received weight bearing help or full performance of certain subtasks 3 or more times 6. TOTAL DEPENDENCE—full performance of activity during entire period by others 8. ACTIVITY DID NOT OCCUR during entire period	
a	PERSONAL HYGIENE	How patient manages personal hygiene, including combing hair, brushing teeth, shaving, applying makeup, washing/drying face and hands (EXCLUDE baths and showers)	
b	WALKING	How patient walks between locations on same floor indoors	
c	WHEELING	How patient moves between locations on same floor indoors when in wheelchair	
d	TOILET USE	How patient uses the toilet room (or commode, bedpan, urinal), cleansing self after toilet use or incontinent episode(s), changes pad, manages ostomy or catheter, adjusts clothes, (EXCLUDE transfer on/off toilet)	
e	EATING	How patient eats and drinks (regardless of skill). Includes intake of nourishment by other means (e.g. tube feeding, total parenteral nutrition)	

SECTION G. SELF-CARE (cont'd)

2	**IADL CAPACITY** *(CODE capacity based on patient's presumed ability to carry out activity as independently as possible. This will require "speculation" by the assessor.)* 0. INDEPENDENT—no help, setup, or supervision 1. SETUP HELP ONLY—article or device provided or placed within reach 3 or more times 2. SUPERVISION—oversight, encouragement or cueing 3. LIMITED ASSISTANCE—help to complete task on some occasions, other times does on own 4. EXTENSIVE ASSISTANCE—assistance throughout the task but performs 50% or more of subtasks involved in the activity on own 5. MAXIMAL ASSISTANCE—involved but completes less than 50% of subtasks involved in the activity on own 6. TOTAL DEPENDENCE—full performance of activity during entire period by others		
a	MEAL PREPARATION	How meals are prepared (e.g. planning meals, cooking, assembling ingredients, setting out of food and utensils)	
b	MANAGING MEDICATIONS	How medications are managed (e.g. remembering to take medications, opening bottles, taking correct drug dosages, giving injections, applying ointments)	
c	TRANSPORTATION	How patient travels by public transportation (navigating system, paying fare), or arranges other transport, or drives self (including getting out of house, into/out of vehicles)	
d	MANAGING FINANCE	How bills are paid, checkbook is balanced, household expenses are balanced, credit card account is monitored	
e	PHONE USE	How telephone calls are made or received (with assistive devices such as large numbers in telephone, amplification as needed)	
3	STAMINA	Hours of physical activities in the last 3 days (e.g. walking, outdoor gardening, shopping, cleaning house, exercise) 0. More than 2 hours 2. Less than 1 hours 1. 1–2 hours 3. None	
4	ADL DECLINE	ADL status is worse than 90 days ago, or since last assessment if less than 90 days ago. 0. No or unsure 1. Yes, more impaired today	

SECTION H. COMMUNICATION/VISUAL PATTERNS

1	HEARING	Ability to hear with hearing appliance normally used. 0. HEARS ADEQUATELY—no difficulty in normal conversation, social interaction, TV, phone 1. MINIMAL DIFFICULTY—requires quiet setting to hear well 2. HEARS IN SPECIAL SITUATIONS ONLY—speaker has to increase volume and speak distinctly 3. HIGHLY IMPAIRED—absence of useful hearing	
2	VISION	Ability to see in adequate light and with glasses or with other visual appliance normally used. 0. ADEQUATE—sees fine detail, including regular print in newspapers/books 1. IMPAIRED—sees large print, but not regular print in newspapers/books 2. MODERATELY IMPAIRED—limited vision; not able to see newspaper headlines, but can identify objects 3. HIGHLY IMPAIRED—object identification in question, but eyes appear to follow objects 4. SEVERELY IMPAIRED—no vision or sees only light, colours, or shapes; eyes do not appear to follow objects	
3	MAKING SELF UNDERSTOOD	Expressing information content (however able). 0. UNDERSTOOD—expresses ideas without difficulty 1. USUALLY UNDERSTOOD—difficulty finding words or finishing thoughts, BUT if given time, little or no prompting required 2. OFTEN UNDERSTOOD—difficulty finding words or finishing thoughts, prompting usually required 3. SOMETIMES UNDERSTOOD—ability is limited to concrete requests 4. RARELY/NEVER UNDERSTOOD	

SECTION I. HEALTH CONDITIONS AND POSSIBLE MEDICATION SIDE EFFECTS

1	SIGNS AND SYMPTOMS	Code for all problems present in **last 3 days** unless other time frame indicated. 0. Indicator not exhibited in last 3 days 1. Exhibited on 1–2 of last 3 days 2. Exhibited on each of last 3 days			
		a. Headache		i. Nausea	
		b. Dizziness/vertigo or lightheadedness		j. Vomiting	
		c. Shortness of breath		k. Constipation	
		d. Chest pain/pressure		l. Diarrhea	
		e. Blurred vision		m.Daytime drowsiness/sedation	
		f. Dry mouth		n. Fatigue/weakness	
		g. Increase or decrease in normal appetite		o. Impaired balance/ataxia	
		h. Difficulty urinating/urinating 3 or more times a night/polyuria		p. Emergent conditions (e.g. itching, fever or rash)	
				q. Edema	
2	EXTRAPYRAMIDAL SIGNS AND SYMPTOMS	Presence of extrapyramdal signs and symptoms at any point during the **last 3 days.** 0. No 1. Yes **INCREASE IN MOTOR ACTIVITY** a. **Akathisia**—patient reports subjective feeling of restlessness or need for movement b. **Dyskinesia**—chewing, puckering movements of the mouth; abnormal irregular movements of lips; or rocking or writhing of trunk c. **Tremor**—involuntary rhythmic movements of the fingers, limbs, head, mouth or tongue **DECREASE IN MOTOR ACTIVITY** d. **Rigidity**—resistance to flexion and extension of muscles (e.g. continuous or cogwheeling rigidity) e. **Slow shuffling gait**—reduction in speed and stride length of gait, usually with a decrease in pendular arm movement f. **Bradykinesia**—decrease in spontaneous movements (e.g. reduced body movement, or poverty of facial expression, gestures, speech) **MUSCLE CONTRACTIONS** g. **Dystonia**—muscle hypertonicity (e.g. muscle spasms or stiffness, protruding tongue, upward deviation of the eyes)		
3	SEXUAL FUNCTIONING	Patient reports persistent difficulty with sexual functioning during the **past 30 days** (e.g. loss of interest or drive, impaired erection or impaired ejaculation, inhibited female orgasm). 0. No 1. Yes			
4	SELF RATED HEALTH	Patient feels he/she has poor physical health (when asked). 0. No 1. Yes			
5	CHEWING/SWALLOWING	Any problem chewing or swallowing (e.g. pain while eating). 0. No 1. Yes			
6	SKIN OR FOOT PROBLEMS	Any troubling skin conditions (e.g. burns, bruises, rashes, pressure ulcers, body lice, scabies, stasis ulcers) or foot conditions (e.g. open lesions, infections, fungi) in the **past 30 days.** 0. No 1. Yes			
7	FALLS	Fell in the **last 30 days** 0. No 1. Yes			

SECTION I. HEALTH CONDITIONS & POSSIBLE MED'N SIDE EFFECTS (cont'd)

8	PAIN	a. Frequently complains or shows **evidence of pain** in the **last 3 days.** 0. No Pain 1. Pain less than daily 2. Pain daily
		b. Intensity of pain—code for most intense, distressful pain. 0. No pain 3. Severe 1. Mild 4. Times when pain is 2. Moderate horrible or excruciating
9	BLADDER CONTINENCE	In the last 3 days, control of urinary bladder function (includes dribbling). 0. CONTINENT—complete control; DOES NOT USE any type of catheter or other urinary collection device 1. CONTROL WITH CATHETER—complete control with any type of catheter or urinary collection device that does not leak urine 2. INFREQUENT INCONTINENCE—not incontinent over last 3 days, but patient does have incontinent episodes 3. EPISODE OF INCONTINENCE—on one day 4. OCCASIONALLY INCONTINENT—on two days 5. FREQUENTLY INCONTINENT—tended to be incontinent daily, but some control present 6. INCONTINENT—inadequate control of bladder, multiple daily episodes all or almost all of the time 8. DID NOT OCCUR—no urine output from bladder
10	BOWEL CONTINENCE	In the **last 3 days** control of bowel function 0. CONTINENT—complete control, does not use ostomy device 1. CONTINENT WITH OSTOMY—complete control with use of ostomy device that does not leak stool 2. INFREQUENT INCONTINENCE—not incontinent over last 3 days, but patient does have incontinent episodes 3. EPISODE OF INCONTINENCE—on one day 4. OCCASIONALLY INCONTINENT—on two days 5. FREQUENTLY INCONTINENT—tends to be incontinent daily, but some control present (e.g. during day) 6. INCONTINENT—inadequate control of bowel, multiple daily episodes all or almost all of the time 8. DID NOT OCCUR—no bowel movement during the entire assessment period
X11	PRESENCE OF MEDICAL DIAGNOSES	Patient has medical diagnoses that are currently subject to active treatment or monitoring. 0. No (Skip to J1) 1. Yes
11	MEDICAL DIAGNOSES RELEVANT TO PATIENT'S STATUS	Code for all medical diagnoses that are currently subject to active treatment or monitoring (refer to medical records department or consult manual for ICD-10-CA codes if needed). Primary Medical Dx ICD-10-CA a. _____ ☐☐☐.☐☐☐ Other b. ☐☐☐.☐☐☐ c. ☐☐☐.☐☐☐ d. _____ ☐☐☐.☐☐☐ e. _____ ☐☐☐.☐☐☐ f. _____ ☐☐☐.☐☐☐

SECTION J. STRESSORS

1	LIFE EVENTS AND HISTORY	Code for most recent time of event. 0. Never 2. Last Year 1. More than 1 year ago 3. Last 7 days
		a. Serious accident or physical impairment
		b. Distressed about health of another person
		c. Death of close family member or friend
		d. Child custody issues, birth or adoption of child
		e. Conflict-laden or severed relationship, including divorce
		f. Failed or dropped out of education program
		g. Major loss of income or serious economic hardship due to poverty
		h. Major organizational change at workplace (e.g. plant closure, downsizing)
		i. Review hearing (e.g. forensic, certification, capacity hearing)
		j. Immigration, including refugee status
		k. Lived in war zone or area of violent conflict (includes combatants and civilians)
		l. Witness to severe accident, disaster, act of terriorism, violence or abuse
		m. Victim of crime (e.g. robbery); exclude assault
		n. Sexual assault/abuse
		o. Physical assault/abuse
		p. Emotional abuse
2	RESPONSE TO LIFE EVENTS	Patient describes one or more of these events as evoking a sense of horror or intense fear. 0. No or not applicable 1. Yes
3	OTHER INDICATORS	Code for other indicators of abuse. 0. No 1. Yes
		a. Any history of physical/emotional/sexual abuse or sexual assault experienced by family member(s)
		b. Fearful of a family member, friend, caregiver or staff

SECTION K. MEDICATIONS

1	HISTORY OF MEDICATION ADHERENCE	Adherent with prescribed medications during the month **prior to admission.** 0. Always adherent 1. Adherent 80% of time or more 2. Adherent less than 80% of time, including failure to purchase prescribed medications 3. No medications prescribed 8. Unknown
2	MEDICATION REFUSAL	Patient refused to take some or all of prescribed medication in the **last 3 days.** 0. No 1. Yes
3	PAST MEDICATION SIDE EFFECTS	In the **last 3 months**, patient stopped taking psychotropic medication because of side effects. 0. No 1. Yes
4	INTENTIONAL MISUSE OF MEDICATION	Misuse of prescription or over-the-counter medications in the **last 3 months** (e.g. use medication for purpose other than intended). 0. No 1. Yes
5	ACUTE CONTROL MEDICATIONS	Number of times psychotropic medication used as an immediate response to prevent harm to self or other in **the last 3 days.** Code actual number; if more than 9, code "9"
6	ALLERGY TO DRUGS	Allergy to drugs 0. No 1. Yes

SECTION L. SERVICE UTILIZATION/TREATMENTS

1	FORMAL CARE	Number of days of contact of at least 15 minutes per day in the **last 7 days or since admission** (if less than 7 days). Code 0 to 7 days.	
		a. Psychiatrist	
		b. Nurse Practitioner or MD (non-psychiatrist)	
		c. Social Worker	
		d. Psychologist or Psychometrist	
		e. Occupational Therapist	
		f. Recreation Therapist	
		g. Addiction Counsellor	
		h. Dietician	
2	NURSING INTERVENTIONS	Record the number of days each of the following was provided for 15 minutes or more per day in the **last 7 days or since admission** (if less than 7 days). Code "0" if none or less than 15 minutes per day.	
		a. Medical interventions	
		b. One-to-one counselling, teaching	
		c. Crisis intervention	
		d. Family support/consultation	
3	TREATMENT MODALITIES	Code for treatment modalities used in the **last 7 days or since admission** (if less than 7 days). 0. Not offered and not received 1. Offered, but refused 2. Received in last 7 days 3. Not received, but scheduled to start within the next 7 days	
		a. Individual therapy	
		b. Group therapy	
		c. Family therapy, couple therapy	
		d. Self-help group	
4	FOCUS OF INTERVENTION	Code for types of issues that were a major focus of interventions **in the last 7 days or since admission** (if less than 7 days). 0. No intervention of this type 1. Offered, but refused 2. Received in last 7 days 3. Not received, but scheduled to start within next 7 days	
		a. Community reintegration	
		b. Social/family functioning	
		c. Psychosocial rehabilitation	
		d. Detoxification	
		e. Alcohol/drug treatment/smoking cessation	
		f. Vocational counselling	
		g. Anger management	
		h. Eating disorder	
		i. Behavioural management	
		j. Post-traumatic stress	
		k. Pain management	
		l. Alternative/non-traditional therapy	
5	ADHERENCE WITH TREATMENTS, THERAPIES, PROGRAMS	Adherent all or most of time with special treatments, therapies and programs, **in last 7 days or since admission** (if less than 7 days). 0. Always adherent 1. Adherent 80% or more of time 2. Adherent less than 80% of time 3. No treatments/programs	
6	ECT	Patient received ECT (code for most recent instance). 0. Never 1. More than one month ago 2. During the last month 3. During the last 7 days 4. Scheduled to begin within 7 days	

SECTION M. CONTROL PROCEDURES/OBSERVATION

1	CONTROL INTERVENTIONS	Code for use of each device in the **last 3 days.** 0. Not used 1. Less than daily use 2. Daily use—night only 3. Daily use—day only 4. Night and day, but not constant 5. Constant use for full 24 hours (with periodic release)	
		a. Mechanical restraint	
		b. Chair prevents rising	
		c. Physical/manual restraint by staff	
		d. Confinement to unit	
		e. Confinement to room	
		f. Seclusion room	
2	CLOSE OR CONSTANT OBSERVATION	Number of days of supervision of the following type in the **last 3 days**. If none, code "0".	
		a. Checked at 15 minute intervals	
		b. Checked at 5 minute intervals	
		c. Constant observation for less than 1 hour	
		d. Constant observation for more than one hour	
3	PSYCHIATRIC INTENSIVE CARE UNIT	Number of days in psychiatric intensive care unit during the **last 3 days**. If none, code 0.	
4	AUTHORIZED ACTIVITIES OUTSIDE OF FACILITY	Number of times in the **last 3 days** that the patient went out of facility (or locked unit, if applicable). 0. None 1. One 2. Two or more	
		a. Left accompanied by staff	
		b. Left not accompanied by staff	

SECTION N. NUTRITION

1	HEIGHT WEIGHT	Enter actual number a. Height ___ ___ ___ cm b. Weight ___ ___ ___ kg	
2	NUTRITIONAL PROBLEMS	0. No 1. Yes	
		a. Weight loss of 5% or more in the **last 30 days** or 10% or more in the **last 180 days**	
		b. Weight gain of 5% or more in the **last 30 days** or 10% or more in the **last 180 days**	
		c. Insufficient fluid, less than 1,000 cc per day or less than four 8 oz cups/day	
		d. In the **last 3 days**, noticeable decrease in the amount of food patient usually eats or fluid usually consumes	
3	INDICATORS OF EATING DISORDERS	Presence of potential signs of eating disorders in **the last month**. 0. No 1. Yes	
		a. Any instances of binge eating, purging or bulimia	
		b. Unrealistic fear of weight gain; statements that suggest a distorted body image	
		c. Fasting or major restriction of diet (exclude religious practices)	
4	POLYDIPSIA	In the **last 3 days**, inappropriate or excessive fluid consumption (e.g. drinks fluids many times during the day, drinks a huge amount at a time, refuses to stop drinking, drinks secretly from unusual sources). 0. No 1. Yes	

SECTION O. ROLE FUNCTIONING AND SOCIAL RELATIONS

1	FAMILY ROLES	Belief that relationship(s) with immediate family members is disturbed or dysfunctional. 0. Belief not present 1. Only patient believes 2. Family/friends/others believe 3. Both patient and family/friends/others believe	
2	SOCIAL RELATIONS AND INTER-PERSONAL CONFLICT	Presence of potential problems with social relation. 0. No 1. Yes	
		a. Patient reports having no confidant	
		b. Family/close friends report feeling overwhelmed by patient's illness	
		c. Patient is persistently hostile toward or critical of family/friends	
		d. Patient is persistently hostile toward or critical of other patients or staff	
		e. Family/friends are persistently hostile toward or critical of patient	
		f. Staff reports persistent frustration in dealing with patient	
		g. Family/friends require unusual amounts of facility staff time	
3	EMPLOY-MENT STATUS	Current employment status. 0. Employed 1. Unemployed, seeking employment 2. Unemployed, NOT seeking employment 3. Other 4. Unknown	
4	RISK OF UNEMPLOY-MENT/DIS-RUPTED EDUCATION	Factors that increase current risk of unemployment or disruption of education. 0. No 1. Yes 8. Not applicable	
		a. Increase in lateness or absenteeism over the last 6 months	
		b. Poor productivity or disruptiveness at work/school	
		c. Expresses intent to quit work/school	
		d. Persistent unemployment or fluctuating work history over the last 2 years	
5	TRADE-OFFS	During the last month, because of limited funds, made trade-offs among purchasing any of the following: prescribed medications, sufficient home heat, necessary health care, adequate food. 0. No 1. Yes	
6	SOCIAL RELATION-SHIP	0. Occurred within last 3 days 1. Occurred within last week 2. Occurred within last month 3. Last occurred more than one month ago	
		a. Participation in social activities of long-standing interest	
		b. Visit by a long-standing social relation/family member	
		c. Telephone or email contact with long-standing social relation/family member	

SECTION P. RESOURCES FOR DISCHARGE

1	AVAILABLE SOCIAL SUPPORTS (Family/ close friends)	Presence of one or more family members (or close friends) who are willing and able to provide the following types of support after discharge from formal care programs/setting. 0. Not needed 2. Occasional 1. Regular 3. No	
		a. Help with child care, other dependents	
		b. Supervision for personal safety	
		c. Crisis support	
		d. Support with ADLs or IADLs	
2	DISCHARGE READINESS	Presence of indicators of discharge readiness 0. No 1. Yes	
		a. Patient expresses/indicates preference to return/to remain in the community	
		b. Patient has a support person who is positive towards discharge/maintaining residence in community	

SECTION P. RESOURCES FOR DISCHARGE (cont'd)

3	PROJECTED TIME TO PLANNED DISCHARGE	How long patient is expected to stay in current setting or under the care of this service prior to planned discharge (count from date of admission, including that day). 0. 1–7 days 3. 31–90 days 1. 8–14 days 4. 91 or more days 2. 15–30 days	
4	OVERALL CHANGE IN CARE NEEDS	Change in psychiatric symptoms as compared to one month ago or since last assessment (if less than one month ago). 1. Deteriorated—symptoms are more frequent and/or severe 2. No change 3. Improvement in symptoms 4. Marked improvement	
5	LIVING ARRANGE-MENT	Code for initial arrangement expected at discharge. 0. Deceased 1. Private home/apartment 2. Rented room 3. Board and care/assisted living/group home/mental health residence 4. Facility for those with an intellectual disability 5. Psychiatric unit/hospital 6. Homeless (with or without shelter) 7. Long-term care facility (nursing home) 8. Rehabilitation unit/ hospital 9. Hospice 10. Acute unit/hospital 11. Correctional facility 12. Other 13. Unknown	
X 140	DIS-CHARGED TO FACILITY NUMBER	Prov/Terr Facility Number (See manual for province/territory codes.)	

SECTION Q. PSYCHIATRIC DIAGNOSTIC INFORMATION

1	DSM-IV PROVIS-IONAL DIAGNOSTIC CATETORY	Select up to three provisional DSM-IV diagnoses determined by the psychiatrist/attending physician and rank them in order of importance as factors contributing to this admission. **Code "1" for most important diagnosis, "2" for the second most important, "3" for the third most important** (Note: 2 and 3 coded if applicable)	
		a. Disorders of childhood/adolescence	
		b. Delirium, dementia, and amnestic and other cognitive disorders	
		c. Mental disorders due to general medical conditions	
		d. Substance-related disorders	
		e. Schizophrenia and other psychotic disorders	
		f. Mood disorders	
		g. Anxiety disorders	
		h. Somatoform disorders	
		i. Factitious disorders	
		j. Dissociative disorders	
		k. Sexual and gender identity disorders	
		l. Eating disorders	
		m.Sleep disorders	
		n. Impulse-control disorders not elsewhere classified	
		o. Adjustment disorders	
		p. Personality disorders	

SECTION Q. PSYCHIATRIC DIAGNOSTIC INFORMATION (cont'd)

2	DIAGNOSIS	Enter Axis I and Axis II DSM-IV diagnoses, if known. Must be completed on discharge, but also complete with earlier assessments if specific psychiatric diagnosis already determined. a. AXIS I: a. _____ DSM-IV CODE: ☐☐☐☐☐ b. _____ DSM-IV CODE: ☐☐☐☐☐ c. _____ DSM-IV CODE: ☐☐☐☐☐ b. AXIS II: DSM-IV CODE: ☐☐☐☐☐
3	INTELLECTUAL DISABILITY	Patient has an intellectual disability (e.g. Down's Syndrome). 0. No 1. Yes
4	GAF SCORE	Global Assessment of Functioning. Code current score. ☐☐☐
5	CURRENT PATIENT TYPE	Code for most appropriate patient type. 1. Acute care 3. Geriatric psychiatry patient 2. Longer term patient 4. Forensic

SECTION R. MEDICATIONS

1	PRESCRIBED MEDICATIONS	Patient had medications prescribed for use in the **last 3 days**. 0. No 1. Yes

SECTION S. DISCHARGE INFORMATION

X75	TOTAL DAYS IN ALTERNATIVE LEVEL OF CARE	Enter the total number of days of Alternative Level of Care for this patient. ☐☐☐
X80	DISCHARGE DATE	Enter the date of discharge. ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X90	DISCHARGE REASON	Code the most appropriate reason for the patient's discharge. 1. Planned—ready for discharge 2. Death due to suicide 3. Death not due to suicide 4. Transferred 5. AWOL > 30 days 6. LOA to community > 30 days 7. Discharged against medical advice 8. Other
X100A	SERVICE INTERRUPTION START DATE A	Enter the date the patient left the bed for greater than 72 hours but was not discharged (e.g. LOA, transferred, etc.). ☐☐☐☐ Year ☐☐ Month ☐☐ Day

SECTION S. DISCHARGE INFORMATION (cont'd)

X110A	SERVICE INTERRUPTION END DATE	Enter the date the patient returned from this absence. ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X120A	SERVICE INTERRUPTION REASON	Enter the reason for this service interruption. 1. Transferred to acute care 2. Transferred to rehabilitation care 3. Transferred to LTC 4. Transferred to another mental health facility/unit 5. Transferred to correctional facility 6. AWOL < = 30 days 7. LOA to community < = 30 days 8. Other
X100B	SERVICE INTERRUPTION START DATE B	Enter the date the patient left the bed for greater than 72 hours but was not discharged (i.e. LOA, transferred, etc.). ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X110B	SERVICE INTERRUPTION END DATE	Enter the date the patient returned from this absence. ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X120B	SERVICE INTERRUPTION REASON	Enter the reason for this service interruption. 1. Transferred to acute care 2. Transferred to rehabilitation care 3. Transferred to LTC 4. Transferred to another mental health facility/unit 5. Transferred to correctional facility 6. AWOL < = 30 days 7. LOA to community < = 30 days 8. Other
X100C	SERVICE INTERRUPTION START DATE C	Enter the date the patient left the bed for greater than 72 hours but was not discharged (i.e. LOA, transferred, etc.). ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X110C	SERVICE INTERRUPTION END DATE	Enter the date the patient returned from this absence. ☐☐☐☐ Year ☐☐ Month ☐☐ Day
X120C	SERVICE INTERRUPTION REASON	Enter the reason for this service interruption. 1. Transferred to acute care 2. Transferred to rehabilitation care 3. Transferred to LTC 4. Transferred to another mental health facility/unit 5. Transferred to correctional facility 6. AWOL < = 30 days 7. LOA to community < = 30 days 8. Other
X130	TOTAL DAYS AWAY FROM BED	Enter total days away from mental health bed. ☐☐☐

SECTION T. ASSESSOR IDENTIFICATION

1	SIGNATURE OF PERSON COORDINATING THE ASSESSMENT	a. _____ Signature of Assessment Coordinator b. Date Assessment Coordinator signed as complete ☐☐☐☐ Year ☐☐ Month ☐☐ Day

Medication List

List all medications prescribed for use in the **last 3 days.**

Name—Record the name of the medication.

DIN—Drug Identification Number. Be sure to enter the correct DIN for the drug name, strength and form. The DIN must match the drug dispensed by the pharmacy.

Dose—Record the dose of the medication.

Form—Code the route of administration using the following table:

PO	By mouth	**SL**	Sublingual	**IM**	Intramuscular	**TOP**	Topical	**ET**	Enteral tube
IV	Intravenous	**SQ**	Subcutaneous	**R**	Rectal	**NH**	Inhalation	**OTH**	Other

Freq—Code the number of times per day, week, or month the medication is administered using the following list :

QH	Every hour	**QD**	Once daily	**QW**	Once each week	**QOD**	Every other day
Q2H	Every two hours	**BID**	Two times daily (include	**2W**	Two times each week	**QHS**	At bedtime
Q3H	Every three hours		every 12 hours)	**3W**	Three times each week	**1M**	Once every month
Q4H	Every four hours	**TID**	Three times daily	**4W**	Four times each week	**2M**	Twice every month
Q6H	Every six hours	**QID**	Four times daily	**5W**	Five times each week	**C**	Continuous
Q8H	Every eight hours	**5D**	Five times daily	**6W**	Six times each week	**O**	Other

PRN—Check if medication was given on a PRN basis at anytime in the last 3 days. **D/C**—Check if medication has now been discontinued.

	Name	Drug Identification Number (DIN)	Dose	Form	Freq.	PRN (✓)	D/C (✓)
	a.						
	b.						
	c.						
	d.						
	e.						
	f.						
	g						
	h.						
	i.						

Appendix B:

Mental Health Assessment Protocols (MHAPs) in OMHRS

New Patient	
Violence	Revolving Door
Self-Harm	Discharge Resources
Abuse by Others	Addictive Behaviors
Criminal Activity	Nutrition
Self-Care	Dehydration
Social Function	Polydipsia
Interpersonal Conflict	Skin and Foot Conditions
Vocational Rehabilitation	Oral Health
Support System	Pain
Economic Status	Bladder/ Bowel Functioning
Adherence	Cognition
Psychotropic Drug Review	Communication Disorders
Physical Restraints and Seclusion	Behavior Disturbance

Appendix C

Examples of Outcome Measure (OMHRS)

Cognitive Performance Scale	Substance Addictions Screen
Depression Rating Scale	IADL Summary Scale
Negative Rating Scale	Health Status Index
Anxiety Scale	ADL Hierarchy Scale
Aggressive Behavior Scale	ADL Short Form Scale
Drug-Related Side Effects Scale	ADL Long Form Scale

Appendix D

List of Quality Indicators for Mental Health (OMHRS)

Behavioral Emotional Patterns

- Remission rate of symptoms of depression
- Incidence of Symptoms of Depression
- Remission rate of aggressive behavior disturbance
- Incidence of aggressive behavior disturbance
- Remission rate of disruptive behavior disturbance
- Incidence of disruptive behavior disturbance

Nutrition/ Eating

- Incidence of Weight Loss
- Incidence of Weight Gain
- Prevalence of Dehydration

Cognitive Patterns

- Remission of Hallucinations
- Improvement of Cognitive Impairment
- Incidence of Cognitive …

Physical Functioning

- Improvement of ADL functioning
- Incidence of ADL functioning
- Improvement in Finance Management IADL
- Incidence in Finance Management IADL
- Improvement in Medication Management IADL
- Incidence in Medication Management IADL

Restraint Use

- Prevalence of Chemical Restraint Use
- Prevalence of Physical Restraint Use
- Prevalence of Seclusion Room Use

Clinical Management

- Prevalence of Extra-pyramidal Symptoms
- Prevalence of Rehospitalization ?
- Prevalence of Unauthorized Leaves of Absence
- Prevalence of Self-Injury (Non-suicidal)
- Prevalence of Pain without Analgesic Use or Pain Management
- Prevalence of Smoking/ Tobacco Addiction without an Offer of Therapy
- Prevalence of Signs of Substance Abuse without Therapy
- Prevalence of Psychotropic Medication Underuse