# Prevalence of Pain and receipt of Pain Management in Persons Receiving Inpatient Psychiatric Services in Ontario.

by

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## 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:** Pain significantly impacts health and quality of life but is often underreported and poorly managed among persons with mental illness.

**Objective:** The goal was to examine the prevalence of pain and receipt of pain management among individuals who have received inpatient psychiatric services in Ontario, and to identify characteristics associated with receipt of pain management.

**Methods:** Anonymized population-level data were analyzed from the Ontario Mental Health Reporting System, based on the interRAI Mental Health assessment. Pain prevalence was based on the interRAI Pain Scale with a score that is ≥1. Bivariate and multivariate analyses considered personal (age, sex), social (partner status, residence admitted from, financial trade off in previous month, reported trauma), functional (cognitive performance), and clinical (previous psychiatric admissions, highest number of alcoholic drinks in single sitting, substance use in last month, health instability, psychiatric diagnoses, intellectual or developmental disability, and multimorbidity) to identify factors linked to receiving pain management.

**Results:** Approximately 22% (n=69,529) experienced pain, but only 49% (n=34,470) of those in pain received pain management. At the multivariate level, several factors were significantly associated with increased odds of receiving pain management, including age 25–44 years (OR=1.164, 95% CI=1.096-1.236), 45-64 years (OR=1.219, 95% CI=1.147-1.295), financial trade-off (OR=1.185, 95% CI=1.113-1.260), use of opiates in the previous week (OR=1.751, 95% CI=1.661-1.845), self-reported trauma (OR=1.477, 95% CI=1.414-1.542), and a diagnosis of substance use disorder (OR=1.247, 95% CI=1.151-1.352). Conversely, residence prior to admission (hospital: OR=0.812, 95% CI=0.782-0.843); homeless: OR=0.816, 95% CI=0.739-0.901); correctional facility: OR=0.721, 95% CI=0.609-0.853), substance use in the last week

(inhalants: OR=0.667, 95% CI=0.534-0.833; stimulants: OR=0.919, 95% CI=0.850-0.994), psychiatric diagnoses (psychotic disorders: OR=0.701, 95% CI=0.644-0.764; bipolar disorders: OR=0.770, 95% CI=0.701-0.845; depressive disorders: OR=0.837, 95% CI=0.773-0.906; personality disorders: OR=0.765, 95% CI=0.689-0.849; medication-induced disorders: OR=0.604, 95% CI=0.411-0.887; intellectual or developmental disability: OR=0.848, 95% CI=0.775-0.928), and health instability (OR=0.733, 95% CI=0.703-0.763) were significantly associated with lower odds of pain management.

**Conclusion:** Less than half of those in pain received pain management. Current findings highlight personal, social, functional, clinical and service use factors are associated receipt of pain management. Future research should prioritize a holistic approach to care in inpatient psychiatry that includes appropriately addressing pain.

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## Chapter 1 Introduction

Pain is a complex experience that significantly impacts an individual's quality of life and functional capacity (Raja et al., 2020). Persons with mental illness are more likely to experience both acute and chronic pain, which can negatively impact overall functioning (Public Health Agency of Canada, 2012; Onwumere et al., 2022), lead to poor health outcomes, and reduce quality of life (Martinello & Matthews, 2015; Udo & Gash, 2012). Research has shown that individuals with mental illness receive inconsistent or inadequate pain assessment and management (Burton et al., 2016; Viprey et al., 2021). The experience of pain is frequently underreported among those with mental illness potentially due to fragmented systems of care (Hirdes et al., 2020), and stigma related to mental illness (Stubbs et al., 2014). This complicates effective pain management, which is essential to overall health and improved quality of life.

Despite growing awareness of prevalence of pain and mental health needs in Canada, limited research exists that specifically explores prevalence of pain and its treatment among those with mental illness (Health Canada, 2022; Public Health Agency of Canada, 2012). This study examines uses population-level data to examine the prevalence of pain and the receipt of pain management among persons with mental illness receiving inpatient psychiatric care in Ontario.

# Chapter 2 Literature Review

## Pain

Pain is defined by The International Association of the Study of Pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Raja et al., 2020). Pain may be related to any tissue, organ, or system such as musculoskeletal injuries, neurological conditions, and cancer. This primarily pertains to acute pain, which usually resolves as an individual heals, however in some cases pain can persist beyond the expected healing period (longer than 3 months) and is referred to as chronic pain (Health Canada, 2021). The perception of pain intensity represents a personal experience which can occur even when there is no visible injury or damage and may not always correlate with the extent of condition. Pain is strongly associated with psychological symptoms, such as mental illness, yet the causal pathway is not always clear. Effective approaches to manage pain can reduce severity, psychological symptoms and improve overall quality of life.

Painful conditions and illness are the leading global cause of years lived with disability (Stubbs et al., 2014). In Canada, the Canadian Pain Task Force estimated 7.6 million individuals live with chronic pain (Health Canada, 2021). According to Health Canada (2021) this number is expected to increase by 17.5% from 2019 to 2030 due to population aging. By 2030 as many as 9.0 million Canadians could be living with chronic pain. While pain can be experienced by all demographics, certain populations are more vulnerable to pain and its detrimental impacts. Older adults, women, indigenous peoples, those with mental illness, and those with lower socioeconomic status are disproportionately affected by pain (Health Canada, 2021). The prevalence of chronic pain increases with age, affecting 1 in 3 Canadians over the age of 65 years (Health Canada, 2021). These figures highlight the growing prevalence of pain in Canada

and urgent need for equitable, accessible and targeted pain management approaches.

The financial burden of pain is profound. In 2010, the cost associated with chronic pain the United States of America was between 560 and 635 billion dollars per annum (Gaskin & Richard, 2012). Similarly, the management of chronic back pain in the United Kingdom accounts for over 20% of healthcare expenditure (Stubbs et al., 2014). Thus, pain underscores not only a significant personal toll, but also a substantial economic impact, reinforcing the need for comprehensive and effective approaches to pain assessment, prevention, and management.

Accurate assessment of pain is crucial to understand, classify, and develop an appropriate approach for pain management (Coggins & Curtiss, 2013; Dalal & Bruera, 2011). It is important to note that the pain is not directly the condition that leads to verbalizations of pain, it is the physical and emotional response to pain (suffering) (Hirdes et al., 2011). Since pain is subjective and often invisible, self-reported assessments remain the gold standard of measurement. Self-report assessments commonly use categorical scales (e.g., mild, moderate, severe), numerical rating scales, visual analog scales, and verbal descriptor scales (Dalal & Bruera, 2011). However, challenges exist when assessing pain among persons with cognitive or communication impairments, which may lead to an underestimation of pain prevalence and, consequently undermanagement of pain (Robitaille et al., 2024). For example, a lower prevalence of pain was reported among long-term care residents with higher levels of cognitive impairment, despite no differences in the prevalence of pain-related conditions (Proctor & Hirdes, 2001). In instances where individuals have difficulty communicating pain, assessment of nonverbal pain behaviours (e.g., rapid blinking, distorted expressions, clenched teeth, eye narrowing or closure) become particularly helpful (Booker & Haedtke, 2016; Raja et al., 2020). Under-managed pain is often associated with several adverse outcomes and reduced quality of life (Proctor & Hirdes, 2001;

Raja et al., 2020; Robitaille et al., 2024).

In addition to poor health outcomes of individuals in pain, unmanaged pain is also associated with increased workload for healthcare staff and higher healthcare costs for individuals in pain (Dydyk & Conermann, 2025). Therefore, improved assessment protocols and staff training are crucial to ensure timely and effective relief for individuals in pain.

**Pain management**

Regardless of etiology, pain should be regarded as a vital indicator of quality of life, monitored on a regular basis (Hirdes et al., 2011). Pain management refers to a range of techniques to relieve and manage symptoms of pain (Health Canada, 2021; Dalal & Bruera, 2011; Fillingim et al., 2016). Chronic pain management often requires involvement of a multidisciplinary care team in assessment, evaluation, and treatment (Dalal & Bruera, 2011; Krashin et al., 2012). Ideally, approaches are individualized to recognize unique circumstances, such as medical history, comorbidities, pain severity, and duration, that are discussed with the person (and family as appropriate) (Krashin et al., 2012; Robitaille et al., 2024). However, selecting the most appropriate technique or combination of techniques remains challenging for individuals who present with complex, chronic pain profiles. Consequently, effective pain management relies on clinical expertise but also on ongoing assessment and collaboration with individuals to tailor interventions that address both physical symptoms and psychosocial dimensions of pain (Chen et al., 2014; Knopp-Sihota et al., 2022; Onwumere et al., 2022).

Management techniques include pharmacological approaches (i.e. analgesic and non-analgesic drugs) and nonpharmacological approaches (e.g., physical therapy, educational interventions) (Knopp-Sihota et al., 2022). Opium was first used as a solution for pain relief more than 400 years ago (Robitaille et al., 2024). Opioids are a class of natural semi-synthetic

drugs, widely prescribed and used to manage symptoms of pain providing rapid and substantial relief. These medications are often prescribed using the World Health Organization's 3-step pain ladder for increased drug potency and have been successfully utilized to treat pain in a variety of serious and complex illnesses (Hicks et al., 2025). However long-term use may lead to tolerance, dependence, drug toxicity and addiction and risk of misuse (de Kleijn et al., 2022; Moon et al., 2020). Increases in overdose and drug-related deaths in North America have heightened awareness around these risks (Health Canada, 2022). The lack of access to non-opioid pain options to treat pain and widespread market availability of opioids contribute to the association between opioid use and overdose (Health Canada, 2021).

Chronic experiences of pain and experiences of comorbid illnesses can lead to long-term opioid prescribing (Onwumere et al., 2022). Multiple observational studies suggest a dose-dependent association between long-term opioid treatment and poor health outcomes (e.g., heightened risk of myocardial infarction, fractures, and falls) (Papadomanolakis-Pakis et al., 2021). Additionally, certain individual characteristics such a history of substance use, substance use disorders, illicit opioid use, and certain psychiatric disorders can lead to an increased risk of opioid-related harms (Health Canada, 2022; Moon et al., 2020; Papadomanolakis-Pakis et al., 2021). For instance, substance use disorder affects 15.5 million people worldwide, with Canada experiencing a greater burden opioid-related morbidity and mortality. Papadomanolakis-Pakis and colleagues (2021) report that the age-standardized opioid-related disability-adjusted life year rate in Canada was 355.5 per 100,000 population in 2014, compared to the global rate of 193.2 per 100,000. Specifically, in inpatient mental health settings, the prevalence of substance use disorder tends to rise alongside pain frequency and intensity. Among those who report no pain, 25% have substance use disorder, compared to 33% of those who report pain (Hirdes et al.,

2011). Similarly, illicit substance use (e.g., opiate and cocaine) increases from 2% to 13% among those without pain and those with pain (Hirdes et al., 2011). Therefore, in the Canadian context understanding individual risk must be carefully assessed for pain management to minimize harm. A more nuanced, multidisciplinary approach to pain management, that prioritizes individual safety while relieving pain symptoms is needed.

On the other hand, as awareness of the opioid crisis has grown, healthcare providers are increasingly focused on balancing the legitimate need for pain control with strategies that reduce the potential for harm. However, efforts to reduce opioid related harms have led to unintended consequences for some people living with pain, including unmanaged pain, stigma in response to its use for pain management, and reduced access to opioids for appropriate pain relief (Chen et al., 2014; IsHak et al., 2018; Onwumere et al., 2022). Some Canadians have difficulties accessing opioids to manage their pain symptoms, while others have their opioid dose rapidly tapered or discontinued (Papadomanolakis-Pakis et al., 2021). Increased stigma and fear surrounding opioid use has compounded these challenges and created additional barriers for receipt of pain management (Moon et al., 2020; Papadomanolakis-Pakis et al., 2021).

In 2017, McMaster University published guidelines on the use of opioids to manage chronic non-cancer pain, considering the current opioid crisis (Health Canada, 2022). This report offers suggestions on optimization of nonopioid pharmacotherapy and nonpharmacologic therapy, before opioids are prescribed. However, in many cases, opioids are integrated into multimodal pain management approach to compliment non-pharmacological approaches to mitigate risk (Health Canada, 2022; de Kleijn et al., 2022; Papadomanolakis-Pakis et al., 2021). While considerable progress has been made in pharmacologic and nonpharmacologic approaches to alleviate pain (Health Canada, 2022; Robitaille et al., 2024), opioids offer a valuable approach to

pain management in a multidisciplinary setting (Hanson et al., 2023; Udo & Gash, 2012).

**Mental Illness**

Mental illness is defined as a significant reduction in a person's ability to function effectively over an extended period due to high levels of distress, changes in thinking, feelings of isolation, or disconnection (Public Health Agency of Canada, 2012). It can manifest in various forms, including significant disturbances in mood, thinking, and behavior, such as depression, anxiety disorders, schizophrenia, bipolar disorder, and substance use disorders (Public Health Agency of Canada, 2012)While the terms mental health and mental illness are often used interchangeably, mental health refers to a state of well-being, while mental illness is a diagnosable condition. Although most people will face mental health challenges at some point, not everyone will experience mental illness (Garrido et al., 2017; Kuno et al., 2000).

In 2019, the World Health Organization reported that 1 in 8 individuals worldwide were living with a mental illness. Since the 2019 COVID-19 pandemic, the prevalence of mental illness has risen significantly, with rates of depression and anxiety rising by 26% and 28%, respectively (World Health Organization, 2022). In Canada, 1 in 5 individuals or approximately 6.7 million will experience mental illness in their lifetime. By the age of 40, it is estimated that 1 in 2 Canadians will have or have had a mental illness (Public Health Agency of Canada (PHAC), 2012). In Ontario, the burden of disease related to mental illness and substance use is 1.5 times higher than all cancers put together and more than 7 times that of all infectious diseases (Public Health Agency of Canada, 2012.

While anyone can experience mental illness, several factors contribute to risk, such as genetic predispositions, environmental influences, and socio-economic challenges (Kuno et al., 2000; Onwumere et al., 2022; Sadath et al., 2023). Studies have also shown that some mental

illnesses, such as schizophrenia, bipolar disorder, depression, and attention deficit hyperactivity disorder, share overlapping genetic risk factors (Lu et al., 2021). Additionally, some of these conditions exhibit higher heritability than others, suggesting that genetic influence plays a more significant role in their development, while others may be more strongly shaped by environmental or epigenetic factors (Lu et al., 2021). Further environmental stressors such as financial instability, trauma, and social isolation can exacerbate mental health problems (Hanson et al., 2023; Sadath et al., 2023). The interplay between genetic and environmental factors is complex and may vary among disorders and illnesses, for example, some studies suggest that the heritability of mood and anxiety disorders may be lower than that of psychotic and neurodevelopmental disorders, indicating a larger role for environmental factors (Faraone & Larsson, 2019; Lu et al., 2021).

The Canadian Mental Health Association reports that access to mental health services and social supports is unevenly distributed across provinces and territories, with significant disparities particularly affecting racialized and Indigenous populations in Canada (Canadian Mental Health Association, 2024). When mental illness goes untreated or is inadequately managed, it can have a profound impact on an individual's life. It is estimated that individuals living with mental illness are more likely to die prematurely than the general population, with life expectancy reduced by 10 to 20 years (Chesney et al., 2014). There is growing recognition that people with mental illnesses often experience significantly poorer health outcomes than those without, frequently due to disparities in healthcare access and the added burden of medical comorbidities (Onwumere et al., 2022 & Viprey et al., 2020).

Generally, individuals diagnosed with a mental illness experience have a lower quality of life compared to their counterparts without mental illness. Quality of life encompasses an

individual's perceived wellbeing in relation to their health, psychological conditions, beliefs, interpersonal relationships, living condition, security, accessibility to medical care, and opportunities for recreation (Defar et al., 2023). It is widely recognized as an important indicator for assessing both the severity of illness and effectiveness of treatment interventions (Defar et al., 2023; Kutney-Lee et al., 2021).

**Pain, pain management and mental illness**

The dynamic interplay among pain and mental illness make it challenging to treat either condition independent of each other (Hirdes et al., 2011). Individuals with mental illness, are at increased risk to experience physical health problems and a high burden of pain yet are often under- or misdiagnosed. Perception of pain can be influenced by psychological and emotional factors of mental illness (Carrasco-Picazo et al., 2023; De La Rosa et al., 2024). This contributes to poor disease outcomes and health care inequities (Onwumere et al., 2022, Stubbs et al., 2014 & Viprey, 2020).

Effective pain management is essential to overall health and well-being but becomes particularly demanding when accompanied by comorbid mental illness. Those diagnosed with mental illness often encounter significant barriers to accessing care (Defar et al., 2023) and receive fragmented care from multiple settings (Hirdes et al., 2020). Velly and Mohit (2018) demonstrated that chronic pain has a negative impact on the persistence of psychiatric disorders, thus creating a cyclical relationship that complicates treatment outcomes. As such, addressing pain in the context of mental illness requires an integrated, multidisciplinary approach that considers both physical and psychological aspects (Hinrichs et al., 2022; Sadath et al., 2023).

Pain is a common occurrence for those with mental illness; however, some diagnoses are associated with higher rates and different health outcomes than other (Hirdes et al., 2011). The

remainder of this section provides a brief overview on pain and pain management among persons with different psychiatric diagnoses.

### *Mood and anxiety disorders*

***Depression.*** It is estimated that over 300 million people worldwide have depression, representing 4.4% of the global population (Aoyama et al., 2018). A strong association exists between depression and the experience of pain, often contributing to more severe and persistent pain symptoms (Aoyama et al., 2018; Cafarella et al., 2012). Physical symptoms are common in depression, often individuals with depression will report to primary care with symptoms of pain (Hirdes et al., 2011). Individuals with pain related to a medical condition are at elevated risk of developing depression (Hirdes et al., 2011). Estimates suggest that 65% of individuals with depression, will report pain in one or more areas of their body. Moreover, given that pain is associated with increased suicide risk among those with depression (Onwumere et al., 2022), managing pain becomes even more important. These findings emphasize the importance of addressing both pain and depression in treatment.

***Anxiety.*** Pain and anxiety often influence each other, where symptoms of anxiety often exacerbate perception of pain, and perception of pain often negatively impact symptoms of anxiety (Woo, 2010). Findings from Aaron and colleagues find that among 376 studies from 50 countries comprising 347,468 adult individuals with chronic pain, clinical symptoms of anxiety were present in 40.2%. Similarly, Hirdes and colleagues (2011) report that one third of individuals with anxiety disorder in inpatient mental health settings reported daily pain. Frequently, anxiety disorders are accompanied by physical sensations (e.g., heart palpitations, shortness of breath) which may alter and potentially amplify perception of physical pain (Woo, 2010). This overlap of somatic and emotional symptoms can complicate diagnosis and treatment,

often resulting worse health outcomes such as prolonged hospital stays, readmission for wound complications, and a greater mortality risk (Cafarella et al., 2012; De La Rosa et al., 2024; Woo, 2010).

Anxiety disorders often co-occur with depressive symptoms or depressive disorders (Woo, 2010). This common comorbidity is associated with increased experiences of pain and poorer health outcomes, compared to the general population (Pirl et al., 2012; Woo, 2010); it complicates clinical assessment and treatment and amplifies the burden of illness.

***Post traumatic stress disorder.*** Approximately 70% of individuals globally will experience a traumatic event during their lifetime, however, only 5.6% will develop post-traumatic stress disorder (PTSD). Chronic pain is reported in 10-50% of individuals diagnosed with PTSD (Gasperi et al., 2021). PTSD and chronic pain often co-occur, while pain can trigger or worsen symptoms of PTSD, PTSD can worsen the experience and management of pain (Feldman et al., 2014; Gasperi et al., 2021). The literature consistently demonstrates a strong co-occurrence between pain and PTSD, irrespective of whether pain is evaluated in individuals with PTSD or PTSD is assessed in those experiencing chronic pain (Donovan et al., 2019; Feldman et al., 2014).

Sleep disturbances, including nightmares and insomnia, are common health outcomes associated with comorbid PTSD and pain. For instance, a lack of sleep can cause increased risk factors of other health conditions and overall reduce quality of life (Gaetz et al., 2017). Additionally, persons with chronic pain and a history of trauma or PTSD may experience worse functional status, reduced quality of life, report greater distress, and demonstrate worse response and recovery to medical interventions (Gaetz, 2017; Gasperi et al., 2021). Persons with PTSD have a higher analgesic medication consumption (both opiate and non-opiate), as compared with

non-PTSD patients, further approaches to pain management in this population are yet to be explored (Schwartz et al., 2006).

### *Severe and persistent mental illnesses*

***Bipolar disorder.*** A meta-analysis from Stubbs and colleagues (2014) revealed that he prevalence of pain among 12,375, 644 individuals with bipolar disorder was 28.9%. The authors also reported that people with bipolar disorder are twice as likely to experience pain than those without bipolar disorder in the general population (RR=2.14, 95% CI=1.67-2.75%) (Stubbs et al., 2014). However, findings from Stubbs et al. (2014) and Onwumere at al. (2022) concur that little attention has been given to report and management of pain for persons with bipolar disorder. Yet, it is known that persons with severe and persistent mental illnesses such as bipolar disorder experience barriers to care, elevated risk of mortality, and a life expectancy 13-30 years shorter than the general population (Garrido et al., 2017; Hinrichs et al., 2022; Viprey et al., 2021). Reports of pain are often discounted in this population because of stigma, clinician fear of providing pain management, lack of advocacy, and insufficiency of care team support to appropriately assess and manage pain (Stubbs et al., 2014).

***Psychotic disorders.*** Findings from Stubbs and colleagues (2014) report that clinical symptoms of pain affect 1/3 of individuals with schizophrenia with age and sex-comparable controls. Similarly, Hirdes and colleagues report that 7% of individuals with psychotic disorders such as schizophrenia report daily pain, in inpatient mental health settings (Hirdes et al, 2011).

Individuals with psychotic disorders have been found to experience alterations in perception of pain. Meta-analyses of experimental studies reveal that adults with psychotic disorders have elevated pain thresholds and tolerance compared to adults with other mental illnesses (Onwumere et al., 2022). Early research from Kraepelin and Bleuler highlights that

individuals with schizophrenia have reduced sensitivity to bodily discomforts, as seen in behaviours such as self-injury and/or delayed seeking of medical attention when experiencing painful conditions (Carrasco-Picazo et al., 2023).

Certain core characteristics of psychotic disorders such as affective flattening, attention deficits, and sensory perceptive alterations influence how pain is perceived and expressed. These factors may contribute to the under reporting of pain during clinical assessment (Carrasco-Picazo et al., 2023; Stubbs et al., 2014). Previous research has found that 40% of persons with schizophrenia with clinical pain have not reported to their pain, but can describe it when prompted appropriately (Stubbs et al., 2014; Viprey et al., 2021).

Pain among those with mental illness have deleterious impacts on health and quality of life. However, the intersection of psychotic disorders and pain lead to worse health outcomes and deficits in health-related quality of life (Stubbs et al., 2014). The risk for myocardial infarction is elevated in this population, potentially due to the underreporting of pain symptoms. This underscores the development for appropriate pain management strategies in clinical settings (Shalev et al., 2020; Stubbs et al., 2014).

***Substance use disorders***

Substance use disorders, whether active or in remission, are frequently observed in persons with chronic pain (Chang & Compton, 2013). Estimates suggest that 50-60% of individuals with substance use disorders experience chronic pain (Wyse et al., 2021). Both substance use and pain are significant public health concerns associated with consequences, including increased healthcare costs, worse health outcomes, and reduced quality of life (Krashin et al., 2012; Wyse et al., 2021).

Often, persons with substance use disorder are at a greater risk for under-managed pain

than their counterparts without substance use disorder (Chang & Compton, 2013). Individuals who report pain in this population may experience barriers to appropriate care, including personal, healthcare provider concerns regarding adverse and addictive potentials of pharmacological interventions, or systemic barriers such as harm reduction policies (Krashin et al., 2012; Murnion, 2012; Sowicz et al., 2022). As a result of poor pain management in this population, untreated pain may contribute to relapse, poor engagement in care, and worse health outcomes (Sowicz et al., 2022).

For instance, those with opioid use disorder who are chronically using opioids may face unique challenges in managing pain as their baseline tolerance can complicate effective treatment. In these cases, typical dosing protocols may fall short, and apprehension about increasing doses can make care providers hesitant to adjust. Smith and colleagues (2021) remark that there is little guidance for the management of pain for individuals with opioid use disorder, with difficulties providing a balance providing pain relief while minimizing opioid-related harms. Furthermore, stigma associated with substance use disorders can potentially impact clinical judgement, often causing delays or denials of certain types of pain management interventions (de Kleijn et al., 2022; Papadomanolakis-Pakis et al., 2021). Despite the clear overlap between chronic pain and substance use disorders, there remains limited integration between substance use services and pain management, pointing to an urgent need for coordinated, trauma-informed, and individualized approaches to care.

**Barriers to recognition and management of pain**

Appropriate pain management for individuals with mental illness presents an array of challenges. Pain is a deeply subjective experience, and its recognition and management are often clouded by systemic, clinical, and social barriers (Hinrichs et al., 2022; Sadath et al., 2023). One

major barrier is diagnostic overshadowing, where an individual's physical symptoms may be misattributed to an existing diagnosis like a mental illness. This may lead to an under diagnosis or recognition of pain symptoms among those with mental illness, and consequently, failure to address pain.

Furthermore, pain management among those with mental illness hold a complex pathway due to the interplay between psychological and physical health symptoms. For instance, certain mental illnesses can alter pain perceptions, expression and reporting, making it difficult to accurately assess and manage (Onwumere et al., 2022). Severe and persistent mental illnesses such as schizophrenia or bipolar disorder are associated with elevated pain thresholds or dampened affective responses which may lead to underreporting or misinterpretation of symptoms (Carrasco-Picazo et al., 2023; Stubbs et al., 2014). Additionally, stigma, fragmented care systems and provider hesitancy, especially around opioid prescription can further complicate pain management for those with mental illnesses (de Kleijn et al., 2022; Papadomanolakis-Pakis et al., 2021). Overall, these challenges represent key barriers to recognizing and effectively managing pain among this vulnerable population.

**Gaps in the literature**

There is a growing recognition that effective pain assessment and management are challenges among individuals with mental illness. However, the existing body of literature presents notable gaps. Many studies rely on small, non-representative samples which often focus on specific psychiatric diagnoses such as depression or anxiety. This overlooks the broad array of mental illnesses, which restricts the overall understanding of how pain is experienced and treated across diverse populations with varying mental illness. Much of the literature is concentrated in an outpatient or community-based setting, with limited attention to inpatient psychiatric

environments. Also, few studies have explored these issues within a Canadian context. Differences in healthcare systems, policy frameworks, and population demographics mean that findings from international studies may not be directly applicable.

As such, there is a clear need for Canadian-based research that examines pain recognition and management among individuals with various types of mental illnesses, and within inpatient settings.

## Chapter 3 Research Questions and Objectives

Persons with mental illness represent a vulnerable population who disproportionality experience pain that is often underreported, stigmatized, and misunderstood, leading to mis- or unmanaged pain (Hirdes et al., 2020; Sadath et al., 2023; Shalev et al., 2020).

The literature on pain and mental illness provides a comprehensive overview of the prevalence in Canada, complexity of symptoms and comorbidities, and consequences when mismanaged. However, several gaps persist, such as limited work regarding mental illness comorbidities. For instance, most studies tend to focus on conditions in isolation rather than on multimorbidity (Garrido et al., 2017; Lavin et al., 2017; Proctor & Hirdes, 2001; Robitaille et al., 2024; Viprey et al., 2021). A lack of research overlooks the interaction among illnesses and their intersection to compound symptoms of pain, complicate diagnosis, and fragment effective treatment (Hicks et al., 2025; Hirdes et al., 2020; Stubbs et al., 2014). A fragmented and independent approach to view pain and mental illness limits the understanding regarding a full scope of an individual's needs to improve quality of life.

Additionally, research regarding persons with severe and persistent mental illnesses such as schizophrenia and bipolar disorder is limited, with pain under-recognized or misattributed (Carrasco-Picazo et al., 2023; Stubbs et al., 2014; Viprey et al., 2021). Recent research has demonstrated the need to identify persons with severe and persistent mental illness who experience pain and who could benefit from palliative care to manage pain (Burton et al., 2016; Feldman et al., 2014; Irwin et al., 2014; Udo & Gash, 2012; Viprey et al., 2021). Current assessments and approaches to care can contribute to delays in diagnosis and a misunderstanding of the complex interplay among comorbidities. The lack of studies with targeted research in this area highlights a critical gap in the literature and underscores the need for tailored assessments for a vulnerable and underserved group.

This project aims to provide a better understanding of the prevalence of pain and receipt of pain management services among persons with mental illness. In addition, this project intends to identify factors associated with receipt of pain management in this group.

As such, this study aims to:

1. Determine the prevalence of pain among individuals with mental illness admitted to inpatient psychiatric services in Ontario, and
2. Identify factors associated with receipt of pain management in inpatient psychiatric settings.

Understanding factors and characteristics that are associated with pain symptoms can provide a basis for further research and ground for evidence-based practice to provide an equitable and effective plan to manage pain.

# Chapter 4 Methods

## Ethics

This study relies on secondary analysis of existing anonymized data, which has received an ethics waiver from the Lakehead University Research Ethics Board as per Article 2.4 in the Tri-Council Policy Statement (TCPS2) (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council, 2022). Access to the anonymized data after submission of the TCPS2 certificate and signing a confidentiality form. Additionally, the present study does not disclose health information from the OMHRS database that would allow individual(s) or organization(s) to be identified or cross-matched with other databases through non-encrypted identifiers.

## Study Design

This study employs a cross-sectional design and is based on analysis of existing information on persons who received inpatient psychiatric services in Ontario, Canada.

## Data Source

The data used in this study are from the Ontario Mental Health Reporting System (OMHRS), which is based on the interRAI Mental Health (iMH) assessment instrument (Hirdes et al., 2020). The iMH is a standardized clinical instrument consisting of over 300 items targeting domains of personal demographic information, psychiatric diagnoses, social roles and relationships, physical health conditions and symptoms, mental health service history, service use, and informal support to care. Items on the iMH are organized into various scales, algorithms and protocols, grounded in recovery principles that support evidence-based individual care planning (Hirdes et al., 2020). This assessment is completed at admission to inpatient psychiatric services (when the stay is greater than 72 hours) and at discharge (if the stay lasts beyond 6

days), and a quarterly reassessment is completed every 90 days if still in hospital (Canadian Institute for Health Information, 2023).

### Study Population

The study population included all Ontarians aged 18 years or older admitted to inpatient psychiatric services in Ontario between October 1, 2005, and March 31, 2023 (n=312,440). For the purposes of this study, the admission assessment was used.

### Study Variables

All study variables are based on the iMH assessment tool and informed by the literature review.

#### *Outcome variables*

#### Pain

The Pain Scale was used to determine the presence of pain (Fries et al., 2001). This scale is based on two items related to presence and intensity of pain, and scores range from 0=No pain, 1=Less than daily pain, 2=Daily pain that is not severe, 3=Daily severe pain, and 4=Daily excruciating pain. Scores will be dichotomized to no pain (score=0) and any pain (score=1,2,3,4).

#### Receipt of Pain Management

Receipt of pain management interventions is coded as 0=No intervention, 1=Offered, but refused, 2=Not received, but scheduled in the next 7 days, and 3=Received in the last 7 days. A binary variable was created to indicate that pain was either a recognized need requiring intervention (codes 1,2) or had actually received intervention (code 3). The binary variable is therefore coded as 0=no intervention (code 0), and 1=Offered/Scheduled/Received pain management (codes 1,2,3).

#### *Predictive Variables*

**Biological Sex**

Sex is coded as Male, Female, or Other.

**Age**

Age (in years) is a variable in the dataset, derived using the assessment reference date and the birth date.

**Marital Status**

Marital status is documented as 1=Never married, 2=Married, 3=Partner/significant other,4=Widowed, 5=Separated, 6=Divorced. This item was recoded to indicate the presence of a partner. As such 0=No partner (codes 1,4,5,6) and 1=Partner (codes 2,3).

**Residence prior to admission (admitted from)**

Residence prior to admission is documented as 1=Private home/apartment/rented room, 2=Board and care, 3=Assisted living or semi-independent living, 4=Mental health residence, 5=Group home for persons with physical disabilities, 6=Facility/setting for persons with intellectual disabilities, 7=Psychiatric hospital or unit, 8=Homeless or without shelter, 9=Long term care facility (nursing home), 10=Rehabilitation unit/hospital, 11=Hospice, 12= Acute unit/hospital. 13=Correctional facility, 14=Other/unknown.

This item was recoded to group like residences together: 0= Private home (i.e., Private home/apartment/rented room), 1=Congregated living (i.e., Board and care, Assisted living or semi-independent living, Group home for persons with physical disabilities, Facility/setting for persons with intellectual disabilities), 2=Hospital setting (i.e., Mental health residence, Psychiatric hospital or unit, Long term care facility (nursing home), Rehabilitation unit/hospital, Hospice, Acute unit/hospital), 3=Homeless, 4= Correctional facility, 5=Other, 6=Unknown.

**Financial Trade off**

Presence of a financial trade-off is based on whether the person, due to limited funds, made trade-offs during the last 30 days among purchasing necessities such as food, shelter, clothing, prescribed medications, sufficient home heating or cooling, or necessary health care. It is coded as a dichotomous binary variable (0=no, 1=yes).

**Number of Previous Psychiatric Admissions**

The number of psychiatric admissions in the last 2 years (excluding the current admission) is recorded on the assessment. Answer options include 0=None, 1 =1-2, 2= 3 or more.

**Alcohol Use**

The highest number of drinks consumed in a single sitting in the last 14 days is recorded as follows: 0=zero, 1=one, 2=two to four drinks, 3=five or more.

**Substance Use**

Use of the following substances is recorded in the assessment: inhalants, hallucinogens, cocaine or crack, stimulants, opiates, cannabis. Each item is coded for recency of use: (0) never, (1) more than 1 year ago, (2) 31 days - 1 year ago, (3) 8-30 days ago, (4) 4-7 days ago, (5) in the last 3 days. A binary variable was created for use in the last week: 1=Yes (response codes 4 and 5) or 0=No (response codes 0, 1, 2, 3).

**Self-reported Trauma**

The assessment codes the recency of a variety of traumatic life events, from (0) never to (5) in the last 3 days. Events included: Serious accident or physical impairment, distressed about health of another person, death of close family member or friend, child custody issues, birth or adoption of child, conflict-laden or severed relationship, including divorce, failed or dropped out of education program, major loss of income or serious economic hardship due to poverty, review hearing—e.g., forensic, certification, capacity hearing, immigration, including refugee status,

lived in war zone or area of violent conflict, witnessed severe accident, disaster, terrorism, violence, or abuse, victim of crime, victim of sexual assault, victim of physical assault or abuse, victim of emotional abuse, parental abuse of alcohol or drug. If any of these life events are present, the extent to which the life event(s) invokes a sense of horror or intense fear is coded as 1=yes, 0=no or no traumatic life event, and 8=persons could not (would not) respond. This study will use the self-reported item to identify individuals who have trauma.

**Presence of Medical Multimorbidity in Active Diagnoses**

Medical diagnoses are captured using a list of specific diagnoses (i.e., asthma, diabetes mellitus, hypothyroidism, migraine, and traumatic brain injury). Each condition is coded using one of the following: (0) Not present; (1) Primary diagnosis; (2) Diagnosis present, receiving active treatment; or (3) Diagnosis present, monitored but no active treatment. For this study, the number of diagnoses endorsed as present and either being monitored or receiving active treatment (codes 1,2,3) will be summed to create a count of diagnoses among those listed. A multimorbidity variable was created based on the count of listed medical diagnoses: Multimorbidity=yes if the person has 2 or more medical diagnoses.

**Health Instability**

The Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) scale is a measure of health instability, based on several items related to symptoms (e.g., dyspnea, peripheral edema, vomiting, noticeable decrease in amount of fluids usually eaten or fluids consumed, and/or weight loss), presence of decline in cognition or self-care skills, and prognosis of six or fewer months to live (Hirdes et al., 2003). Greater scores are associated with adverse health outcomes such as mortality, hospitalization, pain, and caregiver stress (Hirdes et al., 2020). Scores may range from 0-4, and a score of 2 or more has been used to indicate the

presence of health instability (Hirdes et al., 2020). This study employs that same cut-off to indicate presence of health instability (0=CHESS 0 or 1; 1=CHESS 2, 3, or 4).

**Psychiatric diagnosis**

The assessment includes information on DSM-IV provisional diagnostic categories, which are based on a diagnosis by a psychiatrist or attending physician. The diagnostic categories include: (a) Disorders of childhood or 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 else classified, (o) Adjustment disorders, and (p) Personality Disorders.

Assessors indicate not only the presence of each diagnosis but also provide a ranking of their contribution to the current psychiatric admission. For the purposes of this study, a binary variable will be used to indicate the presence or absence of the psychiatric diagnosis. As such, a diagnosis will be considered not present if coded as (0) Not present or (8) No provisional diagnosis and coded as present if the diagnosis is coded as any of the following: (1) Most important, (2) Second most important, (3) Third most important, or (4) Less important.
The assessment codes whether the person has an intellectual disability (0. No, 1. Yes) and this item will also be used.

**Cognitive impairment**

A Cognitive Performance Scale is embedded in the assessment, using the following variables: decision making, making self-understood (i.e., expressive communication), short-term

memory, and eating performance (Morris et al., 1994). Scale scores range from 0 to 6, where 0=Intact, 1=Borderline intact, 2=Mild impairment, 3=Moderate impairment, 4=Moderately severe, 5=Severe Impairment, 6=Very severe impairment. For this project, responses will be coded as intact (0), Borderline intact to Mild impairment (1,2), and Moderate impairment to very severe impairment (3,4,5,6).

**Analysis**

All statistical analyses were conducted using SAS 9.4 software. A preliminary data cleaning step was first completed to ensure data accuracy and removal of duplicate individuals, additionally missing values for variables were not included.

Descriptive analyses inform on the overall characteristics of the sample for each variable of interest, the proportion of individuals who report pain, and the proportion of people with pain who receive pain management. Prior to multivariate model estimation, multicollinearity among independent predictor variables was assessed to ensure model stability. A correlation matrix and variance inflation factor (VIF) values were calculated, with a threshold of 5 used to identify collinearity (Schreiber-Gregory, 2017). Variables exceeding this threshold were removed before inclusion in the final model. Pearson's chi-square tests were used to determine if there were significant differences in the characteristics of persons with and without pain. Bivariate logistic regression models inform the unadjusted relationship among individual predictor variables and receipt of pain management. Simultaneous multivariate logistic regression modelling will inform the adjusted relationship among all predictor variables and receipt of pain management at an alpha level of 0.05 for statistical significance. Model fit was evaluated using the -2 Log Likelihood statistic, Akaike Information Criterion (AIC), and Schwarz Criterion (SC). Additionally, the Max R-squared value was calculated to serve as a benchmark for model fitness.

# Chapter 5 Results

## Population Characteristics

*Overall population characteristics*

This study included 312,440 unique individuals who received inpatient psychiatric care between October 1, 2005, and March 31, 2023. Table 1 presents personal demographic information, socioeconomic factors, psychiatric diagnoses, physical health conditions, mental health service history of the overall population, and stratified by reports of pain.

Among the overall population, the largest proportion (36.2%) were between the ages of 25-44, male (51.4%), and did not have a partner (70.5%). Most had been admitted from either a private home (49.4%) or a hospital setting (27.8%), and over half (58.3%) had no previous psychiatric admissions in the last 2 years. Approximately 5.1% of the population reported they have made a financial trade off in the last month.

Almost three quarters (72.1%) reported having zero drinks in the last 2 weeks, though 29.2% reported using a substance in the last week, where cannabis use was the most prevalent (23.4%). Approximately 11.6% reported trauma, and the most common psychiatric diagnoses included depressive disorders (16.9%), psychotic disorders (16.1%), and substance use disorders (13.7%); 3.9% had an intellectual or development disability. Overall, relatively few had multimorbidity (3.3%) and 12.8% showed signs of health instability. Most showed no sign of cognitive impairment (68.7%).

*Population characteristics by presence of pain compared to those without*

Of the 312,400 individuals receiving inpatient services, 22.2% (n=69,529) experienced pain. Those with and without pain differed on all characteristics, except for use of inhalants (p=.80) and diagnoses of dissociative (p=.16), eating (p=.80), sexual (p=.09), personality (p=.83), and paraphilic (p=.226) disorders. Compared to those without pain, persons with pain

were older (38.7% aged 45-64 years vs 29.5%; 21.2% aged 65+ years vs 14.2%), female (54.1% vs. 47.0%) and had partners (33.6% vs 28.4%).

Fewer persons with pain had been admitted from a private home (47.6% vs. 49.9%) or hospital setting (26.3% vs 28.2%) and more had been admitted from a congregate living setting (3.4% vs. 2.5%) than those without pain. There was a higher proportion of people with pain who had made financial trade-offs (6.9% vs 4.4%) and more who had no previous psychiatric admission in the last 2 years (60.1% vs 57.7%). Additionally, a greater proportion of those with pain reported drinking 5 or more drinks in a single sitting (16.8% vs. 14.0%), and fewer reported no episodic drinking (69.8% vs 72.7%). More individuals in pain reported using cocaine (8.8% vs 6.9%), stimulants (5.2% vs. 4.3%), opiates (11.7% vs. 3.5%), and any substance (32.6% vs 28.1%), whereas fewer reported using hallucinogens (1.2% vs. 1.4%) in the previous week. There was a higher proportion of individuals with pain who reported trauma (16.7% vs. 10.0%).

Fewer persons in pain had a diagnosis of neurodevelopmental disorders (1.2% vs. 1.8%), psychotic disorders (10.7% vs. 17.6%), bipolar disorder (6.5% vs. 8.0%), obsessive compulsive disorder (0.6% vs. 0.9%), and impulse disorder (0.3% vs. 0.5%). However, a greater proportion of those in pain had a diagnosis of depressive disorders (17.2% vs. 16.8%), anxiety disorders (6.2% vs. 5.9%), post-traumatic stress disorder (5.4% vs. 3.8%), somatic disorders (0.5% vs. 0.2%), substance use disorder (15.1% vs 13.2%), and neurocognitive disorder (4.2% vs. 2.7%). Additionally, fewer individuals in pain had an intellectual or developmental disability (3.3% vs. 3.9%), demonstrated signs of health instability (4.4% vs. 8.4%), or had intact cognitive impairment (63.4% vs. 70.2%), while more individuals in pain had borderline intact - mild impairment (26.4% vs. 21.8%), and moderate – very severe impairment (10.2% vs. 8.0).

**Table 1 Population Characteristics by Pain Status**

| Characteristics | All N=312,440 N (%) | No Pain N=242,911 N (%) | Pain N=69,529 N (%) | Test statistic | p-value |
|---|---|---|---|---|---|
| **Age** | | | | $\chi^2$(df=3)=7134.40 | <0.0001 |
| Under 25 | 51363 (16.45%) | 45502 (18.74%) | 5861 (8.43) | | |
| 25-44 | 113137 (36.23%) | 91144 (37.54%) | 21993 (19.44%) | | |
| 45-64 | 98514 (31.54%) | 71633 (29.50%) | 26881 (38.68%) | | |
| 65+ | 49294 (15.78%) | 34535 (14.22%) | 14759 (21.24%) | | |
| **Sex** | | | | $\chi^2$(df=2)=1084.69 | <0.0001 |
| Male | 160474 (51.36%) | 128592 (52.9%) | 31882 (45.9%) | | |
| Female | 1511834 (48.60%) | 114222 (47.0%) | 37612 (54.1%) | | |
| Other | 132 (0.04%) | 97 (0.04%) | 35 (0.1%) | | |
| **Has a partner** | 92264 (29.5%) | 68873 (28.4%) | 23391(33.6%) | $\chi^2$(df=1)=726.94 | <0.0001 |
| **Admitted from** | | | | $\chi^2$(df=5)=615.58 | <0.0001 |
| Private home | 154247 (49.4%) | 121100 (49.9%) | 33147 (47.6%) | | |
| Congregated living | 8466 (2.7) | 6115 (2.5%) | 2351 (3.4%) | | |
| Hospital setting | 86826 (27.8%) | 68523 (28.2%) | 18303 (26.3%) | | |
| Homeless | 7646 (2.5%) | 5834 (2.4%) | 1812 (2.6%) | | |
| Correctional facility | 3031 (1.0%) | 2438 (1.0%) | 593 (0.8%) | | |
| Other | 6697 (2.14%) | 5037 (2.1%) | 1660 (2.4%) | | |
| **Financial trade-offs in last month** | 15773 (5.1%) | 10926 (4.4%) | 4847 (6.9%) | $\chi^2$(df=1)=686.34 | <0.0001 |
| **Psychiatric admissions-last 2yrs** | | | | $\chi^2$(df=2)=131.64 | <0.0001 |
| None | 182021 (58.3%) | 140219 (57.7%) | 41802 (60.1%) | | |
| 1-2 | 97269 (31.2%) | 76462 (31.5%) | 20807 (29.9%) | | |
| 3+ | 33150 (10.6%) | 26230 (10.7%) | 6920 (9.9%) | | |
| **Highest # of alcoholic drinks (single sitting)** | | | | $\chi^2$(df=3)=349.19 | <0.0001 |
| None | 225167 (72.1%) | 176629 (72.7%) | 48538 (69.8%) | | |
| 1 | 12442 (4.0%) | 9526 (3.9%) | 2916 (4.2%) | | |
| 2-4 | 29041 (9.3%) | 22635 (9.3%) | 6406 (9.2%) | | |
| 5+ | 45790 (14.7%) | 34121 (14.0%) | 11669 (16.8%) | | |

**Table 1 Population Characteristics by Pain Status – CONTINUED**

| Characteristics | All N=312,440 N (%) | No Pain N=242,911 N (%) | Pain N=69,529 N (%) | Test statistic | p-value |
|---|---|---|---|---|---|
| **Substance use in the last week** | | | | | |
| Inhalants | 1541 (0.5%) | 1194 (0.5%) | 347 (0.5%) | $\chi^2$(df=1)=0.047 | 0.8276 |
| Hallucinogen | 4144 (1.3%) | 3329 (1.4%) | 815 (1.2%) | $\chi^2$(df=1)=16.14 | <0.0001 |
| Cocaine | 22945 (7.3%) | 16836 (6.9%) | 6109 (8.8%) | $\chi^2$(df=1)=273.25 | <0.0001 |
| Stimulants | 14048 (4.5%) | 10429 (4.3%) | 3619 (5.2%) | $\chi^2$(df=1)=104.57 | <0.0001 |
| Opiates | 16802 (5.4%) | 8653 (3.5%) | 8149 (11.7%) | $\chi^2$(df=1)=7062.55 | <0.0001 |
| Cannabis | 73123 (23.4) | 57123 (23.5%) | 16000 (23.0%) | $\chi^2$(df=1)=7.70 | 0.0056 |
| Any substance | 91088 (29.2%) | 68401 (28.1%) | 22687 (32.6%) | $\chi^2$(df=1)=521.89 | <0.0001 |
| **Reported Trauma** | 36074 (11.6%) | 24470 (10.0%) | 11604 (16.7%) | $\chi^2$(df=1)=2316.09 | <0.0001 |
| **Psychiatric diagnoses** | | | | | |
| Neurodevelopmental disorder | 5276 (1.7%) | 4425 (1.8%) | 851 (1.2%) | $\chi^2$(df=1)=116.57 | <0.0001 |
| Psychotic disorder | 50304 (16.1%) | 42870 (17.6%) | 7434 (10.7%) | $\chi^2$(df=1)=1935.18 | <0.0001 |
| Bipolar disorder | 23967 (7.7%) | 19468 (8.0%) | 4499 (6.5%) | $\chi^2$(df=1)=181.33 | <0.0001 |
| Depressive disorder | 52685 (16.9%) | 40757 (16.8%) | 11928 (17.2%) | $\chi^2$(df=1)=5.48 | 0.0193 |
| Anxiety disorder | 18652 (6.0%) | 14347 (5.9%) | 4305 (6.2%) | $\chi^2$(df=1)=7.75 | 0.0051 |
| Obsessive compulsive disorder | 2546 (0.8%) | 2126 (0.9%) | 420 (0.6%) | $\chi^2$(df=1)=49.01 | <0.0001 |
| Post traumatic stress disorder | 13082 (4.2%) | 9318 (3.8%) | 3764 (5.4%) | $\chi^2$(df=1)=335.81 | <0.0001 |
| Dissociative disorder | 222 (0.07%) | 164 (0.07%) | 58 (0.1%) | $\chi^2$(df=1)=1.92 | 0.1652 |
| Somatic disorder | 682 (0.2%) | 369 (0.2%) | 313 (0.5%) | $\chi^2$(df=1)=220.83 | <0.0001 |
| Eating disorder | 2042 (0.7%) | 1583 (0.6%) | 459 (0.7%) | $\chi^2$(df=1)=0.01 | 0.8068 |
| Elimination disorder | 48 (0.02%) | 28 (0.01%) | 20 (0.02%) | $\chi^2$(df=1)=10.45 | 0.0012 |
| Sleep disorder | 376 (0.1%) | 263 (0.1%) | 113 (0.2%) | $\chi^2$(df=1)=13.24 | 0.0003 |
| Sexual disorder | 50 (0.02%) | 39 (0.01%) | 11 (0.01%) | $\chi^2$(df=1)=0.00 | 0.9656 |
| Gender disorder | 245 (0.1%) | 216 (0.1%) | 29 (0.04%) | $\chi^2$(df=1)=15.97 | <0.0001 |
| Impulse disorder | 1398 (0.5%) | 1146 (0.5%) | 252 (0.3%) | $\chi^2$(df=1)=14.79 | 0.0001 |
| Substance use disorder | 42809 (13.7%) | 32291 (13.2%) | 10518 (15.1%) | $\chi^2$(df=1)=152.92 | <0.0001 |
| Neurocognitive disorder | 9637 (3.1%) | 6713 (2.7%) | 2924 (4.2%) | $\chi^2$(df=1)=376.37 | <0.0001 |
| Personality disorder | 15412 (4.9%) | 11972 (4.9%) | 3440 (1.4%) | $\chi^2$(df=1)=0.052 | 0.83281 |
| Paraphilic disorder | 109 (0.03%) | 90 (0.03%) | 19 (0.0%) | $\chi^2$(df=1)=1.46 | 0.226 |
| Medication induced disorder | 445 (0.1%) | 326 (0.1%) | 119 (0.2%) | $\chi^2$(df=1)=5.19 | 0.0227 |
| Other disorder | 3155 (1.0%) | 2542 (1.0%) | 613 (0.9%) | $\chi^2$(df=1)=14.67 | 0.0001 |

**Table 1 Population Characteristics by Pain Status – CONTINUED**

| Characteristics | All N=312,440 N (%) | No Pain N=242,911 N (%) | Pain N=69,529 N (%) | Test statistic | p-value |
|---|---|---|---|---|---|
| **Intellectual or developmental disability** | 11836 (3.8%) | 9559 (3.0%) | 2277 (0.7%) | $\chi^2$(df=1)=64.36 | <0.0001 |
| **Multimorbidity** | 10386 (3.3%) | 7550 (2.4%) | 2836 (0.9%) | $\chi^2$(df=1)= 967.09 | <0.0001 |
| **Health instability (CHESS 2+)** | 39860 (12.8%) | 26261 (8.4%) | 13599 (4.4%) | $\chi^2$(df=1)=3712.76 | <0.0001 |
| **Cognitive Impairment** | | | | $\chi^2$(df=2)=1151.22 | <0.0001 |
| Intact | 214525 (68.7%) | 170423 (70.2%) | 44102 (63.4%) | | |
| Borderline intact-mild impairment | 71309 (22.8%) | 52994 (21.8%) | 18315 (26.4%) | | |
| Moderate or worse impairment | 26576 (8.5%) | 19471 (8.0%) | 7105 (10.2%) | | |

*Pain management*

Of the 69,529 individuals with pain, 49% (n=34,069) were offered or received pain management. Table 2 presents both unadjusted and adjusted odds ratios for offer or receipt of pain management among individuals who have reported pain.

***Factors associated with pain management in unadjusted (bivariate) regression models***

At the bivariate level, several factors were significantly associated with receipt of pain management. Factors associated with higher odds include: age 25-44 years (OR=1.226, 95% CI=1.157-1.299) and 45-64 years (OR=1.254, 95% CI= 1.184-1.327); not having a partner (OR=1.052, 95% CI=1.020-1.086); making financial trade-offs (OR=1.371, 95% CI=1.293-1.455); having one (OR=1.117, 95% CI= 1.036-1.204) and 5+ (OR=1.294, 95% CI=1.243-1.348) drinks in a single sitting; use of cocaine (OR=1.261, 95% CI= 1.196-1.329), stimulants (OR=1.201, 95% CI= 1.123-1.284) opiates (OR=1.917, 95% CI=1.828-2.011), cannabis (OR=1.096, 95% CI=1.058-1.135) or any substance (OR=1.304, 95% CI=1.264-1.346) in the previous week; reporting trauma (OR=1.679, 95% CI=1.612, 1.749); diagnosed anxiety disorders (OR=1.117, 95% CI=1.050-1.188), post-traumatic stress disorder (PTSD; OR=1.369, 95% CI= 1.281-1.463), somatic disorders (OR=1.323, 95% CI=1.058-1.656), eating disorders (OR=1.295, 95% CI=1.076-1.558), substance use disorder (OR=1.372, 95% CI= 1.316-1.430); and borderline intact to mild cognitive impairment (OR=1.048, 95% CI=1.130, 1.085). Conversely, the following were associated with significantly lower odds of pain management: admitted from congregated living (OR=0.744, 95% CI=0.684-0.809), hospital settings (OR=0.726, 95% CI=0.700-0.753), homeless (OR=0.855, 95% CI= 0.777-0.939), and correctional facilities (OR=0.617, 95% CI=0.523-0.727); 1-2 (OR=0.939, 95% CI=0.908-0.971) and 3+ (OR=0.841, 95% CI=0.799-0.885) previous psychiatric admissions; use of inhalants in the last week

(OR=0.766, 75% CI=0.619-0.948); diagnosed neurodevelopmental (OR=0.827, 95% CI=0.722-0.947), psychotic (OR=0.673, 95% CI=0.641-0.707), bipolar (OR=0.775, 95% CI= 0.729-0.824), depressive (OR=0.947, 95% CI=0.910-0.985), neurocognitive (OR=0.880, 95% CI=0.817-0.948), personality (OR=0.849, 95% CI=0.793-0.910), and medication-induced (OR=0.596, 95% CI=0.411-0.865) disorders; presence of intellectual or developmental disability (OR=0.687, 95% CI=0.705,0.835); and a moderate to very severe cognitive impairment (OR=0.926, 95% CI=0.880, 0.973).

*Factors associated with pain management in the adjusted (multivariate) regression model*

Examination of multicollinearity revealed that use of any substance in the last week had a VIF of 6.03, exceeding the threshold of 5. As a result, any substance was excluded from the multivariate model to improve model stability and interpretability. The multivariate model had a −2 Log likelihood of 93598.747, compared to 96334.063 for the intercept-only model. This improvement in model fit was statistically significant ($p < 0.001$), indicating that the covariates improved the model. The Max-rescaled R-squared value of 0.0515, with the model explaining about 5% of the variation in the outcome. This suggests the predictors provide meaningful, though not exhaustive, explanatory value. Additionally, AIC and SC values for the full model (AIC = 93704.747; SC = 94189.643) were lower than for the intercept-only model supporting the model fit.

In the multivariate model, several factors remained significantly associated with receipt of pain management among those in pain. Factors associated with higher odds include: ages 25-44 years (OR=1.164, 95% CI=1.096-1.236) and 45-64 years (OR=1.219, 95% CI=1.147-1.295), having no partner (OR=1.035, 95% CI=1.035-1.070), making a financial trade off in the previous month (OR=1.185, 95% CI=1.113-1.260), having 5+ drinks in a single sitting (OR=1.102, 95%

CI= 1.054-1.152), use of opiates (OR=1.751, 95% CI=1.661-1.845), reporting trauma (OR=1.477, 95% CI=1.414-1.542), diagnosis of post-traumatic stress disorder (OR=1.114, 95% CI=1.006- 1.233) substance use disorders (OR=1.247, 95% CI=1.151- 1.352), presence of borderline intact to mild cognitive impairment (OR=1.120, 95% CI=1.079-1.162) and moderate or worse cognitive impairment (OR=1.074, 95% CI= 1.009-1.13).

Among individuals who reported pain, several factors were significantly associated with lower odds of receiving pain management services at the multivariate level. These factors include: residing in a congregated living setting (OR=0.897, 95% CI=0.819-0.982), hospital setting (OR=0.812, 95% CI= 0.782-0.843), homelessness (OR=0.816, 95% CI=0.739-0.901), and correctional facilities (OR=0.721, 95% CI= 0.609-0.853); or 3+ previous psychiatric admissions (OR=0.880, 95% CI=0.834-0.928); use of inhalants (OR=0.667, 95% CI=0.534-0.833) and stimulants (OR=0.919, 95% CI=0.850-0.994) in the last week; diagnosis of psychotic disorders (OR=0.701, 95% CI=0.644-0.764), bipolar disorders (OR=0.770, 95% CI=0.701-0.845), depressive disorders (OR=0.837, OR=0.773-0.906), personality disorders (OR=0.765, 95% CI=0.689-0.849), medication induced disorders (OR=0.604, 95% CI=0.411-0.887), and paraphilic disorders (OR=0.301, 95% CI=0.105-0.863); having an intellectual or developmental disability (OR=0.848, 95% CI=0.775-0.928), and health instability (OR=0.733, 95% CI=0.704-0.763).

Certain factors associated with pain management at the bivariate level did not retain their significance in the multivariate model (i.e., not having a partner; having 1 drink in a single sitting; having 1-2 previous psychiatric admissions in the last two years, use of cocaine, cannabis and stimulants; and diagnoses of neurodevelopmental, anxiety, somatic and eating disorders).

**Table 2 Results of Unadjusted and Adjusted Regressions**

| Variables | Unadjusted | | | | Adjusted | | | |
|---|---|---|---|---|---|---|---|---|
| | OR | 95% CI | | P-value | OR | 95% CI | | P-value |
| **Age (ref=under 25)** | | | | | | | | |
| 25-44 years | 1.226 | 1.157 | 1.299 | <0.0001 | 1.164 | 1.096 | 1.236 | <0.0001 |
| 45-64 years | 1.254 | 1.184 | 1.327 | <0.0001 | 1.219 | 1.147 | 1.295 | <0.0001 |
| 65+ | 0.975 | 0.918 | 1.036 | 0.4155 | 0.997 | 0.930 | 1.069 | 0.9321 |
| **Sex (ref=male)** | | | | | | | | |
| Female | 1.010 | 0.980 | 1.040 | 0.5250 | 1.025 | 0.994 | 1.058 | 0.1193 |
| **No partner (ref=partnered)** | 1.052 | 1.020 | 1.086 | 0.0015 | 1.035 | 1.001 | 1.070 | 0.0462 |
| **Admitted from (ref=private home)** | | | | | | | | |
| Congregated living | | | | | | | | |
| Hospital setting | 0.744 | 0.684 | 0.809 | <0.0001 | 0.897 | 0.819 | 0.982 | 0.0191 |
| Homeless | 0.726 | 0.700 | 0.753 | <0.0001 | 0.812 | 0.782 | 0.843 | <0.0001 |
| Correctional facility | 0.855 | 0.777 | 0.939 | 0.0011 | 0.816 | 0.739 | 0.901 | <0.0001 |
| Other | 0.617 | 0.523 | 0.727 | <0.0001 | 0.721 | 0.609 | 0.853 | 0.0001 |
| | 0.949 | 0.860 | 1.048 | 0.3014 | 0.964 | 0.872 | 1.06 | 0.4725 |
| **Made financial trade-offs in the last month** | 1.371 | 1.293 | 1.455 | <0.0001 | 1.185 | 1.113 | 1.260 | <0.0001 |
| **Previous psychiatric admissions (ref=none)** | | | | | | | | |
| 1-2 | 0.939 | 0.908 | 0.971 | 0.0002 | 0.967 | 0.935 | 0.999 | 0.0568 |
| 3+ | 0.841 | 0.799 | 0.885 | <0.0001 | 0.880 | 0.834 | 0.928 | <0.0001 |
| **Highest # of alcoholic drinks in a single sitting (ref=none)** | | | | | | | | |
| 1 | 1.117 | 1.036 | 1.204 | 0.0038 | 1.044 | 0.967 | 1.127 | 0.2727 |
| 2-4 | 1.051 | 0.997 | 1.107 | 0.0634 | 0.969 | 0.917 | 1.023 | 0.2517 |
| 5+ | 1.294 | 1.243 | 1.348 | <0.0001 | 1.102 | 1.054 | 1.152 | <0.0001 |
| **Substance use in last week** | | | | | | | | |
| Inhalants | 0.766 | 0.619 | 0.948 | 0.0141 | 0.667 | 0.534 | 0.833 | 0.0004 |
| Hallucinogens | 1.040 | 0.906 | 1.194 | 0.5752 | 0.882 | 0.759 | 1.024 | 0.0983 |
| Cocaine | 1.261 | 1.196 | 1.329 | <0.0001 | 0.983 | 0.924 | 1.045 | 0.5761 |
| Stimulants | 1.201 | 1.123 | 1.284 | <0.0001 | 0.919 | 0.850 | 0.994 | 0.0353 |
| Opiates | 1.917 | 1.828 | 2.011 | <0.0001 | 1.751 | 1.661 | 1.845 | <0.0001 |
| Cannabis | 1.096 | 1.058 | 1.135 | <0.0001 | 0.980 | 0.941 | 1.022 | 0.3473 |
| Any substance | 1.304 | 1.264 | 1.346 | <0.0001 | -- | -- | -- | -- |

**Table 2 Results of Unadjusted and Adjusted Regressions - CONTINUED**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Reports trauma** | 1.679 | 1.612 | 1.749 | <0.0001 | 1.477 | 1.414 | 1.542 | <0.0001 |
| **Psychiatric diagnoses** | | | | | | | | |
| Neurodevelopmental disorders | 0.827 | 0.722 | 0.947 | 0.0062 | 0.877 | 0.745 | 1.033 | 0.1154 |
| Psychotic disorders | 0.673 | 0.641 | 0.707 | <0.0001 | 0.701 | 0.644 | 0.764 | <0.0001 |
| Bipolar disorders | 0.775 | 0.729 | 0.824 | <0.0001 | 0.770 | 0.701 | 0.845 | <0.0001 |
| Depressive disorder | 0.947 | 0.910 | 0.985 | <0.0001 | 0.837 | 0.773 | 0.906 | <0.0001 |
| Anxiety disorder | 1.117 | 1.050 | 1.188 | 0.0004 | 0.958 | 0.866 | 1.060 | 0.4034 |
| Obsessive compulsive disorder | 0.951 | 0.785 | 1.152 | 0.6095 | 0.892 | 0.721 | 1.104 | 0.2936 |
| Post-traumatic stress disorder | 1.369 | 1.281 | 1.463 | <0.0001 | 1.114 | 1.006 | 1.233 | 0.0374 |
| Dissociative disorder | 0.827 | 0.493 | 1.388 | 0.4716 | 0.740 | 0.433 | 1.264 | 0.2704 |
| Somatic disorders | 1.323 | 1.058 | 1.656 | 0.0142 | 1.228 | 0.965 | 1.562 | 0.0954 |
| Eating disorders | 1.295 | 1.076 | 1.558 | 0.0062 | 0.999 | 0.812 | 1.229 | 0.9956 |
| Elimination disorders | 1.242 | 0.515 | 2.998 | 0.6292 | 1.286 | 0.527 | 3.137 | 0.5801 |
| Sleep disorders | 1.193 | 0.824 | 1.728 | 0.3500 | 1.101 | 0.749 | 1.619 | 0.6251 |
| Sexual disorders | 0.382 | 0.101 | 1.439 | 0.1549 | 0.355 | 0.092 | 1.370 | 0.1329 |
| Gender disorders | 0.720 | 0.344 | 1.508 | 0.3842 | 0.807 | 0.375 | 1.736 | 0.5830 |
| Impulse disorders | 0.827 | 0.645 | 1.060 | 0.1341 | 0.846 | 0.647 | 1.105 | 0.2200 |
| Substance use disorders | 1.372 | 1.316 | 1.430 | <0.0001 | 1.247 | 1.151 | 1.352 | <0.0001 |
| Neurocognitive disorders | 0.880 | 0.817 | 0.948 | 0.0007 | 1.015 | 0.913 | 1.129 | 0.7810 |
| Personality disorders | 0.849 | 0.793 | 0.910 | <0.0001 | 0.765 | 0.689 | 0.849 | <0.0001 |
| Paraphilic disorders | 0.364 | 0.131 | 1.009 | 0.0522 | 0.301 | 0.105 | 0.863 | 0.0255 |
| Other disorders | 0.871 | 0.734 | 1.022 | 0.0908 | 0.847 | 0.710 | 1.010 | 0.0644 |
| Medication induced disorders | 0.596 | 0.411 | 0.865 | 0.0065 | 0.604 | 0.411 | 0.887 | 0.0101 |
| **Intellectual/Developmental disability (IDD)** | 0.767 | 0.705 | 0.835 | <0.0001 | 0.848 | 0.775 | 0.928 | 0.0003 |
| **Multimorbidity** | 1.020 | 0.926 | 1.124 | 0.6871 | 0.994 | 0.899 | 1.100 | 0.9104 |
| **Health instability (CHESS 2+) (ref=CHESS 0 or 1)** | 1.338 | 1.288 | 1.389 | <0.0001 | 0.733 | 0.704 | 0.763 | <0.0001 |
| **Cognitive impairment (ref=intact)** | | | | | | | | |
| Borderline intact-mild impairment | 1.048 | 1.130 | 1.085 | 0.0075 | 1.120 | 1.079 | 1.162 | <0.0001 |
| Moderate or worse impairment | 0.926 | 0.880 | 0.973 | 0.0026 | 1.074 | 1.009 | 1.143 | 0.0250 |

# Chapter 6 Discussion

The present study reports on over 300,000 unique individuals who have received inpatient psychiatric services in Ontario, Canada between October 1, 2005, and March 31, 2023. It offers a system-wide view on pain and pain management among persons with mental illness. Approximately 22.2% of the population reported pain. Alongside current literature Hirdes and colleagues (2011) found that in inpatient mental health settings, 27% of persons had pain during 1 or 2 of the last 3 days, while 15% had daily pain. In the present study, fewer than half of the individuals (n=34,069) who reported pain were offered or were receiving pain management. Several factors such as age, sex, marital status, residence admitted from, financial trade off, previous psychiatric admissions, substance use, reported trauma, certain mental illnesses, intellectual or developmental disability, health instability, and cognitive impairment were associated with receipt of pain management.

## Personal characteristics

### *Age*

Among this study population, the greatest proportion of individuals reporting pain were adults aged 45-64 (38.7%). This differs the existing literature, which frequently identifies adults aged 65 and older as the primary group reporting pain. Hirdes et al. (2020) reported that individuals with mental illnesses who survive later in life are more likely to experience significant frailty and associated pain. Although mental illness can span the lifetime, aging is often compounded by physical and mental health challenges such as dementia and chronic illness, most prevalent in older adults.

The multivariate analysis revealed that compared to those under the age of 25, those aged 24-64 were significantly associated with higher odds of receiving pain management. While

current literature suggests that older individuals (65+) experience lower odds of receiving pain management, this study did not identify a statistically significant association. Several factors may explain age related patterns in receipt of pain management. Persons aged 25-64 may be more likely to articulate their pain according to pain scales and advocate for appropriate care (Stubbs et al., 2014). Additionally, some older adults may present age related comorbidities that can complicate limit treatment options due to increased risk of side effect or interactions (Kaye et al., 2010).

### *Sex*

In the present study, among those in pain, the majority of individuals were female (54.1%). This aligns with current literature finding sex and gender differences in reported pain. For example, The International Association for the study of pain (2024) reports that women experience more pain across the lifespan when compared to men. However, this figure still may underestimate true prevalence, as pain experienced by females is often underreported in clinical settings. For example, Guzikevits and colleagues (2024) identified sex and gender related bias among clinicians' perception of pain and pain management. They found female patients pain scores being 10% less likely to be documented in emergency department datasets than men, despite reporting similar levels of pain.

In the multivariate analysis, sex was not associated with receiving pain management when comparing males and females. Although pain management is approached from a sex and gender-neutral perspective, existing literature finds key differences between biological sex and pain management (Morgan et al., 2023). For example, Guzikevits and colleagues (2024) found that females are less likely to receive prescribed pain-relief medications compared to males. Similarly, Asif and colleagues (2025) found females were less likely to receiving inpatient

opioids for pain relief than their male counterparts. Together, these findings point to a disconnect between clinical practice and empirical evidence, highlighting the need for more nuanced, sex-informed approaches to pain management.

## Social characteristics

### *Marital status*

Among those in pain, the majority (66.4%) reported not having a partner. In the multivariate analysis, not having a partner was significantly associated with increased odds of receiving pain management. This contrasts with current literature. For example, Pan and colleagues (2022) found that the married patients with cancer-related pain gained support and medical advocacy from their partners, which was associated with greater likelihood of obtaining active treatment for pain. Similarly, findings from Guitierrez-Veg and colleagues (2018) suggested that having a partner who provides support and acts as an advocate for medical needs increases quality of life among older adults.

### *Residence admitted from*

In the multivariate model, when compared to a private residence, being admitted from a congregate living setting, hospital setting, and correctional facilities were associated with lower odds of receiving pain management. Previous research has found that living in institutional settings may reduce access to care needs from systemic barriers, stigmatization, and fragmented care (Hwang et al., 2011). Furthermore, individuals who reported homelessness at time of admission also experienced lower odds of receiving pain management. This finding aligns with a cross-sectional study from Hwang and colleagues (2011). They reported that among 252 homeless individuals living in Toronto, Ontario, 37% reported disabling and severely limiting pain, yet faced substantial barriers to receiving pain management. Hwang and colleagues (2011) interviewed 61 physicians who reported challenges in managing pain among this population,

expressing concerns about prescribing narcotics due to the patient's history of substance abuse, psychiatric comorbidities, frequently missed appointments, and difficulty getting the patient to take medications correctly.

## Clinical characteristics

### *Previous psychiatric admissions*

Most individuals in pain had no previous psychiatric admissions in the last two years. However, in the multivariate model, individuals with a history of three or more previous admissions had lower odds of receiving pain management compared to those without a history of psychiatric admissions. This finding aligns with current literature suggesting that persons with recurrent psychiatric hospitalizations may face systemic barriers to accessing care (Kallur et al., 2022). Hallyburton and Allison-Jones (2023) further explain this finding through the concept of diagnostic overshadowing, where individual's physical symptoms are misattributed to mental illness, potentially contributing to the under-treatment of pain in this population.

### *Substance Use*

The relationship between substance use and inadequate pain management has been well-documented in the literature. For example, Sowicz and colleagues (2022) found that persons who report using illicit substances are at risk for undertreated pain. They proposed this may occur for multiple reasons, such as personal or healthcare providers' concerns about the adverse effects of substances, and stigmatization of uncontrolled pain or drug-seeking behaviours. This aligns with the present study finding decreased likelihood of receipt of management for those in pain who report using inhalants and stimulants. Use of inhalants in the previous week was associated with decreased odds of receiving pain management among those in pain. Previous research suggests that pain in individuals with active substance use may be deprioritized or dismissed, despite guidelines emphasizing the importance of addressing pain and harm reduction (Sowicz et al.,

2022; Woodward & Braunscheidel, 2023; Wyse et al., 2021).

In the present study, opioid use was strongly associated with higher odds of receiving pain management. Current literature finds a mixed review about the association of opioid use and receipt of pain management, with large variations between illicit and prescribed use. Efforts to reduce opioid related harms have led to unintended consequences for some people living with pain, including unmanaged pain, stigma in response to its use for pain management, and reduced access to opioids for appropriate pain relief (Chen et al., 2014; IsHak et al., 2018; Onwumere et al., 2022). Chang and Compton (2013) found that opioid prescription for those with mental illness provides a unique challenge to healthcare providers to avoid adverse effects. However, the current study found higher odds of receiving pain management. Given that the assessment does not differentiate between prescribed and illicit substance use, it is possible the opioid use identified could reflect the pain management an individual receives.

Use of stimulants among those in pain during the last week was significantly associated with higher odds of pain management at the bivariate level, but with lower odds in the multivariate model. The reversal in the association may reflect the complex role of stimulant use in populations with unmet clinical needs. Beliveau et al. (2023) found that women and individuals with mental illness were more likely to use illicit stimulants to manage pain, suggesting that such use may represent a form of self-management in the context of inadequate or inaccessible care. This finding is supported by evidence of disparities in pain management and mental health care engagement, particularly among already known marginalized groups (Samuel et al., 2019).

The majority (69.8%) of those in pain reported episodic drinking and a non-trivial minority (16.8%) reported having 5+ drinks in a single sitting. In the multivariate model, when

compared to no drinks, consuming 5+ drinks was significantly associated with higher odds of pain management. Maleki and colleagues (2019) reported that alcohol use and chronic pain often co-occur, and De Aquino and colleagues (2024) proposed that episodic binge drinking may be used to alleviate chronic pain. Although it may relieve immediate symptoms, it may trigger a higher need for alcohol consumption in the future. In the setting of inpatient psychiatric services, abstinence of alcohol use can lead to alcohol withdrawal and increased expression of pain, which may make individuals with previous episodic drinking more likely to receive pain management.

### *Trauma*

There were more individuals with pain who reported trauma and had a diagnosis of PTSD compared to those without pain. This is consistent with current literature which finds a bidirectional relationship among pain and PTSD. Finding that PTSD and chronic pain commonly co-occur, while pain can trigger or worsen symptoms of PTSD, PTSD can worsen the experience and management of pain (Feldman et al., 2014; Gasperi et al., 2021). The literature consistently demonstrates a strong relationship between pain and PTSD, irrespective of whether pain is evaluated in individuals with PTSD or PTSD is assessed in those experiencing chronic pain (Donovan et al., 2019; Feldman et al., 2014).

Both reported trauma and a diagnosis of PTSD were significantly associated with increased likelihood of receiving pain management in the multivariate model. This finding is consistent with current literature. For example, Schwartz and colleagues (2006) found that among a sample of 173 individuals with PTSD, symptoms of trauma were associated with increased pain management prescription of analgesic medications. Additionally, findings from Baltes and colleagues (2024) highlight the importance of clinicians utilizing trauma informed approaches to treat those with trauma and PTSD. This may heighten clinician awareness to

identifying expressions and appropriately addressing of pain among this subpopulation. Additionally, individuals with pain who have a history of trauma or PTSD often experience poorer functional outcomes, lower quality of life, heightened psychological distress, and reduced responsiveness to medical treatments (Gaetz, 2017; Gasperi et al., 2021). These challenges may lead to more frequent use of healthcare services as they seek relief and support.

### *Psychiatric Diagnoses*

The present study highlights the intersection of mental illness, pain and pain management, highlight disparities in prevalence and management across psychiatric diagnoses. Pain is a common occurrence for those with mental illness; however, some diagnoses are associated with higher rates and different health outcomes than others (Hirdes et al., 2011).

Among those in pain, 10% of individuals had a diagnosis of a psychotic disorder, which aligns with previous research in inpatient psychiatry settings. For instance, Hirdes and colleagues reported that 7% of individuals with psychotic disorders report daily pain in inpatient mental health settings (Hirdes et al, 2011). This relatively low prevalence may reflect altered pain perception among this subpopulation; individuals with psychotic disorders have been found to experience alterations in perception of pain, including elevated pain thresholds and tolerance (Onwumere et al., 2022). These factors may contribute to the under reporting of pain during clinical assessment (Carrasco-Picazo et al., 2023; Stubbs et al., 2014).

Only, 17.2% of those in pain had a diagnosis of depression, which is lower than current literature which suggests that 65% of individuals with depression will report pain (Onwumere et al., 2022). This discrepancy may be attributed to several factors, including differences in study populations, methods of assessing pain, or underreporting due to stigma or measurement limitations. The present study further revealed that individuals with a range of psychiatric

diagnoses, including psychotic, bipolar, depressive, personality, paraphilic, and medication-induced disorders had significantly lower odds or receiving pain management. These findings are consistent with existing literature, which underscore that mental illness may act as a barrier to equitable pain management, which can lead to poorer health outcomes and reduced quality of life (Martinello & Matthews, 2015; Udo & Gash, 2012). In general, individuals with mental illness, are at increased risk to experience physical health problems and a high burden of pain yet often less likely to receive pain management than their counter parts (Carrasco-Picazo et al., 2023; De La Rosa et al., 2024). Particularly, individuals with bipolar disorder had a lower likelihood of receiving pain management despite their elevated risk for poor health outcomes and reduced life expectancy (Garrido et al., 2017; Hinrichs et al., 2022; Viprey et al., 2021). Stigma, clinician hesitancy, and systemic inadequacies in care coordination may all contribute to this finding (Stubbs et al., 2014).

Chronic pain is highly prevalent among individuals with substance use disorders, with estimates ranging from 50–60% (Wyse et al., 2021). Despite this, pain in this population is frequently under-managed due to concerns about addiction, adverse effects of pharmacological treatments, and restrictive policies regarding harm reduction (Krashin et al., 2012; Murnion, 2012; Sowicz et al., 2022).

### *Physical health*

Prevalence of health instability, as measured by the CHESS, was lower among those who reported pain. While it was associated with higher odds of pain management at the bivariate level, health instability was associated with lower odds of receiving pain management in the multivariate model. This may indicate that individuals with higher CHESS scores may have multiple competing health issues that shift clinical focus away from presence of pain and receipt of pain management

(Heckman et al., 2021 & Hirdes et al., 2003).

In the present study, multimorbidity and receipt of pain management were not statistically significantly associated, though existing literature suggests that the presence of multimorbidity is associated receiving pain management. For example, Neba and colleagues (2024) found that among adults with chronic pain, those who had multimorbidity were more likely to utilize opioid pain therapy. In this study, multimorbidity was based on presence of two or more medical diagnoses captured using a list of specific diagnoses (i.e., asthma, diabetes mellitus, hypothyroidism, migraine, and traumatic brain injury). As such, it is possible that the results reflect under detection of medical multimorbidity, given the limited set of medical diagnoses available.

***Cognitive impairment***

Just over one third of individuals experienced some level of cognitive impairment. Though the literature notes the challenges in identifying pain and navigating pain management for persons with cognitive impairment (for example, see Miller & Okur, 2024), this study found that cognitive impairment was associated with higher odds of receiving pain management. This could potentially imply a growing focus on individuals with cognitive impairment, given their known status as an underserved group. The presence of IDD was significantly associated with lower odds of receiving pain management, even after controlling for presence of cognitive impairment as well as other covariates. This aligns with current literature highlighting several disparities in receipt of pain management of among individuals with IDD, despite knowing that persons with IDD are known to experience more pain than the general population (El-Tallawy et al., 2023). For instance, The International Association for the Study of Pain (2019) reported that persons with IDD often receive less pain medication than their neurotypical peers, even when

experiencing similar conditions. They suggested disparities may be due to difficulties in verbally expressing pain using normative rating scales for pain intensity and severity. Symons and colleagues (2010) reported an under-recognition of pain in individuals with IDD, often due to communication challenges or functional limitations that complicate the presentation of pain (Symons et al., 2010).

**Summary and next steps**

These findings reveal a low prevalence of individual in pain receiving pain management in inpatient psychiatric settings. Existing literature consistently links untreated pain and poor health outcomes, diminished quality of life and an elevated risk of premature mortality. These disparities are particularly concerning in inpatient psychiatric settings, where individuals often present with complex needs and heightened vulnerability. To better understand the long-term consequences of unmet pain needs in a Canadian context, future research should prioritize longitudinal studies within inpatient populations. Such work could examine the impact of not receiving pain management on quality of life outcomes, length of inpatient stay and/or rehospitalization. Additionally, future work should prioritize pain management as a part of holistic approaches to inpatient psychiatric care. Conducting qualitative or mixed methodology studies to gain deeper personal insight into the experiences of people with unmanaged pain is warranted. For example, to understand their perceptions of care and unmet needs, and the impact of these on their quality of life. Addressing these gaps is essential not only for improving clinical outcomes, but for advancing a more equitable and compassionate standard of care.

## Chapter 7 Strengths and Limitations

This study utilizes a population level dataset of over 300,000 unique individuals in Ontario admitted to inpatient psychiatric services over an 18-year period. A key strength lies in the use of a large dataset, based on the interRAI Mental Health assessment, provides comprehensive information across multiple domains, including personal, social, functional, and clinical characteristics, as well as service use. Use of these data allowed for consideration of a wide range of variables in the multivariate regression modelling.

However, several limitations exist in this study. While the large dataset provides its strengths, it may also detect statistically significant associations that may have little clinical or practical significance, potentially leading to overinterpretation of findings.

The study evaluated individual substance use in the previous seven days, which may be insufficient to understand the extent of substance use given the context and setting of inpatient psychiatric services. Furthermore, the assessment does not distinguish between illicit and prescribed usage. Differentiation among the prescribed and illicit use is especially useful for information for substances such as cannabis and opioids, which may be pain management interventions.

Multimorbidity was based on a limited list of specific diagnoses (i.e., asthma, diabetes mellitus, hypothyroidism, migraine, and traumatic brain injury). This likely resulted in under-detection of multimorbidity, presenting a measurement bias limitation.

The dichotomization and categorization of certain variables (e.g., age categories) and scales (e.g., health instability [CHESS scale], cognitive performance scale) enhanced interpretability of findings, but may have reduced nuance and variability within original scales. In particular, the cognitive impairment variable which collapsed 6 scores into 3 broader

categories simplified analysis but may have obscured distinctions in severity. Collapsing multi-level variables into broader categories reduced data granularity, potentially reducing subtle yet meaningful differences between groups.

While the present study controlled for many different variables in the multivariate analysis, it is likely that there are confounding variables that were not available in the data set. Variables relating to clinician level experience such as provider workload, years of experience, or training in trauma informed care that may influence the likelihood of pain being reported and receipt of pain management. The Max-rescaled R-squared value of 0.0517 suggests the variables considered had some explanatory value, but that a substantial portion of the outcome remains influenced by other factors not captured in the model. While it was not the goal of this study to develop a full, comprehensive model explaining receipt of pain management, future work is needed in this area.

This cross-sectional study was based on admission assessments, and consequently did not capture changes in symptoms or interventions put in place after the admission assessment. Future research should investigate pain and receipt of pain management longitudinally beyond admission and over the course of an inpatient stay.

# Chapter 8 Conclusion

The present study provides insights into the persistent disparities in receipt of pain management among individuals receiving inpatient psychiatric services in Ontario. Despite clear prevalence and indications of pain in this population, less than half of individuals who reported pain received any form of pain management, revealing a large gap in care. Through characteristics included in this study, current findings highlight how certain personal, social, functional, clinical and service use factors are associated with significantly lower odds to receiving pain management

Conversely, factors such as reported trauma, recent opioid use, certain socioeconomic indicators were associated with higher odds of receiving pain management, suggesting that receipt of pain management may be mediated by intersecting indicators of vulnerability and visibility within mental health settings. These disparities highlight the need for integrated approach to pain management to address unique needs of this underserved population.

Future research should prioritize pain management care as part of a holistic approach to inpatient psychiatric care. Future research should explore these associations longitudinally to examine the pathways through which social and clinical factors further impact pain management. Additionally, qualitative or mixed method studies may provide deeper insight into the experiences of individuals who are known to be underserved from appropriate pain management services, including their perceptions of care, decision-making processes, and unmet needs.

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# Appendix

## Appendix A: literature search strategies

The first search was a larger overview of current knowledge surrounding health instability, mental illness, medical comorbidity and palliative care. Pubmed, CINAHL, webofscience, and psychINFO were search using the following syntax: (“palliati* [Title/Abstract] OR “end-of-life" [Title/Abstract] OR “end-stage” [Title/Abstract] OR “life limiting” [Title/Abstract] OR “seriously ill” [Title/Abstract] OR “health instability” [Title/Abstract] OR “palliative care” [MeSH]) AND (“mental illness” [Title/Abstract] OR “mental health” [Title/Abstract] OR “psychiatric” [Title/Abstract] OR “inpatient” [Title/Abstract] OR “mental disorders” [MeSH]) AND (“medical comorbid*” [Title/Abstract] OR “multimorbid*” [Title/Abstract] OR “comorbidity [MeSH]). Filtered to meet the inclusion criteria of English, full papers, published in and after 2010, key words in title/abstract, and excluded if not about palliative care/mental illness/health instability. 506 titles were found under the search were imported on November 10, 2023 for screening and abstract review, where 480 studies were excluded for full review and 26 articles were included for full review.

The second series of smaller, more targeted searches of literature discussing pain and specific mental illness were conducted. This search was restricted to systematic reviews or meta analyses, published from 2015-2025. PubMed was searched using the following syntax: (“pain” [Title/Abstract] AND “depress*” [Title/Abstract]), (“pain” [Title/Abstract] AND “anxiety” [Title/Abstract] ), (“pain” [Title/Abstract] AND “psycho*” [Title/Abstract] OR “schizo*” [Title/Abstract]), (“pain” [Title/Abstract] AND “bipolar” [Title/Abstract]), (“pain” [Title/Abstract] AND “trauma” [Title/Abstract] OR “PTSD” [Title/Abstract]). A total of 44 full articles were reviewed. Selected articles were relevant to pain and specific mental illnesses.