

# Out of Sight, Out of Mind: Addressing the Invisible and Older Faces of Canada's Opioid Crisis



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**NIA** NATIONAL  
INSTITUTE  
ON AGEING\*

# National Institute on Ageing

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**Mailing Address:**

**National Institute on Ageing  
Ted Rogers School of  
Management  
350 Victoria St.  
Toronto, Ontario  
M5B 2K3  
Canada**

## About the National Institute on Ageing

The National Institute on Ageing (NIA) is a public policy and research centre based at Toronto Metropolitan University (formerly Ryerson University). The NIA is dedicated to enhancing successful ageing across the life course. It is unique in its mandate to consider ageing issues from a broad range of perspectives, including those of financial, psychological, and social well-being

The NIA is focused on leading cross-disciplinary, evidence-based and actionable research to provide a blueprint for better public policy and practices needed to address the multiple challenges and opportunities presented by Canada's ageing population.

The NIA is committed to providing national leadership and public education to productively and collaboratively work with all levels of government, private- and public-sector partners, academic institutions, ageing-related organizations, and Canadians.



## Authors and Reviewers

The background research and writing for this report was undertaken by:

**Matthew Downer, BSc (Hons), MSc, MD/ DPhil Candidate**

Junior Research Fellow,  
National Institute on Ageing;  
Medical Student, Memorial University of  
Newfoundland;  
DPhil Student, University of Oxford

**Samir Sinha, MD, DPhil, FRCPC, AGSF**

Director of Health Policy Research,  
National Institute on Ageing,  
Toronto Metropolitan University;  
Director of Geriatrics, Sinai Health System  
and University Health Network;  
Professor of Medicine, Family and Community  
Medicine, Health Policy, Management and  
Evaluation, University of Toronto

The NIA would like to kindly thank the following reviewers for their time and work in reviewing this report:

**Marilyn White-Campbell B.A., Dip. Grt.**

Geriatric Addiction Specialist BSO  
Behaviour Support for Seniors Program -  
Baycrest  
Toronto, ON

**Dr. Stephen Darcy MD, FCFP, FISAM**

Associate Professor  
Faculty of Medicine,  
Discipline of Family Medicine  
Memorial University of Newfoundland  
St. John's, NL

**Dr. Christopher Kitamura, MD, FRCPC**

Staff Geriatric Psychiatrist, Baycrest  
Assistant Professor, University of Toronto  
Department of Psychiatry, Division of  
Geriatric Psychiatry,  
Toronto, ON

**Dr. Launette Rieb, MD, MSc, CCFP (AM),  
FCFP, CCSAM, DABAM, FASAM**

Clinical Associate Professor,  
Department of Family Practice,  
The University of British Columbia  
Pain and Addiction Medicine Consultant,  
Actum Health, Surrey  
Pain and Addiction Medicine Consultant,  
Rapid Access Addictions Clinic,  
St. Paul's Hospital,  
Vancouver, BC

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## List of Abbreviations Used in This Report

<b>AB</b>	Alberta
<b>BC</b>	British Columbia
<b>CADTH</b>	Canadian Agency for Drugs and Technologies in Health
<b>CCSMH</b>	Canadian Coalition for Seniors' Mental Health
<b>CIHI</b>	Canadian Institute for Health Information
<b>DAD</b>	Discharge Abstract Database
<b>DSM-5</b>	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
<b>ED</b>	Emergency Department
<b>LTC</b>	Long-term Care
<b>MB</b>	Manitoba
<b>NACRS</b>	National Ambulatory Care Reporting System
<b>NB</b>	New Brunswick
<b>NL</b>	Newfoundland and Labrador
<b>NPDUIS</b>	National Prescription Drug Utilization Information System
<b>NPHA</b>	National Poll on Healthy Aging
<b>NS</b>	Nova Scotia
<b>ON</b>	Ontario
<b>OD</b>	Opioid Use Disorder
<b>PEI</b>	Prince Edward Island
<b>SK</b>	Saskatchewan
<b>US</b>	United States
<b>YT</b>	Yukon

## Executive Summary

Opioids, commonly referred to as “narcotics,” are potent medications used widely to treat pain — but they also have strong potential for misuse and addiction. Over the past decade, the opioid crisis in Canada has become a major, growing public health emergency. Two broad, but related, factors have contributed to the acceleration of the opioid crisis in Canada. First, opioid prescription rates have risen steadily over the past 30 years to today's extremely high levels, and despite recent decreases in opioid prescription rates, Canada remains one of the largest consumers of prescription opioids in the world. Second, there has been a steep rise in the use of street opioids, many of which are extremely potent (i.e. fentanyl), which have been linked to skyrocketing rates of opioid overdoses and deaths across Canada.

As more attention is being paid to the opioid crisis in Canada, various responses have been launched in an attempt to curb some of these alarming trends. However, older adults have been largely left out of the conversation.

**Simply put — older Canadians in this crisis have been left out of sight and out of mind. With this report, the National Institute on Ageing (NIA) aims to raise awareness of the serious risks to older adults related to the opioid crisis, and to explain why this group will require particular attention in order to stem the crisis.**

While current perceptions of the opioid crisis tend to focus on younger adults consuming non-prescribed opioids and experiencing high rates of overdose, many people are unaware that older Canadians actually bear the largest burden from opioids — mostly from prescription sources. Compared to all other age groups, older adults have the highest rate of prescription opioid consumption, as well as the highest rates of side effects, overdoses and mortality associated with prescription opioids. This is strongly related to the fact that older adults experience more chronic pain compared to any other age group, and opioids are very commonly used in this population to manage pain symptoms.

There are several factors that make older adults more likely to experience an overdose when using opioids, including age-related metabolic changes; a higher likelihood of also

taking multiple other medications — including other sedatives — which increases the risk of dangerous drug interactions; and higher rates of more severe chronic pain that require higher doses of opioids to manage symptoms. Together, these factors put older adults at higher risk of overdose, hospitalization and death when consuming opioids. Older adults are also at greater risk of other side effects from opioids, including nausea and constipation, which can negatively impact their overall quality of life.

Given the high rates of prescription opioid use among older adults, alongside the higher risk of negative outcomes linked to opioid use in this age group, Canadian health care professionals need to re-examine pain management strategies that are taught to current and future prescribers. In this report, we detail a concerning, ongoing over-reliance on opioid therapies for older Canadians, while the use of other methods — such as topical analgesics or multidisciplinary pain clinics — remains seriously lacking in Canada. This over-reliance on opioids persists despite some evidence suggesting pain in many older Canadians often goes undertreated. We also review research around which groups of older adults are at greater risk of consuming opioids longer-term for the management of pain symptoms, and the current challenges with deprescribing opioids in older adults. Unfortunately, much work is left to be done in this area worldwide, and there is a particular dearth of data on these issues in the Canadian context.

Related to the current over-reliance on using opioids in older Canadians are the underappreciated and rising rates of opioid use disorder (OUD), which is the technical term for the disease of opioid addiction. Research suggests this is a growing problem in Canada, but awareness surrounding OUD in older adults is lacking. Further, while the proportion of Canadians living with OUD is likely underreported, research suggests the number of older adults in Canada with OUD will likely grow in the years to come. However, the current public health response to the opioid crisis in Canada largely ignores older adults living with OUD. This report discusses these issues and reviews the prevention, screening and treatment sections of the recently developed *Canadian Guidelines on Opioid Use Disorder Among Older Adults*, produced by the Canadian Coalition for Seniors' Mental Health.

Another key group that has been largely left out of the discussion thus far is older Canadians living in long-term care (LTC) homes who use opioids. While recent research indicates that opioid prescriptions are increasing in Canadian LTC settings, there remains little research about policies, guidance and training on the appropriate prescribing and use of opioids in these settings. In this report, we discuss research from other jurisdictions and highlight key considerations for improving opioid prescribing policies in Canadian LTC settings.



We also explored research on older adults' knowledge of opioids, as well as their perspectives on opioid-related policies. Sadly, there is once again a paucity of research and policy on this front in Canada, but research done elsewhere suggests that many older adults know little about opioids and the potential risk of serious outcomes such as overdose.

There are also important opioid policy implications for older adults that require specific consideration. For instance, a recent national poll of older Americans found that many older adults hold onto unused opioids out of fear they will need them again, and that many opioid disposal options are inaccessible for older Americans. Further, opioids remain the medication of choice in suicide attempts among older adults in the U.S. and Canada.

In response to the scarcity of Canadian data about opioid use and outcomes in older adults, the NIA obtained and analyzed data from the Canadian Institute for Health Information (CIHI) on opioid-related prescriptions, hospitalizations and emergency department visits from 2015 to 2020. Our analysis suggests that, despite variations between provinces and territories, there is a high rate of prescription opioid use among older Canadians. Between 2015 and 2020, prescription rates for older adults have tended to decline overall, particularly for some stronger formulations (i.e. fentanyl and oxycodone), and

increased or remained stable for others (i.e. hydromorphone), while rates of some lower-strength opioids (i.e. codeine) have shown some decline but remain high.

### **This report also provides some of the first published data on OUD-related hospital visits in older Canadians.**

The NIA's analyses found that older Canadians experience very high rates of opioid-related harms — particularly adverse events from prescription medications. Combined with our findings on prescription rates, our analyses provide an important, high-level perspective on some of the impacts of the Canadian opioid crisis on older adults.

Opioid-related deaths in Canada spiked during the COVID-19 pandemic. In this report, we outline how the "twindemic" of the COVID-19 pandemic and opioid crisis epidemic has likely had a disproportionate — albeit under-investigated — impact on older Canadians. As was the case with our COVID-19 pandemic responses, societal ageism has likely played a role in the widespread lack of research, policy, awareness and understanding of the opioid crisis in older Canadians to date.

Older Canadians have been failed across the board with respect to responses, research, policy and guidelines aimed at curbing the opioid crisis in Canada. To that end, the NIA offers six evidence-informed policy recommendations that can act as a first step to ensure older Canadians are no longer overlooked:

- 1.** Apply an Ageing-Specific Lens to Opioid Policies and Practices
- 2.** Increase the Use of Non-Opioid Therapies Before Climbing the Opioid Pain Management Ladder and Expand Access to Multidisciplinary Pain Treatments
- 3.** Increase Awareness and Understanding of Opioid Use Disorder in Older Canadians
- 4.** Create Guidelines on Opioid Use and Pain Management in Canadian Long-Term Care Settings
- 5.** Enhance Health Care Provider Education and Training Around the Use and Effects of Opioids in Older Canadians
- 6.** Conduct More Research and Collect More Data on Opioid Use and Harms in Older Canadians



## Background

### What are opioids?

Opioids, often referred to as “narcotics” or “painkillers,” are powerful medications primarily used to treat various forms of pain.<sup>1,2</sup> They are used to treat both acute and chronic pain, with short-acting formulations that can last three to six hours, compared to long-acting formulations that can last up to 24 hours.<sup>1,2</sup> Opioids primarily act on cell receptors in the brain and inhibit the release of specific neurotransmitters to prevent the sensation of pain.<sup>1,2</sup> Counterintuitively, they can lead to increased pain sensitivity over time, a state known as “opioid-induced hyperalgesia.”<sup>3</sup> Other reasons for prescription opioid use include cough suppression, reducing the sensation of breathlessness, and the treatment of opioid use disorder (OUD).<sup>4,5</sup>

**While various forms of opioids have existed for thousands of years, the use of opioids in Canada has steadily increased over the past 30 years.<sup>6</sup>**

There are multiple public health concerns associated with their use. First, opioids are highly addictive substances and many of the more powerful varieties are more likely to be associated with problematic use and OUD,<sup>1,2</sup> a type of addiction characterized by a strong urge to

consume opioids, with increasingly higher doses needed to achieve the desired effects.<sup>7</sup> Second, those living with OUD or using opioids long-term who decrease their opioid dosage or stop taking opioids entirely can experience intense withdrawal symptoms including nausea, vomiting, anxiety, and muscle and joint aches.<sup>8</sup> Third, in addition to reducing the sensation of pain, opioids are highly sedative medications that suppress the rate of breathing, particularly when used in stronger formulations or greater amounts.<sup>9</sup> This effect puts users at risk of overdose, which can be fatal.<sup>9</sup> Further, opioid users can develop physical tolerance, meaning they need greater amounts of opioids to obtain the desired effects. This can lead to a cascade of higher doses and/or stronger formulations over time,<sup>10</sup> which is also associated with a greater risk of opioid overdose.<sup>11</sup> Other side effects of short-term use include decreased breathing, drowsiness and coma.<sup>9</sup> Opioids are also associated with an increased risk of motor vehicle accidents, falls and heart complications.<sup>12</sup>

There are several types and formulations of opioids that vary in strength. In Canada, codeine, morphine and tramadol are among the weakest formulations that are commonly prescribed.<sup>13</sup> To put the strength of these medications in relative terms, acetaminophen has roughly 1/360 strength of morphine,

while ibuprofen has roughly 1/222 the strength of morphine.<sup>13</sup> Stronger formulations commonly found in Canada include oxycodone and hydromorphone, which are roughly 1.5 and five times the strength of morphine, respectively. Fentanyl is considered one of the strongest

formulations, with a relative potency roughly 100 times greater than that of morphine.<sup>13</sup> Even more potent are various synthetic derivatives, including carfentanyl and furanyl-fentanyl. Table 1 shows the relative strengths of various opioids commonly used in Canada.

## Table 1: Common Opioids in Canada and Their Potency Relative to Morphine

OU: Opioid Use Disorder (OU)

Opioid	Relative Potency (Compared to Morphine)	Typical Half-Life* (In Hours)
Codeine & Tramadol	1/7-1/10	3 - 6
Hydrocodone	1/8	4 - 8
Morphine	1	4 - 5
Oxycodone	1.5	3 - 4
Methadone (OU Treatment)	5 - 10	8 - 12
Hydromorphone	4 - 7.5	4 - 5
Buprenorphine	16	6 - 8
Fentanyl	100 - 150	3 - 7

\*Note: These values represent the typical half-life (i.e. the amount of time for the concentration of a drug in the body to decrease to half of the original dose after it has been consumed) of various opioids. Pharmacokinetic changes that occur in older adults can extend the duration of effect of opioids and increase the risk of accumulation in the body/toxicity.<sup>14,15</sup> OU: Opioid Use Disorder.

## Opioid Prescription Patterns in Canada

Over the past three decades, the number and rate of opioid prescriptions in Canada has increased dramatically.<sup>6</sup>

**Since the 1980s, the amount of opioids sold to Canadian hospitals or pharmacies has increased by roughly 3,000 per cent.<sup>6</sup> In 2016, 20 million prescriptions for opioid medications were provided in Canada.<sup>6</sup> According to recent estimates, one out of eight Canadians were prescribed an opioid in 2018.<sup>16</sup>**

However, data from the Canadian Institute for Health Information (CIHI) suggests modest reductions in opioid prescribing patterns in Canada in more recent years. In 2013, 14.3 per cent of prescriptions filled in community pharmacies in Ontario, Manitoba, Saskatchewan and British Columbia were opioids, compared to 12.3 per cent in 2018.<sup>17</sup> Over the same time period, CIHI also reported modest reductions in the number of people starting new opioid therapies, as well as in the overall amount of opioids Canadians were being prescribed.<sup>16</sup>

Despite this progress, opioid consumption remains very high, and it remains a major concern for Canadian health officials.<sup>6</sup>

## What is the Opioid Crisis in Canada?

The opioid crisis is the epidemic stemming from the culmination of multiple factors that have combined to lead to an alarming surge in both the overall consumption of prescription and non-prescription opioids as well as misuse and opioid-related deaths, in Canada. In 2021, there were an estimated 7,650 opioid-related deaths in Canada, representing roughly 21 people dying every day.<sup>6</sup> The rate of hospitalization for opioid overdoses has also increased by 53 per cent in the last decade; in 2021, there were 6,164 opioid-related hospitalizations (approximately 17 per day).<sup>18</sup>

A 2017 Health Canada report found that roughly one third of those who have used opioids in Canada did not do so using a prescription.<sup>19</sup> Identified sources for obtaining opioids without a prescription include street markets, prescription fraud, diverting opioids prescribed to others, and using a second prescribing practitioner.<sup>6</sup> However, among Canadians aged 55 years and older, only 1.1 per cent reported improperly using prescription opioids.<sup>20</sup> Data suggests older Canadians are much more likely to consume prescription opioids as opposed to opioids obtained from other sources.<sup>20</sup>

Canada's rising rates of OUD reflect a worldwide trend.<sup>6</sup> OUD is recognized as a psychiatric diagnosis under the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) and is described as the continued use of opioids at increasing amounts and duration despite its interference with an individual's daily function.<sup>21</sup> (The diagnostic criteria from the DSM-5 are outlined in Table 2.) OUD is associated with a strong desire for ongoing use and withdrawal symptoms when consumption is discontinued abruptly.<sup>21</sup> Research suggests individuals with a history of other mental health conditions issues, including childhood trauma, depression, anxiety and post-traumatic stress disorder, are at greater risk of developing OUD.<sup>22-24</sup> OUD is higher among men than women,<sup>25</sup> and opioid-related overdoses from OUD are highest between age 36 to 50.<sup>26</sup>

A large proportion of opioid overdoses in Canada, and a facet of the crisis prominently covered by the media, involves the illegal sale and use of highly potent opioids such as fentanyl and carfentanyl. These synthetic opioid derivatives have been on the rise in the illegal market in Canada in recent years and are extremely potent. According to a recently released report by the Public Health Agency of Canada (PHAC), fentanyl was involved in 57 per cent of accidental opioid toxicity deaths in Canada in 2016, and in 86 per cent of such deaths in 2021.<sup>18</sup>

In Ontario, the number of opioid overdoses that were found to have involved fentanyl increased by 548 per cent from 2006 to 2015.<sup>27</sup> In British Columbia, fentanyl was found to be involved in 68 per cent of illicit drug overdoses in 2016, up from four per cent in 2012.<sup>6</sup>

People who use opioids — and often, many who live with OUD and consume non-prescription opioids — experience stigma around substance use disorders.<sup>28</sup> It is well-documented that policies adopting a so-called “war on drugs” approach make negative assumptions about opioid users, placing blame on the individuals themselves instead of recognizing the disease of addiction.<sup>29</sup> This has contributed to the opioid crisis in Canada by further marginalizing those living with OUD and making it more difficult for them to seek appropriate help. They may often avoid seeking care out of a fear of being labelled or viewed as criminals, as well as previous negative interactions with care providers.<sup>28</sup>

One key factor contributing to the opioid crisis in Canada is the staggeringly high volume of opioids being prescribed. Canada is one of the highest prescribers of opioids per capita in the world. Despite the modest decline in prescriptions described above, millions of Canadians still receive prescriptions for opioids every year.<sup>30</sup> Opioid prescriptions can be a double-edged sword: as a means for treating many of the one in five Canadians living with some amount

of chronic pain, they are important — but with a troubling proportion of those Canadians developing OUD as a result, they can also be dangerous.<sup>31</sup>

Despite that, for some prescribers, opioids remain their primary tool for treating chronic pain.<sup>32</sup>

## Table 2: Diagnostic Criteria for Opioid Use Disorder (OUD) from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)

### DSM-5 Diagnostic Criteria for OUD - Symptoms

- Opioids are often taken in larger amounts or over a longer period of time than intended.
- There exists a persistent desire or unsuccessful efforts to cut down on or control opioid use.
- A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects.
- Craving, or a strong desire to use opioids.
- Recurrent opioid use resulting in failure to fulfill major role obligations at work, school, or home.
- Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.
- Important social, occupational, or recreational activities are given up, or reduced, because of opioid use.
- Recurrent opioid use in situations where it is physically hazardous.
- Continued use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by opioids.
- <sup>1</sup>Tolerance, as defined by either of the following:
  - a need for markedly increased amounts of opioids to achieve intoxication or desired effect
  - markedly diminished effect with continued use of the same amount of an opioid
- <sup>1</sup>Withdrawal, as manifested by either of the following:
  - the characteristic opioid withdrawal syndrome
  - the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

#### Severity:

- Mild: 2-3 symptoms
- Moderate: 4-5 symptoms
- Severe: more than 6 symptoms

<sup>1</sup>Either of these criteria is not met in cases where the person is consuming opioids strictly under appropriate medical supervision.

Source: American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. Washington, DC.

## The Burden of Opioids on Older Adults in Canada

Older adults bear the largest burden of the rise of opioid use in Canada, in terms of overall opioid consumption,<sup>33</sup> adverse side-effects,<sup>34</sup> hospitalizations and mortality.<sup>16</sup> However, the impact of the opioid crisis on older Canadians has garnered significantly less attention than the effects on Canada's younger opioid users.

### **Compared to younger persons, older adults consume prescription opioids in larger quantities and more frequently.**

According to the most recent estimates available from CIHI, Canadians aged 65 years and older were the most likely age group to start on opioid therapy in 2018.<sup>16</sup> This is related to the greater prevalence of chronic pain in older populations, increased side effects from other medications, and a false perception that older adults are unlikely to get addicted or misuse their medications.

Older adults tend to live with more comorbid conditions, and the prevalence of chronic pain also tends to also be higher for this population.<sup>35</sup> For instance, U.S. data shows that 25-50 per cent of community-dwelling older adults, and 70 per cent of older adults living in long-term care (LTC) settings, report living with daily pain.<sup>36</sup> In Canada, roughly one in three adults aged 65 years or older live

with some amount of chronic pain;<sup>32</sup> with a rapidly ageing population, this number will grow in the coming decades.

For older adults, chronic pain is associated with greater disability, lower mobility, and an increased risk of depression, anxiety, sleep impairment, social isolation and falls.<sup>32</sup> Due to the profound impact that pain can have on older adults, adequate pain treatment is critical for maintaining a high quality of life. As a result, opioid therapy has remained a mainstay for treatment for pain in older Canadians. However, potentially due to a generally heightened awareness of the opioid crisis, data suggests that the overall prevalence of opioid use in older Canadians has decreased in recent years while use of stronger formulations has increased.<sup>16,37</sup>

The prescribing of opioids to older adults lies on a delicate balance between the risks associated with the use of opioids and the risks of inadequate pain control. Despite the high frequency with which opioid therapies are used to treat pain in older Canadians, evidence suggests that the *under*-treatment of chronic pain among this population remains an ongoing problem.<sup>38</sup> Further, while older Canadians are more likely to live with chronic pain, their pain is more likely to go untreated as compared



to younger Canadians.<sup>39</sup> Reasons for this include the perception among many older adults and their clinicians that pain is a normal part of ageing; cognitive impairments that may reduce an older adult's ability to communicate pain; a fear that pain is a sign of impending death or disability; and a generalized fear of using opioids among many older patients and their providers, especially when the older person is living with frailty, comorbidity/multimorbidity (living with one or more long-term health conditions) and polypharmacy (using multiple medications).<sup>40</sup>

## Issues with Opioids as Mainstay Therapy for Pain Management of Older Canadians

While the need to address chronic pain in older Canadians is clear, existing treatment paradigms that lead to a high reliance on opioid therapy have not been without significant risks. Older adults are at a higher risk of experiencing hospitalizations and death from opioid overdoses.<sup>16</sup>

**Roughly four out of every 10 deaths worldwide associated with drug use occurs in persons older than 50, and in those aged 65 years and older, three out of every four deaths associated with drug use are linked to opioids.**<sup>20,41</sup>

According to a 2016 report by CIHI, opioids were associated with 8.1 per cent of hospitalizations in older Canadians.<sup>16</sup> In Canada, older adults are more likely than all but one age group to be hospitalized for opioid overdoses (19.2 per 100,000, compared to 20.2 per 100,000 in adults aged 45-64).<sup>16</sup> This stems from various factors making older persons more predisposed to experience overdoses from opioids compared to younger persons. For instance, metabolic changes associated with ageing typically result in older adults having less ability to process and break down opioid metabolites.<sup>42</sup> Further, due to the high use of other sedating central nervous system medications (such as various antidepressant or antipsychotic medications), older adults are more likely to experience negative drug interactions that increase the risk of respiratory depression, and therefore, putting them at greater risk of overdose.<sup>43</sup> As a result, non-pharmacological and non-opioid treatments should be considered first-line.<sup>20,41</sup>

When initiating opioid therapies in older adults, it is often recommended to prescribe roughly a quarter of the dose used in younger adults.<sup>20,34,41</sup> However, older adults often experience higher levels of pain and hence have higher treatment needs. Many will develop a tolerance to opioids over time that will require higher doses to maintain a similar level of pain control, which consequently puts older adults at higher risk of overdose and hospitalization.<sup>20,34,41</sup>

There are also several opioid side effects that can interfere with the daily life of older persons. For instance, research suggests that opioid use is a risk factor for major depression disorder and anxiety/stress disorders.<sup>44</sup> Nausea and constipation have been reported as the most common side effects of long-term opioid use in older persons.<sup>45, 46</sup> Research also suggests roughly half of LTC residents on opioid therapy experience associated constipation, which can lead to various negative outcomes, such as severe gastrointestinal issues and a decreased quality of life.<sup>45</sup> Urinary retention is another side effect which can lead to similar negative outcomes.<sup>34</sup> Across all age groups, a meta-analysis by Furlan and colleagues in 2006 found nausea to be the most serious side effect experienced from long-term use of opioids.<sup>47</sup> Another important side effect to consider is opioid-induced hyperalgesia, a condition where patients who require increased doses of opioids develop an increased sensitivity to pain.<sup>34</sup> Another 2-10 per cent of older adults using opioids experience skin irritation.<sup>34</sup> However, more research is required to obtain more robust prevalence estimates on the rates of side effects from opioids in older adults.

Lastly, opioids are among the most commonly used medications for suicide attempts in older adults.<sup>48, 49</sup>

## **Rethinking Pain Management in Older Adults: Are We Climbing the Ladder Properly?**

Due to the increased risks associated with opioid use in older persons detailed above, there is a need to re-examine the strategies being recommended and employed to treat pain in this age group. In a set of guidelines released in 2017 by the National Pain Centre at McMaster University, the first recommendation was to optimize non-opioid therapies for pain management before prescribing opioids.<sup>50</sup> This aligns with the World Health Organization's "Analgesic Ladder," which recommends starting treatments with non-opioid-based therapies until pain persists, and then consequently "moving up" the ladder to use opioids, starting with lower-strength formulations.<sup>51</sup> However, the remarkably high prevalence of opioid use in older Canadians suggests that many are being treated a couple steps higher on the ladder than they need to be and are, therefore, living with unnecessary risks.

With this in mind, we need to reconsider how we are training Canadian health care providers to treat pain. Research suggests that topical analgesic medication could, and likely should, be used more often.<sup>52</sup> The Canadian Agency for Drugs and Technologies in Health (CADTH) released a report in 2018

highlighting several non-opioid pain management techniques, including many topical therapies that have been shown to be effective. Some of these topical therapies have been approved for the management of chronic pain in other jurisdictions such as the U.S., but not in Canada.<sup>52</sup> Considering the high risks associated with opioids, and the large burden of chronic pain in older adults in Canada, we need to re-examine current pain treatment protocols and explore other options to better and more safely manage pain in older Canadians.

Finally, the clinical gold standard for pain management in Canada is the use of multidisciplinary pain clinics that provide comprehensive care to individuals living with chronic pain, including older adults.<sup>53, 54</sup> Multidisciplinary pain treatment includes multiple health care practitioners adopting a multifaceted, patient-centred approach to treating chronic pain, which research suggests is more effective in reducing pain than single-discipline approaches.<sup>55,56</sup> However, access to multidisciplinary pain care in Canada is seriously lacking. One study from 2007 found that the average wait time to access publicly funded multidisciplinary pain care in Canada was six months, while roughly a third of clinics had wait times of over a year and some reported wait times of up to five years.<sup>57</sup> A 2015 report by the Canadian Medical Association has suggested that this lack of access has likely contributed to the increased use of opioids for treatment of chronic pain in adults in Canada.<sup>58</sup>

Multidisciplinary pain rehabilitation approaches have been found to be particularly effective in older adults; however, this age group is the least likely to be able to access these services. Research suggests that only seven to 10 per cent of patients from some multidisciplinary pain centres are aged 65 years and older.<sup>59</sup> Considering the growing number of older adults in Canada living with chronic pain, the lack of availability of multidisciplinary treatment of pain is a major concern.

## **Predictors of Long-Term Opioid Use in Older Adults, and Challenges with Deprescribing**

Given the potentially staggering consequences of opioid use, it is imperative to better understand the predictors of long-term opioid use in older adults in order to better target prevention and management efforts. However, the high prevalence of chronic pain in older adults, along with the lack of understanding of chronic pain, makes it complicated to predict which older adults will require or use opioids over the long term. Several different studies have attempted to shed light on this issue. For example, one study of older adults living with chronic pain in North Carolina determined that predictors of long-term opioid use include polypharmacy, history of depression, and high pain-catastrophizing scores.<sup>60</sup> A Dutch observational study from 2005 to 2017 found that age

was the main predictor of chronic opioid use, and that musculoskeletal diagnoses were key predictors of long-term opioid use in older age groups.<sup>61</sup> Research in other jurisdictions had similar findings.

A national retrospective cohort study of 13,059 older adults in Australia found four key patterns of opioid users (labelled “minimal-users, incident chronic-users, discontinuing-users, and prevalent chronic-users”), and determined that prevalent chronic-users were more likely to be female, less educated, live in some form of institutionalized setting, have polypharmacy (specifically co-prescriptions of antidepressants or anxiolytic/sedative/hypnotic agents), and have no history of dementia.<sup>62</sup> Studies suggest that both the number of pills and number of days of medication prescribed are key predictors of unintended long-term opioid use, after accounting for the types of injuries and initial pain scores.<sup>63,64</sup> As a result, guidelines — including the *Canadian Guidelines on Opioid Use Disorder Among Older Adults* developed by the Canadian Coalition for Seniors' Mental Health (CCSMH) — suggest limiting prescriptions where possible and close follow-up of patients.<sup>20, 41</sup>

Unfortunately, there are no widely used predictive or prognostic tools available to help clinicians predict

which older adults will continue to require long-term prescription opioids. There are tools that can help predict the likelihood of addiction, such as the ORT<sup>65</sup> or SOAPP<sup>66</sup> tools, but neither are designed specifically for use in older adults. Further, the data that such tools are based on is unlikely to reflect the Canadian context, owing to the pervasive lack of data on this issue in Canada. More work is needed in Canada and around the world to better understand predictors of long-term prescription opioid use in older adults.

In light of the high proportion of older adults who are prescribed long-term opioid therapy, there have been growing calls to deprescribe opioids.<sup>67</sup> Broadly speaking, “deprescribing” refers to reducing the number and volume of prescription medications that may be harmful or no longer needed. However, the challenge of deprescribing opioids in older adults has fallen into the chasm between two larger movements. First, due to the rising prevalence of older adults living with both multimorbidity and polypharmacy, there has been considerable research and policy guidance aimed at the general deprescribing of medications in this population.<sup>69, 70</sup> Second, in response to high opioid prescription rates across age groups, a considerable body of research has also focused on tapering and deprescribing the use of opioids.<sup>71</sup>

Typically, this involves clinicians working to reduce the volume and dose of opioids being prescribed to a patient to either discontinue opioid therapy altogether, or reduce it to a safer amount. Unfortunately, neither of these two movements has paid due attention to the issue of deprescribing opioids in older adults. For instance, a 2018 policy paper found a major lack of focus on opioid deprescribing in the U.S., with no national efforts geared towards opioid deprescribing in older adults.<sup>72</sup> Further, a 2021 review of pharmacist-based interventions on deprescribing found several studies on deprescribing benzodiazepines in older adults, but little research on deprescribing opioids.<sup>73</sup>

Some great work in Canada has been launched to help generalized deprescribing efforts, including by the Canadian Deprescribing Network and the Bruyère academic health care organization, which has developed deprescribing algorithms.<sup>68</sup> The CCSMH has provided some clinical guidance on deprescribing in its guidelines on the treatment of OUD in older adults.<sup>20,41</sup> However, Canada and other jurisdictions must devote greater attention and resources to helping older adults taper their opioid use, and to safely deprescribing long-term opioid therapies when and where appropriate.

## Opioid Use Disorder in Older Canadians

The high volume of prescription opioids used by older Canadians places this group at significant risk for Opioid Use Disorder (OUD), yet they have received considerably less attention compared to the general population. Those who live with OUD experience a growing tolerance to opioids, a need for progressively higher doses to achieve the same effects, and the onset of withdrawal symptoms when not consuming opioids. Further, OUD is an addiction; those living with the disease often increase their use of opioids despite significant life consequences and social issues, and undertake risky behaviours to obtain opioids. They often experience various mental health issues or the sense of loss of control — all of which may be entangled with addiction.<sup>7</sup>

While data on the prevalence of OUD in older Canadians is scarce, data from the US suggest the number of older adults presenting to emergency departments (EDs) for OUD or accessing OUD treatment is increasing rapidly. Research from the US suggests that the number of OUD-related ED visits by older Americans related rose 220 per cent between 2006 and 2014,<sup>74</sup> and that the proportion of older adults seeking treatment for OUD rose 54 per cent between 2013 and 2015.<sup>75</sup>

Research suggests that older adults who develop OUD stem from two general, but not exhaustive, categories. The first includes patients who first tried opioids through drug experimentation, typically not provided through prescription, at a younger age and subsequently live with OUD into older adulthood. The second includes patients who were previously prescribed opioids from a clinician, typically to treat acute or chronic pain, and subsequently developed OUD.<sup>41</sup> In the Canadian context, there is little data on the origins of OUD in older adults; however, evidence from other jurisdictions suggests that many older adults living with OUD tend to start by using prescription opioids.<sup>16,74</sup>

While the public perception of the Canadian opioid crisis typically involves younger individuals using non-prescription opioids and experiencing overdose, special consideration is needed with respect to older adults living with OUD. First, according to the CCSMH, Canada will likely see a growing number of older persons living with OUD.<sup>20,41</sup> Further, OUD is more likely to be undetected in older persons for several reasons, including higher rates of social isolation, medical comorbidities and cognitive impairment,<sup>76,77</sup> and low awareness among health care workers.<sup>78</sup> For these reasons, older persons with OUD are less likely to receive treatment than younger persons.<sup>77</sup>

This is compounded by the lack of older adult-specific treatment options for OUD, as most programs are not geared towards older adults — an additional barrier to accessing treatment. Further, research suggests older persons living with OUD may experience more stigma than younger persons,<sup>77,79</sup> and be less educated about or feel overly stigmatized when accessing important harm-reduction supports,<sup>80</sup> such as safe needle exchanges, supervised consumption facilities or naloxone kits. A 2021 study in the US found that a sample of older adults living in the community using opioids were greatly lacking in their knowledge and use of naloxone to treat opioid overdose.<sup>78</sup> Additionally, it is unclear how many older adults in Canada with OUD have been prescribed a public supply of addictive drugs (also referred to as “safe supply”), which has begun in jurisdictions such as British Columbia. No work has explored how the provision of a public supply of addictive drugs, including opioids, has influenced prescribers with regards to treatment for other older adults.

Overall, the number of older Canadians living with OUD is likely larger than most Canadians appreciate, and this number will only grow in the years to come. Unfortunately, such individuals are more likely to be left at the margins of public health responses as the opioid crisis continues.

## Use of Opioids in Canadian Long-Term Care Settings: A Balancing Act with No Guidance

Recent research has begun to highlight the pervasive use of opioids in Canadian LTC homes. For instance, a recent study of Ontario LTC residents (older than 66 years of age without cancer and not receiving palliative care) found total opioid prescriptions increased from 15.8 per cent in 2009 to 19.6 per cent in 2017.<sup>37</sup> Further, the study reported larger increases in hydromorphone prescriptions and decreases in prescriptions for other formulations; most opioid prescriptions were for residents living with greater levels of frailty and those living with dementia.<sup>37</sup> The authors also noted that, as of the publication date (September 2019), no organizations had set forth guidelines with recommendations for the more appropriate use of opioids in LTC settings in Canada.

Outside of Canada, there has been more research and policy guidance on this issue. For example, a 2012 study of US LTC homes found one in seven residents were prescribed long-term opioids, roughly twice the proportion of community-dwelling older adults.<sup>81</sup> US research has also found that LTC residents being prescribed opioids were among the most frail and vulnerable to adverse side effects, leading to an increased risk of falls and respiratory sedation/overdose.<sup>81</sup> Another US study also

found that only roughly one of every four LTC residents prescribed opioids were also undergoing non-opioid pain treatment, which was largely attributed to cognitive issues leading patients to be unsuitable for certain non-opioid treatments (such as exercise or physiotherapy).<sup>81</sup>

It is also important to acknowledge that many residents in LTC homes have their symptoms well-controlled and stable on long-term opioid therapy; for these residents, it may be inappropriate to discontinue opioid treatments,<sup>81, 82</sup> although ongoing monitoring is always needed and their dosing needs may change. There have been documented incidents of harms to LTC residents whose opioid therapies were discontinued inappropriately, limiting access to a key pain-controlling class of substances for an already vulnerable population.<sup>82</sup> This report's authors have also heard first-hand accounts of Canadian LTCs refusing admission to older adults living with OUD where, for instance, they are using methadone maintenance therapy. This is another important example of how more guidance could be helpful for LTC care providers in Canada.

The use of opioids in Canadian LTC homes involves a fine balance between risks and benefits. The first key consideration is the balance between the high prevalence of pain in Canadian LTC residents with the risk of falls, overdose or over-sedation, drug interactions and polypharmacy, all of which are higher among older

persons in LTC homes compared to community-dwelling older adults.<sup>82</sup> Many non-pharmacological pain-management options (including exercise, physiotherapy or massage therapy) are not employed in LTC homes for a variety of reasons, including higher rates and levels of physical and cognitive disability among residents.<sup>81</sup> Additionally, side-effect profiles from other pain medications in older adults, such as many non-steroidal anti-inflammatory drugs (NSAIDs), often make it less likely these medications will be prescribed; as such, opioids have become a more popular pain treatment in LTC.<sup>82</sup> However, there is a risk of adverse reactions to opioids as well, particularly in predominantly older institutionalized persons living with multiple comorbidities and disabilities. The American Geriatrics Society reports that common adverse effects include constipation, sedation, falls, nausea and delirium, in combination with decreased kidney function, drug metabolism and polypharmacy, which are particularly important to monitor in LTC.<sup>34</sup>

Unlike Canada, the US has issued guidance for the use of opioids in LTC settings. In 2015, the Centers for Disease Control and Prevention released guidelines for the prescription of opioids for treatment of chronic pain, with a section of the report dedicated to the prescription of opioids in LTC settings.<sup>75</sup> The report indicated little research has been conducted on long-term (more than one year) use of opioids in

LTC settings, and recommended re-evaluating opioid use one to four weeks after a resident enters a LTC home, followed by a review every three months.<sup>75</sup> The report also highlighted the need for LTC homes to have pain management protocols in place and continuously evaluate the possibility of reducing the amount of opioids a resident uses or attempt alternatives, if possible.<sup>75</sup> Lastly, the report called for extra caution to be used when benzodiazepines — a common class of psychoactive medications often used to treat anxiety in LTC residents — are co-prescribed with opioids due to their simultaneous sedation effects.<sup>75</sup>

Within LTC settings, particular consideration is also needed for those living with dementia and pain who are being treated with opioids. A growing body of evidence suggests that people living with dementia, particularly those in LTC settings, are much more likely to have undetected and untreated pain than those living without dementia.<sup>83,84</sup> A 2020 scoping review of regulatory and legislative standards for the assessment and management of pain in Canadian LTC settings found that current regulations in Canada fail to abide by expert guidance on the frequency of pain assessments in LTC settings.<sup>85</sup> As such, the authors recommended that Canadian jurisdictions develop better evidence-based guidelines for pain assessment of residents living with dementia in LTC settings.<sup>85</sup> One such tool that LTC homes and care providers can consider implementing



is the Pain Assessment in Advanced Dementia scale (PAIN-AD).<sup>86</sup> However, with regard to the use of opioids to treat pain in Canadian LTC residents living with dementia, the evidence base remains scarce and understudied. One study by Laboni and colleagues in 2019 found that significantly more LTC residents in Ontario living with dementia were on opioids (38.6 per cent) compared to those without dementia (21.6 per cent).<sup>37</sup> However, there is clearly a need for further research and policy guidance.

There has also been limited research in Canada on the training of LTC staff on the nuances of pain management and opioid use in LTC settings. Evidence from the US suggests that nursing staff in LTC homes are often undertrained in their knowledge of pain management, and LTC homes typically lack comprehensive pain-management protocols.<sup>82</sup> US research has also highlighted that high staff turnover in LTC settings makes it more challenging to increase knowledge of the “fine line” of pain management.<sup>82, 87</sup> While no such evidence is available for Canada, high staff turnover in Canadian LTC settings is well documented.<sup>88</sup> Research also suggests that inadequate staffing in LTC settings is associated with a greater reliance on opioid therapies for residents.<sup>82, 87</sup> While little to none of this research has looked at Canadian LTC settings, the COVID-19 pandemic highlighted serious and pervasive issues in training and staffing in Canadian LTC homes,<sup>89</sup> and the

present work suggests a need for a re-evaluation of the use of opioids in these settings.

**Further training, robust re-evaluation of opioid prescriptions for residents, and more research into the use of opioids in Canadian LTC settings is needed to make this “fine line” clearer for residents, care providers and policymakers.**

Further work is also needed to better support older adults living with OUD who either need to be admitted to LTC settings, or who already live in LTC homes.

## **Older Adults’ Knowledge and Perceptions of Opioids**

In response to the large and growing opioid crisis in older adults, researchers in other jurisdictions have begun to explore the knowledge, attitudes and perceptions of older persons towards opioids. Unfortunately, similar to many of the other topics considered in this report, research and understanding in the Canadian context is lacking.

Recent preliminary studies conducted in the US have begun to explore older Americans’ understanding of the use of opioids.<sup>78, 90</sup> This includes assessing their level of understanding

of a variety of opioid-related issues, such as the reason one might be prescribed opioids or the serious risk of side-effects, including overdose. For example, a recent study of the SAFE-HOME program provided by home health workers for older adults living in rural Illinois found a baseline understanding of the risks of opioid overdose and naloxone to be lacking, but also that the program was effective in increasing older adults' knowledge.<sup>78</sup> Another study of 119 older adults in the US found a lack of knowledge among participants about opioids and addiction risk.<sup>90</sup> Overall, more work is needed both globally and in Canada to better understand knowledge gaps pertaining to opioids and opioid-related issues in older adults.

Other recent work, predominantly in the US, has begun to shed light on the perceptions and attitudes of older adults towards opioids and policies surrounding opioid use.<sup>91</sup> One key study in this area comes from the University of Michigan's National Poll on Healthy Aging (NPHA),<sup>91</sup> which is an annual poll on older adults from across the US. In 2018, a NPHA report focused on older Americans' perspectives on opioid medication disposal regulations and safe prescription disposal. One third of all respondents had filled an opioid prescription in the past two years, and roughly three quarters of respondents supported limits on lengths and amounts of opioid prescriptions, whereby in order to obtain prescription opioids, patients would be required to continuously

obtain prescriptions.<sup>91</sup> However, the report notes that restrictive opioid prescription limits can also incentivize older adults to hold on to unused opioids out of fear that future pain may occur and acquiring new opioids may be challenging and time-consuming.<sup>91</sup> Sixty-two per cent of respondents said they would save their opioids in case they needed them in the future, highlighting that safe and accessible methods of opioid disposal are likely to be ineffective if there is a widespread belief among older adults of the likely need for future use.<sup>91</sup> While there is, again, little guidance on this issue in the Canadian context, this is an important issue to consider when considering opioid-related policy changes in Canada.

In addition, safe opioid disposal methods are largely inaccessible for many older adults. For example, only 13 per cent of NPHA respondents reported returning opioids to a safe disposal location.<sup>91</sup> In particular, many safe disposal locations are not accessible for older adults who cannot leave their homes, those living with disabilities, or those who cannot drive.<sup>91</sup> This is further complicated by the fact that home disposal methods, such as flushing opioids down the drain, are not advised due to environmental reasons. Together, this often leaves older adults with no safe recommended method to dispose of unused opioids, resulting in an unnecessarily high proportion of older adults having leftover opioids in the home.<sup>91</sup> In the US, more accessible alternatives to opioid disposal

are becoming available, including products that can allow opioids to be safely thrown in the trash.<sup>91</sup> However, these products are not yet available in Canada and would likely come as an out-of-pocket expense. Again, similar work to understand the perspectives of older adults on opioid policies in Canada is likely needed.

The NPHA survey asked older adults about their perspectives on opioid-related education and training. Eighty per cent of respondents were in favour of specialized training on opioid prescribing for health care providers.<sup>91</sup> This was likely related to the fact that less than half of NPHA respondents indicated that they were told by prescribers about the risk of addiction (48 per cent), overdose (46 per cent) or how to dispose unused opioids (37 per cent), while only 60 per cent reported being told about opioid side effects or when to taper their dosage.<sup>91</sup> While no analogous data exists in Canada, there are many lessons to be gleaned with regard to improving medical education to be better geared to helping older adults who are prescribed opioid therapies. However, a recent curriculum update on opioids by the Association of Faculties of Medicine of Canada did not include specific education on opioids and their considerations for older adults.<sup>92</sup> This is concerning, considering previous research suggests many opioid prescribers experience hesitation and uncertainty when it comes to treating their older patients living with chronic pain.<sup>93</sup>

More comprehensive education on the specific considerations needed when prescribing opioids to older adults is should be included in Canadian health care training.



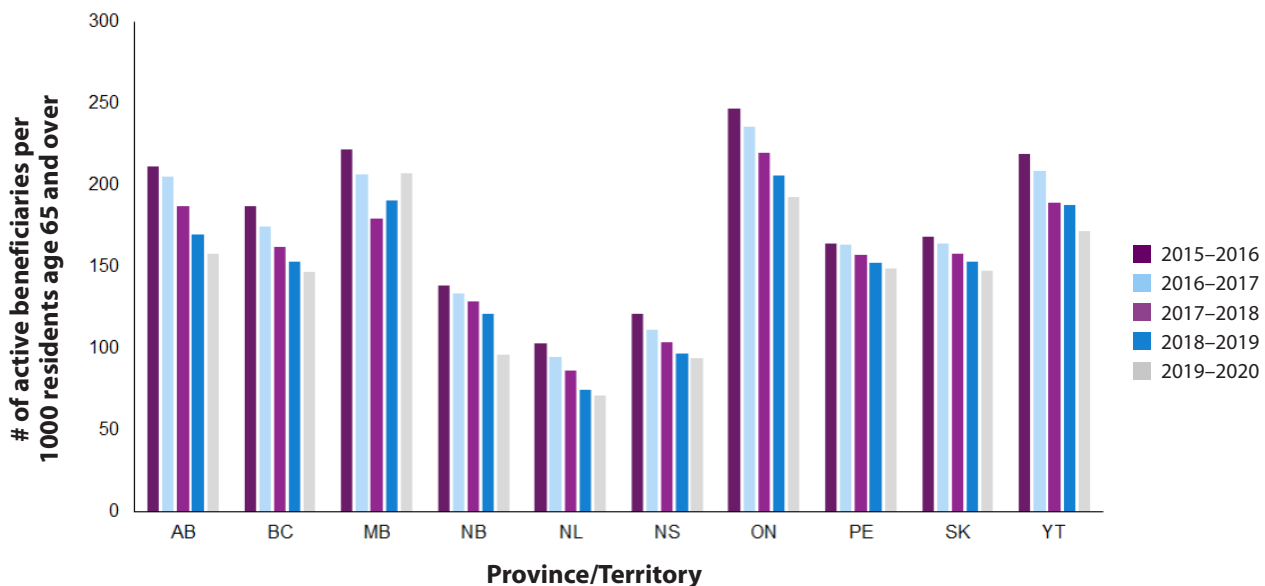
# Developing a Better Understanding of Canada’s Opioid Crisis through a Pan-Canadian Analysis of Opioid Prescriptions and Hospital Visits Among Older Canadians

In response to the scarcity of data on opioid-related issues in older Canadians, NIA researchers partnered with the Canadian Institute for Health Information (CIHI) to acquire national data on opioid use and outcomes. We acquired all available provincial and territorial data from 2015-20 from the National Prescription Drug Utilization Information System (NPDUIS); all available emergency room data relating to opioids from the National Ambulatory Care Reporting System (NACRS); and all available inpatient hospitalization data from the Discharge Abstract Database (DAD). Further details on the specific methodology used and how the NPDUIS, NACRS, and DAD data were obtained, cleaned and analyzed are found in the *Supplemental Appendix*.

## Understanding the Volume and Rate of Prescription Opioids Used Among Older Canadians

Using the CIHI NPDUIS database, data on the number of active beneficiaries aged 65 years and older (i.e. the number of people with current prescriptions for opioids) were available for the following provinces: Alberta (AB), British Columbia (BC), Manitoba (MB), New Brunswick (NB), Newfoundland and Labrador (NL), Nova Scotia (NS), Ontario (ON), Prince Edward Island (PE), Saskatchewan (SK) and Yukon (YT). The estimated number of active beneficiaries aged 65 years and older per 1,000 residents of each province/territory during the years 2015-2020 are provided in Figure 1 below.

**Figure 1: Older Adults who were Opioid Beneficiaries Across Provinces and Territories between 2015 and 2020**



The estimated number of active beneficiaries (i.e. # of people with an active opioid prescription, expressed as a proportion out of 1,000 residents) varied significantly between jurisdictions, but overall the rates were high. Multiple Canadian jurisdictions had estimates suggesting roughly 1 in 5 of their older adults received some form of opioid prescription during a given year. However, nearly all showed a trend where the estimated per capita opioid prescription rates declined between 2015 and 2020. It is also important to note that much of the variation between Canadian jurisdictions is likely attributable to differences in coding practices and data availability, in addition to differences in their underlying patient populations and prescriber practices.

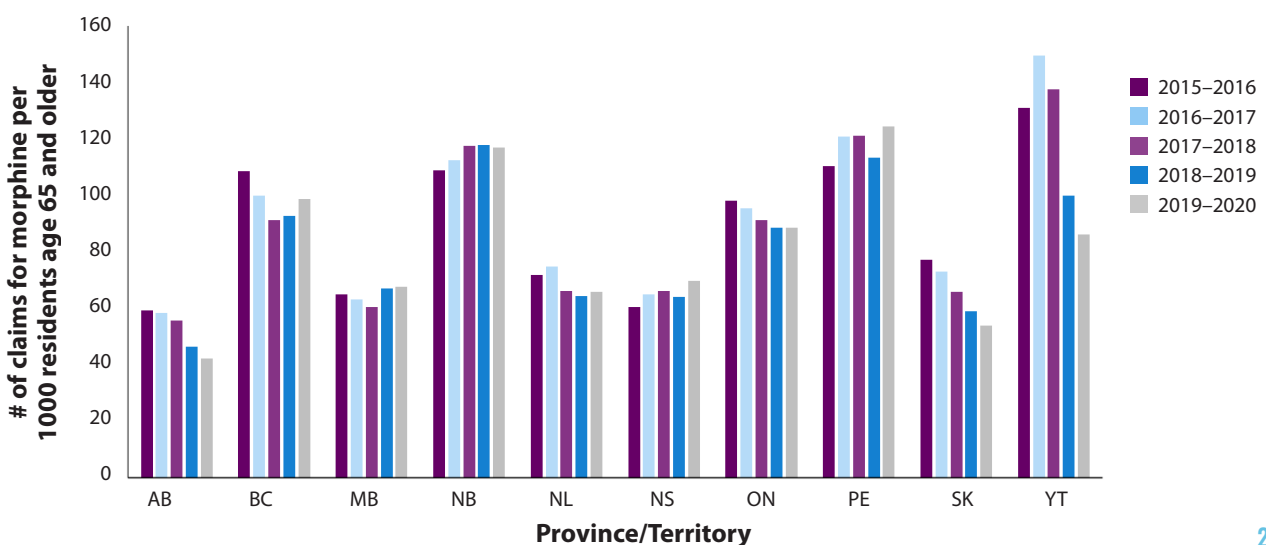
Similar trends continued when examining the total number of claimed opioid prescriptions from 2015-2020 using NPDUIS data. Overall claims data was only available for three provinces (BC, MB and SK). The number of claimed prescriptions by age group (less than

65 vs 65 and older), expressed as a proportion of residents in that province, are shown in *Supplemental Appendix*. The data show overall high rates of prescription opioids being dispensed per capita to older adults in the three provinces examined. As expected, while there were more claims made in the younger age group, the claims per 1000 residents were much higher in the older age group (see *Supplemental Appendix*).

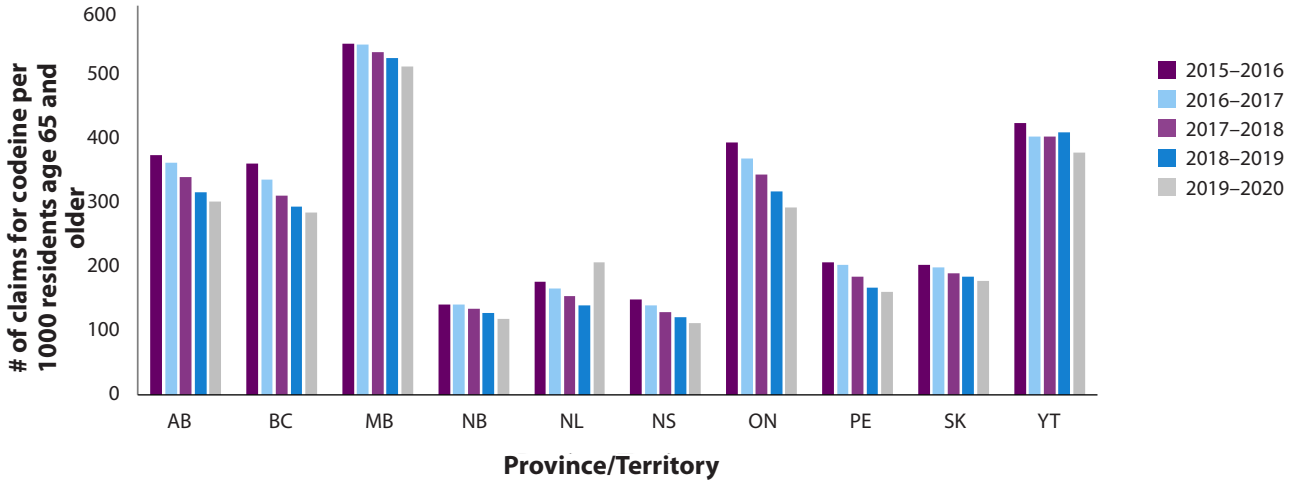
We also obtained drug-level data to ascertain opioid prescription patterns across provinces/territories where data was available. Drug-level data available for the following provinces/territories: AB, BC, MB, NB, NL, NS, ON, PE, SK and YT.

We analyzed data for the five most commonly used opioids of various strengths (codeine, morphine, oxycodone, hydromorphone and fentanyl). Below, we provide graphs for the number of total claims (prescriptions) per 1,000 residents aged 65 years and older for provinces/territories for the years 2015-16 to 2019-20.

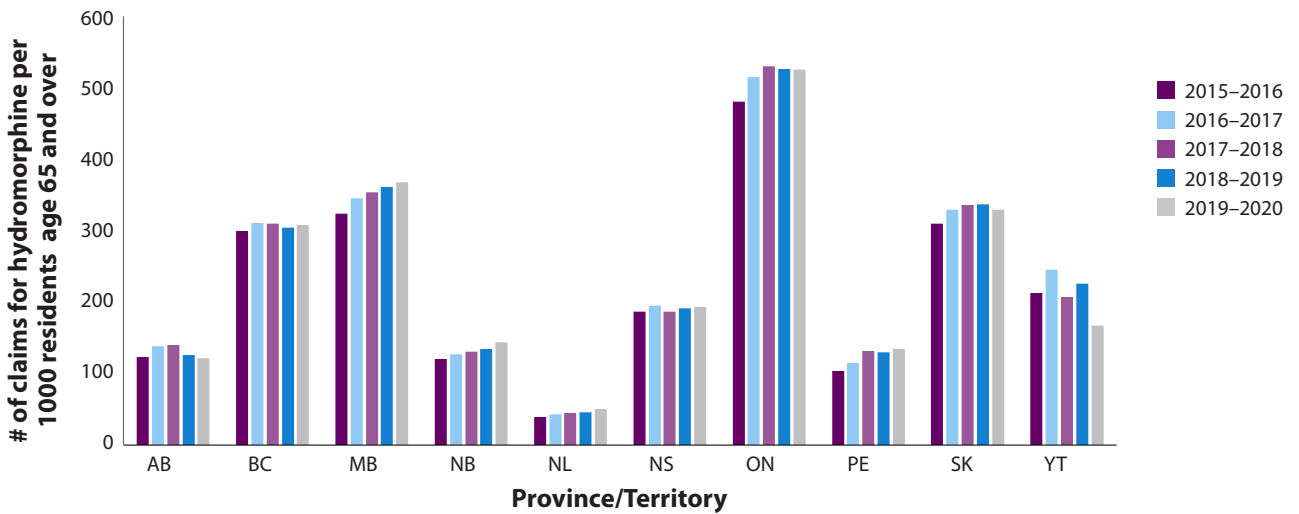
**Figure 2A: Morphine Claims by Older Adults in Provinces and Territories (2015-2020)**



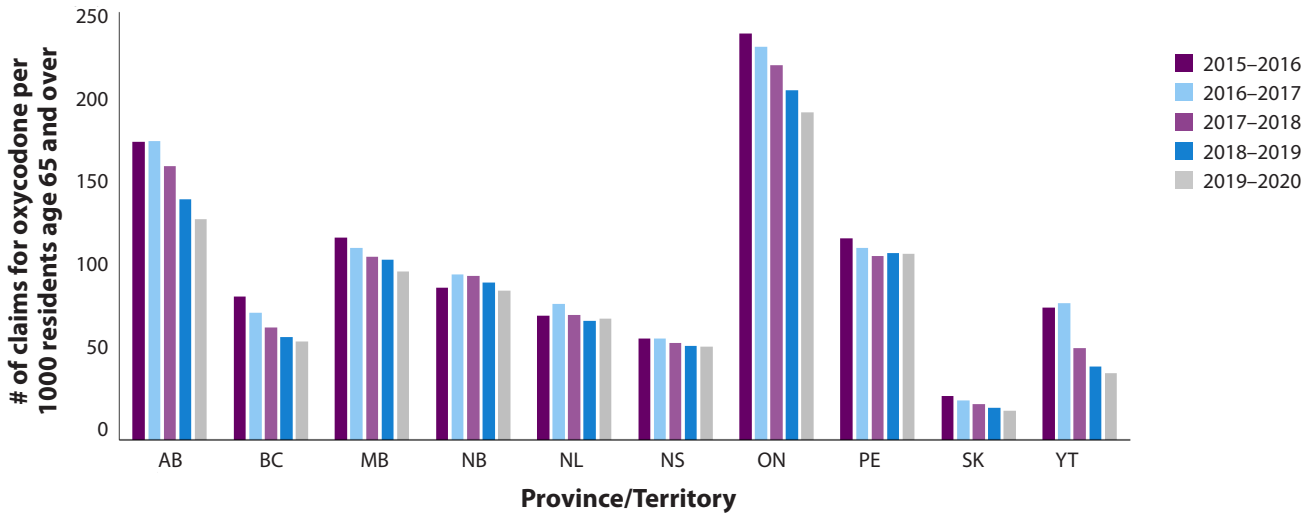
**Figure 2B: Codeine Claims by Older Adults in Provinces and Territories (2015-2020)**



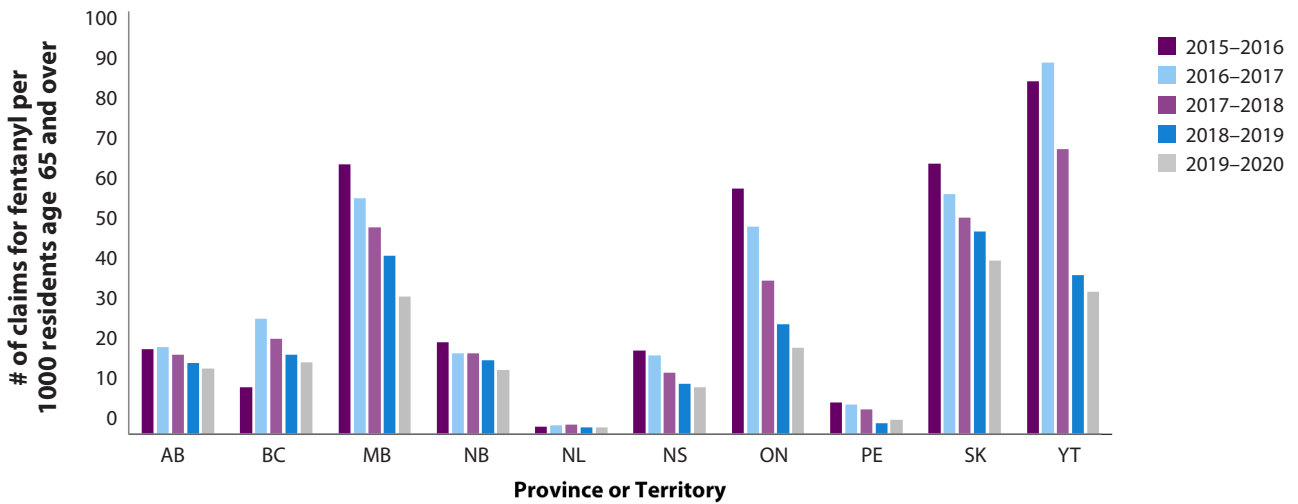
**Figure 2C: Hydromorphone Claims by Older Adults in Provinces and Territories (2015-2020)**



**Figure 2D: Oxycodone Claims by Older Adults in Provinces and Territories (2015-2020)**



**Figure 2E: Fentanyl Claims by Older Adults in Provinces and Territories (2015-2020)**



The drug-specific analyses of the CIHI NPDUIS data revealed a few key trends across the country. First, similar to the data on opioid beneficiaries, the drug-level analyses showed an overall high level of opioid consumption in older Canadians, although the rate of opioids claimed varied over the years and across the provinces/territories.

The data also suggest recent shifts in opioid prescription patterns for older Canadians. In particular, the prescription rates of oxycodone and fentanyl appear to have decreased rapidly and steadily across the provinces/territories in recent years. This may reflect changes in prescribing and patient preferences, as awareness of the risks associated with fentanyl and oxycodone has grown throughout the Canadian opioid crisis.<sup>94</sup> In particular, fentanyl has been a central focus of attention with regards to the overdose crisis in many provinces,<sup>94</sup> and it appears that the rate of fentanyl prescriptions among older Canadians has dropped in many provinces/territories, such as MB, ON, SK and YT.

At the same time, it appears that the prescribing of hydromorphone, another common high-potency opioid, has remained stable or increased in certain provinces/territories (e.g. up to 500 claims per 1,000 residents in Ontario). It is an interesting observation, considering the strength of hydromorphone lies between that of oxycodone and fentanyl, but it received markedly less attention in the public conversation on the

Canadian opioid crisis. This aligns with recent research showing the growing use of hydromorphone in Ontario LTC homes.<sup>37</sup> One of many reasons for this shift may be the fact that hydromorphone has some properties that make it more favourable than other opioids, such as causing less renal impairment.<sup>95</sup>

On the other hand, the observed rates of annual codeine claims were also high in many provinces/territories (e.g. over 500 claims per 1,000 older residents in MB). While codeine is one of the least potent formulations and, in some provinces/territories, can be obtained without a prescription, it still has potential for misuse. The current data show a high rate of older Canadians relying on codeine as a means of pain control. However, it seems that codeine and morphine rates are also decreasing on a per capita basis in older Canadians. Similar to oxycodone and fentanyl, it is possible that a heightened awareness of the opioid crisis in general has caused reductions in the rate of codeine and morphine prescriptions for older Canadians.

While it's important to pay attention to the high quantities of opioids being prescribed to older Canadians, the data also leaves questions as to how many of these Canadians described in the reductions of formulations such as codeine, oxycodone and fentanyl are receiving adequate pain control. As mentioned above, the availability of non-opioid pain therapy treatments (such as multidisciplinary pain clinics



or other non-opioid treatments) in Canada is very poor.<sup>57</sup> While the current ecological-level data on the amount and rate of prescriptions offers an important high-level view of opioid use in older Canadians, more detailed and nuanced research and understanding into the factors and outcomes associated with such shifts in opioid use in older Canadians is urgently needed.

Lastly, it is unclear as to why we saw large variations in prescription patterns across Canada. The rate of claims in older adults between provinces/territories varied considerably for the various formulations studied. It appears that clinicians in some provinces tended to prescribe higher or lower rates of certain formulations than others. The underlying reasons for the variations are unclear, but it could be due to differences in case-mix and demographics other than age (e.g. sex, socioeconomic status, urban/rural, access to physicians or treatment, etc.), differences in medical practice between provinces/territories, or a combination of several reasons. There may also be factors within the data itself that could explain some differences, including differences among provinces/territories in coding and reporting rates of opioid prescriptions or hospital visits. The current ecological data offers a critical first glimpse into this issue, but further work is needed to better understand the nuances of opioid prescription rates for older Canadians in specific provinces/territories.

Overall, the NPDUIS data provides an important first look into the high volumes and rates of opioid prescriptions among older Canadians over the past five years. The data show a shift away from some high-strength formulations such as oxycodone and fentanyl, but not from hydromorphone or codeine. Moving forward, there is a need to better understand the key drivers of the usage of various opioids in Canada, why older adults in some provinces/territories are using more or less of a specific opioid than others, and what can be done to safely lower consumption of opioids by older Canadians while ensuring they receive adequate pain treatment.

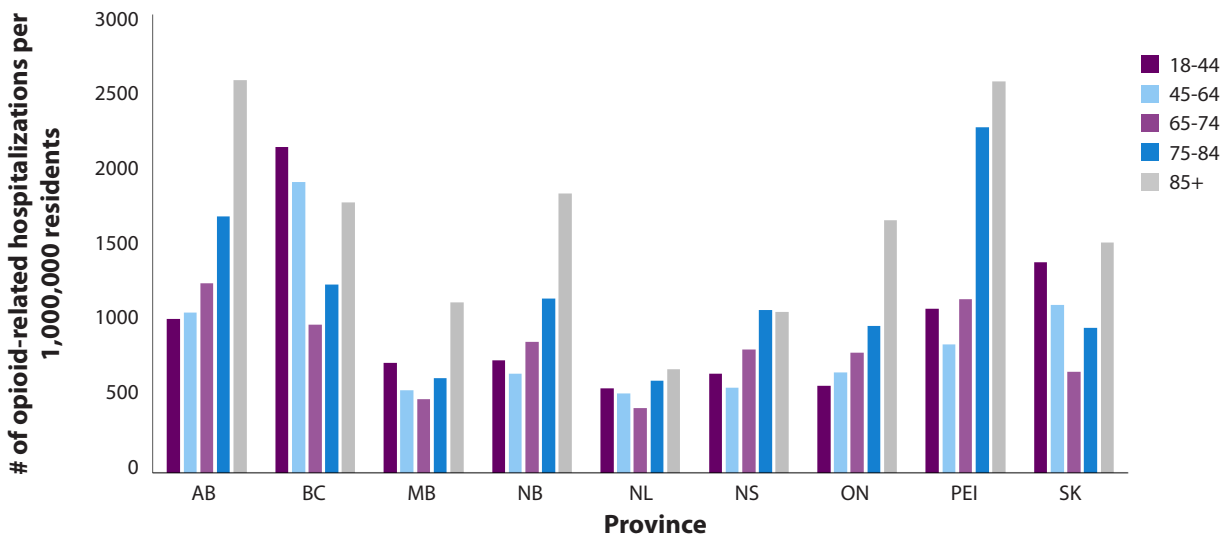
## **DAD and NACRS Database**

We also obtained data through the DAD and NACRS data systems at CIHI, which provide provincial/territorial-level data on hospitalizations and emergency department (ED) visits, respectively. Within each dataset, there are three main types of codes used to describe opioid-related visits or hospitalizations: opioid-related adverse events, which typically refers to a range of negative effects or symptoms experienced by persons who are prescribed opioids, such as gastrointestinal problems, delirium, falls/fractures, among others ----; OUD cases; and opioid overdose. Similar to the NPDUIS data, we obtained data on the past five years available (2015-20). Additional information on the data and methodology used can be found in the *Supplemental Appendix*.

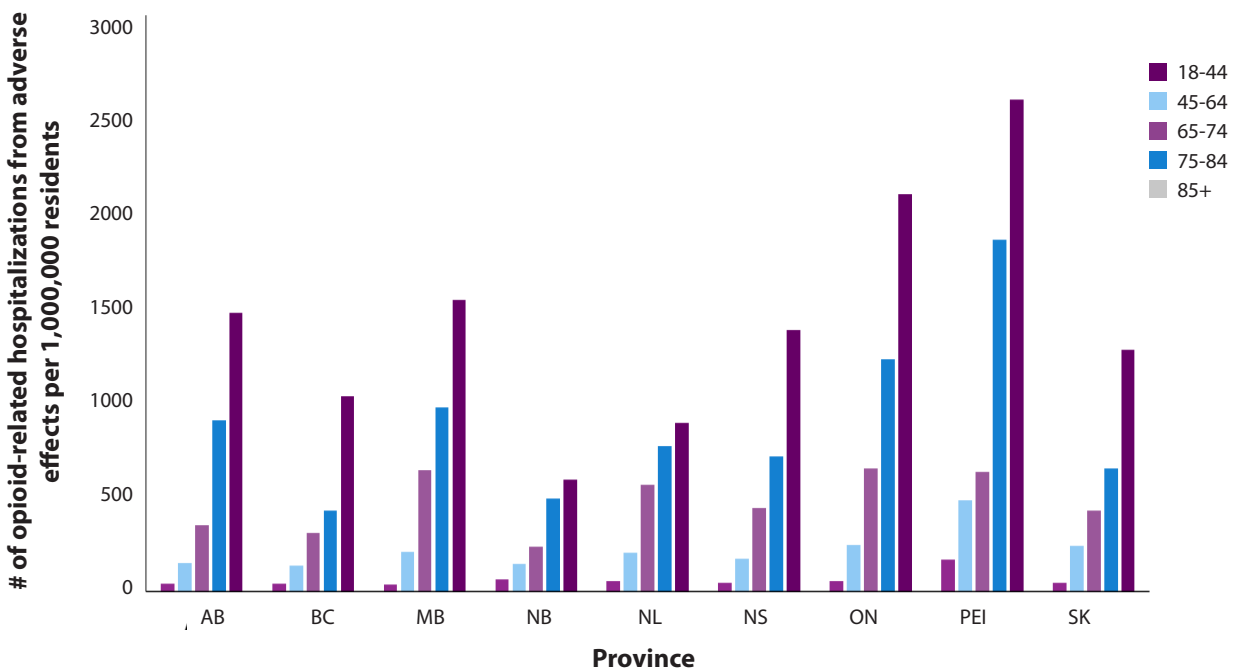
The following figures outline the estimated number of overall hospitalizations (all codes), along with hospitalizations for each individual code (opioid-related adverse events, OUD cases, opioid overdoses), by age group, per one million residents for

2019-20 in each province for which data was available (no data was available for any of the territories). All of the other years studied (2015-19) are included in the *Supplemental Appendix*; most trends shown below are similar in the other years studied.

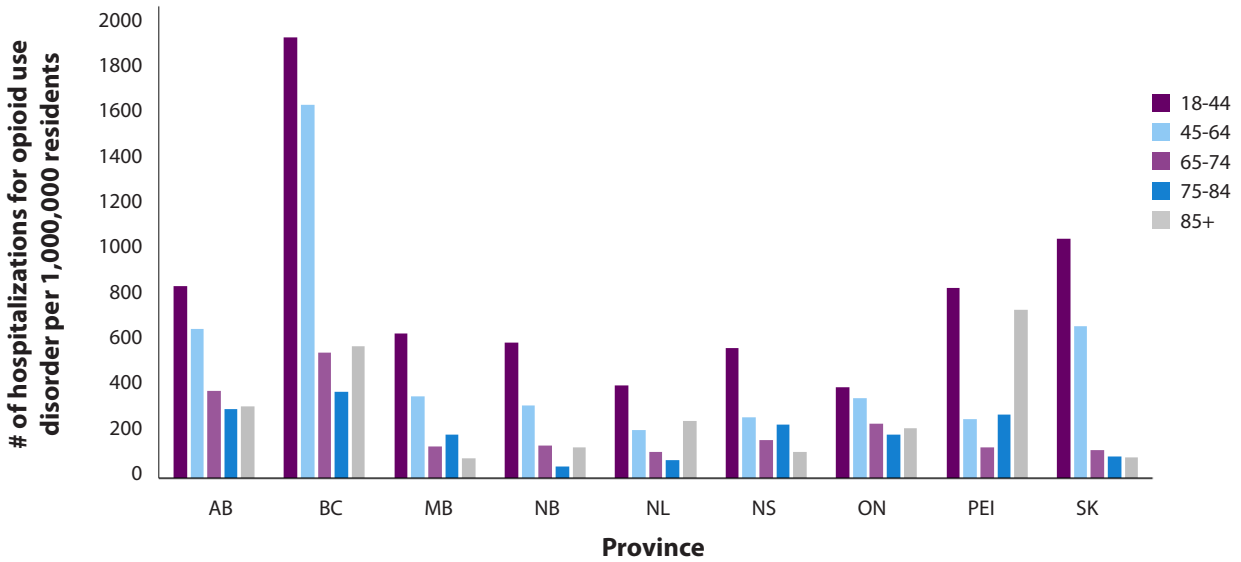
**Figure 3A: Opioid-Related Hospitalizations in Older Adults across Provinces and Territories in 2019-2020**



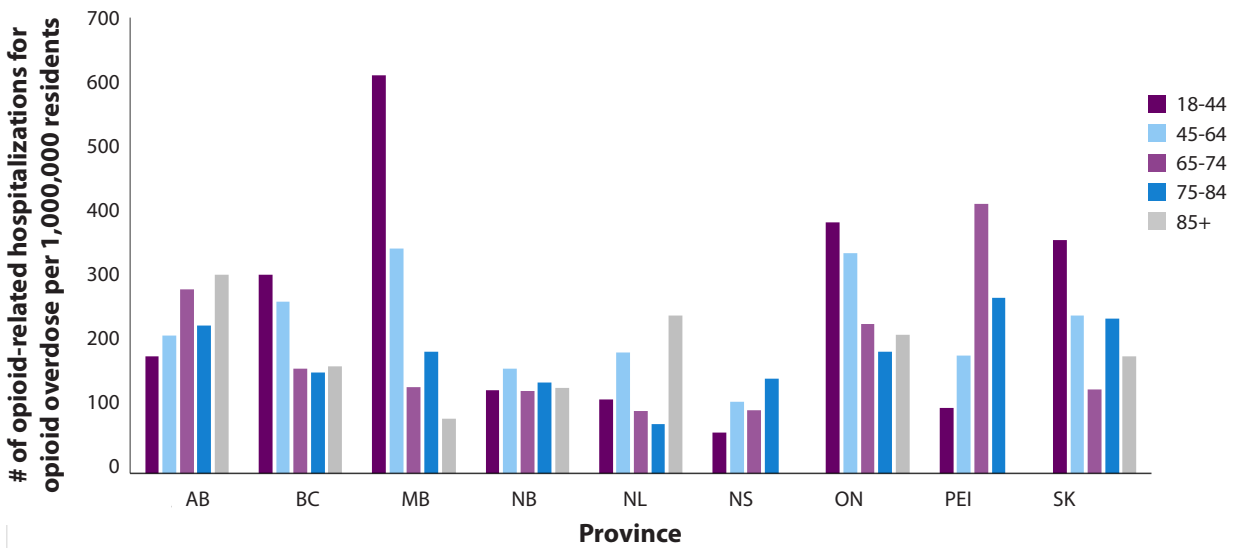
**Figure 3B: Hospitalizations from Adverse Effects from Opioids across Provinces and Territories in 2019-2020**



**Figure 3C: Hospitalizations for Opioid Use Disorder across Provinces and Territories in 2019-2020**



**Figure 3D: Hospitalizations for Opioid Overdose across Provinces and Territories in 2019-2020**



Several key findings emerge from the DAD data. Concerning all opioid-related hospitalizations, the data suggest that age is a key risk factor. Hospitalizations are more likely to occur in older adults compared to younger persons.<sup>96</sup> Therefore, the data somewhat reflect a bias: if two persons, one younger adult and one older adult, consume the same opioid or experience overdose, the older one is at a higher risk of being hospitalized. (It is also important to note that this data includes suicide attempts.) Hospitalizations are a serious outcome from opioid use and can have significant impacts on health-related outcomes and quality of life in older adults. The high rates of opioid hospitalizations among older Canadians, and their underlying causes, warrant more attention and further investigation.

There is a considerable degree of heterogeneity in hospitalization rates between provinces across age groups. Similar to the NPDUIS data, this may result from a wide range of factors, such as regional- or provincial-level opioid use or misuse, differences in prescription patterns between provinces, differences in patient demographics and case-mix, differences in coding practices between provinces, and so on. However, while the available data is not granular enough to allow us to fully understand the provinces' variance, the trends across age groups are vitally important. In many provinces, such as AB, MB, NS and ON, there is a clear trend where the overall risk of hospitalization appears

to rise in tandem with each age group. Other provinces, such as BC and SK, display more of a bimodal distribution (with both younger and older age groups experiencing higher numbers of hospitalizations), likely reflective of the high rates of overdoses in younger populations in these provinces.

In terms of opioid-related adverse events, there was a step-wise relationship between age group and rate of hospitalization in every province studied. This is in line with research from other jurisdictions and previous Canadian data.<sup>96,97</sup> The findings likely reflect the fact that, as seen in our analysis of the NPDUIS data, the volume and rate of opioid prescriptions in older Canadians remains very high overall. They also reflect that, due to several aforementioned factors, older persons are at higher risk of adverse events from opioids. However, limitations in the data do not allow a more nuanced understanding of the epidemiology and risk factors that predispose older Canadians to such hospitalizations, or why hospitalization rates for older persons are higher in some provinces and territories than others. Future work and research in Canada must better understand this underappreciated public health problem.

With respect to OUD, the opposite trend was largely observed, which also aligns with previous research conducted elsewhere.<sup>98</sup> In general, most provinces report more hospitalizations associated with OUD in younger age groups as compared

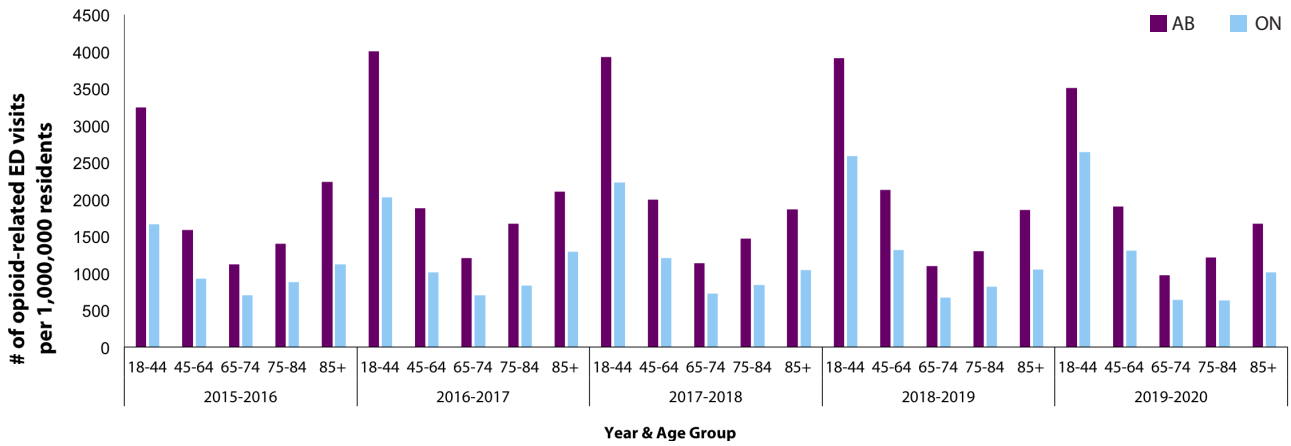
to older age groups. However, some provinces buck the trend (particularly AB, BC and PEI) with higher hospitalization rates for older adults. It is also important to recognize that there are OUD hospitalizations for older age groups in every province and the numbers appear to be rising (see data from 2015-19 in the *Supplemental Appendix*). This may be surprising to many, as in Canada there is often a preconceived notion that OUD is an issue for younger Canadians. Moving forward, more research is needed to understand the drivers of OUD in older Canadians, and health policy on OUD must better address the unattended needs of the large and growing number of older Canadians living with OUD. For additional information, please see the recent *Canadian Guidelines on Opioid Use Disorder Among Older Adults* by the CCSMH.<sup>20, 41</sup>

Lastly, the rates of hospitalization from opioid overdose provide a murkier picture with respect to age. Across the provinces, there was no clear relationship between age groups and the rate of hospitalization from opioid overdose. However, the data suggest that a considerable number of older Canadians every year are hospitalized from opioid overdose, which may come as another surprise to those who perceive opioid overdose as a public health issue centred on younger Canadians.

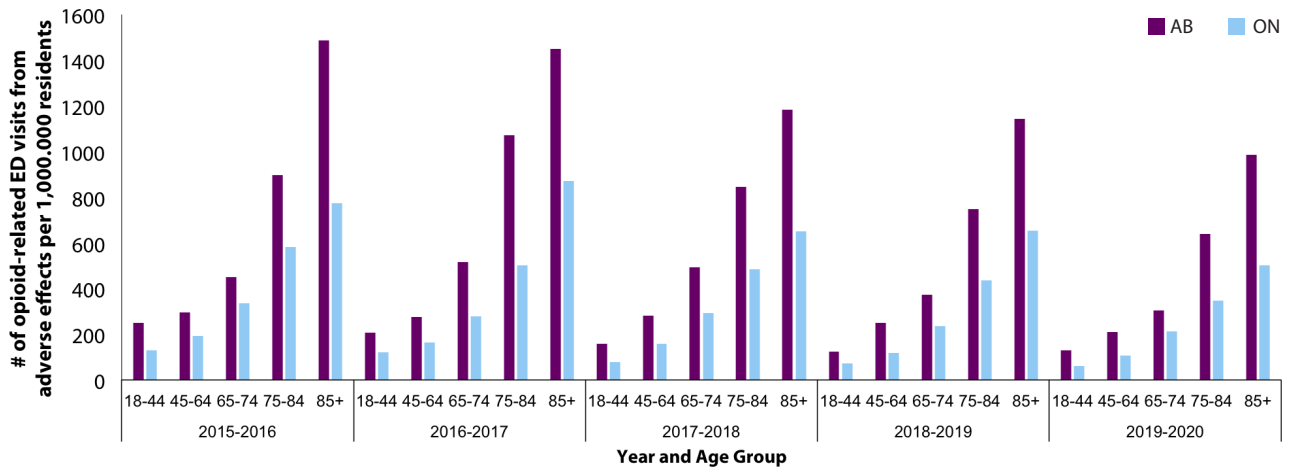
As a final note on the rate of hospitalization in older Canadians, there is little available data outlining how physicians and other health care professionals across Canada code for opioid-related hospitalizations and visits. For instance, it is unclear during which circumstances someone may code a patient who has been prescribed opioids as experiencing an adverse event or as opioid overdose. Due to the prevalence of opioid prescriptions among older Canadians, it is possible that there is a bias towards coding hospitalizations as "adverse events" as opposed to "opioid use disorder" or "overdose," as OUD has been found to be less likely to be detected, recognized or addressed in older age groups.<sup>20, 79</sup> Further investigation is needed into coding practices for opioid-related harms in older adults across Canadian provinces and territories.

We also analyzed all the available emergency department (ED) data through the NACRS database from 2015-20. Data was available for AB, MB, NS, ON, PEI, SK and YT; however, limitations to the data allowed only AB and ON to be analyzed. The following figures provide estimates for ED visits in ON and AB related to opioid use: overall ED visits, opioid-related adverse events, OUD, and opioid overdoses.

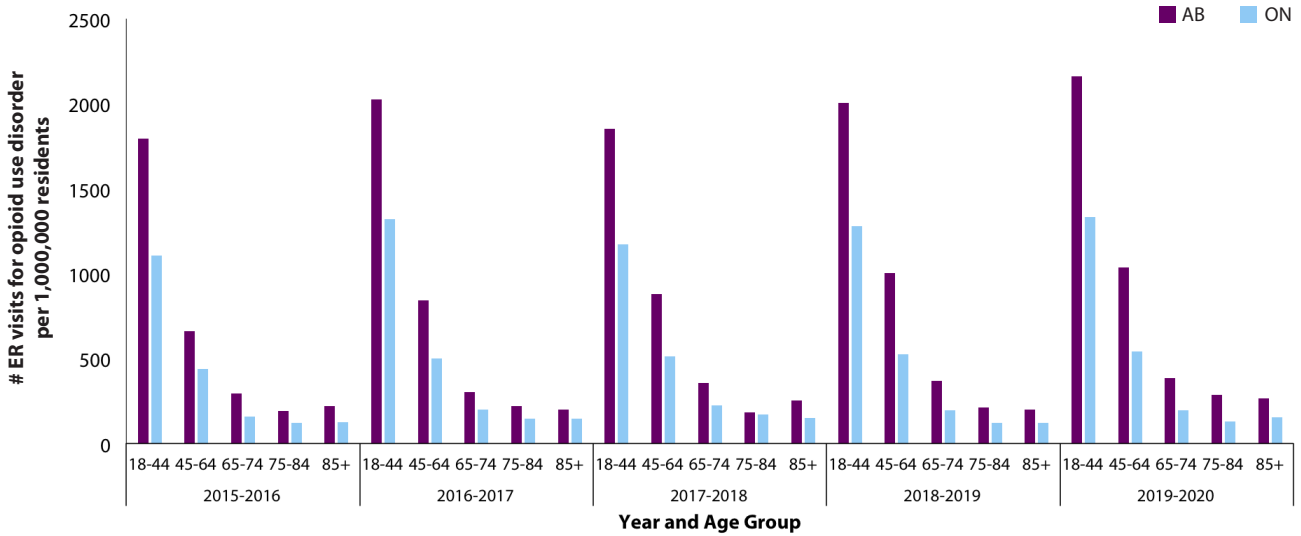
**Figure 4A: All Opioid-Related Emergency Department Visits in Alberta and Ontario (2015-2020)**



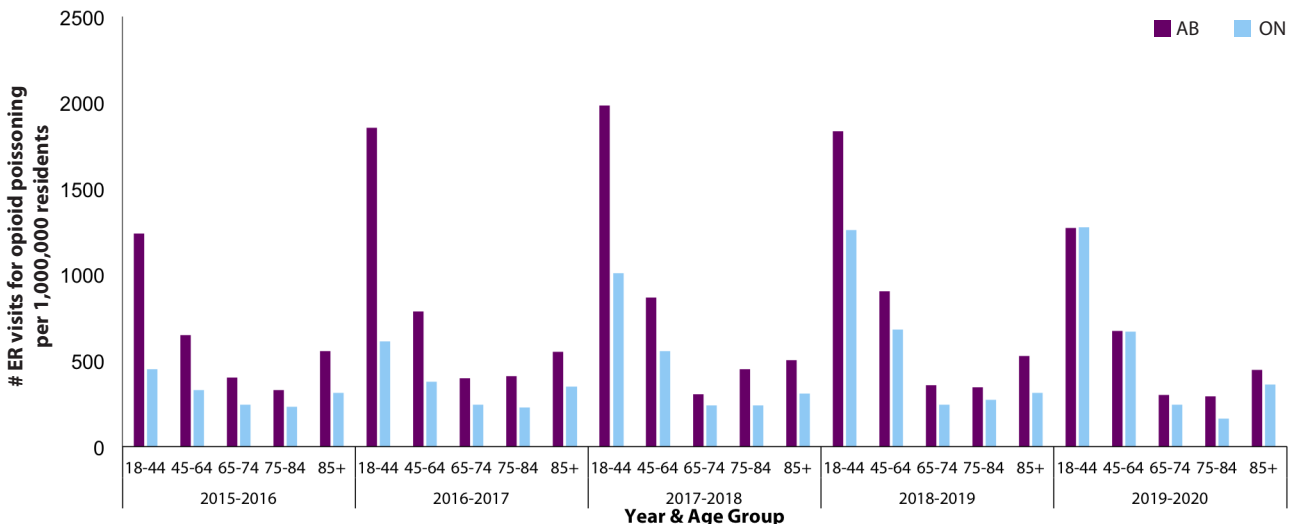
**Figure 4B: Emergency Department Visits related to Adverse Effects from Opioid Use in Alberta and Ontario (2015-2020)**



**Figure 4C: Emergency Department Visits related to Opioid Use Disorder in Alberta and Ontario (2015-2020)**



**Figure 4D: Emergency Department Visits related to Opioid Overdose in Alberta and Ontario (2015-2020)**



The NACRS findings were largely similar to the hospitalization trends previously discussed. Our ability to interpret the results is largely limited by the small number of provinces and territories with data available. However, there are important takeaways from the ED data that add to our understanding of opioid-related harms in older Canadians.

First, it should be re-emphasized that an ED visit is a less serious outcome than hospitalization. As older adults are at greater risk of opioid-related harms, they are more likely to require more intense intervention in response (i.e. hospitalization as opposed to an ED visit followed by discharge). Therefore, it is expected that certain trends may be more pronounced in younger age groups, as younger persons may not experience as intense symptoms or effects from opioids and may be less likely to require hospitalization for the same event (such as an opioid overdose).

With that being said, the ED data obtained from NACRS largely reflects findings from the hospitalization data acquired from the DAD database. For instance, with overall ED visits related to opioids, the youngest age group (18 to 45) experienced the highest annual rate per capita, but the second highest rate was for the oldest age group (more than 85 years old). When examining the type of ED visit in more detail, it becomes apparent that ED visit rates for the younger groups are largely related to OUD, while in the older groups it is heavily driven by

opioid-related adverse events. Again, the ED data on opioid overdose largely shows a trend in which, while a larger portion of younger adults experience opioid-related overdoses, there is still a large number of older adults experiencing opioid-related overdoses resulting in ED visits.

Together, the NACRS and DAD data provide some key insights into how older Canadians are experiencing harms related to opioid use. It offers a key glimpse into how the opioid crisis is leading to older Canadians visiting EDs or being admitted to hospitals across the country. This is reflected in the high overall numbers of ED visits and hospitalizations related to opioids seen across the provinces and territories studied. When looking at the specific codes underlying ED visits and hospitalizations, older Canadians have been experiencing high rates of opioid-related adverse events. Unfortunately, the data available did not allow for a more detailed and nuanced understanding of the factors and epidemiology underlying this trend. Little research into this topic in the Canadian context exists today. However, the data show that many older Canadians have been to the ED or have had hospital stays as a result of OUD or an overdose; likely in much larger numbers than most Canadians appreciate.

It is also important to note that, while this data provides insights on opioid-related harms across age groups and provinces, it does not include data on Indigenous or other ethnocultural



groups, or people across Canada's three northern territories. Future work exploring the intersections of age and opioid-related harms in specific groups and areas across the country is urgently needed.

There are also significant health care costs associated with the high volume of opioid-related hospitalizations and ED visits across Canada. According to a report from the Canadian Centre on Substance Use and Addiction and the Canadian Institute for Substance Use Research, the overall cost of opioids in Canada (including lost productivity, health care costs, criminal justice costs and other direct costs) in 2017 was approximately \$6 billion.<sup>99</sup> Of this, health care costs were estimated at \$400 million;<sup>99</sup> however, this figure has likely grown much larger in recent years due to dramatic increases in overdose rates, ED visits and hospitalizations nationwide attributable to opioids.<sup>100</sup> Importantly, many of the ED visits and hospitalizations involving opioids in older adults were preventable, which suggests that a greater emphasis on effective prevention in older adults would likely be both highly beneficial and cost-effective.

Collectively, these findings on opioid prescriptions and hospital visits offer a preliminary, pan-Canadian snapshot that quantitatively illustrates the need to address the Canadian opioid crisis specifically in older adults. With high volumes of opioid prescriptions (particularly formulations such as codeine and hydromorphone) in many parts of Canada, along with

high rates of opioid-related ED visits and hospitalization in older adults (particularly related to adverse events from prescriptions), the opioid crisis has hit older Canadians particularly hard. This data suggests an urgent imperative to increase research into the understanding of opioid prescriptions and harms in older Canadians, to improve policies to better address these prescriptions and hospitalizations rates, and to raise awareness of how deeply older Canadians are impacted by opioids.



## COVID-19 and the Canadian Opioid Crisis: What Do We Know about the Impact of the Pandemic on Older Adults?

The onset of another epidemic in Canada, the COVID-19 pandemic, sparked a resurgence of conversations about the opioid crisis in Canada. In particular, the COVID-19 pandemic led to higher rates of opioid overdoses and deaths across the country during its first to years. The Public Health Agency of Canada reported 6,213 opioid-related deaths in 2020 and 7,560 in 2021, a substantial increase from the 3,698 deaths recorded in Canada in 2019.<sup>100</sup> As a result, due to the profound and unprecedented response to curb the COVID-19 pandemic in Canada, advocates nationwide have urged for similar resources be mobilized in order to tackle Canada's opioid crisis.

To date, the research aiming to identify how the COVID-19 pandemic exacerbated the opioid crisis is just beginning to produce results. With respect to fatal overdoses, it has been found that the Canada-US border closure led to disrupted drug supply chains that increased the toxicity level of illicit fentanyl in parts of Canada.<sup>101</sup> Other factors that have been found to be associated with the increase in opioid-related deaths in Canada include higher rates of social isolation experienced in tandem with social or physical distancing recommendations, and reduced availability of health

care, addiction and harm-reduction services. In addition, many Canadians reported high stress levels due to the COVID-19 pandemic.<sup>102, 103</sup> Stress is well established as a key risk factor for substance use, including opioid use and OUD.<sup>104</sup> Many opioid-related deaths occurred with persons dying alone in their own homes due to lockdowns.<sup>101</sup>

In light of the profound and unprecedented response to curb the COVID-19 pandemic in Canada, many academics, advocates and organizations nationwide have urged that similar resources be deployed to tackle the Canadian opioid crisis.<sup>101, 105</sup> However, older Canadians are largely left out of the conversation, just as they were before COVID-19. For instance, a report by the Ontario Science Table titled "The Impact of the COVID-19 Pandemic on Opioid-Related Harm in Ontario" identified specific groups of Ontarians that had been disproportionately affected by this pandemic. It did not include older adults. While much of the data in the Science Table report,<sup>105</sup> and other research,<sup>106</sup> focused on overall mortality and overdose rates experienced in Ontario, this report suggests that the scope of opioid-related harms and burdens experienced by older adults is not likely being adequately captured.

With this in mind, there is still little research on the impact of COVID-19 on opioid-related harms on older Canadians. The little work that does exist has focused on medication use in Ontario LTC homes during COVID-19, which demonstrated that it increased.<sup>107,108</sup> However, outside of LTC settings, research on opioids in older adults and on opioid-related harms in Canada during the COVID-19 pandemic suggest that this “twindemic” may have had grave and serious implications for older Canadians who use opioids. In particular, much of the research in Canada points towards social isolation as a key factor behind increasing rates of opioid-related harms. Considering the established relationship between isolation and loneliness as a driver of opioid-related harms in older adults,<sup>109</sup> and the well-known isolating impacts of the COVID-19 pandemic impact on older Canadians,<sup>110,111</sup> one can assume that older Canadians who use opioids have experienced a particularly heavy burden. However, as was the case before the pandemic, the impact of opioid use specifically on older adults remains an area of scarce research. A better understanding of how this pandemic has affected older Canadians who use opioids is urgently needed. Older Canadians must also be considered and prioritized in calls for changes to opioid-related policies and practices to repair weaknesses in public health revealed by the “twindemic.”

## How Ageism in Canada May Be Exacerbating Canada's Opioid Crisis

Throughout the COVID-19 pandemic, pervasive ageism in Canada became more readily apparent as evidenced by the spike in mortality rates in older Canadians, particularly in LTC settings. The unprecedented spike in mortality rates was paired with delayed and inadequate responses, as many of Canada's oldest and most vulnerable citizens were left to die. Statements justifying excess mortality in older adults from COVID-19, such as "they had multiple comorbidities" or "they were old, frail and were going to die anyway" became far too commonplace.<sup>112</sup> As of Dec. 5, 2022, 42,703 persons aged 60 years or older have died from COVID-19 in Canada, compared to 3,326 aged 59 years or younger.<sup>113</sup> This means approximately 93 per cent of deaths from COVID-19 occurred in Canadians aged 60 or older.

The opioid epidemic among older Canadians has also likely been exacerbated due to persistent societal ageism. When considering the aforementioned evidence and the lack of action taken towards or on behalf of older adults, it is likely that ageism has, at least in part, played some role in why the disproportionate impact of opioid crisis in older Canadians has largely not been recognized nor addressed. Indeed, there has been a stunning lack of research, policy, guidelines or awareness on this issue of the opioid epidemic in older adults. Furthermore, while over the past

decade, there have been thousands of news articles in Canada written on the Canadian opioid crisis, it is difficult to find many that focus specifically around the impacts on and needs of older Canadians.

As Canada recovers from the COVID-19 pandemic and continues to address the opioid crisis, an acknowledgement and understanding of our deeply rooted societal ageism must come to the forefront if we are to meaningfully improve the lives of older Canadians. The NIA's annual *Ageing in Canada Survey* has found that ageism remains a significant societal issue that many older Canadians continue to face, with nearly one-third (31%) of Canadians aged 50 years and older reporting that they have personally experienced discrimination or been treated unfairly because of their age in 2022.<sup>114</sup> Furthermore, while older Canadians reported experiencing ageism across a range of different settings, among Canadians aged 80 years and older, hospitals and other health care settings were found to be the most frequently reported place in which they had experienced ageism. If Canada hopes to learn from the COVID-19 pandemic and properly tackle the opioid epidemic in our country, we must acknowledge our past failings towards older adults and centre them in our research, policies, and practices moving forward.

## What is Being Done to Respond to Canada's Opioid crisis and Where Should Older Canadians Fit Within its Response?

In recent years, heightened media attention has shed light on the opioid crisis in Canada and the important work that needs to be done to help the many Canadians impacted by opioid-related issues. However, one group that needs particular attention with respect to the crisis is older Canadians. There is a noticeable lack of focus or special consideration of the needs of older adults in responses to the opioid crisis. Like many people affected by this epidemic, older Canadians remain largely out of sight and out of mind.

For this report, NIA researchers examined several reports across various disciplines that have been produced with the aim of addressing the Canadian opioid crisis. In response to the growing epidemic, the Government of Canada formally recognized the urgent need to mobilize resources and has implemented recent policy and legislative changes.<sup>115</sup> Several other initiatives have also been introduced, such as: increases in harm reduction resources (such as safe needle exchanges, public supply of addictive drugs, and supervised consumption sites);<sup>116</sup> increased physician training in Canadian medical schools;<sup>92</sup> and prescription monitoring programs for opioids.<sup>117, 118</sup>

One key report that warrants special mention is the Canadian Coalition for Seniors' Mental Health report titled *Canadian Guidelines on Opioid Use Disorder Among Older Adults*, which specifically targets clinicians and addresses the need to improve the care of patients living with OUD.<sup>20,41</sup> However, beyond this work, we could find no Canadian-specific initiative or report that addresses older Canadians specifically, which presents a major gap in addressing the opioid crisis.

## Evidence-Based Policy Recommendations

Addressing Canada's opioid crisis undoubtedly requires a nuanced response. While older Canadians face one of the largest burdens of the opioid crisis, they have received among the least amount of attention in attempts to address it. The following six recommendations aim to be a first step to increase awareness and understanding of the issue and initiate a push for more specific approaches to better meet the needs of older Canadians while addressing Canada's opioid crisis:

### 1) Apply an Ageing-Specific Lens to Opioid Policies and Practices

Older Canadians are an important and often overlooked group with respect to the Canadian opioid crisis. Future work by governments at the provincial, territorial and federal levels, non-governmental organizations and academics should consider the specific impacts that policies may have on older Canadians who use opioids. Specific policies and guidelines for older adults are needed as part of any future work that aims to address the Canadian opioid crisis.

### 2) Increase the Use of Non-Opioid Therapies Before Climbing the Opioid Pain Management Ladder and Expand Access to Multidisciplinary Pain Treatments

Evidence suggests that non-opioid therapies for pain management in older adults are likely both underused and under-researched in Canada. Further, the lack of access to multidisciplinary pain treatment in Canada particularly affects older adults and renders them more likely to be treated with long-term opioid therapy. While many older Canadians need opioids for ongoing chronic pain, evidence suggests a collective over-reliance on opioids with a general lack of research, guidelines and availability of non-opioid treatment options as a first line of treatment for older Canadians prior to starting opioid therapies. Greater research and access to non-opioid pain therapies and multidisciplinary pain clinics should be prioritized in Canada.

### 3) Increase Awareness and Understanding of Opioid Use Disorder in Older Canadians

Older adults living with OUD face unique burdens, barriers and stigma compared to younger Canadians living with OUD. In clinical practice, special

consideration is needed for older adults to reduce their risk of OUD, and to provide the many older Canadians living with OUD with more treatment and support. Harm-reduction policies should also apply an ageing-specific lens: a lack of awareness and stigmatization often prevents older adults from accessing vital harm-reduction resources and services. Moving forward, the issue of OUD in older Canadians needs more attention and awareness across Canada in order to better address this growing issue and support older Canadians living with OUD.

#### **4) Create Guidelines on Opioid Use and Pain Management in Canadian Long-Term Care Settings**

There are currently no guidelines on the use of opioids to treat chronic pain in LTC settings in Canada. Considering the high prevalence of opioid use in LTC homes in Canada, there is an urgent need for guidelines in the delivery of pain management in this setting. While there is research from the U.S. highlighting how staffing and training concerns may lead to problematic opioid use, there is an urgent need to address this research gap in the Canadian context. Important consideration should also be given to LTC residents living with dementia and chronic pain who use opioids.

#### **5) Enhance Health Care Provider Education and Training Around the Use and Effects of Opioids in Older Canadians**

Health care education should play a key role in addressing the Canadian opioid crisis. Curriculums in Canada for future health care providers — including medical students, pharmacy students and others — that aim to improve training and knowledge surrounding opioids should specifically address opioid-related issues in older adults.

#### **6) Conduct More Research and Collect More Data on Opioid Use and Harms in Older Canadians**

It is apparent that research into opioid-related issues is lacking, and the Canadian data that exists has many limitations that hinder understanding of this pervasive and complex public health issue. Research funding bodies should place a larger emphasis on research into opioids in Canadian older adults and ensure that older adults remain a priority in future opioid-related research efforts. The collection of national, provincial, territorial and local data on opioid use in older Canadians should be improved and expanded to aid in the research and understanding of these issues.

## Conclusion

The Canadian opioid crisis has touched the lives of millions of Canadians. As we collectively move forward to address this epidemic, older Canadians need special attention. This report aims to comprehensively highlight the burden and key issues surrounding opioid use in older Canadians so they can be equitably supported, which will in turn help Canada to adequately address this ongoing crisis. Future action on multiple fronts is urgently needed so that the many older Canadians that use opioids are no longer left out of sight, or out of mind.



# Supplemental Appendix

Parts of this material are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions and statements expressed herein are those of the author and not necessarily those of the Canadian Institute for Health Information.

## Section 1: Data Collection & Methodology

### 1.1: Data Sources

We obtained all available data from the Canadian Institute for Health Information (CIHI) from the previous five years (2015-20). Data was provided from the following three databases:

#### **1) National Prescription Drug Utilization Information System (NPDUIS):**

NPDUIS contains data on prescription claims (including opioids) across Canada. For more information on NPDUIS database, please visit the following [link](#).

In the NPDUIS database, active beneficiaries are persons who had an accepted claim with a public drug program in participating provinces/territories. Claimants are persons who submitted a claim to a public drug program or had a claim processed in a drug information system in participating provinces/territories.

#### **2) Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS):**

DAD and NACRS provide data on inpatient hospital stays and emergency room visits across Canada, respectively. For more information on DAD and NACRS databases, please visit the following [link](#). For the purposes of this report, we used the terminology of "adverse events" and "opioid overdose," whereas CIHI uses "adverse effects" and "opioid poisonings," respectively. However, these terms can be used synonymously.

Lastly, CIHI does not provide data on metrics that affect five or fewer people in order to protect their privacy. For example, if three people in a certain age group are hospitalized in a province during a given year, this figure would be "masked," or represented by a \* on CIHI data outputs. For the purposes of these analyses, we assigned masked cells in the data outputs a count of 2.5 to include them in our province/territory-level analysis.

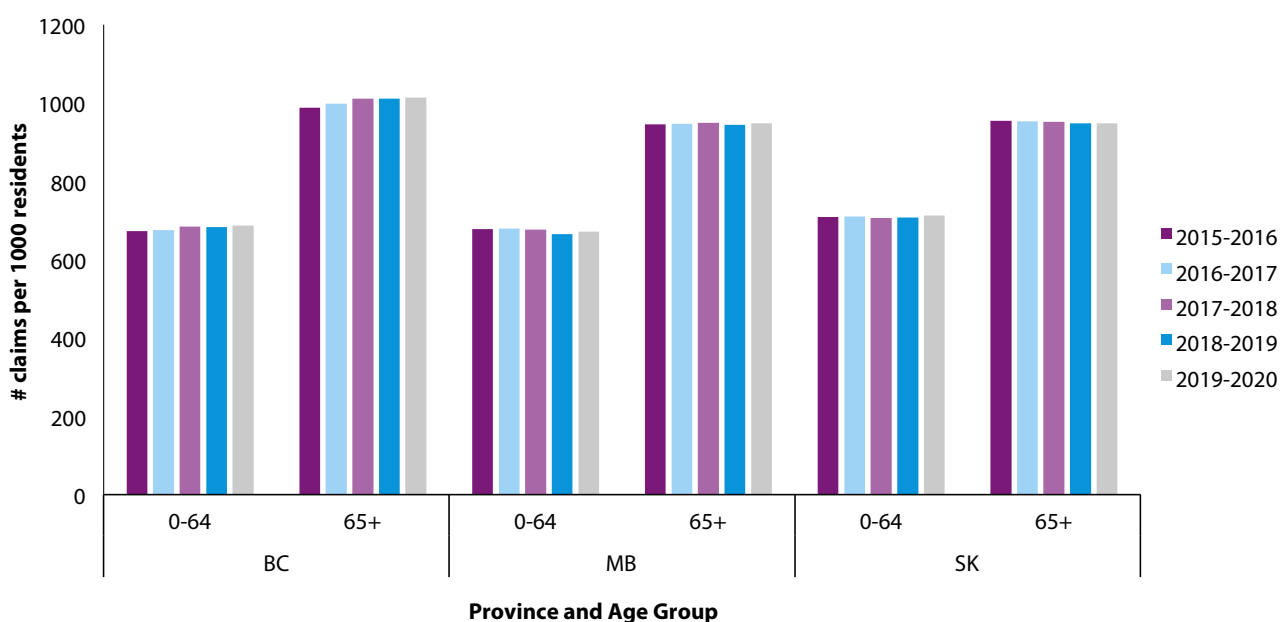
## 1.2 Data Analysis

To compare the relative number of opioids prescribed, or the number of opioid-related harms (ED visits or hospitalizations), we aimed to provide rates of annual opioid prescriptions per year per either 1,000 (prescriptions) or 1,000,000 (hospital visits).

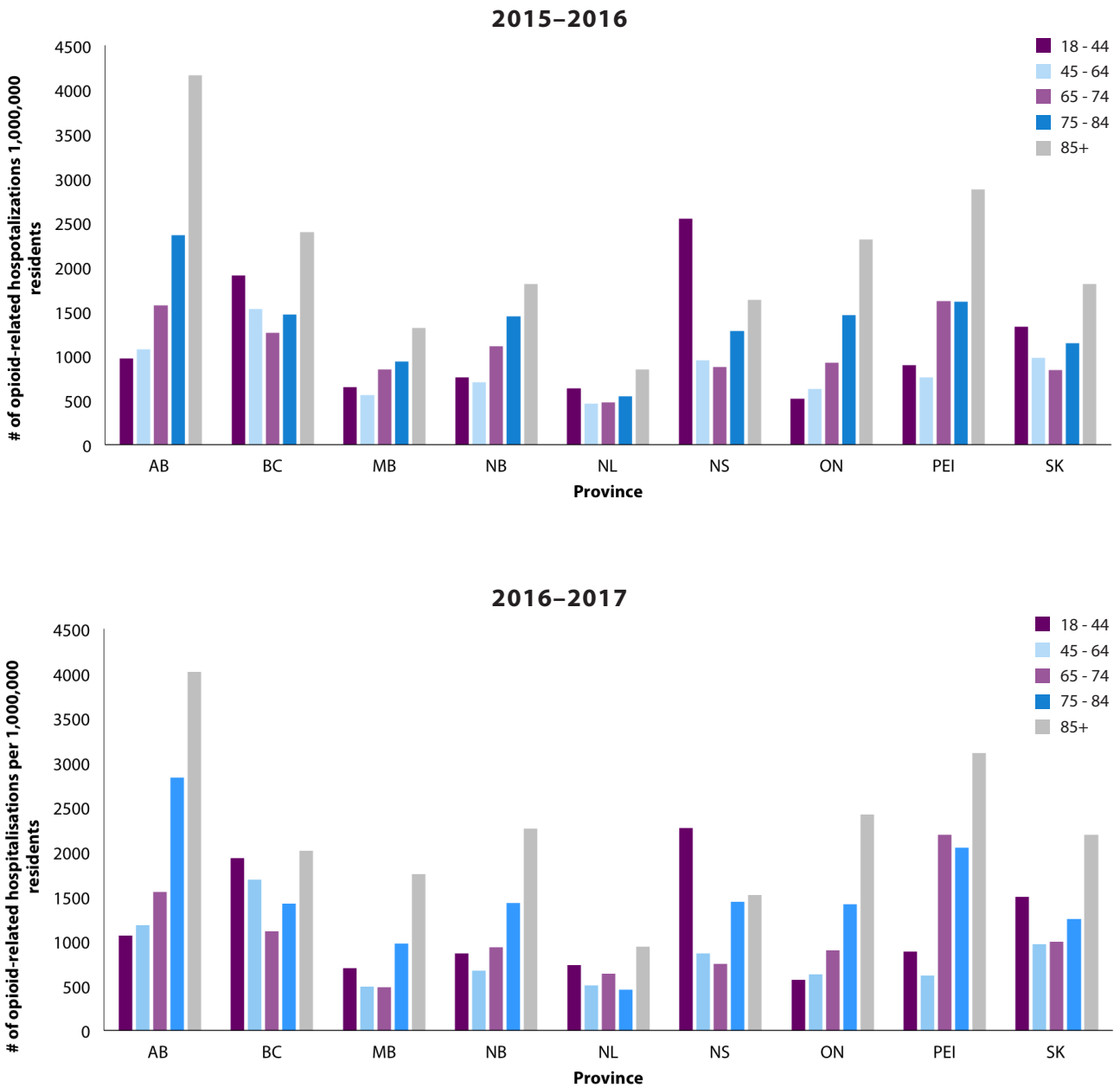
For this analysis, we obtained the number of people living in each province/territory for every age group during the years studied (2015-20). This data is publicly available through Statistics Canada (available at this [link](#)). We then divided the number of prescriptions provided or hospital visits (ED or inpatient admission) by the number of persons living in that province/territory in that age group during that, as a crude means to standardize the number of prescriptions or hospital visits per resident. For NPDUIS data, we then multiplied the ratio by 1,000 to obtain the estimated number of beneficiaries or claimants per 1,000 residents in a given province/territory during a certain year. For DAD/NACRS data, we multiplied the obtained ratio by 1,000,000 to provide an estimate of the number of hospital visits per 1,000,000 residents in a given province/territory during a certain year.

## Section 2: Supplemental Results

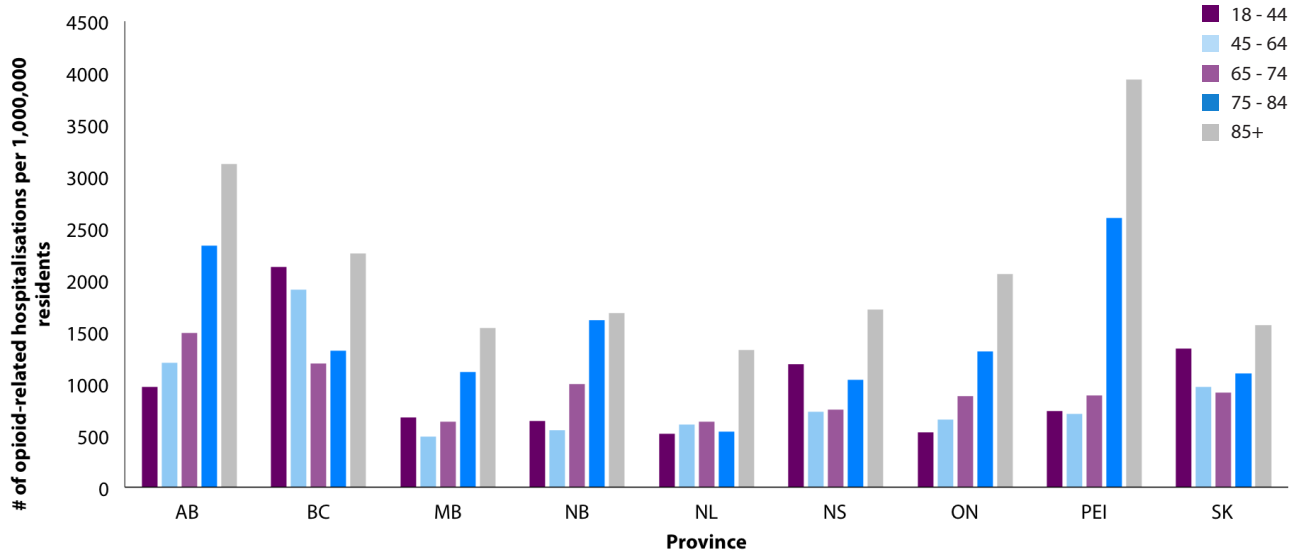
**Figure S1: Number of Opioid Claims in Available Provinces or Territories (BC, MB, SK) per 1000 Residents, by Age Category (0-64, 65+)**



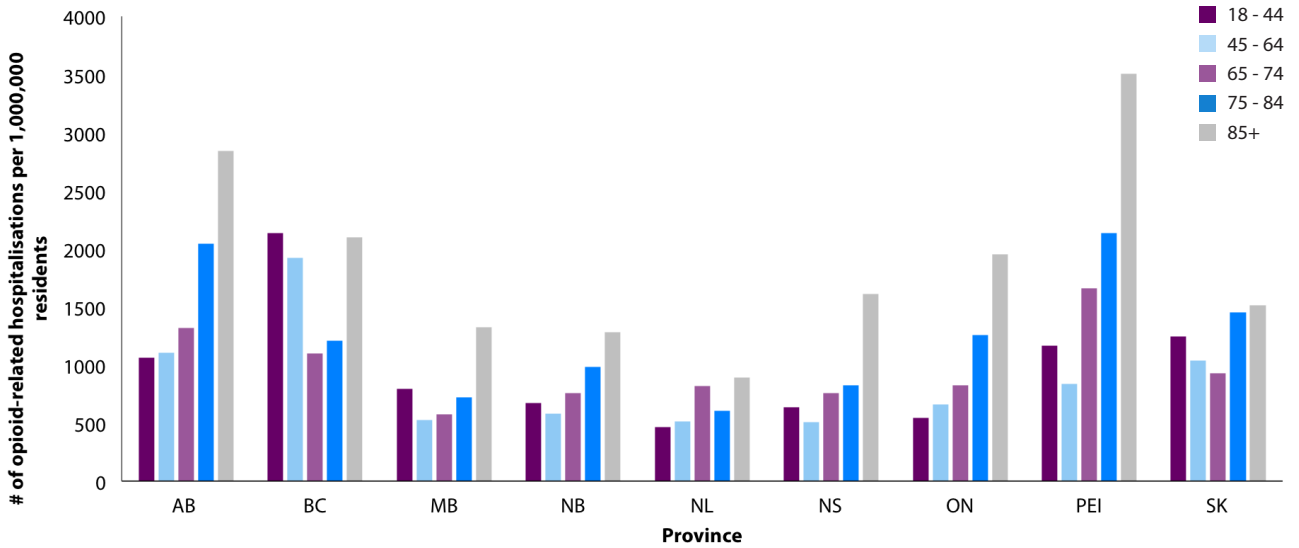
**Figure S2: Overall Opioid-Related Hospitalizations by Province and Age Group (2015-2019)**



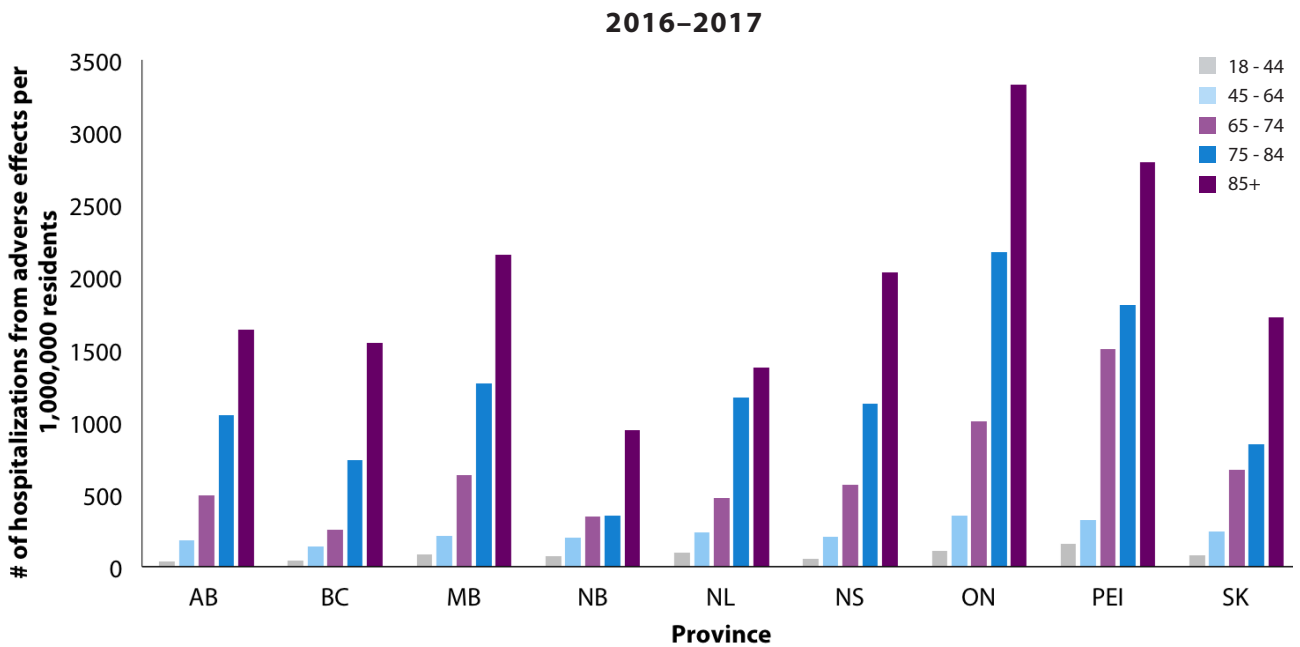
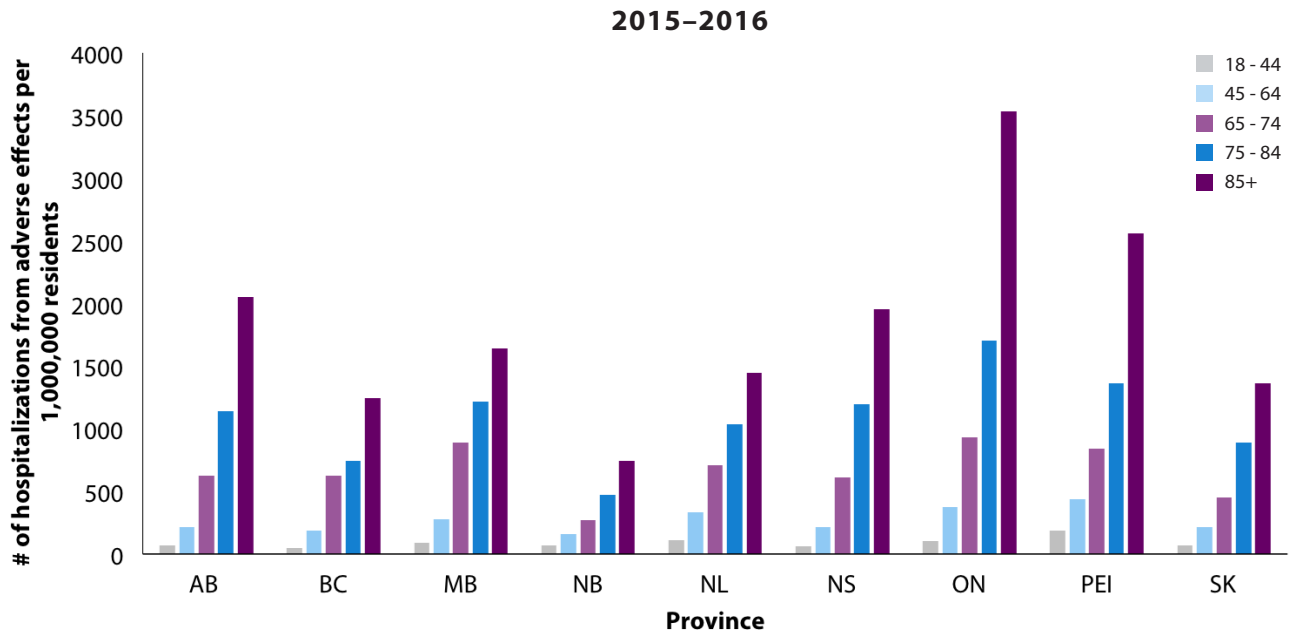
**2017-2018**

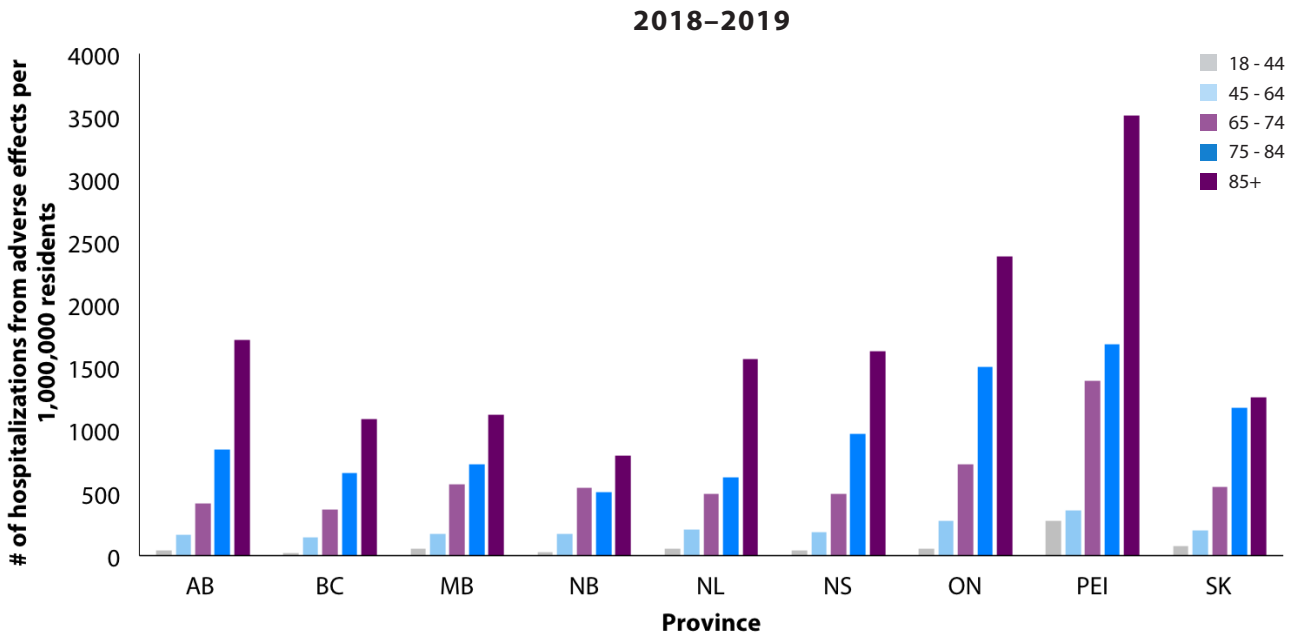
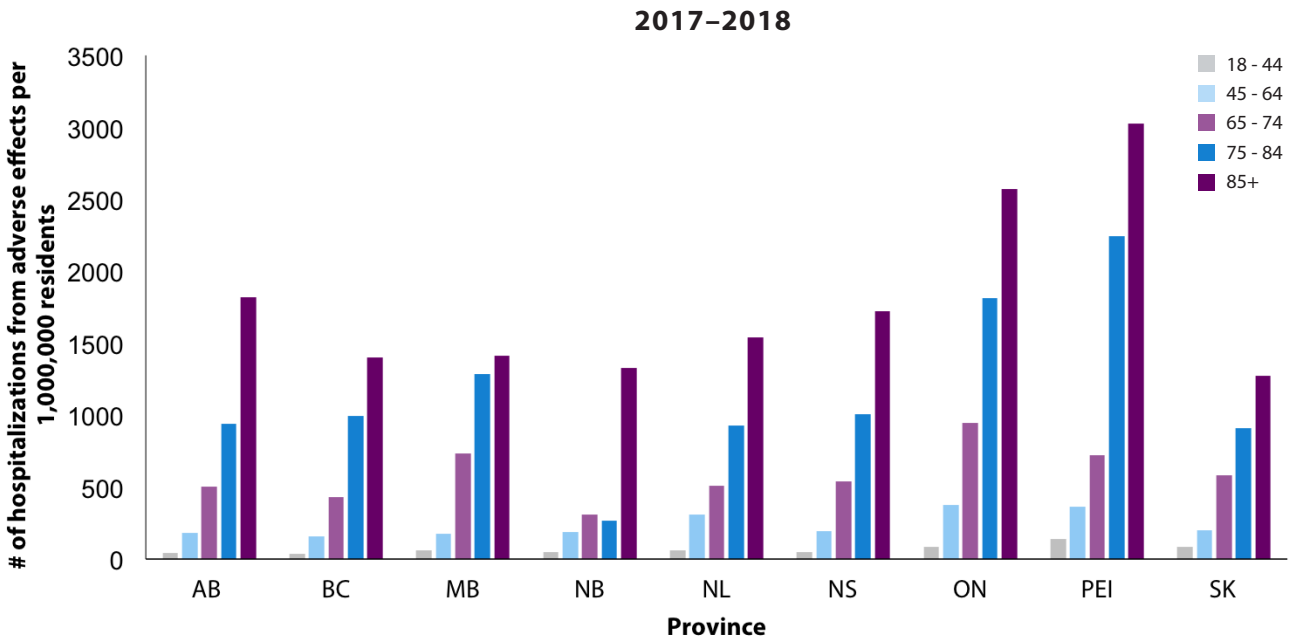


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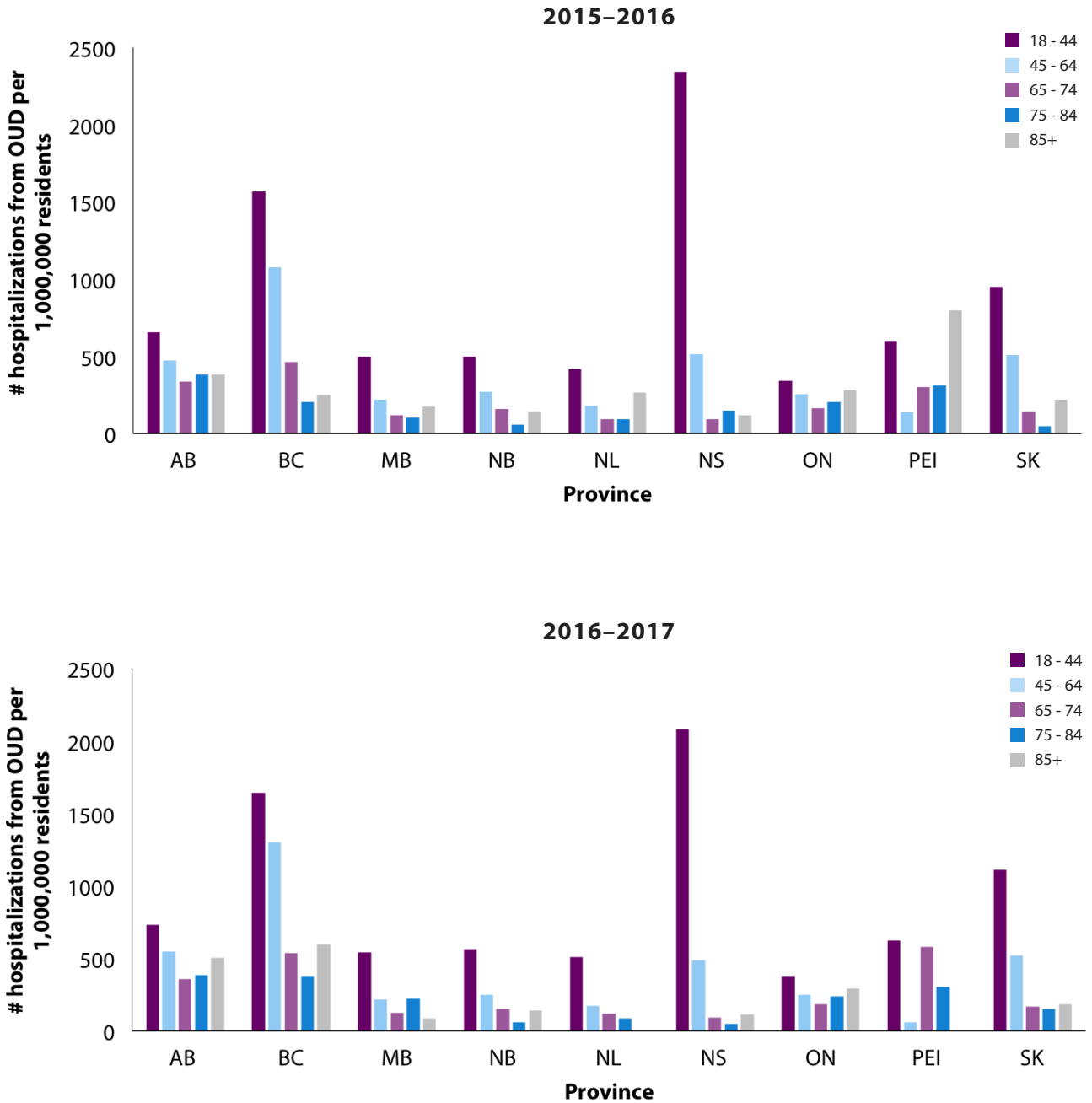


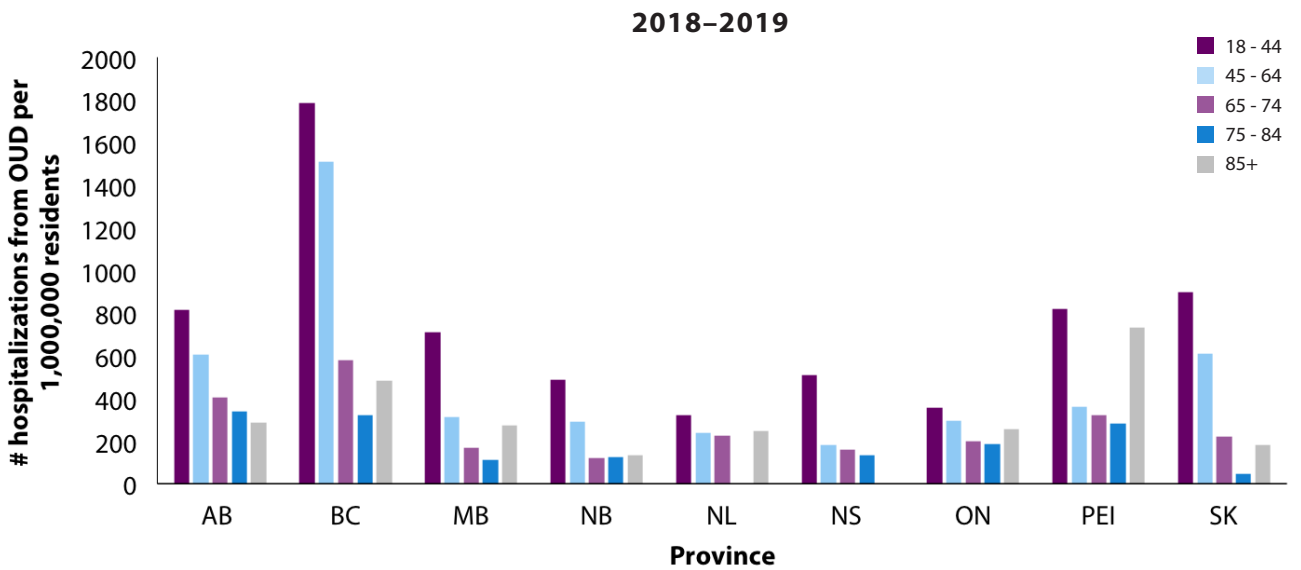
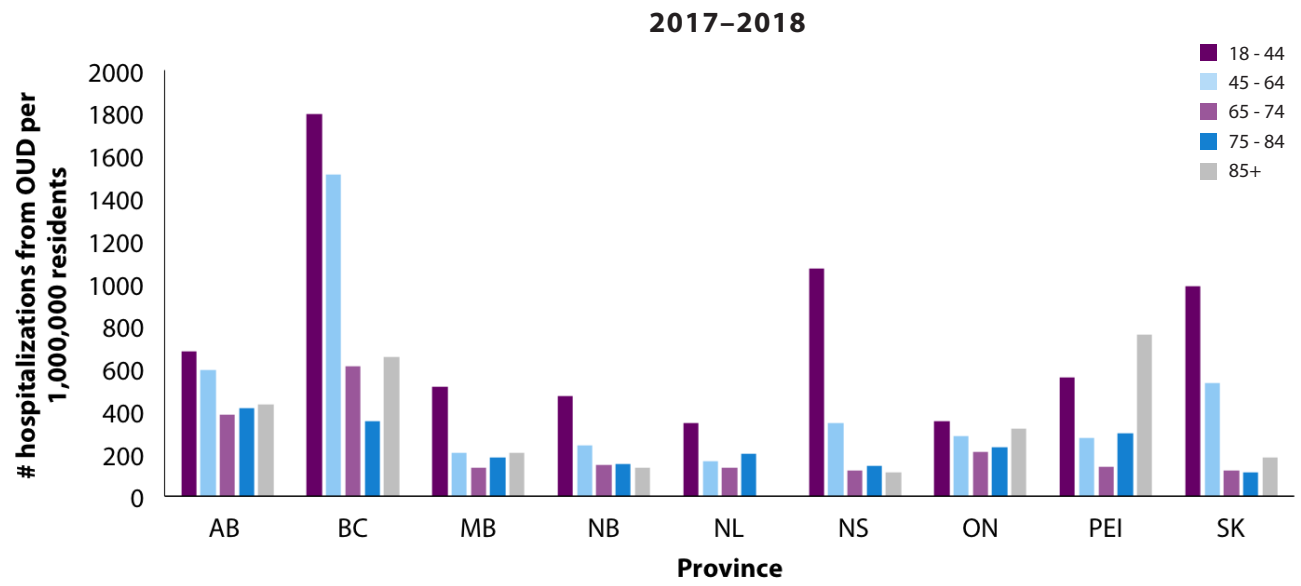
**Figure S3: Opioid-Related Hospitalizations Due to Adverse Events by Province and Age Group (2015-2019)**





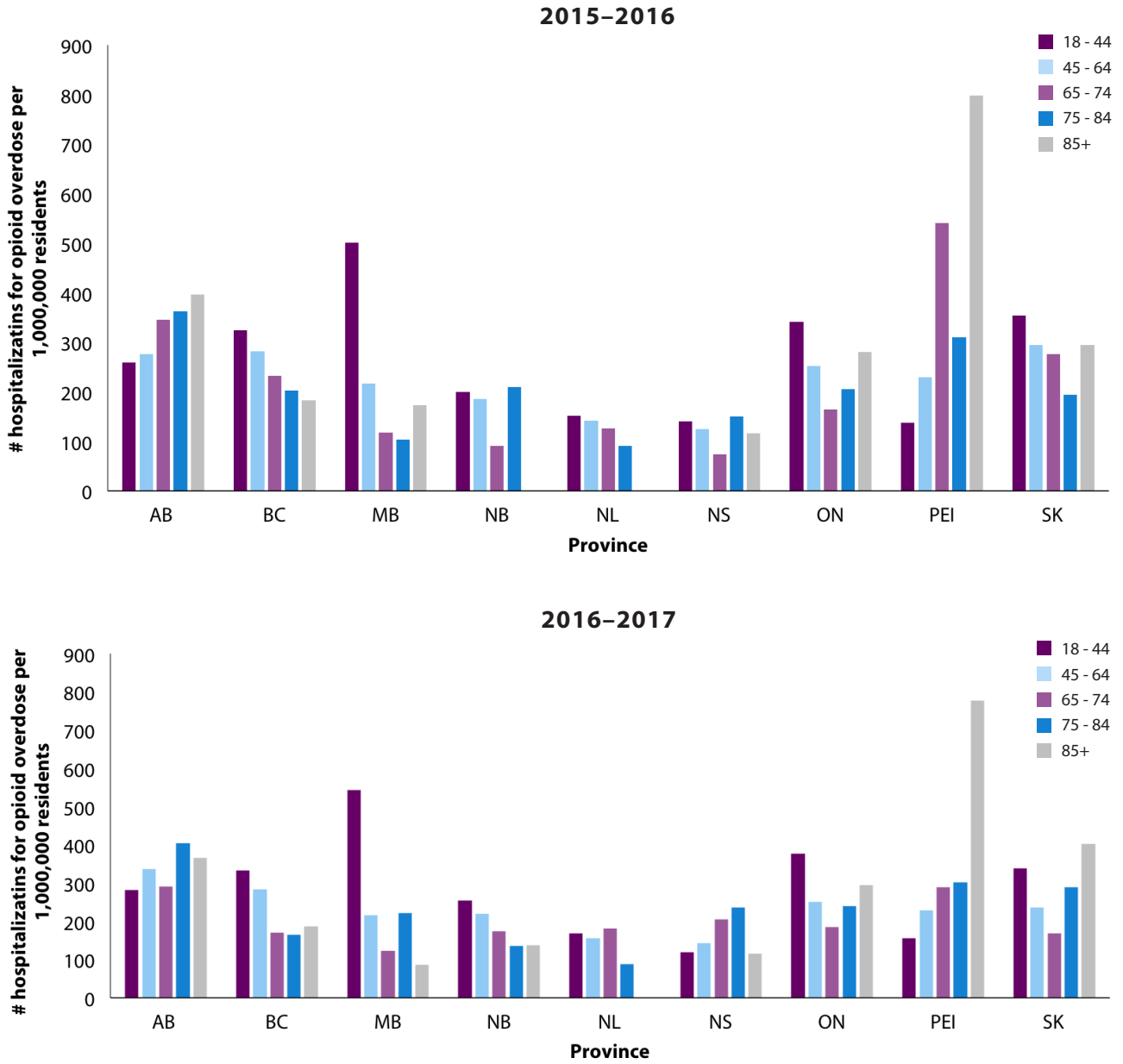
**Figure S4: Hospitalizations Due to Opioid Use Disorder by Province and Age Group (2015-2019)**



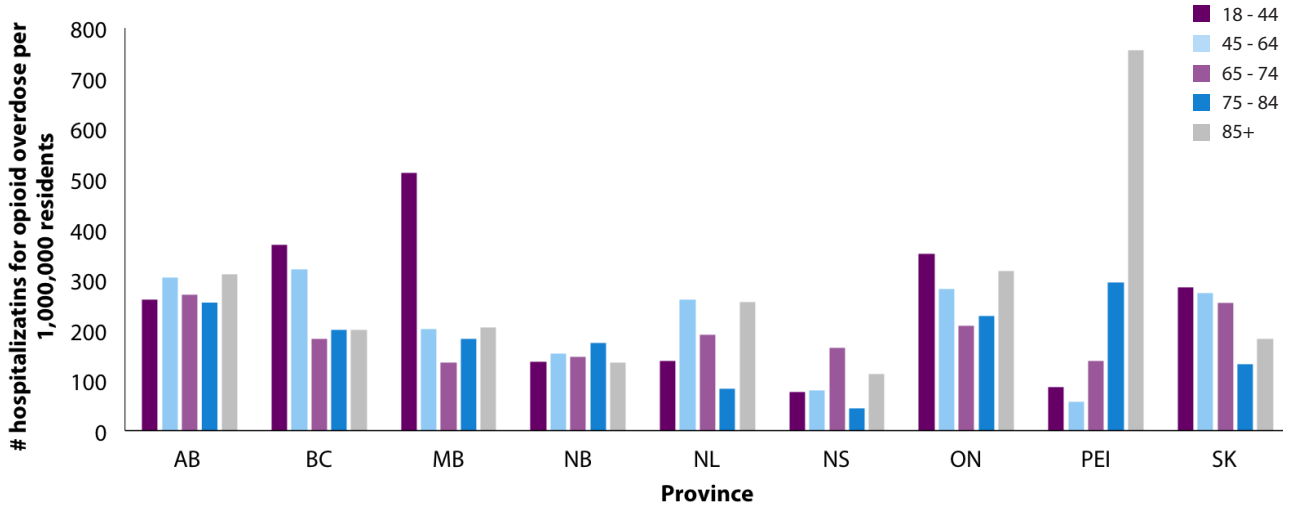




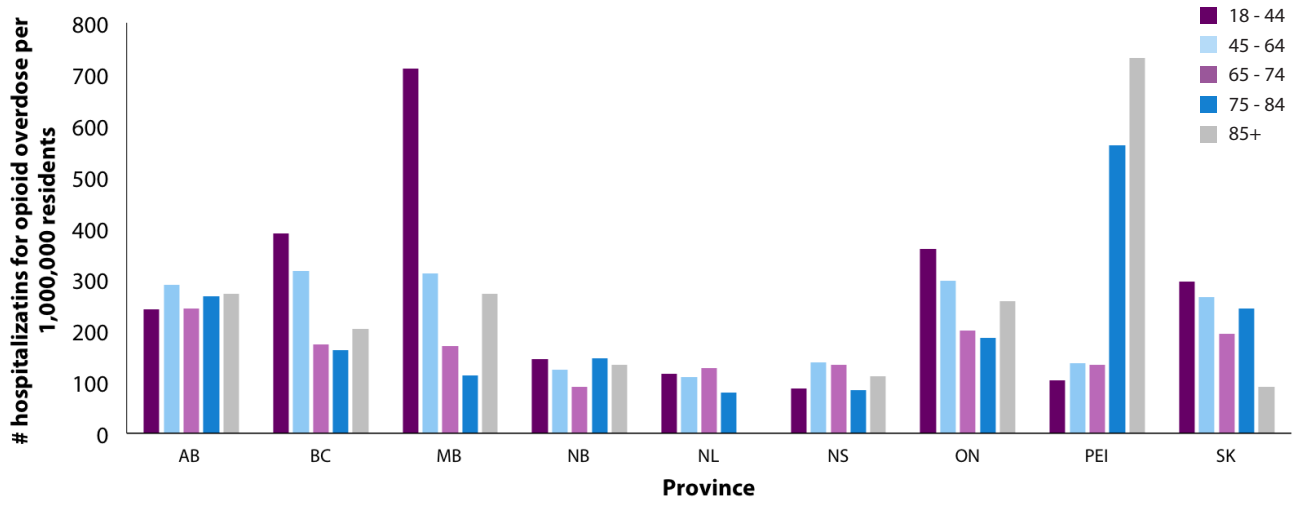
**Figure S5: Hospitalizations Due to Opioid Overdose by Province and Age Group (2015-2019)**



2017-2018



2018-2019



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