

**THE IMPACT OF PRISON HEALTH POLICY: A MULTIMETHOD STUDY OF THE
CONTEXT AND OUTCOMES OF THE TRANSFER OF HEALTHCARE SERVICES IN
BRITISH COLUMBIA'S PROVINCIAL CORRECTIONAL FACILITIES TO THE
MINISTRY OF HEALTH**

by

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Abstract

Background: Effective prison healthcare governance is essential to addressing health inequities faced by people who experience incarceration. There is a global lack of evidence concerning current governance models or their impact. In 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities from a private for-profit contractor to the Ministry of Health. This dissertation work aimed to examine the effects of this transfer on healthcare providers, as well as the impact of early changes to discharge planning and use of opioid agonist therapy (OAT) on outcomes among people recently released.

Methods: I analysed interviews with correctional healthcare leadership (n=8) using Interpretive Description methodology. Using linked administrative data for a sample of releases between January 1, 2015 – December 1, 2018, I employed recurrent event models to examine outcomes in the 30 days after release. Among all releases (n=16,809) I assessed use of community healthcare services and subsequent overdose. Among people with opioid use disorder (n=4,738) I examined expanded access to OAT in custody and overdose after release.

Results: Qualitative analysis revealed that the transfer had a positive impact on job satisfaction among healthcare providers, the sense of meaning of their work and the quality of care they felt able to provide. Quantitative analyses identified significant effects of the transfer on health outcomes after release from custody. People released after the transfer were more likely to access community healthcare services; use of this healthcare was associated with having a healthcare-attended nonfatal overdose and reduced hazard of fatal overdose. A higher proportion of people

released after the transfer received OAT in custody. Use of OAT was associated with a decreased hazard of nonfatal overdose after release, including among people who initiated a new episode of OAT in custody.

Conclusions: The change of governance for healthcare services in provincial correctional facilities resulted in improvements in the quality and continuity of care, the work-life and wellbeing of healthcare providers, and health outcomes of people who experience incarceration. Integrating correctional facilities within community healthcare systems may help address health disparities for people and communities. Lessons learned in British Columbia provide valuable insights for other jurisdictions.

Lay Summary

How healthcare services are organized, funded, and held accountable shapes the care they provide. This dissertation aimed to understand how transferring responsibility for healthcare in British Columbia's provincial correctional facilities to the Ministry of Health affected healthcare providers, services, and health outcomes for people who experience incarceration. In interviews, healthcare leaders described how the transfer improved quality of care and the work-life of providers. They also discussed a new focus on continuity of care with the community and access to treatments for opioid use disorder (OUD). People who used community healthcare after release were more likely to get medical help for an overdose and less likely to die from an overdose. People who received medications for OUD in custody were less likely to have a nonfatal overdose after release. These findings emphasize how integrating prisons within the community healthcare system may help address health disparities for people who experience incarceration.

Preface

Under the guidance of my supervisors Dr. Jane Buxton and Dr. Ruth Elwood Martin, and committee members Dr. Ehsan Karim and Dr. Amanda Slaunwhite, I was responsible for conceiving, designing, analysing, and writing all work presented in this dissertation. Research presented in Chapters 3-5 was approved by the University of British Columbia Behavioural Research Ethics Board (H17-02577 and H19-03731). Approval for the qualitative study presented in Chapter 3 was also granted by the British Columbia Mental Health and Substance Use Research Services Committee. Co-authors of manuscripts derived from this dissertation include Dr. Jane Buxton, Dr. Ruth Elwood Martin, Dr. Ehsan Karim, Dr. Amanda Slaunwhite, Marnie Scow, Guy Felicella, Dr. Bohdan Nosyk and Megan Kurz.

Chapter 1 and **Chapter 2** are original unpublished works. I reviewed the literature and wrote both chapters with guidance from my committee. A version of **Chapter 3** has been submitted for publication in a peer-reviewed journal. I designed the study with input from my supervisors and conducted all interviews. I analysed the qualitative data in collaboration with my supervisors and wrote the manuscript. A version of **Chapter 4** has been published as McLeod KE, Karim ME, Buxton JA, Martin RE, Scow M, Felicella G, Slaunwhite AK. Use of Community Healthcare and Overdose in the 30 Days Following Release from Provincial Correctional Facilities in British Columbia. *Drug and Alcohol Dependence*. 2021. doi:10.1016/j.drugalcdp.2021.109113. I designed the study with input from my committee and conducted all statistical analyses in SAS. I wrote the manuscript with feedback provided by co-authors on interpretation of findings and manuscript drafts. A version of **Chapter 5** has been submitted for publication in a peer-reviewed

journal. I designed the study with input from my committee and conducted all statistical analyses in SAS. I prepared the manuscripts with valuable feedback from co-authors. **Chapter 6** is original, unpublished work. I reviewed the literature and wrote the chapter with guidance from my committee.

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List of Abbreviations

2SLGBTQ+	Two-Spirit, lesbian, gay, bisexual, transgender, queer/questioning
(a)HR	(Adjusted) Hazard Ratio
(a)RR	(Adjusted) Risk Ratio
95%CI	95% Confidence Interval
BC	British Columbia
BCCDC	British Columbia Centre for Disease Control
BCCS	British Columbia Coroners Service
BCEHS	British Columbia Emergency Health Services
BCMHSUS	British Columbia Mental Health and Substance Use Services
CHS	Correctional Health Services
CSC	Correctional Service Canada
DAD	Discharge Abstract Database
DIN	Drug Identification Number
DPIC	Drug and Poison Information Centre
EED	Enhanced Emergency Department records
HIV	Human Immunodeficiency Virus
ICD-10	International Classification of Diseases -10th Edition
ICD-9	International Classification of Diseases - 9th Edition
IQR	Interquartile Range
MSP	Medical Services Plan
NACRS	National Ambulatory Care Reporting System

NHS	National Health Service (UK)
OAT	Opioid Agonist Treatment/Therapy (also known as Opioid Substitution Therapy)
ODU	Opioid Use Disorder
PHN	Personal Health Number
PHSA	Provincial Health Services Authority
PIN	Product Identification Number
THN	Take Home Naloxone
UN	United Nations
UTG	Unlocking the Gates Services Society
WHO	World Health Organization

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Chapter 1: Introduction

1.1 Overview of the literature review

In this chapter I discuss the literature relevant to the research conducted as part of this dissertation. First, I provide a brief introduction to federal and provincial/territorial carceral systems in Canada and the models of governance which shape healthcare services delivered in correctional facilities across Canada. People who experience incarceration have a high burden of mental and physical health conditions. I describe some of the health inequities faced by people who experience incarceration including a discussion of substance use and substance use disorders among people in custody. I also outline some of the specific inequities faced by women engaged by the criminal legal system. Next, I provide an overview of the limited research available about healthcare services delivered in correctional settings in Canada. This small body of work highlights the systemic barriers negatively affecting quality and continuity of care and resulting in fragmentation of care during transitions between custody and community. In addition to affecting health outcomes and services, these barriers shape the experiences of healthcare providers working in the carceral environment. Health leaders within Canada and around the world argue that integrating healthcare services in correctional facilities with the broader healthcare system may help to address systemic challenges to delivering high-quality care in custody. I provide an overview of arguments and available evidence for this model of governance and introduce gaps in the existing literature. In 2017 British Columbia (BC) became the third Canadian province to transfer responsibility for healthcare services in provincial correctional facilities to the Ministry of Health. I provide a brief introduction to the context and aims of this transfer in BC and describe the limited reports available about early outcomes of this change. To address health inequities and improve health outcomes of people who experience

incarceration there is an urgent need to understand how governance models shape healthcare services in correctional facilities. Understanding the experiences and outcomes of the transfer in BC will inform policy and practice and has the potential to transform healthcare services for people who experience incarceration across Canada and around the world.

1.2 Literature review

1.2.1 Carceral systems in Canada

On any given day an estimated 11 million people are incarcerated world-wide¹ including about 38,000 adults incarcerated in Canada.² Systems such as bail and remand, used in Canada and in many other countries, mean that the number of people who move in and out of correctional facilities each year is much higher, as is the number of people who will experience incarceration in their lifetime.

Canada has two systems of adult custody which are delineated by the length of sentenced time. Correctional Service Canada (CSC) is responsible for the federal correctional system which incarcerates adults (aged 18 years and older) who are sentenced to custody for two years or longer. Adults who are sentenced to less than two years in custody, or who are remanded to custody to wait for trial or sentencing are held in provincial and territorial correctional facilities. On any given day about 14,000 adults are incarcerated in federal correctional facilities and 24,000 adults are incarcerated in provincial/territorial correctional facilities.² Canada has ten provinces and three territories ranging in size from Ontario (about 14.8 million residents³ with an average daily count of approximately 7,500 people in provincial correctional facilities²) to Nunavut (about 40,000 residents³ with an average daily count of 160 people incarcerated in territorial

correctional facilities).³ Rates of incarceration in provincial/territorial correctional facilities vary across jurisdictions. BC and Nova Scotia share the lowest rate of incarceration of 59 people per 100,000 population; Nunavut has the highest rate of incarceration with 667 people in custody per 100,000 population.² Across Canada a majority (63%) of people in provincial/territorial correctional facilities are being held on remand and most people admitted to provincial/territorial custody are released after less than a month.²

Responsibility and standards for healthcare services in correctional facilities also vary by jurisdiction, including application of the *Canada Health Act*. The *Canada Health Act* is the federal legislation that defines Canada's publicly funded healthcare insurance.⁴ The Act sets out the criteria and conditions for healthcare services that the provinces and territories must meet in order to receive federal government funding for healthcare services through the Canada Health Transfer. People incarcerated in federal correctional facilities are excluded from the *Canada Health Act*⁴ because they are under federal jurisdiction. Instead, the *Corrections and Conditional Release Act* (86(1)) mandates that CSC provide "every [incarcerated person] with essential health care and reasonable access to non-essential health care."⁵ It is important to note that the lack of a definition of "essential care" in the context of correctional facilities has negative effects on health and healthcare for people incarcerated in federal correctional facilities⁶ including contributing to inconsistencies in quality and availability of care⁷ and overreliance on a curative paradigm of health.⁶

The *Canada Health Act* makes no distinction between people incarcerated in provincial and territorial correctional facilities and people residing in community; the province or territory is

responsible for healthcare services delivered to all residents.⁴ In Nova Scotia, Alberta and BC, healthcare services in provincial correctional facilities are delivered by the provincial ministry responsible for health. However, in the majority of jurisdictions in Canada, delivery of healthcare services in provincial and territorial correctional facilities is the responsibility of the ministry responsible for corrections (such as the Ministry of the Solicitor General in Ontario).⁸ In some cases healthcare services are delivered by private, for-profit companies contracted by the ministry responsible for correctional facilities, as was the case in BC prior to October 2017.⁹ The separation of healthcare services in correctional facilities from the community healthcare system results in a number of challenges to quality and continuity of care including disruptions in treatments and barriers to information sharing.^{10,11}

1.2.2 Health equity and people who experience incarceration

Incarcerated populations have a disproportionate burden of health conditions and healthcare needs. Health disparities faced by people who experience incarceration are a matter of health equity because they are largely driven by injustice and policy failure across social sectors.¹²⁻¹⁴ Among people who experience incarceration in Canada there is a higher prevalence of communicable conditions, mental illness and substance use disorder, disability, Fetal Alcohol Spectrum disorders, traumatic brain injury and other noncommunicable conditions such as diabetes and cardiovascular disease.^{12,15-23} Incarceration is associated with shortened life expectancy and significantly raised mortality rates compared to the general population.^{24,25} People who have experienced incarceration are four times more likely to die prematurely than the general population, mostly from preventable or treatable conditions.²⁴

Despite the high prevalence of healthcare needs, people who experience incarceration face barriers to accessing healthcare services in custody and in community. Prior to admission people are less likely to have had a regular care provider in the community compared to the general population.²⁶ After release people also face discrimination and stigma within the healthcare system based their history of incarceration which limits access to services.^{27–29} People recently released from correctional facilities more frequently use the emergency department^{30–34} indicating unmet healthcare needs.

Social and structural drivers of health inequity, known as the social determinants of health, are also determinants of criminalization and incarceration.^{12,13} Most people in custody are affected by trauma; a majority of people in custody experienced adverse childhood events such as family violence or engagement by the child welfare system and at least half experienced some form of childhood abuse.^{12,35} People who experience incarceration in Canada are also more likely to have unstable or inadequate housing, low income and are less likely to have completed highschool.^{12,16,22,24,36,37}

Furthermore, incarceration and engagement by the criminal legal system is itself a determinant of health. Time in custody can have lasting psychological effects.³⁸ Conditions of confinement, including overcrowding and inadequate harm reduction services contribute to increased risk of communicable infections such as tuberculosis,²⁰ respiratory infection,^{39,40} human immunodeficiency virus (HIV) and Hepatitis C virus.^{23,41,42} People with a recent history of incarceration are also less likely to be housed in the year following release⁴³ in part because

discrimination and stigma based on a history of incarceration can limit access to housing and employment.^{27–29,38,44–46}

Our understanding of incarceration as a determinant of health is important because ongoing colonial violence, racism and systemic income inequality shape and define Canada’s carceral and legal systems. This results in disproportionate criminalization, incarceration²³ and impact of the carceral system on some communities, including the growing crisis of overincarceration and criminalization of Indigenous people. Although 4.5% of the Canadian population identifies as Indigenous, 31% of admissions to provincial/territorial custody and 29% of admissions to federal custody are identified as Indigenous people.² This inequity is even more profound for Indigenous women. In federal correctional facilities 41.4% of incarcerated women are Indigenous.²³ Black Canadians are also overrepresented in the criminal legal system and experience stereotyping, racism and structural disparities within correctional facilities including disproportionate classification to maximum security, greater likelihood of institutional charges, overrepresentation in segregation and use of force incidents and lack of access to cultural products or supports.⁴⁷ Overincarceration and the effects of conditions of confinement have far-reaching effects on the health and wellbeing of individuals, families and communities.⁴⁸ Furthermore, social determinants of health and incarceration often intersect resulting in a compounding effect. In Canada, Indigenous, Black and other racialized families are more likely to be engaged by the child welfare system^{49,50} contributing to disproportionate harm of the ‘foster-care-to-prison pipeline’ within these communities.

Arguments for investing in health and healthcare for people who experience incarceration have been made on human rights, public health, public safety and economic grounds.⁵¹ Health and access to healthcare services for people recently released from custody has an impact on the health of their families^{52,53} and can influence determinants of long-term health and wellbeing including reincarceration.^{51,54} Improving health and healthcare for people who experience incarceration is an important, but often overlooked component of reducing social inequities and improving the health of communities.^{52,55,56}

1.2.2.1 Incarceration, substance use and the overdose public health emergency

Criminal legal systems around the world incarcerate a high number of people who use drugs including people with substance use disorders.^{12,18,57} In Canada, the ongoing “War on Drugs”^{14,58} results in disproportionate harms, including arrest and incarceration, for people who use drugs. Excluding cannabis, in 2019 60% of drug arrests in Canada were for personal possession.⁵⁹ Most people incarcerated in Canada report recent drug use at the time of their arrest.^{12,57}

Across Canada, the increasing presence of high-potency fentanyl and its analogues in the illicit drug supply has resulted in a high risk of death among people who use drugs.^{60,61} BC is one of the regions with the highest burden of overdose related harms in Canada and in 2016 the province declared a public health emergency in response to the rising number of overdose deaths.⁶² Since that time more than 7,000 people in BC have died of overdose due to the toxic illicit drug supply; in 2020, an average of five people died of overdose every day.^{60,63}

People who have experienced incarceration are at a higher risk of overdose compared to the general population.^{64,65} A review by the BC Coroner's Service found that two-thirds of people who died of an overdose in BC between January 2016 and July 2017 had been engaged by BC Corrections at some point in their lives.⁶⁶ Overdose is the leading cause of death among people recently released from incarceration.⁶⁷⁻⁶⁹ An Ontario study of deaths between 2006-2013 found that ten percent of drug toxicity deaths in adults occurred among people who had been released from a provincial correctional facility in the previous year.⁷⁰ Cohort and population studies conducted in Canada and internationally have consistently found that the weeks following release from custody are a period of extremely high risk for nonfatal^{71,72} and fatal overdose.^{24,68,70,73,74} Jourdey and colleagues identified multiple factors which shape this increased risk of opioid-related overdose death after release including disruption of social networks, interruptions in medical care and substance use treatments, lack of financial resources, stigma and loss of tolerance to the effects of drugs.⁷⁵

1.2.2.2 Women who experience incarceration

Like most jurisdictions, there is no data available about the gender of people incarcerated in Canadian correctional facilities. Instead, information on sex is available from government documentation (such as a birth certificate or driver's license). Though it is accurate to discuss differences in sex using the adjectives 'female' and 'male', throughout this dissertation I use the nouns 'women' and 'men'. This choice was both for readability and to ensure consistency with the principles of using respectful person-centred language in work with people who experience incarceration.

Only 14% of people admitted to provincial and territorial facilities in Canada are women.² However, intersecting structural and societal factors impact the experiences and effects of incarceration for women and men differently. Incarcerated women have a greater burden of medical and physical health conditions compared to incarcerated men and to nonincarcerated women^{19,76-78} and most women incarcerated in Canada experienced childhood abuse.³⁵ Women spend less time in remand and sentenced custody than men² which may affect access to services in custody and discharge planning. Women also have different patterns of healthcare utilization both in custody and after release. A cohort study of women released from Ontario's provincial correctional facilities in 2010 found that women were more likely to use primary care while in custody and after release compared to incarcerated men and to women in the general population.⁷⁷ After release, women also more frequently used the emergency department than either men who had experienced incarceration or women in the general population and had higher rates of psychiatric hospitalization.⁷⁷ In the weeks following release from custody, women have a higher standardized mortality ratio compared to men²⁴ and some studies have found a higher risk of fatal overdose following release among women compared to men.^{65,67,68}

A majority of published research about the health of people who experience incarceration and interventions to provide support are about men and few studies focus on women specifically.^{79,80} This gap affects our understanding of the needs of incarcerated women and the potential impact of programs and policies.⁷⁹ Research which examines differences in the health and health outcomes for women and men is needed to inform meaningful practice and policy change.

1.2.3 Healthcare services in Canadian correctional facilities

Providing access to adequate healthcare services is fundamental to protecting the rights of people who are incarcerated, such as the right to security of the person and to be free of torture and ill-treatment.^{81,82} The United Nations Minimum Standard for the Treatment of Prisoners, known as the Nelson Mandela Rules, states that people who are incarcerated “should enjoy the same standards of healthcare that are available in the community, and should have access to necessary healthcare services free of charge and without discrimination on the grounds of their legal status” (Rule 24.1, United Nations General Assembly, 2015). This concept is known as the ‘principle of equivalence’ and is echoed in other international standards including the Bangkok Rules,⁸⁴ recommendations by the World Health Organization (WHO) and United Nations Office on Drugs and Crime⁸⁵ and the principles and spirit of the *Canada Health Act*.⁴ Though no systematic assessment of quality and access to healthcare in Canadian correctional facilities is available, reports from correctional investigations, government bodies and studies on care for a range of health conditions indicate that care provided in custody is insufficient to meet the healthcare needs of people who are incarcerated and does not meet community standards of access and quality.^{6,7,91–95,8,23,82,86–90} Furthermore, because people who experience incarceration have a higher burden of mental and physical health conditions compared to the general population, equivalent care is unlikely to achieve equivalent health outcomes or to address health equity.^{96,97} It is also argued that states have a special duty to care for people who are incarcerated because they have no alternative access to care.⁸⁵

In addition to obligations to provide care, investing in healthcare services in custody presents an opportunity for population and public health efforts. Incarceration is a unique setting in which

healthcare services may be provided to people while they face fewer competing priorities; in the community, addressing other essential needs such as finding housing or work can make it more difficult to prioritize and access healthcare services.¹⁶ Two population-based retrospective cohort studies among people released from Ontario provincial correctional facilities in 2010 found higher rates of ambulatory care use in custody compared to the general population and compared to the months following release.^{34,77} However, healthcare services in carceral contexts are often defined by a reactive approach to need rather than a long-term holistic view of patient and community health and wellness. As a result, people in custody often lack access to preventive care that is available in the community,¹⁶ such as cancer screening,^{89,93} or contraception.⁹⁰ Other barriers to healthcare services in custody include long waitlists,^{16,46} fragmentation of care,^{16,98} lack of trust between providers and clients,^{16,99,100} tensions between patient needs and security priorities,^{101,102} perceptions of stigma and judgement from healthcare staff for substance use and being incarcerated,¹⁶ and inadequate access to culturally appropriate programs and services for Indigenous people experiencing incarceration.²³ Challenges may be exacerbated by private, for-profit contractors providing care in correctional facilities - as was the case in BC prior to October 2017.⁹ In BC, this resulted in long waitlists for treatments for Opioid Use Disorder (OUD) and no provision of needed medications during transition to community because of the high cost of prescription medications to the private, for-profit provider.^{8,88}

Another challenge of providing healthcare services for people who experience incarceration is the fragmentation and interruption of care during transitions between carceral settings and the community. The disconnect between these two healthcare systems can result in the discontinuation of treatments including medications for HIV,⁹² OUD,^{8,88,102-105} and prescriptions

to treat mental illness.^{106,107} These disruptions are common and have negative effects on health that may persist for years after release.^{27,38,92,98,108} For example, interruptions in HIV treatment during incarceration have long-term effects on care and outcomes. A cohort study in Ontario found that only 34% of people who had HIV when they were admitted to custody received HIV care during their incarceration.⁹² Additionally, after release, sustained care and treatment for HIV was lower among people who had been incarcerated compared to the general population.⁹² In some cases, medications available in community may be subject to institutional policies which restrict access, so prescriptions will be stopped, switched or reduced in custody.^{38,102} This practice is seen in many jurisdictions for Opioid Agonist Treatment (OAT),^{8,88,102–105} medications, such as buprenorphine/naloxone and methadone which are used to treat OUD. In many jurisdictions across Canada and around the world, OAT is not available in custody or is provided only to people who have an active community prescription when they are admitted.^{104,109,110} Where OAT is available, waitlists and security concerns can act as a barrier to accessing treatment. A 2016 survey of physicians practicing in provincial correctional facilities in Ontario described a range of systemic barriers to initiating OAT in custody including concerns about diversion, lack of connection with community-based providers, policy barriers, and a lack of institutional and nursing support.¹⁰¹ People who have experienced forced withdrawal in correctional facilities report harms to their mental health, increased severity of their addiction¹¹¹ and aversion to using OAT after release.¹¹² Conversely, people who use OAT in custody are more likely to engage in community OAT and are less likely to use illicit opioids after release.^{110,113,114} For people who were engaged in community OAT prior to their arrest, continuity of OAT in custody is protective against all-cause mortality and fatal-overdose after release.^{115–117} These examples highlight how care in custody has a long-term impact on the

health and wellbeing of people who experience incarceration and reflect the urgent need to address continuity of care between correctional facilities and the community. The limited evidence available suggests that strengthening the connection between custody and community care providers may help to address health needs,³⁸ reduce emergency department and hospital visits and improve use of primary and preventive services.^{79,118}

1.2.3.1 Healthcare providers in correctional settings

Though healthcare providers are integral to the delivery and quality of healthcare services, there has been limited research examining the working conditions and experiences of healthcare providers working in correctional settings in Canada^{99,119} or other jurisdictions.^{100,120–124}

Available studies have consistently highlighted the difficulties healthcare providers face in navigating tensions between the priorities and obligations of health and security which can create challenges to practice consistent with ethical and professional standards.^{99,100,123–126} Additionally, staffing shortages, a perceived lack of time to complete work, and inadequate access to resourcing and equipment are commonly identified as negatively affecting healthcare providers in carceral settings and the care they are able to provide.^{123,127,128} The detrimental effects of these challenges on the health and wellbeing of the workforce were demonstrated in a 2013 study in Ontario which found that 67% of healthcare managers and 39% of nurses in provincial correctional facilities had scores of emotional exhaustion that indicate burnout¹¹⁹ on the Maslach Burnout Inventory-Human Services Survey.¹²⁹ Practitioners in carceral settings commonly experience professional isolation and limited opportunities for education, training and advancement.^{125,127} However, healthcare providers practicing in correctional facilities also report that their work with patients is rewarding and meaningful^{99,123,127,128} with diverse clinical

experiences and problem solving.^{99,127} To our knowledge, there has been no research examining how a change in healthcare governance may affect the work-life or job satisfaction of healthcare providers working in correctional facilities.

1.2.4 Governance of healthcare services

Governance provides the architecture that shapes healthcare services in correctional settings, yet globally little is known about how models of prison health governance are structured, financed, or held accountable.¹⁰ Governance in healthcare systems it is most often framed in terms of the responsibilities and principles that configure administrative structures and relationships with stakeholders.¹³⁰ For example, the WHO's *Health Systems Governance for Universal Health Coverage* lists the fundamental responsibilities of health governance as: formulating policy and strategic plans, generating intelligence, putting in place levers and tools for implementing policy, collaboration and coalition building, and ensuring accountability.¹³¹

Despite the importance of governance in shaping healthcare services, research and evaluation of existing governance models for healthcare services in carceral settings is extremely limited.¹⁰ In most jurisdictions in Canada, and around the world, healthcare services are the responsibility of the body responsible for correctional facilities, such as the Ministry of Justice or Ministry of the Interior. However, a small but growing number of jurisdictions have transferred responsibility for healthcare services in correctional facilities to their ministry responsible for health.^{8,10}

In Canada, Nova Scotia was the first province to transfer responsibility for healthcare services in provincial correctional facilities to its public healthcare system in 2001,¹³² followed by Alberta in

2010¹³³ and British Columbia in 2017.^{8,9,134} Currently, Quebec¹³⁵ and Newfoundland and Labrador¹³⁶ are in the process of transferring healthcare services in provincial correctional facilities to their respective ministries of health. Globally, there is a lack of robust evaluation and research on the impact this change in governance model has on health outcomes for people who experience incarceration or on the sustainability or efficacy of healthcare systems.¹⁰ However, arguments have been made on the grounds of guaranteeing clinical independence,¹²⁵ improving practice standards and supporting integration with community healthcare services.^{10,85}

1.2.4.1 Arguments for change in healthcare governance

The WHO and United Nations Office on Drugs and Crime recommend that “health ministries should provide and be accountable for healthcare services in prisons and advocate healthy prison conditions”.⁸⁵ This is also the position of leaders in Canadian healthcare including the College of Family Physicians of Canada.¹³⁷ An important argument in support of the transfer is addressing role conflict and guaranteeing clinical independence for healthcare providers working in corrections.^{125,138} Healthcare providers employed by corrections are caught in an ethical tension between their responsibilities to their patient and to their employer. Examples include during a medical examination after a use of force incident or if a patient discloses illegal activities such as alcohol or drug use.^{82,125} Perceptions of dual loyalty may negatively affect trust between providers and people in need of care which can act as a barrier to services.¹⁶ Clinical independence is also essential to providing care that is consistent with the principles of confidentiality and consent.¹²⁶ It is particularly important in custody where people are unable to choose their care provider and may be required to engage with healthcare services through compulsory procedure.¹²⁵ Additionally, providers may be better positioned to advocate for

measures to improve health, such as harm reduction services, if their structures of supervision and reporting are not embedded within the hierarchy of corrections.¹³⁹ It is also argued that integration with the larger healthcare system may help to address professional isolation of providers in correctional contexts including increased opportunities for training, research and career advancement. These opportunities may in turn facilitate better recruitment and retention of high-quality medical staff.^{138,139} Integration with the broader healthcare system may also provide healthcare professionals working in corrections with greater involvement in the work of the ministry responsible for health leading to better inclusion of correctional facilities in population and public health strategies and policy.¹³⁹

Another foundational argument in support of the transition of responsibility for care in custody is the opportunity to better integrate healthcare services in correctional facilities with the larger healthcare system. This includes alignment of standards and quality of services in custody with those available in community. Despite the principle of equivalence, in many jurisdictions there are no mechanisms that hold healthcare within correctional facilities accountable to the standards of care of health ministries.^{8,88,140} Moving responsibility for healthcare services in correctional facilities to the broader healthcare system may also support coordination of efforts between prisons and community in responding to communicable infections¹³⁹ such as COVID 19.¹⁴¹ It may also improve continuity of care during transitions between correctional settings and community.¹³⁸ The importance of integration and alignment of services is reflected in the Nelson Mandela Rules; Rule 24.2 states: “Healthcare services should be organized in close relationship to the general public health administration and in a way that ensures continuity of treatment and care”.⁸³ Anecdotal reports from jurisdictions that have completed the transfer describe raised

clinical standards, improved continuity of care and patient safety and increased accountability and transparency.^{128,139,142}

1.2.4.2 Available evidence

Globally, there is a critical lack of research and evidence about the impact of the transfer on healthcare services or health outcomes.¹⁰ Evaluations of the transfer are available as reports from England^{142,143} and Scotland¹²⁸ though both studies are retrospective (reported ten and five years after the transfer respectively) and relied on limited survey and interview data. Additionally two reports, one from the WHO¹⁴⁰ and one from the International Centre for Prison Studies¹³⁹ provide anecdotal reports about the transfer of healthcare services in England,^{139,140} Wales,¹³⁹ Norway,¹³⁹ Finland,¹⁴⁰ France,¹³⁹ and New South Wales, Australia.¹³⁹ Another early description of the experience in England and Wales was published in the *American Journal of Public Health*.¹⁴⁴

These reports describe a number of positive outcomes of the transfer of healthcare services to the ministry responsible for health. Effects on service delivery include increased quality of care,^{139,140,142} improved access to services and a wider range of services offered,^{128,144} strengthened connection to community services and better information sharing.^{128,139} They also identified improved structures of strategic oversight and accountability such as increased focus on patient safety, increased performance measures and greater transparency,^{128,140,142,143} increased data collection and surveillance,¹⁴⁰ better understanding of population health needs,^{142,143} improved management structures and supervision,¹²⁸ and greater inclusion of the health needs of people who are incarcerated in national and public policy.¹³⁹ Reported benefits

for health human resources in correctional settings include improved recruitment and quality of medical staff,^{139,140} increased professional standards for staff, greater access to training,^{128,142,143} and reduced professional isolation.¹⁴⁴ In England, it was also reported that the transfer to the National Health Service (NHS) increased engagement of service users in providing feedback on services as well as in care provision through expanded peer support programs.^{142,143}

These reports also identified challenges that remained after the transfer of healthcare services. These included ongoing difficulties with recruitment and retention of staff,¹³⁹ the complicated relationship and power dynamics between healthcare and correctional staff,¹³⁹ remaining information gaps about the health needs of people who are incarcerated,¹²⁸ perceptions that healthcare services in corrections are not well understood by the wider healthcare community and in some jurisdictions there was an identified need for greater inclusion of correctional data in health system reporting.^{128,143} The Royal College of Nursing Scotland reported that lack of strategic leadership had created fundamental challenges in realising the aims of the transfer in Scotland.¹²⁸

In Spain, Bengoa and colleagues¹⁴⁵ compared available resources and use of services in a correctional facility where healthcare was transferred to the community health system with four facilities where healthcare services remained under the department of corrections. Their study found that the ratio of physicians to patients and of nurses to patients was lower in the non-transferred facilities and that technologies (such as telehealth) were only available in the transferred facility. Additionally, the rate of access to specialized care was higher in the transferred facility.

No evaluation of the transfer in either Nova Scotia or Alberta has been published, though Alberta's Correctional Health Services received reports from Accreditation Canada in 2014 and 2020.¹⁴⁶ The 2020 report describes positive partnerships with community organizations including public health, efforts to standardize policies, and placements for students in professional programs. The report also highlights persistent challenges in recruitment and retention of staff, barriers to information sharing for transition teams, and changes in leadership.¹⁴⁶

1.2.5 The transfer of healthcare services in BC

1.2.5.1 Provincial corrections in BC

BC has a population of approximately 5.2 million people.³ In 2018/2019 there were more than 23,000 admissions to BC's ten provincial correctional facilities.² Like most jurisdictions in Canada, a small proportion (11%) of admissions to custody are women and the majority (67%) of people in BC correctional facilities are being held on remand. The average length of time spent in custody is 38 days for people held on remand and 59 days for people with a custodial sentence.¹⁴⁷ In BC nearly half (44%) of incarcerated women are Indigenous, and 31% of incarcerated men are Indigenous, reflecting the structural colonial violence and racism that results in the over-policing and criminalization of Indigenous people.

1.2.5.2 The transfer of healthcare services in provincial correctional facilities

Healthcare services in BC are the responsibility of the Ministry of Health and are delivered by two specialized province-wide health authorities and five regional health authorities. The five regional health authorities deliver healthcare services within their geographic region.¹⁴⁸ The

Provincial Health Services Authority (PHSA) is a province-wide health authority which coordinates and provides specialized health services and programs such as BC Cancer and BC Emergency Health Services.¹⁴⁹ The First Nations Health Authority designs and delivers First Nations health programs across the province.¹⁵⁰

On October 1, 2017, BC transferred responsibility for healthcare services in provincial correctional facilities to PHSA. The new Correctional Health Services (CHS) was formed under BC Mental Health and Substance Use Services (BCMHSUS), an agency of PHSA. Prior to this transition, healthcare services in provincial correctional facilities had been provided by private, for-profit companies under contract with the Ministry of Public Safety and Solicitor General.⁹ The transfer responded to expert recommendations^{9,88,134} and calls for change including those from the World Health Organization,⁸⁵ The College of Family Physicians of Canada,¹³⁷ the BC Coroner's Service¹¹ and BC Auditor General.^{86,88} Additionally, a 2014 safety review of BC Corrections recommended that the Ministry of Health explore options to provide mental health care in custody.¹⁵¹

1.2.5.2.1 Timeline

The transfer of healthcare services in BC resulted from recommendations and efforts accumulated over many years. A brief timeline of the transfer in British Columbia is provided in Figure 1.1. Prior to 2003, healthcare services in BC's provincial correctional facilities were delivered through 52 separate contracts.¹⁵² In April of 2003, healthcare service delivery in all correctional facilities was awarded to a single, private, for-profit contractor.^{88,152} A review of service delivery models was undertaken by BC Corrections in 2006 but the decision was to

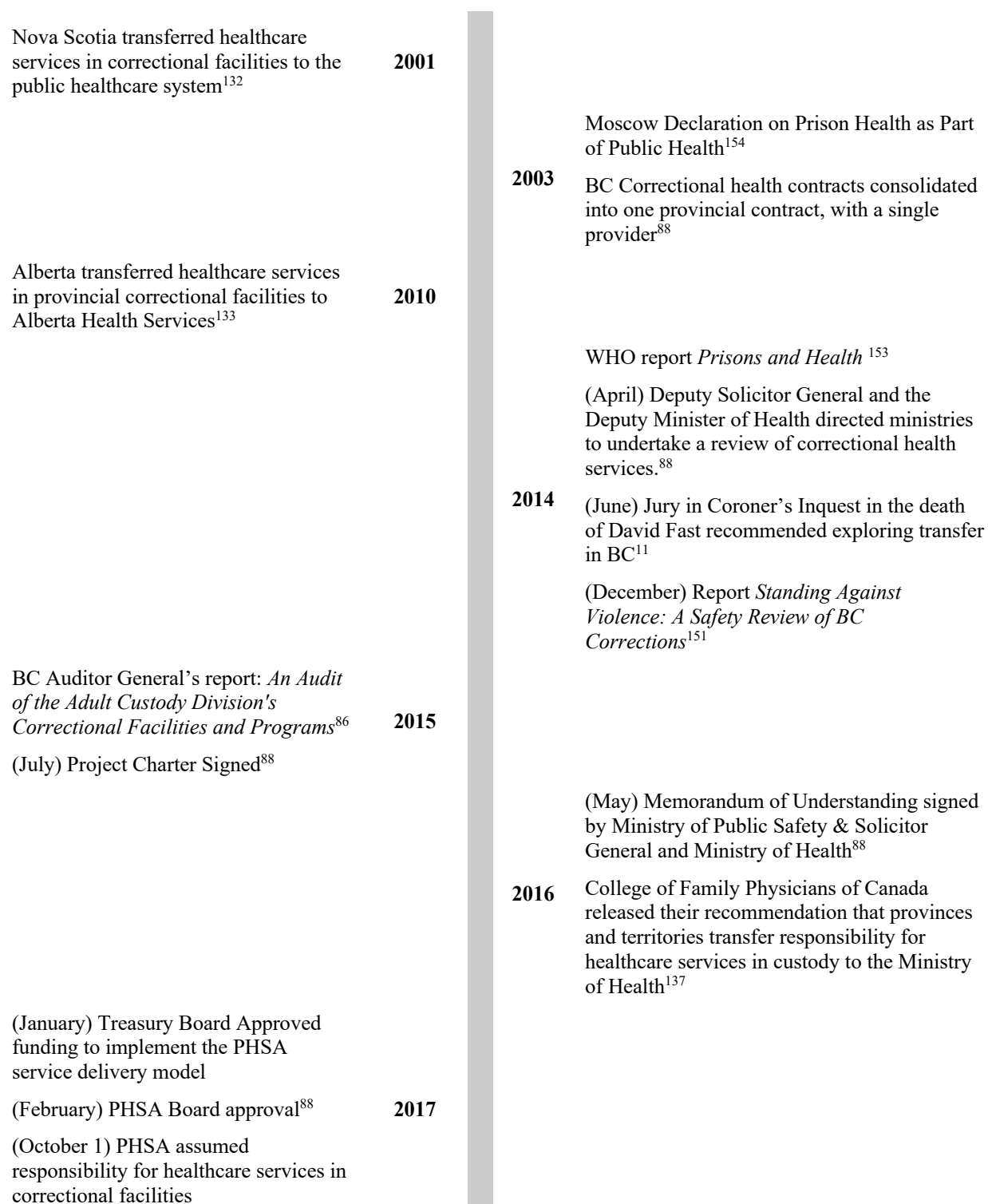
maintain a provincial contract.¹⁵² In 2013, the WHO released *Prisons and Health* which presented arguments and recommendations for integrating healthcare services in correctional facilities with the general healthcare system.¹⁵³ In April 2014 the Deputy Solicitor General and the Deputy Minister of Health directed a joint review of BC correctional healthcare services.^{88,152} This review found significant gaps in service delivery including unmet needs for mental health and addiction services, episodic primary healthcare, poor continuity of care, and practices that did not meet standards or that lacked mechanisms of oversight.⁸⁸ Also in the spring of 2014, the verdict was released from the BC Coroner's inquest into David Fast's death from acute complications to his diabetes while in custody. To address the gaps that contributed to the death of Mr. Fast the jury recommended that healthcare services in BC correctional facilities be delivered by a health authority. The coroner's comments highlight the structural challenges for healthcare services delivered by a private contractor:

“It was explained that health services are currently provided through a contracted agency. Health authorities have a number of structures and processes for quality assurance that are not available in this stand-alone agency, including participation in a national accreditation program, a credentialing process for physicians, and ongoing on-site quality and safety reviews. Additionally, there was testimony of significant impediments in the transfer of information between the health authority and the contracted health staff that in this case resulted in the failure to identify critical treatment requirements.”¹¹ (p. 11)

Discussions between the ministries about the transfer of care began in the fall of 2014.¹⁵² In December, Laurie Throness, BC's Parliamentary Secretary for Corrections released the report

Standing Against Violence in which he recommended the Ministry of Health explore options to better serve people with complex mental health needs in custody.^{134,151} In January 2015, the BC Auditor General released a report examining facilities and programming in BC's provincial correctional facilities.^{86,88} This report identified a need for increased performance management, quality assurance measures and evidence-based decision making and highlighted the particular impact of these gaps on people with mental health needs.⁸⁶ In July 2015, a project charter was signed and in May 2016, the Ministry of Public Safety & Solicitor General and the Ministry of Health signed a Memorandum of Understanding to move forward with the transfer.⁸⁸ In early 2017, the Treasury Board Approved funding to implement the PHSA service delivery model and the transfer was approved by the PHSA Board.⁸⁸ Finally on October 1, 2017, PHSA assumed responsibility for healthcare services in BC's provincial correctional facilities.

Figure 1.1 Timeline of the transfer of responsibility for healthcare services in provincial correctional facilities in British Columbia to the Provincial Health Services Authority



1.2.5.3 Aims of the transfer in BC

The stated aims of the transfer in BC are to strengthen healthcare services within correctional facilities and to improve continuity of care and integration with the broader public healthcare system^{9,155,156} with a specific focus on care for mental health and addictions.¹³⁴ To achieve these aims the clinical service plan is informed by key principles: equivalence (care access, equity and quality is the same as community services), autonomy (legal responsibility for healthcare is separate from corrections administration), integration (with PHSA, regional health authorities, and the First Nations Health Authority to support continuity of care) and collaboration (between CHS and BC Corrections).^{88,156} BCMHSUS also anticipated benefits for employees, stating that the transfer would result in “stable, public sector jobs integrated within the broader health care system for employees.”⁹

1.2.5.4 Reported early changes

Very little reporting about the achievements and outcomes of the transfer of healthcare services in BC correctional facilities is available. PHSA and CHS leadership presented on the transfer at a small number of conferences in 2018⁸⁸ and 2019¹⁵⁵ and BCMHSUS released communications on their website about the introduction of specific initiatives.^{157,158} However, these reports have been focused on the activities and provide little information on outcomes. CHS reported increased resourcing to health services including the introduction of physician clinics delivered by telehealth,^{88,159} elimination of the waitlist for OAT^{88,155} and the addition of new positions to each correctional facility including access and transition nurses, mental health nurses and concurrent disorders counsellors.^{88,155} In January 2019, five of the ten correctional facilities in BC began

piloting Community Transition Teams to support people with OUD for the first 30 days after their release.^{88,157} To improve continuity of care, CHS also implemented use of Personal Health Numbers (PHN) the unique identifier assigned to every resident of BC as part of the public health insurance system.¹⁵⁸

PHSA and CHS also conducted an internal evaluation of the activities and outcomes in the first year following the transfer.^{155,159} However, few outcomes were assessed and the report primarily focused on activities and outputs (such as policies developed and staff hired) achieved in the first year.¹⁵⁹ The evaluation did report percent changes in the number of healthcare encounters that occurred before and after the transfer; adjusted for different lengths of follow-up and declining client population, the report found that from October 1, 2017 – August 31, 2018 healthcare encounters increased overall by 8.4% compared to the preceding months. Increases were reported across all types of service encounters except ‘code blue’ responses which occur when someone is having a life-threatening emergency (-12%). Encounters related to discharge planning increased 391% and those for medication/prescription at discharge increased 28%.^{155,159} Additionally, the number of people receiving OAT in custody increased 15%.^{155,159} Though the evaluation included a staff survey, measures were limited to examination of the current state rather than comparison with previous structures, or changes attributed to the transfer. These provide a helpful benchmark of areas for improvement moving forward but do not shed light on progress made since the transfer.

An important impact of the transfer is that healthcare in BC’s provincial correctional facilities is now subject to the requirements and legislation that governs health authorities. For example, the

Patient Care Quality Review Board Act requires all health authorities to receive and process care quality complaints.¹⁶⁰ The PHSA Patient Care Quality Office took over the patient complaints process and in 2018 established the nursing role of a patient care quality specialist for correctional facilities in BC.¹⁶¹ Similarly, community healthcare services must be accredited by Accreditation Canada. The CHS Clinical Services Plan is explicitly informed by the Accreditation Canada's Provincial Correctional Health Services Standards (version 12).¹⁵⁶ CHS is scheduled for its first Accreditation Canada survey in 2021.¹⁶¹ Though CHS reports positive changes to procedure and policy, there is a need for greater understanding of their impact.

1.3 Dissertation rationale

Improving the health of people who have experienced incarceration is an issue of public health, human rights and the economics of healthcare systems.⁵¹ Despite the importance of governance models in shaping healthcare services and health outcomes for people who experience incarceration, globally, there is a lack of research evaluating the impact of policy change to integrate governance of services with community healthcare systems.¹⁰ Given the increasing interest in integrated models of healthcare in carceral settings, there is a need for research to address the current gap in evidence.

Understanding the impact of governance models on healthcare providers is essential to improving recruitment and retention, health and wellbeing of the workforce and quality of care.¹⁶²⁻¹⁶⁴ Clinical independence is central to professional integrity, autonomy and satisfaction among providers as well as functioning as a determinant of access to care.¹²⁵ To address this common challenge in correctional settings research is needed to understand how transferring

healthcare services to the ministry responsible for health may affect the autonomy and control of providers working in correctional settings. Furthermore, understanding how models of governance shape the work-life and satisfaction of providers in corrections will help to inform policies and practices that may strengthen and empower healthcare providers as specialists in their field.

Though improved continuity of care between correctional facilities and the community is an argument in favor of the transfer^{10,85} and a primary aim of the transfer in BC,¹³⁴ little evidence is available about how these connections may be established and supported or their effect on access to services or health outcomes after release. Since interruption in healthcare services may contribute to risk of overdose after release^{72,75} understanding and addressing continuity of care is particularly important in the context of the growing crisis of the toxic drug supply. Research is needed to understand how access to community healthcare services may affect the acute period of elevated overdose risk following release to ensure evidence-informed policies and supports for discharge and community connection.

Finally, expanded access to OAT is an early and important achievement reported by CHS.^{88,155} Previous research has demonstrated positive effects of continuing community OAT prescriptions in custody on health outcomes¹¹⁵⁻¹¹⁷ but there has been no examination of how broader access to OAT affects nonfatal overdose after release. Addressing this gap may provide a foundation on which to build evidence-informed policies and practices around initiating and maintaining OAT in custody as well as discharge planning and related supports.

Anecdotal reports from jurisdictions in Europe and Australia provide compelling arguments and optimism for the transfer,^{128,139,140,142–145} however, to our knowledge, no studies have examined the effect of the transfer on provider or patient outcomes. The growing number of Canadian provinces which have transferred, or are in process of transferring, healthcare services in correctional facilities to their Ministry of Health demonstrates a need to understand this model of governance in the context of Canada's healthcare system.

1.4 Dissertation objectives

The overall objective of this dissertation is to examine the impact of the transfer of responsibility for healthcare services in BC's provincial correctional facilities to PHSA on healthcare providers and health outcomes for people who experience incarceration. Specifically, using a multimethod approach, my dissertation addresses the following objectives:

Objective 1: Understand healthcare providers' perceptions of the impact of the transfer on their work and satisfaction with their role.

Objective 2: Examine the effect of increased focus on discharge planning and community integration on addressing risk and harms from fatal and nonfatal overdose after release.

Objective 3: Determine the impact of expanded access to OAT in custody on risk of nonfatal overdose after release.

1.5 Outline

This dissertation uses a multimethod approach to examine the impact of transferring healthcare services in provincial correctional facilities in BC to the PHSA on healthcare providers working in correctional facilities and on health outcomes for people who experience incarceration. The methods used in both the qualitative and quantitative analyses are described in detail in **Chapter 2**.

Three chapters on study findings (Chapter 3, 4, 5) address the primary objectives of this work. **Chapter 3** reports on a qualitative study which used one-on-one interviews with correctional facility healthcare managers and medical and administrative leadership in CHS to understand healthcare providers' perceptions of the impact of the transfer on their work and role (Objective 1). Findings from this qualitative study informed the research questions addressed in the quantitative studies described in subsequent chapters. In Chapters 4 and 5, I used linked administrative data to examine the effect of the transfer on health outcomes after release from custody. In **Chapter 4** I examined the effect of increased focus on discharge planning and community integration on addressing risk and harms from fatal and nonfatal overdose after release from correctional facilities (Objective 2). To do this, I used multivariate modelling to examine the relationships between use of care in the community and the hazard of nonfatal and fatal overdose in the weeks following release. **Chapter 5** I investigated the effect of expanded access to OAT in custody on hazard of overdose in the weeks following release (Objective 3). In **Chapter 6**, I synthesized findings, provide recommendations for future research, and describe implications of findings for policy and practice.

Chapter 2: Methodology

This chapter provides an overview of methods used in this dissertation including study design, measures, data collection, and analysis. For the qualitative study described in **Chapter 3**, I developed an interview script with input from my supervisors and conducted eight interviews with healthcare leadership between January and October 2019. I analysed and interpreted qualitative data in collaboration with my supervisors.

The quantitative studies described in **Chapter 4** and **Chapter 5** used secondary data from the British Columbia Provincial Overdose Cohort. Housed at the British Columbia Centre for Disease Control (BCCDC) and led by Dr. Amanda Slaunwhite (Senior Scientist, Committee Member), the Provincial Overdose Cohort is a set of linked administrative data developed and used to inform the response to the overdose public health emergency in BC. I independently conducted the analyses presented with input from my committee members.

2.1 Multimethod approach

Since the early 2000s there has been a rapid growth in the number of studies employing both qualitative and quantitative methods.¹⁶⁵ Using multiple methods allows researchers to engage more meaningfully with complex social phenomena¹⁶⁶ and is particularly useful in addressing complex questions in health and health services research.¹⁶⁷ However, the expansion of this field has been marked by blurred concepts and overlapping terms which are frequently used interchangeably.¹⁶⁵ These include mixed methods research, mixed methodology, multimethod research, integrated research, combined research, mixed research and methodological triangulation.¹⁶⁸ Recent work has sought to articulate and delineate, in particular, mixed methods

and multimethod approaches. Mixed methods requires data from both qualitative and quantitative approaches to be mixed through merging, embedding or connecting data sets.¹⁶⁹ This combining can take place at the data collection stage and/or data analysis stage.¹⁶⁸ In contrast, multimethod approaches use different approaches in parallel or sequence, but are not taken together until inferences are being made.¹⁶⁸

For my dissertation, I used findings from interviews in Chapter 3 to inform research questions for the quantitative studies described in Chapters 4 and 5 but data sets were not integrated as part of analyses. Instead, approaches served distinct qualitative and quantitative goals which advanced the overall objective of understanding the context and outcomes of the transfer of healthcare services in BC's provincial correctional facilities. Results from both qualitative and quantitative studies were used to develop the conclusions and recommendations of this dissertation.

2.2 Researcher and reflexivity

I conducted all interviews and analyses included in this study as a PhD student in the School of Population and Public Health at the University of British Columbia. I received training in qualitative and quantitative methods as part of my Masters program and coursework during my PhD. I gained experience in interviewing and analysis of qualitative and quantitative data as both a co-investigator and a project lead in the five years prior to commencing my dissertation work and throughout my PhD. I have also had valuable opportunities to develop and apply knowledge and subject matter expertise in models of governance for healthcare services in correctional facilities. In 2017, I worked with the John Howard Society of Ontario to develop a report

describing policy opportunities for improved integration of healthcare services in provincial correctional facilities with the public healthcare system.¹⁷⁰ This experience helped me to develop an understanding of the practical process of developing and communicating policy recommendations drawn from a body of evidence. In 2018-2019 I led a group of experts from around the world to develop a paper discussing the global lack of research and evidence for prison healthcare governance and why effective prison health governance is a critical component of addressing health inequities.¹⁰ This project gave me insight into the variety of models of governance for healthcare services in correctional facilities employed around the world and highlighted for me the importance of considering the larger social, political and economic context in understanding and transforming complex systems.

Throughout my PhD I have had invaluable opportunities for collaborative work which shaped my understanding of health and healthcare in the context of Canadian carceral systems. I have been incredibly fortunate to have worked with and learned from people who have experienced incarceration on a diverse range of projects. In sharing their experiences and perspectives, these colleagues helped me to see and consider in my dissertation work the numerous and intersecting forces that shape health and wellbeing of people in custody and people who have been recently released. The Unlocking the Gates Services Society^{37,171,172} (UTG) is a peer-led organization in which mentors, who have themselves experienced incarceration, meet people on the day they are released from prison and then for three days walk alongside clients to offer guidance and support and to help them connect with community services. Working with the amazing, committed members of the UTG team helped to guide the development of this dissertation project and provided insights into analyses, themes and findings. UTG was imagined and implemented by a

group of women who had been incarcerated in Alouette Provincial Correctional Facility. The program began in 2012 and exclusively served women leaving provincial custody until 2019 when it expanded to offer services to people leaving correctional facilities across BC. The expertise and experiences shared by UTG mentors about the needs and challenges facing women in custody and following release informed my perspective on gaps in the literature in terms of sex- and gender-specific understanding of experience and need. This influenced my decision to include sex-based sub analyses in quantitative analyses included in this dissertation. Furthermore, the perspectives of UTG peer health mentors and the important work that they do shaped my understanding of the period following release from custody as well as the need for comprehensive and person-centred support.

Throughout my PhD I was the evaluator on a participatory action research project with the Collaborating Centre for Prison Health and Education. In this role I had the opportunity to work with men incarcerated in a federal correctional facility to develop and implement a peer education and support program.¹⁷³ Working with this dedicated group of peers gave me a lens through which I came to understand the social and structural forces that define access to and experiences of healthcare services inside correctional facilities. This work also provided validation and insight into the direction and development of my dissertation project and my interpretation of findings.

As a member of the University of British Columbia Transformative Health and Justice Research Cluster¹⁷⁴ I had the opportunity to learn from and work with a diverse group of community members affected by incarceration. As part of this work, community members gathered together

to have open and candid discussions about the criminal legal system and its effects on individuals and communities. The group identified many ways in which policy and systemic social determinants shape criminalization, incarceration and health outcomes. Rather than focusing on proximate determinants, such as healthcare services, community members dug to the roots of health inequity for people who experience incarceration such as ongoing colonial violence, trauma, the housing crisis and the foster care system. These conversations molded my thinking about how healthcare services for people with recent experiences of incarceration fit as a component of the much larger work to address systems that affect health.

Additionally, for three years I was the teaching assistant for Dr. Ruth Elwood Martin's course SPPH 481C Prison Health. Over the years guest speakers including healthcare providers working in corrections, correctional staff, and people who have experienced incarceration graciously shared their perspectives on how the criminal legal system acts as a determinant of health in the lives of people who experience incarceration, their families, and communities. This extended my thinking about the lasting effects of periods of incarceration which provided insight into analyses and interpretations.

Finally, co-authors of manuscripts developed from chapters of this thesis generously shared their personal experiences and insights which directly affected the analyses conducted and the interpretation of findings. In all of these projects, I am grateful to have had the opportunity to work with diverse individuals and groups. As a cis-gendered white woman conducting research in a field defined by structures of oppression, such as racism and colonial violence, I was graciously and repeatedly offered opportunities to confront and consider this oppression in my

work. Throughout study design, data collection and analysis, reflexivity was a key practice to critically reflect on and honour the ways in which my position, values, personal experiences and worldview inform and affect my research.^{175,176} Tools used included memoing and reflective journaling, I also engaged in ongoing, reflective conversation with my supervisors and with colleagues. Though no formal community advisory committee was convened for my dissertation work, colleagues with lived experience of incarceration and the criminal legal system graciously offered advice and perspective at every stage of this work, including co-authoring resulting manuscripts.

2.3 Qualitative methodology

2.3.1 Qualitative setting and participants

Participants in the qualitative study were members of the CHS administrative and medical leadership teams, and healthcare managers in BC provincial correctional facilities. Public reporting about the transfer process allowed me to identify key experts for interview.

Interviewees were also asked to identify other individuals who had played an important role in the change. I sent an invitation to participate in a research interview via email to five members of CHS administrative and medical leadership teams. Invitations were sent to healthcare managers by a member of CHS leadership (with my email address CC'd). I sent all follow-up invitations and CHS leadership received no indication of whether healthcare managers agreed or declined to participate. Four people did not respond to the email invitation and to one follow-up invitation. All participants were made aware in the invitation that interviews were being conducted as part of my dissertation research. The neutral relationship between participants and the researcher protected the consent process from coercion; I was external to participants' employing

organizations and a student. Prior collegial relationships with some members of the administrative and medical leadership team were established as part of developing the study aim and navigating approval processes internal to BCMHSUS and BC Corrections. Approval for this study was granted by the University of British Columbia Behavioral Research Ethics Board (H17-02577) and the BCMHSUS Research Committee.

2.3.2 Qualitative data collection

Interviews took place between January and October 2019. Each interview took between 45 minutes and an hour. I conducted the interviews over the phone or at the participant's workplace depending on participant location and preference. No one else was present for any of the interviews. I developed interview questions and prompts with input from my supervisors Dr. Jane Buxton and Dr. Ruth Elwood Martin. The interview guide is provided in Appendix A. Interviews were audio recorded and transcribed verbatim by a professional transcriptionist. Transcripts were reviewed and checked against audio recordings. Transcripts were de-identified and each participant was assigned a single-letter identifier. I took notes during the interview and wrote field notes afterwards. I did not conduct any repeat interviews, but participants had the option to review the transcript of their interview and provide comment. I also invited study participants to review a draft copy of manuscripts which reported the findings.

I organized and managed interview data using NVivo 12 software¹⁷⁷ available to students through the University of British Columbia. The software facilitates the development of themes through tools such as on-screen coding, indexing, memoing, searches and retrieve operations. Consistent with interpretive description's approach of multiple data collection strategies.¹⁷⁸ I also

reviewed and considered documents relevant to the transfer such as press releases and government reports.

2.3.3 Qualitative data analysis

I used Interpretive Description methodology^{178,179} to analyse data. Interpretive Description blends a constructivist paradigm with acknowledgement of shared realities that shape human behavior.¹⁷⁸ This approach is designed to generate new knowledge which is contextualized and has practical application.¹⁷⁸ My supervisors, Dr. Jane Buxton and Dr. Ruth Elwood Martin, were both directly involved in iterative, collaborative processes of analysis, including coding and theme development. We each independently coded the same three transcripts then came together to compare and discuss initial themes. Consistent with Interpretive Description, initial, broad-based codes were generated from the data rather than from an apriori theory.¹⁷⁹ Iterative discussion throughout the analysis of remaining transcripts allowed initial themes to be developed into higher-order ideas until we reached a consensus on final themes. Based on these themes, I reviewed the literature for theories explaining the relationship between changes to the work environment and the wellbeing of employees. This search produced several theories for consideration. I chose the Two-Factor theory of Job Satisfaction^{180,181} (Figure 2.1) because it was both comprehensive in its examination of workplace characteristics and flexible in its application. Additionally, the Two-Factor theory was designed to inform change and action and has been frequently used in the nursing literature to understand the experiences of healthcare providers.¹⁸²⁻¹⁸⁵ Within the context of developed themes and with input from my supervisors, I reanalysed transcripts using the Two-Factor theory^{180,181} as a framework to understand the

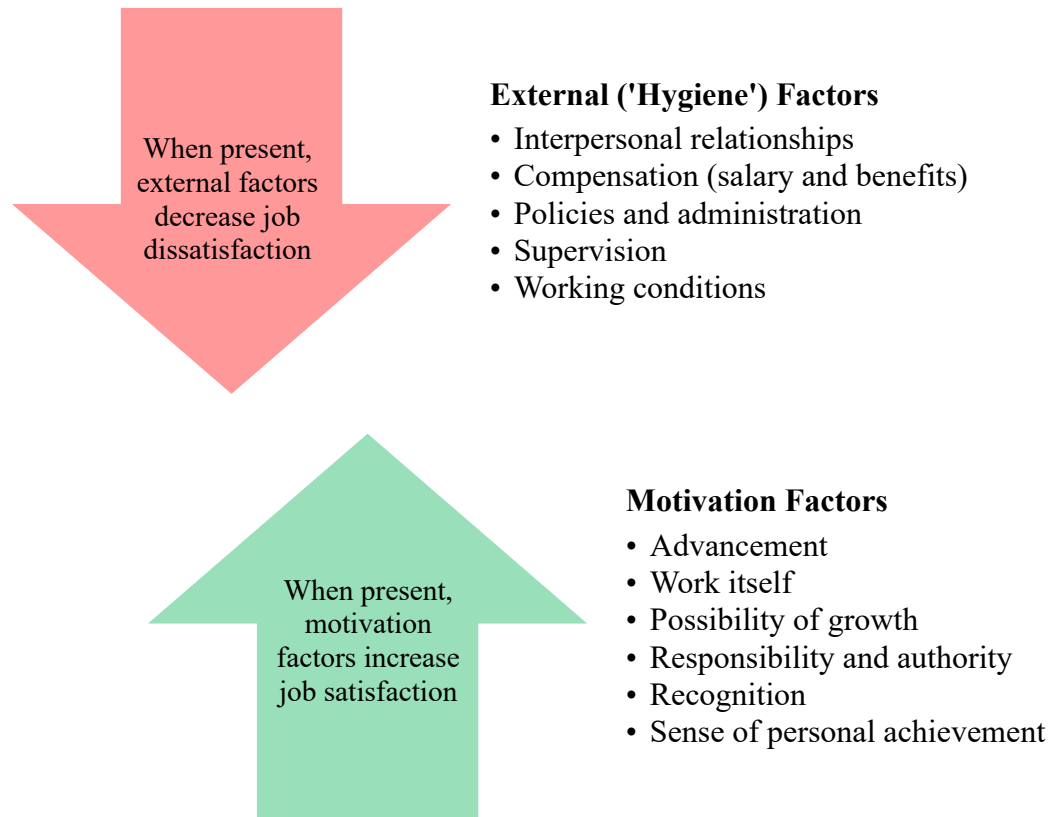
relationship between the changes to the context and working conditions described by participants and provider work-life and job satisfaction.

Two-factor theory, also called Motivation-Hygiene theory or dual-factor theory, was proposed by Frederick Herzberg, Bernard Mausner and Barbara Snyderman in *The Motivation to Work* (1959).¹⁸⁶ The theory is foundational to much of the literature in Human Resource Development around motivation, job satisfaction and compensation.¹⁸⁰ The theory describes two parallel sets of factors that influence job satisfaction. External factors (called “hygiene” factors in the original framework) are extrinsic to the job and affect dissatisfaction, but not job satisfaction. They include interpersonal relationships (relationships with peers, subordinates, and supervisors) compensation (salary and benefits), policies and administration (whether policies and guidelines are adequate and appropriate), supervision (including supervisor’s willingness to delegate responsibility or to teach, their fairness and job knowledge), and working conditions (including the amount of work, space, ventilation, tools, temperature and safety). Motivation factors are intrinsic to the job. Motivation factors are internally generated drives based on growth needs and self-actualization. To this end, increasing motivation requires job enrichment, not just job enlargement.^{181,187} Motivation factors include advancement (upward mobility and positive status or position), possibility of growth (opportunities for professional growth, new skills and training), responsibility and authority (freedom to make decisions), work itself (the content of the job, whether work is interesting or boring), recognition (praise or rewards for success or high-quality work), and sense of achievement (seeing positive results of one’s work, solving a job-related problem). They can affect job satisfaction but do not significantly affect job dissatisfaction.^{181,186} The theory posits that motivation factors are more important than hygiene

factors in determining job satisfaction but that they co-exist. So, the opposite of job satisfaction is no job satisfaction, and the opposite of job dissatisfaction is no job dissatisfaction.^{181,187}

Several studies have used the Two-Factor theory as a conceptual framework to examine job satisfaction among healthcare providers in contexts with elements similar to corrections such as: emergency department nurses in Canada,¹⁸² psychiatric nurses in the United States (US),¹⁸³ mental health nurses in a Swedish in-patient psychiatric ward,¹⁸⁴ and nurse practitioners in the US.¹⁸⁵ It has also been used to examine turnover among correctional officers in the US.¹⁸⁸

Figure 2.1 External and Motivation factors of the Two-Factor theory of job satisfaction



Historically one of the most controversial components of the two-factor models is the minor role attributed to compensation.^{184,187} Sashcau attributes this to a misinterpretation of the theory and describes money as a short-term incentive but one that is unable to lead to long-term satisfaction.¹⁸⁷ Another critique of the model is about the central assumption that motivation and external factors act independently and do not overlap. For example, it is argued that interpersonal relationships are a component of meaning and satisfaction and are therefore misclassified as external factors.^{184,189} Though these debates persist, Stello argues that the theory has never been validated or invalidated by the literature, but remains important because “a theory that stands the test of time, integrates itself into basic points of view about managing people, and continues to provide ideas for generations of scholars is a theory that has proven its value”.¹⁸⁰

Guba and Lincoln describe the trustworthiness of a study in terms of credibility, transferability, dependability and confirmability.¹⁹⁰ In this study I addressed credibility by inviting participants to review and comment on findings described in manuscripts and by triangulating data collected from different participant groups as well as from available documents and other data sources. To enhance the transferability of this study, we included a thick description of the context and experience of the transfer in BC as described by participants. I addressed dependability and confirmability through an audit trail and by employing researcher reflexivity, including field notes and journaling. Additionally, the direct involvement and participation of both supervisors (Dr. Jane Buxton and Dr. Ruth Elwood Martin) in data analysis helped ensure validity and rigor of methods and interpretation.

2.4 Quantitative methodology

2.4.1 The BC Provincial Overdose Cohort

The British Columbia Provincial Overdose Cohort is a set of linked administrative data developed and used to inform the response to the overdose public health emergency in BC. The cohort uses deterministic and probabilistic algorithms to link individual-level health and social services data using the person's name, date of birth, sex and PHN (a unique lifetime identifier assigned to residents of the province as part of the universal public health insurance system).¹⁹¹ The cohort includes all people with a record of fatal or nonfatal overdose between January 1, 2015 and December 31, 2018, as well as a 20% random sample of the population of BC (about 1.1 million people). Once a person is added to the cohort, social, incarceration and health information including prescription, hospital, emergency department, and physician data is appended starting from 2010 and then individuals are followed prospectively. Linked datasets are described in Table 2.1.

Table 2.1 Description of datasets in the British Columbia Provincial Overdose Cohort used in this dissertation

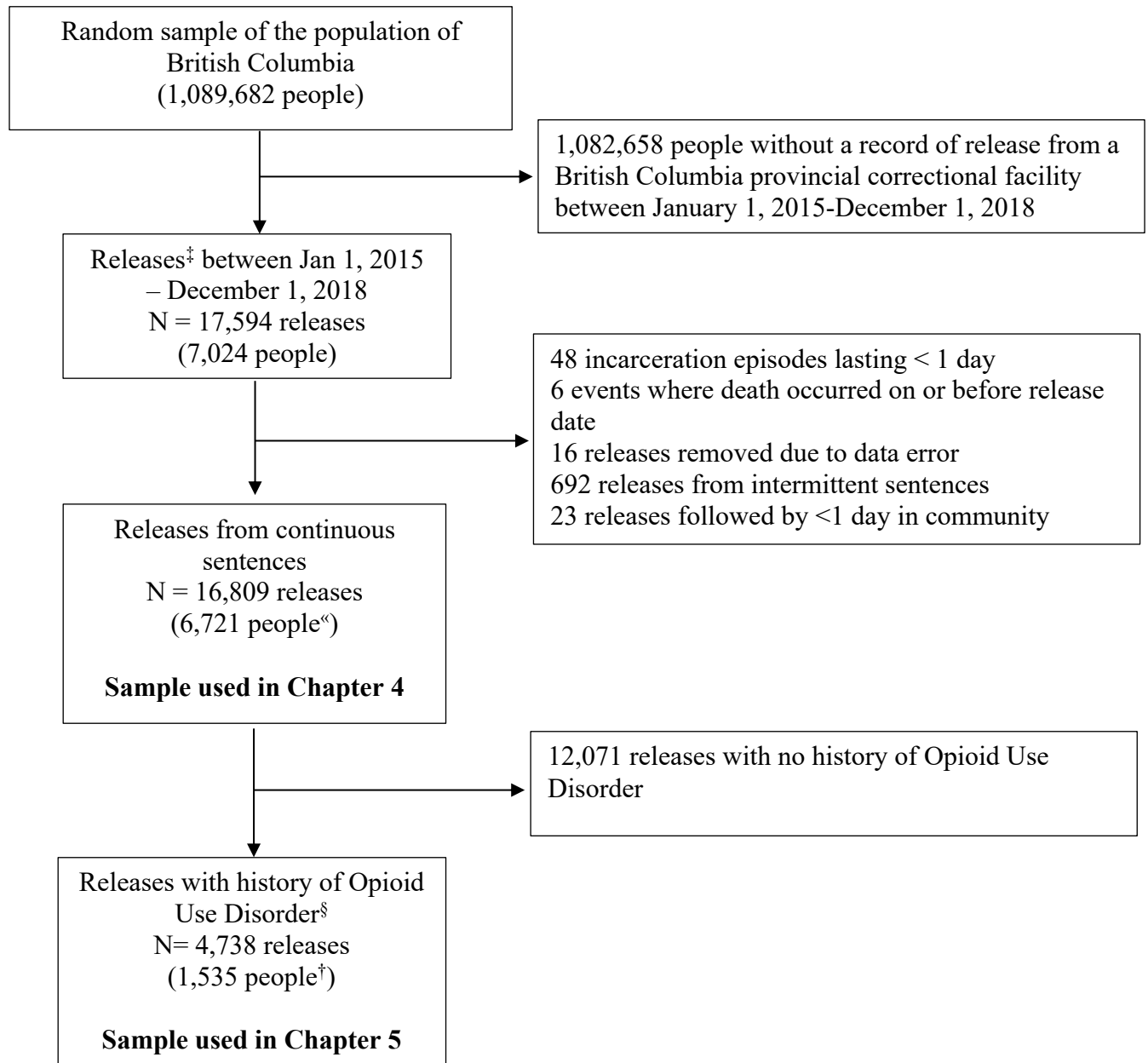
Dataset	Description
Ministry of Health Provincial Client Roster	Contains demographic characteristics, death date, and location information of BC residents for each calendar year available after 2010.
BC Emergency Health Services (BCEHS)	Contains information about the time and location of an overdose event, demographic information about patients, and details from the dispatch and paramedic's assessment, treatment, and transportation of patients.
Drug and Poison Information Centre (DPIC)	Contains information about calls to the DPIC from the public or medical personnel for advice on poisoning management.
BC Coroners Service (BCCS)	BCCS investigates all unnatural, sudden and unexpected, unexplained or unattended deaths in the province including all accidental and undetermined illicit drug-related overdose deaths. ⁶¹
Enhanced Emergency Department (EED) records	Contains data from paper-based reporting of opioid- and drug-related overdose in emergency departments in three of the five BC Health Authorities.
National Ambulatory Care Reporting System (NACRS)	NACRS is a national database designed to capture information on patient visits to hospital-based and community-based ambulatory care.
Discharge Abstract Database (DAD)	Contains discharges, transfers, and deaths occurring in acute care hospitals in BC.
Medical Services Plan (MSP)	Contains records of all fee-for-service physician visits billed to the province's universal health insurance program.
PharmaNet	Contains records of all ambulatory care prescription dispensations in the province of BC.
BC Corrections	Includes demographic, admission, transfer, and discharge information of adults (aged 18 years and older) in BC provincial correctional facilities.
Vital Statistics	Vital Statistics captures cause of death information from residents of BC who have died in BC.

2.4.2 Analytic Sample

For both quantitative studies I used the 20% random sample of the population of BC contained within the Provincial Overdose Cohort. Study samples included all people in the random sample who were released at least once from a BC provincial correctional facility between January 1, 2015 and December 1, 2018 and were aged 18 or older at the time of release. Each release within the timeframe was counted so individual people could contribute multiple releases to the study sample. I excluded incarceration episodes that lasted less than one day, releases where people spent less than one day in the community, and intermittent sentences. Intermittent sentences are sentences of less than 90 days during which people serve most of the time in the community under conditions of parole with some days (usually weekends) spent in custody.

For the study described in Chapter 5, examining access to OAT in custody, I further restricted the analytic sample to people who have OUD. Using a standardized definition developed by the Provincial Overdose Cohort, I identified people as having OUD if: they had at least one OAT dispensation since 2010 in the community or in a BC provincial correctional facility; or they had a hospital or emergency department record related to OUD; or they had two diagnostic codes in physician billing records related to OUD within one year. Specific diagnostic codes and prescription identification numbers used to identify OUD are presented in Appendix B, Table B.1. A flowchart of the creation of both study samples is provided in Figure 2.2.

Figure 2.2 Flow chart of the analytic sample selection using data from the random sample of British Columbia population included in the Provincial Overdose Cohort released at least once from provincial correctional facilities between January 1, 2015- December 1, 2018



‡ Number of releases from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018.

Ⓐ Each individual person in this cohort contributed a median of 1 release (IQR 1-3; Range 1-52).

§ History of Opioid Use Disorder at the time of release. Defined as: any record of opioid agonist therapy between 2010 and date of release, any hospital or emergency department record of opioid-related disorder or two records of opioid-use related diagnostic codes appearing in physician billing records within one year since 2010.

† Each individual person in this cohort contributed a median of 2 releases (IQR 1-4; Range 1-52).

Study follow-up began on the day of each release and was censored on the day of the first of reincarceration, death, or 30 days post-release. This timeframe was based on a robust body of literature demonstrating that the first month after release is the period of highest risk for overdose. The risk of fatal overdose is 3 to 8 times higher in the first two weeks after release compared to subsequent weeks^{24,64,65,67,71–74,192} and remains significantly elevated up to 4 weeks following release.^{24,64,65,67,72,73}

2.4.3 Quantitative measures

2.4.3.1 Outcome measures

The primary outcome in both quantitative studies was nonfatal overdose. Overdoses were identified using data from BC Emergency Health Services (BCEHS), Drug and Poison Information Centre (DPIC), BC Coroner’s Service, case-based reporting from Emergency Departments, National Ambulatory Care Reporting System (NACRS), Discharge Abstract Database (DAD), Medical Services Plan (MSP) and BC Vital Statistics. Case definitions for overdose were developed and validated for use in each specific data set.^{191,193} A brief description of case definitions is provided in Table 2.2, more detailed descriptions are available elsewhere.^{191,193} To prevent over-counting overdose records across datasets less than one day apart (within two calendar days) were collapsed.¹⁹¹

A secondary outcome in the study presented in Chapter 4 was fatal overdose. Fatal overdose is defined by the BC Coroners Service as a death involving controlled and illegal street drugs, medication(s) not prescribed to the decedent, a combination of the above with prescribed

medications or where the drug origin is unknown.^{60,191} Fatal overdose was identified using data from BC Coroners Service and Vital Statistics (Table 2.2).

Table 2.2 Case definition of overdose used in the British Columbia Provincial Overdose Cohort

Dataset	Overdose Definition
British Columbia Emergency Health Services (BCEHS)	Naloxone administered by paramedics, or paramedic impression code for: recreational drug overdose AND cardiac or respiratory arrest/death, overdose/poisoning (ingestion), sick, unconscious, or impression code for: opioid related, opioid related / overdose or cardiac arrest AND overdose/poisoning (ingestion). ³⁵
Drug and Poison Information Centre (DPIC)	A record indicative of opioid consumption (37701–05, 37707–8, 37784, 41700, 72700, 72702, 72704, 77810, 200625, 200628, 200630, 200638, 201063, 201131)
Enhanced Emergency Department (EED) records	Physician assessment that clinical symptoms indicate an opioid overdose
Medical Services Plan (MSP)	ICD-9 code of 965.0 or E850
Discharge Abstract Database (DAD)	Primary discharge diagnosis ICD-10 code of T40.0-T40.6
National Ambulatory Care Reporting System (NACRS)	ICD-10 code of T40.1 or T40.6 in the emergency department discharge diagnosis field
BC Coroners Service (BCCS)	Illicit drug toxicity includes street drugs (heroin, fentanyl, cocaine, MDMA, methamphetamine, etc.), medications that were not prescribed to the deceased person, combinations of the above, with prescribed medications, and those overdoses where the origin of drug is not known. Includes open investigations (toxicology pending) and closed drug toxicity death
Vital Statistics Deaths	ICD-10 cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14

ICD-10/ICD-9 = International classification of disease 10th edition/9th edition

2.4.3.2 Independent variables

In Chapter 4 I aimed to understand the role of increased connection to community healthcare services and continuity of care on overdose during the period of elevated risk following release (Objective 2). Using MSP data, I considered any record of physician billing not related to an overdose event as engagement with community healthcare services. In BC the vast majority of primary care physicians are compensated through the provincial fee-for-service billing model. I used a time-varying community encounter variable to establish the timing of healthcare visits relative to overdose.

In Chapter 5 I aimed to determine the impact of expanded access to OAT in provincial correctional facilities on the hazard of nonfatal overdose after release (Objective 3). I considered any dispensation of OAT on or after the date of admission and prior to the date of release as the receipt of OAT during incarceration. I used records in the BC PharmaNet database (provincial prescription dispensations) to identify OAT use in the community and in correctional facilities.

2.4.3.3 Characteristics associated with overdose

In the literature I identified demographic, health and incarceration factors associated with overdose among people who have been recently incarcerated. Available studies have predominantly examined the risk of fatal overdose following release and little is available about factors associated with nonfatal overdose though it is likely that they are similar.^{69,75,194} The literature cited below is drawn largely from studies specific to people who have experienced incarceration but also includes studies conducted among people who use substances that did not

consider incarceration history. Description and sources of covariates of interest are outlined in Appendix B, B.2

Demographic Factors: Based on the literature, I considered both age and sex in analyses.

Cohort studies among people recently released in the US found increased risk of fatal overdose with older age.^{64,65,68,192,195} One study in BC found that increasing age was associated with a small reduction in risk of non-fatal overdose among a sample of people who used illicit drugs and had experienced incarceration in the last 6 months.¹⁹⁶ This study used self-reported data and did not distinguish between nonfatal overdoses that occurred before or after incarceration, though younger age has been shown to be associated with nonfatal overdose among people in the general community who use drugs.^{197,198} Though evidence is mixed, studies suggest there may be a relationship between sex and overdose risk. Cohort studies in the US^{65,68} and Norway⁶⁷ found increased risk of fatal overdose after release among women. However another US cohort study found an increased risk of overdose mortality among men in the first two weeks after release but no difference in subsequent weeks.¹⁹² Other studies have not found a relationship.^{64,65,195}

A limitation of using administrative data is the absence of identity data. Every person in the data set was identified as either male or female and no data on gender or sexual identity was available. There is a gap in the current literature around the prevalence or rate of overdose among people who are Two-Spirit, lesbian, gay, bisexual, transgender, or queer/questioning (2SLGBTQ+). However, the prevalence of structural and social risk factors among 2SLGBTQ+ communities indicate a disproportionately high risk of overdose and related harms.¹⁹⁹ This is particularly relevant to studies of the carceral environment as people who identify as 2SLGBTQ+ are overrepresented in the criminal legal system.^{200,201} Additionally, no data on Indigenous identity were available in the data set. In 2020 the First Nations Health Authority

reported that First Nations people in BC died of overdose at 5.3 times the rate of other BC residents.²⁰² This lack of data is also particularly important in the carceral space as Indigenous people,^{2,203} are overincarcerated by the Canadian criminal legal system.

Health factors: Based on the literature, health factors considered included mental health diagnosis, chronic health conditions and previous nonfatal overdose. Cohort studies among people who have experienced incarceration in the US,^{74,192} Australia,²⁰⁴ and Canada²⁰⁵ have shown an increased risk of fatal and nonfatal overdose among people with mental health conditions. Studies in the community have also shown an association between mental health conditions and increased risk of nonfatal overdose.^{206–208} Previous nonfatal overdose has been shown to increase risk of fatal overdose.^{207,209} Finally, a previous study using the Provincial Overdose Cohort found that having two or more chronic health conditions²⁰⁵ was associated with risk of fatal overdose.

Incarceration factors: Incarceration factors considered included number of previous incarceration episodes, length of incarceration, year of release and release before or after the transfer of healthcare services to PHSA. People who have experienced multiple incarceration episodes have a higher risk of fatal overdose after release.^{67,192} There is also evidence that length of incarceration may be related to overdose risk following release. Though periods of time compared are inconsistent between studies, people incarcerated for short (a month or less) or longer (a year or more) periods appear to have a lower risk of overdose after release compared to people who are incarcerated for between 31 days and a year. A US cohort study found risk of overdose after release was increased among people who had been incarcerated between 31 days

and six months.⁶⁵ Another study in Norway found that risk of overdose death was highest among people who had been incarcerated for between three and twelve months.⁶⁷ By contrast, one Australian study did not find an association between nonfatal overdose and length of time of incarceration, but this may be due to small sample size.⁷¹ Based on the literature, I considered both number of incarcerations and length of incarceration episode in this study. I defined categories of length of incarceration by dividing the data set into quartiles. Because Chapters 4 and 5 used different samples, these categories differ slightly between the two studies. In addition, I used release before or after the transfer of healthcare services to PHSA to account for changes in policies and practices. I also considered year of release to account for changes in risk of overdose over time due to increasing presence of fentanyl and its analogs in the illicit drug supply.^{63,210}

2.4.4 Quantitative data analysis

This section provides a general description of analyses carried out in Chapters 4 and 5 to address Objectives 2 and 3 respectively. I used SAS Enterprise Guide 7.1 software²¹¹ for all analyses and considered p-value <0.05 to be statistically significant. Ethics approval for quantitative studies was granted by the University of British Columbia Research Ethics Board (H1903731).

In both studies, chi-square tests were used to compare characteristics of releases between different categories of exposure. To examine the relationship between exposure and nonfatal overdose (recurrent event) Andersen-Gill regression models²¹² with robust error variance were used.²¹³ The Andersen-Gill model is a generalization of the Cox proportional hazards model²¹⁴

that allows for examination of recurrent event data which follows a Poisson process.²¹⁵ In my analyses, this meant the model accounted for an individual person experiencing multiple nonfatal overdose events during follow-up. It is not well understood how experiencing a nonfatal overdose may affect the timing or risk of a subsequent nonfatal overdose. A small number of studies have suggested that those who have previously experienced a nonfatal overdose at some point in their history may be at an elevated risk for another nonfatal overdose.^{71,196,197} I could not find any study that says such relationships persist in a short period of follow up (e.g., 30 days) which was the interest of this study. Since there is no known or obvious biological mechanism that might create a relationship between the timing of overdose events, the primary assumption was that the risk of nonfatal overdose remains constant during the 30 days of follow-up and does not depend on the number of previous overdose events in the preceding days or weeks. For this reason, and also to avoid adjusting for post-baseline factors that might lead to over-adjustment due to potential adjustment of mediator or collider²¹⁶ I did not include or adjust for a time-dependent covariate counting the number of events during follow-up. I used a robust error variance as proposed by Lin and Wei²¹³ to account for correlation between events among individuals in the study.²¹⁷

In terms of parameter estimates, the Andersen-Gill model performs comparably to the Poisson regression^{215,218} when robust standard error estimates are used, and performs better than Poisson regression (with robust standard error) in terms of type I error rates.²¹⁵ Negative binomial regression models performance is similar to that of the Andersen-Gill model in terms of bias and coverage (again when robust standard error estimates are used).²¹⁵ Finally, the Andersen-Gill model has been demonstrated to be a preferred method for studying recurrent events in

discontinuous risk intervals^{218,219} and has been used previously to investigate characteristics associated with nonfatal overdose among people recently released from prison.⁷¹ Therefore, the Andersen-Gill model was considered the main analysis. I conducted multiple sensitivity analyses using Andersen-Gill, Poisson, and negative binomial regression models which are detailed in Chapters 4 and 5.

In Chapter 4 (Objective 2) I used chi square tests to compare characteristics of releases in which the person accessed community healthcare services which were not part of an overdose event at any point within 30 days of release with those who had no community healthcare contact during follow-up. I also compared characteristics of people who experienced a fatal overdose and those who had a nonfatal overdose attended by emergency services during follow-up. To understand the association between the use of community healthcare services with subsequent nonfatal overdose after release, I applied Andersen-Gill regression models with robust error variance. In sensitivity analyses for this primary aim I applied Poisson and negative binomial regression models as well as Andersen-Gill models. The secondary aim of this study was to examine the relationship between use of community healthcare and fatal overdose; for these analyses I used Standard Cox proportional hazards models. As a third aim, I conducted a stratified sex-based analysis of the relationship between use of community healthcare and nonfatal overdose after release using Andersen-Gill models.

In Chapter 5 (Objective 3) I examined the association between dispensation of OAT on or after the day of admission but prior to the day of release and nonfatal overdose within 30 days of release using Andersen-Gill regression. Sensitivity analyses to the primary aim used Poisson and

negative binomial regression models as well as Andersen-Gill models. As a second aim, I examined the association between OAT use in custody and nonfatal overdose after release separately for people who were initiating a new episode of OAT while in custody and people who had an active community prescription on admission and continued OAT in custody using Andersen-Gill models. Finally, as a third aim, I stratified the data based on sex and used Andersen-Gill models to examine the relationship between OAT use in custody and nonfatal overdose after release among women and men separately.

2.4.5 Sex-based stratified sub-analysis

In both quantitative studies, I conducted a sex-based stratified sub-group analysis. Because the majority of people incarcerated in Canada are men there is a lack of health research specific to the experiences and outcomes of women.⁸⁰ This research is needed because structural and social factors shape experiences and risks of incarceration, substance use, healthcare access and overdose differently for men and women. Women who are incarcerated have a higher burden of mental health conditions and substance use compared to incarcerated men.^{18,220,221} Women also tend to spend less time incarcerated both in remand and sentenced custody² which may have implications for access to services in custody as well as opportunities for discharge planning and establishing connections with community supports. Understanding how policy changes resulting from the transfer might affect men and women differently is important to inform evidence-based and gender-responsive programming.

A limitation of administrative data is the absence of data about gender. People who are transgender disproportionately experience incarceration and are more likely to experience

physical and sexual violence while incarcerated²⁰⁰ directly affecting their health and health outcomes. In this study, the variable for sex was identified from vital statistics records, so people whose gender identity is different from the assigned sex on their documentation were misclassified. There are no data available about the number of people in Canadian correctional facilities who identify as transgender or gender diverse. In 2018, the Office of the Correctional Investigator reported that 52 people incarcerated in federal correctional facilities required an accommodation for gender identity or expression.²³ The CHS one-year evaluation of the transfer of healthcare services to PHSA reported that six people had received transgender-affirming care in BC's provincial correctional facilities.¹⁵⁹ Though in this study, the number of people affected is likely to be very small, the lack of available data represents a critical gap in understanding and addressing the needs of transgender and gender diverse people who experience incarceration and should be addressed by future research.

Though data available is limited to female or male sex, throughout this dissertation I use the terms 'women' and 'men' as nouns for people identified as female and male respectively. This choice is both for ease of reading and to be consistent with principles of thoughtful and deliberate use of respectful language when working with people who experience incarceration.²²²

Chapter 3: Healthcare perspectives on the impact of the transfer on work-life and job satisfaction

This chapter describes the qualitative study I conducted to investigate the perceptions of healthcare leadership working in provincial correctional facilities of the impact of the transfer of healthcare services to the Ministry of Health on their work and on satisfaction with their role (Objective 1). A version of this chapter has been submitted to a peer-reviewed journal for publication.

Briefly, I conducted eight interviews with healthcare leadership between January and October 2019. I applied Interpretive Description methodology to analyse interview data, using the Two-Factor theory of job satisfaction as a framework and with input from my supervisors. Participants reported four areas of work-life changed by the transfer: 1) staffing, equipment and resources 2) systems of supervision and support 3) standards, policies and quality improvement and 4) culture and orientation. Participants predominantly described the transfer as having a positive impact on job satisfaction and directly increasing quality of care. Lessons learned from providers in BC may inform efforts to improve healthcare services and health outcomes in correctional settings in other jurisdictions.

3.1 Introduction

Models of healthcare governance shape quality, effectiveness and accessibility of healthcare services.^{85,125,223} However, little is known about how governance models define healthcare in correctional facilities¹⁰ or impact care providers in these settings. Globally, most systems of

healthcare in carceral environments are under the authority of the ministry responsible for corrections. Limited research available on the experiences and working conditions of healthcare providers in correctional facilities in Canada^{99,119} and internationally,^{120–124} identifies ethical and structural challenges common to this type of model. In particular, healthcare providers employed by corrections experience conflict between the cultures and priorities of healthcare and security which create barriers to clinical independence,¹²⁵ negatively affect providers and directly influence care.^{119,124,127} For example, providers must navigate ethically and professionally complex situations such as assessments after use-of-force incidents or patient disclosure of illegal activity, such as drug use.^{82,125}

In a small but growing number of jurisdictions worldwide responsibility for healthcare in custody has been moved partially, or completely, to the ministry responsible for health.¹⁰ To our knowledge there has been no research examining the impact of this change in governance model on the work-life or job satisfaction of providers working in correctional facilities. On October 1, 2017 BC transferred responsibility for healthcare services in provincial correctional facilities from a private, for-profit company to the PHSA under the BC Ministry of Health.¹³⁴ Through interviews with correctional healthcare leadership, we aimed to explore the impact of this transfer in BC on healthcare services and on providers working in provincial correctional facilities. This study also provides a rich description of the context of healthcare services in BC's provincial correctional facilities and the policy and resource changes implemented by PHSA. Findings from this study were used to inform the quantitative analyses presented in Chapters 4 and 5.

3.2 Methods

3.2.1 Methodology

To conduct this study we used Interpretive Description methodology.^{178,179} Interpretive Description was developed to generate grounded knowledge in the intersection of subjective experience and shared understanding of healthcare contexts.¹⁷⁸ This approach is designed to provide knowledge which is contextualized and can inform clinical practice.¹⁷⁸ For this study, Interpretive Description provided a flexible analytic framework which could draw on both the individual experiences of healthcare staff interviewed and patterns within the broader context of the environmental shifts of their practice setting.

3.2.2 Recruitment

I conducted one-on-one interviews with healthcare managers of correctional centres and members of CHS administrative and medical leadership teams. I sent invitations to participate in a research interview via email to five members of the CHS administrative and medical leadership teams. Invitations were sent to the seven healthcare managers by a member of CHS leadership with my email address CC'd. I sent all follow-up invitations. Four people did not respond to the initial email invitation plus one follow-up invitation. Approval for this study was granted by the University of British Columbia Behavioral Research Ethics Board (H17-02577) and the BCMHSUS Research Committee.

3.2.3 Data Collection

Interviews took place between January and October 2019. I conducted interviews by phone or at participant workplace depending on the participant's location and preference. Interviews were

audio recorded and transcribed verbatim. Transcripts were reviewed and checked against the audio recording. Transcripts were de-identified and each participant was assigned a single-letter identifier. I took notes during the interview and wrote field notes after. Consistent with Interpretive Description, data collection and analysis were carried out concurrently to enable each process to inform the other.²²⁴ No repeat interviews were conducted but participants had the option to review the transcript of their interview and/or the draft manuscript. One participant requested their transcript and their feedback was incorporated into the analysis. Five participants were sent a draft manuscript for comment.

3.2.4 Analysis

Transcripts were managed using Nvivo 12.¹⁷⁷ I analysed transcripts in collaboration with my supervisors, Dr. Jane Buxton and Dr. Ruth Elwood Martin. We each independently analysed and coded three transcripts then came together to compare and discuss themes. Consistent with Interpretive Description, codes were generated from the data.¹⁷⁹ Then, iterative discussion throughout the analysis of remaining transcripts allowed initial themes to be developed into higher-order ideas until we reached consensus on final themes.

Within the context of these themes, we used Two-Factor theory as a framework to examine participant perceptions of effects of the transfer on their work-life and job satisfaction. Two-Factor theory is described in more detail in Chapter 2. Briefly, the theory describes two parallel sets of factors which influence job satisfaction. External factors affect job dissatisfaction and include interpersonal relationships, compensation, policies and administration, supervision, and working conditions. Motivation factors are intrinsic to the job and affect job satisfaction. They

include advancement, possibility of growth, responsibility and authority, work itself, recognition, and sense of achievement (Figure 2.2).^{181,186}

Consistent with Interpretive Description²²⁵ other data sources including news releases and reports were used to inform the interpretation of findings and for triangulation²²⁶ but were not coded as data.

3.3 Findings

Eight people participated in this study. Five participants were healthcare managers and three had leadership roles within CHS. Three of the eight participants were women. Four participants were located in the city of Vancouver or in one of the surrounding municipalities included in the Greater Vancouver Metropolitan Area, the remaining six were located across the province. Six participants had worked in provincial corrections prior to the transition. Interviews took between 45 minutes and an hour.

Participants identified multiple activities and initiatives implemented by PHSA that changed the work-life of healthcare staff and affected job satisfaction. Most changes were described as affecting motivational factors and enriching¹⁸¹ the roles of healthcare managers and their staff. Though interview questions probed for challenges and difficulties, the vast majority of comments made by participants reflected positive perceptions of the transfer.

Through data analysis we developed four categories of changes to work and working conditions highlighted by participants: 1) staffing, equipment and resources, 2) systems of supervision and

support, 3) standards, policies and quality improvement, and 4) culture and orientation (Figure 3.1). In most instances, initiatives and activities implemented by PHSA were described as affecting multiple factors of job satisfaction.

Figure 3.1 Themes of changes identified in interviews with healthcare managers and Correctional Health Services leadership in British Columbia

Staffing, equipment and resources	Telehealth
	Tools, equipment, treatments
	Health human resources
Systems of supervision and support	Centralized leadership and reporting structures
	Structured relationship between healthcare and corrections
	Healthcare staff input into decision-making
	Support of PHSA departments (e.g., Human Resources, Finance)
Standards, policies and quality improvement	Quality improvement and culture of change
	Standardization of policies across centres
	Alignment with PHSA policies (e.g., compensation, shift changes, Occupational Health and Safety)
	Professional development training and courses
Culture and orientation	Patient-centred care
	Discharge planning and connection to community resources

PHSA = Provincial Health Services Authority

3.3.1 Staffing, Equipment and Resources

Participants highlighted that increased staffing had affected “*the whole team because now we’re not working short all the time*” (P). PHSA introduced new positions to each facility including access and transition nurses, mental health nurses, and concurrent disorder counsellors.⁸⁸

Healthcare leadership highlighted that these new positions had enriched the work of others in the department by increasing time available to staff to complete their work and by providing support for specific components of care such as discharge planning.

We never had anybody for discharge planning. We kind of just had to roll it into the roles that we already had [...] Now we’ve got all these other roles that allow our healthcare department to flourish in ways that we haven’t before. (W)

In addition to new positions participants felt increased access to physicians improved the ability of healthcare to provide efficient, high-quality services.

Extra staffing has definitely helped and having the doctor here on a daily basis has absolutely been amazing. It’s made it so much easier for the nursing staff to get clients seen in a timely manner. (S)

All participants highlighted that the introduction of telehealth had increased access to physician care and the timeliness of consultations. Telehealth also improved access to specialist care such as for Hepatitis C and for transgender clients. Participants felt this resource increased autonomy and control for staff and supported higher quality care.

We run two telehealth clinics here a week now and we can be connected to pretty much anyone we need to be [...] that's a really big change. I mean, just that alone, for the quality of care or the ability to provide care to people (P)

Though most participants acknowledged recruitment and retention as an ongoing problem, many felt the status of PHSA had helped to increase interest in positions and attract high-caliber candidates. In addition to the status conferred by being part of a health authority, PHSA opened doors for advancement for healthcare staff as seniority was now transferable across PHSA's other programs and services creating access to positions throughout the province.¹⁴⁹

Before I'd go through six, eight, ten people and then I'd find one diamond in the rough. Where now it's, like, oh, my god, I have all these people that I'm interviewing and I have to pick the best out of a bunch of really great people. (W)

Participants also discussed increased access to equipment and treatments, such as pharmaceuticals to treat hepatitis C. These resources helped healthcare staff to provide to high-quality patient care and increased the autonomy and control healthcare staff had in their work.

Now we're getting all these tools to work with patients. So patient care and quality of care's going up. You're able to provide them with things that you couldn't provide [...] I mean, you feel empowered to do this job. (P)

Access to equipment and treatments also changed how participants saw their role and their ability to make a meaningful, long-term impact for clients.

Like, we can make a difference in people's lives. Dentures, for instance [...] we can now get them a set of dentures that can maybe allow them to get a job. (W)

3.3.2 Systems of supervision and support

Structures of supervision and reporting implemented by PHSA were cited by participants as having a positive effect on the morale and working conditions of healthcare staff. The support of the new leadership structures was contrasted with the isolation that healthcare managers felt prior to the transfer.

It was the manager that carried the ball at each centre that ensured that the health services would carry on. And we would provide the best service we could. But it wasn't because of leadership from the contractor. (L)

An important distinction was the feeling that supervisors and leadership were experts in healthcare which supported perceptions that the aims and practices of strategic directions and policies aligned with the values and goals of the professionals providing care.

Like, healthcare people should be looking after healthcare. Corrections should be looking after corrections. (W)

Alignment of values between providers and leadership in turn supported a sense of ownership and control over services.

We're not contracted to provide the service. We are the service. It's our service. We're not reporting to Corrections on our health outcomes. We report to the Ministry. We report to the PHSA Board. We're health and we're an entity on our own. (E)

Healthcare managers highlighted both benefits and challenges of integrating with PHSA departments such as human resources and finance. All managers described these departments as increasing bureaucracy. In some cases, managers felt that challenges were created because these PHSA departments were unfamiliar with the unique needs and context of corrections. Most managers felt that despite the bureaucracy, these departments had relieved administrative burden and had helped them to focus their time and energy on supporting staff and providing patient care. One health manager felt the increased administrative burden had reduced time spent with staff.

"I don't know that I've really stressed the support and how it's impacted us by all of the different specialized departments in PHSA [...] Even though sometimes it can make it seem like everything is further removed, having the specialists managing a lot of these elements has really made it easier for us to focus on the patient care." (D)

All participants highlighted that throughout the transfer healthcare staff had a voice in policy and decision-making. This engagement was seen as recognition of the expertise of healthcare providers as specialists in care in the carceral environment. It was also viewed as a fundamental

part of improving working conditions and services as well as supporting providers to feel empowered in their work. All healthcare managers reported that PHSA continued to ask for advice from healthcare staff after the transfer and several were members of committees working on specific policy areas. This ongoing role for staff in decision-making was also described as a marker of positive supervision and leadership from PHSA.

The other thing is that PHSA is still asking us for advice when it comes to providing healthcare in the correctional setting [...] That's a good thing because there's lots of years of experience throughout the service that can make things go a lot smoother and work a lot better. (L)

The value of staff voice in decision-making was also reflected by participants in leadership positions.

And from the ground up. Right? Front-line saying 'this is not working for us' okay if it's not working what do we need to be doing differently? (J)

3.3.3 Standards, policies and quality improvement

Nearly all participants identified the increased access to training and professional development opportunities under PHSA as having an important and positive effect on staff and on quality of care.

I think it makes them feel a little bit more valued as employees. But it also makes them feel more qualified to deliver care. (D)

Healthcare managers were also offered training which strengthened their own leadership and clinical skills and helped them to feel well positioned to support staff.

The other thing that's been great about being in a health authority is the amount of education that we've been allowed to have over the last year. I don't think I've ever taken so many courses in my life. And I've never felt so supported. (W)

Participants identified some negative effects of integration and implementation of centralized PHSA policies. One such effect was that standardization of compensation rates meant that some staff lost monetary incentives previously paid by private companies.

Some people had to take pay cuts, which has since been addressed, but that impacted I think their morale. So, we had low morale for a while. (D)

Centralized human resource policies meant the previous four-on-four-off rotation did not fit the PHSA definition of a full-time position (37.5 hours). In some sites this was discussed as an ongoing source of staff frustration. In other facilities, healthcare staff had been able to elect to go down to part-time (0.93 FTE) in order to return to this rotation. The availability of this choice was credited to advocacy by individual leaders.

So that has definitely caused some frustration for staff, because the rotations that they're working right now - it's not very consistent [...] I think that's the only thing if they could change. (S)

Centralization of policies was also highlighted as contributing to the standardization of care. Healthcare services delivered in the community must be accredited by Accreditation Canada, and CHS will undergo an accreditation survey in 2021. Most participants reported that policies implemented toward accreditation raised expectations around standards and quality improvement. They also reported that the standardization of policies across centres had improved working conditions as well as care provided to clients. Measuring progress toward these standards helped to empower people with data and also provided a means of recognizing areas of achievement.

I think that it's one thing to have standards [...] but it's also the ability to measure those standards and to act on those standards. To improve those standards. And they've done that in spades already. [...] So we can see at a glance what we're being successful in and what we're not being successful in. (P)

Focus on quality improvement and accreditation also increased feelings of recognition and professionalism among providers.

If we're wanting to provide the best possible care to our clients, then that's a way we can say that, hey, we meet all the professional standards that are required. So I think that's really important, and I'm kind of looking forward to that. (W)

Participants highlighted the relationship between Corrections and PHSA as a key facilitator of improving and standardizing policies. The relationship between the two organizations meant healthcare staff felt supported in their work and that reporting structures provided a means of exerting more control and influence over working conditions and patient care.

It's not just me now going to the warden and saying 'we're going to do this' and hope for the best. They're having these discussions and they're collaborating to make it work for both sides. (D)

3.3.4 Culture and orientation

Participants identified a top-down shift in the orientation of healthcare services toward a focus on patient centred-care. This included a requirement that healthcare staff use the word 'client' when referring to people receiving care. This change in language was viewed as both signaling and contributing to a larger shift in culture. Participants felt that it changed the way staff viewed clients and their relationship as providers.

I see people being a lot more engaged than they were before. Before, it was really-- not everybody, not everybody was like this before -- but it was like, oh, inmate, inmate, inmate, stigma, stigma, stigma. Now we call them clients. We don't call them inmates

anymore because we're not allowed to. That's how PHSA likes us to address our clients. So I feel like my staff in a sense are looking at our clients more like people than just inmates, which was what it was before. (W)

This culture change also included modifying specific policies that had previously been dominated by security concerns, such as medication diversion, to a focus on client needs. This contributed to a new understanding of the role of healthcare providers within the context of corrections and the purpose and meaning of their work.

Going from being a paid-for-by Corrections contractor, so basically you're answering to Corrections, to being a public health authority who works with Corrections but is paid through the province and not through Corrections. It's a different relationship. And it also brings a different lens. (H)

Participants also frequently identified the new focus on discharge planning and continuity of care as transforming the work that they are able to do and establishing healthcare in corrections as part of a continuum with services in the community.

We're also now able to assist our clients better on their transition back into the community. Because before, it used to be when they're discharged, they kind of went to the gate and then that was it. (W)

Participants viewed these changes as affecting the long-term impact their efforts could have in the lives of clients.

So even if [we] are providing excellent care while the client is with us, it doesn't mean anything if there's nothing after they leave [...]. So, I think that is one of the biggest things that I think that the health authority has brought into that model of care is the continuity of care (E)

Beyond health, participants expressed the hope that better continuity of care would mean their work could have an impact on the wellbeing of clients, including breaking the cycle of reincarceration.

We've seen an improved ability to help the guys when they're headed out of here and into the real world. So I'm hoping that we see a reduction in return rate for some of the guys. Well, for all of them. (L)

Participants saw this shift toward trauma-informed client-centred care, in combination with increased access to resources and treatment, as changing the relationship between healthcare and clients.

To be honest, and this is really hard to define, but there is different attitude about who we are now. Meaning if somebody asks for something healthcare-wise, we typically will do our best to try to meet that need. And we go out of our way. I think we just take an extra

step in anything that we do to make sure that we've addressed everything that we possibly can for that patient. (D)

Some participants felt that this changed relationship was also experienced by some clients who expressed appreciation for support they received from healthcare staff.

I've never had before where they just put in a health service request just [to say] -- and it only seems like it's happened maybe in the last eight or nine months -- "thank you guys so much for what you did for me". And at Christmas this year, I got like nine cards from the clients here saying thanks for all that you do for us. (W)

Participants also highlighted that the new orientation toward connection and integration with community services changed the relationship with community organizations.

One of the biggest complaints with community partners was the discharge plan historically was 'here's a bus ticket to Greyhound and off you go'. Or they'd just get released at court and they're not our problem anymore. So that all changed the day PHSA took over. (P)

Participants discussed how PHSA's status as a health authority and the relationship of the organization to community services improved information sharing and helped to support access to community services for clients in custody and after release.

The amount of doors that have opened for our clients and also us- and when I say that I mean we're not shut down when it comes to calling the hospital or calling a doctor's office or trying to get them in with a specialist. And information sharing from our community [...] we now actually have clout behind our name. (W)

Finally, many participants discussed feeling hopeful and excited about the culture of change and quality improvement that they felt under PHSA.

I just think that there's endless possibilities [...] we've got all the right people in the right places, and I'm just really excited for the future. I don't know what it holds, but I think it's going to be pretty good. (W)

3.4 Discussion

Healthcare services leadership in BC's provincial correctional facilities described many ways in which the transfer of healthcare services to PHSA had improved both motivation and external factors identified in Two-Factor Theory¹⁸⁶ as well as the ways in which these changes had affected the work-life and job satisfaction of healthcare providers. Additionally, participants felt these changes had made a difference in the quality of care they were able to provide for clients and the impact of their work on health outcomes. These improvements are important from both an individual and health systems perspective; in addition to promoting retention and a healthy workforce, job satisfaction among providers has been linked to quality, safety, and patient satisfaction with care.¹⁶²⁻¹⁶⁴

Positive changes to external and motivational factors highlighted in this study align with challenges identified in other studies of experiences and working conditions of healthcare providers working in correctional settings. Participants in this study identified increased staffing and access to equipment and treatment as improving their control and autonomy over their work, as well as the quality of care they were able to achieve for patients. Other studies have highlighted lack of adequate access to staff and equipment resources as a source of frustration for healthcare providers in correctional settings in the US^{121,122,124,127} and Canada.¹¹⁹ Similarly, improved supervisor support and participation in decision-making and policy change were highlighted frequently by participants in this study. Other studies have identified ineffective leadership^{121,127,128} and/or a perceived lack of respect for healthcare services and providers^{119,127} as an obstacle to quality care and job satisfaction. On the other hand, recognition, trust in managers and having a voice in decision-making have been linked with retention of nurses in other healthcare settings.²²⁷ Professional development and learning opportunities, which was a positive change highlighted repeatedly by participants in this study, has also been identified as contributing to retention of nurses.²²⁷ Learning from the changes and experiences reported by healthcare leadership in BC may provide valuable insight for other jurisdictions.

Currently, there are no studies available about the impact of integrative governance models on job satisfaction among healthcare staff or leadership in other jurisdictions. However, reports from the United Kingdom have included surveys, interviews and focus groups with healthcare staff in correctional facilities. In England, respondents reported that the transfer of services to the NHS resulted in more patient-friendly care, a greater say for nurses in how services should be delivered and reduced feelings of professional isolation. They also identified remaining conflicts

between the aims of care and custody, and ongoing challenges with recruitment and retention.¹²³ Recently, austerity measures introduced across the NHS in England in 2008 have been cited as reducing access to healthcare services within correctional facilities, lowering quality of care, and increasing use of private contractors.²²⁸ In Scotland, nurses reported that lack of strategic leadership negatively impacted potential gains from the transfer; a lower proportion of nurses surveyed after the transfer reported feeling that criminal justice nursing was a rewarding career.¹²⁸ The similarities and differences between reports from other jurisdictions and findings in this study indicate an urgent need for research to understand governance models for healthcare in correctional facilities within the context of the larger healthcare system.

Like health systems around the world, burnout is a growing crisis in Canada's healthcare workforce. A 2013 study among healthcare providers in Ontario's provincial correctional facilities found that 67% of healthcare managers and 39% of nurses had scores of emotional exhaustion that indicate burnout¹¹⁹ on the Maslach Burnout Inventory-Human Services Survey.¹²⁹ The Job Demand-Control model posits that employee mental health and wellbeing are influenced by the intersection of job demands, such as workload and emotional strain, and job control, such as being able to make task-related decisions.²²⁹ Many of the changes to work-life identified by participants in this study directly addressed elements of workload, autonomy and control. Understanding how models of governance effect work-related stress for providers in correctional facilities may provide opportunity to support health, wellness and job sustainability for healthcare staff.

Participants' comments about the transfer were predominantly positive, though some participants discussed periods of low morale as the transfer was underway. This is consistent with the Change Curve model of organizational change^{230,231} based on Kubler-Ross' stages of grief.²³² In Stage 1, when the idea of change is introduced, people commonly respond with denial and remain committed to the status quo. In the second stage, as change is initiated people may fear, or correctly identify, negative effects for themselves or their work resulting in anger and frustration. In Stage 3, people begin to accept the change; they start exploring what the change will mean for them and may begin to recognize opportunities. In the final stage, people have become committed to the change and its success which in turn may improve morale and the perceptions of work. More than a year after the transfer occurred, when we conducted interviews for this study, most people would have moved into the stages of acceptance and commitment.

To our knowledge this is the first study to examine change in governance of healthcare services in a carceral setting through the lens of work-life and job satisfaction. A strength of this study is that most participants had worked in corrections prior to the transfer and therefore had a comprehensive understanding of changes. Though there were limited insights into negative effects of the transfer, participants were forthcoming and candid when discussing the challenges that were identified both during and after the transition, so we do not have reason to believe participants were deliberately omitting challenges.

Interviews were conducted with healthcare leadership, and their views may not reflect the experience or perspectives of staff. In a Scottish report, healthcare managers were "generally more positive about the transfer than front-line staff,"¹²⁸ though it is not clear how generalizable

this discrepancy might be to the structures of healthcare in BC. Additionally, the primary focus of interviews in this study was the transfer process and outcomes related to patient care. The breadth and diversity of changes and effects highlighted by this study's participants illustrate a comprehensive change, although the absence of specific questions focused on job satisfaction may have missed key changes or components. Furthermore, member-checking provided opportunities to identify gaps. Finally, interviews were conducted less than two years after the transfer and reflect early outcomes and potentially, optimism. Future research should seek to understand the challenges, gains, and outcomes for correctional healthcare under PHSA in the medium and long-term.

The overwhelming majority of changes identified by healthcare leadership were reported as having a positive effect on the job satisfaction and work-life of healthcare providers. Many changes addressed challenges consistently identified by healthcare providers in other correctional settings indicating that lessons learned in BC may be valuable to efforts to improve services and healthcare provider work-life in other jurisdictions. Governance models that support clinical independence through separated structures of supervision and support, resourcing and integration with community services may enable meaningful improvements to the work-life of providers in carceral contexts and to help address health equity for people who experience incarceration.

Chapter 4: Continuity of care: use of community healthcare and risk of overdose in the 30 days following release

This chapter presents the quantitative study I conducted to examine the effect of increased focus on discharge planning and community integration on addressing risk and harms from fatal and nonfatal overdose after release (Objective 2). A version of this chapter has been published in *Drug and Alcohol Dependence* (<https://doi.org/10.1016/j.drugalcdep.2021.109113>).

Briefly, because interruptions in healthcare services contribute to an elevated risk of overdose in the weeks following release from incarceration, this study examined the association of use of community healthcare with nonfatal and fatal overdose in the 30 days following release. I conducted a retrospective cohort study using linked administrative data from the 20% random sample of the BC population contained in the Provincial Overdose Cohort. I included all individuals who were released from a provincial correctional facility in BC at least once from January 1, 2015 to December 1, 2018. Nonfatal overdoses were identified using ambulance, hospital, physician billing, poison control and emergency department records. Community healthcare use was determined using physician billing records. I fit multivariate Andersen-Gill models to examine nonfatal overdose after release from incarceration. Fatal overdoses were identified using BC Coroners Service and Vital Statistics Agency data. I used Standard Cox Regression to examine fatal overdoses after release. There were a combined 16,809 releases of 6,721 people in this study. At least one overdose occurred in 2.84% of releases. A community visit preceded the first nonfatal overdose in 86.35% of releases with a nonfatal overdose event. Only 48.39% of people who had a fatal overdose accessed community healthcare. A higher

proportion of people released after the transfer of healthcare services to PHSA used community healthcare services at least once in the month following release. In adjusted analysis, people who had accessed community healthcare were more likely to have a healthcare-attended nonfatal overdose (aHR 2.83 95% CI 2.13, 3.78). Community healthcare use was associated with a 42% lower risk of fatal overdose (n=31; aHR 0.58, 95%CI 0.28, 1.19), though this estimate is imprecise due to small sample size. Improved discharge planning and integration of healthcare services in custody with the community healthcare system has a positive effect on use of community services and outcomes in the month following release. Community healthcare visits after release from custody may be an important opportunity to provide overdose prevention and harm reduction supports. Policies and resourcing are needed to facilitate better connection to primary healthcare during the transition to community and providers in community should be equipped to offer care people who have recently experienced incarceration in a way that is accessible, acceptable and trauma-informed.

4.1 Introduction

BC, like many parts of Canada and the US, is in the midst of an overdose emergency.⁶² In 2020, more than 1500 people in BC died of illicit drug overdose, an average of five people every day.⁶³ Nonfatal overdoses are estimated to occur at 10 - 50 times^{233,234} the rate of fatal overdose and are associated with both acute and chronic morbidity, including injury from falls, peripheral neuropathy, pneumonia, chest infection and brain injury.^{235,236} The weeks following release from incarceration are a period of elevated risk for fatal and nonfatal overdose.^{67,68,70,192,196} Overdose is the leading cause of death among people recently released from prison.⁶⁸ This increased risk is influenced by the convergence of multiple structural and personal risk factors on release,

including disrupted support networks, lowered tolerance for the effect of drugs, stigma, depression and anxiety, chronic pain, and interruptions in healthcare services.⁷⁵

People who experience incarceration have high rates of acute and chronic physical and mental health conditions^{12,15,19,34} but are less likely to have a regular primary healthcare provider prior to their incarceration or after release.^{26,237} People recently released from correctional facilities use health services more frequently than the general population but face discrimination and stigma when accessing healthcare²⁷⁻²⁹ and have a high use of the emergency department.³⁰⁻³⁴ These gaps highlight the need for comprehensive and tailored interventions to support connection to appropriate and acceptable community healthcare services after release from correctional facilities. Currently, interruption in care and treatments due to incarceration or transitions between prison and community are common.^{92,238,239} Studies have shown that incarceration commonly results in disruption of treatment for HIV,⁹² interruption in OAT^{8,88,102-105} and prescriptions to treat mental illness.^{106,107} In some cases, policy may mean that medications received in the community are stopped, switched or reduced in custody.^{38,102} There are also structural challenges to continuity of care. For example, in provincial correctional facilities the relatively short periods of incarceration and uncertainty around release from remand (i.e., release from court) create challenges for the stability of healthcare and other supports, increasing the risk for disrupted treatment.

In addition to the direct harms of disrupted care, interruptions in treatment during the transition between correctional facilities and the community may affect risk of overdose after release.⁷⁵ Conditions such as HIV,²⁴⁰ mental health diagnosis^{74,192,204,205} and chronic pain²⁴¹ are associated

with substance use and increased risk of overdose. Unmanaged conditions or interruptions in treatment may affect mental health and patterns of substance use among people recently released from custody, putting them at risk of overdose.⁷⁵ Furthermore, discontinuation of some types of medication, such as antipsychotics, is associated with an increased risk of overdose.⁷² However there is a lack of research exploring how connecting to community healthcare services after release from custody may affect risk of subsequent overdose.

Women are a minority of people incarcerated in the Canadian criminal legal system,² but intersecting structural and societal factors related to incarceration have a differential impact on the lives of women and men. Though the majority of overdose deaths are among men, the risk of overdose death after release from prison is higher for women.^{67,68,70} Furthermore, studies have shown that patterns of healthcare use both in custody and after release are different for women and men.²⁴² Additionally, women spend less time on remand and in sentenced custody than men² which may affect access to services and discharge planning. Considering these differences there is a need for research to understand the relationship between use of healthcare services after release and subsequent overdose specifically for women who experience incarceration.

Few studies have examined nonfatal overdose in the period of high-risk following release from custody. To our knowledge, none have examined access to primary healthcare services as a factor in the risk of overdose after release. The primary aim of this study was to examine the relationship between engaging with community healthcare services in the weeks following release from provincial correctional facilities and the hazard of subsequent nonfatal overdose.

We also aimed to assess the relationship between engaging in community healthcare services and

fatal overdose in this time period. As a third aim we examined the relationship between community healthcare visits and nonfatal overdose among women and men separately.

4.2 Methods

4.2.1 Data source and study design

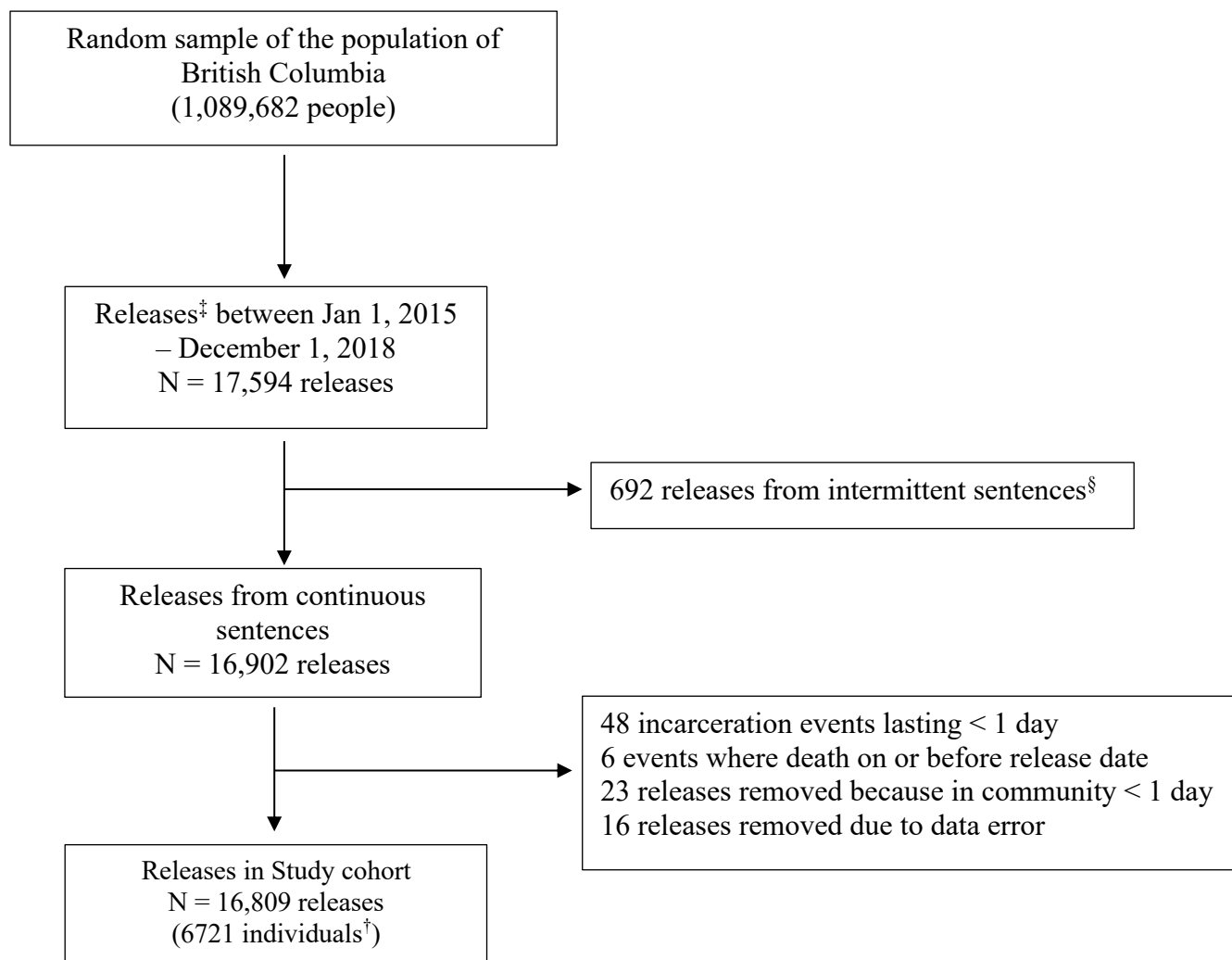
We used data from the BC Provincial Overdose Cohort for this retrospective cohort study. The BC Provincial Overdose Cohort is a collection of linked administrative data¹⁹¹ which was developed to support response to the overdose public health emergency declared in 2016.⁶² The Provincial Overdose Cohort is described in Chapter 2. Briefly, individual-level healthcare, criminal-legal and social services data are linked via name, birthdate and the 10-digit PHN assigned to each BC resident as part of the province's universal health insurance program. The Provincial Overdose Cohort includes a representative 20% random sample of the BC population (approximately 1.1 million people).

Our study cohort included people aged 18 and older in the 20% random sample who were released from a BC provincial correctional facility at least once between January 1, 2015 and December 1, 2018. Each release during this time-period was counted so individual people could contribute more than one release to the cohort. For each release, follow-up began on the day of release from custody and was censored at the first of reincarceration, death or 30 days.

Intermittent sentences were excluded from this study. Intermittent sentences are sentences of less than 90 days which people serve in community under conditions of parole with some time (usually weekends) spent in custody. Deaths on the date of release were excluded as they could not be distinguished from deaths in custody. We also excluded incarceration events lasting less

than 1 day and releases where people spent less than 1 day in the community before being reincarcerated (Figure 4.1). Ethics approval for this study was granted by the University of British Columbia Behavioral Research Ethics Board (H19-03731).

Figure 4.1 Flow chart of the analytic sample selection of data using the random sample of British Columbia population included in the Provincial Overdose Cohort for releases from provincial correctional facilities between January 1, 2015- December 1, 2018.



‡ Number of releases from provincial correctional facilities in British Columbia.

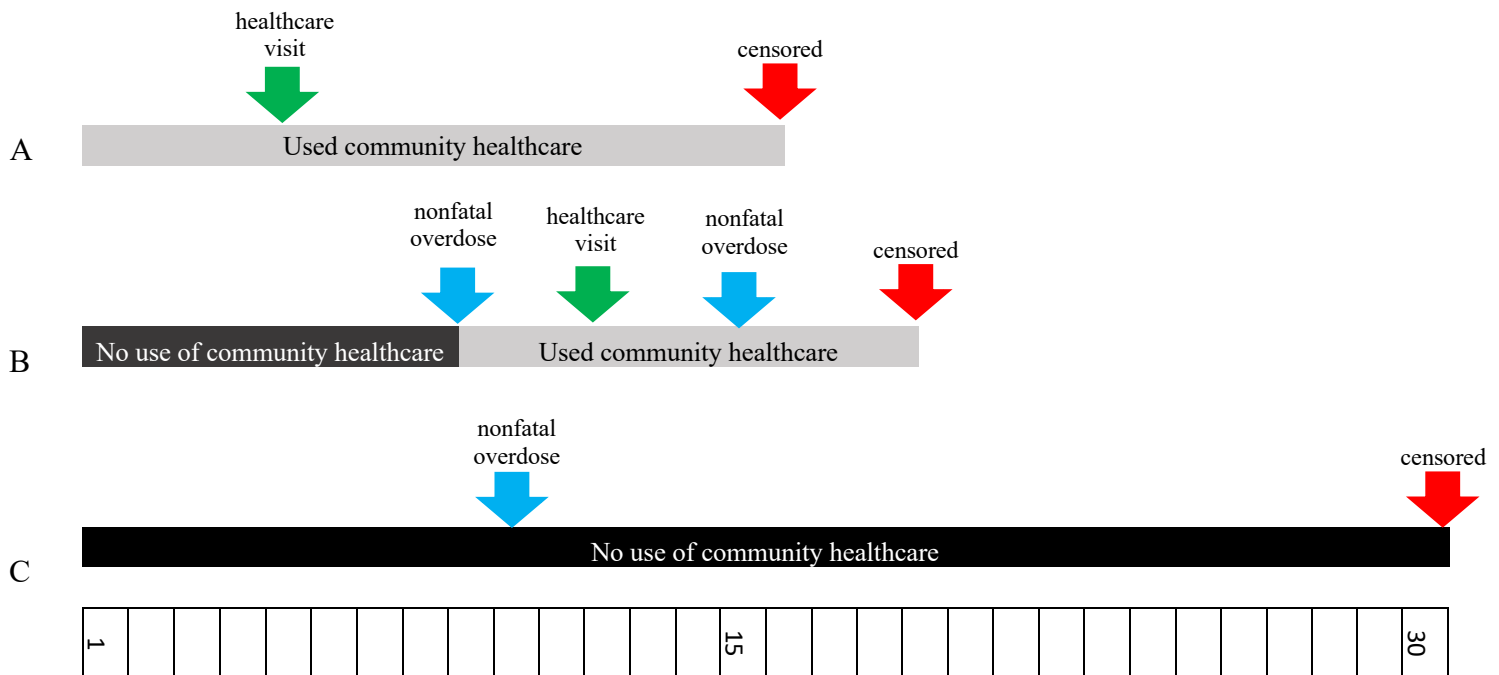
† Each individual contributed a median of 1 release to the study (IQR 1-3; Range 1-52).

§ Intermittent sentences are sentences of less than 90 days which people serve in community under conditions of parole with weekends usually spent in custody.

4.2.2 Primary exposure

Any record of physician billing not related to an overdose event was used to identify engagement with community healthcare services. A binary (yes/no) time-varying community healthcare encounter variable was used to establish timing of community healthcare visit relative to overdose events. This ensured that in regression analyses the variable examined was healthcare accessed prior to the overdose event. Independent increments were defined by the outcome (nonfatal overdose) and censoring events. If the community healthcare variable changed to ‘yes’ during an increment the entire interval and subsequent increments were classified as engagement in community healthcare. Illustrative examples are provided in Figure 4.2.

Figure 4.2 Illustrative examples of classification of exposure during follow-up for the 30 days following release from correctional facilities in British Columbia



Person A visited community healthcare services five days after they were released and were reincarcerated 16 days after release. They would contribute 16 days of follow-up all classified as “used community healthcare”

Person B experienced a nonfatal overdose nine days after they were released, visited community healthcare services 12 days after release, experienced a second nonfatal overdose 15 days after release and were reincarcerated 19 days after release. They would contribute a total of 19 days of follow-up; nine days classified as “no use of community healthcare” and ten days classified as “used community healthcare”. The first nonfatal overdose event (on day nine) would be classified as “no use of community healthcare” the second nonfatal overdose event (on day 15) would be classified as “used community healthcare”.

Person C experienced a nonfatal overdose ten days after release and were censored 30 days after release. They would contribute 30 days of follow-up time all classified as “no use of community healthcare”.

4.2.3 Outcome variable

The primary outcome of interest in this study was healthcare-attended nonfatal overdose in the 30 days following release from a provincial correctional facility. Nonfatal overdose events were identified using ambulance, poison control, emergency department, hospital and physician billing records.¹⁹¹ A description of datasets used is provided in Table 2.1. The case definition of overdose used in each dataset is provided in Table 2.2. To prevent over-counting, healthcare records less than one day apart (within two calendar days) were collapsed into a single overdose event.

Death during follow-up, including fatal overdose events were identified using data from the BC Coroners Service and from the Vital Statistics Agency.¹⁹¹ Overdose-related death is defined as a death involving controlled and illegal street drugs, medication(s) not prescribed to the decedent, a combination of the above with prescribed medications or where the drug origin is unknown.^{60,191}

4.2.4 Potential confounders and risk factors

From the literature, we identified demographic^{64,65,67,68,192,195,204,205,209,243} and incarceration^{63,65,67,71,113,192,204,205,210} factors associated with overdose after release. This literature informed variables selected for consideration in our models which included: age (18-29, 30-49, 50 and older), sex (female or male), length of most recent incarceration (1-4 days, 5-15 days, 16-52 days, ≥ 53 days, categorized based on the distribution of the data), number of previous provincial incarcerations since 2010 (0, 1, 2+) and whether the person received OAT at any point during the most recent incarceration (yes/no). We also considered having ever received social

assistance (Jan 1, 2010 to date of release; yes/no). Whether release occurred before or after the transition of healthcare services to the PHSA (October 1, 2017; yes/no) was included because a primary aim of this change was to improve continuity of care between correctional facilities and the community.^{88,134} As a sensitivity analysis we considered year of release to account for the increasing presence of fentanyl and its analogs in the illicit drug supply over time.^{63,210} Previous nonfatal overdose is a predictor of fatal overdose^{209,244} so in examining the relationship between use of community healthcare and fatal overdose in the 30 days after release, we considered the number of healthcare-attended nonfatal overdoses since January 1, 2015 (0, 1, ≥ 2). We used a time-varying measure to include nonfatal overdoses which occurred during follow-up (between the date of release and the fatal overdose). Though it was not included in any models, in descriptive analysis we examined whether the reason for the first visit to community healthcare services was related to OAT using physician billing codes for OAT-related services (P13013, P13014, P00039, P15039).²⁴⁵

4.2.5 Statistical Analyses

We used the chi-square test to compare characteristics of releases stratified by the use of community healthcare that was not part of an overdose event at any point within 30 days of release. We also used descriptive statistics to compare characteristics of people who experienced a fatal overdose and those who had a nonfatal overdose attended by emergency services during follow-up.

To examine the association between the use of community healthcare services with the primary outcome (nonfatal overdose) after release, we applied bivariate and multivariate Andersen-Gill²¹²

models with robust error variance.²¹³ We conducted sensitivity analyses for the primary aim using Andersen-Gill, Poisson and negative binomial regression. Comparison of Andersen-Gill, Poisson and negative binomial models is provided in Chapter 2. We also conducted a sensitivity analysis testing for effect modification of age category on community healthcare use. We also tested models using year of release in place of the variable for release before or after the transfer of services to PHSA. For the secondary aim, we used Cox proportional hazard models²¹⁴ to examine the association between use of community healthcare services and fatal overdose after release. Finally, we applied Andersen-Gill models to conduct a sex-based subgroup analysis using stratification. Statistical Analyses were performed using SAS Enterprise Guide 7.1.²¹¹

4.3 Results

In this study, 6,721 people were released from BC provincial correctional facilities a combined 16,809 times between January 1, 2015 and December 1, 2018. The median number of releases contributed to the study by each person was 1 (IQR 1-3, Range 1-52). The characteristics of individuals included in the study at the time of their first release during the study period are described in Table 4.1. There were 36 deaths during follow-up (0.21%), including 31 overdose deaths (0.18% of the sample, 88.11% of deaths during follow-up). Reincarceration was the reason for censoring in 17.62% of release events (n=2963).

Table 4.1 Baseline characteristics of individuals included in the study, at the time of first release from provincial correctional facilities between January 1, 2015 and December 1, 2018 in a 20% random sample of the population of British Columbia

		Individuals included in study
		N(%)
		6721
Number of releases in study[‡]		Median: 1 (IQR 1-3)
Age group (years)		
	18-29	2253 (33.52)
	30-39	2114 (31.45)
	40-49	1437 (21.38)
	≥50	917 (13.64)
Sex		
	Male	5903 (87.86)
	Female	818 (12.17)
Ever received social assistance[¶]		
	No	5402 (80.37)
	Yes	1319 (19.63)
Released after transfer[†]		
	No (before)	5288 (78.68)
	Yes (after)	1433 (21.32)
Year of release		
	2015	2599 (38.67)
	2016	1671 (24.86)
	2017	1315 (19.57)
	2018	1136 (16.90)
Previous nonfatal overdose[§]		
	0	6383 (94.97)
	1	238 (3.54)
	≥2	100 (1.49)

IQR = Interquartile Range

[‡]Individuals in this study were released from provincial correctional facilities in British Columbia a combined 16,809 times during the study period.

[¶]In British Columbia, between January 1, 2010 and date of release.

[†] On October 1, 2017, British Columbia transferred responsibility for healthcare services in provincial correctional facilities from a private, for-profit contractor employed by BC Corrections to the Provincial Health Services under the Ministry of Health.

[§]Record of nonfatal overdose in data from Emergency Health Services (BCEHS), Drug and Poison Information Centre (DPIC), case-based reporting from Emergency Departments, National Ambulatory Care Reporting System (NACRS), Discharge Abstract Database (DAD) or Medical Services Plan (MSP); Captured between January 1, 2015 and date of first release.

In 33.98% of releases (n=5711) there was at least one record of use of community healthcare services that was not part of an overdose event during follow-up (Table 4.2). Compared to people who did not use community healthcare within 30 days of release, a higher proportion of those who did were older, female, spent more days in custody, had more previous incarcerations, had ever received social assistance and received OAT while incarcerated. Use of community healthcare services within 30 days was higher among releases after the transfer (36%) than before (33%).

Table 4.2 Characteristics of individuals at the time of each release by use of community services within 30 days of release from provincial correctional facilities between January 1, 2015 and December 1, 2018 in a 20% random sample of the population of British Columbia

	Total releases N(%)	No community healthcare visit within 30 days of release N(%)	Community healthcare visit within 30 days of release [†] N(%)	p-value [‡]
	16809	11098 (66.02)	5711 (33.98)	
Age group (years) at time of release				<0.01
18-29	5928 (35.27)	4257 (38.36)	1671 (29.26)	
30-39	5741 (34.15)	3631 (32.72)	2110 (36.95)	
40-49	3385 (20.14)	2130 (19.19)	1255 (21.98)	
≥ 50	1755 (10.44)	1080 (9.73)	675 (11.82)	
Sex				<0.01
Male	14946 (88.92)	9981 (89.94)	4965 (86.94)	
Female	1863 (11.08)	1117 (10.06)	746 (13.06)	
Length of most recent incarceration				<0.01
1-4 days	4432 (26.37)	3063 (27.60)	1369 (23.97)	
5-15 days	4119 (24.50)	2812 (25.34)	1307 (22.89)	
16-52 days	4085 (24.30)	2505 (22.57)	1580 (27.68)	
≥ 53 days	4173 (24.83)	2718 (24.49)	1455 (25.48)	
Number of provincial incarcerations[§]				<0.01
0	5778 (34.37)	4295 (38.70)	1483 (25.97)	
1	4662 (27.74)	3084 (27.79)	1578 (27.63)	
2+	6369 (37.89)	3719 (33.51)	2650 (46.40)	
Ever received social assistance[§]				<0.01
No	11413 (67.90)	8691 (78.31)	2722 (47.66)	
Yes	5396 (32.10)	2407 (21.69)	2989 (52.34)	
Released after transfer[¶]				<0.01
No (before)	11888 (70.72)	7961 (71.73)	3927 (68.76)	
Yes (after)	4921 (29.28)	3137 (28.27)	1784 (31.24)	
Received OAT while incarcerated				<0.01
No	14227 (84.64)	10249 (92.35)	3978 (69.66)	
Yes	2582 (15.36)	849 (7.65)	1733 (30.34)	

	Total releases N(%)	No community healthcare visit within 30 days of release N(%)	Community healthcare visit within 30 days of release[†] N(%)	p-value[‡]
Year of release				<0.01
2015	4149 (24.68)	2822 (25.43)	1327 (23.24)	
2016	4471 (26.60)	3020 (27.21)	1451 (25.41)	
2017	4282 (25.47)	2805 (25.27)	1477 (25.86)	
2018	3907 (23.24)	2451 (22.09)	1456 (25.49)	

OAT = Opioid Agonist Therapy

[†] Any access to community healthcare that was not part of an overdose event at the time of censoring; may have occurred before or after a nonfatal overdose event.

[‡] Chi-square test, p<0.05

[§] In British Columbia, between January 1 2010 and date of release.

“ On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

At least one fatal or nonfatal overdose occurred during follow-up in 478 release events (2.84%). In 86.35% of releases that were followed by a nonfatal overdose, the person had accessed community healthcare services prior to their first nonfatal overdose. Only 48.39% of people used community healthcare services prior to their fatal overdose (Table 4.3). Among people who engaged with community healthcare services prior to their first nonfatal overdose or their fatal overdose, we looked at the reason for their first community healthcare visit. In follow-ups that included a fatal overdose, the vast majority of first visits with community healthcare services after release were not related to OAT initiation or management ($n < 5$). Among follow-ups in which community healthcare services were engaged prior to the first nonfatal overdose only 7.77% ($n=30$) of first community healthcare visits after release included a record of OAT-related services (data not shown).

Table 4.3 Characteristics of individuals at each release at the time of first nonfatal overdose or of fatal overdose after release from a provincial correctional between January 1, 2015 and December 1, 2018 in a random sample of the British Columbia population

	Fatal overdose N(%)	Nonfatal overdose N(%) ^c	p-value [‡]
	31	447	
Community healthcare visit[†]			<0.01
No	16 (51.61)	61 (20.78)	
Yes	15 (48.39)	386 (86.35)	
Age group (years) at time of release			0.26
18-29	8 (25.81)	162 (36.24)	
30-39	11 (35.48)	169 (37.81)	
≥40	12 (38.71)	116 (25.95)	
Sex			
Male	<i>Cell size <5[†]</i>	383 (85.68)	
Female		64 (14.32)	
Length of most recent incarceration			0.09
< 16 days	8 (52.81)	185 (41.39)	
≥ 16 days	23 (74.19)	262 (58.61)	
Number of previous incarcerations[§]			0.04
0 or 1	10 (11.24)	79 (17.67)	
≥ 2	21 (67.74)	368 (82.33)	
Ever received social assistance[§]			
No	<i>Cell size <5[†]</i>	24 (5.37)	
Yes		423 (94.63)	
Released after transfer[¶]			0.73
No (before)	21 (67.74)	316 (70.69)	
Yes (after)	10 (32.26)	131 (29.31)	
OAT while incarcerated			0.73
No	21 (67.74)	289 (64.65)	
Yes	10 (32.26)	158 (35.35)	
Number of previous nonfatal overdose events[Ⓔ]			0.02
0	19 (61.29)	163 (36.47)	
≥1	12 (38.71)	284 (63.53)	

OAT = Opioid Agonist Therapy

^c Does not include people who had a fatal overdose at any point during follow-up.

† Any access to community healthcare that was not part of an overdose event at the time of censoring; may have occurred before or after a nonfatal overdose event.

‡ Chi-square test, $p < 0.05$

† Cell-sizes of < 5 are suppressed in accordance with information sharing agreements

§ In British Columbia, between January 1 2010, and date of release.

“ On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

° Record of nonfatal overdose in data from Emergency Health Services (BCEHS), Drug and Poison Information Centre (DPIC), case-based reporting from Emergency Departments, National Ambulatory Care Reporting System (NACRS), Discharge Abstract Database (DAD) or Medical Services Plan (MSP). Between January 1, 2015 and date of release.

In subgroup analysis, both women and men who had at least one community healthcare visit that was not part of an overdose event at any point during follow up were more likely to have had a healthcare-attended overdose during follow-up (7.91% vs. 0.63% of releases of women, 6.88% vs. 0.70% of releases of men). Among both men and women, more people accessed community healthcare services who received OAT during their incarceration and who were released after the transition of healthcare services to PHSA (Table 4.4)

Table 4.4 Characteristics of women and of men at each release from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018 stratified by community healthcare visit during 30-day follow-up in a random sample of the population of British Columbia

	Women N=1863			Men N=14946		
	No community healthcare visit within 30 days of release N (%)	Community healthcare visit within 30 days of release [†] N (%)	p-value [‡]	No community healthcare visit within 30 days of release N (%)	Community healthcare visit within 30 days of release [†] N (%)	p-value [‡]
Age group (years) at time of release	1117 (59.96)	746 (40.04)		9981 (66.78)	4965 (33.22)	
			0.01			<0.01
18-29	490 (43.87)	270 (36.19)		3767 (37.74)	1401 (28.22)	
30-39	359 (32.14)	276 (37.00)		3272 (32.78)	1834 (36.94)	
40-49	195 (17.46)	151 (20.24)		1935 (19.39)	1104 (22.24)	
≥ 50	73 (6.54)	49 (6.57)		1007 (10.09)	626 (12.61)	
Length of most recent incarceration			<0.01			<0.01
1-4 days	388 (34.74)	190 (25.47)		2675 (26.80)	1179 (23.75)	
5-15 days	307 (27.48)	205 (27.48)		2505 (25.10)	1102 (22.20)	
16-52 days	244 (21.84)	208 (27.88)		2261 (22.65)	1372 (27.63)	
≥ 53 days	178 (15.94)	143 (19.17)		2540 (25.45)	1312 (26.42)	
Number of previous provincial incarcerations[§]			<0.01			<0.01
0	483 (43.24)	226 (30.29)		3812 (38.19)	1257 (25.32)	
1	327 (29.27)	247 (33.11)		2757 (27.62)	1331 (26.81)	
≥ 2	307 (27.48)	273 (36.60)		3412 (34.18)	2377 (47.88)	
Ever received social assistance[§]			<0.01			<0.01
No	820 (73.41)	315 (42.23)		7871 (78.86)	2407 (48.48)	
Yes	297 (26.59)	431 (57.77)		2110 (21.14)	2558 (51.52)	
Released after transfer[¶]			0.01			<0.01
No (before)	835 (74.75)	519 (69.57)		7126 (71.40)	3408 (68.64)	
Yes (after)	282 (25.25)	227 (30.43)		2855 (28.60)	1557 (31.36)	

		Women N=1863		Men N=14946			
		No community healthcare visit within 30 days of release N (%)	Community healthcare visit within 30 days of release [†] N (%)	p-value [‡]	No community healthcare visit within 30 days of release N (%)	Community healthcare visit within 30 days of release [†] N (%)	p-value [‡]
Received OAT while incarcerated				<0.01			<0.01
	No	1027 (91.94)	514 (68.90)		9222 (92.40)	3464 (69.77)	
	Yes	90 (8.06)	232 (31.10)		759 (7.60)	1501 (30.23)	
Year of release				<0.01			<0.01
	2018	212 (18.98)	183 (24.53)		2239 (22.43)	1273 (25.64)	
	2017	306 (27.39)	208 (27.88)		2499 (25.04)	1269 (25.56)	
	2016	310 (27.75)	207 (27.75)		2710 (27.15)	1244 (25.06)	
	2015	289 (25.87)	148 (19.84)		2533 (25.38)	1179 (23.75)	

OAT = Opioid Agonist Therapy

[†] Any access to community healthcare that was not part of an overdose event at the time of censoring; may have occurred before or after a nonfatal overdose event.

[‡] Chi-square test, p<0.05

[§] In British Columbia, between January 1 2010 and date of release.

[¶] On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

4.3.1 Nonfatal overdose

In unadjusted analysis, using a time-varying measure of community healthcare use, record of community services was associated with a subsequent healthcare-attended nonfatal overdose (HR 6.51 95% CI 4.96, 8.54). Having a greater number of previous incarcerations, being released from a longer period of incarceration, having ever received social assistance, having received OAT while incarcerated and being released after the transfer to PHSA were associated with a greater hazard of a healthcare-attended nonfatal overdose. In the adjusted model, having accessed community healthcare services was associated with healthcare-attended nonfatal overdose (aHR 2.83 95%CI 2.13, 3.78; Table 4.5). As a sensitivity analysis we used year of release in place of release before or after October 1, 2017 (when the transition of healthcare services to PHSA occurred). Using year of release in place of release before or after the transfer did not affect the estimate for the association between community healthcare visit and nonfatal overdose (aHR 2.86 95% CI 2.16, 3.80). In the adjusted model we also tested effect modification of age category on community healthcare use. The positive association was seen for all age groups and was significant for all groups except releases of people aged 50 or over (18-29 years aHR 3.47, 95%CI 2.14, 5.63; 30-39 years aHR 2.60, 95%CI 1.68, 4.02; 40-49 years aHR 2.63, 95%CI 1.62, 4.26; 50 years and older aHR 1.83, 95%CI 0.74, 4.51; data not shown). Finally, we used Poisson and negative binomial regression to examine the relationship between use of community healthcare services and healthcare-attended nonfatal overdose. The unadjusted and adjusted models produced similar estimates to the main model for both Poisson (RR 6.54, 95%CI 4.99, 8.60; aRR 2.83 95%CI 2.12, 3.79) and negative binomial regressions (RR 6.55, 95%CI 4.99, 8.60; aRR 3.41 95%CI 2.93, 3.89).

Table 4.5 Unadjusted and adjusted hazard ratios for nonfatal overdose following release from provincial correctional facilities between January 1, 2015 and December 1, 2018 in a random sample of the population of British Columbia

	Unadjusted HR (95%CI)	Adjusted HR (95%CI)
Community healthcare visit[†]		
No	Ref	Ref
Yes	6.51 (4.96, 8.54)	2.83 (2.13, 3.78)
Age group (years) at time of release		
18-29	Ref	Ref
30-39	1.10 (0.76, 1.59)	0.98 (0.69, 1.38)
40-49	0.91 (0.64, 1.30)	0.82 (0.59, 1.14)
≥ 50	0.53 (0.29, 0.96)	0.59 (0.34, 1.01)
Sex		
Male	Ref	Ref
Female	1.40 (0.83, 2.34)	1.22 (0.76, 2.00)
Length of most recent incarceration		
1-4 days	Ref	Ref
5-15 days	1.38 (0.98, 1.93)	1.18 (0.85, 1.64)
16-52 days	2.15 (1.55, 2.98)	1.41 (1.03, 1.95)
≥ 53 days	1.46 (1.03, 2.07)	1.34 (0.95, 1.89)
Number of previous provincial incarcerations[§]		
0	Ref	Ref
1	2.94 (2.01, 4.32)	1.71 (1.16, 2.51)
≥ 2	9.21 (6.44, 13.16)	2.69 (1.86, 3.89)
Ever received social assistance[§]		
No	Ref	Ref
Yes	43.18 (25.31, 73.68)	23.06 (13.03, 40.80)
Received OAT while incarcerated		
No	Ref	Ref
Yes	2.89 (2.29, 3.66)	0.90 (0.69, 1.16)
Released after transfer[¶]		
No (before)	Ref	Ref
Yes (after)	1.41 (1.09, 1.83)	1.05 (0.80, 1.38)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

[†]Community healthcare use preceding the overdose event; community healthcare use was a time-varying measure recorded at the time of overdose or at censoring.

§ In British Columbia, between January 1 2010, and date of release.

“ On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

4.3.2 Fatal overdose

In unadjusted analysis, a community healthcare visit was associated with a greater hazard of fatal overdose (HR 1.80, 95%CI 0.89, 3.63). Having ever received social assistance, being incarcerated for longer, having a greater number of previous incarcerations, having received OAT while incarcerated, and having a previous nonfatal overdose were also associated with greater hazard of fatal overdose (Table 4.6).

In adjusted analysis, people who engaged with community healthcare services had 42% lower hazard of fatal overdose (aHR 0.58 95% CI 0.28, 1.19; Table 4.6). Due to small cell size, we tested models excluding social assistance and excluding sex and social assistance. In these models, the estimate for the association between community healthcare services and fatal overdose moved closer to the null but was not significant.

Table 4.6 Unadjusted and adjusted hazard ratio of fatal overdose after release from provincial correctional facilities between January 1, 2015 and December 1, 2018 in a random sample of the population of British Columbia

		Unadjusted HR (95%CI)	Adjusted HR (95%CI)
Community healthcare visit			
	No	Ref	Ref
	Yes	1.80 (0.89, 3.63)	0.58 (0.28, 1.19)
Sex			
	Male	Ref	Ref
	Female	0.54 (0.13, 2.24)	0.47 (0.12, 1.91)
Ever received social assistance[§]			
	No	Ref	Ref
	Yes	21.38 (6.48, 70.54)	21.19 (6.20, 72.63)
Age group (years) at time of release			
	18-29	Ref	Ref
	30-39	1.41 (0.57, 3.51)	1.35 (0.54, 3.37)
	≥ 40	1.68 (0.69, 4.11)	1.80 (0.73, 4.43)
Length of most recent incarceration			
	< 16 days	Ref	Ref
	≥ 16 days	2.93 (1.31, 6.55)	2.57 (1.20, 5.51)
Number of previous provincial incarcerations[§]			
	0-1	Ref	Ref
	≥ 2	2.42 (1.15, 5.13)	0.75 (0.31, 1.79)
OAT while incarcerated			
	No	Ref	Ref
	Yes	2.60 (1.22, 5.52)	0.99 (0.41, 2.42)
Released after transfer[¶]			
	No (before)	Ref	Ref
	Yes (after)	1.13 (0.53, 2.39)	1.15 (0.51, 2.61)
Number of previous nonfatal overdose events[†]			
	0	Ref	Ref
	≥ 1	15.99 (7.23, 35.31)	6.08 (2.69, 13.74)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

[§] In British Columbia, between January 1 2010, and date of release.

[¶] On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

[†]Number of healthcare-attended nonfatal overdoses since 2010, including those which occurred during previous episodes of incarceration.

4.3.3 Subgroup analysis

In unadjusted analysis, community healthcare visit was associated with increased hazard of subsequent healthcare-attended nonfatal overdose among women (HR 5.67 95%CI 2.78, 11.59) and men (HR 6.60 95%CI 4.93, 8.83). The positive association remained in analyses adjusted for age group, length of incarceration, number of previous incarcerations, year of release, receipt of social assistance and receipt of OAT while incarcerated for women (aHR 2.57 95% CI 1.33, 4.95) and men (aHR 2.89 95%CI 2.12, 3.94; Table 4.7).

Table 4.7 Unadjusted and adjusted hazard ratios for nonfatal overdose among women and men released from provincial correctional facilities between January 1, 2015 and December 1, 2018 in a random sample of the population of British Columbia

		Women		Men	
		Unadjusted HR (95%CI)	Adjusted HR (95%CI)	Unadjusted HR (95%CI)	Adjusted HR (95%CI)
Community healthcare visit[†]					
	No	Ref	Ref	Ref	Ref
	Yes	5.67 (2.78, 11.59)	2.57 (1.33, 4.95)	6.60 (4.93, 8.83)	2.89 (2.12, 3.94)
Age group (years) at time of release					
	18-29	Ref	Ref	Ref	Ref
	30-39	1.81 (0.64, 5.12)	1.51 (0.60, 3.83)	1.01 (0.69, 1.48)	0.89 (0.63, 1.27)
	40-49	1.24 (0.52, 2.96)	0.99 (0.44, 2.24)	0.87 (0.59, 1.29)	0.83 (0.58, 1.17)
	≥50	0.67 (0.15, 3.13)	1.04 (0.24, 4.47)	0.51 (0.27, 0.98)	0.54 (0.30, 0.97)
Length of most recent incarceration					
	1-4 days	Ref	Ref	Ref	Ref
	5-15 days	1.93 (0.73, 5.09)	1.62 (0.63, 4.12)	1.28 (0.91, 1.81)	1.15 (0.82, 1.61)
	16-52 days	2.23 (0.85, 5.89)	1.75 (0.63, 4.91)	2.15 (1.52, 3.04)	1.42 (1.03, 1.96)
	≥ 53 days	1.63 (0.68, 3.88)	1.65 (0.67, 4.06)	1.47 (1.00, 2.14)	1.33 (0.93, 1.93)
Number of previous provincial incarcerations[§]					
	0	Ref	Ref	Ref	Ref
	1	3.78 (1.87, 7.66)	2.42 (1.17, 5.00)	2.70 (1.72, 4.24)	1.42 (0.90, 2.24)
	≥ 2	5.98 (3.08, 11.59)	2.56 (1.32, 4.94)	10.20 (6.72, 15.47)	2.32 (1.50, 3.60)
Ever received social assistance[§]					
	No	Ref	Ref	Ref	Ref
	Yes	33.50 (11.22, 99.98)	23.43 (7.68, 71.55)	44.60 (24.58, 80.92)	24.33 (12.80, 46.26)
Received OAT while incarcerated					
	No	Ref	Ref	Ref	Ref
	Yes	2.12 (1.35, 3.33)	0.59 (0.32, 1.09)	3.03 (2.33, 3.95)	0.86 (0.63, 1.14)
Released after the transfer[¶]					
	No (before)	Ref	Ref	Ref	Ref
	Yes (after)	1.53 (0.83, 2.84)	1.62 (0.93, 1.85)	1.00 (0.74, 1.34)	0.97 (0.72, 1.30)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

[†]Community healthcare use preceding the overdose event; community healthcare use was a time-varying measure recorded at the time of overdose or at censoring.

[§]In British Columbia, between January 1 2010, and date of release.

“ On October 1, 2017 British Columbia transferred responsibility for healthcare in provincial correctional facilities to the Provincial Health Services Authority under the Ministry of Health.

4.4 Discussion

In this study use of community healthcare services was associated with having a subsequent healthcare-attended nonfatal overdose in the 30 days following release from a provincial correctional facility. We also found that the use of community healthcare services was associated with a reduced hazard of fatal overdose in the weeks following release. The association between community healthcare visits and healthcare-attended nonfatal overdose was similar among women and men. In this study a higher proportion of people released after the transfer accessed community healthcare services in the month after release compared to releases before the transfer.

We found that people who used community healthcare care for any reason not part of an overdose event were more likely to access healthcare services for nonfatal overdose. This suggests that engagement with primary healthcare may increase the likelihood of contacting or accessing medical help for a nonfatal overdose event. In an Australian study, accessing a primary care physician within one month of release from incarceration increased access to other services including hospital, mental health services, alcohol and drug supports, as well as subsequent primary care physician services.²⁴⁶ People engaged in the healthcare system may also be more likely to engage with harm-reduction services which could influence whether or how people access medical help in the event of an overdose. Additionally, in this study, 86% of people who had a healthcare-attended nonfatal overdose accessed community healthcare services prior to their first overdose and only a small proportion of these visits were related to initiating or maintaining prescriptions for OAT. This indicates that community healthcare visits after release, including visits unrelated to substance use, may be an important opportunity to provide overdose

prevention supports and to promote use of healthcare after a nonfatal overdose. Increased awareness among primary healthcare providers as well as appropriate training and resourcing are needed to ensure that care provided to people recently released from custody is accessible, acceptable and trauma-informed. Active discharge planning and programs which strengthen connection to community services may be a key support during release.

Overdose was the leading cause of death during follow-up, which is consistent with other studies of mortality after release from incarceration.⁶⁷⁻⁶⁹ Use of community healthcare services was associated with a reduced hazard of fatal overdose, though this should be examined in a larger dataset. The difference in use of healthcare services between people who had a fatal overdose and people who experienced nonfatal overdose suggests that healthcare engagement may address or manage conditions that are associated with increased risk for fatal overdose, such as HIV and mental health conditions.^{68,75,192,247}

In this study 60% of women and 67% of men did not access community services in the 30 days following release. However, we also found that the proportion of people with no use of community services was lower after the transfer to PHSA indicating a role for governance and policy change in supporting continuity of care. That a majority of people do not engage with community healthcare services is consistent with an Ontario study which found that 66% of women and 76% of men did not use primary healthcare services after release from provincial prison.²⁴⁸ Research is needed to better understand and address access to services among people leaving custody. Programming and supports should build on the limited research evidence

available⁷⁹ including active discharge planning, tailored and trauma-informed services and peer support.^{37,79,249}

In sex-based analysis we found that use of community healthcare services was associated with healthcare-attended nonfatal overdose among both women and men. Though our study found similar estimates for both women and men, future research is needed to understand differences and similarities in the mechanisms of this relationship. For example, women face greater stigma related to drug use and are more vulnerable to consequences including violence, homelessness or loss of custody of children.²⁵⁰ It may be that healthcare visits unrelated to substance use are more important points of intervention for women at risk of overdose compared to men. The intersectionality of social and structural factors which influence both risk of overdose and access to healthcare and harm reduction services highlight a need for services and programs which are tailored to women's experiences and needs.

4.4.1 Strengths and Limitations

Due to the nature of administrative data, overdoses reversed in the community where healthcare was not called or where the person was not on scene when the paramedics arrived are not captured in this study. BC has an active Take Home Naloxone (THN) program in which community members are trained and equipped with the tools needed to recognize and respond to an overdose using naloxone.²⁵¹ There are more than 1800 active THN distribution sites across BC and since the program began in 2012, more than 80,700 THN kits have been reported as used to reverse an overdose.²⁵² People who have used THN to reverse an overdose in BC report that emergency health services were not called in 40-50% of overdose events.^{253,254} The most

commonly reported reasons for not calling 911 were that the community responder felt that they had the situation under control and concerns about police presence.^{253,254} Since these overdose events are not captured in administrative data it is not possible to examine healthcare-attended nonfatal overdoses within the context of overdose rates overall. Similarly, we were not able to limit the sample to people who use opioids or to people who have an OUD since obtaining a diagnosis requires engagement with the healthcare system which was our exposure of interest. However, we found that for most people, the first engagement with healthcare services was unrelated to treatment for OUD. Additionally, using all available incarceration events would have biased our findings towards the null, suggesting an underestimation of the relationship in our study. It was not possible to distinguish a death occurring in the community on the day of release from a death in custody. This uncertainty affected only 6 release events which were excluded from the analysis. We could not determine whether people had been sentenced or remanded to custody. This difference may affect access to services during incarceration as well connection to community services after release due to shorter length of incarceration or an uncertain release date. Differences in continuity of care related to sentencing status should be examined in future research. We were not able to capture healthcare use during incarceration. Future research should examine the relationship between use of healthcare services while in custody and engagement with care after release. Additionally, use of community services may be underreported especially in urban centres, due to models of care in which physicians are salaried by the clinic. However, this type of model represents only a small fraction of primary healthcare in the province and therefore would not have a significant effect on estimates. Chronic health conditions are a known risk factor for fatal and nonfatal overdose but to be captured in administrative data, require engagement with healthcare services which was our primary

exposure of interest. Finally, a limitation of this study was the absence of data on Indigenous identity. Historical and ongoing systemic violence, stigma and discrimination within the healthcare system create disparities in access to services based on Indigenous identity.^{255,256} Additionally, a 2020 report by the First Nations Health Authority showed that Indigenous people are disproportionately affected by the toxic drug crisis and that Indigenous women are at the highest risk of overdose death.²⁰² In 2020 First Nations women died of overdose at 9.9 times the rate of other female residents of BC and First Nations men died at 4.3 times the rate of other male residents of BC.²⁰² In the context of the crisis of overincarceration of Indigenous people,² and the systemic racism and discrimination in healthcare,²⁵⁶ future research is needed to specifically examine how to meaningfully address inequities faced by Indigenous people leaving prison. This study also has several strengths. We used a large, representative sample of the BC population. The use of linked administrative data ensured the reliability of variables and findings. Furthermore, administrative records allowed us to establish the temporality of events and examine the effect of the use of community healthcare services on risk of subsequent nonfatal overdose event. Additionally, sensitivity analyses, including those using Poisson and negative binomial regression, produced point estimates similar to those of the main analysis indicating robustness of our findings.

4.4.2 Conclusions

A majority of people with a recent history of incarceration do not access community healthcare services in the weeks following release, though this proportion showed a small improvement after the transfer to PHSA. There is an urgent need to increase support and facilitate continuity of care and connection with community resources during the transition from correctional facilities

to community. Further, the relationship between use of community healthcare services and experiencing a fatal or nonfatal overdose highlights the importance of primary healthcare visits as a potential opportunity for overdose prevention and harm reduction. Community healthcare providers must be supported to understand and respond to the unique needs of people with a recent experience of incarceration so that they may provide trauma-informed and culturally-safe care in a way that is accessible and acceptable.²⁵⁷ Resources are also needed to ensure that people being released from correctional facilities are connected to a primary healthcare provider in their community. Models of governance which foster integration of healthcare services in correctional facilities with community healthcare services may be an important component of facilitating meaningful connection with community providers and achieving continuity of care.

Chapter 5: Receipt of opioid agonist treatment and overdose in the month following release

This chapter reports on the quantitative study I conducted to examine the impact of expanded access to OAT in custody on nonfatal overdose after release from provincial correctional facilities (Objective 3). A version of this chapter has been submitted for publication in a peer-reviewed journal.

Briefly, OAT are medications, such as buprenorphine/naloxone and methadone, prescribed to treat OUD. Receipt of OAT during incarceration is associated with reduced risk of fatal overdose after release from custody; however, there has been little research on the association between OAT use during incarceration and nonfatal overdose after release. Even less is known about people who initiate a new episode of OAT while incarcerated. I used a random sample of 20% of the population of BC to examine releases from provincial correctional facilities between January 1, 2015 – December 1, 2018 among people with OUD. OUD was determined using hospital, physician and prescription records from 2010 to the date of release. Nonfatal overdoses were identified using ambulance, poison control, emergency department, hospital, and physician billing records. OAT dispensed in custody or in the community was identified using pharmacy records in the provincial PharmaNet database. I fit Andersen-Gill models to examine the association between receipt of OAT dispensation in custody and the hazard of nonfatal overdose after release. In this study, there were 4,738 releases of 1,535 people with OUD. OAT was dispensed in 55.74% of incarcerations. In adjusted analysis, receipt of OAT in custody was associated with a reduced hazard of nonfatal overdose in the 30 days after release (aHR 0.55 95% CI 0.41, 0.74). Compared to incarcerations in which the person did not receive OAT a

reduced hazard of nonfatal overdose after release was found for prescriptions continued from the community (aHR 0.49 95%CI 0.36, 0.67) and for new episodes of OAT initiated in custody (aHR 0.58 95%CI 0.41, 0.82). Though receipt of OAT in custody was protective among both women and men, the effect was greater among women. Policies to expand access to OAT in correctional facilities, particularly to initiate treatment for people not receiving OAT prior to admission, may help protect people from harms related to nonfatal overdose in the weeks following release.

5.1 Background

Criminal legal systems around the world incarcerate a large number of people who use drugs including people with OUD.^{12,18,57} In Canada, the criminalization of illicit drug use and associated harms of the “War on Drugs”^{14,58} results in the disproportionate arrest and incarceration of people who use substances. OAT are medications such as buprenorphine/naloxone and methadone, used to treat OUD. Despite international^{83,84} and national^{4,137} requirements that healthcare services in correctional settings are adequate and equivalent to services in community, incarceration is a common reason for interruption of OAT.^{103–105} In many jurisdictions OAT is not available or is provided only to people who have an active community prescription when they are admitted to custody.^{104,109,110} Much of the existing literature on OAT in correctional settings has focused on people who were using OAT in the community prior to their incarceration and compares outcomes for people who had their OAT prescriptions continued in custody and those who were discontinued.^{104,109,110,113} These studies found that continuity of OAT in custody is protective against all-cause mortality and fatal-overdose after release.^{115,116} Additionally, people who continued OAT during their

incarceration were more likely to engage in community OAT and less likely to use illicit opioids after release^{110,113,114} Forced withdrawal in custody results in harms to mental health, increased severity of addiction¹¹¹ and aversion to using OAT in future.¹¹²

Policies and practices for dispensing OAT in provincial and territorial correctional facilities in Canada vary by jurisdiction. In BC a study of OAT access in provincial correctional facilities from 2005-2016 found only 35% of participants with OUD reported having accessed OAT in custody and a vast majority (91%) of these were continued community prescriptions.¹⁰⁴

Recently, policy changes in BC have expanded access to OAT in provincial correctional facilities²⁵⁸ particularly for people who are not actively using OAT when they are admitted. CHS, the body responsible for healthcare services in BC provincial correctional facilities, reported in 2019 that 40% of people in custody were dispensed OAT.¹⁵⁹ Interviews with healthcare leadership (Chapter 3) revealed that the transfer to PHSA had increased resourcing and policy support to expand access to OAT in custody including increased access to physician services, dedicated nursing positions and efforts to eliminate the waitlist for OAT.^{88,159}

The four weeks following release from incarceration represent a period of elevated risk for nonfatal and fatal overdose.^{68,70-72,74,259} Nonfatal overdoses occur at 10 - 50 times^{233,234} the rate of fatal overdose and are associated with both acute and chronic morbidity.^{235,236} However, there is limited research examining nonfatal overdose after release or the potential effect of use of OAT in custody on this risk.¹¹³ Even less is known or documented about outcomes for people who initiate a new episode of OAT in custody. In a cohort study of people who use illicit drugs in Vancouver, BC between 2005-2016, self-reported receipt of OAT in custody in the six months

prior to interview was associated with lower odds of reporting a nonfatal overdose in the same period. However, 91% of people who used OAT in custody reported that these were continued community prescriptions.¹⁰⁴ One US-based randomized control trial²⁶⁰ showed that people who had their methadone prescription continued during their incarceration had a lower risk of nonfatal overdose in the year following release compared to people who experienced forced withdrawal from treatment while incarcerated. Incarceration is a unique opportunity to offer treatment and services because people often have fewer priorities competing with healthcare needs (such as finding housing or employment) compared to when they are in the community.^{16,261} Evidence-based healthcare policies are essential to addressing healthcare needs and to improving health outcomes after release.

There is also a paucity of research considering the intersecting structural and social factors which shape experiences and risks of incarceration, substance use and overdose differently for women and men. The prevalence of substance use disorder is higher among incarcerated women compared to men^{18,220} and women are at a higher risk of fatal overdose after release.^{66,67,69,25} Furthermore, there are structural differences which shape the experiences of women and men; for example, women on average spend shorter periods of time incarcerated² which may result in differences in access to services in custody. There is a need for research to examine the effect of expanded access to OAT for women and for men.

The primary aim of this study was to examine the relationship between receipt of OAT while incarcerated and the risk of nonfatal overdose during the first four weeks following release from provincial correctional facilities among people who have OUD. The second aim was to assess

this relationship separately for people who initiated a new episode of OAT while in custody and people who continued a community prescription. As a third aim, we examined the relationship between receipt of OAT during incarceration and nonfatal overdose after release among women and men separately.

5.2 Methods

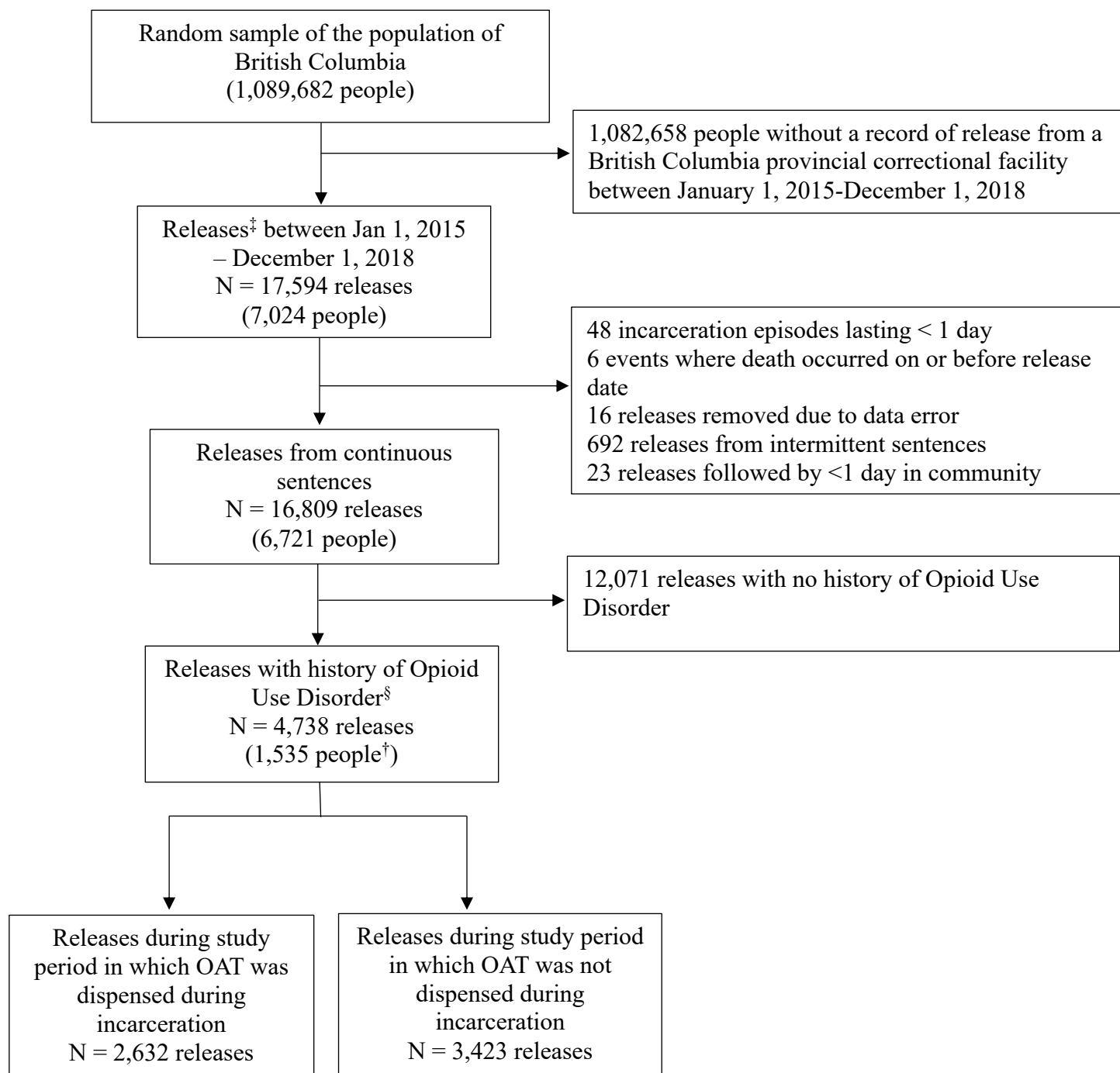
5.2.1 Data source and study design

We conducted a retrospective cohort study using linked administrative data from the BC Provincial Overdose Cohort.¹⁹¹ The Provincial Overdose Cohort is described in Chapter 2. Briefly, the cohort includes a representative 20% random sample of the BC population (approximately 1.1 million people). Healthcare, pharmaceutical and criminal-legal data are linked using name, birthdate and the ten-digit PHN assigned to each resident of BC as part of the public universal health insurance program.

We included all releases from BC provincial correctional facilities from January 1, 2015 to December 1, 2018 among people with OUD and aged 18 and over at the time of release in the 20% random sample (Figure 5.1). OUD was defined as having at least one OAT dispensation in community or in a BC correctional facility prior to release, a hospital or emergency department record related to OUD, or two diagnostic codes in physician billing records related to OUD within one year between 2010 and the date of release (Appendix B, B.1). Each release was counted separately, so individual people could contribute multiple releases to the cohort. For each release, follow-up began on the day of release from custody and was censored at the first of reincarceration, death or 30 days. We excluded incarceration events lasting less than one day and

releases where people spent less than one day in community. We also excluded intermittent sentences. Intermittent sentences are sentences of less than 90 days in which people serve most of their time in the community under conditions of parole but spend some time (usually weekends) in custody. Ethics approval for this study was granted by the University of British Columbia Behavioral Research Ethics Board (H19-03731).

Figure 5.1 Flow chart of the analytic sample selection using data from the 20% random sample of British Columbia population included in the Provincial Overdose Cohort for releases from provincial correctional facilities between January 1, 2015 - December 1, 2018



‡ Number of releases from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018.

§ History of Opioid Use Disorder at the time of release. Defined as: any record of opioid agonist therapy between 2010 and date of release, any hospital or emergency department record of opioid-related disorder or

two records of opioid-use related diagnostic codes appearing in physician billing records within one year since 2010.

† The median number of releases contributed by each individual person was 2 (IQR 1-4; Range 1-52).

5.2.2 Primary exposure

Our primary exposure was OAT dispensation during incarceration. An incarceration event which included any dispensation of OAT on or after the date of admission and prior to the date of release was considered receipt of OAT during incarceration. We used records in the BC PharmaNet database (provincial prescription dispensations) to identify OAT use in community and in correctional facilities. We defined active community treatment as a community prescription current within the six days prior to the admission date.

5.2.3 Outcome variable

The primary outcome of interest was nonfatal overdose in the 30 days following release. Nonfatal overdoses were identified using linked administrative data from ambulance, poison control, emergency department, hospital and physician billing records.^{191,193} A description of datasets is provided in Table 2.1. The case definition of overdose used in each dataset is provided in Table 2.2. To prevent over-counting healthcare records less than one day apart (within two calendar days) were collapsed into a single overdose event.

5.2.4 Potential confounders and risk factors

From the literature, we identified demographic,^{64,65,67,68,192,195,204,205,209,243} health^{71,74,209,192,196,197,204–208} and incarceration^{63,65,67,71,113,192,204,205,210} factors known to be associated with overdose after release for consideration in analyses. These factors included: age (18-29, 30-49, 50 and older), sex (female or male), length of most recent incarceration (1-4 days, 5-15 days, 16-52 days, \geq 53 days; categorized into quartiles based on the distribution of the data), and number of previous provincial incarcerations since 2010 (0, 1, 2+). We considered year of

release to account for changes in risk of overdose over time due to increasing presence of fentanyl and its analogs in the illicit drug supply.^{63,210} We also considered mental health condition^{206–208,262} (yes/no) and number of chronic health conditions²⁰⁵ (0, 1+) diagnosed between 2010 and date of release. When healthcare services in BC’s provincial correctional facilities transferred from a private, for-profit contractor to PHSA on October 1, 2017, the new CHS made access to and continuity of OAT for people with OUD a key focus of services.^{88,134,159} Therefore, we also considered whether the release occurred before or after the transfer. Death, including those from fatal overdose were identified using data from the BC Coroners Service and Vital Statistics.

5.2.5 Statistical Analyses

We used the chi-square test to compare characteristics of releases in which the person received OAT in custody with those that did not. For all analyses we applied Andersen-Gill²¹² regression models with robust error variance.²¹³ The Andersen-Gill model accounts for correlation between recurrent events which in this study meant the model could consider individuals experiencing multiple nonfatal overdose events during follow-up. The Andersen-Gill model is described in Chapter 2. For the primary analysis we examined the association between use of OAT during incarceration and nonfatal overdose in the 30 days following release. As a sensitivity analysis of the primary aim, we used a more conservative definition of OAT use during incarceration by counting only prescriptions dispensed between the date of admission and the date of release (excluding dispensations on the day of admission which were not distinguished from dispensations in community prior to arrest). As a second sensitivity analysis, we examined the relationship between receipt of OAT in custody and any overdose after release (fatal and

nonfatal). We also conducted an analysis using release before or after the transfer of healthcare services in correctional facilities to the PHSA (on or after October 1, 2017) in place of year of release. Finally, we examined the relationship between receipt of OAT in custody and nonfatal overdose after release using Poisson and negative binomial regressions using robust standard error and offsets for variation in follow-up time between releases in this study.

To address the second aim, we examined the association between OAT use in custody and nonfatal overdose after release among people who were initiating a new episode of OAT while in custody and those who were continuing a community prescription separately. As a sensitivity analysis for the second aim, we examined the relationship between OAT use during incarceration and nonfatal overdose after release for those without any previous record of OAT prior to incarceration separate from those with a history of OAT use who were initiating a new episode.

As a third aim, we conducted a sex-based subgroup analysis using stratification. We used Andersen-Gill models to conduct a stratified sex-based subgroup analysis. We used an interaction model as a sensitivity analysis. All statistical analyses were performed using SAS Enterprise Guide 7.1. We considered p-value <0.05 to be significant.

5.3 Results

In this study, 1,535 people contributed a total of 4,738 incarceration episodes with a median of two releases (IQR 1-4, Range 1-52) per person. Of the 25 deaths during follow-up, 22 (88%)

were due to fatal overdose. OAT was dispensed in custody in 55.74% of incarceration episodes; 55.66% of OAT dispensed was buprenorphine/naloxone, 44.26% was methadone, less than one percent was morphine (data not shown). A higher proportion of people who received OAT during incarceration were incarcerated for longer, had no chronic conditions, did not have a mental health diagnosis, were released after the transfer to PHSA, and had history of OAT use (Table 5.1). Reincarceration was the reason for censoring in 21% of all releases. A similar proportion of women (53.42%) and men (56.09%) were dispensed OAT while in custody (Table 5.2).

Table 5.1 Characteristics of individuals at the time of each release from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018 by receipt of Opioid Agonist Treatment in custody

		Study Cohort N=4738			
		All releases N (%)	Did not receive OAT during incarceration N (%)	Received OAT during incarceration N (%)	p-value [‡]
		4738	2097 (44.26)	2641 (55.74)	
Any overdose during follow-up[†]					<0.01
	No	4362 (92.06)	1892 (90.22)	2470 (93.53)	
	Yes	376 (7.94)	205 (9.78)	171 (6.47)	
Censored due to reincarceration					<0.01
	No	3724 (78.60)	1532 (73.06)	2192 (83.00)	
	Yes	1014 (21.40)	565 (26.94)	449 (17.00)	
Active community OAT prescription[‡]					<0.01
	No	3534 (74.59)	1953 (93.13)	1581 (59.86)	
	Yes	1204 (25.41)	144 (6.87)	1060 (40.14)	
History of OAT use prior to incarceration[§]					<0.01
	No	1065 (22.48)	600 (28.61)	465 (17.61)	
	Yes	3673 (77.52)	1497 (71.39)	2176 (82.39)	
Age group (years) at time of release					0.04
	18-29	1440 (30.39)	680 (32.43)	760 (28.78)	
	30-39	1919 (40.50)	826 (39.26)	1093 (41.39)	
	40-49	1026 (21.65)	447 (21.32)	579 (21.92)	
	≥50	353 (7.45)	144 (6.87)	209 (7.91)	
Length of most recent incarceration					<0.01
	1-4 days	1060 (22.37)	796 (37.96)	264 (10.00)	
	5- 17 days	1070 (22.58)	518 (24.70)	552 (20.90)	
	18 -53 days	1301 (27.46)	490 (23.37)	811 (30.71)	
	≥ 54 days	1307 (27.59)	293 (13.97)	1014 (38.39)	
Number of previous provincial incarcerations[§]					0.57
	0	753 (15.89)	338 (16.12)	415 (15.71)	
	1	1185 (25.01)	509 (24.27)	676 (25.60)	
	≥2	2800 (59.10)	1250 (59.61)	1550 (58.69)	

	All releases N (%)	Did not receive OAT during incarceration N (%)	Received OAT during incarceration N (%)	p-value [‡]
Mental health diagnosis[¶]				<0.01
No	3331 (70.30)	1304 (62.18)	2027 (76.75)	
Yes	1407 (29.70)	793 (37.82)	614 (23.25)	
Number of chronic conditions				<0.01
None	2492 (52.60)	984 (46.92)	1508 (57.10)	
One or more	2246 (47.40)	1113 (53.08)	1133 (42.90)	
Year of release				<0.01
2015	909 (19.19)	598 (28.2)	311 (11.78)	
2016	1102 (23.26)	597 (28.47)	505 (19.12)	
2017	1387 (29.27)	514 (24.51)	873 (33.06)	
2018	1340 (28.28)	388 (18.50)	952 (36.05)	
Released after transfer[⊥]				<0.01
No (before)	3047 (64.31)	1579 (75.30)	1468 (55.59)	
Yes (after)	1691 (35.69)	518 (24.70)	1173 (44.41)	

OAT = Opioid Agonist Treatment

[‡]Chi-square test; p<0.05

[†]Record of nonfatal overdose in data from Emergency Health Services (BCEHS), Drug and Poison Information Centre (DPIC), case-based reporting from Emergency Departments, National Ambulatory Care Reporting System (NACRS), Discharge Abstract Database (DAD) or Medical Services Plan (MSP). Fatal overdose identified in Vital Statistics and BC Coroner Records.

[¶]Active community treatment was defined as a community prescription current within the six days prior to the admission date.

[◊]Any record of OAT dispensation in British Columbia from January 1, 2010 to date of admission to custody.

[§]In British Columbia, between January 1 2010, and date of release.

[¶]Mental Health Diagnosis includes ICD-10 codes classifying mental, behavioural and neurodevelopmental disorders, excluding those related to psychoactive substance use and ICD-9 codes classified as Mental Disorders excluding drug or alcohol-related psychoses, dependence, or non-dependent abuse of drugs (Appendix B, B.2).

[⊥]Responsibility for healthcare services transferred from a private, for-profit company contracted by BC Corrections to the Provincial Health Services Authority on October 1, 2017

Table 5.2 Characteristics of men and women at each release from provincial correctional facilities facility in British Columbia between January 1, 2015 and December 1, 2018 by use OAT during incarceration

	Women N=614			Men N=4124		
	Did not receive OAT during incarceration N(%)	Received OAT during incarceration N(%)	p-value [‡]	Did not receive OAT during incarceration N(%)	Received OAT during incarceration N(%)	p-value [‡]
Any overdose during follow-up[†]	286 (46.58)	328 (53.42)		1811 (43.91)	2313 (56.09)	
			0.07			<0.01
No	254 (88.81)	305 (92.99)		1638 (90.45)	2165 (93.60)	
Yes	32 (11.19)	23 (7.01)		173 (9.55)	148 (6.40)	
Censored due to reincarceration			<0.01			<0.01
No	230 (80.42)	298 (90.85)		1302 (71.89)	1894 (81.88)	
Yes	56 (19.58)	30 (9.15)		509 (28.11)	419 (18.12)	
Active community OAT prescription[‡]			<0.01			<0.01
No	264 (92.31)	194 (59.15)		1689 (93.26)	1385 (59.88)	
Yes	22 (7.69)	134 (40.85)		122 (6.74)	928 (40.12)	
History of OAT use prior to incarceration[◇]			<0.01			<0.01
No	79 (27.62)	52 (15.85)		521 (28.77)	413 (17.86)	
Yes	207 (72.38)	276 (83.15)		1290 (71.23)	1900 (82.14)	
Age group (years) at time of release			0.08			0.17
18-29	124 (43.36)	115 (35.06)		556 (30.70)	645 (27.89)	
30-39	110 (38.46)	128 (39.02)		716 (39.54)	965 (41.72)	
40-49	42 (14.69)	68 (20.73)		405 (22.36)	511 (22.09)	
≥50	10 (3.50)	17 (5.18)		134 (7.40)	192 (8.30)	
Length of most recent incarceration			<0.01			<0.01
1-4 days	148 (51.75)	40 (12.20)		648 (35.78)	224 (9.68)	
5-17 days	73 (25.52)	88 (26.83)		445 (24.57)	464 (20.06)	
18-53 days	43 (15.03)	106 (32.32)		447 (24.68)	705 (30.48)	
≥ 54 days	22 (7.69)	94 (28.66)		271 (14.96)	920 (39.78)	

	Women N=614			Men N=4124		
	Did not receive OAT during incarceration N(%)	Received OAT during incarceration N(%)	p- value	Did not receive OAT during incarceration N(%)	Received OAT during incarceration N(%)	p- value
Number of previous provincial incarcerations[§]			0.50			0.27
	0	69 (24.13)		269 (14.85)	338 (14.61)	
	1	90 (31.47)		419 (23.14)	585 (25.29)	
	≥2	127 (44.41)		1123 (62.01)	1390 (60.10)	
Mental health diagnosis[¶]			<0.01			
	No	145 (50.70)		1159 (64.00)	1801 (77.86)	
	Yes	141 (49.30)		652 (36.00)	512 (22.14)	
Number of Chronic conditions			0.145			<0.01
	None	98 (34.27)		886 (48.92)	1377 (59.53)	
	One or more	188 (65.73)		925 (51.08)	936 (40.47)	
Year of release			<0.01			<0.01
	2015	79 (27.62)		519 (28.66)	282 (12.19)	
	2016	88 (30.77)		509 (28.11)	437 (18.89)	
	2017	81 (28.32)		433 (23.91)	751 (32.47)	
	2018	38 (13.29)		350 (19.33)	843 (36.45)	
Released after transfer[⊥]			<0.01			<0.01
	No (before)	235 (82.17)		1344 (74.21)	1277 (55.21)	
	Yes (after)	51 (17.83)		467 (25.79)	1036 (44.79)	

OAT = Opioid Agonist Treatment

[‡]Chi-square test; p<0.05

[†]Record of nonfatal overdose in data from Emergency Health Services (BCEHS), Drug and Poison Information Centre (DPIC), case-based reporting from Emergency Departments, National Ambulatory Care Reporting System (NACRS), Discharge Abstract Database (DAD) or Medical Services Plan (MSP). Fatal overdose identified in Vital Statistics and BC Coroner Records.

[¶] Defined as a community prescription current within the six days prior to the admission date.

[◇] Any record of OAT dispensation in British Columbia between January 1, 2010 and date of admission.

[§] In British Columbia, between January 1 2010, and date of release.

[¶] Mental Health Diagnosis includes ICD-10 codes classifying mental, behavioural and neurodevelopmental disorders, excluding those related to psychoactive substance use and ICD-9 codes classified as Mental Disorders excluding drug or alcohol-related psychoses, dependence, or non-dependent abuse of drugs (Appendix B, B.2).

[⊥] Responsibility for healthcare services transferred from a private, for-profit company contracted by BC Corrections to the Provincial Health Services Authority on October 1, 2017

5.3.1 Use of OAT and nonfatal overdose

In unadjusted analysis receipt of OAT during incarceration was associated with a 41% reduced hazard of nonfatal overdose in the 30 days after release (95% CI 0.45,0.77). Increased hazard of nonfatal overdose was associated with previous provincial incarcerations, having one or more chronic health conditions, and having a mental health diagnosis. In the adjusted model, OAT during incarceration was associated with a lower hazard (aHR 0.55, 95% CI 0.41, 0.74) of nonfatal overdose in the 30 days after release (Table 5.3).

Table 5.3 Unadjusted and adjusted hazard ratio for nonfatal overdose following release from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018

	Unadjusted (HR 95% CI)	Adjusted (HR 95% CI)
OAT while incarcerated		
No	Ref	Ref
Yes	0.59 (0.45, 0.77)	0.55 (0.41, 0.74)
Age group (years) at time of release		
18-29	Ref	Ref
30-39	0.99 (0.67, 1.45)	1.02 (0.71, 1.47)
40-49	0.83 (0.57, 1.21)	0.90 (0.64, 1.29)
≥50	0.87 (0.49, 1.54)	0.95 (0.54, 1.65)
Sex		
Male	Ref	Ref
Female	1.17 (0.65, 2.10)	1.10 (0.63, 1.91)
Length of most recent incarceration		
1-4 days	Ref	Ref
5-17 days	1.26 (0.86, 1.83)	1.50 (1.02, 2.22)
18-53 days	1.56 (1.07, 2.25)	1.91 (1.31, 2.80)
≥ 54 days	1.10 (0.76, 1.59)	1.85 (1.26, 2.73)
Number of previous provincial incarcerations[§]		
0	Ref	Ref
1	1.94 (1.21, 3.11)	1.70 (1.06, 2.72)
2+	3.72 (2.41, 5.74)	2.40 (1.56, 3.70)
Number of chronic conditions		
0	Ref	Ref
1 or more	2.60 (1.89, 3.57)	1.56 (1.15, 2.11)
Mental health diagnosis[¶]		
No	Ref	Ref
Yes	3.76 (2.87, 4.93)	2.62 (1.98, 3.46)
Year of release		
2018	Ref	Ref
2017	1.44 (1.06, 1.95)	1.24 (0.92, 1.68)
2016	1.34 (0.91, 1.98)	1.01 (0.68, 1.50)
2015	0.71 (0.46, 1.11)	0.57 (0.36, 0.90)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

[§] In British Columbia, between January 1, 2010 and date of release.

[¶] Mental health diagnosis includes ICD-10 codes classifying mental, behavioural and neurodevelopmental disorders, excluding those related to psychoactive substance use and ICD-9 codes classified as Mental Disorders excluding drug or alcohol-related psychoses, dependence, or non-dependent abuse of drugs (Appendix B, B.2).

5.3.2 New and continued episodes of OAT

Compared to people who did not receive OAT in custody, in the unadjusted model a decreased hazard of nonfatal overdose was observed for OAT continued from community (HR 0.49, 95%CI 0.36, 0.68) and for OAT episodes initiated in custody (HR 0.66, 95% CI 0.48, 0.89). This was also seen in the adjusted model; compared to people who did not receive OAT in custody, a reduced hazard of nonfatal overdose after release was found for people who continued OAT from the community (aHR 0.49, 95%CI 0.36, 0.67) and people who initiated a new episode of OAT in custody (aHR 0.58, 95%CI 0.41, 0.82; Table 5.4).

Table 5.4 Unadjusted and Adjusted hazard ratio for nonfatal overdose following release from provincial correctional facilities in British Columbia between January 1, 2015 and December 1, 2018 among people who did not receive OAT, people who continued a community prescription and people who initiated a new episode of OAT in custody.

	Unadjusted (HR 95% CI)	Adjusted (HR 95% CI)
OAT while incarcerated		
No OAT	Ref	Ref
Continued OAT	0.49 (0.36, 0.68)	0.49 (0.36, 0.67)
New episode of OAT	0.66 (0.48, 0.89)	0.58 (0.41, 0.82)
Age group (years) at time of release		
18-29	Ref	Ref
30-39	0.99 (0.67, 1.45)	1.02 (0.72, 1.46)
40-49	0.83 (0.57, 1.21)	0.98 (0.69, 1.39)
≥50	0.87 (0.49, 1.54)	0.96 (0.55, 1.66)
Sex		
Male	Ref	Ref
Female	1.17 (0.65, 2.10)	1.08 (0.62, 1.85)
Length of most recent incarceration		
1-4 days	Ref	Ref
5- 17 days	1.26 (0.86, 1.83)	1.49 (1.02, 2.19)
18 -53 days	1.56 (1.07, 2.25)	1.94 (1.33, 2.84)
≥ 54 days	1.10 (0.76, 1.59)	1.91 (1.30, 2.81)
Number of previous provincial incarcerations[§]		
0	Ref	Ref
1	1.94 (1.21, 3.11)	1.66 (1.06, 2.59)
2+	3.72 (2.41, 5.74)	2.24 (1.49, 3.39)
Number of chronic conditions		
0	Ref	Ref
1 or more	2.60 (1.89, 3.57)	1.53 (1.14, 2.06)
Mental health diagnosis[¶]		
No	Ref	Ref
Yes	3.76 (2.87, 4.93)	2.56 (1.95, 3.36)
Year of release		
2018	Ref	Ref
2017	1.44 (1.06, 1.95)	1.27 (0.94, 1.71)
2016	1.34 (0.91, 1.98)	1.05 (0.71, 1.56)
2015	0.71 (0.46, 1.11)	0.58 (0.36, 0.92)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

[§] In British Columbia, between January 1, 2010 and date of release.

[¶] Mental health diagnosis includes ICD-10 codes classifying mental, behavioural and neurodevelopmental disorders, excluding those related to psychoactive substance use and ICD-9 codes classified as Mental

Disorders excluding drug or alcohol-related psychoses, dependence, or non-dependent abuse of drugs
(Appendix B, B.2).

5.3.3 Subgroup analyses

The association between OAT during incarceration and nonfatal overdose after release was observed for both women and men in subgroup analysis stratified by sex. In unadjusted analysis of releases of women, OAT dispensation during incarceration was associated with a hazard ratio of 0.55 (95%CI 0.32, 0.96). Having a mental health diagnosis and two or more previous provincial incarcerations were associated with increased hazard of nonfatal overdose. In adjusted analysis, receipt of OAT while in custody was associated with a reduced hazard of nonfatal overdose in the 30 days following release (aHR 0.41, 95% CI 0.20, 0.82; Table 5.5). In a second adjusted model, compared to women who did not receive OAT, receipt in custody was associated with a reduced hazard of nonfatal overdose after release for women who initiated a new episode of OAT in custody (aHR 0.16, 95%CI 0.05, 0.46) and women who continued a community OAT prescription (aHR 0.49, 95% CI 0.27, 0.88; data not shown).

Among men, OAT receipt in custody was associated with reduced hazard of nonfatal overdose after release in unadjusted (HR 0.60, 95%CI 0.45, 0.80) and adjusted analysis (aHR 0.60, 95%CI 0.45, 0.81; Table 5.5). Compared to men who did not receive OAT in custody, a reduced hazard of nonfatal overdose after release was seen for men who were continuing a community OAT prescription (aHR 0.47, 95% CI 0.33, 0.70) and for men initiating a new episode of OAT in custody (aHR 0.70, 95%CI 0.51, 0.98; data not shown).

Table 5.5 Unadjusted and Adjusted hazard ratios of nonfatal overdose after release from provincial prison in British Columbia 2015-2018 among men and women

		Women		Men	
		Unadjusted HR (95%CI)	Adjusted HR (95%CI)	Unadjusted HR (95%CI)	Adjusted HR (95%CI)
Received OAT while incarcerated					
	No	Ref	Ref	Ref	Ref
	Yes	0.55 (0.32, 0.96)	0.29 (0.14, 0.58)	0.60 (0.45, 0.80)	0.60 (0.45, 0.81)
Age group (years) at time of release					
	18-29	Ref	Ref	Ref	Ref
	30-39	1.78 (0.55, 5.79)	1.74 (0.63, 4.80)	0.89 (0.60, 1.31)	0.92 (0.65, 1.32)
	40-49	1.63 (0.69, 3.87)	1.58 (0.77, 3.26)	0.74 (0.49, 1.12)	0.84 (0.57, 1.24)
	≥50	1.41 (0.29, 6.74)	2.17 (0.52, 9.03)	0.81 (0.44, 1.50)	0.85 (0.47, 1.52)
Length of most recent incarceration					
	1-4 days	Ref	Ref	Ref	Ref
	5-17 days	2.07 (0.75, 5.71)	2.59 (0.97, 6.96)	1.12 (0.76, 1.65)	1.30 (0.90, 1.90)
	18-53 days	2.00 (0.65, 6.16)	2.74 (0.82, 9.09)	1.49 (1.00, 2.21)	1.76 (1.23, 2.51)
	≥ 54 days	1.53 (0.64, 3.64)	4.15 (1.43, 12.07)	1.04 (0.69, 1.57)	1.65 (1.12, 2.44)
Number of previous provincial incarcerations[§]					
	0	Ref	Ref	Ref	Ref
	1	1.62 (0.79, 3.34)	1.20 (0.54, 2.67)	2.15 (1.18, 3.94)	1.94 (1.06, 3.55)
	≥2	2.58 (1.32, 5.04)	1.59 (0.70, 3.61)	4.40 (2.53, 7.64)	2.78 (1.60, 4.82)
Mental health diagnosis[¶]					
	No	Ref	Ref	Ref	Ref
	Yes	2.60 (1.52, 4.45)	1.87 (1.06, 3.30)	4.00 (2.95, 5.43)	2.75 (2.02, 3.75)
Number of chronic conditions					
	None	Ref	Ref	Ref	Ref
	One or more	2.47 (0.99, 6.19)	1.94 (0.89, 4.24)	2.62 (1.88, 3.64)	1.52 (1.11, 2.08)
Year of release					
	2018	Ref	Ref	Ref	Ref
	2017	1.00 (0.61, 1.66)	0.72 (0.42, 1.24)	1.53 (1.07, 2.18)	1.34 (0.95, 1.88)
	2016	0.82 (0.30, 2.20)	0.50 (0.20, 1.26)	1.47 (0.97, 2.22)	1.13 (0.75, 1.70)
	2015	0.27 (0.08, 0.93)	0.13 (0.03, 0.51)	0.82 (0.51, 1.31)	0.69 (0.43, 1.10)

OAT = Opioid Agonist Therapy; HR = Hazard Ratio; CI = Confidence Interval

§ In British Columbia, between January 1, 2010 and date of release.

¶ Mental health diagnosis includes ICD-10 codes classifying mental, behavioural and neurodevelopmental disorders, excluding those related to psychoactive substance use and ICD-9 codes classified as Mental Disorders excluding drug or alcohol-related psychoses, dependence, or non-dependent abuse of drugs (Appendix B, B.2).

5.3.4 Sensitivity analyses

There were 59 incarceration events where OAT was only dispensed on the date of admission. Because OAT dispensations can be for multiple days of treatment, OAT dispensed on the day of admission could have been dispensed in custody or in the community prior to arrest. As a sensitivity analysis, we considered only incarceration events where OAT was dispensed after the date of admission as having received OAT while incarcerated. This change did not affect the estimate in unadjusted (HR 0.60, 95% CI 0.46, 0.79) or adjusted analyses (aHR 0.55, 95% CI 0.41, 0.74). As a second sensitivity analysis we replaced the variable for year of release with a dichotomous variable of whether the release occurred before or after the transfer of healthcare services to PHSA (October 1, 2017). This produced a similar estimate (aHR 0.62, 95%CI 0.47, 0.82). We also examined the relationship between receipt of OAT in custody and any overdose (fatal or nonfatal) in the first 30 days after release. Similar to estimates for nonfatal overdose, in this analysis, receipt of OAT in custody was associated with reduced hazard of overdose in both the unadjusted (HR 0.59, 95%CI 0.46, 0.77) and adjusted (aHR 0.54, 95%CI 0.41, 0.72) models. Poisson regression produced similar estimates to the main model in unadjusted (RR 0.58, 95%CI 0.45,0.76) and adjusted (aRR 0.56, 95% CI 0.42, 0.75) analyses as did negative binomial regression in unadjusted (RR 0.43, 95% CI 0.33, 0.56) and adjusted (aRR 0.43, 95%CI 0.33, 0.58) analyses. To understand the effect on people initiating OAT for the first time while in custody we examined the association between OAT during incarceration and nonfatal overdose after release separating those with and without a prior history of use of OAT. Compared to people who did not receive OAT, receipt of OAT in custody was associated with a decreased hazard of nonfatal overdose after release among people initiating OAT for the first time (aHR 0.40, 95% CI 0.21, 0.77), people initiating a new episode of OAT in custody who had a previous

history of OAT use (aHR 0.64 95%CI 0.44, 0.92) and people continuing a community prescription (aHR 0.50 95% CI 0.36, 0.68). Due to the small sample of women, we conducted a sensitivity analysis including an interaction term for sex and use of OAT in custody. Compared to women who did not receive OAT, men who received OAT (aHR 0.47 95% CI 0.23, 0.98) and women who received OAT (0.44 95% CI 0.25, 0.79) had a reduced hazard of nonfatal overdose after release.

5.4 Discussion

This study found that receipt of OAT during incarceration was associated with a 45% reduction in the hazard of nonfatal overdose in the 30 days following release from provincial correctional facilities in BC. The protective effect of OAT during incarceration was observed for people continuing a community prescription for OAT and for people initiating a new episode of OAT in custody. Finally, we found that OAT receipt during incarceration significantly reduced the hazard of nonfatal overdose after release among both women and men, but that the effect seen was larger among women.

This study demonstrates that expanded access to OAT during incarceration could help protect against the acute risk of nonfatal overdose after release from incarceration. In our study, only 40% of people who received OAT while in custody had an active community prescription in the week prior to their incarceration and 18% had no prior history of OAT use. In many jurisdictions across Canada and the US if OAT is available to those in custody it is limited to people with an active community prescription,^{104,109,110} indicating a high level of unmet need. To expand access to OAT in custody requires a comprehensive approach to addressing barriers in policies and

practice. Providers in Ontario identified multiple systemic barriers to initiating OAT in provincial correctional facilities including policy barriers, lack of resources and the absence of links to community providers.¹⁰¹ In BC expansion of access to OAT in provincial correctional facilities came from a number of policy and legal changes. This included buprenorphine/naloxone becoming a regular benefit under the provincial PharmaCare program (a publicly funded program which helps to cover the cost of some prescription drugs for eligible residents of BC).²⁶³ Becoming a regular benefit meant that buprenorphine/naloxone could be offered as an alternative to methadone without special approval from PharmaCare.²⁶⁴ The province also declared a public health emergency of overdose deaths in 2016⁶² which garnered political will and funding to prevent and address harms from the toxic drug supply. Also in 2016, BC Corrections settled a charter challenge about access to OAT in provincial correctional facilities²⁶⁵ and introduced policies to use buprenorphine/naloxone as first line treatment.²⁵⁸ These changes saw use of OAT among people with OUD in BC provincial correctional facilities increase from 28% to 65% between 2015 and October 1, 2017.²⁵⁸ The transfer of responsibility for healthcare services in BC provincial correctional facilities to PHSA also included an explicit focus on improving services for mental health and substance use.^{88,134,156} We found a higher proportion of people released after the transfer received OAT in custody which is consistent with reports of improved access since the transfer, including elimination of the waitlist for OAT.^{88,159} Incarceration is a unique opportunity for people to initiate or reinstate OAT²⁶⁶ that may be continued following release with appropriate community linkages and supports. Comprehensive patient-centred policies which address institutional barriers and prescriber hesitancy are required to expand access to OAT in custody in order to reduce harm from overdose after release and increase access to care in the community.

Among women, OAT receipt during incarceration was associated with a 71% reduction in the hazard of nonfatal overdose after release. This was substantially greater than the effect seen for men (aHR 0.60 95% CI 0.45, 0.81). Though a greater number of men die of fatal overdose, women who have experienced incarceration are at a greater risk of overdose death in the weeks following release.^{67,68,70,267} Increased access to OAT for incarcerated women and particularly for women who do not have an active community OAT prescription, may help to reduce harms during the acute period of risk following release. Increasing access for women may require specific, targeted approaches. On average, women spend less time in remand and sentenced custody² compared to men which may affect access to or stability of OAT treatment. Furthermore, women face greater stigma related to drug use and more often experience violence, homelessness or loss of custody of children as a result.²⁵⁰ These realized and potential harms may act as barriers to accessing care. Further research is needed to understand and implement tailored, gender-responsive programming to increase access to OAT access during incarceration and after release.

Finally, in 44% releases of people with OUD, the person did not receive OAT during their incarceration (including 144 in which the person had an active community prescription prior to admission). Future research should examine barriers and opportunities to accessing OAT in custody, as well as alternative treatments and supports for people who do not want to use OAT or for whom OAT is insufficient.

5.4.1 Strengths and Limitations

This study had several strengths. We used a large sample of the BC population which supports the generalizability of findings to BC and similar populations. Furthermore, administrative records allowed us to establish the specific temporality of the relationship between receipt of OAT in prison and nonfatal overdose after release. Sensitivity analyses for the definition of receipt of OAT in custody, for the change in healthcare governance in correctional facilities and that included fatal overdose in the outcome variable, all produced similar estimates.

Additionally, sensitivity analysis for people without a history of OAT use demonstrate its protective effect across categories of previous exposure. Finally, both Poisson and negative binomial models produced estimates similar to the primary analysis indicating robustness in our findings. This study also had several limitations. Overdoses reversed in the community where healthcare was not called or where the person was not on scene when the paramedics arrived are not captured in administrative data and so nonfatal overdoses are underreported in our study. BC has an active THN program in which community members are trained and equipped with naloxone to reverse overdose. Since the program began in 2012 more than 80,700 THN kits have been reported as used to reverse an overdose.²⁵² THN program participants who used their kit to reverse an overdose reported that emergency medical services were called in 50-60% of overdose events.^{253,254} Administrative data also has limitations on the specificity of identifying people with OUD. In this study we included only people who had diagnostic codes that specified opioid use. We protected against misclassification by requiring at least two physician billing records for OUD. We did not examine continuity of OAT prescription after release from custody. Future research should examine the effect of OAT continuity on the relationship between OAT receipt during incarceration and nonfatal overdose after release. Finally, this study focused on

outcomes in the short time after release when risk of overdose is highest.^{68,70,73,74} Research is needed to understand the long-term outcomes of expanding access to OAT in correctional settings, particularly for people initiating a new episode of OAT while incarcerated.

5.4.2 Conclusions

We found that OAT receipt during incarceration was associated with decreased hazard of nonfatal overdose in the weeks following release from custody and the effect seen was larger among women. Efforts are needed to ensure stable access to OAT throughout incarceration and that supports for initiation and maintenance of OAT in custody are gender-responsive. In this study OAT was also protective against nonfatal overdose after release among people initiating a new episode of OAT in custody. Policies to expand access to OAT for people without an active community prescription are needed to leverage correctional facilities as a setting for initiating care that may be continued in community after release.

Chapter 6: Conclusion

6.1 Summary of research objectives and study findings

Effective governance for healthcare services in correctional facilities is essential to addressing health inequities for people who experience incarceration. Despite the large number of people who experience incarceration each year in Canada and internationally, there is a paucity of research about the impact of governance structures on healthcare services and health outcomes. The research presented in this dissertation provides a first step in addressing this gap by identifying and examining some of the early effects of the transfer of responsibility for healthcare services in provincial correctional facilities in BC from a private, for-profit contractor to the PHSA. Using a multimethod approach provided a means of engaging with the complex social and cultural changes that resulted from the transfer and their effects on a population level. Additionally, findings from the qualitative study were used to inform development of research questions explored in quantitative studies. Interviews with healthcare leadership provided a rich description of the context of healthcare services in correctional facilities in BC and of the perceived effects of the transfer on providers who were simultaneously experiencing and realizing change (Objective 1). Healthcare providers described the transfer as having a predominately positive impact on the quality of care they felt able to provide, on their work-life, and on the meaning of their work. Interview participants also highlighted key changes to healthcare services which had transformed the culture and orientation of care including an increased focus on discharge planning and community integration, and expanded access to OAT in custody. The effects of these changes on health outcomes for clients were examined using quantitative analyses. To understand the effect of increased discharge planning on overdose after

release (Objective 2) I examined use of community healthcare and its relationship to nonfatal and fatal overdose. This study revealed that that use of community healthcare services after release from custody was associated with having a healthcare-attended nonfatal overdose and a reduced hazard of fatal overdose. These findings suggest that the increased focus on connection to community services introduced by PHSA helped to improve engagement with community healthcare services. It also suggests an important role for community healthcare in providing appropriate substance use and harm reduction supports to people recently released from custody. Finally, I conducted a second quantitative study to examine the impact of expanded access to OAT in custody on nonfatal overdose after release (Objective 3). This study found that use of OAT in custody was associated with a reduced hazard of nonfatal overdose in the weeks following release, including among people initiating a new episode of OAT in custody. This suggests that policy changes to expand access to OAT during incarceration have a positive impact on health outcomes after release. Together, these findings demonstrate that governance models in which correctional facilities are integrated with the larger healthcare system support delivery of patient-centred and community-connected care that may meaningfully impact health outcomes for people who experience incarceration. In this section I discuss the findings for each objective explored in this dissertation as well as the limitations and strengths of the work presented and make recommendations for future research, policy and practice.

6.1.1 Healthcare services and the work-life of healthcare providers

The first objective of this dissertation was to understand healthcare providers' perceptions of the impact of the transfer on their work and satisfaction with their role (Objective 1). Perspectives of healthcare leadership explored in Chapter 3 provide insight into how the changes implemented

by PHSA shaped healthcare services, working conditions and the work-life of healthcare staff working in provincial correctional facilities. The findings from this study contribute novel understanding to the literature on both models of governance for healthcare services in correctional facilities and on the experiences of healthcare providers working in carceral contexts. Participants highlighted that the transfer of responsibility for healthcare services in correctional facilities to PHSA had raised standards of practice, introduced and strengthened connections to community services and increased access to technology, treatments, equipment and health human resources. Importantly, participants noted that the transfer to PHSA meant that structures of reporting and support for healthcare staff were now external to the hierarchy of corrections which changed the culture and orientation of healthcare services and provided a greater voice for healthcare providers in policy and practice. Existing literature on the working environment and work-life of healthcare providers in correctional settings has predominately identified challenges common to practice including tensions with security in policies and practices, inadequate access to tools and resources, and professional isolation.^{119,121,122,124,127} This dissertation contributes new knowledge to the field by providing insight into how structures of governance may help address these challenges to improve provider work-life and increase quality of care.

This work also provides new evidence that governance models play an important role in ensuring clinical independence of healthcare providers in corrections. Though the potential effect on clinical independence is a common argument in support of the transfer^{10,85,125} little evidence of its implementation is available in the literature. In this study, healthcare leadership reported an improved ability to advocate for client and provider needs after the transfer to PHSA through

increased input into decision-making, working within structures of supervision and reporting that are external to correctional services and an ability to leverage the status and resources of PHSA as a health authority.

In addition to improvements in the conditions of practice, to our knowledge this study provides the first examination of how changes in governance may influence job satisfaction for healthcare providers working in corrections. The health and wellbeing of the workforce is important for sustainability of healthcare services as well as quality of care. The Quadruple Aim^{268,269} adds improving the work-life of healthcare providers to the original Triple Aim of improving patient experience, the health of populations and reducing per capita cost as a framework for optimizing health system performance.²⁷⁰ In this study participants identified multiple changes that occurred because of the transfer that had multifaceted positive effects on working conditions and on job satisfaction. For example, becoming part of PHSA gave healthcare providers and healthcare services in correctional facilities new status within the healthcare system. Being part of a health authority increased recognition of healthcare providers in correctional facilities within the wider professional community, fostered professional growth through training and increased opportunities for advancement, and introduced standards of care which supported greater autonomy, feelings of professionalism and achievement. Job satisfaction among healthcare providers is not only essential to a healthy and sustainable workforce but is also associated with safety and quality of care.^{162–164}

Within the context of the transformation sought by the transfer to PHSA, healthcare providers both experienced and enacted change. In many instances this meant that changes implemented by

PHSA affected services and outcomes directly (such as through resourcing and policy) as well as indirectly through providers. Several participants identified that the cultural shift introduced by PHSA, including a requirement to refer to people accessing services as “clients” rather than “inmates”, changed how many providers viewed their relationship to clients and their role as providers. Some people described a new willingness or expectation for providers to “take an extra step” to do what they could for clients. Healthcare leadership also consistently highlighted improvements and initiatives that aligned with this cultural shift toward client-centred care, such as resources and policies focused on discharge planning and supporting client wellbeing after release. In this way, changes to the work-life and job satisfaction of healthcare providers were mutually-reinforcing with top-down efforts to improve healthcare and promote integration with community services. Though difficult to measure, the perspectives of participants in Chapter 3 provide novel insight into the ability of governance structures to influence culture within correctional settings and as a result, affect care. Furthermore, quantitative studies conducted in this dissertation demonstrate that these changes may improve health outcomes for people who experience incarceration.

Participants in the qualitative study described the new patient-centred and community-facing orientation of correctional healthcare services as having a positive impact on how providers saw the meaning of their work. Its effect on access to services was seen in the 2018 CHS internal evaluation which reported an increase in healthcare encounters related to discharge planning and use of OAT.¹⁵⁹ Quantitative studies in Chapters 4 & 5 provide examples of how this change in policy and culture may impact health outcomes after release. In Chapter 4 we saw that there was an increased use of community healthcare services after the transfer to PHSA and that use of this

healthcare was associated with a reduced hazard of fatal overdose and with healthcare-attended nonfatal overdose. Similarly, participants in the qualitative study described the new emphasis on provision of OAT as being facilitated by increased resources and policy supports, as well as a new sense of meaning to the work of healthcare staff which encouraged providers to take a long-term and client-centred approach to patient needs. The impact on health outcomes was seen in the quantitative study (Chapter 5). A larger proportion of people with OUD released after the transfer accessed OAT in custody and people who received treatment during their incarceration had a reduced hazard of nonfatal overdose after release.

Overall, this dissertation contributes new insight into the impact of governance models on healthcare services, the work-life of healthcare providers and on health outcomes. In the context of transformative change to systems of healthcare, the experiences and perspectives of service providers are integral as both agents and targets of change. Models of governance which integrate healthcare services in correctional facilities with the broader healthcare system may be an important means of promoting clinical independence, reducing professional isolation, and supporting providers to see their work as making a difference in the long-term health and wellbeing of clients.

6.1.2 Discharge planning and continuity of care

The second objective of this dissertation was to examine the effect of increased focus on discharge planning and community integration on addressing the risk and harms of overdose after release (Objective 2). Discharge planning was highlighted by participants in the qualitative study (Chapter 3) as an area of particular emphasis which had seen significant change as a result

of the transfer to PHSA. Additionally, improved discharge planning was an important marker of the change that healthcare providers felt in their ability to make a difference in the long-term wellbeing of clients. To examine the impact of this focus on continuity of care, in Chapter 4 I assessed use of community healthcare services in the four weeks following release and the relationship between use of community healthcare services and subsequent fatal and nonfatal overdose. Though interruptions in healthcare after release from custody are common,^{27,38,92,98,108} and unmet healthcare needs affect risk of overdose after release,^{75,92,238,239} to our knowledge, this study is the first to explore the relationship between use of community healthcare and overdose following release.

A higher proportion of people released after the transfer to PHSA used community healthcare services within the first month after release, demonstrating a positive effect of the new outward-facing orientation of healthcare services in custody. People who accessed community healthcare for any reason were more likely to have a subsequent healthcare-attended nonfatal overdose and had a reduced hazard of fatal overdose. A much higher proportion of people who experienced a nonfatal overdose had used healthcare services prior to their first overdose event compared to people who experienced a fatal overdose. This suggests that supporting connection to community healthcare during the transition from custody to community may provide important opportunities for overdose prevention and to promote engagement with other types of healthcare services. This study builds on findings of a 2015 study from Australia which found that use of primary healthcare services after incarceration promotes subsequent access to healthcare services, including substance use treatment and supports.²⁴⁶

That a higher proportion of people used community healthcare services after the transfer of services to PHSA aligns with the internal evaluation of the first year after the transfer. This evaluation was conducted by CHS and reported a 391% increase in healthcare encounters related to discharge and a 28% increase in encounters related to medications and prescriptions for discharge.¹⁵⁹ A 2008 study among people released from San Francisco County Jail, where discharge planning is offered to people who have an HIV diagnosis, found that people who received discharge planning were six times more likely to have a regular source of care in the community after release compared to people with other chronic health conditions.²⁷¹ Limited evidence available about interventions to promote access to healthcare services after release from custody has primarily focused on community supports such as case management and tailored community services.^{79,249,272} Findings from studies in this dissertation suggest that policies and practices internal to corrections also have an important role in promoting continuity of care after release. Interviews with providers indicate that integration of healthcare services with the community healthcare system supports meaningful discharge planning and promotes continuity of care.

This dissertation contributes new insight into the value of an outward orientation of healthcare services in correctional facilities for discharge planning and continuity of care. This culture of integration also has a direct impact on how healthcare staff view their role as providers and the meaning of their work in the long-term health and wellbeing of patients. In addition, these findings suggest that community healthcare services have an important role in supporting the transition from custody to community. Visits for any type of care present a potential opportunity to provide prevention and harm reduction supports.

6.1.3 Expanded access to OAT

The final objective of this dissertation was to determine the impact of expanded access to OAT in custody on risk of nonfatal overdose after release (Objective 3). In the qualitative study (Chapter 3) participants credited increased access to OAT since the transfer to PHSA to a multifaceted approach including dedicated health human resources, policies which support immediate start to medications, and increased access to physicians. Participants also described intangible facilitators of this change such as a new culture of patient-centred care and an orientation towards community connections and the long-term wellbeing of clients. These findings complement those of a 2016 survey of physicians practicing in provincial correctional facilities in Ontario which reported that beyond institutional policies, structural barriers to providing OAT in custody included security concerns about diversion, lack of connection with community based-providers, and lack of support.¹⁰¹ Insights from this dissertation make a novel contribution to the literature by highlighting changes which providers view as effective in changing prescribing and dispensing practices. This work also provides new evidence that models of governance which integrate healthcare services in correctional facilities with the broader healthcare system supports delivery of care that is better aligned with the principle of equivalence, improved connection to community services and a culture of patient-centred care.

The success of initiatives and policies aimed to increase access to OAT were borne out in quantitative analysis in Chapter 5, which found that receipt of OAT in custody was higher after the transfer among both women (45% before, 73% after) and men (49% before, 69% after) with OUD. In Chapter 5 we also found that expanded access to OAT in custody reduced the hazard of overdose after release among people with OUD. This relationship was seen among people who

were actively using OAT in the community prior to their arrest and among people initiating a new episode of OAT in custody. This work extends the existing literature which has predominately looked at people who are using OAT at the time of their admission to custody and compares outcomes of people who continued treatment during incarceration with people who had their medications discontinued.^{104,110,115,116,260} To our knowledge no other studies have examined outcomes for people initiating OAT in custody. In this study a reduction in the hazard of nonfatal overdose was seen for people continuing community prescriptions, initiating a new episode of treatment and among people initiating OAT for the first time in custody. Furthermore, 60% of people who received OAT during their incarceration did not have an active community prescription when they were admitted to custody and 18% had no prior history of OAT use. This indicates significant treatment gaps in facilities in which OAT is not available or is only available to people with an active community prescription.

Another novel contribution of this study was our finding that receipt of OAT in custody reduced the hazard of nonfatal overdose after release substantially more among women than men. Though similar proportions of women and men received OAT in custody (53.4% and 56.1% respectively), we found that receipt of OAT was associated with a 71% reduction in the hazard of overdose among women, compared to a 40% reduction among men. Though studies have found that women experience a higher risk of mortality and overdose death after release,^{67,68,70,267} to our knowledge no other study has examined a sex-or-gender-based difference in the use of OAT in custody. These findings point to the need for gender-responsive programming and supports to prevent harms during the period of elevated risk of overdose following release.^{24,64,65,67,72,73}

Individually, these studies suggest that initiatives implemented as part of the transfer of healthcare services in BC correctional facilities to PHSA had positive effects on provider well-being, quality of care, and on outcomes for people who experience incarceration. These findings provide valuable insight to correctional healthcare services in BC and in other jurisdictions. Taken together, these works provide support for policies and governance structures which promote greater integration of healthcare services in correctional facilities with community healthcare systems as a means of addressing health inequities by improving access to and quality of healthcare services in custody, promoting satisfaction and sustainability of work for healthcare providers and improving health outcomes for people who experience incarceration.

6.2 Strengths, limitations and recommendations for future research

6.2.1 Measures, standards and comparable research

One limitation of this study is the absence of comparable literature or standards of care. In general, there is a paucity of research examining health and healthcare services in carceral contexts^{79,80,273} and the small number of reports which address governance are largely anecdotal.^{10,128,140,143,145} This makes it difficult to compare the experiences and outcomes in BC with other models of governance, methods of implementing change or how the larger context of health and social services may affect outcomes. For example, when England transferred healthcare services in correctional facilities to the NHS, local health boards became responsible for healthcare services in the individual correctional facilities in their area. This led to a high degree of variability in service availability and quality between correctional facilities.^{140,143} By contrast, in BC responsibility for services in provincial correctional facilities were transferred to a central entity (PHSA). Interviews conducted in the qualitative study (Chapter 3) highlighted

benefits to this centralized model, such as standardization of policies and practice between correctional centres. However, this also means that regional health authorities in BC which deliver healthcare services within their geographic region¹⁴⁸ do not have an explicit mandate to consider correctional facilities which may lead to local variation in success of efforts to integrate with community healthcare services. More research is needed to critically examine existing prison health governance structures and their effect on healthcare services and health outcomes across jurisdictions. Future research should also investigate policies and initiatives aimed at improving integration of correctional facilities with community care and the context of different health and social systems. In particular, there is a need for research on health and healthcare services for people who are incarcerated in low-and-middle-income countries^{10,80} where most of the world's incarcerated population resides.¹

Another challenge to measuring the impact of governance models on healthcare services and outcomes is the absence of standards for healthcare services in correctional facilities or agreed upon indicators.¹⁰ Though benchmarks based in morals and ethics such as the principle of equivalence⁸³ serve as important guides, they are not readily evaluated, particularly given systemic disparities in access to services and outcomes in community. Furthermore, because of the high burden of healthcare needs experienced by people who are incarcerated, it is argued that care equivalent to that available in community is likely insufficient to achieve equivalent outcomes or to address disparities in health equity.^{96,97} The absence of clear standards of care makes it difficult to measure change or achievement in a way that is comparable over time or between jurisdictions. An important first step in addressing the structural determinants of gaps in both research and metrics is to ensure that research funding aligns with commitments to reduce

health inequities for people who are engaged by the criminal legal system. Currently, only a small fraction of research funding is directed to health and healthcare for people who experience incarceration. Between 2010 and 2014, the Canadian Institutes of Health Research awarded only 0.13% of grants and 0.05% of funding to prison health research.²⁷³ In addition to funding resources, there is an urgent need for improved data collection, monitoring and surveillance for services and outcomes in carceral contexts. Increased data sharing through partnerships with universities and other public institutions could support evidence-informed policies to improve healthcare and health outcomes for people who experience incarceration, their families, and communities.

6.2.2 Long-term outcomes

That this study was conducted within the first two years of the transfer is both a strength and limitation of this study. Though this timeframe meant that changes and comparisons were readily accessible to interview participants, it may also be that this obscured challenges and frustrations that take longer to surface or may be created by subsequent changes in the environment. For example, in England austerity measures introduced across the NHS in 2008 - two years after the transfer of healthcare in correctional facilities to the NHS - are thought to have reversed progress made as part of the transfer, resulting instead in greater staffing challenges, lowered quality of care, and an increased use of private contractors.²²⁸

Conversely, continued efforts towards improvement and new initiatives implemented by CHS may not yet have had time to fully develop or affect change. For example, in early 2019 CHS began piloting Community Transition Teams in five correctional facilities to provide additional

supports to people with OUD during the transition from custody to the community.¹⁵⁷ Since data used in this dissertation were only available to the end of 2018, the impact of this initiative is not captured. Similarly, in the qualitative study (Chapter 3), healthcare leaders described their hope that improvements to healthcare in custody and in continuity of care would have a long-term impact in the lives of clients and ultimately reduce recidivism. Future research should examine the medium and long-term effects of transferring healthcare services in custody to the broader healthcare system.

6.2.3 Demographic data and statistical models

Due to the nature of administrative data, this study was limited in terms of the ability to consider identity as a factor in access to services or in health outcomes. Every person in our data set had been identified as either male or female and no data on gender or sexual identity was available. This is an important gap because evidence suggests that structural oppression and stigma create specific health risks for 2SLGBTQ+ people in custody. A 2011-2012 national survey of US prisons and jails found that people who identify as lesbian, gay or bisexual were incarcerated at a higher rate than the general population and were more likely to experience sexual violence and solitary confinement while incarcerated.²⁰¹ High rates of incarceration and of physical and sexual assault in custody were also reported by respondents to the US National Transgender Discrimination Survey.²⁰⁰ Reports of incarceration and assault were higher for Black and Latinx respondents compared to the general sample, reflecting the compounding risk of oppression of intersecting social identities. In the qualitative study (Chapter 3) participants described telehealth as enabling access to specialists to provide appropriate care to clients who are transgender. The internal one-year evaluation conducted by CHS found that interactions for transgender-affirming

care are not currently captured in administrative records, though administrators reported that in the first year after the transfer six clients received transgender-affirming care through telehealth.¹⁵⁹ Future research should examine the role of healthcare governance and culture in improving the health and healthcare experiences of 2SLGBTQ+ people in custody.

Also absent from the database was any indication of race, ethnicity, or Indigenous identity. Historic and ongoing colonial violence in Canada has sustained a growing crisis of overrepresentation of Indigenous people in Canada's criminal legal system.^{2,203} Racism in policies and practices in custody also have a direct effect on healthcare access and health outcomes. The Office of the Correctional Investigator reports that people who are Indigenous are disproportionately placed in maximum security institutions, held longer in solitary confinement, serve a higher proportion of their sentence in custody, and are over-represented in use-of-force incidents.^{23,203} There is a lack of research on interventions which may effectively support health and wellbeing for Indigenous people who are incarcerated.²⁷⁴ Future research should examine how governance models might support efforts to address the health needs of Indigenous people who experience incarceration. The absence of this data also creates gaps in our understanding of health outcomes. The First Nations Health Authority reported that in 2020 First Nations people died due to the toxic drug supply at 5.3 times the rate of other BC residents.²⁰² The report also found that First Nations women faced particular risk from the toxic drug supply; First Nations women died at 9.9 times the rate of other women in BC.²⁰² Community-led research is urgently needed to understand and address these disparities in a way that meaningfully considers intersectionality in risk and support structures.

Black Canadians are also overincarcerated and are one of the fastest growing subpopulations in federal correctional facilities.⁴⁷ The Office of the Correctional Investigator identified structural disparities which create disproportionate risk to the health and wellbeing of Black people who experience incarceration.⁴⁷ Research which considers intersecting identities in seeking to illuminate differences in experiences and outcomes in custody is essential to understand which governance models work, in what circumstances, and importantly, for whom.

A strength of this study is that outcomes for women were modeled separately from those of men. Intersecting social and structural forces mean that women's experiences of incarceration, criminalization, release, and healthcare are different from those of men.^{2,19,35,65,67,68,76-78} Despite these differences, most research published about the health of people who experience incarceration in Canada is primarily, or exclusively about men and few studies address the needs women specifically.^{79,80} The research presented in this dissertation found differences in the experiences and outcomes of women and men that, to our knowledge, had previously been unexplored. Future research should examine the mechanisms behind these differences to inform gender-responsive policies and supports. Additionally, future research should explicitly consider sex- and gender-based differences in healthcare needs, services and outcomes for people who experience incarceration in order to inform meaningful change to practice and policy.

In Chapters 4 and 5 the Andersen-Gill model was considered the main analysis for quantitative analyses; Poisson and negative binomial regression models were considered as sensitivity analyses. Unfortunately, none of these models' frameworks directly incorporate competing risks into the recurrent events analysis.²⁷⁵ Although some ad-hoc suggestions of how to modify data to

make these analysis strategies accommodate competing risks are outlined in the literature, the interpretation of the results are not straightforward.²⁷⁶ Further methodological research in this area is needed.

6.3 Implications and considerations for policy and practice

Recommendations for clinical practice and policy considerations described below are based on the findings of this dissertation as well as relevant literature. Though they are situated in the context of British Columbia, lessons learned may provide insight to jurisdictions across Canada and around the world.

6.3.1 Strengthen supports and connection between custody and community

Taken together, findings from this dissertation highlight the value of investing in continuity of care between correctional facilities and community, as well as opportunities to strengthen supports and connection. The outward-facing orientation introduced by the PHSA helped to support transition between correctional centres and community through increased discharge planning, strengthened relationships with regional health authorities and community organizations, and policies which empowered healthcare staff. Increased use of community healthcare services after the transfer to PHSA (Chapter 4) indicates that this model of governance may help to create an environment and culture which promotes and supports continuity of care. That use of community healthcare services after release affected health outcomes of people leaving custody suggests that there is also an important role for community healthcare to actively support connection to services and to address the health needs of people being released. Education and training are needed among community healthcare providers to

increase awareness of incarceration-related health risks and the healthcare needs of people recently released.²⁵⁷ In a 2019 survey only 23% of primary care physicians in BC reported that they felt well prepared to provide care to a patient with a substance use disorder.²⁷⁷ Additionally, healthcare funding must be structured to support care which is accessible, acceptable and patient-centred.

People who have experienced incarceration often face discrimination and stigma within the healthcare system which act as a barrier to services.^{27,29,45,46,75,278} Therefore, addressing stigma among community providers must be a component of including correctional facilities in community care. Exposing students to carceral settings and to people who have experienced incarceration has been shown to decrease stigma and dispel myths and stereotypes, as well as increase interest in future work with people engaged by the criminal legal system.^{279–283}

Increased opportunities for learner placements in correctional settings and the reduced professional isolation of health services and providers in corrections may help to address stigma in community, effectively improving access to services.

There has been limited research into interventions to support transitions between correctional settings and community⁷⁹ though there is opportunity to build on promising practices.

Randomized control trials have shown some positive affect of active case-management on outcomes related to substance use and use of healthcare services after release.⁷⁹ Promising practices are also seen in Transitions Clinics Networks in the US which provide enhanced primary care designed specifically to meet the needs of people recently released and include community health workers who have themselves experienced incarceration.^{249,284} Clients of

Transitions Clinics had improved primary care engagement, reduced the use of emergency departments and lowered odds of reincarceration for technical violations.^{249,284} This dissertation extends existing literature by suggesting that correctional healthcare and community healthcare may act as two sides of a bridge supporting continuity of care. Integration of healthcare services in correctional facilities with the broader healthcare system may help to develop and support policies, partnerships and shared interventions to realise this link.

Additionally, though high-quality evidence is lacking, community programs which employ people with lived experience of incarceration have demonstrated immense benefits to people leaving custody including facilitating connection with community services, improved health outcomes and feelings of belonging.^{37,172,249,285} To address health equity, both correctional facilities and community services must direct policies, practices and resources to establish and strengthen a continuum of care and to actively address the health needs of people leaving custody.

Finally, meaningful supports to address health and healthcare needs during transitions between custody and community require multi-agency commitment to a person-centred approach. When released from custody, people face multiple competing priorities such as finding housing, employment and reconnecting with loved ones.^{37,44,261} These urgent needs can take priority over addressing health concerns or navigating access to healthcare services.¹⁶ Additionally, conditions of parole can have a direct impact on health and access to services. For example, area restrictions (known as ‘red zones’) are conditions on bail, probation or conditional sentences which prohibit people from specific geographic areas. Frequently, these boundaries deny people access to their

community, effectively eliminating connection with care providers, harm reduction services, and social supports.²⁸⁶ The Provincial Court of British Columbia provides a standardized ‘picklist’ for red zones in Vancouver; all are areas of the Downtown East Side²⁸⁷ where the city’s low-barrier and tailored health, social and harm reduction services are concentrated. To effectively support access to health services for people leaving custody and to meaningfully address health equity requires a transformative shift in policies and practices of systems within and beyond healthcare services.

6.3.2 Expand access to OAT and supports in custody

This dissertation showed that access to OAT in custody reduced the hazard of overdose in the month after release for people continuing a community prescription and people starting a new episode of treatment in custody (Chapter 5). We found this association persisted among people who used OAT for the first time while they were incarcerated. This novel finding provides evidence to support implementation of policies which expand access to OAT in custody in all types of governance models and, at a minimum, align with community standards. In BC multiple changes to policy and practice supported the expansion of OAT access in custody prior to the transfer to PHSA. These included making buprenorphine/naloxone a regular benefit under the provincial PharmaCare program and a policy change which made buprenorphine/naloxone a first-line treatment in BC Corrections. Since buprenorphine/naloxone has a better safety profile compared to naloxone (including shorter induction period and reduced risk of injection)²⁸⁸ this change directly supported prescribers working in correctional facilities. After the transfer to PHSA, interviewees in the qualitative study (Chapter 3) and reports from CHS^{88,155,159} describe targeted initiatives to eliminate the waitlist for OAT and to expand access to treatment. These

included a dedicated nursing position, expanded access to physician services, increased focus on discharge planning as well as a cultural shift emphasizing access to OAT in custody and connection to community services. This multifaceted approach reflects the complexity of intersecting policy, structural and security barriers that shape access to OAT in custody. Though vast improvements have been made in BC opportunities to improve remain, including addressing reasons for interruption or non-receipt of OAT in custody as well as provision of alternatives for people for whom OAT is not sufficient or who do not want to use OAT. This dissertation provides evidence that models of governance which integrate healthcare services in correctional facilities with the broader healthcare system may support expanded access to OAT through funding and resource structures, expectations and policy change and connection to prescribers in the community.

6.3.3 Integrate correctional facilities with the broader healthcare systems

COVID-19 has highlighted for many that the health of people in custody is a part of the health of communities; addressing the health disparities faced by people experiencing incarceration is an essential component of population and public health.^{51,289} In BC's provincial correctional facilities, successful outbreak prevention during the pandemic was credited to the coordinated, collaborative response of BC Corrections and PHSA.¹⁴¹ Beyond communicable conditions, our study showed that greater integration of healthcare services in custody with the community healthcare system also improved health outcomes related to overdose, quality of care, information sharing and standards of practice. Becoming part of the broader healthcare system also introduced new systems of accountability to community standards of care such as accreditation. Policy changes striving to meet accreditation standards and the principle of

equivalence, such as expanded access to OAT and provision of appropriate care for people who are transgender, improved care and health outcomes as well as the work-life of providers. Early outcomes in BC provide important insight about the positive effects of greater integration of healthcare services in correctional facilities with the broader healthcare system. These lessons learned may be applicable to work transforming healthcare policy in jurisdictions across Canada and around the world.

Within Canada, both Quebec¹³⁵ and Newfoundland and Labrador^{8,136} are in the process of transferring healthcare services to their respective ministries of health. There have also been calls for the federal government to integrate services in federal correctional institutions into the larger healthcare system.^{6,290} These changes in governance should be accompanied by comprehensive policy changes to intentionally build and maintain collaborative relationships with community organizations and institutions. For jurisdictions which have already transferred to the community healthcare system, continuous evaluation and quality improvement efforts should seek to strengthen and improve integration with community services through application of community standards of access and quality, strengthened information sharing and increased supports to facilitate a seamless transition between correctional facilities and community.

6.4 Conclusions

How healthcare services are organized, funded, and held accountable shapes the values, quality and effectiveness of the care they provide. In BC, transferring healthcare services in provincial correctional facilities from a private, for-profit contractor to the PHSA resulted in improvements to the quality and continuity of healthcare services, the work-life of healthcare providers, and the

health and wellbeing of people who experience incarceration. To address health inequities for people who experience incarceration requires responsibility and accountability for healthcare and health outcomes to be shared by policymakers, funders, researchers and the public healthcare system. Thoughtful, coordinated efforts are needed to ensure continuous, high-quality care throughout the continuum of services. Researchers can contribute to these efforts through critical examination of current models of governance and their short- and long-term impact on health outcomes and health systems. Additionally, community-led research is urgently needed to understand and address the health and healthcare needs of populations who are disproportionately harmed by the criminal legal system. Lessons learned from the experience in BC provide valuable insights to other jurisdictions looking to transform healthcare services in corrections. This work provides a some of the first evidence that models of governance which integrate healthcare in correctional facilities with the larger healthcare system may help to address health inequities and improve health outcomes for people who experience incarceration, their families, and communities.

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Appendices

Appendix A - Interview guide

Context (Decision)

1. Please would you tell me about your role and how it relates to the change in responsibility for healthcare delivery for people in BC correctional facilities?
2. What is the story of how BC arrived at the decision that PHSA would assume responsibility for healthcare services in correctional facilities?
 - a. What were the motivators?
 - b. What were the goals?
 - c. Please would you share a key moment that you feel moved the idea forward, or that set the idea back?
 - d. Were there any other key moments you could share?
3. What was the process of moving from the decision to actually transferring responsibility to PHSA in October?
 - a. What were your expectations?
 - b. Were they met?
4. From your perspective, what were some of the challenges in the transfer process?

- a. How were they addressed?
 - b. What are some of the anticipated challenges moving forward?
5. What were some of the important facilitators of the process?
- a. What will be the facilitators moving forward?

Expectations/Changes

6. From your perspective what are the biggest changes so far that have resulted from the transfer of service delivery?
- a. What did you anticipate would be the changes? [What were your expectations?]
 - i. Were they met?
 - ii. What surprised you?
 - b. What were/are facilitators and barriers to the transfer's impact?
7. From your perspective, are there further expected effects of PHSA assuming responsibility for service delivery? [Short term? Long term?]
- a. In what ways do you anticipate that the transfer will change health service delivery?
 - b. In what ways do you anticipate the transfer will change continuity of care?
 - c. What do you expect will be other outcomes of the transfer?
8. What does success of this transfer look like to you?

- a. What does the Ministry of Health regard as success?
 - b. What does Corrections view as success?
 - c. What would you say success looks like for the population?
9. Advice that you would give to another jurisdiction considering the transfer?
10. How is quality of health care defined in this context?
- a. In what ways do you anticipate that the transfer will impact quality?
 - b. How is quality of health care measured?
 - i. Are there indicators?
 - ii. Quality improvement?
 - c. Are there aspects of quality that are important but are not captured in current data/monitoring?

Closing

- 11. Is there anything else you'd like to add?
- 12. Who else should we speak to, to learn more about the context and expectations of the transfer of responsibility for healthcare services?

Options for further involvement

- 1. Would you like to receive a copy of your transcript to review and provide comment?
- 2. Would you be interested in receiving a draft manuscript to review and provide comment?

3. Is it okay if I contact you if I have further questions?

Appendix B - Definitions in quantitative analyses

B.1 Identification of Opioid Use Disorder

ICD-9 and ICD-10 codes used for identification of Opioid Use Disorder from Medical Services Plan, PharmaNet and Discharge Abstract Database data

Description	Code
ICD-10 codes for OUD	F11
ICD-9 codes for OUD	304.0, 304.7, 305.5
Pharmanet DIN/PIN for OAT (Methadone, buprenorphine, buprenorphine/naloxone, slow-release oral morphine for OUD)	999776, 999792, 2242963, 2242964, 2295695, 2295709, 2408090, 2408104, 2424851, 2424878, 22123346, 22123347, 22123348, 22123349, F3466999990, 66999991, 66999992, 66999993, 66999997, 66999998, 66999999, 67000000, 67000001, 67000002, 67000003, 67000004

ICD-10/ICD-9 = International classification of disease 10th edition/9th edition; OUD = Opioid Use Disorder; DIN/PIN = Drug Identification Number/Product Identification Number; OAT = Opioid Agonist Therapy

B.2 Variables associated with overdose identified in the literature

Variable of interest	Time-Period	Variable type	Data Source	Definition
Exposure				
Use of OAT while incarcerated	On or after day of admission, before day of release	Categorical	PharmaNet	
Use of healthcare services	Between 1-30 days after release	Categorical	MSP	
Demographic				
Age (year)	On day of release	Categorical	BC Client Roster	
Sex	Lifetime	Categorical	BC Client Roster	
Health History				
Mental Health Diagnosis	Between January 1, 2010 and day of release	Categorical	MSP, DAD	ICD 10-codes: F01-F09, F20-F99 ICD-9 Codes: 290, 293 – 302, 306-319, 50B
Chronic conditions	Between January 1, 2010 and day of release	Categorical	MSP, DAD	Count of conditions included in Elixhauser ¹³⁵ comorbidity index excluding drug use and mental health conditions.
Incarceration History				
Year of Release	On day of release	Categorical	BC Corrections	
Released after transfer to PHSA	On day of release		BC Corrections	
Length of most recent incarceration	On day of release	Categorical	BC Corrections	
Number of previous provincial incarcerations	Between January 1, 2010 and day of release	Categorical	BC Corrections	

OAT = Opioid Agonist Therapy; ICD-10/ICD-9 = International classification of disease 10th edition/9th edition; MSP = Medical Services Plan; DAD = Discharge Abstract Database