

IMPROVING SUBSTANCE USE SUPPORTS FOR RETURNING TO WORK FOR INDIVIDUALS IN THE CONSTRUCTION INDUSTRY

A scoping review on evidence-based treatment for opioid use disorder or alcohol use disorder in the construction industry



Improving Substance Use Supports for Returning to Work for Individuals in the Construction Industry:

A scoping review on evidence-based treatment for opioid use disorder or alcohol use disorder in the construction industry

Suggested citation:

Author: British Columbia Centre on Substance Use (BCCSU)

Publisher: British Columbia Centre on Substance Use (BCCSU)

Document Purpose: Clinical guidance

Publication Date: March 2022; updated May 2025

Target Audience: Policy makers, employers, unions, health care providers, health care administrators, allied health care professionals, and all other clinical and non-clinical personnel working with or supporting construction industry workers with alcohol or opioid use disorders

Contact:

British Columbia Centre on Substance Use
4th Floor, 1190 Hornby Street,
Vancouver BC, V6Z 2K5
inquiries@bccsu.ubc.ca

Land Acknowledgement

The BCCSU respectfully acknowledges that the land on which we work is the traditional, unceded homelands of the xʷməθkʷəy̍əm (Musqueam), Skwxwú7mesh (Squamish), and səliłwətał (Tsleil-Waututh) Nations.

We recognize that the ongoing criminalization, institutionalization, and discrimination against people who use drugs disproportionately harm Indigenous Peoples, and that continuous efforts are needed to dismantle colonial systems of oppression.

We see our work connected to these efforts and hope that this report helps to reduce the harms and stigma faced by people who use drugs and improves the health and well-being of those who work in the construction industry.

About the British Columbia Centre on Substance Use

The **BC Centre on Substance Use (BCCSU)** is a provincially networked resource with a mandate to develop, implement and evaluate evidence-based approaches to substance use and addiction. The BCCSU's focus is on three strategic areas including research and evaluation, education and training, and clinical care guidance. With the support of the province of British Columbia, the BCCSU aims to help establish world leading educational, research and public health, and clinical practices across the spectrum of substance use. Although physically located in Vancouver, the BCCSU is a provincially networked resource for researchers, educators and care providers as well as people who use substances, family advocates, support groups and the recovery community.

Legal Disclaimer

This document is not a substitute for the advice or professional judgment of a health care professional. Health care professionals must take into consideration the individual circumstances of their patients/clients and all applicable laws, regulations, and standards, including those set by their relevant governing bodies. The BCCSU and its affiliated organizations make no representation or warranty of any kind, either expressed or implied, as to the accuracy or completeness of the information in this document, or the fitness of the information for any use, and assume no liability, loss, or risk incurred as a consequence, directly or indirectly, of the use or application of any of the contents of this document.

June 2026 Update

Please note this report was originally developed and published in 2022 and may not reflect the current state of return-to-work legislation, policy, and practice in BC. Individuals are encouraged to consult the appropriate resources, organizations, legislation, and policy when navigating return-to-work situations in the context of substance use.

Executive Summary

Background

Substance use disorders (SUDs) represent a major challenge for the health care system in British Columbia (BC). The prevalence of opioid use disorders (OUD) among individuals aged 12 and older in BC has increased from 1% in 2000 to 1.92% in 2017.¹ Data from the British Columbia OUD Cohort^a indicates that there was a 19.2% increase in diagnosed opioid use disorder between September 2018 and September 2020. An increasingly toxic unregulated drug supply has contributed to a surge in drug poisoning deaths in BC.² Despite continued efforts to reduce drug poisoning events and related deaths, 9,316 people^b in BC have died from unregulated drug poisoning since the declaration of a public health emergency in April 2016.³ This increase in drug toxicity deaths has disproportionately impacted the trade and transport sector, particularly those employed as construction workers, among whom SUDs are a particular concern. Construction workers are more likely to have a SUD compared to workers in other industries,⁴ and individuals who were employed in the construction industry at their time of death are overrepresented in drug toxicity deaths attributed to the use of unregulated drugs.^{5,6} For example, 55% of individuals who were employed at the time of unregulated drug toxicity death in the period between 2011 and 2016 worked in the trades or transport industry in BC.^{5,6}

In addition to opioid toxicity, alcohol use is associated with significant harms to individuals and significant health care costs. It is estimated that 19.5% of Canadians aged 12 or older are engaged in high-risk^c drinking,⁷ and alcohol consumption rates and hospitalization rates for alcohol-related conditions have increased in BC.⁸ Among other harms, alcohol use is associated with an increased risk workplace accidents,⁹ which is particularly relevant to the construction industry. Despite the high prevalence of high-risk drinking and alcohol use disorder in Canada, there has historically been low awareness and uptake of treatment interventions for alcohol use disorder.¹⁰

Many workers in the construction industry are employed in safety-sensitive positions, in which impairment may cause harm to the worker themselves, other workers, the construction site or property, and members of the public. Thus, supporting construction workers to access and remain engaged in treatment and recovery from substance use is both an individual health and public safety issue. Access to substance use care through workplace policies or programs can improve an individual's well-being; promote financial stability during treatment, which can act as a significant barrier to accessing and continuing treatment; support an individual to involve their

^a The opioid use disorder (OUD) cohort is an administrative database that captures all BC residents with an indication of OUD since 1996. The cohort is identified using linked population-level administrative databases, capturing provincial health insurance plan registration, physician billing records, hospitalizations, medication dispensations, emergency department visits, perinatal services for all provincial births, mortality and cause of death.

^b Since the original publication of this document (March 2022), the provincial drug poisoning death toll has increased significantly: in the period between April 2016 and January 2025, more than 16,280 people have died from drug poisoning.

^c This is based on data collected in 2012 in reference to the Canadian Low Risk Alcohol Drinking Guidelines, which defined high-risk drinking as "drinking five or more drinks on the same occasion on 5 or more days in the past 30 days". **Since the initial publication of this document, the Canadian guidance, and the corresponding statistics, have been updated.** Published in 2023 by the Canadian Centre on Substance Use and Addiction, [Canada's Guidance on Alcohol and Health](#) presents an evidence-based continuum of risk associated with weekly alcohol use, whereby 2 or less standard drinks per week are considered low-risk, 3–6 drinks are defined as moderate-risk, and 7 standard drinks or more are associated with high risk of harm. According to [2023 national survey data](#) collected by statistics Canada, at least 30% of Canadian adults drink in excess of the updated low-risk threshold.

family and friends in their treatment; promote a workplace culture that supports employees who seek substance use treatment; increase connection between peers in the workplace; help to avoid preventable deaths that impact an individual's family, friends, and community. There are also benefits for employers, such as improved worker retention, worker performance, workplace safety, and staff well-being, and reduced absenteeism.¹¹

Issue

The high prevalence of drug poisoning events, fatalities, and other substance-related harms among individuals who use substances is a particular concern in the construction industry, due, in part, to the significant number of workers in the construction industry are employed in safety-sensitive positions. These workers perform tasks that require a high level of awareness and skill, such as operating heavy machinery, equipment, vehicles, or tools. Mistakes or accidents resulting from impairment by workers in these positions can result in significant harm to the worker themselves, other workers, the construction site or property, and members of the public. Effective, evidence-based approaches to support the treatment goals and return to work of individuals with SUDs are urgently needed.

A lack of guidance and policies that outline how workers can access, begin, and remain on evidence-based pharmacotherapy when they return to work in the construction industry highlights the need for new approaches to supporting individuals with SUDs in the workplace. To address this issue, an interdisciplinary Expert Advisory Panel was formed to develop a scoping review to map and summarize the existing evidence as well as develop key recommendations pertaining to return to work for workers who are on evidence-based pharmacotherapies for opioid and/or alcohol use disorders. This panel was composed of individuals with expertise in occupational health, frontline clinical work, substance use disorders, and scoping review methodology. The protocol development and report for this scoping review were guided by the Joanna Briggs Institute Manual for Evidence Synthesis¹² and Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist.¹³

Review Findings

Following a literature search, 543 articles were reviewed for inclusion, with 23 academic and 28 grey literature articles found eligible for inclusion. Data extraction and thematic analysis identified the following themes: safety sensitive; impairment; fitness for duty or work, individualized assessment and treatment plans; return to work; patient-reported outcomes; First Nations and rural/remote; policy/regulatory; and guidance. This thematic analysis was the basis for a discussion of the existing evidence and its implications for return-to-work policies and practices.

This scoping review identified the following findings:

- There is a **dearth of evidence pertaining to the use of pharmacotherapy** for OUD and/or AUD in safety-sensitive positions;
- While evidence for the potential impairing effects for OUD pharmacotherapies was identified,¹⁴⁻¹⁵ a lack of consensus among and within the existing literature precludes drawing any significant conclusions,¹⁶ and **the applicability of the existing evidence about the impairing effects of OUD pharmacotherapies to real-world safety-sensitive tasks remains unclear**;
- There was a very **limited base of evidence examining the use of AUD pharmacotherapy** identified in the literature; and

- There is a **lack of validated tools for measuring impairment** and, in particular, assessing how that impairment affects real-world work tasks that are performed by workers in safety-sensitive positions, such as construction workers.

Despite the need for evidence-based workplace substance use programs and policies, there is a lack of standardization of appropriate measures for determining the quality and effectiveness of such programs. In the absence of standardized evaluation, it is unclear how workplace policies affect workers and, further, unclear how to tailor workplace policies so that they are effective for specific workplaces. Employers may also use practices such as urine drug testing despite a lack of evidence that this practice can identify impairment¹⁷ or is effective at reducing workplace accidents.¹⁸

This scoping review also identified a lack of guidance in the existing literature that can help support employers to create evidence-based workplace substance use policies. No standardized definitions were identified for commonly used terms and concepts in existing workplace policies, such as impairment, fitness for duty, and safety-sensitive workers. Although best practices for developing return-to-work policies and processes were identified in this review,^{11,19-22} there are a lack of tools and resources that can help to support employers in implementing these best practices in their workplace. The existing evidence emphasized the need for workplace substance use policies that are non-stigmatizing and supportive of workers who are on evidence-based pharmacotherapy to improve treatment outcomes for this population.^{11,22}

Recommendations

Based on the findings of this scoping review and expert consensus, the Expert Advisory Panel has developed the following recommendations:

Policy and Standards

Currently, there is a lack of guidance for supporting employers to create evidence-based workplace substance use policies and standards. Construction industry associations and regulatory bodies (i.e., WorkSafeBC, Ministry of Labour) can support employers to create effective, evidence-based policies and standards by:

1. Creating standardized definitions of key concepts relating to substance use prevention and treatment in a workplace context, including:
 - i. Impairment
 - ii. Fitness for duty/work
 - iii. Safety-sensitive positions
 1. Safety-sensitive positions could be stratified according to the tasks required and the associated risks
2. Developing guiding principles that emphasize trauma-informed, non-punitive, and non-stigmatizing approaches to workplace substance use policies and programs that recognize substance use disorders are often a chronic and relapsing condition that require continuing care, which may include long-term pharmacotherapy
3. Supporting employers to develop evidence-based return-to-work policies and processes, including^d:
 - i. A formal return-to-work agreement

^d These concepts are based on the recommendations from the Fraser Health Authority report *Supporting Recovery Through Return to Work*¹¹

- ii. Flexible and collaborative return-to-work programming
 - iii. Urine drug testing
 - iv. Clear disability benefits and claims processes
 - v. Access to a qualified return-to-work coordinator or disability manager
 - vi. Regular review of workplace accommodations, including consideration of prescribed medications
 - vii. Aftercare support and programs for relapse prevention
- 4. Developing policies that incorporate evidence-based pharmacotherapy for OUD and/or AUD and individualized functional assessment for individuals returning to work
- 5. Developing educational resources for employers that support the development of evidence-based substance use programs, including concepts such as:
 - i. Individualized assessment
 - ii. Pharmacotherapy
 - iii. Safety-sensitive positions
 - iv. Determining impairment
 - v. Stigma related to substance use and/or pharmacotherapy
 - vi. Human rights concerns related to urine drug testing
- 6. Developing educational resources for employers in rural and remote communities to support employees to access substance use treatment, including considerations for:
 - i. Mitigating inequitable impacts of workplace substance use policies and return-to-work programs on Indigenous communities and people who live in rural and remote contexts

Further Research

Research in the following areas should be pursued and supported:

- 7. The evaluation of functional and neurocognitive outcomes (such as working memory, reaction time) that have been measured in research settings, and whether they apply in real-world workplace settings
- 8. The assessment of impairment while performing construction-specific tasks and functions, particularly those that are deemed safety-sensitive
- 9. The development and validation of tools to assess impairment and fitness for work
- 10. Pharmacotherapy-specific research that assesses the impact of real-world use of OUD and/or AUD medications on impairment, including initiation, dose increases, and stable (or maintenance) doses, as well as the impact of return to substance use on workplace impairment
- 11. Context-specific program evaluation that studies the effectiveness of current and novel workplace substance use policies and programs in specific populations, including construction workers and other safety-sensitive occupations. Outcomes requiring further evaluation include the effectiveness of programs at returning workers to their previous positions and patient-reported outcomes such as improvements in abilities related to work
- 12. The influence of the social context of the workplace on the effectiveness of workplace substance use policies and return-to-work programs. Concepts requiring further exploration and understanding include shame, stigma, equity-oriented factors such as socio-economic status, geography, ethnicity, and gender.

Table of contents

June 2026 Update	4
Executive Summary	5
1.0 Background	10
1.1 Drug Toxicity and Death in the Construction Industry	11
1.2 Substance Use in the Construction Industry	12
1.3 Current Approaches to Return to Work in the Construction Industry	13
1.4 Need for New Approaches	14
2.0 Scope and Methodology	16
2.1 Scope and Objectives	16
2.2 Methodology	16
3.0 Results	23
3.1 Search Results	23
3.2 Inclusion of Sources of Evidence	26
3.3 Review Findings	26
4.0 Discussion	50
4.1 Safety-Sensitive	50
4.2 Impairment	52
4.3 Fitness for Duty or Work	53
4.4 Individualized Assessment and Treatment Plans	54
4.5 Return to Work	55
4.6 Patient-reported Outcomes	55
4.7 Indigenous Peoples and Rural or Remote Communities	56
4.8 Policy or Regulatory	57
4.9 Guidance	57
4.10 Limitations	58
5.0 Conclusion and Future Directions	59
Appendix 1: Expert Advisory Panel Recommendations	60
Appendix 2: Academic Search Strategy	62
Appendix 3: Grey Literature Search Strategy	72
Appendix 4: Sources Excluded Following Full-Text Review	77
References	81

1.0 Background

In 2016, BC declared a public health emergency due to the rising number of drug toxicity deaths.²³ At the time of this document's publication (March 2022), 9,316^e people have died in BC from unregulated drug poisoning.³ At the population level, BC's life expectancy at birth, which had increased by almost 3 years from 2000 to 2013 (80.27 to 83.02 years of age), declined by 0.38 years from 2014 to 2016 as a direct consequence of the drug poisoning crisis.²⁴ The average age of death due to drug toxicity is 42.²⁵ While drug poisoning deaths are occurring across all demographics, men aged 30–59²⁶ and Indigenous Peoples²⁷ are disproportionately affected. The emergence and proliferation of fentanyl and fentanyl analogues in the toxic street drug supply is a significant driver of drug poisoning deaths, with fentanyl or its analogues detected in 85% of unregulated drug toxicity deaths in 2021.²⁸ The modes of consumption associated with unregulated drug toxicity deaths have also changed. Injection as the primary mode of consumption involved in unregulated drug toxicity deaths has declined from 39% in 2016 to 19% in 2020^f, while involvement of inhalation has increased from 31% to 56% during the same time period.²⁹ This is particularly relevant as most supervised consumption sites are not equipped to support inhalation, although the accessibility of sterile inhalation supplies is increasing in BC communities and some overdose prevention sites are able to support inhalation.

Additionally, individuals may be using other substances alongside opioids, either intentionally or unintentionally. According to BC Coroners Service's rapid toxicology results for 2021, 74% of the samples submitted from suspected unregulated drug toxicity deaths contained at least one stimulant, and 44% were positive at least one benzodiazepine.³⁰ The detection rate of benzodiazepines has been increasing rapidly in recent years. BC drug checking data suggests that the overall percentage of opioid samples testing positive for benzodiazepines rose from 20% to 36%^g between January 2021 and March of 2022.³¹ The growing presence of benzodiazepines in unregulated opioids is a significant concern, as the concurrent use of benzodiazepines and opioids significantly increases the risk of respiratory depression and can lead to drug poisoning events that are particularly challenging to reverse.^{32–35}

The alarming rise in drug poisoning deaths has been accompanied by a host of other drug-related harms affecting communities across the province, including brain injuries from non-fatal drug poisoning events, which have contributed to morbidity and mortality, as well as significant costs to the health care system.³⁶ Despite significant investment by various levels of government, interagency collaborations, and the hard work of health authorities and other key stakeholders to pilot and expand a variety of programs and services aimed at reducing the number of drug poisoning events and related deaths, unregulated drug toxicity deaths in BC remain high.³

In addition to opioid toxicity, alcohol use is associated with significant harms to individuals and significant health care costs. It is estimated that 19.5% of Canadians aged 12 or older are

^e Since the original publication date of this document, the provincial drug poisoning death toll has increased significantly: in the period between April 2016 and January 2025, more than 16,280 people have died from drug poisoning.

^f Update: Smoking remains the most common mode of consumption observed among unregulated drug poisoning deaths, with 66% of deaths attributed to use of drugs through smoking in December 2024 according to [Coroners Report](#).

^g Update: The upward trend in benzodiazepine detection in unregulated opioids has continued into 2025, with benzodiazepines detected in nearly 53% of BC [Drug Checking](#) samples in February 2025.

engaged in high-risk^h drinking,⁷ while up to 18% of all Canadians aged 15 or older have met the clinical criteria for an AUD during their lifetime.³⁷ In BC, consumption rates of alcohol increased from 8.25L per capita in 2002 to 9.39L per capita in 2017, and hospitalization ratesⁱ for alcohol-related conditions have similarly increased from 383 per 100,000 individuals in 2002 to 557 per 100,000 individuals in 2017.⁸ In addition to hospitalizations that are directly related to alcohol, alcohol use is associated with an increased risk of various cancers, cardiovascular diseases, liver and pancreatic diseases, and all-cause mortality.^{38,39} Alcohol use is also associated with interpersonal conflict, financial problems, traffic accidents, and workplace accidents⁹—the latter of which is particularly relevant to the construction industry. Despite the high prevalence of high-risk drinking and alcohol use disorder in Canada, there has historically been low awareness and uptake of treatment interventions for alcohol use disorder.¹⁰

1.1 Drug Toxicity and Death in the Construction Industry

Construction, which includes residential and non-residential building, engineering, and maintenance of public infrastructure, is a major contributor to Canada's gross domestic product (GDP). Nearly 1.4 million Canadians worked in the construction industry in 2019, representing approximately 7.5% of the national workforce.⁴⁰ These workers are predominantly male, employed full-time, and middle-aged.^{41,42} While construction workers contribute significantly to Canada's economy, it is important to remember that each of these individuals also contribute to their families, social circles, and communities. Families, friends, and communities experience a significant loss when a loved one dies as a result of the toxic drug supply.

Unregulated drug toxicity is of particular concern in the construction industry. An analysis of data from the BC Coroner's Service found that 55% of individuals who were employed at the time of unregulated drug toxicity death worked in the trades or transport industry.⁶ Data from Statistics Canada showed that 20% of drug toxicity deaths in BC between 2011–2016 occurred in individuals who worked in the construction industry at the time of death.⁵ Medical examiner data from Alberta corroborates the high prevalence of unregulated drug toxicity deaths among construction workers, demonstrating that 53% of individuals who died due to opioid toxicity were reported to work as tradespeople or as transport and equipment operators by their family.⁴³ The high prevalence of fatalities due to opioid poisoning in the construction industry has been noted in the US as well—an analysis by the US Centers for Disease Control and Prevention found that construction workers experienced the highest proportional mortality rate (PMR) due to drug poisoning (1.25) compared to other occupational groups^j during 2007–2012.⁴⁴ A sub-analysis within the construction worker group found that the PMR was elevated for heroin-related

^h This is based on data collected in 2012 in reference to the Canadian Low Risk Alcohol Drinking Guidelines, which defined high-risk drinking as "drinking five or more drinks on the same occasion on 5 or more days in the past 30 days". **Since the initial publication of this document, the Canadian guidance, and the corresponding statistics, have been updated.** Published in 2023 by the Canadian Centre on Substance Use and Addiction, [Canada's Guidance on Alcohol and Health](#) presents an evidence-based continuum of risk associated with weekly alcohol use, whereby 2 or less standard drinks per week are considered low-risk, 3–6 drinks are defined as moderate-risk, and 7 standard drinks or more are associated with high risk of harm. According to [2023 national survey data](#) collected by statistics Canada, at least 30% of Canadian adults drink in excess of the updated low-risk threshold.

ⁱ Update: In the 2023-2024 fiscal year, the Canadian rate of hospitalization entirely attributed to alcohol was 258 per 100,000 people aged 10 and older, exceeding the rate of hospitalizations due to heart attacks (241 per 100,000 people aged 10 and older). Source: Canadian Institute for Health Information. [Health indicators interactive tool: Hospitalizations entirely caused by alcohol](#).

^j Other occupations in this analysis that had elevated PMRs due to drug poisoning death were: health care support (1.18), health care practitioners and technical roles (1.16), extraction (1.16), food preparation and serving (1.11), and personal care and service (1.10) let me kn.⁴⁴

poisoning deaths (1.46) and methadone-related poisoning deaths (1.39).⁴⁴ Additionally, a 2018 report by the Midwest Economic Policy Institute estimated that the fatal opioid poisoning rate was 83.5 per 100,000 construction workers in 2015, compared to 11.5 per 100,000 individuals in the general population.⁴⁵

1.2 Substance Use in the Construction Industry

The construction industry has a higher prevalence of substance use compared to other industries. A 2015 analysis of US national data by the Substance Abuse and Mental Health Services Administration (SAMHSA)—part of the US Department of Health and Human Services—showed that 16.5% of construction workers drank heavily^k in the past month, which is almost double the national average for all workers.⁴ Additionally, 14.3% of construction workers had an alcohol or other substance use disorder,^l compared to 9.5% of all workers.⁴ Although there is a lack of comparable data in Canada, similarities between the working populations suggest that substance use is similarly prevalent among Canadian workers. As indicated above, coroner's data⁶ from BC indicates that individuals in the construction industry are disproportionately represented in unregulated drug toxicity deaths.

There are a number of reasons why construction industry workers may be more likely to engage in substance use than the general population. Working in the construction industry—particularly in labourer positions—is physically demanding, which is reflected in high workplace injury rates. In 2018, construction workers in BC had an injury rate of 0.8 per 100 workers, compared to the provincial average injury rate of 0.3 per 100 workers.⁴⁷ Despite evidence showing limited benefit and increased potential harm from opioid therapy for chronic non-cancer pain,⁴⁸ and guidelines recommending the preferential use of non-opioid analgesia,⁴⁹ construction workers are more likely than workers in other industries to be prescribed opioids for pain. In the United States, an estimated 20% of prescriptions written to construction workers were for opioids, compared to 10–15% in other industries, based on health insurance claim data.⁵⁰ In one study of previously opioid-naïve workers, 4% developed long-term opioid use after being prescribed opioids for acute pain due to a workplace injury.⁵¹ The high risk of injury among construction workers, and subsequent treatment with opioids, is thought to contribute to the high prevalence of substance use seen in the industry. Additionally, precarious employment (e.g., temporary employment, job changes, unemployment) has been identified as a risk factor for increased substance use. Construction workers who are unemployed or have multiple employers, which suggests dismissal from their job, or seasonal, part-time, and/or temporary work, report higher rates of substance use compared to construction workers who have stable employment.⁵²

The social context of the construction industry may contribute to high rates of substance use among construction workers. In some cases, such as worksites in remote locations, workers may be expected to work long hours and extended workdays, which can result in feelings of social isolation from friends and family. Importantly, social isolation has been associated with an increased risk of mood, anxiety, and substance use disorders.⁵³ In addition, with a workforce that is largely male, workers may experience expectations based on gendered stereotypes, such as the expectation that men should work through pain and ignore injuries.⁵⁴ These social pressures may result in a work environment that is both mentally and physically challenging, which may contribute to higher rates of substance use.

^k In the context of this study, heavy alcohol use was defined as “drinking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on 5 or more days in the past 30 days”.^{4, 46}

^l Note: “Other substance use disorder” was not defined in this report.

1.3 Current Approaches to Return to Work in the Construction Industry

Historically, treatment for individuals with substance use disorders working in safety-sensitive positions has focused on abstinence-based care. Evidence-based pharmacotherapies for the treatment of SUDs have had limited uptake and accessibility. Although some individuals prefer and do well with abstinence-based care, many individuals would benefit from evidence-based pharmacotherapy. For example, opioid agonist treatment for opioid use disorder is associated with reduced mortality,⁵⁵ improved retention in treatment,⁵⁶ and reduced risk of hepatitis C and HIV among injection substance users.⁵⁷ As such, pharmacotherapy is a vital component of continuing care^m for many individuals with substance use disorders.⁵⁸ For example, the provincial [*Guideline for the Clinical Management of Opioid Use Disorder*](#) (2023)ⁿ recommends opioid agonist treatment (with buprenorphine/naloxone, methadone, or slow-release oral morphine) as the standard of care for individuals with opioid use disorder.⁵⁸ The provincial [*Guideline for the Clinical Management of High-Risk Drinking and Alcohol Use Disorder*](#) recommends naltrexone and acamprosate as first-line continuing care treatment for individuals with alcohol use disorder.⁵⁹ However, there is a lack of guidance on how to support individuals who have been prescribed evidence-based pharmacotherapy to return to work, as well as a lack of guidance on how to include pharmacotherapy. Although limited best practice guides and toolkits relating to substance use in the workplace^o exist, they seldom include pharmacotherapy as part of an employee's return-to-work plan. Consistent, evidence-based policies that support access to treatment are vitally needed in order to stem the harms related to substance use in the construction industry. However, current approaches are inconsistent and often not evidence based.⁶¹

A 2018 report on workplace substance use policies in Canada published by the Canadian Centre for Substance Use and Addiction (CCSA) found that many workplaces do not have substance use policies in place.⁶¹ Where they do exist, they often focus on identifying substance use that will impede the worker's performance, and rarely address prevention, treatment, or recovery.⁶¹ Despite the existence of relevant policies, some workers may feel pressured to not pursue treatment through their employer. In qualitative interviews with construction workers performed by Fraser Health Authority, workers reported experiencing shame and stigma during and after participating in return-to-work programs for substance use.¹¹ In particular, workers reported feeling isolated and experiencing discrimination from their peers upon returning to work after treatment.¹¹

Outside of impacting performance, substance use is often considered a private matter to be addressed outside of work time.⁶¹ In order to maintain their privacy regarding substance use treatment, workers may seek treatment outside of work without notifying their employer or wait to pursue treatment during slow seasons.¹¹ Anticipated stigma and potential discrimination may also impact a worker's decision of whether to report their substance use treatment. During qualitative interviews, workers often reported fearing repercussions from their employer if they reported substance use.¹¹ Fear of repercussions upon disclosure may lead to workers choosing

^m Continuing care refers to treatment that helps support a patient in maintaining their reduced use of substances. This may include pharmacotherapy, psychosocial interventions and supports, and community-based services such as recovery-focused inpatient care. Although the importance of psychosocial treatment and supports, including recovery-oriented care, is recognized, the scope of this report was limited to the use of evidence-based pharmacotherapies for opioid use disorder and alcohol use disorder.

ⁿ Updated to reflect the current provincial guideline (2023).

^o For example, a report by the Canadian Human Rights Commission on accommodating substance dependence in the workplace.⁶⁰

to conceal their treatment or choosing to leave a job site to avoid negative consequences.

Employers are required by law to accommodate individuals who are returning to work with a disability, including any disability due to substance use.⁶² Accommodation may come in the form of re-assignment to appropriate duties, modification of duties, or paid leave. The 2018 CCSA report on policies in Canada found that many workplaces provide only a temporary accommodation while the worker is participating in a substance use treatment program, and that individuals may face punitive actions if they return to substance use during treatment, such as suspension, termination, or other sanctions⁶¹

1.4 Need for New Approaches

The high prevalence of drug poisoning events, fatalities, and other substance use harms among workers in the construction industry highlights the need for new approaches for supporting individuals with SUDs in the workplace. Current workplace substance use policies often do not reflect current evidence, and may utilize punitive and stigmatizing approaches to preventing, identifying, treating, and supporting recovery among workers. Without supportive and evidence-based workplace policies, workers may be unable to return to work if they are on pharmacotherapy for SUD. This may necessitate a choice between drug poisoning risk or ongoing substance-related harms, losing employment, or accessing limited treatment modalities offered through or permitted at their workplace.

Opioid agonist treatment (OAT) has been shown to improve health-related quality of life,⁶³ reduce unregulated use,⁶⁴ and reduce mortality.⁶⁵ There are significant harms associated with delaying this treatment, including an increased risk of drug poisoning and other drug-related harms (e.g., bloodborne illness, soft-tissue infection, cirrhosis, and cancer).⁶⁶⁻⁶⁸ In the case of alcohol use disorder, pharmacotherapy can play an important role in supporting an individual's treatment goals and lead to clinically meaningful improvements such as a reduction in high-risk drinking.^{59,69,70}

Returning to work after beginning pharmacotherapy for a substance use disorder is a challenge for many workers, as reported by construction workers who participated in qualitative interviews with Fraser Health Authority.¹¹ Although adjusted duties may be necessary or perceived as necessary for individuals on pharmacotherapy, workers were fearful of discrimination and stigma at work if they were seen performing altered duties by their peers.¹¹ In addition, individuals may find that their adjusted duties do not align with their professional goals or interests.

Return to substance use among individuals with a SUD is common and occurs at rates similar to relapse for other chronic conditions such as hypertension or asthma.⁷¹ Workers with SUD who are treated with pharmacotherapy and return to work may feel discouraged from reporting a return to substance use or seeking further treatment due to the potential impacts on their job and income.¹¹ Individuals who are actively using substances may in turn feel pressured to conceal their substance use. Pressure to conceal substance use may lead to riskier, rushed use in isolation,⁷² and an increased risk of fatalities due to drug poisoning.⁷³

The impact of policies that limit access to evidence-based treatment options, potential stigma and discrimination, and changes to individuals' roles may act as a deterrent to seeking treatment and reporting substance use (or return to substance use) to individuals' employers. In addition to the harms related to untreated substance use faced by individuals in the construction industry, delayed treatment may result in workers who are impaired at work, putting themselves, their colleagues, and the public at risk.

There is a significant need for the development and implementation of consistent, evidence-based substance use policies that improve the health and well-being of construction workers, reduce the stigma of substance use in the construction industry, and promote harm reduction. Such policies would improve care for construction workers themselves and support the safety of the public and others affected by safety-sensitive positions. Supporting workers to return to work can help ensure individuals achieve their treatment goals and improve their overall health, while allowing them to maintain employment, a key determinant of health, to support themselves and their loved ones. Workplaces are both a convenient and necessary setting to reach construction workers through substance use interventions and supportive policies, as workplaces can hold considerable influence over their employees and the risks associated with impaired performance in construction settings are considerable. However, the current evidence base to support the development of these policies is sparse.

In order to support the development of evidence-based approaches to return-to-work in the construction industry, there is a need to map out the existing evidence and identify gaps in current knowledge. As such, this scoping review will examine the existing evidence on return to work for individuals receiving pharmacotherapy for opioid use disorder and alcohol use disorder.

2.0 Scope and Methodology

2.1 Scope and Objectives

Initial exploratory literature searches indicated a relative paucity of high-quality evidence that could inform the development of standardized, evidence-based return-to-work practices and policies for individuals in the construction industry with OUD and/or AUD, with a focus on the use of evidence-based pharmacotherapies. For this reason, a scoping review was chosen in order to map and summarize the existing evidence. Scoping reviews can be used to determine the scope and nature of literature on a given topic, to identify the characteristics or factors related to a particular concept, and to identify and analyze gaps present in a given knowledge base.⁷⁴ Given the lack of evidence pertaining specifically to individuals in the construction industry, a broader population was chosen—individuals in safety-sensitive positions^p—in order to identify evidence relevant to industries in which impairment could impact the health or safety of employees, the public, property, or the environment.

To this end, two closely-related domains were selected for investigation in this report:

1. Safety-sensitive positions and pharmacotherapy for OUD and AUD; and
2. Return to work for individuals receiving pharmacotherapy for OUD and/or AUD.

The scoping review has been guided by the following objectives:

- To identify the state of evidence and current practices pertaining to return to work for workers on evidence-based pharmacotherapies in safety-sensitive positions;
- To identify barriers and facilitators for returning to and staying at work for workers on evidence-based pharmacotherapies for opioid and/or alcohol use disorder(s); and
- To identify challenges and opportunities in workplace practice in order to support policy changes that can improve worker outcomes upon return to work and stay at work.

2.2 Methodology

The Joanna Briggs Institute (JBI) Manual for Evidence Synthesis¹² was used to guide the development of this scoping review. The JBI Manual requires the development of an *a priori* scoping review protocol that defines the objectives, methods, and reporting of the review prior to the project initiation, which increases the transparency of the process and allows for any reporting bias to be identified and minimized. This protocol detailed the research questions, inclusion and exclusion criteria, and process for data extraction. The JBI approach is congruent with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Scoping Review Checklist¹³ and, as such, the PRISMA checklist was used to ensure that the protocol developed for this review met the required reporting standards.

An information specialist was contracted to support the development of the search strategy and run the database searches. The information specialist and a BCCSU staff member, with the support of the manager of the medical writing team, performed duplicate title/abstract screen, full-text review, and thematic grouping for included studies. The manager of the medical writing team served as a 'tie-breaker' when there was a lack of consensus on inclusion or exclusion of a given article.

^p Safety-sensitive jobs can be understood as those where impaired performance could result in a significant incident affecting the health or safety of employees, the public, property, or the environment.⁷⁵

2.2.i Research Questions

Primary research question: What are the current return-to-work (RTW) policies and regulations for construction-industry workers who are on opioid agonist treatment (buprenorphine or buprenorphine/naloxone, methadone, slow-release oral morphine, injectable hydromorphone, injectable diacetylmorphine), opioid antagonist treatment (oral naltrexone and extended-release naltrexone), and/or first-line pharmacotherapy for alcohol use disorder (oral or extended-release naltrexone and acamprosate)?^q

The primary research question has been divided into the following sub-questions:

1. How and in what safety-sensitive work settings and contexts have the pharmacotherapy options included in the primary review question been used?
2. What benefits and harms are associated with the current approach in regards to return-to-work strategies for construction workers on pharmacotherapy for OUD and/or AUD?
3. What strategies are currently used to mitigate impairment-related harms where public safety is concerned (e.g., driving with health conditions, safety-sensitive positions with non-substance use disorder health conditions)?
4. What strategies are currently in place to define the type and scope of work for a safety-sensitive worker on pharmacotherapy based on the type of substance use disorder(s), dosage of maintenance therapy, and level of impairment?

2.2.ii Population, Concept, Context Criteria

The population, concept, and context analysis (PCC criteria) for this literature search are defined below in Table 1.

Table 1. Population, Concept, Context Analysis

Population	Workers in safety-sensitive positions
Concept	Return to work while receiving pharmacotherapy for OUD and/or AUD
Context	Safety-sensitive positions
Types of evidence sources	Primary literature, reviews, mixed methods, and guideline recommendations

2.2.iii Inclusion/Exclusion Criteria

Two separate search strategies were developed. The first searched for peer-reviewed publications that assess or provide guidance on return to work for individuals on evidence-based pharmacotherapy for OUD and/or AUD. The second searched for guidelines, regulations, and policy (that is, grey literature) detailing current practices regarding return-to-work for individuals with OUD and/or AUD.

1. Academic Literature Search

Include:

^q Naltrexone and acamprosate are recommended as first-line medications for alcohol use disorder in the BCCSU, Ministry of Health, and Ministry of Mental Health and Addictions provincial [Guideline for the Clinical Management of High-risk Drinking and Alcohol Use Disorder](#).

Population: Safety-sensitive workers with alcohol and/or opioid use disorders, including co-occurring disorders of all levels of severity

Study design: Peer-reviewed journal publications (primary studies and reviews) and clinical guidelines

Context: Safety-sensitive positions where public safety is a concern (e.g., construction workers)

Concept: Interventions addressing one or more of the following objectives:

1. Assessing functional outcomes of individuals on pharmacotherapies for OUD and/or AUD
2. Identifying pharmacotherapeutic strategies that facilitate the process of return-to-work and stay-at-work
3. Providing recommendations and guidance for employees and employers in terms of return to work for individuals receiving evidence-based pharmacotherapy for OUD and/or AUD.

Language: English

Time: January 1, 2005 to August 31, 2020 (search date)

Exclude:

Population: Studies on mental health with no substance use component; patients on opioid analgesia; substance use disorders other than OUD and/or AUD

Study type: Exclusively quantitative studies

Context: Workers in industries that are not safety sensitive

2. Grey Literature Search

Include:

Population: Safety-sensitive workers with alcohol and/or opioid use disorders, including co-occurring disorders of all levels of severity

Context: Safety-sensitive positions where public safety is a concern (e.g., construction workers)

Concept: Guidelines, policies, and regulations addressing one or more of the following outcomes:

1. Facilitated work re-integration and supportive strategies for workers with OUD and/or AUD in safety-sensitive positions
2. Return to work as defined by resumption of part-time, full-time, or temporary work
3. Retention of work for a specified amount of time
4. Integrated pharmacotherapeutic treatment in the workplace

Themes: Return-to-work strategies including any of the following:

1. Current return-to-work policies and procedures for safety-sensitive workers on pharmacotherapy for OUD and/or AUD
2. Individualized approaches for return to work
3. Scope and type of work following return to work

Language: English

Time: January 1, 2010 to September 17, 2020 (search date)

Exclude:

Population: Mental health with no substance use component; patients on opioid analgesia; substance use disorders other than OUD and/or AUD

Concept: Older versions of the same guideline

Context: Workers in positions that are not safety sensitive

2.2.iv Search Strategy

A structured literature search was conducted to identify published studies in English from 2005–2020 addressing pharmacotherapy for safety-sensitive position workers with OUD and/or AUD and return-to-work strategies. Separate searches were conducted for two overarching questions: pharmacotherapy for AUD and/or OUD and 1) safety-sensitive positions and 2) return-to-work strategies.

Peer-reviewed articles and papers were identified by searching health-related databases with international coverage (Medline, Embase, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials via Ovid; CINAHL and PsycINFO via EbscoHost; Sociological Abstracts and PAIS via Proquest; and Web of Science—Social Science Citation Index via Clarivate). Where subjects are well indexed, subject headings were used to increase relevance and precision of search results and to ensure a manageable number of items retrieved; where subjects were less well indexed, or had not yet been assigned subject headings, key words were added to increase recall. Subject headings used were database dependent, but analogous to the Medical Subject Headings (MeSH) used in Medline.

Search parameters were developed collaboratively by a BCCSU staff member, the manager of the medical writing team, and a contracted information specialist, with consultation from the Expert Advisory Panel.

Grey literature between 2010 and 2020 was identified using targeted key word internet searches (Google), searches of publications by relevant standard-setting and policy organizations, and a search of cited references in academic articles included in the review.

The detailed search strategies used in this scoping review can be found in [Appendix 2](#) and [Appendix 3](#).

2.2.v Screening and Selection

The academic literature search yielded a total of 459 records. Of the total records identified, 237 duplicates were removed, leaving 222 items to be screened for relevance based on the inclusion/exclusion criteria.

A two-step screening process was used to screen the records retrieved from the database search. Two reviewers independently screened the titles and abstracts of the selected 222 academic records. This process was performed independently and was followed by a final comparison of results for concordance between the reviewers. A total of 45 studies from the academic literature were selected for full-text review. Throughout the reviewing and selection process, disagreements were discussed by the reviewers until a consensus was reached. If consensus was not reached, assistance was sought from the manager of the medical writing team. Overall, 22 studies were excluded with the following reasons: wrong interventions (N=12); outcomes not relevant to research question (N=8); wrong patient population (N=1); wrong setting (N=1). In

addition to the academic literature, a search was performed to identify relevant grey literature records. This search yielded 84 documents, which were all screened for relevancy per the PCC criteria, objectives, and the research questions. A total of 31 grey literature records were selected for full-text screening, with 28 selected for inclusion.

Following the full-text review, 23 academic and 28 grey literature records were included in the final qualitative analysis.

2.2.vi Data Extraction

Data were charted based on six domains:

1. Publication characteristics
2. Population and sample size
3. Concept: intervention type, comparator
4. Context: safety-sensitive positions (brief overview of position and work setting/duties)
5. Outcomes
6. Key findings relating to the scoping review questions posed in the studies.

2.2.viii Population

Study populations included individuals on pharmacotherapy for OUD and/or AUD, workers with OUD and/or AUD who were returning to work, and populations of workers in safety-sensitive positions (e.g., physicians, nurses, pharmacists, or anesthesiologists). The pharmacotherapies for OUD included buprenorphine, methadone, slow-release oral morphine, and naltrexone.[†] The pharmacotherapies for AUD included naltrexone and acamprosate.

2.2.ix Summary of Findings

There were 23 articles from the academic literature search and 28 grey literature documents included in the final review, for a total of 51 articles. These covered a range of topics relating to the research question. While some articles provided information on a single topic, many of them discussed more than one topic that was relevant for the analysis. The topics identified in the identified articles included:

- Articles and documents discussing safety-sensitive workers in the context of pharmacotherapy, functional outcomes, and return-to-work policies (N=27);
- Articles on fitness for duty or work (N=13);
- Policy and regulatory documents from various employers or industries relating to workplace substance use policies or industry regulations (N=11);
- Articles on impairment (N=9);
- Articles discussing individualized assessment and treatment plans (N=9);
- Articles reporting return-to-work outcomes for individuals who had taken part in pharmacotherapy treatment programs for OUD and/or AUD (N=9);
- Documents that provide guidance pertaining to the management of OUD and/or AUD s in the workplace (N=9);

[†] Although other pharmacotherapies for OUD were included in the search strategy (namely, injectable hydromorphone and injectable diacetylmorphine), no articles discussing these medications were found in the literature included in this review.

- Documents that gave recommendations for return-to-work programs for workers with OUD and/or AUD (N=5);
- Documents that included toolkits for assisting employers to develop return-to-work policies and programs for workers with OUD and/or AUD (N=4);
- Articles reporting patient-reported outcomes related to employment (N=3);
- Documents relating to Indigenous communities and rural and remote communities (N=1).

2.2.xi Development of Recommendations

Based on the literature review, thematic analysis, and key findings, recommendations were developed iteratively by the Expert Advisory Panel until consensus was reached.

2.2.xii Committee

This scoping review has been guided by both an internal steering committee and the Expert Advisory Panel, both of which have provided feedback on the direction and methodology throughout the project development. The two groups have membership representing expertise in research, academia, frontline clinical work, occupational health, and medical writing and methodology.

Internal Steering Committee

The Internal Steering Committee is made up of representatives from the BCCSU who are involved in the supervision and direction of the project, including the executive director, the director of education and clinical activities, the clinical and internal engagement lead, a senior policy advisor, and the manager of the medical writing team. The Internal Steering Committee provided guidance and oversight on the scoping review development— including methodology, review and revision of the report, and drafting the recommendations—and provided regular project updates to the BC Ministry of Mental Health and Addictions (MMHA) and the Overdose Emergency Response Centre (OERC).

Expert Advisory Panel

The Expert Advisory Panel is comprised of individuals with expertise in occupational health, frontline clinical work, substance use disorders, and/or scoping review methodology assembled to support the development of the scoping review. The Expert Advisory Panel provided clinical and scientific expertise to develop and review this scoping review. This included:

- Reviewing the inclusion/exclusion criteria and ensuring alignment with the review objectives and questions
- Reviewing the planned approach to evidence screening, data extraction, and evidence analysis
- Reviewing and providing feedback on evidence synthesis and recommendations
- Ensuring project alignment with companion work being conducted by partner organizations

Management of Potential Conflicts

Each member of the Expert Advisory Panel submitted a conflict of interest declaration. Competing interests were assessed using the Guidelines International Network's [*Principles for Disclosure of Interests and Management of Conflicts in Guidelines*](#). No current or ongoing direct competing interests were disclosed by the 13 members of the Expert Advisory Panel. One individual reported funding from a pharmaceutical company which ceased in 2017; however, the purpose for this funding was not relevant to the aim and purpose of this scoping review. No individual reported a history of employment (either self or family member); consulting or advising; honoraria or fees for training, speaking, or panel discussions; investment interests; grants-in-aid for research, non-monetary research or program support (e.g., equipment, travel, staff salary, facilities); or intellectual property holdings with industry or any commercial entity that could potentially benefit from the scoping review results and recommendations.

In terms of indirect sources of potential interest or bias, 5 individuals disclosed special interests in relation to the scoping review objectives and scope including return to work, safety-sensitive positions, and pharmacotherapies for opioid and/or alcohol use disorder(s). The special interests pertained to specific expertise and/or clinical experience (e.g., addiction and occupational medicine clinician, academic expertise on substance use disorders, and research scientists in occupational health and return to work), involvement with provincial OAT or iOAT programs and committees, engagement with construction industry stakeholders in drug poisoning response, partnership with a construction industry rehabilitation plan, substance use disorder-focused return to work monitoring, or research interests and publications. No individual reported that their clinical revenue would be influenced by the scoping review or the accompanying recommendations. Upon review by the panel co-chairs, none of the potential direct or indirect conflicts of interest or bias disclosed by the panel members were deemed to be of sufficient relevance or weight to warrant the members' exclusion from the panel.

All 13 panel members participated in multiple rounds of review and revision of the draft and granted final approval of the scoping review report contents and recommendations.

Funding

Members of the Expert Advisory Panel who were not representing a health system partner organization were provided remuneration for the participation in the project. This included clinicians in private practice and other knowledge holders.

Funding for this project was provided by the BC Ministry of Mental Health and Addictions' Overdose Emergency Response Centre (OERC). No funding was provided from the pharmaceutical industry.

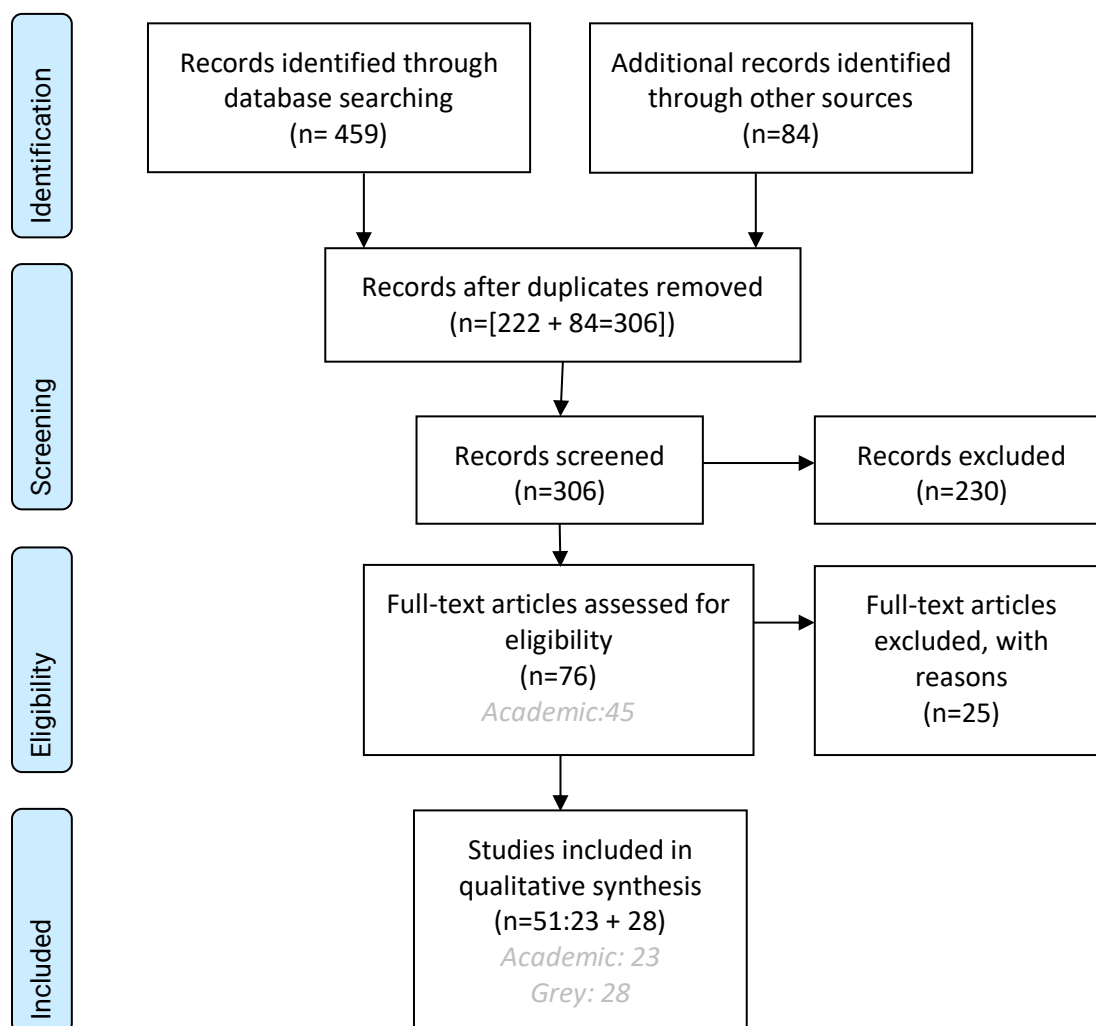
3.0 Results

The results of the academic and grey literature searches are presented in this section.

3.1 Search Results

In total, 543 articles were identified through the academic and grey literature search strategies outlined in the previous section. After duplicate title/abstract screen, 51 articles were included for final review. Any discrepancies among the included articles were settled by discussion, or brought to a third team member to serve as a 'tie-breaker'. Out of these, 23 articles were from the academic literature and 28 were from the grey literature. Figure 1 (below) outlines the identification and selection process used to arrive at the final set of included articles.

Figure 1: PRISMA diagram showing the identification and inclusion of articles



3.1.i Academic Literature

The academic literature search aimed to identify peer-reviewed articles that:

1. Assessed impairment-related outcomes relating to medication-assisted treatment for OUD and/or AUD,
2. Discussed pharmacotherapy for OUD and/or AUD for workers returning to work, and
3. Provided recommendations for OUD and/or AUD pharmacotherapy in the workplace.

There were 23 academic articles identified that addressed these subject areas.

Methodology

The included articles included a range of methodologies. Among the 23 academic articles, this included systematic reviews (N=2; including 1 meta-analysis), a randomized controlled trial (N=1), observational studies (N=15; cohort: N=10; case-control: N=2; cross-sectional: N=3), narrative literature reviews (N=4), and a commentary (N=1).

Population and Setting

The scoping review aimed to identify and map information on workers with OUD and/or AUD in safety-sensitive positions as well as return to work for any workers with OUD and/or AUD. The included academic articles focused on individuals with SUDs (19 OUD; 1 AUD; 3 non-specified SUD). Safety-sensitive occupational groups were represented in 7 articles (2 anesthesiologists; 5 health care professionals) and 2 articles focused on employment in general. None of the identified articles focused on construction workers. The remaining articles (N=10) focused on SUDs in non-occupational contexts.

Key Findings

The academic articles comprised 3 main groups based on the outcomes being studied or discussed:

1. Recommendations for return to work
2. Employment in a psychosocial context
3. Measures of neurocognitive ability.

Three articles made recommendations for return to work for employees with substance use disorders. Improved working abilities and rates of return to work among participants were discussed in 13 articles. While these articles may not specify return-to-work policies or practices, they can provide insight on treatment strategies that may facilitate return to work and retention in work. Finally, 7 articles assessed neurocognitive-related measures of working ability (e.g., working memory, cognitive function) in the context of long-term substance use or substance use treatment. Although these articles do not discuss employment specifically, a key aspect of return-to-work policies involves preventing impaired work in safety-sensitive positions. Thus, mapping the evidence regarding impairment for evidence-based OUD and/or AUD treatment may help inform the development of recommendations for standardized, evidence-based return-to-work strategies.

Gaps in the Research

The presence of only 1 randomized controlled trial and 2 systematic reviews in the included articles reflects the paucity of high-quality evidence relating to return-to-work policies for individuals with OUD and/or AUD. Additionally, while 7 studies included individuals in safety-sensitive occupations (e.g., nurses, physicians), the dearth of studies focused on construction workers is a significant gap; it is unclear to what extent literature on other safety-sensitive positions is generalizable and applicable to the construction industry. Finally, the number of studies focused on OUD far outweighed studies specific to AUD, for which there was only one study.

3.1.ii Grey Literature

The grey literature search aimed to identify documents that included:

1. Guidelines, policies, and regulations relating to return to work and retention in work after treatment for OUD and/or AUD
2. Supportive strategies for workers with OUD and/or AUD in safety-sensitive positions
3. Integrated pharmacotherapy programs for OUD and/or AUD in the workplace

There were 28 grey literature documents that met these criteria and were included in the final review.

Methodology

Of the 28 included grey literature documents, there were a range of methodological approaches. This included narrative literature reviews (N=2), structured literature review (N=1), environmental scan (N=1), key informant interviews (N=3), and a national survey of employers (N=2). The remaining articles (N=19) did not report their methodology.

Population and Setting

Of the selected grey literature documents, 7 articles focused on workers with OUD, 1 on workers with AUD, and 20 on workers with unspecified SUD. The grey literature documents discussed a wide spectrum of workplace settings, including construction (N=2), health care (N=3), aviation (N=1), enforcement (N=2), public sector (N=4), and nuclear energy (N=1). The remaining articles either discussed workplaces in general (N=12), safety-sensitive industries (N=1), or were focused on patient populations who were participating in treatment programs for OUD or AUD (N=2).

Key Findings

The guidelines, policies, and regulations discussed in the grey literature articles fell into 2 general categories:

1. Existing workplace substance use policy documents (N=10)
2. Guidelines, recommendations, and tools with information relevant to supporting the development of workplace substance use policies and programs (N=18).

Gaps in the Research

While there were 28 grey literature documents selected for inclusion, a relatively small number of these reported the methodology used in their development. Most identified articles focused on substance use in general, with 7 documents focused on OUD. While the search parameters did include slow-release oral morphine (SROM), this pharmacotherapy was only mentioned in one article; the lack of literature on SROM represents an additional knowledge gap. Only one document was specific to AUD, a further knowledge gap. While a relatively high number of documents discussed return to work (N=14), there was a lack of documents discussing workplace-based substance use policies to support workers with SUDs, including pharmacotherapy. This highlights a key gap in current guidance for workplace substance use policy.

3.2 Inclusion of Sources of Evidence

Following full-text review, data extraction was done in duplicate. Data extracted from each article included:

- Citation details—title, author(s), date, journal, volume, issue
- Country/jurisdiction
- Population
- Methods
- Concept
- Context
- Outcomes
- Key findings relating to the research questions

A summary table of the included articles and data extraction is provided in Appendix 2.

3.3 Review Findings

The findings of the scoping review are presented in the following section. This includes key findings and a thematic analysis of the included articles from the academic and grey literature searches

3.3.i Key Findings

Following screening, full-text review, and data extraction, the included articles were assessed to identify the key findings of each study and their relevance to the research questions.

The following tables provide an overview of the key findings for the included articles from the academic literature search (Table 2) and the grey literature search (Table 3).

Table 2: Key findings from academic literature search

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Bach et al., 2019 ¹⁴ (Germany)	Impaired Working Memory Performance in Opioid-dependent Patients is Related to Reduced Insula Gray Matter Volume: A Voxel-based Morphometric Study	n=26; 11 individuals with opioid dependence (11 received methadone, 6 received buprenorphine), 25 healthy controls; recruited from an outpatient clinic	OUD; buprenorphine and methadone	Experimental study; patients completed spatial memory tasks while in an MRI scanner	Working memory performance	Participants who were taking buprenorphine or methadone had poorer working memory performance and less grey matter volume compared to healthy controls. Current use of buprenorphine, methadone, or concurrent use of illegal substances during treatment were not significantly associated with reduced grey matter volume. Longer duration of heroin use prior to beginning opioid maintenance therapy was associated with less grey matter volume, which plays a role in cognitive performance.
Bach et al., 2012 ⁷⁶ (Germany)	Diminished Brain Functional Magnetic Resonance Image Activation in Patients on Opiate Maintenance Despite Normal Spatial Working Memory Task Performance	n=26; 13 patients with opioid dependence, 13 controls; cases and controls recruited from an outpatient clinic	OUD; buprenorphine and methadone	Experimental study; patients completed spatial memory tasks while in an MRI scanner	Working memory performance	Current use of opioid agonist treatment was not associated with impaired working memory performance.
Bald et al., 2013 ⁷⁷ (Germany)	Heroin or Conventional Opioid Maintenance? The Patients' Perspective	n=986; patients receiving opioid maintenance treatment; recruited through hospitals and medical practices	OUD; conventional opioid maintenance therapy (methadone, levomethadone, and buprenorphine) compared to heroin-assisted treatment	Cross-sectional survey of patients receiving opioid maintenance treatment	Self-reported improvement in working ability following participation in a conventional opioid maintenance treatment program	Individuals who would prefer to switch to heroin maintenance therapy were less likely to have had success with conventional opioid maintenance treatment, and were more likely to report that they did not experience improved working ability due to conventional opioid maintenance treatment.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Bilban et al., 2008 ⁷⁸ (Slovenia)	Ability to Work and Employability of Patients in Opioid Substitution Treatment Programs in Slovenia	n=239; individuals enrolled in opioid substitution treatment programs n=66; representatives from companies selected from the Slovenian Labor Inspectorate	OUD; opioid substitution treatment	Cross-sectional surveys (one for individuals enrolled in opioid substitution programs, one for employers)	Survey for individuals in opioid agonist treatment programs: employment status and perceived working ability after taking part in the program Survey for employers: perspectives on unregulated drug use in their workplace, presence of workplace substance use policies, and perspectives on hiring individuals who had taken part in opioid agonist treatment programs	Participants in opioid agonist treatment programs experienced lower rates of unemployment and improved perception of their own working abilities after completion of the opioid substitution program compared to their responses at the beginning of the program. Most employers surveyed indicated that their workplace did not have workplace substance use policies in place. Most employers also stated they would be less likely to hire individuals currently in a drug treatment program.
Braquehais et al., 2015 ⁷⁹ (Spain)	Buprenorphine-naloxone Treatment in Physicians and Nurses with Opioid Dependence	n=9; 2 nurses and 7 physicians with opioid dependence	OUD; buprenorphine/naloxone	Retrospective cohort; analysis of clinical records of patients who had been admitted into the program for health care professionals with opioid dependence	Return to unregulated use (relapse) after treatment.	7 patients remained abstinent during the follow-up period (2 years after treatment); 6 patients were able to go back to work safely and 1 remained unemployed, whereas 2 returned to unregulated use not long after their discharge. The 6 patients who returned to work remained abstinent from heroin after treatment with buprenorphine for the 2-year follow-up. Their treatment had no effect on work performance.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Earley et al., 2017 ⁸⁰ (US)	Open-label Study of Injectable Extended-release Naltrexone (XR-NTX) in Healthcare Professional with Opioid Dependence	n=38; health care professionals in outpatient treatment for opioid dependence	OD; injectable extended-release naltrexone	Prospective cohort study; participants were assessed at regular intervals for up to 24 months while participating in the outpatient treatment program. Participants completed monthly questionnaires and urine drug tests for opioids. Participants also completed a trimonthly short form (36) Health Survey, an opioid craving questionnaire, and a Treatment Satisfaction Questionnaire for Medication.	The questionnaire included questions relating to employment, treatment effectiveness, and opioid craving. Urine samples were also tested for the presence of opioids.	45.5% of participants who were unemployed at the start of the study reported improved employment status by the study's end 12.5% of participants who were employed at the start of the study reported worse employment status by the study's end. For participants who completed the full 24-month follow-up (n=15), unemployment in a health care profession fell from 78.6% of participants at baseline to 13.3% at the end of the study. The average number of working hours for these participants increased from 9.8 to 28.9 hours per week by the end of the study.
Enos, 2020 ⁸¹ (US)	Doctors' Exemplary Treatment Success Occurs Absent High Use of Buprenorphine	Physicians with OD	OD; AUD mentioned	Narrative review providing a discussion of various issues specific to the use of pharmacotherapies for OD amongst medical professionals.	N/A	In general, physicians have a high degree of success with medication-assisted treatments for OD and AUD. Medication-assisted treatments for OD and AUD are an important component of physicians' return to practice. State medical boards have a role in preserving public safety, and may become involved if an individual returns to substance use during a treatment program.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Hamza et al., 2012 ⁸² (US)	Buprenorphine Maintenance Therapy in Opioid-Addicted Health Care Professionals Returning to Clinical Practice: A Hidden Controversy	Health care professionals with opioid dependence	OUD; buprenorphine	Literature review on the use of buprenorphine for the treatment of OUD.	N/A 51 professional health programs were asked to provide their organization's policies regarding healthcare professionals returning to work while on buprenorphine maintenance therapy.	There was a lack of consensus about the safety of health professionals returning to clinical work while using buprenorphine. It is also noted that the use of buprenorphine in medical settings may increase risks of diversion and impaired cognitive function. Due to these concerns, the paper recommends that abstinence-based treatment is more appropriate for safety-sensitive positions, rather than buprenorphine.
Lefebvre et al., 2016 ⁸³ (Canada)	The Identification and Management of Substance Use Disorders in Anesthesiologists	Anesthesiologists with SUDs	SUD; main focus on buprenorphine and methadone	Literature review of current evidence on the management of SUD in anesthesiologists and approaches for return to practice.	N/A	Treatment for anesthesiologists with SUDs should involve ongoing monitoring of SUDs in a chronic disease management paradigm. Anesthesiologists and physicians have greater rates of success from substance use treatment and monitoring programs compared to the general population.
Ling et al., 2018 ⁸⁴ (US)	Effects of Monthly Buprenorphine Extended-release Injection on Patient-centered Outcomes: A Long-term Study	n=669; patients with OUD	OUD; once-monthly depot buprenorphine	Prospective cohort study; patient receiving once-monthly depot buprenorphine were followed for 12 months; baseline and endpoint assessment included a questionnaire with questions relating to employment	Employment status at baseline and at 12 months	The proportion of participants who were employed increased from 44.2% at baseline to 51.2% at the end of the study.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
LoCastro et al., 2009 ⁸⁵ (US)	Alcohol Treatment Effects on Secondary Nondrinking Outcomes and Quality of Life: the COMBINE Study	n=1,226; individuals with alcohol dependence	AUD; naltrexone and acamprosate (combined with behavioural interventions)	Prospective cohort study; the study assessed the impact of a 16-week treatment program for AUD on quality-of-life outcomes, including employment, over a 1-year follow-up	Employment measured as the percentage of days paid for work	The percentage of days paid for work showed improvement at the end of the 16-week treatment period, but did not persist at the 52-week follow-up.
Maglione et al., 2018 ¹⁶ (North America and Europe)	Effects of Medication Assisted Treatment (MAT) for Opioid Use Disorder on Functional Outcomes: A Systematic Review	Individuals taking medication-assisted treatment for OUD	OUD; buprenorphine, buprenorphine/naloxone, methadone, naltrexone	Systematic review of the evidence relating to the effects of medication-assisted treatment for OUD on functional outcomes. Functional outcomes examined in the review included cognitive, physical, occupational, social/behavioural, and neurological effects.	N/A	The quality of evidence for most outcomes in the study were rated low or very low, highlighting the lack of evidence to draw from in making strong conclusions about the effects of medication-assisted treatment on functional outcomes.
Maremmanni et al., 2008 ⁸⁶ (Italy)	Improvement in the Quality of Life in Heroin Addicts: Differences Between Methadone and Buprenorphine Treatment	n=133; 50 patients in buprenorphine treatment and 83 patients in methadone treatment	OUD; methadone and buprenorphine	Prospective cohort study; participants were followed for 12 months and assessed using the Quality of Life Assessment Questionnaire.	Measured outcomes included improvement in job status, earning ability, and relationship with their work environment.	Both methadone and buprenorphine were associated with improved quality of life outcomes. Patients on buprenorphine showed a higher improvement in job status and earning ability than those on methadone.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Merlo et al., 2011 ⁸⁷ (US)	Mandatory Naltrexone Treatment Prevents Relapse Among Opiate-Dependent Anesthesiologists Returning to Practice	n=22; 11 anesthesiologists with opioid dependence (7 anesthesiologists and 4 anesthesiology residents) who were taking naltrexone for OUD were compared to 11 controls who had OUD but did not take naltrexone	OUD; naltrexone (oral or injectable)	Retrospective cohort; participants' medical charts were monitored as part of a treatment program follow-up for OUD. Charts for patients who had taken naltrexone as part of a mandatory naltrexone treatment program for individuals with OUD were compared to individuals with OUD who did not take naltrexone.	Charts were assessed for return to work and amount of time working successfully in anesthesiology before a return to opioid use.	This study followed the implementation of a mandatory naltrexone policy for anesthesiologists who had been diagnosed with OUD. Anesthesiologists who took naltrexone were less likely to return to opioid use and more likely to return to the practice of anesthesiology. The average period of opioid abstinence was significantly longer for those on naltrexone than those not on naltrexone.
Öhlin et al., 2015 ⁸⁸ (Sweden)	Buprenorphine Maintenance Program with Contracted Work/Education and Low Tolerance for Non-prescribed Drug Use: A Cohort Study of Outcome for Women and Men after Seven Years	n=170; patients with a history of heroin dependence; recruited from a buprenorphine treatment program	OUD; buprenorphine	Prospective cohort; participants were followed for 7 years after beginning the buprenorphine treatment program.	Measured outcomes included retainment in the program, employment and psychosocial conditions.	After 7 years, 64% of the patients were retained in the program. All individuals who were retained in the program were employed at the 7-year follow-up, while all individuals who did not complete the program (due to a return to drug use) were unemployed at the end of 7 years.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Polles et al., 2020 ⁸⁹ (US)	Neuropsychological Impairment Associated with Substance Use by Physicians	Physicians who use substances or who have substance use disorders	SUD, mainly focused on OUD; buprenorphine and naltrexone for the treatment of OUD are discussed	Literature review of neurocognitive deficits observed following use of substances including stimulants, benzodiazepines, cannabis, alcohol, and opioids. Neurocognitive impacts of pharmacological treatments for OUD are also discussed.	N/A	Alcohol and opioids are the most common substances used by healthcare professionals. Individualized plans for treatment and recovery from OUD are recommended, as there is a lack of evidence about the effects of medications for OUD on impairment Naltrexone has been shown to be effective for the treatment of OUD and is not known to negatively impact cognitive function, and may be particularly valuable for physicians or those in safety-sensitive positions. Buprenorphine for the treatment of OUD should be used in conjunction with neurocognitive testing to ensure that the dosages do not impair the physician's ability to practice safely.
Rapeli et al., 2012 ⁹⁰ (Finland)	Do Drug Treatment Variables Predict Cognitive Performance in Multidrug-treated Opioid-dependent Patients? A Regression Analysis Study	n=104; patients with opioid dependence patients; 52 treated with buprenorphine, 52 treated with methadone	OUD; buprenorphine, buprenorphine/naloxone, and methadone	Experimental study; participants completed cognitive tasks 3–6 hours after administration of the opioid agonist treatment drug.	Measured outcomes included reaction time, working memory performance, and attention performance.	Patients who had taken buprenorphine showed faster reaction times than those who had taken methadone. Patients who had been in an opioid substitution therapy program (for either buprenorphine or methadone) for over a year had better working memory performance scores. Patients who were taking more than one psychoactive drug in addition to their opioid substitution treatment had lower verbal memory scores.
Rass et al., 2015 ⁹¹ (US)	A Randomized Controlled Trial of the Effects of Working Memory Training in Methadone Maintenance Patients	n=56; individuals with OUD on methadone maintenance therapy	OUD; methadone	Randomized Controlled Trial; patients on methadone maintenance completed either a 28-session computerized training module, or 28 active control computer sessions.	Working memory and functional outcomes were assessed as measures of cognitive performance.	Participants who completed the experimental, computerized training sessions showed improvements in working memory measures at the end of the study, while those in the control group did not. Participants in the control group experienced increased drug use during the course of the study, while drug use in the experimental training group remained constant.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Rass et al., 2014 ⁹² (US)	Cognitive Performance in Methadone Maintenance Patients: Effects of Time Relative to Dosing and Maintenance Dose Level	n=51; individuals with OUD on methadone-based opioid agonist treatment	OUD; methadone	Experimental study; participants completed 2 tests of cognitive performance, once approximately 2 hours after taking their methadone dose, and once approximately 26 hours after their methadone dose.	The cognitive test included measures of attention performance, working memory, and executive function.	Measures of cognitive performance (sensory processing, psychomotor speed, attention, and working memory) were found to be worse 2 hours after methadone dosing compared to 26 hours. Higher doses of methadone were associated with better performance on measures of executive function and worse performance on measures of attention and working memory.
Reece, 2007 ⁹³ (Australia)	Psychosocial and Treatment Correlates of Opiate-Free Success in a Clinical Review of a Naltrexone Implant Program	n=376; patients receiving naltrexone for OUD in 3 treatment groups: 1. 102 patients; extended-release naltrexone implant 2. 113 patients; oral naltrexone 3. 161 patients; oral naltrexone 12 months prior to study (not during study period)	OUD; oral and extended-release naltrexone	Retrospective cohort study; medical charts for patients in each of the 3 naltrexone treatment groups were compared.	Employment status before and after treatment was assessed as part of the study.	Across all treatment groups, the rate of employment increased from 35% prior to treatment to 54% after treatment.

Academic Literature						
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Methods	Outcomes	Conclusions
Salsitz et al., 2016 ⁹⁴ (US)	Pharmacotherapy of Opioid Addiction: "Putting a Real Face on a False Demon"	Individuals with OUD	OUD; methadone	Literature review of the history of methadone-based opioid agonist treatment and its efficacy in the treatment of OUD.	N/A	Many patients taking methadone for OUD experience improvements in employment and social functioning. Patients stabilized on a dose of methadone should be able to fully participate in employment. People taking methadone face stigma that their medication is akin to continued use of unregulated opioids
Severt et al., 2011 ⁹⁵ (US)	Buprenorphine Compliance is Associated with Improved Employment and Functioning Outcomes Among Opioid Dependent Patients	n=1,426; patients with opioid-dependence	OUD; buprenorphine	Prospective cohort study; participants completed the Addiction Severity Index survey at baseline and at 1, 2, 3, 6, and 12 months. Semi-structured interviews were also performed at these time intervals to assess buprenorphine compliance and ask questions relating to employment.	Employment outcomes	At 12 months, patients who were retained in buprenorphine treatment had significantly lower employment composite scores (indicating lower severity of employment-related problems). Patients who were retained in treatment reported more days paid for work and were less likely to miss days of work due to substance use-related problems. They were also less likely to report being less productive at work due to substance use-related problems.
Sun et al., 2014 ⁹⁶ (China)	Methadone Maintenance Treatment Programme Reduces Criminal Activity and Improves Social Well-being of Drug Users in China: A Systematic Review and Meta-analysis	Individuals on methadone-based opioid agonist treatment	OUD; methadone	Systematic review of the effects of methadone-based opioid agonist treatment on measures of social well-being. Evidence relating to the rate of employment during and post treatment is discussed.	N/A	The rate of employment for individuals on methadone-based opioid agonist treatment increased from 26.4% before treatment to 41.6% after 6 months of treatment. At 12 months of treatment, the rate of employment increased to 59.8%. For time periods over 12 months, the rate of employment decreased slightly to 55.4%.

Table 3: Key findings from grey literature search

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
Alaska Department of Addiction and Social Services, 2020 ¹⁹ (US)	Addiction and the Workplace: A Toolkit to Support Workplace Wellness as it Relates to Substance Use	Individuals who use substances in the workplace	SUD; no pharmacotherapy specified	Describes recommended components of a return-to-work policy following treatment for SUD.	The employee and the employer should reach a mutual agreement outlining the employees' workplace conduct responsibilities and the employer's accommodations upon the employee's return to work.
Arruda, 2019 ¹⁷ (Canada)	Fit for Duty: Alcohol and Drug Testing in Canadian Workplaces	Individuals who use substances in the workplace	SUD, with a focus on cannabis; no pharmacotherapy specified	Discussion of drug testing in the workplace, with a focus on cannabis. Includes a survey of Canadian employers about the use of drug testing and motivations for including drug testing in their workplace policies.	91% of employers who took part in the survey cited fitness for duty and safety as the main reasons for using workplace alcohol and drug testing. 70% of workplaces used a fitness-for-duty policy. Workplaces should develop a workplace substance use policy that aligns with their testing practices.
Kulh, 2016 ⁹⁷ (US)	Mitigating the Effects of Opioid Use Among Workers	Workers with OUD	OUD; methadone, naltrexone, and buprenorphine	Review of current evidence relating to opioid use and in the context of the workplace.	Medication-assisted treatment for OUD is evidence-based and should be accompanied by psychosocial supports. Outlines recommendations for implementing substance use programs for employees, such as education, employee assistance programs, and access to confidential treatment (including pharmacotherapy).
Atlantic Canada Council on Addiction, 2010 ⁹⁸ (Canada)	Problematic Substance Use That Impacts the Workplace: A Step-by-Step Guide & Toolkit to Addressing it in Your Business/Organization	Workers with SUDs	SUD; no pharmacotherapy specified	Includes a review of literature on substance use in the workplace and a toolkit for employers developing workplace substance use policies and programs.	Employers are encouraged to apply the steps and tools provided in the toolkit and to connect with local addiction services in their region to address substance use in their workplace.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
Atlantic Pilotage Authority, 2018 ⁹⁹ (Canada)	Impairment in the Workplace Policy	Workers in the marine pilotage industry who use substances	SUD; no pharmacotherapy specified	An industry policy document for the prevention of impaired performance due to substance use.	Employees are designated as safety-sensitive, critical decision-maker, or non-safety sensitive based on the duties of their position. Fitness for duty is defined as being able to safely and acceptably perform assigned duties without any limitations due to substance use. Requirements for return to work are detailed for each category of worker. Assignment of alternate duties until employees in treatment programs are able to safely perform their duties is discussed.
British Columbia Centre on Substance Use, 2017 ⁵⁸ (Canada) ^s	A Guideline for the Clinical Management of Opioid Use Disorder	Individuals with OUD	OUD; methadone, buprenorphine/naloxone, naltrexone, SRM	Guidance for the management of OUD.	Opioid agonist treatment may not be permitted for individuals who are subject to provincial or federal workplace-related legislation (e.g., health care professionals). Individuals who are in safety-sensitive positions may require modification of workplace duties if on opioid agonist therapy. Naltrexone is less effective for the treatment of OUD, but may be appropriate for individuals in safety-sensitive positions where opioid agonist treatment is prohibited.

^s The BCCSU released an update to the *Guideline for the Clinical Management of Opioid Use Disorder* in 2023. While the guidance related to workplace legislation is similar to the 2017 version, there are significant updates to the recommendations and guidance contained in the rest of the document. Please refer to the updated guideline when providing care to people with opioid use disorder.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
BMA Occupational Medicine Committee, 2016 ¹⁰⁰ (US)	Alcohol, Drugs, and the Workplace—The Role of Medical Professionals: A Briefing from the BMA Occupational Medicine Committee	Workers with SUDs	SUD; no pharmacotherapy specified	Provides guidance to medical professionals to support patients with SUDs to return to work.	Assessment of fitness for work may require referral of a patient to another practitioner with expertise in occupational health. Medical professionals must only disclose medical information to a patient's employer with the consent of the patient. Only information that is necessary for the purpose of determining functional capacity and developing workplace adjustments should be shared. A return to safety-sensitive work involves completion of an appropriate treatment program and a period of monitoring to detect any relapses.
Butler, Barbara & Associates Inc., 2019 ¹⁰¹ (Canada)	Workplace Alcohol and Drug Issues in an Ever-changing Environment	Workers with SUDs	SUD; no pharmacotherapy specified	An overview of approaches used in Canada for implementing comprehensive substance use policies.	Workplace substance use policies and programs should be tailored to meet the specific needs of each workplace. Policies should create a balance between health and safety and respect for individual rights and privacy. This may include measures to control or prevent substance use (clear standards, investigation tools, and consequences or discipline) as well as substance use prevention measures (education, training, and employee assistance). The use of alcohol and drug testing has been increasing in workplaces across Canada, but is only justifiable if they are part of a comprehensive approach to substance use in the workplace.
Meister, 2018 ⁶¹ (Canada)	A Review of Workplace Substance Use Policies in Canada	Workers with SUDs	SUD; no pharmacotherapy specified	A review of workplace substance use policies in Canada.	Organizations should develop comprehensive substance use policies that are tailored for their workplace. Industry associations may have frameworks for these policies. Additional research is required to determine which components of workplace substance use policies are effective in reducing issues related to substance use are required.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
Canadian Nuclear Safety Commission, 2020 ¹⁰² (Canada)	Human Performance Management Fitness for Duty, Volume II: Managing Alcohol and Drug Use	Workers with a SUD	SUD; no pharmacotherapy specified	Policy for determining fitness for duty in the management of alcohol and drug use for workers in high-security sites in the Canadian nuclear industry.	Workers in safety-sensitive or safety-critical positions must undergo drug and alcohol testing when there are reasonable grounds to believe that the worker is unfit to perform their duties due to substance use.
Roelofs, 2018 ¹⁰³ (US)	Opioids and Work: A Formative Research Assessment to Inform Educational Outreach	Workers with OUD	OUD; no pharmacotherapy specified	Interviews and focus groups were conducted with key informants with expertise and awareness of opioid use in the workplace. Perspectives of issues relating to opioid use and work are discussed.	Recommendations for educational interventions relating to opioid use and work are presented. These include education for workers, education for employers, and education for medical professionals providing care to workers.
City of Calgary, 2020 ¹⁰⁴ (Canada)	The City of Calgary Substance Use Policy Guidelines	Workers with an SUD	SUD; no pharmacotherapy specified	A policy for managing substance use for employees of the City of Calgary are presented. The policy outlines the roles, responsibilities, and expectations for all involved parties.	All employees who complete treatment for a substance use disorder are expected to participate in a 2-year aftercare program and follow the conditions set out in a formal return to work agreement.
Connecticut Department of Public Health, 2018 ²⁰ (US)	The Opioid Crisis and Connecticut's Workforce	Workers with OUD	OUD; methadone, buprenorphine/naloxone, and naltrexone	A discussion of the roles of employers, employees, insurers, and healthcare providers in the recognition, treatment, and recovery of workers with an OUD.	Employees in safety-sensitive positions are subject to industry rules regarding return to work (e.g., regulations from the US Department of Transportation).
Construction Owners Association of Alberta and Energy Safety Canada, 2018 ¹⁰⁵ (Canada)	Canadian Model for Providing a Safe Workplace	Workers in the construction industry with a SUD	SUD; no pharmacotherapy specified	Presents best practices for workplace alcohol and drug policies in Canada.	Defines safety-sensitive and risk-sensitive positions. Includes guidelines for employee education and self-help, urine drug testing, and consequences if an employee fails to comply with the workplace drug and alcohol policies.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
District of Mission on the Fraser, 2018 ¹⁰⁶ (Canada)	Safety Management System	Workers with a SUD	SUD; no pharmacotherapy specified	A policy for managing substance use for employees of the District of Mission are presented.	The policy states that the employer will provide a graduated return-to-work program for individuals being treated for SUD, which will include collaboration with the employee's treating medical professional.
Flight Attendant Drug and Alcohol Program, 2010 ¹⁰⁷ (US)	Flight Attendant Drug and Alcohol Program Manual	Flight attendants with an SUD	SUD; a range of pharmacotherapies for OUD and AUD are discussed	Best practice guidelines for the prevention, treatment, and recovery of flight attendants who have a SUD are presented.	The use of acamprosate, disulfiram, or naltrexone for the treatment of AUD is recommended. These medications should be provided in combination with supportive therapy. Pharmacotherapy for withdrawal management for opioid use disorder is recommended, but the use of opioid agonist treatment (methadone, buprenorphine, or levomethadyl acetate hydrochloride)¹ is not recommended. Flight attendants should have access to non-opioid pain management programs.
Fraser Health Authority, 2018 ¹⁰⁹ (Canada)	Alcohol and Drug Use	Workers with a SUD	SUD; no pharmacotherapy specified	A policy for substance use for Fraser Health employees. The policy is applicable to all employees working in risk sensitive positions. Individuals in non-risk-sensitive positions may also request assistance with substance use through this policy.	Distinguishes between safety-sensitive and risk-sensitive positions. Safety-sensitive is defined as a position in which incapacity due to drug or alcohol impairment could result in direct and significant risk of injury to the employee, others, or the environment. Risk-sensitive positions are defined as those that have a key and direct role in the provision of any clinical or support service where impaired performance could result in 1) a significant incident affecting the health and safety of employees, patients, public, physicians, volunteers, students, contractors or their employees; 2) damage affecting the reputation of Fraser Health Authority, property, or the environment. The employer defines responsibilities for supporting employees through rehabilitation and return to work following treatment for a SUD.
Fraser Health Authority, 2020 ¹¹ (Canada)	Supporting Recovery Through Return to Work	Construction workers with mental illness or a SUD	SUD; use of pharmacotherapy is discussed, not specified	A literature review to identify current return-to-work practices in the construction industry in BC was conducted. Key informants were also interviewed to	The report describes best practices that can be implemented to support return to work for workers in construction with mental illness or an SUD. The recommendations for return-to-work policies include:

¹Levomethadyl acetate hydrochloride (LAAM) is not approved for use in Canada and is no longer produced world-wide due to severe adverse cardiac events.¹⁰⁸

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
				provide additional understanding of return-to-work practices in jurisdictions across Canada.	1. Developing a formal return-to-work agreement between the worker and the employer to define the duration of the agreement, expectations of the worker, and the recommended workplace accommodations. 2. Incorporating regular communication between involved parties, including discussions about how any medications taken will affect the worker's performance. 3. Recognizing the chronic and relapsing nature of addiction, and incorporating accommodations for preventing relapse and extending treatment if necessary.
Justice Institute of British Columbia, 2019 ¹¹⁰ (Canada)	Workplace Impairment	Workers with an SUD	SUD; pharmacotherapy not specified	A policy for substance use for employees. The policy outlines employee requirements for fitness for duty, disclosure of substance use, and consequences of misconduct.	The policy states that the employer will provide medical and rehabilitation assistance as required by law. Employees seeking accommodation or assistance are not necessarily protected from consequences of failing to adhere to the requirements of the substance use policy.
Middaugh, 2019 ²¹ (US)	Opioids and the Workplace: An Employer Toolkit for Supporting Prevention, Treatment, and Recovery	Workers with OUD	OUD; methadone, buprenorphine, and naltrexone	A toolkit that provides recommendations and tools to support workers, including prevention, treatment, and recovery from OUD.	Recommendations for workplace substance use policies and programs include: 1. Offering flexible scheduling and leaves of absence to support employees in accessing treatment for OUD. 2. Developing a return-to-work policy that sets clear expectations for the employee's workplace conduct and responsibilities. 3. Covering medications for OUD and integrating policies to reduce barriers for accessing substance use treatment. 4. Covering naloxone in employee health plans.
KFL&A Public Health, 2013 ¹¹¹ (Canada)	Alcohol and the Workplace Toolkit	Workers with AUD	AUD; pharmacotherapy not specified	A toolkit that provides information and tools to help employers implement workplace programs and policies for alcohol use.	Workplace alcohol policies should reflect the culture, values, specific regulations, and program needs of each workplace.
Metro Vancouver Transit Police, 2018 ¹¹² (Canada)	South Coast British Columbia Transportation Authority Police Service Policies and Procedures Manual	Workers with an SUD	SUD; pharmacotherapy not specified	A policy defining fitness for duty for employees to ensure that impairment from substances does not compromise or threaten the safety of workers or others.	Employees must follow all treatment and continuing care programs recommended by their treating medical professional prior to returning to work.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
NIOSH, 2019 ¹¹³ (US)	Medication-Assisted Treatment for Opioid Use Disorder	Workers with OUD	OUD; methadone, buprenorphine, buprenorphine/naloxone, and naltrexone	This document provides information about medication-assisted treatment for OUD, as well as information for employers wishing to support workers with OUD.	Medication-assisted therapy for OUD may have side effects that cause impairment. Workers in safety-sensitive positions may have restrictions to the duties they can perform while taking medications for OUD. Determination of duties that can be performed by an occupational healthcare provider may be necessary. Employers should provide reasonable accommodation, when appropriate.
Nurses Association of New Brunswick, 2016 ²² (Canada)	Guidelines for the Recognition and Management of Problematic Substance Use in the Nursing Profession	Nurses with an SUD	SUD; pharmacotherapy not specified	This document provides guidance for RNs and managers or employers of RNs on workplace substance use.	Return to work plans should be individualized, non-punitive, and supportive, with a focus on rehabilitation. A formal return-to-work agreement should outline the responsibilities of the employee, including a commitment to abstinence from alcohol or drugs (unless the drugs have been prescribed and do not impact the RN's ability to be fit to practice), attendance at support groups, urine or blood screening, and regular performance evaluations.
Ohio Department of Job and Family Service, 2019 ¹¹⁴ (US)	Strategies for Helping Individuals Impacted by Opioid use Disorder: A Toolkit for Ohio's Public Workforce System	Workers with OUD	OUD; methadone and buprenorphine	A toolkit for local workforce boards to implement strategies to help workers with OUD.	Defining what constitutes impairment is a challenge, especially in the case of safety-sensitive positions where an employee is taking a prescribed medication as prescribed. Employers must determine whether an employee has the capacity to perform their duties while taking a medication known to cause impairment. However, there are currently no validated instruments, regulations, or guidelines for determining impairment due to prescription medications.
Public Service Alliance of Canada, 2019 ¹¹⁵ (Canada)	Duty to Accommodate: A PSAC Guide for Local Representatives	Workers with disability which may require workplace accommodations	SUD; pharmacotherapy not specified	A guide for issues relating to "duty to accommodate" in the workplace.	The duty to accommodate applies to any individual needs that are prohibited grounds of discrimination under human rights laws. This includes substance use disorders.

Grey Literature					
Author, Date, and Location	Title	Population and Setting	Disorder and Pharmacotherapy	Purpose of Document	Relevant Findings
SAMHSA, 2020 ¹¹⁶ (US)	Considerations for Safety- and Security-sensitive Industries	Workers with SUD	SUD; pharmacotherapy not specified	This document describes requirements for workers in safety-sensitive positions, including drug testing.	Employers are required to test safety-sensitive employees during pre-employment, after involvement in accident, or whenever there is reasonable cause to suspect that an individual is impaired at work due to substance use. Testing must also occur before an employee can return to duty after a positive drug test. Any employee found to have an SUD must be referred to a medical professional who will evaluate the employee's treatment needs and assess their ability to return to work.
Vancouver Police Department, n.d. ¹¹⁷ (Canada)	Professional Standards: Impairment at the Workplace	Police officers with an SUD	SUD; pharmacotherapy not specified	This document details workplace substance use policies for police officers and other VPD employees. Policies pertaining to employee performance and fitness for duty, testing, and accommodation are described.	Accommodation and treatment are the preferred response to confirmed substance use by an employee. Disciplinary actions may be taken if an employee fails to disclose a disability that impacts their fitness for duty and endangers themselves or others.

Following data extraction, the included articles were analyzed and grouped into themes relevant to the identified research question and sub-questions. Articles could belong to more than a single theme, if appropriate. A discussion of the articles included in each thematic grouping is provided below.

3.3.ii.1 Safety-sensitive Positions

There were 27 articles discussing workers in safety-sensitive positions, including 13 from the academic literature and 14 from the grey literature. These articles explored a number of sub-themes that are relevant to safety-sensitive positions, including pharmacotherapy, functional outcomes, and return-to-work policies.

Pharmacotherapy

There was a scarcity of evidence examining the use of pharmacotherapy for AUD and/or OUD in safety-sensitive positions. Three academic articles reviewed the existing evidence evaluating the use of pharmacotherapies for the treatment of OUD and/or AUD among workers in safety-sensitive positions.^{82,89,83} These studies noted that the use of buprenorphine, a partial opioid agonist, has particular risks in health care settings, including the potential impairment⁸⁹ and the relative ease of diversion^u of the small, sublingual tablet form of the medication.⁸² Naltrexone, on the other hand, is an opioid antagonist and is not believed to cause impairment. For this reason, the available literature in aggregate endorses naltrexone as the recommended option for the treatment of health care professionals with OUD when they are in safety-sensitive positions.⁸⁹ However, a systematic review evaluating the use of pharmacological treatments for OUD concluded that the existing evidence examining cognitive and neurological effects of buprenorphine, buprenorphine/naloxone, methadone, and naltrexone was of a low quality; and, therefore, **there is not sufficient evidence to make conclusions about the effects of OAT and naltrexone on impairment.**¹⁶

Functional Outcomes

Functional outcomes for individuals taking pharmacotherapy for OUD (specifically, buprenorphine or methadone) were evaluated in 55 academic articles.^{92,91,76,14,90} Measured functional outcomes included working memory, reaction time, executive function, and measures of attention. There was not a clear consensus among the literature about whether buprenorphine or methadone cause deficits in measured functional outcomes at a level that could be considered impaired in a work context. Certain scores, such as executive function, were found to improve with the use of methadone, while others experienced a deficit (e.g., attention).⁹² It is worth noting that, while pharmacotherapies for AUD—such as naltrexone or acamprosate—are not believed to be impairing, no articles were identified in this review that evaluated functional outcomes for individuals using AUD pharmacotherapies.

^u In BC, the buprenorphine/naloxone formulation is more commonly prescribed for OAT than the buprenorphine mono-product. The naloxone component is added to deter diversion, as naloxone may precipitate withdrawal if injected or insufflated.

Return-to-work Policies

There were 3 articles from the academic literature that evaluated employment outcomes of workers in safety-sensitive positions who had participated in pharmacological treatment programs for OUD. The pharmacotherapies included were naltrexone (N=2)^{80,87} and buprenorphine/naloxone (N=1).⁷⁹ These studies reported positive treatment outcomes—including successful return to work after completion of a treatment program and abstinence from unregulated opioid use—as a result of participating in these pharmacological treatment programs.

Among the 14 grey literature articles, the majority (N=8) were workplace substance use policies from specific employers where safety-sensitive positions were defined in the policy as having special requirements in the context of impairment and fitness for work. Only one of these policies included any information about the use of pharmacotherapies in the treatment of OUD and/or AUD.¹⁰⁷ The remaining articles (N=6) included recommendations for return-to-work policies for safety-sensitive industries or positions, such as through the implementation of monitoring for continued abstinence through urine drug testing. Only one of these articles included recommendations relating to the use of pharmacotherapy.²⁰

3.3.ii.2 Impairment

Impairment was discussed in 9 articles, including 6 from the academic literature and 3 from the grey literature. All 6 academic articles discussed impairment in the context of cognitive or functional deficits resulting from the use of pharmacotherapy for OUD (buprenorphine and methadone). However, these articles did not define how functional outcomes are related to impairment in the context of working ability. Similarly, the 3 articles from the grey literature that discussed impairment also provided no definition of how impairment was to be measured. One article included a discussion of impairment in the context of workplace drug and alcohol testing.

3.3.ii.3 Fitness for Duty or Work

All of the 13 articles discussing fitness for duty or work were from the grey literature. Of these 13 articles, 7 were workplace policy documents that defined fitness for duty or work for their employees. While the importance of tailoring workplace policies to specific circumstances is recognized,^{101,111} there is little guidance for employers seeking to develop their own workplace substance use policies, including a definition of fitness for duty or work. The Ohio Department of Job and Family Service¹¹⁴ notes that there are currently no validated instruments, regulations, or guidelines for determining impairment due to prescription medications. The Canadian Centre on Substance Abuse⁶¹ also noted that defining fitness for work was identified as a key challenge in a survey of employers about workplace substance use policies, and that additional research is required to further inform workplace substance use policies. In the absence of validated instruments or evidence-based guidelines, the BMA Occupational Medicine Committee¹⁰⁰ stated that assessing fitness for work in the case of workers with SUDs should be based on the individual and may require the involvement of a medical practitioner with expertise in occupational health.

3.3.ii.4 Individualized Assessment and Treatment Plans

There were 9 articles discussing individualized assessment and treatment plans, including 2 from the academic literature and 7 from the grey literature. The 2 academic articles were both reviews of the existing evidence on using pharmacotherapy for the treatment of SUDs among workers; both articles suggested the use of individualized treatment plans for workers returning to work after treatment for SUD. In a review of the use of pharmacotherapy among anesthesiologists with SUDs as part of return to work, the use of individualized treatment plans was found to support the worker by ensuring their treatment is viewed as part of a chronic disease management paradigm that allows for the possibility of return to substance use (or relapse).⁸³ Additionally, a review of the impairing effects of the use of various substances among physicians noted that there is a lack of evidence on the impairing effects of any particular treatment for OUD or AUD over another.⁸⁹ With this in mind, the review recommended that individualized treatment plans be used to give each individual the greatest support to return to work.⁸⁹

The 77 grey literature documents all provided guidance for developing workplace substance use policies and treatment programs. Each of these articles included a recommendation that treatment plans should be individualized; this recommendation reflects that treatment services may vary by region,⁹⁸ there may be industry-specific restrictions on certain treatments (particularly in safety-sensitive industries),¹⁰⁷ and that under human rights laws there is a need to provide reasonable accommodation for individual circumstances.¹¹⁵

3.3.ii.5 Return to Work

Return to work was discussed in 14 articles, including 9 from the academic literature and 5 from the grey literature. The majority of the academic literature (N=8) reported statistically significant improvements in measures of employment after participation in a pharmacological SUD treatment program as part of return to work, while 1 study reported an initial increase in rates of employment that did not persist at a 1 year follow-up of the participants.⁸⁵ Measured outcomes included self-reported improvement in working ability,⁷⁷ percentage of participants employed at the end of the study^{88,96,86} and number of earning days.^{95,85} The majority of these studies followed participants for a period of 12 months, with 1 study following participants for 7 years.⁸⁸ The 5 grey literature documents gave recommendations for developing return-to-work programs for workers with SUDs.

3.3.ii.6 Patient-reported Outcomes

There were 3 articles discussing patient-reported outcomes in the context of employment, all of which were from the academic literature.⁷⁷ Each of the 3 academic studies asked participants to self-report their employment or employment ability after completing their pharmacological treatment program for OUD. All 3 studies reported improvements in self-reported employment and working abilities.

3.3.ii.7 First Nations and Rural/ Remote

There was 1 document from the grey literature that discussed workplace substance use issues specific to Indigenous communities and rural and remote communities. The BCCSU provincial OUD Guideline⁵⁸ notes that there may be a lack of treatment options for remote communities, including Indigenous communities. The requirement to travel for treatment and being unable to access outpatient treatment services locally create additional barriers for individuals to want to return to work.

3.3.ii.8 Policy or Regulatory

There were 15 articles that discussed policy or regulatory aspects of workplace substance use, all of which were from the grey literature. Many of these documents were policy documents outlining workplace substance use policies for various employers (N=9) or industries (N=1). This category also included toolkits (N=4) that had been developed to assist employers in developing workplace substance use policies; however, only two of these discussed the use of pharmacotherapy for workers with SUDs. Finally, 1 article outlined the regulatory requirements pertaining to safety-sensitive workers.

3.3.ii.9 Guidance (General)

There were 9 articles that discussed workplace substance use guidance outside of the policy or regulatory theme. All of these articles were found in the grey literature. Of these articles, 1 provided clinical guidance for the treatment of OUD in the general population.⁵⁸ Guidance pertaining to the use of pharmacotherapy for the treatment of SUDs for workers in various industries was discussed in 4 articles, with 1 of the 4 focused on workers in the construction industry. The remaining articles (N=4) provided guidance for the management of SUDs in the workplace, with no mention of pharmacotherapy.

The following table provides a visual representation of the themes identified in each included source. A source may encompass one or more theme.

Table 4: The identified themes for each article.

Author, Date	Theme								
	Safety Sensitive	Impairment	Fitness for Duty/Work	Individualized Treatment Plan	Return-to-Work	Patient Reported Outcomes	First Nations and Rural/Remote	Policy/Regulatory	Guidance (General)
Academic Literature									
Bach et al., 2019									
Bach et al., 2012									
Bald et al., 2013									
Bilban et al., 2008									
Braquehais et al., 2015									
Earley et al., 2017									
Enos, 2020									
Hamza et al., 2012									
Lefebvre et al., 2016									
Lingi et al., 2018									
LoCastro et al., 2009									
Maglione et al., 2018									
Maremmani et al., 2008									
Merlow et al., 2011									
Ohlin et al., 2015									
Polles et al., 2020									
Rapeli et al., 2012									
Rass et al., 2015									
Rass et al., 2014									
Reece., 2007									
Salsitz et al., 2016									
Severt et al., 2011									
Sun et al., 2014									
Grey Literature									
Alaska Department of Addiction and Social Services, 2020									
Arruda, 2019									
American Psychiatric Association Foundation, 2016									
Atlantic Canada Council on Addiction, 2010									
Atlantic Pilotage Authority, 2018									
British Columbia Centre on Substance Use, 2017									
BMA Occupational Medicine Committee, 2016									
Butler, Barbara & Associates Inc., 2019									
Canadian Centre on Substance Use and Addiction, 2018									
Canadian Nuclear Safety Commission, 2020									

Center for the Promotion of Health in the New England Workplace, 2018									
City of Calgary, 2020									
Connecticut Department of Public Health, 2018									
Construction Owners Association of Alberta and Energy Safety Canada, 2018									
District of Mission on the Fraser, 2018									
Flight Attendant Drug and Alcohol Program, 2010									
Fraser Health Authority, 2018									
Fraser Health Authority, 2020									
Justice Institute of British Columbia, 2019									
Kentuckiana Health Collective, 2019									
KFL&A Public Health, 2013									
Metro Vancouver Transit Police, 2018									
NIOSH, 2019									
Nurses Association of New Brunswick, 2016									
Ohio Department of Job and Family Service, 2019									
Public Service Alliance of Canada, 2019									
SAMHSA, 2020									
Vancouver Police Department, ND									

4.0 Discussion

This scoping review aims to identify and describe the existing evidence relating to return to work for individuals receiving evidence-based pharmacotherapy for OUD and/or AUD in the construction industry. This section provides a discussion of the key themes and implications for return-to-work policies and practices.

4.1 Safety-Sensitive

While this scoping review is focused on workers in the construction industry, no articles found in the academic literature focused on construction workers. There are 2 articles in the grey literature (published by an industry association and a health authority) that focus on best practices for construction workers with SUDs.^{105,11} It is notable, however, that neither of these documents from the grey literature include guidance on return to work for individuals receiving pharmacotherapy for OUD and/or AUD. The existence of best practice guidance for return to work for construction workers with SUDs in spite of a scarcity of relevant, high-quality evidence in this area demonstrates a need for future research that can inform standardized, evidence-based guidance.

Given the lack of available evidence to guide return-to-work policies for construction workers receiving evidence-based pharmacotherapy for OUD and/or AUD, the inclusion criteria were expanded to include evidence relating to workers in other safety-sensitive positions. A number of other safety-sensitive industries are represented in the included academic and grey literature. Health care professionals, in particular, are well-represented in the academic literature. However, there may be challenges and limitations in extrapolating the findings from other safety-sensitive groups to construction workers. For example, health care professionals with SUDs have been shown to have a higher rate of success with substance use disorder treatment compared to the general population.⁸³ This success has been attributed to the use of physician health programs for health care professionals with SUDs that are based on individualized assessment and treatment with an extended period of monitoring after completion of the program.⁸³ Physician health programs also frequently operate on the condition that the physician in treatment follows the conditions set out by the treatment program; if they are not compliant, they face sanction by their professional regulatory body. This type of professional regulation does not exist for all construction workers, although some specific positions (such as engineers) may be regulated by a professional body. While the approach of individualized assessment and treatment used by physician health programs suggests promise, the additional influence and structure provided by a professional regulatory body may contribute to the high rate of reported positive outcomes documented in health care professionals. It is possible that the employment context of a population is a meaningful component of their response to treatment during a return-to-work treatment program, which emphasizes the need for research that accounts for contextual differences between population groups. It is also possible that other determinants—such as education, socioeconomic status, ethnicity, and cultural factors—may impact the effectiveness of return-to-work treatment programs, although these potential relationships have not yet been researched.

4.1.i Pharmacotherapy

There is little consistency among guidelines and policies regarding the use of pharmacotherapy in the treatment of OUD and/or AUD in the context of safety-sensitive work. Only 2 guidelines in the included literature discuss the use of pharmacotherapies in the treatment of OUD and/or AUD.^{107,20} The US Flight Attendant Drug and Alcohol Program recommends that pharmacotherapy for AUD (specifically, acamprosate, naltrexone, or disulfiram^y) is used as part of treatment along with supportive therapy, as these are not known to cause impairment.¹⁰⁷ However, this program only recommends the use of pharmacotherapy for OUD as part of withdrawal management for opioids. They recommend against the use of OAT (methadone, buprenorphine, or levo-alpha-acetylmethadol^w) due to the potential for impairment and addiction.^x This recommendation does not align with current evidence or standards of care for OUD. For example, the BCCSU and Ministry of Health's provincial [Guideline for the Clinical Management of Opioid Use Disorder](#) recommends the use of OAT (buprenorphine/naloxone, methadone, or slow-release oral morphine)^y as the standard of care for OUD.⁵⁸ The use of withdrawal management alone, without continuing OAT, has been shown to result in higher rates of return to use^{67,66,68} and fatal drug poisoning due to a loss of tolerance to opioids.⁶⁸ The BCCSU's guideline also recommends that all individuals with OUD should be provided with information about and referrals to specialist-led psychosocial treatment interventions and community-based services as part of continuing care.⁵⁸

4.1.ii Functional Outcomes

Of the academic articles included in this review, 5 examine functional outcomes for individuals taking methadone or buprenorphine.^{92,91,76,14,90} Functional outcomes—such as working memory, reaction time, attention span, and executive function, among others—are measurable outcomes that are sometimes used as a proxy for how the use of one of these medications may impact an individual's ability to work. No consensus was found among or within these articles on the effects of these pharmacotherapies on functional outcomes—for example, one study reported that methadone use resulted in improvements in executive function scores, but decreases in attention.⁹² Additionally, it is unclear to what extent these tests—which are typically performed in laboratory settings on a computer—can be extrapolated to real-world tasks performed in work settings. Of particular interest would be safety-sensitive tasks that are performed in construction settings, such as operating tools and machinery, lifting heavy materials, working at heights, or working near cars or other vehicles.

All of the articles that examine functional outcomes resulting from pharmacotherapies are studies of pharmacotherapies for OUD; none investigate the effects of pharmacotherapies for AUD. While some of the included literature discuss impairment in the context of both OUD and/or AUD pharmacotherapy, the fact that medications for OUD and/or AUD have different mechanisms of action suggests that studying them separately in terms of impairment, and treating them uniquely in the context of return to work, would be prudent. Full or partial opioid agonists, including methadone and buprenorphine, respectively, bind to opioid receptors (to different

^y Note: Disulfiram is not recommended over other available pharmacotherapies for AUD that have been proven effective in preventing relapse and/or reducing alcohol consumption. by the BCCSU, Ministry of Health, and Ministry of Mental Health and Addictions' [Guideline for the Clinical Management off High-risk Drinking and Alcohol Use Disorder](#).

^w Levomethadyl acetate hydrochloride (LAAM) is not approved for use in Canada and is no longer produced world-wide due to severe adverse cardiac events.¹⁰⁸

^x Note that this terminology and reasoning is from the source material.

^y This information was updated to reflect guidance provided in the 2023 Guideline.

degrees) in the brain and are known to cause sedation and cognitive blunting.⁵⁸ There is limited evidence, however, that AUD pharmacotherapies such as naltrexone or acamprosate have significant impairing effects.¹⁷

4.1.iii Return-to-work Policies

The selected literature includes a number of existing workplace policies from a variety of industries with safety-sensitive positions, including aviation, enforcement, nuclear energy, marine pilotage, and public service. These policies often include a formal definition of what is considered safety-sensitive work,^{109,112,117} or a categorization of job titles into safety-sensitive or non-safety sensitive based on job tasks.⁹⁹ In a report presenting best practices for workplace substance use policies in the construction industry, the Construction Owners Association of Alberta recommends categorizing workers into safety-sensitive positions (for workers performing tasks that present a safety risk to workers or the public) and risk-sensitive positions (for workers performing job duties that present a risk to the company, such as those handling confidential information).¹⁰⁵ Categorizing positions in such a way can allow employers to place additional restrictions on workers, such as requirements for workplace drug testing or more stringent requirements for return to work, only where it is necessary for safety and risk purposes.

4.2 Impairment

The findings of this scoping review suggest that impairment resulting from methadone or buprenorphine is not uniform.^{14,16,47–92,118–15} Timing, length of treatment, and medication dose all seem to impact impairment measures. In the case of methadone, patients show higher impairment 2 hours after taking methadone compared to 26 hours after a dose,² and higher doses are associated with greater impairment in attention and memory but also greater improvements in executive function.⁹² Improvements in working memory over 1 year of treatment were found in patient groups taking either methadone and buprenorphine.^{90,91} This suggests that there may be a beneficial effect of opioid agonist treatment for individuals with OUD over time, although there is a lack of data to provide insight on this relationship at 1–12 months. Additionally, individuals who have used heroin for longer periods of time prior to starting treatment may be more likely to have lower working memory scores.¹⁴ This suggests that long-term heroin use may result in lower working memory scores, which raises the question of whether measured deficits are the result of opioid agonist treatment or the result of long-term opioid use. There is minimal research examining the impact of long-term opioid use on neurocognitive function, but the small number of studies that do exist suggest that longer duration of heroin use is associated with decreased performance in functional tasks¹¹⁸ and neurological structural changes that may indicate decreased functioning in cognitive tasks.¹⁵ The literature included in this scoping review demonstrates the complexity in measuring and assessing the real-world implications of potential impairment from opioid agonist treatment, as well as the relative paucity of impairment-related literature. The single systematic review identified in this scoping review¹⁶ concludes that the existing evidence for cognitive and neurological effects of buprenorphine, buprenorphine/naloxone, methadone, and naltrexone for the treatment of OUD is of low quality and not sufficient to draw any conclusions. This highlights a gap in knowledge and current

² It should be noted that methadone pharmacology is complex, and significant interindividual variability may exist. Peak effect occurs around 2–4 hours after ingestion, with a particularly long elimination half-life relative to other opioids (around 24–96 hours).

practice that precludes the utilization of evidence-based return-to-work policies and practices that incorporate pharmacotherapy.

4.3 Fitness for Duty or Work

Workplace policies and regulations often use the concepts of ‘fitness for duty’ or ‘fitness for work’ to define impairment in the workplace. Fitness for duty is a determination of whether an individual is physically, mentally, and emotionally capable of performing the essential tasks of their job.¹¹⁹ In some cases, such as a worker returning to work after an injury or illness, fitness for duty may be determined with a medical assessment.¹¹⁹ However, the determination of what exactly constitutes impairment resulting from OUD and/or AUD pharmacotherapies in an occupational context presents a challenge in developing workplace substance use policies.⁶¹ As noted by the Ohio Department of Job and Family Service,¹¹⁴ there are currently no validated instruments, regulations, or guidelines for determining impairment resulting from pharmacotherapies for the treatment of OUD and/or AUD. This makes implementing evidence-based fitness for duty policies for OUD and/or AUD pharmacotherapies difficult in practice, as it requires employers to develop their own definition of fitness for duty that may not reflect the true impact of pharmacotherapy on impairment. As shown in the varying definitions among the existing workplace substance use policies included in this scoping review,^{99,102,104,109,110,112,117} defining these concepts is often left to the discretion of the employer. While this allows employers to tailor their workplace substance use policies to their own circumstances,^{101,111} it also presents a challenge, as there may be inconsistent definitions for the same role between different employers that may not be evidence-based and may be discriminatory.

4.3.i Urine Drug Testing

Some industries have zero-tolerance policies regarding the use of substances that may cause impairment for individuals in safety-sensitive positions.^{20,116} These policies often use urine drug testing and workplace-based treatment programs as a measure of fitness for duty.^{17,116} This is despite a lack of evidence that urine drug testing can identify impairment; in practice, urine drug testing can only determine whether a given substance has been used during the detection window, which may include substance use outside of work time.¹⁷ Depending on the substance, the test, and use patterns, a positive result may indicate use as recently as a few hours¹²⁰ or as long as 4 weeks ago.¹²¹

Urine drug testing is used as part of substance use policies by many safety-sensitive industries. A survey of Canadian organizations that employ workers in safety-sensitive industries found that nearly half of respondents use urine drug testing to investigate potential substance use among their workers in response to a change in employee behaviour, decline in performance, or a supervisor or co-worker reports concern (47% of respondents).¹²² Despite this wide adoption of urine drug testing, there is a lack of evidence to support this practice; according to one systematic review included in this scoping review, there is little high-quality evidence that workplace drug testing is effective at preventing workplace accidents and injuries.¹⁸

An additional concern related to the use of urine drug testing is its potential infringement on human rights. Urine drug tests ordered for employees can reveal private medical information, such as medications used for other health conditions, potentially infringing on workers’ right to privacy.¹¹⁵ Workers with SUDs are also protected under human rights laws, as SUDs are considered a disability that must be accommodated under the *Canadian Human Rights Act*.⁶²

Urine drug testing without due cause (i.e., reason to believe an employee was impaired at work) may be considered a human rights violation if the identification of substance use or prescription medication for treatment of another condition is used as grounds of dismissal.⁶² In addition, according to the Canadian Human Rights Commission, urine drug testing is only acceptable for safety-sensitive workers, and employers using this testing method for non-safety sensitive workers may be in violation of privacy laws if they use urine drug testing on non-safety sensitive workers without demonstrating a health and safety requirement for the test.¹⁷

How employers respond to positive tests can influence employee attitudes. Employees may feel pressured to hide near-misses, workplace accidents, or injuries if they know that reporting them will trigger an investigation and they fear the consequences of a urine drug test positive for psychoactive substances.¹²³ Conversely, employers who respond to a positive test with supportive measures such as education or treatment measures may experience lower absenteeism and improved staff morale.¹²⁴

Considering the challenges relating to urine drug testing, employers who choose to use this practice should strive to find a balance between workplace safety and human rights by developing a comprehensive workplace substance use policy that includes measures to control or prevent substance use (including clear standards relating to urine drug testing and any consequences or discipline) as well as substance use prevention measures (such as education, training, and treatment).¹⁰¹ When developed as part of a comprehensive plan, a urine drug testing policy can be tailored to meet the needs and circumstances of each workplace.¹⁷ However, there is a lack of guidance on how to include urine drug testing as part of a return-to-work plan in way that it is evidence-based. According to surveyed Canadian employees in safety-sensitive industries, follow-up testing after completion of a substance use treatment program is most often unannounced and used to determine if the employee is continuing to use substances.¹²²

4.4 Individualized Assessment and Treatment Plans

A report by the BMA Occupational Medicine Committee¹⁰⁰ provides recommendations for medical professionals providing treatment to workers with SUDs. The report notes that assessment of fitness for work may require the involvement of a practitioner with experience in occupational health, as these professionals have training in completing functional assessments that can be tailored to a worker's specific job duties. The Washington Physicians Health Program is an example of a program that includes individualized assessment and treatment for health care professionals who seek substance use treatment.⁸¹ The program refers its participants to specialized evaluation centres, where they are recommended a course of treatment for each individual based on an evaluation of their job responsibilities (for example, participation in hands-on or cognitive tasks as part of their job that may be impacted in the event of impairment due to treatment).⁸¹ In the absence of guidelines, the BMA Occupational Committee recommends the use of individualized assessment and clinical judgement when determining impairment as part of a return-to-work plan,¹⁰⁰ which represents a significant departure from standard practice in many industries. However, no guidelines were found in the included literature that provided standardized guidance for occupational health professionals in completing these assessments, demonstrating a gap in guidance in this area.

British Columbia's Fraser Health Authority's¹¹ report on best practices for return to work for workers in the construction industry who use substances recommends that regular communication between the worker, their employer, and the medical professional be

incorporated into a return-to-work plan, including discussions about how any medications that are prescribed may affect the worker's performance at work. These assessments should be revisited over the course of the worker's treatment, to continually re-evaluate their ability to perform workplace tasks. Standardization of an individualized approach to return-to-work assessment and treatment for workers with SUDs could add strength to formal return to work agreements by providing professional insight into each worker's treatment—the medical professional would work with the worker and the employer to identify tasks that the worker is able to perform throughout each stage of their treatment, and could provide cautions for any potentially impairing effects that may occur.

4.5 Return to Work

A formal return-to-work agreement developed for each worker provides a framework for treatment and recovery that can be individualized. A number of articles in the literature provide guidelines and best practices for developing a return-to-work agreement (N=5).^{11,19-22} These articles are in accord that a formal agreement should outline the details of the agreement, including the duration of the agreement, the roles and responsibilities of all involved parties, and the agreed-upon workplace accommodations (such as flexible scheduling, leaves of absence, and reassignment to alternative duties), if necessary. The Kentuckiana Health Collective²¹ recommends that pharmacotherapies for the treatment of OUD be covered by workplace health insurance plans, where possible.^{aa} However, only Fraser Health Authority¹¹ includes a recommendation that a discussion of the potential impairing effects of pharmacotherapy be included in the return-to-work agreement. This highlights a critical gap in guidance for incorporating pharmacotherapy into return-to-work plans and the development of individualized treatment planning rather than blanket approaches for all workers.

Generally, a formal return-to-work agreement requires that the worker completes a rehabilitation or treatment program that is defined by the employer and outlines the employer's role in accommodating the worker while they are participating in the program (such as through reassignment to alternative job duties, paid leave, or other accommodations). In safety-sensitive industries, participation in the program may be dependent on the worker completing regular urine drug testing to ensure adherence with an abstinence-based program. It is important to note that, with a lack of guidance and education, programs that are developed by an employer may not use evidence-based treatment approaches, for example, forbidding pharmacotherapy and relying solely on abstinence-based approaches. Fraser Health Authority¹¹ further notes that a clear, high-quality return-to-work agreement helped to support workers during their recovery by providing economic stability, increasing social supports, and improving their sense of self-worth. There are also benefits for employers, with a return-to-work agreement resulting in improved worker retention, worker performance, workplace safety, and staff well-being, and reduced absenteeism.¹¹

4.6 Patient-reported Outcomes

The included literature reports a wide range of patient-reported outcomes relating to return to work. Measured outcomes include number of paid days per a defined time period,^{84-86,95} return to

^{aa} In BC, opioid agonist treatment medications (buprenorphine/naloxone, methadone, extended-release buprenorphine, and slow-release oral morphine) are a regular benefit covered under [PharmaCare](#) Plans B, C, G, and Z. Non-benefit OAT medications (compounded methadone, Methadose sugar-free) may be covered with Special Authority approval.

previous position, self-reported improvement in working ability,^{77,78} employment status,⁷⁸ and job satisfaction. It is not clear from the literature which of these outcomes, if any, is best suited for measuring the effectiveness of a return-to-work program for workers with OUD and/or AUD, particularly in the case of workers using pharmacotherapy. The measures used in the existing literature may not be effective at capturing meaningful phases of return to work during OUD and/or AUD treatment, such as working while performing alternative duties, return to substance use during treatment, or a worker's ability to return to work while taking a prescribed OUD and/or AUD pharmacotherapy. There is a lack of guidance on which measures are useful in determining the effectiveness of an OUD and/or AUD return-to-work program, including patient-reported outcomes.

4.7 Indigenous Peoples and Rural or Remote Communities

The literature revealed a paucity of evidence related to substance use and return to work policies and programs related to Indigenous Peoples and rural or remote communities. Considerations for treatment opportunities in these communities are mentioned in the provincial [Guideline for the Clinical Management of Opioid Use Disorder \(2023\)](#)⁵⁸ as part of a broader discussion about access to treatment in these populations, although not in the context of treatment as part of employment or return to work.

4.7.i Indigenous Peoples

Indigenous Peoples often face stigma and discrimination due to substance use.¹²⁵ Despite the need for guidance that supports the development of culturally safe and humble policies related to return to work, the literature included in this review highlights a dearth of evidence relating to Indigenous Peoples. There is a lack of guidance on cultural safety and humility related to return-to-work. Recognizing the ongoing effects of colonialism; addressing racism and stigma in the workplace; ensuring access to treatment, particularly for Indigenous Peoples who live in rural or remote settings^{bb}; providing information about treatment resources specific to Indigenous Peoples (e.g., First Nations Health Authority's [Doctor of the Day](#) program and [Health Benefits for Status First Nations](#)); and recognizing the importance and value of and incorporating Indigenous healing and cultural practices into AUD and/or OUD treatment in return-to-work policies and programs.

4.7.ii Rural and Remote Populations

Similarly, the literature revealed an absence of evidence regarding return-to-work policies and programs in rural^{cc} and remote^{dd} communities. There is a lack of guidance related to barriers

^{bb} While many Indigenous people live in rural and remote communities, 78% of Indigenous people (i.e., First Nations, Metis, and Inuit) in BC live in urban and off-reserve communities.¹²⁶

^{cc} Rural is defined as a population of 1,000–20,000 people; communities may have some specialized acute services, residential care and assisted living, limited inpatient care, primary and community care, and basic and urgent emergency care, depending on the size and needs of the community.¹²⁷

^{dd} Remote is defined as a population of 0–1,000 people; communities may have nurse-led care, first aid, mobile primary and community care. Some remote communities are too small and dispersed to maintain health services, requiring community members to access health care in other communities.¹²⁷

specific to rural and remote populations, particularly limited access to care providers and facilities; privacy concerns of individuals; and additional costs related to travelling for treatment.

4.8 Policy or Regulatory

The policy and regulatory documents found in the literature vary in the industries they represent and the level of detail they provide. These predominately focus on the concept of fitness for duty. Impairment, the use of pharmacotherapy during treatment, and return to work are not identified in any workplace policies included for review. While this report includes only a small subset of workplace policies, this likely reflects a lack of employer awareness and knowledge about the use of pharmacotherapy as part of OUD and/or AUD treatment. This is a concern, since workplace policies provide information for both the employer and the employee. If pharmacotherapy is not mentioned in workplace substance use policies, employees who could benefit from expert assessment and care planning recommendations—which may include pharmacotherapies—employees may not realize that pharmacotherapy is an option for them through their workplace. For individuals who do seek treatment for OUD and/or AUD, the workplace policy provides information for both the employee and the employer when developing a return-to-work agreement. As pharmacotherapy is an essential part of treatment for many with OUD and/or AUD, this omission from workplace policies could lead to conflicts between an individual's treatment preferences and work tasks, which may negatively affect their treatment and substance use outcomes or their safety at work. Employers can be supported to develop workplace policies that incorporate the use of pharmacotherapy, which will provide common frame of reference for both employer and employee to develop a return-to-work plan.

4.9 Guidance

While guidance documents for workplace substance use policies are present in the grey literature, these documents in general provide very high-level recommendations. This is likely due to the dearth of evidence with which to form more specific recommendations. Additionally, even among the documents that provide guidance, the use of pharmacotherapy is discussed in only 2 articles.^{107,113} The guidance found in the literature is not always based on the most current evidence—in one example,¹⁰⁷ the use of pharmacotherapy for opioid use disorder is only recommended for withdrawal management, not continuing care, which runs counter to the recommendations in [Guideline for the Clinical Management of Opioid Use Disorder \(2023\)](#), which recommends opioid agonist treatment as the standard of care for adults diagnosed with OUD.⁵⁸ This highlights the lack of evidence to inform the development of recommendations regarding the use of evidence-based pharmacotherapy for individuals with OUD and/or AUD seeking to return to work.

4.10 Limitations

Scoping reviews are useful to determine the scope and nature of literature on a given topic, to identify the characteristics or factors related to a particular concept, and to identify and analyze gaps present in a given knowledge base. However, there are a number of limitations to a scoping review. Firstly, the methodology of a scoping review does not require a formal assessment of quality or assessment of the included articles for risk of bias. Like all scoping reviews, there is a risk of selection bias in the available evidence and by the scoping report authors in interpreting the results. For example, scoping reviews carry a risk of selection bias in the final data set, as relevant articles may be missed during the literature search. The key findings of this review are dependent on the evidence in the included articles. The report authors strove to minimize selection bias by defining inclusion and exclusion criteria search terms prior to completing the literature search and hiring an information specialist to design and conduct the literature search.

Additionally, this study was limited by the lack of available evidence specific to construction workers, the target population, as well as the absence of workplace policies that address pharmacotherapy, impairment, and return to work. Due to the limited evidence specific to construction workers, safety-sensitive workers in other industries—such as health care, aviation, and enforcement—were included in this review as an alternative source of evidence. It is unclear, however, if the evidence gathered from these populations is directly relevant to construction workers. As noted above in the discussion, aspects such as working environment, culture, and regulation of other industries may make the extrapolation to construction workers less relevant. The use of safety-sensitive workers in this review, rather than all workers, was intended to make this scoping review as relevant as possible, as many construction workers also perform safety-sensitive tasks.

In addition to the dearth of available evidence, this scoping review was also limited by the quality of the evidence that was included for review. Among the 23 academic articles identified, there were only 2 systematic reviews (1 including meta-analysis) and 1 randomized controlled trial. Although assessing the methodological quality of each of the reviewed articles was out of scope for this review, the recognized lack of high-quality evidence represents a significant limitation to extrapolating from these findings.

A number of pharmacotherapies that were included in the initial literature search were not identified in the articles included in this review—namely, slow-release oral morphine (SROM), injectable hydromorphone, and injectable diacetylmorphine. As such, the results of this scoping review are limited to the pharmacotherapies that were identified in the amassed literature (methadone, buprenorphine/naloxone, oral naltrexone, extended-release naltrexone, and acamprosate). When pharmacotherapy was specifically mentioned, the majority of articles included in this review focused on the use of pharmacotherapy for the treatment of OUD. The limited availability of articles discussing the use of pharmacotherapy for AUD represents a significant limitation and gap in the literature.

5.0 Conclusion and Future Directions

Construction workers face a disproportionate burden of substance use-related injuries and fatalities.^{5,6} Due to the safety-sensitive nature of their work, it is in the best interest of both the employee and the employer to support workers with OUD and/or AUD to access effective, evidence-based treatment, including pharmacotherapy when it is indicated by a trained addiction medicine provider. Current approaches to workplace substance use policies in the construction industry do not appear to be based on the most current evidence relating to substance use treatment. As a result, workers with substance use disorders may not receive evidence-based, effective treatment for their SUD. In addition, some policies can contribute to the stigmatization of people who use drugs through the use of punitive approaches. In order to support the development of standardized, evidence-based policies, there is a need to identify the current evidence relating to the use of OUD and/or AUD pharmacotherapy in safety-sensitive positions, and in particular, the construction industry.

This scoping review aimed to identify and describe the current evidence by amassing academic and grey literature relating to the use of OUD and/or AUD pharmacotherapy among workers in safety-sensitive positions, as well as the use of OUD and/or AUD pharmacotherapy as part of return to work. The identified literature represented evidence from a wide range of industries with workers in safety-sensitive positions.

The findings of this scoping review highlighted the dearth of evidence related to this topic. The evidence regarding impairment from OUD and/or AUD pharmacotherapies is scarce and equivocal. It is also not well understood how these medications affect real-world working ability for workers in construction positions, particularly those performing safety-sensitive tasks.

There is also currently a lack of guidance for employers in creating effective, evidence-based workplace substance use policies. A first step for developing evidence-based policies may be the standardization and codification of definitions of important concepts such as impairment, fitness for duty, and safety-sensitive positions and tasks that can strengthen existing workplace substance use policies. The development of standardized approaches to individual functional assessment could also provide tools for employers to support workers to access and complete effective, evidence-based substance use treatment.

This report has identified key areas for research and policy aimed at improving the health and safety of construction workers. For example, further research is needed to explore the impacts of shame, stigma, and equity-oriented factors on substance use in the construction industry. Future policies should address issues specific to Indigenous Peoples, such as cultural safety and humility, and barriers specific to rural and remote populations, such as access to care and privacy concerns. As a result of these findings, the Expert Advisory Panel has developed recommendations to increase knowledge and standardize practice, presented in [Appendix 1](#). It is the aim of the report authors that these findings and recommendations will support practice and policy change that will help reduce the burden of substance use-related harms, including fatalities and injuries, among construction workers, and prompt future change.

Appendix 1: Expert Advisory Panel Recommendations

Based on the findings of this scoping review and expert consensus, the Expert Advisory Panel has developed the recommendations presented in this section.

Policy and Standards

Currently, there is a lack of guidance for supporting employers to create evidence-based workplace substance use policies and standards. Construction industry associations and regulatory bodies (i.e., WorkSafeBC, Ministry of Labour) can support employers to create effective, evidence-based policies and standards by:

1. Creating standardized definitions of key concepts relating to substance use prevention and treatment in a workplace context, including:
 - i. Impairment
 - ii. Fitness for duty/work
 - iii. Safety-sensitive positions
 1. Safety-sensitive positions could be stratified according to the tasks required and the associated risks
2. Developing guiding principles that emphasize trauma-informed, non-punitive, and non-stigmatizing approaches to workplace substance use policies and programs that recognize substance use disorders are often a chronic and relapsing condition that require continuing care, which may include long-term pharmacotherapy
3. Supporting employers to develop evidence-based return-to-work policies and processes, including^{ee}:
 - i. A formal return-to-work agreement
 - ii. Flexible and collaborative return-to-work programming
 - iii. Urine drug testing
 - iv. Clear disability benefits and claims processes
 - v. Access to a qualified return-to-work coordinator or disability manager
 - vi. Regular review of workplace accommodations, including consideration of prescribed medications
 - vii. Aftercare support and programs for relapse prevention
4. Developing policies that incorporate evidence-based pharmacotherapy for OUD and/or AUD and individualized functional assessment for individuals returning to work
5. Developing educational resources for employers that support the development of evidence-based substance use programs, including concepts such as:
 - i. Individualized assessment
 - ii. Pharmacotherapy
 - iii. Safety-sensitive positions
 - iv. Determining impairment
 - v. Stigma related to substance use and/or pharmacotherapy
 - vi. Human rights concerns related to urine drug testing

^{ee} These concepts are based on the recommendations from the Fraser Health Authority report *Supporting Recovery Through Return to Work*¹¹

6. Developing educational resources for employers in rural and remote communities to support employees to access substance use treatment, including considerations for:
 - i. Mitigating inequitable impacts of workplace substance use policies and return-to-work programs on Indigenous communities and people who live in rural and remote contexts

Further Research

Research in the following areas should be pursued and supported:

7. The evaluation of functional and neurocognitive outcomes (such as working memory, reaction time) that have been measured in research settings, and whether they apply in real-world workplace settings
8. The assessment of impairment while performing construction-specific tasks and functions, particularly those that are deemed safety-sensitive
9. The development and validation of tools to assess impairment and fitness for work
10. Pharmacotherapy-specific research that assesses the impact of real-world use of OUD and/or AUD medications on impairment, including initiation, dose increases, and stable (or maintenance) doses, as well as the impact of return to substance use on workplace impairment
11. Context-specific program evaluation that studies the effectiveness of current and novel workplace substance use policies and programs in specific populations, including construction workers and other safety-sensitive occupations. Outcomes requiring further evaluation include the effectiveness of programs at returning workers to their previous positions and patient-reported outcomes such as improvements in abilities related to work
12. The influence of the social context of the workplace on the effectiveness of workplace substance use policies and return-to-work programs. Concepts requiring further exploration and understanding include shame, stigma, equity-oriented factors such as socio-economic status, geography, ethnicity, and gender.

Appendix 2: Academic Search Strategy

The search strategy was developed with the assistance of an information specialist, according to the methodology protocol reviewed and approved by the Expert Advisory Panel. The process was supervised by the medical writing team manager and supported by the internal steering committee. A systematic literature search was conducted to identify key published studies in English from 2005–2020 addressing pharmacotherapy for individuals in safety-sensitive positions with AUD and/or OUD and return-to-work strategies. Separate searches were conducted for two overarching questions: pharmacotherapy for AUD and/or OUD and 1) safety sensitive positions; and 2) return-to-work strategies.

Specifically, several test searches were conducted using *a priori* term tables including subject headings, keywords, and database-specific harvested search terms to identify peer-reviewed articles and papers across health-related databases with international coverage: (Medline, Embase, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials via Ovid; CINAHL and PsycINFO via EbscoHost; Sociological Abstracts and PAIS via Proquest; and Web of Science— Social Science Citation Index via Clarivate). Where subjects are well-indexed, subject headings were used to increase relevance and precision of search results and to ensure a manageable number of items retrieved; where subjects are less well-indexed, or had not yet been assigned subject headings, key words were added to increase recall. Subject headings used were database dependent, but analogous to the Medical Subject Headings (MeSH) used in Medline.

Specific search parameters (e.g., inclusion/exclusion criteria, jurisdictions, time frame, languages of publication) were developed in consultation with BCCSU staff and the manager of the medical writing team during initial planning stages and as per the population, concept, and the context (PCC) analysis.

Inclusion Criteria

- Studies:
 - Secondary research: Systematic reviews, meta-analyses and other high-level evidence-based synthesis studies
 - Guidelines
 - Primary research: Clinical trials, quasi-experimental studies, mixed methods
- Jurisdictions: Any
- Languages: English
- Published: 2005–2020

Exclusion Criteria

- Non-English language publications

Records from database searches were downloaded and imported into an EndNote database to facilitate removal of duplicates and article screening. Final database searches were conducted on September 17, 2020.

Items Identified by Database

Question 1: Safety-Sensitive

Database Name	Number of items Identified	Number of items (Duplicates Removed)
Medline	10	10
Embase	23	13
CDSR	0	0
CCRCT	3	1
CINAHL	6	1
PsycINFO	8	1
Sociological Abstracts	3	3
PAIS Index	1	1
Web of Science	10	3
Total – All Databases	64	33

Question 2: Return to Work

Database Name	Number of items Identified	Number of items (Duplicates Removed)
Medline	117	47
Embase	111	49
CDSR	0	0
CCRCT	32	3
CINAHL	66	57
PsycINFO	21	5
Sociological Abstracts	16	14
PAIS Index	7	7
Web of Science	25	7
Total – All Databases	395	189

Sample Search Strategy

Two sample search strategies—one for each question—follow.

Question 1: Safety-sensitive

EBM Reviews – Cochrane Central Register of Controlled Trials July 2020, EBM Reviews – Cochrane Database of Systematic Reviews 2005 to August 26, 2020, Embase 1974 to 2020 August 28 , Ovid MEDLINE® ALL 1946 to August 28, 2020

1	Alcoholic Intoxication/ or Alcoholism/ or Alcohol Drinking/ or Binge Drinking/ or drinking behavior/	314841
2	("alcohol use disorder*" or drunkenness or "binge drink*" or "problem drink*" or "problematic drink*" or "heavy drink*" or "risky drink*" or "high risk drink*" or "low risk drink*" or "harmful drink*" or "hazardous drink*" or alcohol* or inebriat* or intoxicat* or "alcohol craving*" or "craving alcohol").ti,ab,kf,kw.	379087
3	("problem alcohol use" or "problematic alcohol use" or "heavy alcohol use" or "risky alcohol use" or "at risk alcohol use" or "high risk alcohol use" or "low risk alcohol use" or "chronic alcohol use" or "harmful alcohol use" or "hazardous alcohol use").ti,ab,kf,kw.	9873
4	("alcohol dependen*" or "alcohol misuse*" or "alcohol mis-use*" or "alcohol abuse*" or "alcohol overuse*" or "alcohol over use*" or "alcohol addict*" or "alcohol use disorder*" or "alcohol use").ti,ab,kw,kf.	175879
5	or/1-4 [AUD]	616084
6	exp Opioid-Related Disorders/ or opiate addiction/	49163
7	((opiod* or opiate*) adj2 "use" adj2 disorder*).ti,ab,kf,kw.	7673
8	(opiod* or opiate*).ti,ab,kf,kw.	286447
9	(fentanyl or phentanyl or Fentanest or Sublimaze or Duragesic or Durogesic or Fentora or "R 4263" or R4263).ti,ab,kf,kw.	59893
10	(oxycontin or oxycodone or dihydron or oxycone or dihydrohydroxycodone or oxycodone or eucodal or theocodin or pancodine or dinarkon or oxiconum or oxycodan or 64nglish64 or Percodan or 64nglish or dihydron or oxycone or dihydrohydroxycodone or oxycodone or theocodin).ti,ab,kf,kw.	12689
11	(codeine or methylmorphine or isocodeine or ardinex or 64nglish64ate or hydrocondone or 64nglish64ate64none or dicodid or robidone or condinovo or hycodan or hycon).ti,ab,kf,kw.	13527

12	(heroin or diacetylmorphine or diamorphine or diagesil or diamorf or morphine or morphia or ms contin or oramorph or duramorph or "SDZ 202 250" or "SDZ202 250" or SDZ202250).ti,ab,kf,kw.	163381
13	or/8-12	426011
14	(dependen* or misuse* or mis-use* or abuse* or overuse* or over-use* or addict*).ti,ab,kf,kw.	4211909
15	13 and 14	115436
16	or/6-7,15 [OUD]	138941
17	Naltrexone/ or (Naltrexone or Antaxone or Celupan or "EN 1639A" or EN1639A or Nalorex or Nemexin or ReVia or Trexan or Vivitrol).ti,ab,kf,kw.	28564
18	Acamprosate/ or (acamprosate or acetylhomotaurine or Aotal or Campral or Regtect or Zulex).ti,ab.	3774
19	17 or 18 [AUD Tx]	30124
20	5 and 19 [AUD + AUD Tx]	7932
21	Buprenorphine/ or "Buprenorphine, Naloxone Drug Combination"/	25563
22	(Buprenorphine or Buprenex or Prefin or Subutex or Buprex or Temgesic or 6029 M or 6029M or RX-6029-M or RX 6029 M or RX6029M or suboxone).ti,ab,kf,kw.	20011
23	Methadone/	45366
24	(Methadone or Biodone or Dolophine or Metadol or Metasedin or Symoron or Methadose or Methex or Phenadone or Physeptone or Phymet or Pinadone or Amidone or Methaddict).ti,ab,kf,kw.	35466
25	Morphine/ and (Delayed-Action Preparations/ or delayed release formulation/) and "Administration, Oral"/	241
26	((slow-release or delayed-release or delayed-action or sustained-release or extended-release) adj3 (oral or orally) adj3 (morphine* or MS contin or oramorph or duramorph or SDZ 202 250 or SDZ 202250 or SDZ202 250 or SDZ202250)) or SROM or SROMOS).ti,ab,kf,kw.	667
27	Morphine/ and ((slow-release or delayed-release or delayed-action or sustained-release or extended-release) and (oral or orally)).ti,ab,kf,kw.	759
28	(Hydromorphone/ or Heroin/tu) and (exp Injections/ or injectable.ti,ab,kf,kw.)	612

29	(inject* adj3 (hydromorphone or Dihydromorphinone or Hydromorphon or Palladone or Laudacon or Dilaudid or diacetylmorphine or diamorphine or diagesil or diamorf or diacetylmorphine)).ti,ab,kf,kw.	292
30	(exp Injections/ or injection/) and (hydromorphone or Dihydromorphinone or Hydromorphon or Palladone or Laudacon or Dilaudid or diacetylmorphine or diamorphine or diagesil or diamorf or diacetylmorphine).ti,ab,kf,kw.	602
31	"Administration, Oral"/ or oral drug administration/ or Delayed-Action Preparations/ or delayed release formulation/ or (oral or orally or slow-release or delayed-release or delayed-action or sustained-release or extended-release).ti,ab,kf,kw.	2182345
32	17 and 31	4483
33	Opiate Substitution Treatment/	5813
34	((("opiate substitution" or "opioid substitution") adj3 (therap* or treatment* or pharmacother* or "pharmaco ther*" or intervention*)).ti,ab,kf,kw.	2545
35	((opioid agonist* or opioid antagonist*) adj3 (therap* or treatment* or pharmacother* or "pharmaco ther*" or intervention*)).ti,ab,kf,kw.	2372
36	(OAT or OATs or iOAT*).ti,ab,kf,kw.	22976
37	Narcotic Antagonists/ or narcotic antagonist/	17034
38	or/21-30,32-37 [OUD Tx]	117592
39	16 and 38 [OUD + OUD Tx]	38913
40	20 or 39 [(AUD OR OUD) + (AUD Tx OR OUD Tx)]	45597
41	("safety sensitive" or "safety critical" or "decision critical").ti,ab,kf,kw.	1309
42	Environmental Medicine/	550
43	Occupational Medicine/ or industrial medicine/	37024
44	("industrial medicine" or "occupational medicine" or "environmental medicine").ti,ab,kf,kw.	19248
45	Work Performance/ or job performance/	17653
46	((work* or employ* or job*) adj2 perform*).ti,ab,kf,kw.	49113
47	or/41-46 [SAFETY-SENSITIVE]	110653
48	Construction Industry/ or building industry/	5004

49	((construction or building) adj2 (industry or industries or trade or trades)).ti,ab,kf,kw.	4745
50	((construction or building) adj2 (employee* or worker* or occupation*)).ti,ab,kf,kw.	5293
51	or/48-50 [CONSTRUCTION INDUSTRY]	11478
52	47 or 51 [SAFETY-SENSITIVE OR CONSTRUCTION INDUSTRY]	121462
53	40 and 52 [(AUD OR OUD) + (AUD Tx OR OUD Tx) + (SAFETY-SENSITIVE OR CONSTRUCTION INDUSTRY)]	52
54	limit 53 to (67nglish language and yr="2005 -Current") [Limit not valid in CDSR; records were retained]	36 3
	EBM Reviews – Cochrane Central Register of Controlled Trials <July 2020>	0
	EBM Reviews – Cochrane Database of Systematic Reviews <2005 to August 26, 2020>	23 10
	Embase <1974 to 2020 August 28>	
	Ovid MEDLINE® ALL <1946 to August 28, 2020>	
55	remove duplicates from 54	26
	EBM Reviews – Cochrane Central Register of Controlled Trials <July 2020>	1
	EBM Reviews – Cochrane Database of Systematic Reviews <2005 to August 26, 2020>	0 15
	Embase <1974 to 2020 August 28>	10
	Ovid MEDLINE® ALL <1946 to August 28, 2020>	

Question 2: Return to Work

CINAHL (1982 – present)

S1	MH "Alcoholic Intoxication") OR (MH "Alcoholism") OR (MH "Alcohol Abuse") OR (MH "Binge Drinking")	30,499
	TI ("alcohol use disorder*" OR drunkenness OR "binge drink*" OR "problem drink*" OR "problematic drink*" OR "heavy drink*" OR "risky drink*" OR "high risk drink*" OR "low risk drink*" OR "harmful drink*" OR "hazardous drink*" OR alcoholi* OR inebriat* OR intoxicat* OR "alcohol craving*" OR "craving alcohol") OR AB ("alcohol use disorder*" OR drunkenness OR "binge drink*" OR "problem drink*" OR "problematic drink*" OR "heavy drink*" OR "risky drink*" OR "high risk drink*" OR "low risk drink*" OR "harmful drink*" OR "hazardous drink*" OR alcoholi* OR inebriat* OR intoxicat* OR "alcohol craving*" OR "craving alcohol")	
S2		31,541

S3	TI ("problem alcohol use" OR "problematic alcohol use" OR "heavy alcohol use" OR "risky alcohol use" OR "at risk alcohol use" OR "high risk alcohol use" OR "low risk alcohol use" OR "chronic alcohol use" OR "harmful alcohol use" OR "hazardous alcohol use") OR AB ("problem alcohol use" OR "problematic alcohol use" OR "heavy alcohol use" OR "risky alcohol use" OR "at risk alcohol use" OR "high risk alcohol use" OR "low risk alcohol use" OR "chronic alcohol use" OR "harmful alcohol use" OR "hazardous alcohol use")	1,928
S4	TI ("alcohol dependen*" OR "alcohol misuse*" OR "alcohol mis-use*" OR "alcohol abuse*" OR "alcohol overuse*" OR "alcohol over use*" OR "alcohol addict*" OR "alcohol use disorder*" OR "alcohol use") OR AB ("alcohol dependen*" OR "alcohol misuse*" OR "alcohol mis-use*" OR "alcohol abuse*" OR "alcohol overuse*" OR "alcohol over use*" OR "alcohol addict*" OR "alcohol use disorder*" OR "alcohol use")	27,714
S5	S1 OR S2 OR S3 OR S4	60,899
S6	TI ((opioid* OR opiate*) N2 "use" N1 disorder*) OR AB ((opioid* OR opiate*) N2 "use" N1 disorder*)	2,427
S7	TI (opioid* OR opiate*) OR AB (opioid* OR opiate*)	36,182
S8	TI (fentanyl OR phentanyl OR Fentanest OR Sublimaze OR Duragesic OR Durogesic OR Fentora OR "R 4263" OR R4263) OR AB (fentanyl OR phentanyl OR Fentanest OR Sublimaze OR Duragesic OR Durogesic OR Fentora OR "R 4263" OR R4263)	4,778
S9	TI (oxycontin OR oxycodone OR dihydron OR oxycone OR dihydrohydroxycodone OR oxycodone OR eucodal OR theocodin OR pancodine OR dinarkon OR oxiconum OR oxycodan OR 68nglish68 OR Percodan OR Vicodin OR dihydron OR oxycone OR dihydrohydroxycodone OR oxycodone OR theocodin) OR AB (oxycontin OR oxycodone OR dihydron OR oxycone OR dihydrohydroxycodone OR oxycodone OR eucodal OR theocodin OR pancodine OR dinarkon OR oxiconum OR oxycodan OR 68nglish68 OR Percodan OR Vicodin OR dihydron OR oxycone OR dihydrohydroxycodone OR oxycodone OR theocodin)	1,828
S10	TI (codeine OR methylmorphine OR isocodeine OR ardinex OR 68nglish68ate OR hydrocondone OR 68nglish68ate68none OR dicodid OR robidone OR condinovo OR hycodan OR hycon) OR AB (codeine OR methylmorphine OR isocodeine OR ardinex OR 68nglish68ate OR hydrocondone OR 68nglish68ate68none OR dicodid OR robidone OR condinovo OR hycodan OR hycon)	996
S11	TI (heroin OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR morphine OR morphia OR ms contin OR oramorph OR duramorph OR "SDZ 202 250" OR "SDZ202 250" OR SDZ202250) OR AB (heroin OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR morphine OR morphia OR ms contin OR oramorph OR duramorph OR "SDZ 202 250" OR "SDZ202 250" OR SDZ202250)	14,033
S12	S7 OR S8 OR S9 OR S10 OR S11 OR S11	48,071
S13	TI (dependen* OR misuse* OR mis-use* OR abuse* OR overuse* OR over-use* OR addict*) OR AB (dependen* OR misuse* OR mis-use* OR abuse* OR overuse* OR over-use* OR addict*)	210,251

S14	S12 AND S13	13,416
S15	S6 OR S14	14,782
S16	(MH "Naltrexone") OR TI (Naltrexone OR Antaxone OR Celupan OR "EN 1639A" OR EN1639A OR Nalorex OR Nemexin OR ReVia OR Trexan OR Vivitrol) OR AB (Naltrexone OR Antaxone OR Celupan OR "EN 1639A" OR EN1639A OR Nalorex OR Nemexin OR ReVia OR Trexan OR Vivitrol)	2,689
S17	(MH "Acamprosate Calcium") OR TI (acamprosate OR acetylhomotaurine OR Aotal OR Campral OR Regtect OR Zulex) OR AB (acamprosate OR acetylhomotaurine OR Aotal OR Campral OR Regtect OR Zulex)	350
S18	S16 OR S17	2,805
S19	S5 AND S18	975
S20	MH "Buprenorphine" OR TI (Buprenorphine OR Buprenex OR Prefin OR Subutex OR Buprex OR Temgesic OR "6029 M" OR 6029M OR RX-6029-M OR "RX 6029 M" OR RX6029M OR suboxone) OR AB (Buprenorphine OR Buprenex OR Prefin OR Subutex OR Buprex OR Temgesic OR "6029 M" OR 6029M OR RX-6029-M OR "RX 6029 M" OR RX6029M OR suboxone)	4,431
S21	MH "Methadone" OR TI (Methadone OR Biodone OR Dolophine OR Metadol OR Metasedin OR Symoron OR Methadose OR Methex OR Phenadone OR Physeptone OR Phymet OR Pinadone OR Amidone OR Methaddict) OR AB (Methadone OR Biodone OR Dolophine OR Metadol OR Metasedin OR Symoron OR Methadose OR Methex OR Phenadone OR Physeptone OR Phymet OR Pinadone OR Amidone OR Methaddict)	6,722
S22	TI (((("slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release") N3 (oral OR orally) N3 (morphine* OR "MS contin" OR oramorph OR duramorph OR SDZ 202 250 OR SDZ 202250 OR SDZ202 250 OR SDZ202250)) OR SROM OR SROMOS) OR AB (((("slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release") N3 (oral OR orally) N3 (morphine* OR "MS contin" OR oramorph OR duramorph OR SDZ 202 250 OR SDZ 202250 OR SDZ202 250 OR SDZ202250)) OR SROM OR SROMOS)	100
S23	(MH "Morphine") AND (TI ((("slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release") AND (oral OR orally)) OR AB ("slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release") AND (oral OR orally)))	95
S24	TI (inject* N3 (hydromorphone OR Dihydromorphinone OR Hydromorphon OR Palladone OR Laudacon OR Dilaudid OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR diacetylmorphine)) OR AB (inject* N3 (hydromorphone OR Dihydromorphinone OR Hydromorphon OR Palladone OR Laudacon OR Dilaudid OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR diacetylmorphine))	57
S25	(MH "Injections+") AND (TI (hydromorphone OR Dihydromorphinone OR Hydromorphon OR Palladone OR Laudacon OR Dilaudid OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR diacetylmorphine) OR AB (hydromorphone OR Dihydromorphinone OR Hydromorphon OR Palladone OR Laudacon OR Dilaudid OR diacetylmorphine OR diamorphine OR diagesil OR diamorf OR diacetylmorphine))	126

S26	TI (oral OR orally OR "slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release") OR AB (oral OR orally OR "slow-release" OR "delayed-release" OR "delayed-action" OR "sustained-release" OR "extended-release")	142,775
S27	S16 AND S26	491
S28	TI (("opiate substitution" OR "opioid substitution") N3 (therap* OR treatment* OR pharmacother* OR "pharmaco ther*" OR intervention*)) OR AB (("opiate substitution" OR "opioid substitution") N3 (therap* OR treatment* OR pharmacother* OR "pharmaco ther*" OR intervention*))	515
S29	TI (("opioid agonist*" OR "opioid antagonist*") N3 (therap* OR treatment* OR pharmacother* OR "pharmaco ther*" OR intervention*))	514
S30	TI (OAT OR OATs OR iOAT*) OR AB (OAT OR OATs OR iOAT*)	1,184
S31	(MH "Narcotic Antagonists")	2,282
S32	S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S27 OR S28 OR S29 OR S30 OR S31	13,189
S33	S15 AND S32	4,663
S34	S19 OR S33	5,539
S35	MH "Job Re-Entry"	6,669
S36	TI ((resum* OR return* OR 70nglish70ate* OR re-integrat*) N2 (work* OR employ* OR job*)) OR AB ((resum* OR return* OR 70nglish70ate* OR re-integrat*) N2 (work* OR employ* OR job*))	7,011
S37	TI (RTW) OR AB (RTW)	741
S38	TI (reemploy* OR re-employ*) OR AB (reemploy* OR re-employ*)	198
S39	TI ("back to work") OR AB ("back to work")	592
S40	TI ((stay* OR remain* OR sustain* OR retention OR retain*) N2 (work* OR employ* OR job*)) OR AB ((stay* OR remain* OR sustain* OR retention OR retain*) N2 (work* OR employ* OR job*))	6,444
S41	TI ("ability to work") OR AB ("ability to work")	884
S42	TI ("work enabling" N5 "opioid management") OR AB ("work enabling" N5 "opioid management")	1
S43	MH "Sick Leave"	5,029
S44	TI ("sick* leave" OR "sickness absence" OR "disability leave" OR "disability absence") OR AB ("sick* leave" OR "sickness absence" OR "disability leave" OR "disability absence")	3,743
S45	TI ("Short Term Illness and Injury Plan" OR STIIP) OR AB ("Short Term Illness and Injury Plan" OR STIIP)	0

S46	TI ("Early Intervention and Return to Work program") OR AB ("Early Intervention and Return to Work program")	0
S47	MH " Rehabilitation, Vocational"	6,035
S48	TI (public N3 safety) OR AB (public N3 safety)	2,060
S49	S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR 48	75,277
S50	S34 AND S49	76
S51	S50 AND (LA english) AND (DT 2005-2020)	66

Appendix 3: Grey Literature Search Strategy

In addition to the academic literature, a limited search was conducted for grey literature published in English from 2010–2020. Specific search parameters (e.g., inclusion/exclusion criteria, jurisdictions, time frame, languages of publication) were developed in consultation with BCCSU staff, the manager of the medical writing team, and the steering committee during initial planning stages and as per the population, concept, and the context analysis.

Include:

Population: Safety-sensitive workers with alcohol and/or opioid use disorders, including co-occurring disorders

Language: English

Time: January 1, 2010 to September 17, 2020

Exclude:

Population: Mental health with no substance use component; patients on opioid analgesia; substance use disorders other than AUD or OUD

Items Identified by Database

Relevant organizations in Canada and other international jurisdictions were identified and searched using search terms related to the research question, such as “opioid use disorder”, “return to work”, safety sensitive”, and “pharmacotherapy”. More general international databases were also searched using similar search terms. The table below shows the identified websites included in the grey literature search and the identified results from each.

Organization	Website	Findings
Canada		
Canadian Agency for Drugs and Technologies in Health (CAD-AMC)	https://www.cadth.ca/search?keywords=	1 item in scope
Canadian Institutes of Health Research (CIHR)	https://cihr-irsc.gc.ca/e/193.html	No items in scope
Public Health Agency of Canada (PHAC)	https://www.canada.ca/en/public-health.html	No items in scope
Canadian Institute for Health Information (CIHI)	http://www.cihi.ca/	No items in scope
Canadian Research Initiative on Substance Matters (CRISM)	http://www.crism.ca	No items in scope
Canada Commons	https://canadacommons.ca/	No items in scope
Aurora – Library and Archives Canada's catalogue	https://bac-lac.on.worldcat.org/discovery?lang=en	No items in scope
Canadian Centre on Substance Use and Addiction	http://www.ccsa.ca	1 item in scope
CAMH. Workplace Mental Health Resource Centre	https://www.camh.ca/en/health-info/workplace-mental-health-playbook-for-business-leaders/resource-centre	No items in scope
Mental Health Commission of Canada	https://www.mentalhealthcommission.ca/English/what-we-do/mental-health-and-substance-use	No items in scope
The Centre for Applied Research in Mental Health and Addiction (CARMHA)	https://www.sfu.ca/carmha/about.html	No items in scope
Institute for Work and Health	https://www.iwh.on.ca	No items in scope
Construction Labour Relations Association of BC—Drug and Alcohol Policy page	https://www.clra-bc.com/services/drug-alcohol-policy/	1 item in scope
Construction Owners Association of Alberta	https://www.coaa.ab.ca	4 items in scope
Canadian Construction Association	https://www.cca-acc.com	1 item in scope

BC Building Trades	https://bcbuildingtrades.org	No items in scope
Conference Board of Canada	https://www.conferenceboard.ca	1 item in scope
CMA Infobase: Clinical Practice Guidelines	https://joulecma.ca/cpg/homepage	No items in scope
National Case Management Network	http://www.ncmn.ca	No items in scope
United States		
Agency for Healthcare Research and Quality (AHRQ)—Technology Assessments	https://www.ahrq.gov/research/findings/ta/index.html	No items in scope
Agency for Healthcare Research and Quality (AHRQ)—Evidence-Based Practice	http://www.ahrq.gov/research/findings/evidence-based-reports/search.html	1 item in scope
ECRI Guidelines Trust	https://guidelines.ecri.org/	No items in scope
Substance Abuse and Mental Health Services Administration (SAMHSA)	https://store.samhsa.gov	1 item in scope
National Institute on Drug Abuse (NIDA), NIH	https://www.drugabuse.gov	Items in scope; previously identified
American Society of Safety Professionals	http://www.assp.org	No items in scope
Center for Construction Research and Training	http://www.cpwr.com	Items in scope; previously identified
North American Building Trades Unions—NABTU Opioid Task Force	https://nabtu.org/home-page/cpwr-covid-19/nabtu-opioid-taskforce-opioid-resources/	Items in scope; previously identified
National Institute for Occupational Safety and Health (NIOSH), CDC	https://www.cdc.gov/niosh/index.htm	2 items in scope
Center for Workplace Mental Health	http://workplacementalhealth.org	No items in scope
United Kingdom		
National Institute for Health and Care Excellence (NICE) Guidelines	http://www.nice.org.uk/guidance	No items in scope
TRIP Database	http://www.tripdatabase.com	3 items in scope
Evidence for Policy and Practice Information (EPPI)	https://eppi.ioe.ac.uk/cms/	No items in scope
Australia and New Zealand		
The Building Trades Group Drug & Alcohol Program	https://btgda.org.au	No items in scope

International Databases		
LILACS	https://bvsalud.org/en/	1 item in scope
Epistemonikos	https://www.epistemonikos.org/en/advanced_search	No items in scope
ETHOS	https://ethos.bl.uk/Home.do	No items in scope
OAISTER	https://oaister.worldcat.org	No items in scope
Centre for Reviews and Dissemination	http://www.crd.york.ac.uk/crdweb/SearchPage.asp	No items in scope
National Safety Council	https://www.nsc.org/work-safety/safety-topics/drugs-at-work/substances	1 item in scope
Google	http://www.google.com	68 items in scope

Sample Search Strategy

An example of the search strategy of one of these databases is included below.

Google

<http://www.google.com>

"safety-sensitive" ("opioid use disorder"|"alcohol use disorder"|AUD) (pharmacotherapy|drug therapy) 168,000

"safety-sensitive" ("opioid use disorder"|AUD) (pharmacotherapy|"drug therapy") 2630 / 1
1 item

("safety-sensitive work"|"safety-sensitive workers"|"safety-sensitive positions") ("opioid use disorder"|AUD) ("opioid antagonist"|buprenorphine|methadone|hydromorphone|naltrexone) 151,000 / 6
6 items

("return to work"|RTW) ("opioid use disorder"|AUD) ("opioid antagonist"|buprenorphine|methadone|hydromorphone|naltrexone) 210,000 / 3
3 items

"safety-sensitive" ("alcohol use disorder"|AUD) (pharmacotherapy|"drug therapy") 170,000
("safety-sensitive work"|"safety-sensitive workers"|"safety-sensitive positions") ("alcohol use disorder"|AUD) (pharmacotherapy|"drug therapy") 47 / 0
Nothing in scope

("safety-sensitive work"|"safety-sensitive workers"|"safety-sensitive positions") ("alcohol use disorder"|AUD) (naltrexone|acamprosate) 157,000 / 0
Nothing in scope

("return to work"|RTW) ("alcohol use disorder"|AUD) (naltrexone|acamprosate) 183,000 / 4
4 items

Appendix 4: Sources Excluded Following Full-Text Review

Academic Literature Excluded List with Reasons

Author/date	Title	Reason
Abbott 2009	A Review of The Community Reinforcement Approach in The Treatment of Opioid Dependence	Intervention out of scope
Aklin 2014	A Therapeutic Workplace for the Long-term Treatment of Drug Addiction and Unemployment: Eight-year Outcomes of a Social Business Intervention	Intervention out of scope
Augustis 2016	The Meaning of Work: Perceptions of Employed Persons Attending Maintenance Treatment for Opiate Addiction	Intervention out of scope
DeFulio 2012	Employment-Based Reinforcement of Adherence to An FDA Approved Extended-Release Formulation of Naltrexone in Opioid-Dependent Adults: A Randomized Controlled Trial	Intervention out of scope
Holtyn 2014	Employment-Based Abstinence Reinforcement Promotes Opiate and Cocaine Abstinence in Out-Of-Treatment Injection Drug Users	Intervention out of scope
Kang 2006	Predictors of Engagement in Vocational Counseling for Methadone Treatment Patients	Intervention out of scope
Knealing 2008	Economic cost of the therapeutic workplace intervention added to methadone maintenance	Intervention out of scope
Magura 2007	An Innovative Job Placement Model for Unemployed Methadone Patients: A Randomized Clinical Trial	Intervention out of scope
Milloy 2019	Curb Heroin in Plants (C.H.I.P.): Revisiting A Mid-1970s Intervention into Workplace Heroin Addiction Created and Led by Detroit Autoworkers	Intervention out of scope
Monaghan 2013	Work and The Journey to Recovery: Exploring the Implications of Welfare Reform for Methadone Maintenance Clients	Intervention out of scope
Silverman 2005	A Web-Based Therapeutic Workplace for The Treatment of Drug Addiction and Chronic Unemployment	Intervention out of scope
Varghese 2014	Opioid Use Remits, Depression Remains	Intervention out of scope
Carpenedo 2007	Professional Demeanor of Chronically Unemployed Cocaine-Dependent Methadone Patients in A Therapeutic Workplace	Outcomes out of scope
Crevecoeur-MacPhail 2012	Implementing A Vivitrol Treatment Program for Alcohol Dependence in A Community-Based Healthcare Setting: Results of A Pilot Program	Outcomes out of scope

Gutwinski 2013	Take Home Maintenance Medication in Opiate Dependence	Outcomes out of scope
Holtyn 2015	Employment-Based Reinforcement of Opiate and Cocaine Abstinence in Out-Of-Treatment Injection Drug Users	Outcomes out of scope
Katz 2012	Alcohol Use in Polish 9/11 Responders: Implications for Cross-Cultural Treatment	Outcomes out of scope
Luo 2017	Re-Entry and Related Predictors Among HIV-Infected Clients Receiving Methadone Maintenance Treatment in Guangdong Province, China	Outcomes out of scope
McCormack 2019	Implementing Emergency Department-Initiated Buprenorphine in Low-Resource, High-Need Settings	Outcomes out of scope
Singh 2020	Methamphetamine Use and Misconceptions Among Primary and Private Methadone Maintenance Treatment (MMT) Program Attendees in Klang Valley, Malaysia	Outcomes out of scope
Zimmermann 2017	Validation of A Human Test System for Development of Medications for Alcoholism (TEMA)	Setting out of scope
Koo 2007	Factors for Employment: A Case-Control Study of Fully Employed and Unemployed Heroin Users	Patient population out of scope

Grey Literature Excluded List with Reasons

Author(s)/Organization and Title	Reason(s)
Employers' guide: Alcohol and drug awareness for supervisors. Supplementary information. Canadian Model for Providing a Safe Workplace – Version 6.0 – July 1, 2018. Construction Owners Association of Alberta. 2018.	No mention of pharmacotherapy
Supervisor' guide: Alcohol and drug awareness for supervisors. Supplementary information. Canadian Model for Providing a Safe Workplace – Version 6.0 – July 1, 2018. Construction Owners Association of Alberta. 2018	No mention of pharmacotherapy
Workers' guide: Alcohol and drug awareness for supervisors. Supplementary information. Canadian Model for Providing a Safe Workplace – Version 6.0 – July 1, 2018. Construction Owners Association of Alberta. 2018.	No mention of pharmacotherapy
Drug and Alcohol Policy Resource Material. Canadian Construction Association	No mention of pharmacotherapy
Reframing Primary Prevention and Opioid Use Reduction in the Construction Industry. FrameWorks Institute. 2020	No mention of pharmacotherapy
Construction Industry of British Columbia Substance Abuse Testing and Treatment Policy. Interpretation bulletin. Re: Workplace Absences and Pre-Access Testing. 2011	No mention of pharmacotherapy
Drug and Alcohol Policy Resource Manual. Canadian Construction Association. 2014.	No mention of pharmacotherapy

Policy: Drug, Alcohol & Impairment. Coast Mountain College. 2018 [under review].	No mention of pharmacotherapy
Alcohol Drugs and Substance Misuse Policy. University of Suffolk. 2012 [Reviewed 2016].	No mention of pharmacotherapy
Alcohol and other drugs. SafeWork, New South Wales. 2020.	No mention of pharmacotherapy
State of Policies and Practices on Substance Use in Safety-sensitive Industries in Canada. Canadian Centre on Substance Use and Addiction. 2017.	No mention of pharmacotherapy
Workplace Policies on Substance Use: Implications for Canada. CSA Group. 2018.	No mention of pharmacotherapy
Procedural Guidelines for Policy AU0200 – Substance Use Disorder. Interior Health. 2013; reviewed/revised 2019.	No mention of pharmacotherapy
The Addicted employee: After treatment. Alberta Health Services. 2010.	No mention of pharmacotherapy
Ontario Public Service Occupational Health and Safety Policy. Government of Ontario. 2018 [reviewed 2019].	No mention of pharmacotherapy
Alcohol and Substance Use Policy. City of Maple Ridge. 2018.	No mention of pharmacotherapy
Fit for work: A comprehensive approach. Alberta Health Services. 2014.	No mention of pharmacotherapy
Human Performance Management: Fitness for Duty, Volume II: Managing Alcohol and Drug Use, version 2. [Draft not for distribution.] Canadian Nuclear Safety Commission. 2018.	No mention of pharmacotherapy
Fitness for Duty Programs. Government of the United States. 2020.	No mention of pharmacotherapy
Impairment in the workplace: What your organization needs to know. Canadian Mental Health Association Ontario. 2019	No mention of pharmacotherapy
Human Resources Policy: Fitness for duty: Alcohol and other drugs. Queensland Health. 2020.	No mention of pharmacotherapy
Procedures and Advice for Addressing Impairment in the Workplace. Government of Yukon. [no date]	No mention of pharmacotherapy
Alcohol and Drug Use and Fitness for Duty. Blessing-Rieman College of Nursing and Health Sciences. 2007; revised 2019.	No mention of pharmacotherapy
Substance Abuse and Drug Free Workplace Policy. Dartmouth-Hitchcock. [2020?].	No mention of pharmacotherapy
Impairment and Workplace Health and Safety. Ontario Ministry of Labour, Training and Skills Development. 2018.	No mention of pharmacotherapy
Beyond Testing: Responding to Drugs or Alcohol in the Workplace with Due Diligence in the Mix. Taylor McCaffrey Lawyers. 2015	No mention of pharmacotherapy
Substance Abuse Policy 2018. City of Toronto. 2013; rev. 2018.	No mention of pharmacotherapy
Recent Alcohol and Drug Workplace Policies in Canada - Considerations for the Nuclear Industry. Canadian Nuclear Safety Commission. 2011.	No mention of pharmacotherapy
Opioids in the Maryland workplace: challenges and solutions: A report on the November 5, 2018 workshop. Maryland Department of Health. 2019.	Brief mention of pharmacotherapy and no mention of RTW
VA/DoD Clinical Practice Guideline for the Management of Substance Use Disorders. 2015.	No mention of RTW and workplace
Assessing fitness to drive for commercial and private vehicle drivers 2016: Medical standards for licensing and clinical management guidelines: a resource for health professionals in Australia As amended up to August 2017 Austroads Ltd. 2017.	Wrong context and concept

Retention Strategies for Medications for Addiction Treatment in Adults with Opioid Use Disorder: A Rapid Evidence Review.	No mention of safety-sensitive and/or RTW
Buprenorphine for opioid use disorder: a review of comparative clinical effectiveness, safety, cost-effectiveness, and guidelines. Ottawa: CADTH; 2019 Apr. (CADTH rapid response report: summary with critical appraisal).	No mention of RTW and/or employment
Tapering opioids: a comprehensive qualitative review. Ann Palliat Med. 2020;9(2):586-610. doi:10.21037/apm.2019.12.10.	Out of scope
The Risks of Opioid Use and the Treatment for Opioid Use Disorder in the Workplace. Journal: The Official Publication of the Ontario Occupational Health Nurses Association; Toronto Vol. 39, Iss. 1, (Spring/Summer 2020): 8-12.	Out of scope
National Academies of Sciences, Engineering, and Medicine. 2019. Medications for Opioid Use Disorder Save Lives. Washington, DC: The National Academies Press	Out of scope
Frimpong JA, Guerrero EG. Management Practices to Enhance the Effectiveness of Substance Use Disorder Treatment. 2019. In: Effective Prevention and Treatment of Substance Use Disorders for Racial and Ethnic Minorities. Edited by Erick Guerrero and Tenie Khachikian.	Out of scope and no pharmacotherapy

References

1. Min JE, Pearce LA, Homa F, et al. Estimates of opioid use disorder prevalence from a regression-based multi-sample stratified capture-recapture analysis. *Drug and Alcohol Dependence*. 2020;1(217):108337. doi:10.1016/j.drugalcdep.2020.108337
2. British Columbia Centre on Substance Use, BC Ministry of Health, and BC Ministry of Mental Health and Addictions. A Guideline for the Clinical Management of Opioid Use Disorder. Published November 2023. Available at: <https://www.bccsu.ca/opioid-use-disorder/>.
3. BC Coroners Service. Unregulated drug Deaths in BC (to December 31, 2022). Available at: <https://www2.gov.bc.ca/gov/content/life-events/death/coroners-service/statistical-reports>.
4. Bush DM, Lipari RN. *Substance Use and Substance Use Disorder by Industry*. 2015. https://www.samhsa.gov/data/sites/default/files/report_1959/ShortReport-1959.html
5. Statistics Canada. Drug overdose crisis: Socioeconomic characteristics of those dying of illicit drug overdoses in British Columbia, 2011 to 2016. Statistics Canada; 2018. <https://www150.statcan.gc.ca/n1/daily-quotidien/181113/dq181113a-eng.htm>
6. British Columbia Ministry of Mental Health and Addictions. *Escalating BC's response to the overdose emergency*. 2019. https://www2.gov.bc.ca/assets/gov/overdose-awareness/mmha_escalating_bcs_response_report_final_26feb.pdf
7. Statistics Canada. CANSIM – 82-624-X – Table 1 – Rates of selected mental or substance use disorders, lifetime and 12 month, Canada, household 15 and older, 2012. November 27, 2015. <https://www150.statcan.gc.ca/n1/pub/82-624-x/2013001/article/tbl/tbl1-eng.htm>
8. University of Victoria, Canadian Institute for Substance Use Research. *British Columbia Alcohol and Other Drug Monitoring Project: substance related hospitalizations and deaths*. <https://www.uvic.ca/research/centres/cisur/stats/hospitalizations-deaths/index.php>
9. The Chief Public Health Officer's Report on the State of Public Health in Canada 2015: Alcohol Consumption in Canada (2016).
10. Grant B, Goldstein R, Saha T, et al. Epidemiology of DSM-5 Alcohol Use Disorder Results From the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*. 2015;72(8):757–766.
11. Fraser Health Authority. *Supporting Recovery Through Return to Work*. 2020.
12. Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil H. *JBIM Manual for Evidence Synthesis*. 2020. <https://synthesismanual.jbi.global>.
13. Moher D, Liberati A, Tetzlaff J, Altman D, The PRISMA Group. Preferred Reporting Items for Systematic reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine*. 2009;6(6):e1000097. doi:10.1371/journal.pmed1000097
14. Bach P, Frischknecht U, Reinhard I, et al. Impaired working memory performance in opioid-dependent patients is related to reduced insula gray matter volume: a voxel-based morphometric study. *European Archives of Psychiatry and Clinical Neuroscience*. 2019;doi:<https://doi.org/10.1007/s00406-019-01052-7>
15. Yuan Y, Zhu Z, Shi J, et al. Gray matter density negatively correlates with duration of heroin use in young lifetime heroin-dependent individuals. *Brain and Cognition*. 2009;71(3):223–228. doi:<https://doi.org/10.1016/j.bandc.2009.08.014>
16. Maglione MA, Raaen L, Chen C, et al. Effects of medication assisted treatment (MAT) for opioid use disorder on functional outcomes: A systematic review. *Journal of substance abuse treatment*. 2018;89:28–51. doi:<https://doi.org/10.1016/j.jsat.2018.03.001>
17. Arruda N. *Fit for Duty: Alcohol and Drug Testing in Canadian Workplaces*. 2019:30 pages.

18. Pidd K, Roche AM. How effective is drug testing as a workplace safety strategy? A systematic review of the evidence. *Accident Analysis and Prevention*. 2014;71:154–165. doi:10.1016/j.aap.2014.05.012.
19. Alaska Office of Substance Misuse. *Addiction and the Workplace: A toolkit to support workplace wellness as it relates to substance use*. Department of Health and Social Services DoPH; 2020.
20. Connecticut Department of Public Health. *The Opioid Crisis and Connecticut's Workforce*. 2018. November 28, 2018.
21. Natalie Middaugh. *Opioids and the Workplace: An Employer Toolkit for Supporting Prevention, Treatment, and Recovery*.
22. Nurses Association of New Brunswick. *Guidelines for the Recognition and Management of Problematic Substance Use in the Nursing Profession*. 2016.
23. Provincial health officer declares public health emergency. Government of British Columbia; 2016.
24. Ye X, Sutherland J, Henry B, Tyndall M, Kendall PRW. At-a-glance - Impact of drug overdose-related deaths on life expectancy at birth in British Columbia. *Health Promot Chronic Dis Prev Can*. Jun 2018;38(6):248-251. Aperçu - Impact des décès par surdose de drogue sur l'espérance de vie à la naissance en Colombie-Britannique. doi:10.24095/hpcdp.38.6.05
25. BC Coroners Service. BC Coroners Service Death Review Panel: A Review of Illicit Drug Toxicity Deaths. March 9, 2022. Available at: https://paninbc.ca/wp-content/uploads/2022/04/review_of_illicit_drug_toxicity_deaths_2022.pdf.
26. BC Coroners Service. Illicit Drug Toxicity: Type of Drug Data to October 31, 2021. Ministry of Public Safety and Solicitor General. December 9, 2021. <https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/statistical/illicit-drug-type.pdf>
27. First Nations Health Authority. Overdose data and First Nations in BC: preliminary findings. https://www.fnha.ca/AboutSite/NewsAndEventsSite/NewsSite/Documents/FNHA_OverdoseDataAndFirstNationsInBC_PreliminaryFindings_FinalWeb_July2017.pdf
28. BC Coroners Service. Illicit Drug Toxicity Deaths in BC January 1, 2011 - December 31, 2021. Ministry of Public Safety and Solicitor General. February 9, 2022.
29. BC Coroners Service. Illicit Drug Toxicity Knowledge Update: Mode of Consumption. Ministry of Public Safety and Solicitor General. February 10, 2022.
30. BC Coroners Service. Illicit Drug Toxicity Type of Drug Data to December 31, 2021. Ministry of Public Safety and Solicitor General. February 9, 2022.
31. BC Centre on Substance Use. Drug Checking in British Columbia: Monthly Data. Available at: <https://drugcheckingbc.ca/monthly-data/>.
32. Sun EC, Dixit A, Humphreys K, Darnall BD, Baker LC, Mackey S. Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis. *BMJ (Clinical research ed)*. 2017;356:j760.
33. Dasgupta N, Funk MJ, Proescholdbell S, Hirsch A, Ribisl KM, Marshall S. Cohort Study of the Impact of High-Dose Opioid Analgesics on Overdose Mortality. *Pain Med*. Jan 2016;17(1):85-98. doi:10.1111/pme.12907
34. Park TW, Saitz R, Ganoczy D, Ilgen MA, Bohnert AS. Benzodiazepine prescribing patterns and deaths from drug overdose among US veterans receiving opioid analgesics: case-cohort study. *BMJ (Clinical research ed)*. Jun 10 2015;350:h2698. doi:10.1136/bmj.h2698
35. Hernandez I, He M, Brooks MM, Zhang Y. Exposure-Response Association Between Concurrent Opioid and Benzodiazepine Use and Risk of Opioid-Related Overdose in Medicare Part D Beneficiaries. *JAMA Netw Open*. Jun 1 2018;1(2):e180919. doi:10.1001/jamanetworkopen.2018.0919

36. BC Centre for Disease Control. *Neurological Injury Following Overdose: Preliminary descriptive results from the Provincial Overdose Cohort*. 2020. Knowledge Update. January 3, 2020.
37. Statistics Canada. CANSIM – 82-624-X – Table 1 – Rates of selected mental or substance use disorders, lifetime and 12 month, Canada, household 15 and older, 2012. November 27, 2015. Accessed April 3, 2020. <https://www150.statcan.gc.ca/n1/pub/82-624-x/2013001/article/tbl/tbl1-eng.htm>
38. Rehm J, Gutjahr E, Gmel G. Alcohol and all-cause mortality: A pooled analysis. *Contemporary Drug Problems*. 2001;28:337–344.
39. Rehm J, Greenfield T, Kerr W. Patterns of drinking and mortality from different diseases: An overview. *Contemporary Drug Problems*. 2006;33(2):205–235.
40. Canadian Construction Association. Value of Industry. <https://www.cca-acc.com/about-us/value-of-industry/>
41. Haan M, Hewitt C, Chuatico G. By the numbers: the construction industry in Canada from 1986 to 2016. *Labour & Industry: a journal of the social and economic relations of work*. 2020:1–22. doi:10.1080/10301763.2020.1819181
42. The Construction Sector Council. *The State of Women in Construction in Canada*. 2010.
43. Opioid-related deaths in Alberta in 2017: Review of medical examiner data (2019).
44. Morano LH, Steege AL, Luckhaupt SE. Occupational Patterns in Unintentional and Undetermined Drug-Involved and Opioid-Involved Overdose Deaths – United States, 2007–2012. *Morbidity and Mortality Weekly Report*. 2018;67(33):925–930. doi:<http://dx.doi.org/10.15585/mmwr.mm6733a3external>
45. Manzo F, Manzo J. *Addressing the Opioid Epidemic Among Midwest Construction Workers*. 2018.
46. Canada Low-Risk Alcohol Drinking Guidelines. 2012.
47. WorkSafeBC. Statistics: Construction. <https://www.worksafebc.com/en/health-safety/industries/construction/statistics>
48. Busse JW, Wang L, Kamaleldin M, et al. Opioids for Chronic Noncancer Pain: A Systematic Review and Meta-analysis. *JAMA*. 2018;320(23):2448–2460. doi:10.1001/jama.2018.18472
49. Dowell D, Tamara M H, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain – United States, 2016. *Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report*. 2016;65(1):1–49.
50. Gregorson J. Construction Industry Tackles the Opioid Crisis. *Engineering News Record*. 20 June 2018.
51. Durand Z, Nechuta S, Krishnaswami S, Hurwitz EL, McPheeters M. Prevalence and Risk Factors Associated With Long-term Opioid Use After Injury Among Previously Opioid-Free Workers. *JAMA Network Open*. 2019;2(7):e197222. doi:10.1001/jamanetworkopen.2019.7222
52. Ompad DC, Gershon RR, Sandh S, Acosta P, Palamar JJ. Construction trade and extraction workers: a population at high risk for drug use in the United States, 2005-2014. *Drug Alcohol Depend*. 2019;205(107640)
53. Chou KL, Liang K, Sareen J. The association between social isolation and DSM-IV mood, anxiety, and substance use disorders: wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. 2011;72(11):1468-1476.
54. Nellis N. INW construction industry combats opioid use. *Journal of Business*. 2019;34(14)
55. Bell J, Butler B, Lawrance A, Batey R, Salmelainen P. Comparing overdose mortality associated with methadone and buprenorphine treatment. *Drug and Alcohol Dependence*. 2009;104:73–77. doi:10.1016/j.drugalcdep.2009.03.020
56. Mattick R, Breen C, Kimber J, Davoli M. Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. *Cochrane Database of Systematic Reviews*. 2009;2009(3)doi:10.1002/14651858.CD002209.pub2

57. MacArthur G, Minozzi S, Martin N. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. *BMJ*. 2012;345:e5945.
58. British Columbia Centre on Substance Use and B.C. Ministry of Health. *A Guideline for the Clinical Management of Opioid Use Disorder*. 2023. November 2023. <http://www.bccsu.ca/care-guidance-publications/>
59. British Columbia Centre on Substance Use BCMoH, and B.C. Ministry of Mental Health and Addictions,. *Provincial Guideline for the Clinical Management of High-Risk Drinking and Alcohol Use Disorder*. 2019.
60. Canadian Human Rights Commission. *Tools for employers: Impaired at Work—A guide to accommodating substance dependence*. 2017.
61. Meister SR. *A Review of Workplace Substance Use Policies in Canada*. 2018.
62. Canadian Human Right Act, §Section 2 and Section 15(2) (1985). <https://laws-lois.justice.gc.ca/eng/acts/H-6/>
63. Nosyk B, Bray J, Wittenberg E, et al. Short term health-related quality of life improvement during opioid agonist treatment. *Drug and Alcohol Dependence*. 2015;157:121–128. doi:10.1016/j.drugalcdep.2015.10.009
64. Nielsen S, Laranca B, Degenhardt L, Gowing L, Kehler C, Lintzeria N. Opioid agonist treatment for pharmaceutical opioid dependent people. *Cochrane Database of Systematic Reviews*. 2016;(5)doi:<https://doi.org/10.1002/14651858.CD011117.pub2>
65. Santo T, Clark B, Hickman M, et al. Association of Opioid Agonist Treatment With All-Cause Mortality and Specific Causes of Death Among People With Opioid Dependence: A Systematic Review and Meta-analysis. *JAMA Psychiatry*. 2021;78(9):979–993. doi:10.1001/jamapsychiatry.2021.0976
66. MacArthur GJ, Velzen Ev, Palmateer N, al. e. Interventions to prevent HIV and hepatitis C in people who inject drugsL: A review of reviews to assess evidence of effectiveness. *International Journal of Drug Policy*. 2014;25(1):34–52.
67. MacArthur GJ, Minozzi S, Martin N, al. e. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. *British Medical Journal*. 2012;345:e5945.
68. Strang J, McCambridge J, Dest D, al. e. Loss of tolerance and overdose mortality after inpatient opiate detoxification: follow up study. *British Medical Journal*. 2003;326(7396):34–52.
69. Spithoff S, Kahan M. Primary care management of alcohol use disorder and at-risk drinking. *Canadian Family Physician*. 2015;61(6):515–521.
70. Spithoff S, Kahan M. Paradigm shift: Moving the management of alcohol use disorders from specialized care to primary care. *Canadian Family Physician*. 2015;61(6):491–493.
71. McLellan A, Lewis D, O'Brien C, Kleber H. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA*. 2000;284(13):1689–1695.
72. Papamihali K, Yoon M, Graham B, et al. Convenience and comfort: reasons reported for using drugs alone among clients of harm reduction sites in British Columbia, Canada. *Harm Reduction Journal*. 2020;17(1):90. doi:10.1186/s12954-020-00436-6
73. Illicit drug overdose deaths in BC: findings of coroners' investigations (2018).
74. Munn Z, Peters MDJ, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*. 2018/11/19 2018;18(1):143. doi:10.1186/s12874-018-0611-x
75. Martin S. Determining fitness to work at safety-sensitive jobs. *BC Medical Journal*. 2010;52(1):48.

76. Bach P, Vollstädt-Klein S, Frischknecht U, et al. Diminished Brain Functional Magnetic Resonance Image Activation in Patients on Opiate Maintenance Despite Normal Spatial Working Memory Task Performance. *Clinical Neuropharmacology*. 2012;35(4):153–160.
77. Bald LK, Bempohl F, Heinz A, Gallinat J, Gutwinski S. Heroin or Conventional Opioid Maintenance? The Patients' Perspective. *Journal of Addiction Medicine*. 2013;7(6):401–404. doi:10.1097/ADM.0b013e3182a11ad0
78. Bilban M, Kastelič A, Zaletel-Kragelj L. Ability to Work and Employability of Patients in Opioid Substitution Treatment Programs in Slovenia. *Croatian Medical Journal*. 2008;49:842–852. doi:10.3325/cmj.2008.49.842
79. Braquehais MD, Fadeuilhe C, Håkansson A, et al. Buprenorphine-Naloxone Treatment in Physicians and Nurses With Opioid Dependence. *Substance Abuse*. 2015;36:138–140. doi:10.1080/08897077.2014.996698
80. Earley PH, Zummo J, Memisoglu A, Silverman BL, Gastfriend DR. Open-label Study of Injectable Extended-release Naltrexone (XR-NTX) in Healthcare Professional With Opioid Dependence. *Journal of Addiction Medicine*. 2017;11(3):224–230. doi:10.1097/ADM.0000000000000302
81. Enos. Doctors' exemplary treatment success occurs absent high use of buprenorphine. *Alcoholism & Drug Abuse Weekly*. 2020;32(19):5–8. doi:10.10012/adaw
82. Hamza H, Bryson EO. Buprenorphine Maintenance Therapy in Opioid-Addicted Health Care Professionals Returning to Clinical Practice: A Hidden Controversy. *Mayo Clinical Proceedings*. 2012;87(3):260–267. doi:10.1016/j.mayocp.2011.09.007
83. Lefebvre LG, Kaufmann LM. The identification and management of substance use disorders in anesthesiologists. *Canadian Journal of Anesthesiology*. 2017;64:211–218. doi:10.1007/s12630-016-0775-y
84. Ling W, Nadipelli VR, Solem CT, et al. Effects of monthly buprenorphine extended-release injection on patient-centered outcomes: A long-term study. *Journal of substance abuse treatment*. 2020;110:1–8. doi:<https://doi.org/10.1016/j.jsat.2019.11.004>
85. LoCastro JS, Youngblood M, Cisler RA, Mattson ME, Zweben A, Anton RF. Alcohol Treatment effects on secondary nondrinking outcomes and quality of life: the COMBINE study. *Journal of Studies on Alcohol and Drugs*. 2009;70(2)
86. Maremmani I, Panil PP, Popovic D, Pacini M, Deltito J, Perugi G. Improvement in the Quality of Live Heroin Addicts: Differences Between Methadone and Buprenorphine Treatment. *Heroin Addiction and Related Clinical Problems*. 2008;10(1):39–46.
87. Merlo LJ, Greene WM, Pomm R. Mandatory Naltrexone Treatment Prevents Relapse Among Opiate-Dependent Anesthesiologists Returning to Practice. *Journal of Addiction Medicine*. 2011;5(4):279–283. doi:10.1097/ADM.0b013e31821852a0
88. Öhlin L, Fridell M, Nyhlén A. Buprenorphine maintenance program with contracted work/education and low tolerance for non-prescribed drug use: a cohort study of outcome for women and men and seven years. *BMC Psychiatry*. 2015;15(56)doi:10.1186/s12888-015-0415-z
89. Polles AG, Williams MK, Phalin BR, Teitelbaum S, Merlo LJ. Neuropsychological impairment associated with substance use by physicians. *Journal of the Neurological Sciences*. 2020;411(116714)
90. Rapeli P, Fabritius C, Kalska H, Alho H. Do drug treatment variables predict cognitive performance in multidrug-treated opioid-dependent patients? A regression analysis study. *Substance Abuse Treatment, Prevention, and Policy*. 2012;7(45)
91. Rass O, Schacht RL, Buckheit K, Johnson MW, Strain EC, Mintzer MZ. A randomized controlled trial of the effects of working memory training in methadone maintenance patients. *Drug and Alcohol Dependence*. 2015;156:38–46. doi:<http://dx.doi.org/10.1016/j.drugalcdep.2015.08.012>

92. Rass O, Kleykamp BA, Vandrey RG, et al. Cognitive Performance in Methadone Maintenance Patients: Effects of Time Relative to Dosing and Maintenance Dose Level. *Experimental and Clinical Psychopharmacology*. 2014;22(3):248–257.
93. Reece A. Psychosocial and treatment correlates of opiate free success in a clinical review of a naltrexone implant program. *Substance Abuse Treatment, Prevention, and Policy*. 2007;2(25)doi:10.1186/1747-597X-2-35
94. Salsitz E, Wiegand T. Pharmacotherapy of Opioid Addiction: “Putting a Real Face on a False Demon”. *Journal of Medical Toxicology*. 2016;12:58–63. doi:10.1007/s13181-015-0517-5
95. Severt J, Tkacz J, Ruetsch C. Buprenorphine Compliance is Associated with Improved Employment and Functioning Outcomes Among Opioid Dependent Patients. 2010;
96. Sun H-M, Li X-Y, Chow EPF, et al. Methadone maintenance treatment programme reduces criminal activity and improves social well-being of drug users in China: a systematic review and meta-analysis. *BMJ Open*. 2015;5doi:10.1136/bmjopen-2014-005997
97. Kuhl E. Mitigating the Effects of Opioid Use Among Workers. *Partnership for Workplace Mental Health*.
98. Atlantic Canada Council on Addiction. *Problematic Substance Use That Impacts the Workplace: A Step-by-Step Guide & Toolkit to Addressing it in Your Business/Organization*. 2010.
99. Impairment in the Workplace Policy (Government of Canada) (2018).
100. British Medical Association. *Alcohol, drugs, and the workplace—The role of medical professionals: A briefing from the BMA Occupational Medicine Committee*. 2017. July 2016.
101. Barbara Butler & Associates Inc. *Workplace Alcohol and Drug Issues in an Ever-changing Environment*.
102. Human Performance Management Fitness for Duty, Volume II: Managing Alcohol and Drug Use (2020).
103. Roelofs C. *Opioids and Work: A Formative Research Assessment to Inform Educational Outreach*. 2018.
104. The City of Calgary Substance Use Policy Guidelines (2010).
105. Construction Owners Association of Alberta. *Canadian Model for Providing a Safe Workplace*. 2018. Jul 1, 2018.
106. District of Mission on the Fraser. Safety Management System. Impairment 2017.
107. Flight Attendant Drug and Alcohol Program. *Flight Attendant Drug and Alcohol Program Manual*. 2010.
108. Drugs.com. Orlaam FDA Alerts. <https://www.drugs.com/fda-alerts/1459-6572.html>
109. Fraser Health Authority. Alcohol and Drug Use. 2018.
110. Justice Institute of British Columbia. *Workplace Impairment*. 2019.
111. KFLA&A Public Health. *Alcohol and the Workplace Toolkit*. 2013.
112. Metro Vancouver Transit Police. South Coast British Columbia Transportation Authority Police Service Policies and Procedures Manual. Fitness for Duty 2018.
113. National Institute for Occupational Safety and Health. *Medication-Assisted Treatment for Opioid Use Disorder*. Centers for Disease Control and Prevention; 2019.
114. Ohio Department of Job and Family Services. *Strategies for Helping Individuals Impacted by Opioid use Disorder: A Toolkit for Ohio’s Public Workforce System*. 2019.
115. Public Service Alliance of Canada. *Duty to Accommodate: A PSAC Guide for Local Representatives*. 2019.
116. Substance Abuse and Mental Health Services Administration. Considerations for Safety- and Security-sensitive Industries. Updated June 24, 2020. <https://www.samhsa.gov/workplace/legal/federal-laws/safety-security-sensitive>
117. Vancouver Police Department. Professional Standards: Impairment at the Workplace. Vancouver, British Columbia.

118. Monterosso JR, Aron AR, Cordova X, Xu J, London ED. Deficits in response inhibition associated with chronic methamphetamine abuse. *Drug and Alcohol Dependence*. 2005;79:273–277.
119. Canadian Centre for Occupational Health and Safety. OSH Answers Fact Sheets: Fit to Work. https://www.ccohs.ca/oshanswers/psychosocial/fit_to_work.html
120. U.S. Food & Drug Administration. Drugs of Abuse Home Use Test.
121. Huhn AS, Hobelmann JG, Oyler GA, Strain EC. Protracted renal clearance of fentanyl in persons with opioid use disorder. *Drug Alcohol Depend*. Sep 1 2020;214:108147. doi:10.1016/j.drugalcdep.2020.108147
122. Canadian Centre on Substance Use and Addiction. *State of Policies and Practices on Substance Use in Safety-sensitive Industries in Canada*. 2017.
123. Cashman C, Ruotsalainen J, Greiner B, Beirne P, Verbeek J. Alcohol and drug screening of occupational drivers for preventing injury. *Cochrane Database of Systematic Reviews*. 2009;doi:10.1002/14651858.CD006566.pub2.
124. Kraus J. The effects of certain drug-testing programs on injury reduction in the workplace: an evidence-based review. *International Journal of Occupational and Environmental Health*. 2001;7(2):103–108.
125. Urbanoski KA. Need for equity in treatment of substance use among Indigenous people in Canada. *CMAJ*. 2017;189(44):E1350-E1351. doi:www.cmaj.ca/lookup/doi/10.1503/cmaj.160778
126. Government of BC. Urban and Off-Reserve Aboriginal People. <https://www2.gov.bc.ca/gov/content/governments/indigenous-people/supporting-communities/urban-off-reserve-aboriginal-people>
127. Rural Health Services In BC: A Policy Framework To Provide A System Of Quality Care (2015).