

**FACTORS INFLUENCING OPIOID AGONIST THERAPY RETENTION AMONG
INDIVIDUALS WITH OPIOID USE DISORDER IN PRIMARY CARE**

by

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Abstract

The opioid crisis remains a significant public health concern, with fentanyl contributing to 79% of accidental opioid-related deaths in Canada between January and June 2024, nearly a 40% increase since the national surveillance in 2016. Opioid agonist therapy (OAT), using medications such as methadone and buprenorphine, is an evidence-based treatment for opioid use disorder (OUD) that aims to reduce harm and mortality. While OAT is increasingly delivered in primary care to improve accessibility, patient retention in these programs remains a significant challenge. Retention is a commonly used outcome in OUD treatment studies; however, there is no universal definition. This integrative review explores the factors influencing OAT retention among individuals with opioid use disorder in primary care settings. A systematic search of peer-reviewed literature published from 2016 to 2024 identified nine U.S.-based studies, including three qualitative and six cohort studies. Findings indicate that comorbid mental health and substance use disorders, along with limited access to psychosocial supports, negatively affect retention. Conversely, low-barrier, trauma-informed, and multidisciplinary care models are associated with improved outcomes. These findings highlight the need for OAT programs to adapt to the complex needs of patients with OUD by providing individualized, flexible, and accessible treatment options. Integrating mental health and addiction care within primary care settings may improve patient engagement and decrease opioid-related harm and mortality.

Keywords: opioid agonist therapy, opioid use disorder, primary care, treatment retention, mental health comorbidities, substance use disorders, integrative review

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Glossary

Behavioural Health	A term that refers to mental, emotional, and social well-being, as well as the systems that support mental health and well-being (Centers for Disease Control and Prevention, 2024).
Benzodiazepines	A class of psychoactive drugs that slow brain activity and are commonly used as sedatives to treat sleep, seizure, and anxiety disorders (Government of Canada, 2023a).
Buprenorphine	A partial opioid agonist with a used to treat opioid use disorders. It has a high affinity for opioid receptors in the brain, providing relief while reducing the risk of overdose compared to full agonists like fentanyl. Buprenorphine is often formulated with naloxone (British Columbia Centre on Substance Use [BCCSU], 2023).
Fentanyl	A highly potent opioid pain reliever, 20-40 times stronger than heroin and 100 times stronger than morphine. Unregulated fentanyl and other fentanyl analogues (ex. carfentanyl) are increasingly found in other street drugs (Government of Canada, 2024b).
General Anxiety Disorder -7 (GAD-7)	A validated screening tool used to assess the severity of generalized anxiety disorder in clinical and research settings (Spitzer et al., 2006).
Harm Reduction	An approach that supports safer substance use and sexual activity. Harm reduction services aim to prevent illness, overdose, and stigma, while respecting the rights of all individuals (BC Centre for Disease Control [BCCDC], n.d.).
Medications for Opioid Use Disorder (MOUD)	An American term for evidence-based treatment for opioid use disorder, using medications like methadone, buprenorphine, or naltrexone (U.S Food & Drug Administration, 2024).
Methadone	A long-acting opioid agonist that binds to mu-opioid receptors to prevent withdrawal symptoms for 24 hours or longer. It reduces opioid cravings and diminishes the euphoric effects of unregulated opioid use by maintaining tolerance (Strain & Peavy, 2025).
Methamphetamines	A highly addictive synthetic stimulant that can be smoked, snorted, injected, or swallowed (Government of Canada, 2023b).
Multidisciplinary Care	An approach where healthcare professionals from different fields work together and provide their expertise to address patient's needs. Unlike team-based care, multidisciplinary care involves separate, parallel contributions instead of integrated collaboration.

Opioid Agonist Therapy (OAT)	The Canadian term for evidence-based treatment for opioid use disorder, using opioid agonists such as buprenorphine and methadone (BCCSU, 2023).
Opioid Withdrawal	A group of progressively worsening physical and psychological symptoms that occur when an individual with physical opioid dependence reduces or stops opioid use. Symptoms include nausea, anxiety, sweating and muscle aches. The onset and severity of withdrawal vary depending on the half-life of the opioid used (Sevarino, 2023).
Patient Health Questionnaire-9 (PHQ-9)	A standardized tool used to assess depression severity. Scores range from 0–27, with higher scores indicating greater severity (Kroenke et al., 2001).
Polysubstance Use	The use of more than one drug, either simultaneously or at different times, often involving substances from different drug classes (Compton et al., 2021).
Precipitated Withdrawal	A sudden onset of opioid withdrawal symptoms caused by a partial opioid agonist or opioid antagonist such as buprenorphine and/or naloxone displace a full agonist (ex. fentanyl) from the opioid receptors. This causes a sudden trigger of intense withdrawal symptoms (Buresh et al., 2021).
Primary Care Provider	A physician or nurse practitioner who delivers longitudinal and comprehensive care in the community including managing chronic diseases and treating illnesses and injuries (British Columbia Ministry of Health, 2025).
Substance Use Disorders	A condition where an individual repeatedly uses a substance, like alcohol or drugs, impairing their daily function. Individuals continue to use despite the harmful consequences (American Psychiatric Association, 2013a).
Team-based Care	A primary care model where multiple healthcare providers from different professional backgrounds collaborate together and with patients/families and communities to provide comprehensive care (Team-Based Care BC, n.d.).
Unregulated Drug Supply	The term refers to substances that are not approved or controlled by regulatory authorities, including those commonly described as ‘illegal’ (Russell et al., 2023).
Urine Drug Test (UDT)	A test used for both screening and monitoring patients on long-term opioid, benzodiazepines, or stimulant therapy. In OAT, a negative urine drug test indicates the presence of only the prescribed medication, while a positive result suggests either the presence of non-prescribed substances or the absence of the prescribed medication (Kale, 2019).

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Chapter 1: Barriers to Opioid Agonist Therapy in Primary Care

The global opioid crisis continues to escalate and pose significant challenges to healthcare systems worldwide (World Health Organization [WHO], 2023). The opioid crisis is complex and multifactorial with opioid related deaths increasing year after year (WHO, 2023). In 2019, over 600,000 deaths worldwide were attributed to unregulated substance use with approximately 80% of these deaths related to opioids (WHO, 2023). The opioid epidemic has significantly worsened since the introduction of fentanyl¹, a powerful synthetic opioid, into the unregulated drug supply (Public Health Agency of Canada, 2024). In Canada, 79% of all accidental opioid toxicity deaths between January and June 2024 involved fentanyl, representing a 39% increase since the initiation of national surveillance in 2016 (Public Health Agency of Canada, 2024). Fentanyl has become the dominant opioid circulating in the illicit drug market and the leading cause of overdose deaths (Krausz et al., 2021).

Opioid use disorder (OUD) is a chronic and relapsing condition that can be treated with opioid agonist therapy (OAT²; Government of Canada, 2024c). Individuals with OUD struggle to control their opioid use, despite significant consequences in their personal and social lives (American Psychiatric Association [APA], 2013b). OAT is an evidence-based intervention for OUD that uses medications to reduce cravings, alleviate withdrawal symptoms, and support long-term stability (WHO, 2023). Buprenorphine and methadone are the gold standard OAT medications due to their effectiveness in managing symptoms and reducing the risk of opioid-related harm or death (British Columbia Centre on Substance Use [BCCSU], 2023; Strain, 2024).

¹ Throughout this paper, “fentanyl” will be used to collectively refer to fentanyl, carfentanil, and other fentanyl analogues, as they share similar synthetic properties and clinical implications (Kleinman, 2024).

² OAT is the Canadian term for OUD medication treatment and will be used throughout the integrative review.

However, mortality risk significantly increases after treatment discontinuation, with rates higher in the first four weeks (Santo et al., 2021). The loss of opioid tolerance makes individuals more vulnerable to overdose if they return to using unregulated opioids (Santo et al., 2021).

OUD treatment has been traditionally provided by specialty addictions services (Lagisetty et al., 2017; Logan et al., 2019). However, there is a growing shift toward providing OAT in primary care settings to increase accessibility and provide comprehensive care (Lagisetty et al., 2017). This transition aims to offer more stable, less stigmatized and accessible care for individuals with OUD, who are often difficult to engage (Ministry of Mental Health and Addictions, 2025). Despite expanded access to OAT in primary care, treatment retention remains a persistent challenge (Klimas et al., 2021). Many individuals discontinue treatment prematurely, which increases the risk of relapse, overdose, and death (Hutchison et al., 2023; Klimas et al., 2021). Gaps persist in understanding how to sustain engagement of individuals with OUD in primary care OAT programs. Research highlights the need to understand the factors that influence individuals to drop out of OAT programs in primary care, as addressing these can help decrease reliance on unregulated opioids, reduce opioid-related harm and mortality, as well as support greater life stability (Hutchison et al., 2023; Lagisetty et al., 2017). This integrative review seeks to examine the research question: What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?

Background

What is Opioid Use Disorder?

Opioid use disorder is a complex, chronic, and relapsing medical condition marked by the compulsive use of opioids (Guidelines and Protocols Advisory Committee, 2023) and has the potential for long-term recovery with appropriate treatment and support (BCCSU, 2023). OUD

can negatively affect individuals' mental, physical, and social functioning, leading to impaired daily functioning (Strain, 2024). Cravings and physical dependence often drive individuals with OUD to continue using despite serious harm to themselves or others (Government of Canada, 2024b). The diagnosis of OUD is made using the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; APA, 2013) and is identified when an individual exhibits at least two of the symptoms listed in Table 1. Furthermore, the severity of OUD is classified as mild (2-3 symptoms), moderate (4-5 symptoms), or severe (6 or more symptoms) (APA, 2013). The DSM-5 criteria are used to assess both the presence and severity of the disorder. OAT is the first line treatment for OUD; however, patients and providers collaborate on the best approach, which may include medications, psychosocial interventions, or both (Strain & Peavy, 2025).

Opioid Agonist Therapy

OAT is the first-line evidence-based treatment for OUD (Strain & Peavy, 2025). Medications such as buprenorphine and methadone reduce opioid cravings and withdrawal without the euphoria effects of unregulated opioids (BCCSU, 2023). OAT helps individuals reduce their reliance on unregulated opioids and improve life stability through a shared decision-making process between patients and providers (Strain & Peavy, 2025). Buprenorphine and methadone have been shown to reduce mortality risk by over 50% (Santo et al., 2021) and are the gold standard OAT medications (BCCSU, 2023; Strain & Peavy, 2025). While methadone is preferred for those with severe OUD or high physical dependence, buprenorphine's ceiling effect on respiratory depression, makes it a widely used option (Santo et al., 2021). Both medications present challenges for retention, including withdrawal concerns during buprenorphine induction (Pergolizzi et al., 2020) and daily dosing requirements for methadone (Elnagdi et al., 2023). These barriers, along with transportation and insurance issues, contribute to treatment

discontinuation and reflect the ongoing challenges in optimizing OAT retention (Jones et al., 2019).

Table 1

DSM-5 Criteria for Opioid Use Disorder

Criteria for Opioid-Use Disorders from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition	
1.	Opioid taken in larger amounts or over a longer period than intended
2.	Persistent desire or unsuccessful efforts to cut down or control opioid use
3.	A lot of time spent obtaining, using, or recovering from the effects of the opioid
4.	Craving or a strong desire to use opioids
5.	Recurrent opioid use resulting in a failure to fulfill major role obligations at work, school, or home
6.	Continued use despite persistent or recurring social or interpersonal problems caused or exacerbated by opioid use
7.	Stopping or reducing important social, occupational, or recreational activities due to opioid use
8.	Recurrent use of opioids in physically hazardous situations
9.	Continued use despite knowledge of having persistent or recurrent physical or psychological problems caused or worsened by opioid use
10.	Tolerance as defined by either a need for markedly increased amounts to achieve intoxication or desired effect or by markedly diminished effects with continued use of the same amount (does not apply when used appropriately under medical supervision)
11.	Withdrawal manifesting as either characteristic syndrome or the substance is used to avoid withdrawal (does not apply when used appropriately under medical supervision)

Note. APA, 2013b

Retention in OAT Programs

OAT programs provide pharmacological treatment, primarily methadone and buprenorphine, for individuals with OUD. These programs are commonly delivered in addiction clinics, primary care settings, community pharmacies, and correctional facilities (BCCSU, 2023; Donroe et al. 2020). Participation in OAT typically involves daily or regular medication administration, routine drug testing, and in some programs, engagement with psychosocial supports such as mental health services or counselling (BCCSU, 2023; Klimas et al., 2021).

Staying in OAT is critical for OUD treatment. Premature discontinuation of OAT increases the risk of returning to unregulated opioid use, as well as higher rates of morbidity, and overdose death (Harris et al., 2024; Kennedy et al., 2022). Overdose risk is particularly heightened when individuals discontinue OAT abruptly, due to a rapid loss of opioid tolerance (Santo et al., 2021). This makes relapse particularly dangerous, as previously tolerated doses of unregulated opioids can become fatal (Santo et al., 2021). In contrast, longer treatment duration is linked to better outcomes, including reduced overdose mortality (Strain & Peavy, 2025), fewer infectious disease complications (Colledge-Frisby et al., 2022), and greater life stability (BC Mental Health & Substance Use Services, n.d.).

Retention in OAT is a common outcome measure in studies assessing OUD treatment and generally refers to how long an individual with OUD remains engaged in treatment. However, there is significant variability in how OAT retention is defined and measured across studies (Biondi et al., 2020). Measures include the duration of time participants stay in the program before dropping out or being removed, the number of individuals still enrolled at the end of a study (Klimas et al., 2021; O'Connor et al., 2020), and the number of doses received (Biondi et al., 2020), regardless of whether participants abstain from unregulated opioids. Definitions of treatment failure also vary widely. Treatment failure definitions include multiple urine drug tests or missing doses for consecutive days (Biondi et al., 2020). Despite OAT being recognized as the most effective treatment for OUD (Kennedy et al., 2022; Madras et al., 2020), there is no universal definition of retention success (Biondi et al., 2020; Hooker et al., 2022).

Traditionally, retention has been measured by ongoing participation and abstinence from unregulated opioids. However, this does not reflect emerging patient led models that prioritize harm reduction, individualized goals, and addressing structural barriers (BCCSU, 2023; Biondi

et al., 2020; Hutchison et al., 2023). Non-retention can present in different ways depending on the program and patients' circumstances. The most common indicator is missed appointments or medication doses, with thresholds often defined as 5 to 30 days consecutive days of absence (Klimas et al., 2021; O'Connor et al., 2020). Some patients may be involuntarily discharged from programs due to policy violations, missed appointments, or suspected diversion of medications (BCCSU, 2023; Klimas et al., 2021).

Challenges with OAT Retention in Primary Care Settings

OAT is an evidence based, first-line treatment for OUD, but retention remains a significant challenge. A range of interconnected factors, including individual and system level challenges, and the increasingly unpredictable and toxic unregulated drug supply can impact a person's ability to remain engaged in treatment (Gomes et al., 2021; Jones et al., 2020; Madras et al., 2020). Systematic reviews by Klimas et al. (2021) and O'Connor et al. (2020) highlight the significant variability in how OAT retention is defined and measured, with retention rates ranging from approximately 20% to 80% depending on the treatment type, study design, and retention definition used (Klimas et al., 2021; O'Connor et al., 2020). Research examining OAT retention in primary care highlight a diversity of program models, including low-barrier approaches (Carter et al., 2022) and multidisciplinary integrated models (Bailey et al., 2021; Pijl et al., 2022). The variation in program models, along with complex interrelated person- and system-related challenges, such as comorbid mental health and substance use disorders can complicate engagement in OAT. In order to improve retention rates, a better understanding of the factors affecting it is needed.

Prevalent Comorbidities in OUD

Mental health and non-opioid substance use disorders frequently co-occur in OUD (Jones & McCance-Katz, 2019; Santo et al., 2024). Between April 2018 and March 2019, 43% of opioid-related hospitalizations had a concurrent diagnosis of a mental health disorder and 46% of another substance use or addictive disorder (Government of Canada, 2021). Literature strongly suggests that opioid, mental health, and non-opioid substance use disorders share the risk factor of adverse childhood experiences (ACE; Jones & McCance-Katz, 2019; Regmi et al., 2024; Stein et al., 2017). ACEs are early life stressors or traumas, such as abuse, neglect, or household dysfunction (WHO, 2020); all of which disrupt brain development, emotional regulation, and lead to poor health outcomes (Regmi et al., 2024). Individuals with multiple ACEs are at a significantly higher risk for early opioid use, intravenous drug use (IVDU), and overdose (Regmi et al., 2024; Stein et al., 2017). Polysubstance use among individuals with OUD is often driven by self-medication for poorly managed physical and mental health conditions, or to alleviate pain (Boileau-Falardeau et al., 2022). These comorbidities present challenges for opioid treatment due to their complexity.

Purpose of the Review

The North American opioid crisis has evolved significantly, with increasingly complex substance use patterns and associated health challenge that further complicate retention in OAT. The opioid epidemic has shifted from prescription opioids to heroin, fentanyl, with polysubstance use involving stimulants and mental health comorbidities characterizing the current phase (Ciccarone, 2019; Jenkins, 2021; Krausz et al., 2021). Healthcare systems face ongoing challenges to meet the growing demand for accessible, sustainable, and effective OUD treatment (Lagisetty et al., 2017; Madras et al., 2020). OAT delivered in primary care is a critical

strategy to mitigate opioid-related complications and mortality by reducing individuals' exposure to the toxic unregulated drug supply (BCCSU, 2023; Bobb et al., 2024; Wakeman et al., 2019). Despite expanded access, long-term retention in primary care OAT programs remains a major barrier to sustained recovery and improved outcomes (Hutchison et al., 2023). Understanding the factors that impact retention within primary care settings is essential to provide effective treatment models, improve patient adherence, and address the evolving needs of individuals with OUD (Madras et al., 2020; Kaczorowski et al., 2020). This integrative review aims to answer the research question: What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?

Chapter 2: Method

Study Design

This chapter will present the integrative review framework strategy which was guided by Whittemore & Knafl (2005). Whittemore & Knafl (2005) highlighted that an integrative review approach synthesizes knowledge by using experimental and non-experimental methodologies to provide a greater understanding of the phenomenon of interest. However, the challenge of combining diverse methodologies can affect the rigor of the review (Whittemore & Knafl, 2005). To reduce concerns from combining experimental and non-experimental analysis, the rigor of integrative reviews can be enhanced by utilizing a systematic approach (Whittemore & Knafl, 2005). The following sections will be presented using Whittemore & Knafl's (2005) five stages of an integrative review: problem formulation, literature search strategy, data evaluation, data analysis, and presentation.

Problem Formulation

The purpose of an integrative review is to gain a better understanding of a phenomenon. Whittemore & Knafl (2005) highlighted that identifying the key variables of interest will help formulate a clear research question, especially when differentiating between pertinent and unnecessary information to focus on in the following stages.

The research question was created using the Population, Issue of interest, and Outcome (PIO) framework (Fineout-Overholt & Stillwell, 2023). The population was defined as patients with OUD in primary care receiving OAT, the issue of interest focused on factors influencing treatment retention, and the outcome of interest was retention in opioid agonist therapy. Additionally, a Feasible, Interesting, Novel, Ethical, and Relevant (FINER) template (Covvey et al., 2024) was created and reviewed by two peers from the NURS 798 course, to evaluate the

practical considerations of the research question. After receiving feedback, suggestions were incorporated, ultimately leading to the final research question.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were formulated to identify the most relevant articles to answer the research question. For transparency and rigor, the reasons behind the established inclusion and exclusion criteria will be discussed. Table 2 highlights the inclusion and exclusion criteria. The decision to focus on adult samples was made as most individuals with OUD are >18 years old. Moreover, the inclusion criteria specified methadone, buprenorphine, and buprenorphine/naloxone because these are evidence-based treatments for OUD (BCCSU, 2023; Strain & Peavy, 2025).

A publication date range from 2016 onwards was selected because 2016 marked the pivotal moment when the opioid crisis surged in North America (Ciccarone, 2019), significantly shaping the current landscape of OUD. Moreover, inclusion and exclusion criteria attempted to capture OAT retention from both patient and staff perspectives. Furthermore, only research based in primary care settings and involving OAT was included. Studies that were not in English were excluded due to concerns about translation accuracy.

Literature Search Strategy

Literature searches were conducted through the University of Northern BC (UNBC) online library system, known as Geoffrey R. Weller library. Database searches on APA PsycInfo, CINAHL, and MEDLINE began early October 2024 and completed on October 26, 2024. These databases were intentionally chosen to obtain a broad range of articles, in an effort to minimize bias (Whittemore & Knafl, 2005). APA Psycinfo was chosen to obtain articles related to psychology, behavioural and social sciences. Moreover, CINAHL was included to

obtain articles related to nursing and allied health. Similarly, MEDLINE was used to broaden the search to include biomedical journals.

Table 2

Inclusion and Exclusion Criteria

Inclusion	Exclusion
• Adults – 18 years and older • Adults with opioid use disorder • Studies that focus on OAT in primary care settings (office-based, healthcare centres, • Discussion of retention factors (including but not limited to medical, socioeconomic, psychosocial, behavioural, structural, personal) • Discussion of retention factors from the lens of patients (currently on OAT and not on OAT) and OAT program staff • Discussion of reasons for accessing, maintaining, and discontinuing OAT • Studies that focus on methadone, buprenorphine, or buprenorphine/naloxone	• Studies that are not in English • Studies that include adult and pediatric samples • Studies focusing on OUD without OAT • Studies that do focus on naltrexone • Studies that do not examine OAT in primary care settings • Studies that are not set in or do not discuss OAT in primary care settings • Studies that only measure mortality and overdose outcomes • Theoretical or discussion-based articles (including but not limited to healthcare systems, OUD, OAT) • Study protocols

Search Terms

A preliminary search using natural terms such as “opioid agonist therapy”, “opioid use disorder”, and “primary care” was conducted across the three databases to understand how these terms were categorized within each database. The initial search was followed by an iterative search process to identify the most relevant search terms, including synonyms, acronyms, ensuring a comprehensive search was completed. Database search terms that were used are presented in Figure 1.

Figure 1

Search Terms

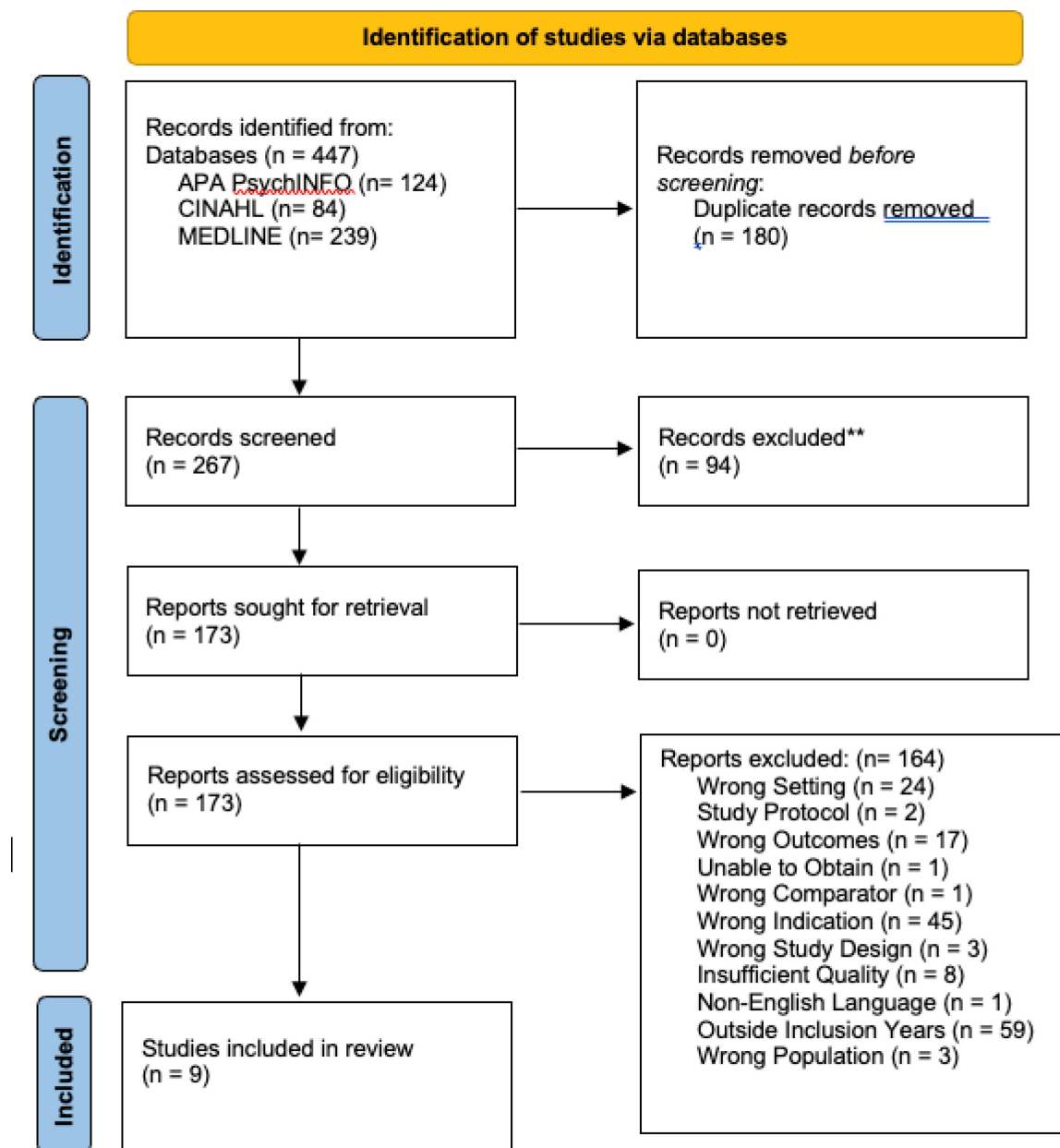
S5	 S1 AND S2 AND S3 AND S4
S4	 primary care or primary health care or primary healthcare or general practice or gp
S3	 treatment retention or drop out or retention or attrition or intent to leave or intent to stay or disengagement or recovery
S2	 opioid use disorder or opioid related disorder or opioid dependence or opioid addiction or opioid misuse or opioid prescription misuse or opioid abuse or heroin addiction
S1	 opioid agonist therapy or opioid agonist treatment or maintenance therapy or buprenorphine or suboxone or buprenorphine/naloxone or medication assisted treatment or mat or medication treatment or opioid substitution therapy or opioid substitution treatment or methadone

Search Results

Final searches in the three databases provided 446 articles total, as seen in the PRISMA diagram (Figure 2). APA PsychInfo, CINAHL and MEDLINE search results were saved as RIS files and transported to Covidence (n.d.). After duplicate removal 266 were screened. Level 1 screening involved scanning titles and abstracts of all the articles, applying inclusion and exclusion criteria. This was followed by level 2 screening, which involved reading the full-text articles and reassessing their relevance against the research question, as well as re-applying the inclusion and exclusion. Finally, this process resulted in the nine articles included in the integrative review. The reasons for excluding articles are shown on the PRISMA diagram (Figure 2).

Figure 2

PRISMA Table



Note. PRISMA template from Page et al. (2021).

Data Evaluation and Analysis

Data evaluation began with information extraction from the nine articles included. Whitemore and Knafl (2005) noted the complexity of evaluating diverse primary resources in an integrative review. Therefore, a thoughtful and systematic process was essential. A mind map was created using draw.io (Appendix A) to organize content under headings, such as methods and results. Key data were marked using visual indicators.

Information from the mind map was then transferred into a data extraction (Appendix B) and critical appraisal matrix (Appendix C), as outlined by Toronto & Remington (2020). The Critical Appraisal Skills Programme (CASP) cohort (CASP, 2024a) and qualitative studies (CASP, 2024b) checklists were used to assess the quality and rigor of the articles included. The critical appraisal matrix included study design, appropriateness of the method, recruitment bias, data collection rigor, key findings, risk of bias, and relevance to review (Appendix C).

The data extraction matrix outlined each study's author, year, design, purpose, intervention, outcomes, key results, themes, and conclusions (Appendix B). Articles were organized chronologically to support pattern recognition. Themes were identified using colour-coded patterns in the data extraction matrix. A separate table (Appendix D) was created to examine the connection between mental health and substance use disorders. The analysis followed Whitemore & Knafl's (2005) integrative review method, which involved iterative review, coding, categorization, and thematic synthesis.

Chapter Three: Findings

This integrative review examined nine U.S. based studies published between 2019 and 2024 that explored factors influencing OAT retention in primary care. The U.S. term *medications for opioid use disorder* (MOUD) is used in this section where applicable to reflect the terminology used in the studies. Sample sizes varied, from 23 participants (Beharie et al., 2022) to 2880 participants (Hawkins et al., 2024), with retention durations ranging from 3 to 12 months. Findings suggest a complex relationship between individual and systemic influences on MOUD retention, shaped by comorbid substance and mental health disorders, social inequities, patient experiences with medications, and the structure and accessibility of care.

Concurrent Substance Use Disorders

Logan et al. (2019) conducted a retrospective program evaluation using data from 61 electronic health records (EHR) of individuals with OUD enrolled in an integrated addiction medicine program at a rural primary care clinic in Hawaii. Inconsistent urine drug tests, defined as the presence of illicit substances, non-prescribed medications, absence of prescribed OAT medications, or a combination of these factors, were prevalent at treatment initiation and associated with shorter OAT durations. Additionally, inconsistent drug tests were linked to both non-opioid substance use and mental health disorders. Heroin use, ($\chi^2[1, N = 61] = 8.90, p < .01$), intravenous drug use, ($\chi^2[1, N = 61] = 6.55, p < .05$), and methamphetamine use disorder, ($\chi^2[1, N = 61] = 6.55, p < .05$) were linked to inconsistent urine drug tests. Non-opioid use disorders were common, including 41% alcohol use, 39.3% methamphetamine use, and 24.6% cannabis. In contrast, Hooker et al. (2020) studied 100 patients in a family medicine clinic located in Minneapolis, MN low-socioeconomic urban area and found 75% of their sample reported illicit non-opioid substance use, with cannabis (43%) and methamphetamine (43%) as the most

commonly reported. Additionally, alcohol use (37%) and tobacco use (86%) were common. IVDU (odds ratio [OR] = 3.57, 95% CI: 1.26, 10.1, $P = 0.017$) was the only predictor of OAT discontinuation at six months. Conversely, Logan et al. (2019) did not find an association between IVDU and OAT retention at three months. Both Hooker et al. and Logan et al. found an 8% prevalence of reported benzodiazepine use, but only Hooker et al. identified a discrepancy between self-reports and urine drug tests. Specifically, 17% of participants tested positive for benzodiazepines, while only 8% reported using them. Hooker et al. did not explain this inconsistency. Hawkins et al. (2024) conducted the largest study reviewed, evaluating the impact of the U.S. Veteran's Health Administration SCOUTT initiative across 18 primary care settings with 2,543 participants. Similar to Logan et al. (2019) and Hooker et al. (2020), Hawkins et al. (2024) found a high prevalence of comorbid substance use disorders, with 41% non-opioid and 41% alcohol use disorder. Concurrent substance use disorders were not linked to treatment retention (Hawkins et al., 2024); however, buprenorphine receipt, defined as receiving at least one prescription from a primary care provider within one year of their first primary care visit, was less likely among individuals with comorbid non-opioid use disorders (adjusted odds ratio [AOR], 0.64; 95% CI, 0.45-0.93) and alcohol use disorder (AOR, 0.39; 95% CI, 0.27-0.57). Stein et al. (2022) analyzed EHRs from 92 patients with OUD who transitioned from sublingual (BUP-NX) to extended release buprenorphine injections (BUP-XR) in a primary care program. Participants who had used heroin in the three months prior to transition were less likely to complete the treatment change.

Authors identified concurrent substance use as a challenge to OAT retention but offered varied implications. Stein et al. hypothesized that supplementing the transition with BUP-NX could support BUP-XR retention, particularly for comorbid chronic pain disorders. Hawkins et

al. emphasized that providers may feel unprepared to manage patients with polysubstance use due to limited access to addiction specialists in primary care. Logan et al. (2019) asserted that integrated primary care team members can mitigate dropout by collaboratively creating re-engagement plans for patients with OUD and polysubstance use. Hooker et al. (2020) hypothesized that individuals who inject opioids may experience more severe substance use disorders and could benefit from need additional supports to stay on OAT.

Concurrent Mental Health Disorders

Mental health disorders were prevalent in up to 90% of the samples and associated with OAT retention in some cases. Neeb et al. (2024) evaluated an opioid treatment program integrated into an urban federally qualified health center to reduce barriers for patients with complex medical and addiction needs. Among 288 participants, mental health disorders were highly prevalent. Anxiety was reported in 88% of individuals, bipolar disorder in 25%, depression in 18%, PTSD in 8%, and schizophrenia in 4.2%. Although participant demographics were collected (Neeb et al., 2024), statistical adjustments were not conducted, potentially leaving the results vulnerable to confounding factors and overlooking how demographic factors could influence treatment retention (CASP, 2024a). Conversely, Logan et al.'s (2019) rural primary clinic study with behavioural health and psychosocial services found that participants with higher depression scores (mean = 15.47 for unretained vs. 9.56 for retained patients) and higher anxiety scores (mean = 13.13 for unretained vs. 8.18 for retained patients) were significantly more likely to drop out within the first 3 months. Additionally, among patients retained for at least three months, depression ($B = -0.03$, 95% CI [0.05, 0.001], $p = .05$) and anxiety symptoms ($B = -0.03$, 95% CI [0.05, 0.01], $p = .05$) showed significant improvement overtime. Sattler et al. (2021) conducted a study with 144 participants, aiming to examine treatment retention and psychosocial

variables in parents versus non-parents enrolled in an OUD program at a primary care clinic over the 12 months post treatment initiation. Sattler et al. found psychiatric and psychosocial functioning of their sample to be poor, with depression, anxiety, and stress screening scores in the mild to moderate ranges; however, parents were more likely to remain in treatment at 12 months. Multivariate analysis showed no significant difference between parents and non-parents in treatment duration $\chi^2(1) = 3.0$, $p = .09$, or in risk of dropping out of treatment (HR = 0.62, 95% CI = 0.36, 1.07) after adjusting for relevant variables. Sattler et al. screened for post-traumatic stress disorder (PTSD) using the 5-item Primary Care PTSD screen (PC-PTSD-5; Prins et al., 2016), in which a score of 3.0 indicates a positive screen for trauma. Average trauma symptom scores for parents were 2.9 and non-parents 3.0; however, no association was found between PTSD and OAT retention. Similarly, Hooker et al.'s (2020) study at a family clinic with 46% female participants, found 81% of participants reported traumatic experiences although only 25% disclosed a PTSD diagnosis at OAT initiation. Additionally, 52% screened positive for probable PTSD. In contrast, Hawkins et al.'s (2024) evaluation of the U.S. Veteran's Health Administration buprenorphine expansion with 91% male participants, found PTSD was prevalent at 44%, however, no association was found between PTSD and buprenorphine receipt or retention, OR = 1.04 (unadjusted) and 1.13 (adjusted). Like Sattler et al. and Hooker et al, Hawkins et al, did not find an association between PTSD and buprenorphine retention. Additionally, Hawkins et al. found anxiety disorders were associated with a higher likelihood of receiving buprenorphine, while serious mental illness (AOR, 0.60; 95% CI, 0.37-0.97), defined as bipolar and psychotic disorders, were had lower likelihood of receiving buprenorphine prescriptions.

Several authors interpreted their findings to suggest that mental health and integrated care play an important role in supporting OAT retention in primary care. Logan et al. (2019) argued that integration of OAT with multidisciplinary support improved mental health, supporting the value of wraparound care. Hooker et al. (2020) echoed this need but noted a lack of guidance on managing mental health comorbidities, with research often focused on toxicology over mental health outcomes. Neeb et al. (2024) suggested that continued engagement in primary care helps identify chronic conditions over time, which may impact retention. In contrast, Hawkins et al. (2024) found that certain psychiatric diagnoses may limit buprenorphine prescribing in primary care, highlighting a need for speciality services. Sattler et al. (2021) offered a different perspective, suggesting that parental motivation may improve mental health and support retention, emphasizing personal factors over system level ones. For a summary of the concurrent substance use and mental health disorders from the studies, refer to Appendix D.

Racial, Socioeconomic, and Psychosocial Disparities

Studies reviewed, suggest that a complex connection between racial, socioeconomic, and psychosocial factors can affect OAT retention. Hawkins et al.'s (2024) study conducted in the U.S., found that non-Hispanic Black patients were significantly less likely to receive buprenorphine (AOR=0.55) and less likely to be retained on buprenorphine for at least 180 days (AOR=0.40), even after adjusting for patient-level factors. Hawkins et al. argued that structural racism negatively impacts healthcare access and outcomes, emphasizing the need for longitudinal research to address these disparities. Similarly, Hooker et al.'s (2020) study at a family medical clinic in a low-socioeconomic urban area observed a 67% retention rate at six months among 100 participants. Unemployment was initially linked to treatment discontinuation, $\chi^2(1) = 3.4$, $P = .06$; however, was no longer a predictor of discontinuation at six months after

controlling for covariates, OR = 1.39, 95% CI [0.50, 3.86], P = .53. Many participants faced food insecurity and low income, earning less than \$10,000 annually. Hooker et al. argued that addressing the reciprocal relationship between psychosocial issues and substance use is crucial for improving OAT retention. Additionally, Hooker et al. emphasized the need to explore new approaches, such as using care coordinators to assist individuals navigate socioeconomic barriers like food insecurity, unemployment, transportation.

Medication Related Factors

Findings suggest that medication related factors, including medication formulations, dosage schedules, previous experiences, and treatment settings can influence OAT retention outcomes. Stein et al.'s (2022) examination of participants transition from buprenorphine/naloxone sublingual tablets (BUP-NX) to buprenorphine extended release injections (BUP-XR) found that individuals who had been on BUP-NX for a longer duration were more likely to continue with BUP-XR. Those who received three or more post-induction BUP-XR injections had an average of 24.3 ($\pm$ 32.5) months on BUP-NX, compared to 8.9 ($\pm$ 19.5) months for those who did not ($p = .009$). Nearly half (48%) of their sample received fewer than three additional BUP-XR injection after the initial dose. Beharie et al. (2022) conducted a qualitative study exploring the experiences of 50 individuals with OUD enrolled in an initiative by the New York City Department of Health and Mental Hygiene, called the Buprenorphine Nurse Care Manager [NCM] Initiative (BNCMI). Participants valued buprenorphine's flexibility in primary care but struggled with replacing one opioid with another, leading to discontinuation. Others reported side effects such as precipitated withdrawals, stomach upset, and inadequate craving management, while some found routine clinic visits and toxicology testing burdensome, expressing a desire to be free of obligations related to MOUD. Similarly, Tofighi et al. (2019)

interviewed 23 individuals with OUD who were conveniently sampled from patients admitted to a New York City hospital for opioid detoxification. Participants described negative experiences with methadone, particularly due to restrictive daily dose visits, sedating effects, and its perceived resemblance to heroin, leading many to prefer buprenorphine or naltrexone (Tofighi et al., 2019). For some, a lack of knowledge of how to safely transition from methadone to buprenorphine led to OAT discontinuation entirely (Tofighi et al., 2019). Some participants reported insurance lapses and frequent location to contribute to buprenorphine discontinuation. Like Beharie et al. (2020), Tofighi et al.'s (2019) participants reported dissatisfaction with buprenorphine side effects and inadequate management of cravings and chronic pain. Tofighi et al. (2019) found that participants experienced precipitated withdrawal when offered buprenorphine without guidance from peers or drug dealers, shortly after using methadone or heroin. Lai et al., (2020) conducted a qualitative study evaluating a low barrier, group-based buprenorphine program at a primary care clinic in Philadelphia, PA, with 20 patients and 26 staff members interviewed in focus groups. Unlike participants in Beharie et al.'s (2022) and Tofighi et al.'s (2019) studies, who faced logistical barriers and negative side effects with buprenorphine, Lai et al. (2020) found that some individuals introduced to buprenorphine through peers or street sources to relieve withdrawal symptoms reported positive experiences and later sought formal treatment.

The implications of these studies highlight challenges and solutions for improving OAT retention. Stein et al. (2022) asserted that the poor retention with BUP-XR, regardless of transition direction, suggests treatment retention is a significant challenge regardless of the formulation type. In contrast, Tofighi et al. (2019) highlighted the need for sustained release buprenorphine or naltrexone formulations with mobile interventions to overcome structural

barriers and reduce reliance on street acquired medications. Beharie et al. (2022) emphasized that while buprenorphine may not require daily visits, routine visits and urine toxicology testing may still be too burdensome for some individuals with OUD, therefore OAT programs must increase their flexibility to accommodate these challenges. Lai et al. (2020) argued that a low-barrier model integrated into primary care enhances access, reduced stigma and improved OAT initiation and retention. While all authors agree on the importance of flexible and accessible treatment, their strategies differ in addressing these challenges.

Patient-Provider Dynamics and Treatment Retention

Findings from multiple studies highlight respectful, non-stigmatizing, and empathetic interactions between patients and program staff critical to OAT retention. Beharie et al.'s (2022) in treatment and out of treatment participants valued NCMs concern and care for their well-being, with some reaching out even when participants were lost to care, which encouraged them to return to treatment. NCMs ability to maintain contact with patients outside clinical settings fostered trust and demonstrated concern beyond medical compliance, which positively impacted participants experience. Participants also felt a deeper connection with NCMs with lived substance use experience, strengthening their credibility and making their guidance more impactful. Similarly, Logan et al.'s (2019) multidisciplinary clinic study found that staff outreach to homeless camps, shelters, and needle exchange programs helped build trust and encouraged reluctant individuals with OUD to engage with OAT staff at the clinic. In contrast, Tofighi et al.'s (2019) inpatient detoxification patient interviews found that limited provider interaction and perceptions of OUD care being commercialized negatively impacted prior OAT retention. Participants who viewed primary care providers as offering comprehensive OUD care, including

OAT, education, and referrals to specialty services were more likely to stay engaged in treatment.

Authors commonly emphasized that fostering trusting and non-stigmatizing patient-provider relationships is essential to improving OAT engagement and retention. Beharie et al. (2022) highlighted that individuals with OUD frequently experience internalized stigma and anticipate discrimination from healthcare providers, which can hinder treatment engagement. In contrast, Tofighi et al. (2019) posited that systemic provider barriers, such as insufficient clinical and administrative support, legal concerns, and a lack of OUD training, continue to negatively affect OAT retention. Logan et al. (2019) argued that team-based collaboration and consistent community outreach in integrated care settings can increase patient attachment and OAT engagement.

Individualized and Flexible Treatment Models

Several studies highlighted that individualized, flexible approaches to OAT—improved treatment retention. Lai et al. (2021) reported that participants in a group harm reduction model remained engaged in treatment because the program supported their personal recovery goals, accepted relapse as part of the process, and reduced stigmatization by not requiring abstinence. However, some participants voiced concerns about overly lenient rules, such as group sessions with actively using peers, which some found detrimental to their recovery. Similarly, Beharie et al. (2022) found that despite positive relationships with NCMs, rigid program policies such as involuntary discharge over medication dose conflicts or positive urine toxicology results led to participant drop-out. Tofighi et al.'s (2019) in-detox participants also reported that inflexible clinic policies, including mandatory abstinence, punitive responses to relapse, and lack of tailored treatment plans, led to treatment disengagement. Participants preferred programs that

provided OAT education, housing support, and self-help group access as part of an individualized care plan.

Authors consistently argued that rigid rules and abstinence-only approaches can lead to disengagement or program discharge. Lai et al. (2021) recommended that harm reduction models support both abstinence and active use pathways while still maintaining a structured program that respects patients' goals. Beharie et al. (2022) emphasized that supportive relationships with program staff are important but may not outweigh the impact of program rigidity on retention. Tofighi et al. (2019) advocated for individualized treatment plans and patient-centered flexibility to better accommodate the complex and relapsing nature of OUD.

Accessibility, Clinical Support, and Integrated Care

Accessibility to OAT programs and supportive multidisciplinary teams was commonly found to contribute to OAT retention. Beharie et al. (2022) found that ease of scheduling, direct NCM contact, assistance with insurance/pharmacy issues, and rapid response to logistical needs increased program engagement. Similarly, Lai et al. (2021) found that flexible weekly group visit options and the ability to schedule promptly based on patients' shifting readiness enhanced treatment initiation and retention. However, large group sizes limited individualized attention. Conversely, Tofighi et al. (2019) found that program administrative delays, insurance lapses, and lack of care navigators were significant barriers, particularly for individuals involved in the criminal justice system. Many participants had to rely on peers or online searches for information, leading to missed or delayed treatment initiation. Clinical support, particularly during treatment initiation, was also crucial. Beharie et al. (2022) highlighted NCMs' role in preventing precipitated withdrawal by guiding appropriate buprenorphine timing. Similarly, Logan et al. (2019) and Neeb et al. (2024) showed that integrated care models offering mental

health, behavioural, and OAT services in one location had higher retention rates. Logan et al. (2019) reported that 92% of patients remained in care at one month and 64% at three months, with integrated care addressing both substance use and mental health. Neeb et al. (2024) found that integrating methadone within primary care achieved retention levels comparable to traditional standalone addiction clinics.

Beharie et al. (2022) argued that team-based, coordinated care helps manage time-sensitive issues that, if unaddressed, could cause patient dropout. Tofighi et al. (2019) emphasized the need to streamline access, reduce administrative burdens, and improve navigator roles to connect patients with OAT programs. Logan et al. (2019) and Neeb et al. (2024) advocated for enhancing integrated care models that reduce stigma, address comorbidities, and improve patient continuity through co-located services.

Chapter Four: Discussion

This integrative review aimed to examine the factors influencing OAT retention in primary care settings. The following discussion will examine the complex connections of findings identified in the studies. OAT is effective for treating OUD, but challenges such as concurrent substance, mental health conditions, and systemic barriers impact retention. The following sections will explore the key factors and discuss how primary care programs can better support long-term engagement in treatment.

The Complex Relationship Between Concurrent Substance Use and OAT Retention

Concurrent substance use is highly prevalent among individuals on OAT, but its influence on OAT retention varies, with only a few studies finding an association with treatment dropout. IVDU (Hooker et al., 2022), concurrent methamphetamine use (Logan et al., 2019), and recent heroin use (Stein et al., 2022) were each associated with shorter OAT duration and drop out. Various motivations for co-occurring substance use, such as counteracting sedating effects or prolonging the high have been identified in current literature (Boileau-Falardeau et al., 2022). Although Hooker et al. did not provide an explanation for positive urine drug tests for benzodiazepines being more than double the self-reported rate (17% versus 8%), one possibility may be the infiltration of benzodiazepines in the unregulated drug supply (BCCSU, 2021). In January 2021, benzodiazepines were found in almost 50% of suspected overdose deaths, over three times the 16% six months earlier (BCCSU, 2021). Harm reduction strategies such as drug checking sites (Angelucci et al., 2024) and take-home fentanyl tests (Vancouver Coastal Health, 2024) are becoming increasingly available in Canada. These tools help individuals identify toxic substances in their supply, reducing overdose related harm or death (Angelucci et al., 2024; Vancouver Coastal Health, n.d.). Offering drug checking at primary care sites could also help

reduce stigma associated with substance use. Individuals with OUD may knowingly or unknowingly be exposed to adulterated opioids, highlighting the need to understand their reasons for use to improve treatment plans and long-term OAT adherence.

The Impact of Mental Health Conditions on OAT Retention

Several studies reported a high prevalence of comorbid mental health disorders among individuals receiving OAT, with mixed findings on how they affect retention. Greater severity of depression and anxiety were linked to poor OAT retention (Logan et al., 2019). Additionally, anxiety was associated with increased treatment initiation and serious mental illness with lower initiation (Hawkins et al., 2024). Mental health severity and overlapping presentations make it difficult to distinguish their specific impact on retention. Positive PTSD screenings were highly prevalent compared to formal PTSD diagnosis (Hooker et al., 2022; Sattler et al., 2021), echoing evidence by Rosic et al. (2021), who found that almost half of individuals with OUD had PTSD symptoms and trauma histories but did not meet full diagnostic criteria. PTSD may be underdiagnosed in individuals with OUD due to its overlap with depression and anxiety, symptom complexity, and patients' reluctance to disclose trauma (Sareen, 2024). Primary care providers' longitudinal relationships with patients offer opportunities to integrate routine mental health screening into OAT visits to identify psychiatric symptoms that could impact retention.

The Need to Tailor OAT Medications

Tailoring OAT medications to individual preferences can boost retention among people with OUD. Studies linked dropout to side effects, fear of withdrawal, inadequate craving control, inconvenient dosing schedules, and negative social stigma (Beharie et al., 2022; Lai et al., 2021; Stein et al., 2022; Tofighi et al., 2019), echoing patient concerns reported by Cioe et al. (2020). Provider related concerns, such as inadequate provider training, social stigma, and lack of

support, also negatively impact OAT prescribing and retention (Cioe et al., 2020). For example, Nguyen et al. (2024) found almost 60% of family physicians lacked confidence and knowledge in prescribing OAT. Traditionally managed by addiction specialists (Donroe et al., 2020), OAT often falls outside primary care providers' expertise, which may contribute to retention challenges. In Canada, virtual resources like the Rapid Access to Consultative Expertise line (Shared Care Committee, n.d.) and 24/7 Addiction Medicine Clinician Support line (Sergeant et al., 2024) offer primary care providers urgent support from addiction specialists. Almost two-thirds of calls in the pilot phase of the latter resource were related to OUD management (Sergeant et al., 2024). Establishing standardized OUD care, OAT training, and virtual resources targeted to primary care providers can improve confidence and patient OAT retention.

Structural and Programmatic Factors Affecting OAT Retention

Retention in OAT improves when care is adaptable, individualized, and supported by a multidisciplinary team. Rigid program structures with strict rules and inflexible schedules often lead to dropout, while flexible, non-judgemental approaches reduce stigma and support engagement. This reflects a shift in OAT delivery toward collaborative goals and recognition of psychosocial outcomes as meaningful measures of success (Biondi et al., 2020; Hooker et al., 2022). Structural and programmatic factors, including racial disparities, socioeconomic instability, and limited psychosocial supports influence OAT retention and highlight the need for care coordination and expanded access. While multidisciplinary support contributed to better retention, primary care settings varied in their capacity to offer flexible services. Some programs faced operational challenges with flexible scheduling (Lai et al., 2021), whereas others mitigated medication, insurance (Beharie et al., 2022), and comorbidity-related barriers (Logan et al., 2019) through team-based care. Research shows that multidisciplinary primary care teams

improve patient OAT and mental health services engagement (Brackett et al., 2022; Santos et al., 2024). As of January 2025, the British Columbia Ministry of Health expanded its mental health and substance use strategy, increasing primary care staffing and enabling same-day services to address gaps and support retention in treatment (British Columbia Ministry of Health, 2025). The growing complexity of individuals with OUD highlights the need for a multidisciplinary approach to better support long-term OAT adherence.

Implications

The findings from this review highlight several key areas for improving OAT retention in primary care. Given the high prevalence of comorbid substance use and mental health and among individuals receiving OAT (Jones & McCance-Katz, 2019; Santo et al., 2024), it is essential to integrate mental health support into these programs. Government funding should be allocated not only to support OAT but also to ensure that mental health and psychosocial services are included in primary care settings. This integrated approach would address the interconnected challenges of substance use, mental health, and socioeconomic disadvantages, ultimately improving retention and treatment outcomes for patients. OAT retention is typically measured by the duration an individual remains in treatment; however, this no longer aligns with emerging care models of care that address physical, psychological, and social functioning (Biondi et al., 2020; Hooker et al., 2022). Incorporating these outcomes into OAT program strategies would provide a more comprehensive understanding of treatment effectiveness and promote better continuity in OAT. Additionally, the increasing prevalence of toxic substances in the unregulated drug supply (Jones et al., 2020) highlights the need for harm reduction tools, such as drug checking to be integrated into primary care. These strategies can reduce stigma, mitigate overdose risks, and better inform treatment plans to improve retention. OAT retention

improves when treatment plans align with a patient's recovery stage, preferences, and treatment goals. Individualized care ensures evolving needs are met. Further longitudinal research is needed to compare the effectiveness of different primary care models overtime. Additionally, further longitudinal research should aim to understand how factors like OUD severity and unintentional substance use impact treatment outcomes to better inform interventions. Although expanding access to OAT in primary care is important, evidence suggests that primary care providers often feel inadequately trained and supported in managing OUD and delivering OAT (Cioe et al., 2020; Madras et al., 2020; Nguyen et al., 2024). This highlights the importance of addressing provider-related barriers that could impact patients' long-term engagement in OAT programs. Standardized education on OUD, including OAT, withdrawal, polysubstance use, and co-occurring mental health concerns is essential. Province- or state-wide access to addiction specialist support could mitigate primary care provider OAT prescribing barriers. Investing in team-based care and expanding primary care capacity can alleviate administrative and clinical burdens, better address patient complexity, and promote long-term OAT engagement.

Limitations

There are several limitations to this integrative review. First, all studies included were conducted in the United States, which may limit the generalizability of the findings to the Canadian context due to the differences in healthcare systems, funding, and OAT regulations. Second, this review may have excluded relevant global insights, as only U.S.-based literature was included. Additionally, the search criteria were limited to studies from 2016 onward, which may have resulted in the omission of relevant studies that could offer additional perspectives on OAT retention. While this review identified key factors influencing retention, the role of OUD severity, comorbid substance use, and mental health conditions remains unclear due to

inconsistent measurement and outcomes used across studies. Lastly, although no single primary care model emerged as most or least effective, the review highlights that team-based approach program structures tend to support OAT retention across various primary care settings.

Conclusion

The unregulated drug supply, largely driven by fentanyl, has drastically changed the landscape of OUD in Canada, with fentanyl contributing to almost 80% of accidental opioids deaths between January and June 2024, alone (Government of Canada, 2024b). In response, healthcare systems have expanded OAT access through primary care integration. Despite these efforts, individuals with OUD often engage inconsistently, and may voluntarily or involuntarily discontinue treatment after enrolling into OAT programs, leading to inconsistent retention rates and ongoing underutilization of OAT (Klimas et al., 2021). This review examined factors influencing OUD patients' retention in primary care OAT programs, finding that disengagement stems from complex personal and systemic interactions. While concurrent mental health and substance use disorders are common among individuals with OUD, determining a direct association with treatment engagement or discontinuation was challenging, partly due to heterogeneity across studies. Individualized treatment approaches that incorporate low-barrier, flexible, and trauma-informed care were consistently linked to better treatment engagement. These findings highlight the need for primary care models that are adaptable and responsive to the complex needs of individuals living with OUD. Future research should examine the roles of OUD severity and unintentional polysubstance use on treatment outcomes, to better inform interventions that support long-term retention and recovery amid an evolving opioid crisis.

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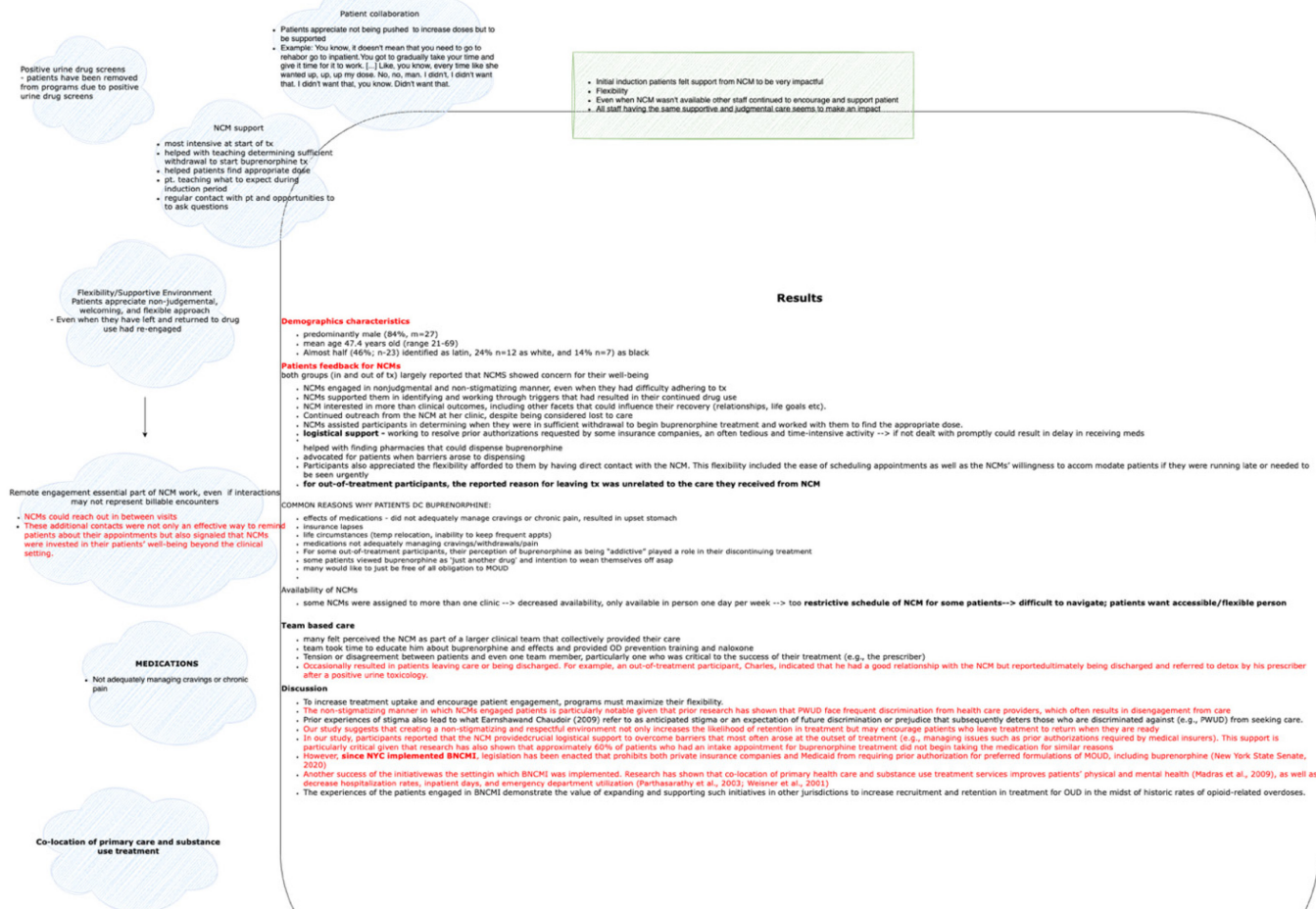
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Appendix A

draw.io Mind Map



Appendix B

Data Extraction Matrix

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
Logan et al., 2019	Retrospective cohort study N = 61 participants with opioid use disorder (OUD) enrolled in an addiction medicine program integrated into a rural primary care clinic in Hawaii, USA	Examine patients accessing addiction medicine services, evaluate changes in MH symptoms and substance use, and identify retention factors	Buprenorphine All patients were scheduled to follow up with their care team on a weekly, biweekly, or monthly schedule based on length of sobriety and adherence with their treatment plan Robust in-house support services – social worker, psychologist, behavioural health case manager, pharmacist, primary care providers Individuals were assigned a provider for buprenorphine	Participant demographic, concurrent use of other substances (confirmed with UDT), and mental health diagnosis association with opioid agonist therapy retention	Association of patient demographics with OAT retention: The majority of patients (72%) remained in treatment for at least 3 months, with early dropout linked to higher initial scores for depression and anxiety Three-month retention was not associated with demographics, insurance type, IV or heroin use, other SUDs, or MH diagnoses Patients were more likely to discontinue treatment within 3 months if they had: inconsistent initial UDT $\chi^2(1, N = 54) = 7.99, p < .01$	Mental Health Depression Anxiety Concurrent substance use Tobacco use Alcohol use disorder Support services Integrated behavioural health services Insurance coverage	Concurrent mental health and substance use can impact an individual's ability to maintain on OAT Patients who use non-substance use related mental health disorder or methamphetamines may be more unlikely to retain OAT A structured integrative care team with patient comprehensive support services may have impacted retention Collaborative signed treatment agreement may enhance an individual's ability to maintain on OAT, rather than dismissing them as not ready

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
			prescription and a PCP for general medical care to ensure accessibility and allow for reengagement in OAT Systematic process to create collaborative, individualized care plans with the patient Patients signed care plans acknowledging the cessation of other controlled substances, treatment compliance, and medication adherence, with an expectation to engage in support services Patients not demonstrating progress treatment goals (ex. inconsistent drug tests, missing		higher baseline depression scores (unretained M = 15.47, SD = 4.34, retained M = 9.56, SD = 7.91, $t(52) = 2.72$, $p < .01$) higher baseline anxiety scores (unretained M = 13.13, SD = 6.24, retained M = 8.18, SD = 7.04, $t(52) = 2.39$, $p < .05$) Demographics: 39% were female 25% were Native Hawaiian or Pacific Islander Mean age was 42.3 (SD = 11.8) year 69% of patients had primary insurance coverage through Medicaid Mental Health: 77% of patients were diagnosed with comorbid MH condition, most commonly depression and anxiety		

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
			scheduled appointments) were supported with additional supports or higher level of care (weekly follow-up interval vs. monthly) *Consistent UDT = shows positive results for prescribed medications and negative for all other substances. *Inconsistent UDT = shows positive results for illicit substances or non-prescribed medications, or negative for prescribed medications.		59% reported moderate to severe depression Objectively, PHQ-9¹ scores had a median of 11.26 (moderate depression) 49% had moderate to severe anxiety Substance use: All patients met the criteria for moderate to severe OUD 72% used tobacco 75% with at least one other substance use (41% alcohol, 39% methamphetamines) Patients were more likely to provide an inconsistent UDT if they were diagnosed with a methamphetamine use disorder, or a non-substance related MH disorder Patients with inconsistent UDT remained in treatment		

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					for significantly fewer months (inconsistent M = 4.89, SD = 4.56, consistent M = 13.88, SD = 5.76, $t(59) = 6.31, p < .01$)		
Tofighi et al., 2019	Qualitative study Convenience sampling n = 23 inpatient detox patients in New York City hospital participated in an in-depth, semi structured interview	Explore factors influencing patient access to medications for OUD, particularly looking for individuals with historically suboptimal follow-up with inhouse referrals to office-based opioid treatment (OBOT)	None	Patient experiences with accessing medications for OUD	Linkage to OBOT: Participants relied on internet searches and actively using peers regarding information on MOUD (medications for opioid use disorder) Positive experiences with illicit buprenorphine have favourable linkage to OBOT with buprenorphine Patient-level factors influencing retention in OBOT: Factors attributed to discontinuation of OBOT include exposure to actively-using peers and drug dealers in close proximity to OBOT programs, coping with 'boredom', benzodiazepine misuse, inadequate pain	Linkage to OBOT (office-based opioid treatment) Induction on buprenorphine and/or naltrexone XR Physician-patient relationships Stigma Transitions from methadone and buprenorphine Preference of buprenorphine over methadone Barriers and facilitators to care	A lack of accessibility to OBOT, including dissemination of health information, encourages patients seek diverted buprenorphine Patients preferred buprenorphine over methadone because of less cognitive altering effects and doses can be administered at home Provider Inflexibility, lack of rapport, and expectations of abstinence can be attributed to discontinuation of OBOT Providers who offered patient education and specialty care (psychiatry, HIV care, individualized care plans) were favoured over physicians perceived to be profit-driven by rushed visits and neglecting to refer patients to specialty care.

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					management, conflicts with clinic staff, and unstable housing Provider-level barriers to OBOT: Negative perceptions of providers stem from commercialization of care, strict protocols pertaining to negative urine drug screen results, limited time spent during encounters, lack of access to support staff, and inability to transition patients from methadone to buprenorphine System-level barriers to OBOT: Challenges with insurance coverage including unexpected deactivation of Medicaid coverage and restrictions to pharmacies and clinics that are far away or offer low-quality care Perceptions of buprenorphine and XR-NTX (extended-release		Patients with on MOUD appreciate flexibility with follow-up and support care services such as case management and behavioural health services.

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					naltrexone) versus methadone: Participants preferred the destigmatized primary care experience combined with support services (behavioural health, case management) offered in methadone maintenance treatment Negative experiences with methadone created higher favourability for engagement with OBOT buprenorphine and XR-NTX XR-NTX non-opioid mechanism of action and monthly injections versus daily dosing preferred by participants Barriers to XR-NTX include limited information regarding the medication, access to providers offering injection, cost, chronic pain, maintenance of abstinence and adequate management of withdrawal		

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					symptoms prior to induction, and misinformation, creating fears of precipitated adverse effects		
Hooker et al., 2020	Prospective cohort study n = 100 receiving medication for opioid use disorder (MOUD) at a family medicine clinic located in a low-socioeconomic area of Minneapolis, MN.	Describe the prevalence of mental health, comorbid substance use, and psychosocial concerns of patients seeking treatment for OUD in primary care and their relation to 6-month treatment retention	Buprenorphine/naloxone	Demographic and social characteristics: Gender, age, race/ethnicity, marital status, employment status, income, typical mode of transportation Substance use and mental health history Depressive symptoms Anxiety symptoms Trauma symptoms Food insecurity Treatment retention	Mental health symptoms were highly prevalent for this sample (44% screened positive for anxiety, 31% for depression, 52% for posttraumatic stress disorder) 75% of patients reported use of illicit substances other than opioids Many patients had psychosocial concerns such as unemployment (54%), low income (75%), food insecurity (51%), and lacking reliable transportation (64%). 67% of the participants were retained at 6 months	Mental health Substance Use and addictive behaviours IV drug use Psychosocial concerns	The study did not find patients' other health concerns to predict treatment retention at 6 months, however, the high rates of comorbid substance use, and mental health disorders supports other study findings The study highlights management of OUD in primary care can provide great continuity of care and presents opportunities for linkage to social services The study provides insight that psychosocial issues and substance use are likely linked in a cycle. Individuals in lower socioeconomic conditions may be more vulnerable to using substances, and

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					Intravenous opioids use was the only predictor of retention at 6 months; individuals using intravenous opioids were more likely to discontinue treatment (P=.003)		substance use can in turn lead to financial and social difficulties. Valuable insights on how social determinants of health issues (ex. food insecurity) could be addressed during OUD treatment visits Future research is needed to examine psychiatric and psychosocial factors that could impact MOUD retention in primary care
Lai et al., 2020	Qualitative study n = 46 participants, including 20 patients and 26 staff members, took part in ten focus groups at a primary care clinic in an urban area of Philadelphia, PA	To evaluate the strengths and limitations of a low-threshold MOUD program at a primary care clinic through the perspectives of its key stakeholders	Low-threshold buprenorphine/naloxone group visit program	Strengths and limitations of group-based MOUD program integrated into primary care clinic	Participants noted the person-centered harm reduction approach as a strength The programs ease of access, integration in primary care, and group-based visit model facilitated patients' participation and engagement in the program Challenges in program implementation included differences in staff acceptance and	Harm Reduction Integration with primary care Integrated behavioural health services Group-based model Low-barrier MOUD model Accessibility	This study filled a knowledge gap in understanding how program design choices affect treatment access, patient retention, and organizational processes Valuable insights provided from the perspectives of patients, staff members, and care providers Study findings provide qualitative evidence for the benefits of 'low threshold' model for MOUD care

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					understanding of harm reduction, unpredictability of clinic volume and flow, and the need to balance access to primary care and MOUD		While many patients appreciated the programs' philosophy, some felt stricter rules were needed to regulate others' behaviour and support their own recovery process, highlighting that a one-size fits all approach will not meet everyone's needs Provides insight on organizational capacity to meet patients primary care and mental health needs adequately
Sattler et al., 2021	Prospective cohort study n = 144 patients including 61 parents, receiving MOUD treatment at a family medicine residency clinic, likely located in the USA (location unspecified)	To examine treatment retention and psychosocial variables in parents versus non-parents engaged in a MOUD treatment program	Buprenorphine	Comorbid mental illness Social support Quality of life Retention on MOUD treatment at 12 months	Of the 144 participants in the study, 66 were censored (ex. dropped out, loss to follow-up) 78 were tracked for 365 days, 34(43.6%) remained in the program by the end of the study Parents reported lower levels of anxiety and loneliness, along with higher levels of social connection, life satisfaction, and a sense of meaning in life	Comorbid mental illness Psychosocial functioning Parental functioning impact on OAT retention	The study provides an understanding of the parent's needs, complex psychosocial and psychiatric issues, that accompany with OUD and MOUD treatment The entire sample's overall psychiatric and psychosocial functioning was relatively poor, with mean depression, anxiety and stress screener scores in the mild to moderate ranges. The low levels of well-being align with research

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					Parents were also older, more likely to be female, of a race other than white, married, employed, and had higher incomes Although parents reported high levels of parental self-agency and strong bonds with their children, many also expressed experiencing elevated parental shame Among parents, higher levels of shame were linked to increased depression, anxiety, anger, stress, and loneliness More than 25% of parents reported that a child had lived with friends or relatives for over three months, and 11% indicated that a child had been removed from the home by child protective services		on comorbidities in patients with OUD After controlling for covariates, there was no difference between parents and non-parents in terms of treatment duration or risk of dropping out. The authors acknowledge that this may be due to insufficient power in the statistical model after including the covariates Parents reported better psychological functioning across all measures, though the authors suggest this could be due to social desirability bias or the possibility that parenthood itself acts as a protective factor, with parents finding motivation through their children MOUD programs could benefit from collaborating with in-house and community-based mental health and parental services to offer comprehensive and family centered care

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					Parents were more likely to be retained in treatment at 12 months, although this finding was non-significant after controlling for covariates		Children of parents with mental illness and substance use disorders are at a higher risk of developing psychological problems, it is essential to invest in a prevention model that supports the entire family
Beharie et al., 2022	Qualitative study n = 50 participants who received buprenorphine treatment at eight safety-net primary care clinics with nurse case managers (NCM) in New York City were interviewed about their experiences with care 31 in-treatment-participants (remained in treatment for 6 months) and 19 out-of-treatment (left treatment within 6 months of intake)	To examine how patients receiving buprenorphine treatment at a safety-net primary care clinic perceive the support provided by nurse care managers	Buprenorphine treatment with support from NCMs who coordinate patient care.	Reasons for initiating buprenorphine treatment at BCNMI site Patient experience while in treatment (administrative, barriers, starting the medication) Likes and dislikes of buprenorphine Relationships with the nurse care manager and prescriber Reasons for continuing or discontinuing treatment	Both, in-treatment and out-of-treatment groups found that NCMs showed care and concern for their well-being in a non-judgemental manner NCMs provided critical clinical and logistical support to participants Out-of-treatment participants rarely cited NCMs as the reason for disengaging with treatment In-treatment participants saw the NCM as an integral member of the clinical team, and their care often motivated	Supportive care Care and concern for patient's well-being Clinical support (treatment induction) Logistical support NCM care as motivator for staying in treatment or returning to treatment Team-based care	The Buprenorphine Nurse Care Manager Initiative supports buprenorphine treatment in primary care settings by assigning a dedicated staff member to oversee and coordinate care Patients felt that NCMs engaged in a non-stigmatizing manner, which helped build rapport and support treatment retention for some participants Integrating substance use treatment into primary care settings increases access, reduces stigma, and provides patients with comprehensive services that can improve overall health outcomes, to an

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
					continued engagement in treatment		already difficult to reach population Patients felt that NCMs could provide critical support with initial buprenorphine education and time-sensitive logistical issues, facilitating meaningful relationships between the NCMs and patients The nurse case manager initiative highlights the benefits of expanding such supports in OUD treatment to improve recruitment and retention in the critical period of rising opioid overdose crisis
Stein et al., 2022	Retrospective observational cohort study n = 92 electronic health records of patients with opioid use disorder who transitioned from buprenorphine/naloxone sublingual (SL) tablets to buprenorphine extended-release	To examine the transition from buprenorphine SL to injectable BUP-XR in a primary care setting, with a focus on BUP-XR retention and its predictors	Buprenorphine extended release injection	Primary outcome: Treatment retention as three or more consecutive monthly BUP-XR injections Other measures collected: Demographics Self-report drug use History of injection drug use	Mean age was 38 years old 67% were male The average duration of SL buprenorphine prior to transition was 17.1 ($\pm$28.1) months 48% of BUP-XR patients had discontinued treatment	Concurrent MH Concurrent chronic pain disorder Concurrent illicit opioid use Buprenorphine SL vs buprenorphine XR injection	Recent heroin use prior to transition to buprenorphine XR suggests uncontrolled cravings on buprenorphine SL, and a negative predictor of retention in buprenorphine XR treatment It is thought that the steadier levels of buprenorphine XR injection and analgesia could influence retention

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	(BUP-XR) injection at a primary-care-based buprenorphine treatment program.			Overdose in the past year Number of consecutive monthly injections received Treatment history	3 months after transition People with chronic pain were more likely to continue buprenorphine XR than those who had used heroin in the last month were less likely to continue The average length of buprenorphine SL prior to transition was 17.1 ($\pm$28.1) months Mean months on SL buprenorphine prior to transitioning to BUP-XR was 24.3 ($\pm$32.5) months for people who received 3+ post induction injections compared to 8.9 ($\pm$19.5) months for those who did not ($p = .009$)		for individuals with chronic pain Chronic pain is common in individuals with OUD and is a relapse risk, but it may also increase engagement in buprenorphine treatment due to greater connection in medical care The study found that a documented psychiatric diagnosis was not statistically significant ($p=.14$) however the directional size effect implies that a psychiatric diagnosis might still play a role in long-term care or discontinue treatment
Hawkins et al., 2024	Retrospective cohort quality improvement evaluation $n = 2880$ patients with OUD seen in	To identify patient-related factors associated with buprenorphine receipt and retention in primary care clinics	Buprenorphine	Buprenorphine receipt (at least one prescription from primary care during the index year)	11.7% of the 2880 total sample (95% CI, 10.6%–12.9%) received buprenorphine in primary care	Concurrent use of non-opioid substances Mental Health Anxiety	Further integration of addictions services in primary care may be needed to enhance buprenorphine receipt for patients with concurrent substance use disorders

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
Authors/Year	Study Design	Purpose/Aim	Intervention	Outcomes Measured	Key Results	Themes	Conclusions/Implications
	Veterans Health Administration primary care clinics			Buprenorphine retention (received buprenorphine for 180 days or longer, without a break in medication supply > 15 days) Predisposing factors (sex, age, marital status, race, ethnicity) Patient housing stability Mental health disorders: - anxiety - depression - posttraumatic stress disorder (PTSD) - bipolar and psychotic disorders (serious mental illness) Substance use disorders: - alcohol use disorder	58.2% (95% CI, 52.8%–63.3%) of participants were retained on buprenorphine for 180 days or longer Patients with alcohol use disorder had lower odds of receiving buprenorphine (AOR: 0.39; 95% CI, 0.27–0.57) Nonopioid drug use disorder had lower odds of receiving buprenorphine (AOR, 0.64; 95% CI, 0.45–0.93) Individuals with serious mental illness had lower odds of receiving buprenorphine (AOR, 0.60; 95% CI, 0.37–0.97) Individuals with anxiety disorder had higher odds of receiving buprenorphine (AOR, 1.42; 95% CI, 1.04–1.95)	Depression Racial disparities	Improve interventions to support disparities in receipt and retention among non-Hispanic Black patients Anxiety was associated with higher odds of receiving buprenorphine – does the severity and type of mental health disorder impact retention? Individuals with alcohol use disorder had lower odds of receiving buprenorphine – do certain concurrent substances influence OAT? Mixed findings regarding the impact of concurrent substance use among the studies. Logan et al. (2019), Hawkins et al. (2024), and Hooker et al. (2020) found substance use related findings associated with OAT retention.

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
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				- non-opioid drug use disorder Medical comorbidity using modified Charlson Comorbidity Index (CCI) score (higher scores = greater severity) Buprenorphine receipt 90 days prior to index date	Non-Hispanic black patients were less likely to receive buprenorphine (AOR, 0.55; 95% CI, 0.35–0.87) and be retained for 180 days (AOR, 0.40; 95% CI, 0.19–0.84) Those with a CCI score of 1, relative to those with a score of 0, were less likely to be retained		

What factors influence opioid agonist therapy retention among individuals with opioid use disorder in primary care settings?							
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Neeb et al., 2024	Retrospective cohort study n = 288 patients with OUD disorder Existing opioid treatment program, (OTP) partnered with a federally qualified health center (FQHC) to develop an integrated methadone-treatment and primary care model Located in Chicago, IL	Examines a care model for integrating a FQHC and OTP, focusing on the DEA ⁷ regulatory process, operational feasibility, and early patient outcomes	Methadone Robust primary care health services Access to speciality services, including oncology, pain management, palliative care etc.	Retention rates at integrated opioid treatment program with primary care setting (OTP-FQHC) compared to stand-alone opioid treatment program (OTP)	55 patients enrolled in care at OTP-FQHC in 2021 and increased to 156 in 2022 833 patients enrolled for OAT at OTP clinics in 2021, 1009 in 2022 OTP-FQHC retention rates are comparable to OTP clinics	Integrated care model Co-location Integrated behavioural health Low-barrier MOUD access	Many patients in this study received previous MOUD treatment (70.1%), with over 54% (158) having been on methadone in the past Older population than other studies → 50-59 (108) and 60-69 (68) had biggest group

Appendix C

Critical Appraisal Table

Critical Appraisal Table								
Study	Study Design (including population and setting)	Methodology Appropriate (Yes/No)	Recruitment Bias (Low/High)	Data Collection Rigorous? (Yes/No)	Results Valid? (Yes/No)	Key Findings	Risk of Bias (Low, Moderate, High)	Relevance to Review
Logan et al., 2019	Retrospective cohort study n = 101 patients referred for buprenorphine treatment for OUD were abstracted Integrated primary care with addictions medicine and behavioural health services ¹ , Hawaii, USA	Yes Clear description of data analysis process and rationale for tools used Clear definitions of outcomes measured	Low Buprenorphine depot offered to all patients at clinic with OUD and/or already receiving OAT	Yes Patient demographics, history, buprenorphine doses, clinic visit dates, and urine drug tests Data collected were from patient records	Yes Stratified models were used to help understand if the findings were influenced by retention duration	Retention: 92% were retained at 1 month and 64% of patients had follow-up at least 3 months Patients were more likely to discontinue treatment within 3 months if they had an inconsistent urine drug test, higher baseline depression, or higher baseline anxiety scores Urine drug tests: Inconsistent urine drug tests were associated with higher baseline depression scores, and higher	Moderate Single site, might limit generalizability	The study demonstrates that integrated OUD treatment, combining medication, behavioural intervention, and psychosocial support in the primary care is effective.

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						baseline anxiety scores. Mental Health Outcomes: Statistically significant overall decrease in depression and anxiety symptoms over time Significant interaction effects were found with the total number of visits and symptoms for both depression and anxiety Patients who were retained for at least 3 months had a significant reduction in both depression and anxiety symptoms over time		
Tofighi et al., 2019	Qualitative study n = 23	Yes Thorough explanation of	High Convenience sampling, small sample size	Yes Interviews were recorded, transcribed, de-	Yes Although from a small sample, the findings echo	Limited accessibility to OBOT can influence individuals with	High Interviews conducted among a convenience	Although the study was a small sample size with convenience sampling, the emerging themes

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	Semi-structured interviews inpatient detox patients in New York City hospital	how interviews were conducted Interviews were conducted by the same two people, the principle investigator and research assistant Use of iterative coding and grounded theory methods, standard practices for qualitative research		identified, and checked for accuracy Used a secure platform analysis tool for qualitative coding and analysis	barriers and facilitators to OAT retention in an office-based setting	OUD to seek illicit substances or diverted OAT Positive experiences with buprenorphine whether obtained prescribed or from peers can influence entry and engagement to OBOT Factors attributed to discontinuation of OBOT include exposure to actively using peers and drug dealers in close proximity to OBOT program, inadequate pain management, conflict with provider and clinic staff, and unstable housing Participants found that positive experiences with providers and clinic staff such as	sampling of participants enrolled in detox program, and may not be representative of general population of individuals with OUD Patients are in a detox setting and experiences with OBOT might be influenced by the immediate context of their treatment, withdrawal symptoms or institutional pressures A survey from a small sample might overstate negative perceptions of misconceptions about certain topics about OBOT	echoed other studies on factors that influence OAT retention in OBOT Specific examples from interviews provide valuable knowledge such as the real-world issues like drug dealers preying on individuals with OUD

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						non-stigmatized care, adequate visit length, encouragement and access to support services were associated with maintaining OBOT Participants preferred buprenorphine over methadone due to less cognitive side effects and ability to administer at home		
Hooker et al., 2020	Prospective cohort study n = 100 patients receiving medication for opioid use disorder (MOUD) at a family medicine clinic located in a low-socioeconomic area of	Yes Self-reported demographic information complemented by electronic medical record data, strengthening methodology Clear definition of treatment retention measures	High Convenience sampling Single site Participants may have potentially higher motivation than general population as they are already seeking MOUD	Yes Utilized validated screening tools including GAD-7 (anxiety), PHQ-9 (depression), and 5-item Primary Care PTSD Screening for DSM-5	Yes Clearly identified primary study variables and utilized logistic regression to control for demographic variables Independent-samples <i>t</i> tests used to compare continuous variables	Mental health symptoms were highly prevalent for this sample (44% screened positive for anxiety, 31% for depression, 52% for posttraumatic stress disorder) 75% of patients reported use of illicit substances other than opioids	Moderate 100 participants however data from a single site Sample primarily white (74%), low income and largely unemployed in an urban setting, may limit generalizability	A sample of 100 participants data set in a prospective study was useful to build on current body of evidence Self-reported demographics combined with chart records paints a comprehensive picture of complex comorbidities

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	Minneapolis, MN.				χ^2 tests of independence or Fisher exact tests (for comparisons with cells smaller than n =5)	Many patients had psychosocial concerns such as unemployment (54%), low income (75%), food insecurity (51%), and lacking reliable transportation (64%). 67% of the participants were retained at 6 months Intravenous opioids use was the only predictor of retention at 6 months; individuals using intravenous opioids were more likely to discontinue treatment (P=.003)	Causality cannot be determined, although prospective design establishes precedence No comparison group Primarily self-reported data, however, was merged with medical record progress notes, urine drug screen results Complete psychiatric assessments were not performed, relying on validated screening tools	Valuable insights comparing self-reported substance use and urine drug screen results – participants may not be aware of toxic drug supply they are using ex. benzodiazepine Helpful to identify and compare participants self-reported diagnoses of depression, anxiety, and PTSD, as well as family histories, though these issues may not be adequately addressed in treatment Provides valuable insights on social determinants of health issues that could be optimized in primary care
Lai et al., 2020	Qualitative study n = 46	Yes Purposeful sampling was	High Small sample size	Yes Clearly explained	Yes Researchers cross-checked	Participants noted the person-centered harm reduction	Moderate Limited participants, with	The study assesses a buprenorphine-naloxone group visit program which aligns

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	10 focus groups, including 20 patient participants and 26 staff members at a primary care clinic in Philadelphia, PA	used to group individuals based on their knowledge and experience within their respective roles, ensuring they could provide the most relevant insights Clear identification of interview questions for participants Focus groups were audio-recorded and transcribed using a professional transcription service	Purposeful participant sampling of staff and patients May not be generalizable to all staff and patients' experiences	thorough data analysis process 3 coders analysed and coded data individually and then met to review coding as a group Iterative process to examine relationships between the codes to arrive at central themes	preliminary findings with staff and patient participants after initial analysis period Obtained staff and patient participant feedback to confirm themes developed during data analysis were accurate	approach as a strength The programs ease of access, integration in primary care, and group-based visit model facilitated patients' participation and engagement in the program Challenges in program implementation included differences in staff acceptance and understanding of harm reduction, unpredictability of clinic volume and flow, and the need to balance access to primary care and MOUD	only 20 patients and 26 members Potential selection bias where participants may have volunteered or particularly motivated to share their experiences Focus group interview could influence participants' opinions or discourage them from expressing their true thoughts	with understanding how different delivery models could impact patient retention The study highlights how the ease of access and integration of OAT into primary care settings are key factors in patient retention, which could help maintain long-term patient engagement It discusses the convenience and valuable opportunities to address primary care concerns for a difficult population to reach
Sattler et al., 2021	Prospective cohort study	Yes	High	Yes	Yes	Of the 78 participants who had been enrolled	Moderate	These findings provide a holistic perspective to help primary care

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	n = 144 participants receiving MOUD at a family residency clinic were surveyed The exact location (city and state) was not specified, but the use of MOUD suggests the study was likely conducted in the USA	A survey was used to collect targeted data relevant to the study's research questions Used baseline survey data due to very high rates of missing follow-up survey responses	The study only includes patients who started buprenorphine between January 2018 and February 2020, which may introduce selection bias due to the longitudinal constraints of the clinic's dataset	Clear description of measured outcomes Researchers used Cronbach's alpha to assess how reliable the validated tools measured the construct of interest All tools utilized had a Cronbach alpha value > 0.80 (good internal consistency)	66 out of the 144 participants were censored to protect the validity of the results and avoid bias Researchers clarified that censored and non-censored participants were not statistically significant different on any of the demographic variables measured Validated tools were used with a clear explanation of the meaning and relevance of the scores Controlled for confounding variables using covariates Survival analysis was used to	in the treatment program for at least 365 days before the study ended (66 of the 144 total participants censored), 34 (43.6%) remained in treatment at the 365-day mark Parents reported lower levels of anxiety and loneliness, along with higher levels of social connection, life satisfaction, and a sense of meaning in life Parents were also older, more likely to be female, of a race other than white, married, employed, and had higher incomes Although parents reported high levels of parental	Single site study, findings may not be generalizable to the general population of individuals with OUD Utilized objective data with electronic health records and chart reviews for buprenorphine prescriptions, which strengthens data quality Controlled for confounders by including covariates (ex. age, gender, mental health conditions)	providers identify and address psychosocial and psychiatric care gaps in practice The study's findings highlight the complex needs of individuals with OUD and the impact on families, offering insights that could inform policy and program development to better support individuals with OUD and their families

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					examine whether psychiatric, psychosocial, or parenting-specific variables were significantly associated to treatment retention specifically among parents Parents remained in treatment significantly longer than non-parents, but this difference was no longer significant after controlling for demographic, psychiatric, and psychosocial factors in a multivariate analysis	self-agency and strong bonds with their children, many also expressed experiencing elevated parental shame Among parents, higher levels of shame were linked to increased depression, anxiety, anger, stress, and loneliness More than 25% of parents reported that a child had lived with friends or relatives for over three months, and 11% indicated that a child had been removed from the home by child protective services Parents were more likely to be retained in		

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						treatment at 12 months, although this finding was non-significant after controlling for covariates		
Beharie et al., 2022	Qualitative study n = 50 patients receiving buprenorphine treatment through the Buprenorphine Case Nurse Manager Initiative (BCNMI) at eight safety-net primary care clinics in New York City were interviewed to explore their experiences with the care provided by nurse case managers	Yes Patients who left treatment within six months of intake were clearly defined as out-of-treatment participants, while those who remained in treatment for six months or more were categorized as in-treatment participants Clearly outlined participant recruitment and collect data procedures The use of participant	High Purposeful sampling with small sample size Potential for self-selection bias for participants who chose to participate Authors acknowledge the difficulty of recruiting out-of-treatment participants as many had no working phones and difficult to locate	Yes All interviews were audio-recorded and transcribed professionally The interview domains for both in-treatment and out-of-treatment participants were clearly defined and tailored to the address the specific experiences of each group, ensuring relevant data was collected	Yes Thematic analytic approach and framework analysis was done to capture relevant themes and concepts Researchers maintained an audit trail documenting decisions and emerging themes and periodic debriefings as a group, ensuring methodological rigor	Of the 144 participants in the study, 66 were censored (ex. dropped out, loss to follow-up) Parents reported lower levels of anxiety and loneliness, along with higher levels of social connection, life satisfaction, and a sense of meaning in life Parents were also older, more likely to be female, of a race other than white, married, employed, and had higher incomes	Moderate Interviews were conducted for 8 out of the 14 BCNMI which may not fully represent the experiences of patients from the 6 other clinics The study focuses on patients at BCNMI clinics, limiting generalizability to the broader OUD population, but including both in-treatment and out-of-treatment participants provides a more comprehensive range of experiences	The study explores the experiences of patients who stayed in treatment for six months and those who discontinued earlier, providing valuable insights into retention factors beyond the focus on nurse case manager implementation This study provides valuable insight into the team-based care model and the co-location of primary care and substance use services, highlighting how these integrated approaches may enhance patient retention in buprenorphine treatment

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		interviews aligns with the purpose of understanding their experiences at the primary care clinic with nurse case managers				Although parents reported high levels of parental self-agency and strong bonds with their children, many also expressed experiencing elevated parental shame Among parents, higher levels of shame were linked to increased depression, anxiety, anger, stress, and loneliness More than 25% of parents reported that a child had lived with friends or relatives for over three months, and 11% indicated that a child had been removed from the home by child protective services	Interviews were conducted by NYC Department of Mental Health staff, which could introduce interviewer bias, as the BCNMI was initiated by the same department	

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						Parents were more likely to be retained in treatment at 12 months, although this finding was non-significant after controlling for covariates		
Stein et al., 2022	Retrospective observational cohort study n = 92 patients with opioid use disorder who transitioned from buprenorphine SL to buprenorphine XR injection at a primary care based buprenorphine treatment program	Yes Researchers reviewed 6 months of patient's electronic health records	High Potential selection bias Included patients who were already stabilized on buprenorphine, excluding others who may just want to start on buprenorphine XR injection	Yes Researchers did not assess reasons for patients transitioning to buprenorphine XR Researchers did not collect data about ongoing use of opioids or other substances during entire study period It is unclear if abstinence rates, or compensatory use of other	No Insurance coverage could be a potential confounder however the researchers addressed that health insurance is universal in Massachusetts Did not conduct statistical analysis of covariates, although, potential bias and lack of precision in results	Mean age was 38 years old 67% were male The average duration of SL buprenorphine prior to transition was 17.1 ($\pm$ 28.1) months 48% of BUP-XR patients had discontinued treatment 3 months after transition People with chronic pain and those who had used heroin in the last month were	High Small sample size Single site Did not adjust for any potential confounders such as insurance coverage, concurrent substance use, comorbidities, duration on buprenorphine SL prior to transition	The study explores potential retention factors when a patient transitions from buprenorphine SL to buprenorphine XR injection Buprenorphine is the safest opioid agonist therapy available, and the monthly injection has become a preferred option due to its convenience

Critical Appraisal Table								
Study	Study Design (including population and setting)	Methodology Appropriate (Yes/No)	Recruitment Bias (Low/High)	Data Collection Rigorous? (Yes/No)	Results Valid? (Yes/No)	Key Findings	Risk of Bias (Low, Moderate, High)	Relevance to Review
				drugs occurred during buprenorphine XR treatment		less likely to continue BUP-XR The average length of buprenorphine SL prior to transition was 17.1 (± 28.1) months Mean months on SL buprenorphine prior to transitioning to BUP-XR was 24.3 (± 32.5) months for people who received 3+ post induction injections compared to 8.9 (± 19.5) months for those who did not ($p = .009$)		
Hawkins et al., 2024	n = 2880 patients with OUD seen in 18 primary care clinics for buprenorphine treatment	Yes Utilized electronic health records to obtain sample characteristics and buprenorphine	High A small number of participants (n = 337) received buprenorphine in primary care	Yes Clear data analysis process and organization of patient data Collected objective data	Yes Controlled for confounding by using sociodemographic and clinical characteristics as well as receipt of buprenorphine in	11.7% of the 2880 total sample (95% CI, 10.6%–12.9%) received buprenorphine in primary care 58.2% (95% CI, 52.8%–63.3%) of participants were	Moderate Poor definition of mental illness, potentially creating bias	Examines the characteristics of individuals with OUD who initiate and continue MOUD Identifies person-related factors as well as system-related barriers

Critical Appraisal Table								
Study	Study Design (including population and setting)	Methodology Appropriate (Yes/No)	Recruitment Bias (Low/High)	Data Collection Rigorous? (Yes/No)	Results Valid? (Yes/No)	Key Findings	Risk of Bias (Low, Moderate, High)	Relevance to Review
		prescription dates Accounted for realistic possibility of patients discontinuing and restarting buprenorphine by using longest supply of buprenorphine to calculate retention Subsequent prescriptions from non-primary care clinics also included to allow for transfers in care	Sample of participants only includes veterans attached to Veterans Health Affair primary care clinics Included patients with documented OUD diagnosis in the electronic health record in the year before index date, potentially excluding a number of patients without proper documentation	with electronic health records Clear definition of buprenorphine receipt and retention Clear process of retention rates calculation for patients who had multiple prescription restarts in the year	the 90 days before index Definition of 'severe mental illness' is vague and poorly defined as bipolar and psychotic disorders	retained on buprenorphine for 180 days or longer Patients with alcohol use disorder had lower odds of receiving buprenorphine (AOR: 0.39; 95% CI, 0.27–0.57) Nonopioid drug use disorder had lower odds of receiving buprenorphine (AOR, 0.64; 95% CI, 0.45–0.93) Individuals with serious mental illness had lower odds of receiving buprenorphine (AOR, 0.60; 95% CI, 0.37–0.97) Individuals with anxiety disorder had higher odds of receiving buprenorphine		

Critical Appraisal Table								
Study	Study Design (including population and setting)	Methodology Appropriate (Yes/No)	Recruitment Bias (Low/High)	Data Collection Rigorous? (Yes/No)	Results Valid? (Yes/No)	Key Findings	Risk of Bias (Low, Moderate, High)	Relevance to Review
						(AOR, 1.42; 95% CI, 1.04–1.95) Non-Hispanic black patients were less likely to receive buprenorphine (AOR, 0.55; 95% CI, 0.35–0.87) and be retained for 180 days (AOR, 0.40; 95% CI, 0.19–0.84) Those with a CCI score of 1, relative to those with a score of 0, were less likely to be retained		
Neeb et al., 2024	n = 288 patients at integrated opioid treatment program-federally qualified health center	Collected data from EHR for self-selected participants to receive methadone from integrated OUD and primary care clinic	High Patients self-selected, potential for selection bias	Yes Data collected were from electronic health records however were de-identified and extracted through chart review	No The study utilized electronic health records however did not run statistical adjustments potentially leaving results vulnerable to confounding factors	55 patients enrolled in care at OTP-FQHC in 2021 and increased to 156 in 2022 833 patients enrolled for OAT at OTP clinics in 2021, 1009 in 2022	High Patients who decided to participate may have different characteristics than those who did not, may not be generalizable to broader population of	Compares stand-alone addictions clinics to primary care clinic with integrated methadone program Only study in the integrative review that primarily studies methadone Collected data on comorbidities,

Critical Appraisal Table								
Study	Study Design (including population and setting)	Methodology Appropriate (Yes/No)	Recruitment Bias (Low/High)	Data Collection Rigorous? (Yes/No)	Results Valid? (Yes/No)	Key Findings	Risk of Bias (Low, Moderate, High)	Relevance to Review
				The researchers did not specify the data extraction process or identify who was responsible for extracting the data		OTP-FQHC retention rates are comparable to OTP clinics	individuals with OUD	providing insight on possible influence on participant retention on methadone program

Appendix D

Prevalence of Mental Health and Substance Use Disorders

Study	Total sample size (n)	On OAT (n)	MH prevalence (n/%)	Types of MH conditions	Other SUD (n/%)	Impact on Retention
Logan et al., 2019	101		Data on patients initiated on buprenorphine 47/77% “Other mental health diagnosis”	Depression, anxiety	Patients initiated on buprenorphine - EHR data Alcohol: n = 25/41% Cannabis: n = 15/24.6% Benzodiazepines: n = 5/8.2% Cocaine: n = 7/11.5% Methamphetamine: n = 24/39.3%	The majority of patients (72%) were retained for at least 3 months, with early dropout linked to higher initial depression and anxiety scores PHQ-9 mean = 11.26 (moderately severe depression) GAD-7 = 9.41 (moderate anxiety) Depression and anxiety strongly positively correlated At treatment initiation, 74% of patients had positive urine drug tests, which decreased to 43% at the most recent visit (p < .001). Inconsistent drug tests were associated with baseline substance use, mental health issues, and shorter treatment durations
Hooker et al., 2020	100	100	89/90%	Depression, anxiety, ADHD, bipolar, psychosis, personality disorders, eating disorders	Self-reported data Methamphetamines: 43/43% Cocaine or crack: 31/31% Hallucinogens: 10/10% Benzodiazepines: 8/8% MDMA: 8/8%	Intravenous drug use is a significant predictor of treatment discontinuation at 6 months, with an odds ratio (OR) of 3.57 (95% CI [1.26, 10.1], P = .017) No other mental health symptoms, comorbid substance use, or psychosocial factors were associated with treatment retention at 6 months.
Sattler et al., 2021	144	144	Sample mean depressive (PHQ-9) and anxious symptoms (GAD-7)	Depression Anxiety	Not collected	Prevalent depressive and anxious symptoms in the sample but no specific data retention linked to conditions reported Data implies mental health conditions likely play a role in retention

			Mean PHQ-9 was 8.2 Mean GAD-7 was 8.8 Mean trauma symptoms (PC-PTSD-5) was 2.9			Depression (PHQ-9) and anxiety (GAD-7) combined mean score for parents and non-parents was mild-moderate Trauma symptoms combined mean score for parents and non-parents was 2.9, 3.0 screens positive for probably PTSD, warranting further investigations
Stein et al., 2022	92	92	62/67.4%	MDD, bipolar disorder, anxiety, psychotic disorder	Not collected	Having a mental health diagnosis was not statistically associated with treatment discontinuation ($p = .14$), but the size effect (Cohen's $h = 0.31$) suggests directionally that it may play a role
Hawkins et al., 2024	2880	337	Depression 1394/48.4% Anxiety 973/33.8% PTSD 1262/43.8% SMI (bipolar and psychotic disorders) 525/18.2%	Depression, anxiety, PTSD, serious Mental Illness (bipolar, psychotic disorders)	EHR data Non-opioid use disorder: 1180/41% Alcohol use disorder: 1172/40.7%	11.7% received buprenorphine (95% CI: 10.6%–12.9%), 58.2% retained for 180 days or more (95% CI: 52.8%–63.3%). Buprenorphine receipt lower for alcohol use disorder, non-opioid drug use disorder, and SMI, not associated with 180 day retention or longer. Anxiety disorder associated with higher buprenorphine receipt
Neeb et al., 2024	288	288	Depression 51/17.7% Anxiety 255/89% Bipolar disorder 71/25% PTSD 24/8.3% Schizophrenia 12/4.2%	Anxiety, bipolar, depression, PTSD, schizophrenia	Not collected	Integrated opioid treatment program in a primary healthcare center 2021: 54.55% retained for 90 days; 38.18% for 180 days 2022: 44.23% retained for 90 days; 27.56% for 180 days Mental health not analyzed as factor in retention