A Scoping Review of the Implementation of Medication-Assisted Treatment in Indian Country: Integration of Cultural Practices and Barriers

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Abstract. *American Indian and Alaska Native (AI/AN) people experience high rates of opioid misuse and disproportionate barriers to treatment services, yet our understanding of the effectiveness of and barriers to medication-assisted treatment (MAT) in Indian Country is limited. The aim of this scoping review was to synthesize research on MAT for opioid use disorders within AI/AN communities across the United States and examine how this treatment approach has been put into practice, studied, or addressed within those populations. A total of 153 articles were reviewed, and 27 articles met the inclusion criteria. The studies included were conducted across the United States, representing all age groups, and encompassing both urban and rural AI/AN community groups engaged in MAT for opioid use disorder. Only a small number of studies focused on effectiveness of MAT for AI/AN populations, with the vast majority focusing on various systemic barriers. Findings also revealed the need to integrate Indigenous cultural traditions and holistic wellness approaches in MAT. Based on this review, we provide recommendations for future MAT interventions including the expansion of telehealth and incorporating unique elements of AI/AN culture to help bridge the gaps in access to care.*

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INTRODUCTION

Mortality rates due to opioid overdoses among American Indians and Alaska Natives (AI/AN) are notably high, exceeding all other racial or ethnic groups in 2021 (Kariisa et al., 2022). However, data on non-medical use of prescription drugs, such as opioids, within AI/AN populations in the United States are scarce. Available information from one tribal study indicated a concerning trend: 47% of individuals aged 18-25 reported at least one-lifetime use of non-medical use of prescription drugs, a rate significantly higher than the 5% average observed across the United States (Venner et al., 2018).

Historically, treatment protocols, clinical trials, and health research related to substance use predominantly focused on cisgender White male populations. This approach inherently assumes that results obtained from these populations are universally applicable, a perspective that overlooks the unique needs and experiences of diverse groups. Notably, Indigenous communities endured historical trauma (Brave Heart, 2003) in the aftermath of violent colonization and experienced subjugation to unethical research practices in the past (Hodge, 2012). These factors not only placed these communities at higher risk of experiencing negative health outcomes but also cultivated a sense of hesitance towards participating in health research initiatives, thus partially explaining issues related to access to treatment as well as limited research that evaluates the effectiveness of those treatments in AI/AN populations.

Currently, opioid use disorder (OUD) treatment has three medications approved for safe and effective use: buprenorphine, methadone, and naltrexone (Food and Drug Administration, 2024). Medication-assisted treatment (MAT) is the use of these medications in combination with counseling and behavioral therapies to treat OUD. Clinical trials investigating these medications, typically using predominantly White samples, have consistently demonstrated that medication-assisted treatments yield substantially better outcomes, such as reduced overdose mortality, reduced death risk, improved treatment retention, and improved psychosocial outcomes in treatment compared to psychosocial interventions alone (Connery, 2015; Sordo et al., 2017; Riblet et al., 2020; Mattick et al., 2014; Victor et al., 2023). Although these results are promising, research that assesses the effectiveness of MAT specifically in marginalized populations, with particular attention to cultural and ethical considerations, is limited. Further, AI/AN communities may be

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understandably reluctant to engage in Western treatment programs that do not reflect their cultural practices, customs, and traditions (Zeledon et al., 2022).

In the last five years, a number of review articles have provided information on the current state of the literature related to substance use disorder (SUD) and treatment within AI/AN populations. Nalven et al. (2021) identified the underrepresentation of AI/AN people, along with other marginalized groups, within randomized clinical trials focusing on opioid pharmacological treatment in the United States. Crouch et al. (2023), in a review of AI/AN participants included in studies in the National Institute of Drug Abuse Clinical Trials Network (CTN), found that stigma, discrimination, or lack of culturally grounded resources were contributing factors to higher rates of substance use in AI/AN populations. They also determined that a number of studies in the CTN that included AI/AN participants reported using community-based participatory research (CBPR) or tribal participatory research approaches when designing and implementing studies. Similarly, in their review of culturally tailored interventions for AI/AN substance use, Richer and Roddy (2023) found that despite the fact that most studies utilized a CBPR approach, generally there is a dearth of culturally relevant treatment programs, and studies that evaluate the programs in a comprehensive way are limited. Additionally, Mpofu et al. (2021) conducted a scoping review of articles that investigated the continuum of care for OUD in rural AI/AN communities including prevention, treatment, and/or care perspectives and identified the need for MAT cultural adaptations for AI/AN people. Comparative research from Canada and Australia is more readily available and has shown that Indigenous opioid users were less likely to receive traditional methadone therapy and were slower to initiate the use of methadone treatment when offered (Kerr et al., 2005; Venner et al., 2018). Other research identified lack of Indigenous providers and the emphasis on abstinence-based recovery as other factors for lower treatment engagement in Indigenous individuals (Rieckmann et al., 2017; Venner et al., 2018).

Given the efficacy of MAT for OUD treatment in mostly White populations, and the identification of an existing gap relative to MAT for substance abuse in AI/AN populations, the current study seeks to synthesize the existing literature on the topic and identify key gaps and takeaways to better serve AI/AN communities. The primary objective of this scoping review was to examine the current state of literature pertaining to MAT for OUD/SUD effectiveness and barriers to care in AI/AN groups in the United States. This involved a comprehensive analysis of peer-reviewed articles that reported on implementation, assessment, or discussion about MAT for

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AI/AN adults who used opioids, other illicit drugs, and alcohol. We aim to illuminate the current landscape of research in this area and identify potential avenues for intervention development tailored to the needs of AI/AN communities.

METHODS

We utilized a scoping review to identify primary literature relating to MAT for AI/AN people living on tribal lands or in metropolitan areas. While conducting the scoping review to find relevant literature and studies, we collaborated with the university librarian to tailor our search strategy. Our review followed the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021). The PRISMA-ScR checklist is included as Appendix C, along with a defined search strategy (Appendix B), that outlined the grounds and purpose of the study, such as inclusion and exclusion criteria, study selection, and data extraction (Page et al., 2021; Richer & Roddy, 2023).

Search Strategy

Inclusion and Exclusion Criteria

This scoping review included peer-reviewed studies involving MAT for substance use intervention for AI/AN peoples living in the United States. Any studies that did not specifically focus on treating AI/AN peoples in the United States were excluded from the review. We included studies that focused on AI/AN people living on rural reservations and those living in metropolitan areas. Only studies that explored MAT for self-identified AI/AN people over the age of 18 were included in the review. All modes of delivery of MAT were included such as in-person and online, as well as in any intervention setting, such as individual or group settings. We included only English-language articles published in or after the year 2000. We excluded all studies that did not specifically refer to MAT or the corresponding treatment drugs for AI/AN people over the age of 18, as well as studies that were not written in English-language, those published before the year 2000, and those not peer-reviewed. Dissertations and theses were not intentionally excluded; however, none were captured in the searches conducted across our selected databases. Additionally, studies that included research with U.S.-based tribal communities in combination with Indigenous populations outside the United States were excluded to maintain a focused scope on U.S. tribal contexts.

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Study Selection

We conducted electronic searches across four databases, PubMed (direct access), PsycINFO (EBSCOhost), CINAHL (EBSCOhost), and Academic Search Complete (EBSCOhost), in September 2022. The search remained open throughout manuscript development and was actively monitored through August 2024, allowing us to include relevant articles published after the initial database export. The search strategy, developed in collaboration with a university research librarian, was applied uniformly across all platforms. The number of citations imported from each database were as follows: PubMed (1,502), PsycINFO (974), CINAHL (778), and Academic Search Complete (2,518). Search terms included keywords and subject headings related to MAT, opioid and alcohol use disorders, and AI/AN populations. The full search strings for each database are provided in Appendix B. While our search strategy included terms for MAT related to both opioid and alcohol use disorders, the majority of included studies focused on opioid-related MAT. Therefore, the synthesis and framing of this review primarily emphasize MAT for opioid use disorder in AI/AN communities.

Search terms within each search string were connected with the 'OR' Boolean operator. Search terms for each search string are as follows:

1. **AI/AN and Indigenous**: "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
2. **Substance use/misuse**: "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
3. **Medication-assisted treatment**: "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR

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"Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

After the initial search strings were developed, they were combined with the following Boolean operators: string 1 AND string 2 AND string 3.

Covidence Review Software

This study utilized Covidence software to organize and manage the scoping review (Covidence Systematic Review Software, 2022). Once the searches using the Boolean terms identified above were conducted, Covidence (2022) removed duplicate articles. In total, 3,150 article abstracts were reviewed to determine their eligibility for full-test review. Authors screened the articles independently using the inclusion and exclusion criteria. Each article had to be reviewed by two authors, and given an inclusion rating of "yes," "no," or "maybe." If the reviewing authors' ratings conflicted, a third author gave a final rating for the article after discussing conflicts and coming to a consensus. If it was unclear to the author whether to include or exclude an article, then the article was selected for full-text review. Upon completing the review of the articles, some of the articles chosen for full-text review did not have a full-text available. The authors attempted to find the full text of the articles electronically and uploaded them into Covidence. If the full text was not accessible electronically, the article was excluded from the review.

The authors reviewed 153 full-text articles to determine if they should be included in the final data extraction phase in Covidence. Similar to the abstract review process, authors discussed conflicts adhering to the exclusion and inclusion criteria. Out of the 153 articles in the full-text review phase, 27 were determined to meet the inclusion/exclusion criteria and were moved to the final data extraction phase. Articles that specifically indicated MAT or medication-assisted treatment or treatment with medication for OUD (MOUD) in the article were tagged as "MAT included." Articles that included residential facilities or treatment were tagged as "Residential Tx included." Articles that did not specify MAT or residential treatment were tagged as "Unspecified Tx." The review team also reviewed references of relevant articles, but this did not yield any additional studies. The search process was tracked using a PRISMA flow diagram (Figure 1).

Quality Assessment

A quality assessment matrix was created within Covidence in order to appraise the quality of each of the included articles according to a bias rating. Utilizing the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018; Pace et al, 2012), which provides quality assessment questions

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for qualitative, quantitative randomized control trials, quantitative nonrandomized, quantitative descriptive, and mixed methods studies, each research article was assessed according to the chosen methodology and design. Response options of "yes," "no," and "can't tell" are available for all quality assessment questions with "yes" responses indicating low bias. All studies included were rated as adequate (4) to low bias (5) with the exception of two of the articles which could not be rated because they were structured as reports and did not fall under either a qualitative, quantitative, or mixed methods classification (see Appendix A, Table A1). Through discussion, the research team chose to include those articles because both included important contributions to the topic of MAT considerations in Indigenous communities that were not captured in other studies.

Data Synthesis

A preliminary data extraction table was created and iteratively refined based on feedback from the review team. Following the full-text screening and data extraction in Covidence, two lead researchers conducted an in-depth review of the extracted data to ensure accuracy and identify areas needing clarification. To improve clarity and coherence, author names and year of publication were merged into a single column, while geographic region and tribal or urban designations were also consolidated into one. Additional columns were created for study aims, methodology, sample size, substance(s) addressed, and key findings. A final column captured quality assessment ratings for each included study. The review team collaboratively synthesized the extracted data to align with the review's aims. The lead authors drafted the initial synthesis, and all coauthors contributed revisions, discussion points, and recommendations in an iterative process until consensus was reached on the final presentation.

RESULTS

Sources of Evidence

An initial search resulted in 5,772 articles, of which 2,622 were identified as duplicates by Covidence and removed. This resulted in 3,150 screened articles. Of these, 2,995 articles were screened that did not focus on medication-assisted treatment or Native, AI/AN, or Indigenous populations (n = 153). Of the 153 full-text articles screened, 126 articles were excluded because they did not specify medication assisted treatment/therapy (n = 85), did not address the Native,

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AI/AN, or Indigenous population (n = 33), focused on children or youth population rather than adult populations (n = 3), did not address the U.S. population (n = 3), or were published before the year 2000 (n = 2), based on the inclusion criteria. Twenty-seven full-text studies are included in this scoping review.

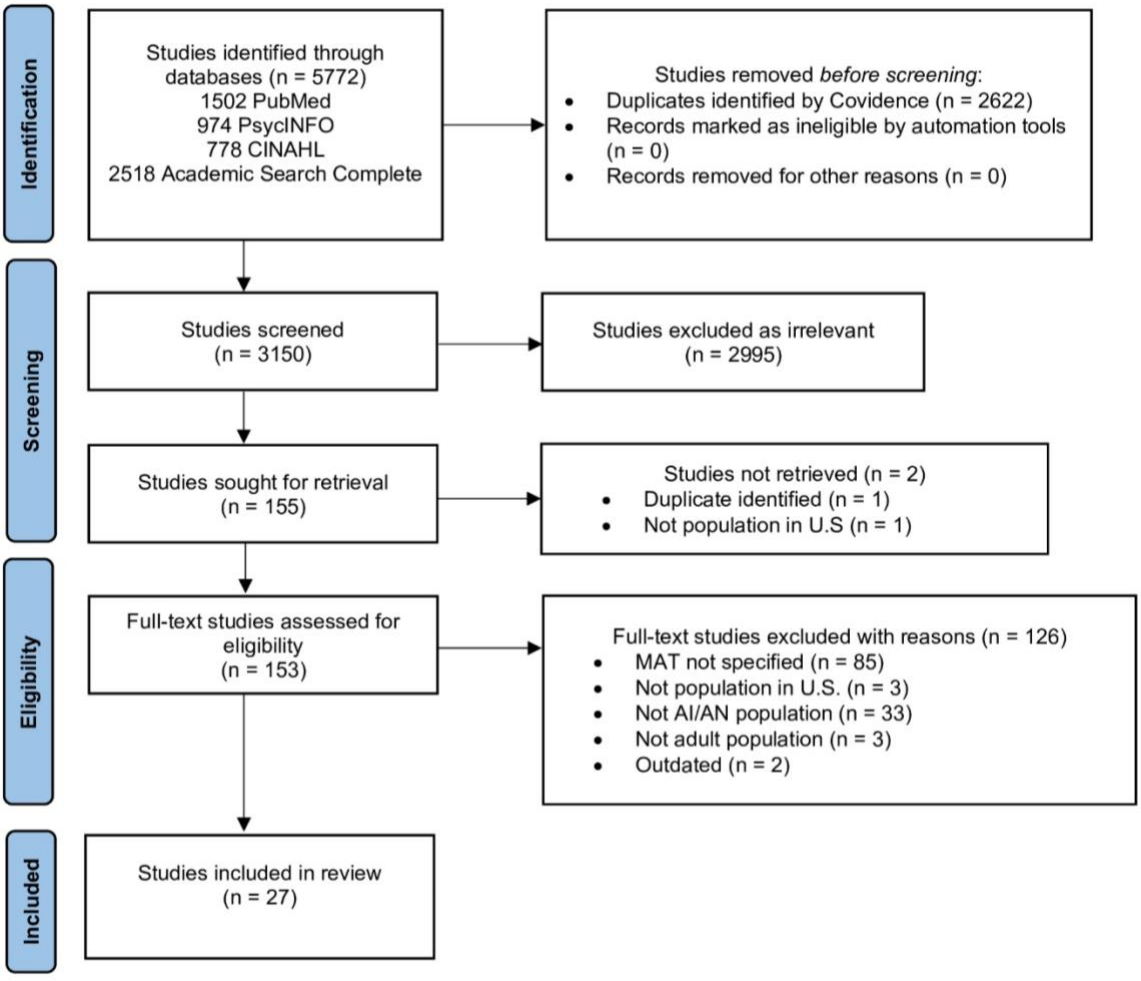


Figure 1. PRISMA flow diagram updated from Covidence

Characteristics of Included Studies

Study characteristics of the 27 studies are described in Table 1. Twenty-three studies presented findings for MAT interventions and outcomes among AI/AN communities and four of the included articles are reviews of the literature or reports on MAT frameworks and intervention. Of these, sixteen studies were conducted in rural and/or tribal communities or areas of Indian

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Country (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Kelley et al., 2021; Krawczyk et al., 2021; Lillie et al., 2021; Morones et al., 2021; Mpofu et al., 2021; Novins et al., 2011; Novins et al., 2016; O'Malley et al., 2008, 2020; Tipps et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022) and others were conducted in Urban regions (El Ibrahimi et al., 2022; Running Bear et al., 2022; Zeledon et al., 2022). Fifteen studies were conducted across the United States (Dunphy et al., 2022; Hirchak et al., 2022; Krawczyk et al., 2021; Marotta et al., 2020; Mpofu et al., 2021; Nalven et al., 2021; Novins et al., 2011; Novins et al, 2016; Pro et al., 2022; Pro et al, 2020; Pro & Zaller, 2020; Rieckmann et al., 2017; Tipps et al., 2018; Venner et al., 2018; Yang et al., 2020), whereas the others included regions of Oregon (El Ibrahimi et al., 2022), New Mexico and Washington (Katzman et al., 2020), Utah (Kelley et al., 2021), Alaska (Lillie et al., 2021; O'Malley et al., 2008; Running Bear et al., 2022), Arizona (Morones et al., 2021), Minnesota (Boyd et al., 2021), Oklahoma, Montana and South Dakota (Anastario et al., 2022), and California (Zeledon et al., 2020; Zeledon et al., 2022).

More than half of the studies, 14 of the 27 articles, presented cultural practices related to and integration in MAT for OUD among the AI/AN populations (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Krawczyk et al., 2021; Mpofu et al., 2021; Nevins et al., 2011; Novins et al, 2016; Rieckmann et al., 2017; Running Bear et al., 2022; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022). Furthermore, 14 of the 27 articles (52% of the studies) addressed disparities and barriers to access to MAT. All but one study included OUD, with that study specifically addressing MAT for alcohol dependence (O'Malley et al., 2008). Others focused on alcohol-use disorder *and* OUD (Running Bear et al., 2022), or all substance-use disorders (Novins et al., 2011; Novins et al, 2016; Rieckmann et al., 2017).

Efficacy of MAT Interventions in Indian Country

Among the 27 studies reviewed, only three studies (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020) offered outcome data related to effectiveness of MAT intervention for AI/AN populations, whereas other studies included in the review typically investigated other elements related to MAT for AI/AN people, including barriers to MAT (discussed below). The three studies that assessed effectiveness of MAT for AI/AN people found promising results with MAT reducing opioid and alcohol use in the samples (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020). Notably, it was not within the scope of these articles to discuss cultural

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relevance or considerations of MAT within AI/AN populations. This is a particularly important piece given the historical context of colonial oppression and violence that has implications for understanding disparate rates of MAT accessibility as well as effectiveness.

Barriers to MAT in Indian Country

Fourteen studies assessed the systemic barriers to access to care and treatment services. Geographic barriers were noted by 7 studies, including living on the reservation with limited access to ancillary services in integrated behavioral health (Anastario et al., 2022; Katzman et al., 2020; Krawczyk et al., 2021; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020) and significant travel times to obtain treatment services (Kelly et al., 2021). Structural barriers were reported by 5 studies, including low offerings of buprenorphine in Indian Health Service (IHS) or tribal government-run treatment facilities (Morones et al., 2021; Yang et al., 2020), statistically significant lower receipt rates of buprenorphine and Vivitrol among AI/AN groups particularly due to lack of prescribers in the area (Dunphy et al., 2022; Kelly et al., 2021), and an overall low rate of MAT implementation in programs for AI/ANs (Rieckmann et al., 2017). Novins et al. (2011) highlighted concerns with the lack of flexibility related to diverse needs of clients, both clinically and culturally, in evidence-based interventions including naltrexone, methadone, buprenorphine, and other medications for both AI/AN and non-AI/AN communities in tribal regions across the United States.

Marotta et al. (2020) found that AI/ANs, along with African Americans and Latinx individuals, were at a greater risk of discharge from MAT due to incarceration, particularly for those in treatment for the use of heroin, benzodiazepines, synthetic opioids, cocaine, and non-prescription methadone. Further, El Ibrahimi et al. (2022) found AI/AN individuals interested in treatment for heroin and meth use received 56% less MOUD services and significantly shorter durations of treatment. Similarly, Pro et al. (2020) reported that AI/AN individuals who had been through some form of methadone treatment were more likely to face discrimination versus those who had never been in treatment, posing an additional barrier to treatment services among this group. Three studies across the nation revealed that AI/AN individuals faced a low rate of MAT implementation in substance use treatment programs (Rieckmann et al., 2017) and were less likely to receive MAT due to factors such as homelessness, history with law enforcement, incarceration, and co-use of substances like alcohol and benzodiazepines (Krawczyk et al., 2021; Marotta et al., 2020). Furthermore, in Alaska, AI/AN patients with polysubstance or co-occurring substance use

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were at a higher risk of discontinuing MAT (Lillie et al., 2021). Although one study did find AI/AN communities showed higher availability of national prescribers with waivers to prescribe MOUD, the availability of waiver prescribers may pose an obstacle for AI/ANs in rural areas (Hirchak et al., 2022).

To address barriers to MAT in Indian Country, Duvivier et al. (2017) pursued training for opioid prescribing and enhancing services for broadening access to MAT within IHS. Additionally, there has been focus on improving availability of naloxone as a response to opioid overdose with one study finding that equipping first responders with naloxone in rural areas can reduce the risk of prescription opioid overdoses (Morones et al., 2021). However, in spite of these steps being implemented by IHS, inadequate staff, out-of-date equipment, restrictions of access in IHS facilities, and failure to meet Medicare requirements (Morones et al., 2021; Tipps et al., 2018) still exist. There have been documented issues of quality of care and oversight of IHS-operated hospitals that involve noncompliance with the Medicare Conditions of Participation (CoPs) and the Emergency Medical Treatment and Labor Act (EMTALA) that likely will play an ongoing role in broadening access to MAT within IHS structures (U.S. Department of Health and Human Services Report, 2019). One additional finding from the review in regards to addressing the barrier of accessibility to MAT given isolated geographic locations of many tribal communities and possibly ease the burden on IHS hospitals may be through the expansion of telehealth. Studies have identified that virtual models have increased clinician capacity to serve underserved communities and will likely provide a path forward to increase access and availability of MAT in Indian Country (Katzman et al., 2016; Tipps et al., 2018).

Cultural & Traditional Practices in MAT Interventions in AI/AN Communities

Fourteen studies highlighted the importance of cultural components implemented alongside MAT (Anastario et al., 2022; Boyd et al., 2021; Duvivier et al., 2017; Katzman et al., 2020; Krawczyk et al., 2021; Mpofu et al., 2021; Novins et al., 2011; Novins et al., 2016; Rieckman et al., 2017; Running Bear et al., 2022; Tipps et al., 2018; Venner et al., 2018; Zeledon et al., 2020; Zeledon et al., 2022). Many of these focused on restoring cultural connection to the people and land, integration of Indigenous and Western practices, and use of traditional healers to connect with the culture to build a sense of belonging and support. These results are presented in Table 1.

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Anastario et al. (2022) advocate for a decolonized approach that identifies and dismantles harmful systems and institutions in light of findings that suggest that Indigenous persons who use injection drugs expressed issues with existing Indigenous-based treatment models, such as the medicine wheel. Boyd et al. (2021) evaluated data in a rural tribal nation in Minnesota and found that the Cascades of Care services included the adoption of the medicine wheel, multiple dimensions of wellness, and traditional ceremonies in their culturally tailored and community-based approaches to OUD treatment. The authors highlighted the importance of culture within OUD treatment, including the use of tobacco, thanking the spirits, and using holistic wellness approaches such as drumming and sweat lodges (Boyd et al., 2021). Duvivier et al. (2017) suggested a focus on effective pharmacy-based harm reduction programs for opioid users and designed multimodal approaches to pain treatment by including aspects of behavioral health treatment, physical therapy, and occupational therapy (Duvivier et al., 2017). They further developed culturally sensitive materials to increase levels of trust and health connection and created training techniques to improve motivational interviewing and health coaching to reduce stigma among AI/AN groups (Duvivier et al., 2017). Katzman et al. (2020) surveyed 38 IHS clinicians who identified key themes of inclusion and respect in chronic pain and opioid management. Facilities serving AI/AN patients, particularly those operated by tribal governments and those with staff speaking Native languages, were found to offer lower rates of agonist maintenance therapy such as methadone or buprenorphine, possibly due to a lack of fit of these treatments in cultural and traditional practices (Krawczyk et al., 2021).

Three studies found family and community involvement in MAT services, including community members and traditional healers, to be a protective factor in the treatment of substance use (Running Bear et al., 2022; Mpofu et al., 2021; Zeledon et al., 2020). A scoping review reported that 5 of the 8 included studies found that rural participants preferred culturally focused health and wellness interventions that involved families and community members, whereas the remaining 3 studies reported the need for cultural adaptation of MAT. One of the studies proposed to use culturally adapted behavioral approaches to OUD treatment (Mpofu et al., 2021). Through mixed-methods research approaches, Novins et al. (2011) analyzed the effectiveness and cultural fitness of SUD treatment for AI/AN communities and integration of traditional practices and found the need for tribally specific approaches in treatment, particularly considering each tribe's unique historical, political, and cultural contexts. In another study, Novins et al. (2016) examined the level of engagement with EBTs in SUD treatment programs serving AI/ANs and found that only

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Motivational Interviewing (MI) and Relapse Prevention Therapy were found to be culturally appropriate programs for AI/AN clients. When evaluating MAT for SUD treatment and barriers for AI/ANs, Rieckman et al. (2017) highlighted the importance of adapting EBTs culturally to the needs of AI/AN communities.

Tipps et al. (2018) found that smaller tribes with concentrated geographical land may benefit from community action programs encouraging community members to take ownership of the opioid crisis that impacts their very own families, friends, and neighbors. Lastly, from a panel discussion with AI/AN community members emerged themes of integrating MAT with holistic and traditional healing through the utilization of Indigenous healing approaches, "translating" Western MAT interventions to AI/ANs, and eliciting perspectives from Indigenous stakeholders including elders, and traditional healers, particularly following community-based participatory research (Venner et al., 2018).

DISCUSSION AND IMPLICATIONS

The aims of this review were to synthesize the existing literature on MAT for substance use disorders among AI/AN populations in the United States and assess how MAT has been implemented, evaluated, or discussed in AI/AN communities. Findings from the 27 studies identified key barriers, facilitators, and culturally grounded approaches that may inform future research and practice. Several important trends are identified through the review. MAT, particularly for OUD, has been implemented in both rural tribal and urban AI/AN contexts, with some evidence of its effectiveness in reducing substance use and improving treatment outcomes (El Ibrahimi et al., 2022; O'Malley et al., 2008; Pro et al., 2020). However, only few studies provided outcome data, and most focused instead on access-related barriers or structural challenges in implementation. These barriers included geographic isolation, lack of trained prescribers, inadequate infrastructure in tribal or IHS-run facilities, and the stigma surrounding MAT within communities (Duvivier et al., 2017; Hirchak et al., 2022; Katzman et al., Kelley et al., 2021; Krawczyk et al., 2021; Lillie et al., 2021; Morones et al., 2021; Rieckmann et al., 2017; Tipps et al., 2018; Yang et al., 2020).

Despite established evidence of MAT's effectiveness in the general U.S. populations (Venner et al., 2018), its cultural and contextual adaptation for AI/AN communities remains limited. This review underscores a significant gap in culturally adapted and community-specific

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MAT programs. Importantly, 14 studies described culturally relevant practices or recommendations, such as integration of traditional healers, the use of sweat lodges and drumming in treatment, or the need to adapt evidence-based practices like Motivational Interviewing to align with Indigenous values (Boyd et al., 2021; Mpofu et al., 2021; Novins et al., 2016; Zeledon et al., 2022). However, few studies evaluated the impact, indicating a significant gap in evidence-based models of culturally integrated MAT. It is notable that traditional practices, such as sweat lodges, community involvement, and spiritual healing, were identified as promising additions or complements to Western MAT models (Anastario et al., 2022; Forcehimes et al., 2011; Legha & Novins, 2012; Lopez et al., 2021). However, these practices remain underutilized or inconsistently integrated. This points to the need for community-led research and intervention models that foreground Indigenous knowledge systems and healing frameworks (Ricker & Roddy, 2023; Venner et al., 2018).

Although telehealth was not a central focus of the studies included, a few referenced virtual delivery models for MAT. Existing evidence suggests that virtual models such as the IHS Pain and Addiction TeleECHO clinic have significantly enhanced clinician capacity in managing OUD, particularly in rural and underserved AI/AN settings (Katzman et al., 2016). Given the geographic isolation of many AI/AN communities, expanding telehealth services represents a critical frontier for addressing access barriers. The IHS implemented progressive strategies in this area, such as requiring providers to check state Prescription Drug Monitoring Program (PDMP) databases before issuing opioid prescriptions exceeding seven days and mandating the Essential Training on Pain and Addiction for all prescribers (Tipps et al., 2018). To support MAT delivery, IHS clinicians are also granted access to online buprenorphine certification, enabling expanded prescribing in remote and underserved settings. Recent federal policy changes further support the implementation of telehealth-based MOUD in tribal communities. As of 2025, rules from the Drug Enforcement Administration (DEA) and U.S. Department of Health and Human Services (HHS) permit the prescribing of buprenorphine via telemedicine, including audio-only visits, for up to six months without an in-person evaluation (DEA & HHS, 2025; SAMHSA, 2025). While these developments occurred after the data collection period for most of the reviewed studies, they have significant implications for future implementation and should be closely monitored in ongoing research.

Overall, while MAT has been found to be effective in AI/AN communities, it continues to encounter significant barriers and is underrepresented in studies on OUD, especially those focusing

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on groups with low socio-economic status indicators such as employment, income, and homelessness (Nalven et al., 2021). Incorporating decision-making and participation from community members and stakeholders, prioritizing unique community policies and practices, and emphasizing community-based research collaboration with AI/AN communities (Novins et al., 2011) are essential strategies for improving OUD treatment.

Implications for Research and Practice

Findings from this review point to three central implications. First, there is a need for culturally integrated MAT models. While nearly half of the included studies referenced cultural considerations, few implemented or evaluated culturally grounded MAT programs. Interventions rooted in Indigenous worldviews and co-designed with community members are urgently needed to ensure treatment is culturally rooted and acceptable to AI/AN patients (Boyd et al., 2021; Zeledon et al., 2020). Second, structural barriers need to be addressed and telehealth options expanded. AI/AN communities continue to face disproportionate barriers to accessing MAT, including provider shortages, travel distance, and facility under-resourcing (Dunphy et al., 2022; Yang et al., 2020). Recent policy changes allowing telehealth prescribing of buprenorphine without an in-person visit (DEA & HHS, 2025; SAMHSA, 2025) offer a promising strategy to expand access in underserved areas. Lastly, there is a need for rigorous and community-driven outcome research. Only a few studies reported on treatment outcomes or effectiveness, and even fewer examined culturally tailored interventions. Future research should include multi-method evaluations and CBPR approaches to assess the efficacy of culturally relevant MAT models in diverse tribal contexts (Novins et al., 2011; Lopez et al., 2021; Richer & Roddy, 2023).

Limitations and Methodological Note

This review chose to cast a wide net related to the current state of the literature on MAT for SUD/OUD in AI/AN populations in an effort to capture varied approaches to studying the topic and reach a more holistic understanding of the potential effectiveness and limitations of MAT for AI/AN communities. As such, an array of methodological techniques and processes were included, ranging from RCTs to qualitative interviews to systematic reviews and reports from working groups. Although this variability strengthens our overall understanding of what research has been conducted and what gaps still exist, it also creates some ambiguity relative to more specific research questions and an assessment of the quality of the research. Following the work of Tuhiwai

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Smith (2021), the methodological approach used in the current review was purposeful in the inclusion of different kinds of research that may not meet typical Western standards of the highest level of research (i.e., RCT). Articles that centered Indigenous community involvement and/or AI/AN voices were included in recognition of decolonized approaches and Indigenous ways of knowing. Future scoping reviews may benefit from broader grey literature searches, community-based research, and other non-indexed materials relevant to Indigenous health and substance use.

CONCLUSION

This review contributes to understanding MAT implementation in Indian Country by identifying common barriers, emerging practices, and persistent research gaps. While MAT shows promise in treating substance use disorders in AI/AN communities, its success requires alignment with Indigenous cultural and community frameworks. Centering Indigenous knowledge systems, improving health infrastructure, and engaging in ethical, community-led research are necessary steps to address disparities in access, engagement, and outcomes.

REFERENCES

Anastario, M., Leston, J., Crisp, C., Lee, C., & Rink, E. (2023). A qualitative study of services accessibility for Indigenous persons who use injection drugs across three communities in the United States. *Journal of Ethnicity in Substance Abuse*, *22*(4), 804–826. https://doi.org/10.1080/15332640.2022.2043798

Boyd, T., Stipek, J., Kraft, A., Muskrat, J., Hallgren, K. A., Alexander, C., & Greenfield, B. (2021). Quantifying opioid use disorder Cascade of Care outcomes in an American Indian tribal nation in Minnesota. *Drug and Alcohol Dependence*, *222*, 108661. https://doi.org/10.1016/j.drugalcdep.2021.108661

Brave Heart, M. Y. H. (2003). The historical trauma response among natives and its relationship with substance abuse: A Lakota illustration. *Journal of Psychoactive Drugs*, 35(1), 7-13.

Connery H. S. (2015). Medication-assisted treatment of opioid use disorder: review of the evidence and future directions. *Harvard Review of Psychiatry*, *23*(2), 63–75. https://doi.org/10.1097/HRP.0000000000000075

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Covidence Systematic Review Software. (2022). Veritas Health Innovation. www.covidence.org

Crouch, M. C., Venner, K. L., Wendt, D. C., Burlew, A. K., Baukol, P., Funaro, M. C., Sorrell, T., & Haeny, A. M. (2023). Lessons learned and future directions: A scoping review of American Indian and Alaska Native participants in the National Drug Abuse Treatment Clinical Trials Network. *Journal of Substance Use and Addiction Treatment*, *153*, 209081. https://doi.org/10.1016/j.josat.2023.209081

Drug Enforcement Administration (DEA), & Department of Health and Human Services (HHS). (2025, January 17). *Expansion of buprenorphine treatment via telemedicine encounter*. Federal Register. https://www.federalregister.gov/documents/2025/01/17/2025-01049/expansion-of-buprenorphine-treatment-via-telemedicine-encounter

Dunphy, C. C., Zhang, K., Xu, L., & Guy, G. P., Jr (2022). Racial–Ethnic Disparities of Buprenorphine and Vivitrol Receipt in Medicaid. *American Journal of Preventive Medicine*, *63*(5), 717–725. https://doi.org/10.1016/j.amepre.2022.05.006

Duvivier, H., Gustafson, S., Greutman, M., Jangchup, T., Harden, A. K., Reinhard, A., & Warshany, K. (2017). Indian Health Service pharmacists engaged in opioid safety initiatives and expanding access to naloxone. *Journal of the American Pharmacists Association*, *57*(2S), S135–S140. https://doi.org/10.1016/j.japh.2017.01.005

El Ibrahimi, S., Hallvik, S., Johnston, K., Leichtling, G., Korthuis, P. T., Chan, B., & Hartung, D. M. (2022). Characteristics and health care events of patients admitted to treatment for both heroin and methamphetamine compared to patients admitted for heroin only. *Journal of Substance Abuse Treatment*, *132*, 108615. https://doi.org/10.1016/j.jsat.2021.108615

Food and Drug Administration. (2024, May 22). *Information about medications for opioid use disorder (MOUD)*. https://www.fda.gov/drugs/information-drug-class/information-about-medications-opioid-use-disorder-moud#:~:text=There%20are%20three%20medications%20approved,to%20be%20safe%20and%20effective.

Forcehimes, A. A., Venner, K. L., Bogenschutz, M. P., Foley, K., Davis, M. P., Houck, J. M., Willie, E. L., & Begaye, P. (2011). American Indian methamphetamine and other drug use in the Southwestern United States. *Cultural Diversity & Ethnic Minority Psychology*, *17*(4), 366–376. https://doi.org/10.1037/a0025431

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University of Colorado Anschutz Medical Campus (www.coloradosph.cuanschutz.edu/caianh)

Greenfield, B. L., & Venner, K. L. (2012). Review of substance use disorder treatment research in Indian country: future directions to strive toward health equity. *The American Journal of Drug and Alcohol Abuse*, *38*(5), 483–492. https://doi.org/10.3109/00952990.2012.702170

Hirchak, K. A., Amiri, S., Kordas, G., Oluwoye, O., Lyons, A. J., Bajet, K., Hahn, J. A., McDonell, M. G., Campbell, A. N. C., & Venner, K. (2022). Variations in national availability of waivered buprenorphine prescribers by racial and ethnic composition of zip codes. *Substance Abuse Treatment, Prevention, and Policy*, *17*(1), 41. https://doi.org/10.1186/s13011-022-00457-3

Hodge, F. S. (2012). No meaningful apology for American Indian unethical research abuses. *Ethics & Behavior*, *22*(6), 431–444. https://doi.org/10.1080/10508422.2012.730788

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M. C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information, 34*(4), 285-291. https://doi.org/10.3233/EFI-180221

Katzman, J. G., Gygi, K., Swift, R., Comerci, G., Bhatt, S., Daitz, B., Martin, C., & Fore, C. (2020). How hands-on pain skills intensive trainings complement ECHO pain and opioid management programs: A program evaluation with the Indian Health Service. *Pain Medicine (Malden, Mass.)*, *21*(9), 1769–1778. https://doi.org/10.1093/pm/pnaa151

Kariisa, M., Davis, N. L., Kumar, S., Seth, P., Mattson, C. L., Chowdhury, F., & Jones, C. M. (2022). Vital Signs: Drug overdose deaths, by selected sociodemographic and social determinants of health characteristics - 25 States and the District of Columbia, 2019-2020. *Morbidity and Mortality Weekly Report*, *71*(29), 940–947. https://doi.org/10.15585/mmwr.mm7129e2

Kelley, A. T., Smid, M. C., Baylis, J. D., Charron, E., Begaye, L. J., Binns-Calvey, A., Archer, S., Weiner, S., Pettey, W., & Cochran, G. (2022). Treatment access for opioid use disorder in pregnancy among rural and American Indian communities. *Journal of Substance Abuse Treatment*, *136*, 108685. https://doi.org/10.1016/j.jsat.2021.108685

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University of Colorado Anschutz Medical Campus (www.coloradosph.cuanschutz.edu/caianh)

Kerr, T., Marsh, D., Li, K., Montaner, J., & Wood, E. (2005). Factors associated with methadone maintenance therapy use among a cohort of polysubstance using injection drug users in Vancouver. *Drug and Alcohol Dependence*, *80*(3), 329–335. https://doi.org/10.1016/j.drugalcdep.2005.05.002

Krawczyk, N., Garrett, B., Ahmad, N. J., Patel, E., Solomon, K., Stuart, E. A., & Saloner, B. (2021). Medications for opioid use disorder among American Indians and Alaska Natives: Availability and use across a national sample. *Drug and Alcohol Dependence*, *220*, 108512. https://doi.org/10.1016/j.drugalcdep.2021.108512

Legha, R. K., & Novins, D. (2012). The role of culture in substance abuse treatment programs for American Indian and Alaska Native communities. *Psychiatric Services (Washington, D.C.)*, *63*(7), 686–692. https://doi.org/10.1176/appi.ps.201100399

Lillie, K. M., Shaw, J., Jansen, K. J., & Garrison, M. M. (2021). Buprenorphine/naloxone for opioid use disorder among Alaska Native and American Indian people. *Journal of Addiction Medicine*, *15*(4), 297–302. https://doi.org/10.1097/ADM.0000000000000757

Lopez, S. V., Cole, A. B., & Leffingwell, T. R. (2021). An overview of alcohol use interventions with American Indian/Alaska Native peoples. *the Behavior Therapist*, 44, 134-143.

Morones, R., Tsatoke, A., Ampadu, I., & Stephens, M. (2021). Addressing the opioid crisis in Native American communities: The role of environmental health specialists. *Journal of Environmental Health*, *83*(10), 22-25.

Mattick, R. P., Breen, C., Kimber, J., & Davoli, M. (2014). Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database of Systematic Reviews*, (2). https://doi.org/10.1002/14651858.CD002207.pub4

Marotta, P. L., Stringer, K. L., Mandavia, A. D., Davis, A., Beletsky, L., Hunt, T., Goddard-Eckrich, D., Wu, E., Gilbert, L., & El-Bassel, N. (2020). Assessing factors associated with discharge from opioid agonist therapy due to incarceration in the United States. *Journal of Addictive Diseases*, *38*(1), 1–18. https://doi.org/10.1080/10550887.2019.1690365

Mpofu, E., Ingman, S., Matthews-Juarez, P., Rivera-Torres, S., & Juarez, P. D. (2021). Trending the evidence on opioid use disorder (OUD) continuum of care among rural American Indian/Alaskan Native (AI/AN) tribes: A systematic scoping review. *Addictive Behaviors*, *114*, 106743. https://doi.org/10.1016/j.addbeh.2020.106743

Copyright: Centers for American Indian and Alaska Native Health, Colorado School of Public Health
University of Colorado Anschutz Medical Campus (www.coloradosph.cuanschutz.edu/caianh)

Nalven, T., Spillane, N. S., Schick, M. R., & Weyandt, L. L. (2021). Diversity inclusion in United States opioid pharmacological treatment trials: A systematic review. *Experimental and Clinical Psychopharmacology, 29*(5), 524–538. https://doi.org/10.1037/pha0000510

Novins, D. K., Aarons, G. A., Conti, S. G., Dahlke, D., Daw, R., Fickenscher, A., Fleming, C., Love, C., Masis, K., Spicer, P., & Centers for American Indian and Alaska Native Health's Substance Abuse Treatment Advisory Board (2011). Use of the evidence base in substance abuse treatment programs for American Indians and Alaska Natives: pursuing quality in the crucible of practice and policy. *Implementation Science*, *6*, 63. https://doi.org/10.1186/1748-5908-6-63

Novins, D. K., Croy, C. D., Moore, L. A., & Rieckmann, T. (2016). Use of evidence-based treatments in substance abuse treatment programs serving American Indian and Alaska Native communities. *Drug and Alcohol Dependence*, *161*, 214–221. https://doi.org/10.1016/j.drugalcdep.2016.02.007

O'Malley, S. S., Robin, R. W., Levenson, A. L., GreyWolf, I., Chance, L. E., Hodgkinson, C. A., Romano, D., Robinson, J., Meandzija, B., Stillner, V., Wu, R., & Goldman, D. (2008). Naltrexone alone and with sertraline for the treatment of alcohol dependence in Alaska natives and non-natives residing in rural settings: A randomized controlled trial. *Alcoholism, Clinical and Experimental Research*, *32*(7), 1271–1283. https://doi.org/10.1111/j.1530-0277.2008.00682.x

Pace, R., Pluye, P., Bartlett, G., Macaulay, A. C., Salsberg, J., Jagosh, J., & Seller, R. (2012). Testing the reliability and efficiency of the pilot Mixed Methods Appraisal Tool (MMAT) for systematic mixed studies review. *International Journal of Nursing Studies, 49*(1), 47-53. https://doi.org/10.1016/j.ijnurstu.2011.07.002

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ (Clinical research ed.)*, *372*, n71. https://doi.org/10.1136/bmj.n71

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University of Colorado Anschutz Medical Campus (www.coloradosph.cuanschutz.edu/caianh)

Pro, G., Hayes, C., Brown, C. C., Goree, J., & Zaller, N. (2022). Individual and health policy factors associated with positive heroin and opioid treatment response: United States, 2018. *American Journal of Public Health*, *112*(S1), S66–S76. https://doi.org/10.2105/AJPH.2021.306503

Pro, G., Utter, J., Cram, J., & Baldwin, J. (2020). Racial/ethnic and gender differences in associations of medication-assisted therapy and reduced opioid use between outpatient treatment admission and discharge. *Journal of Psychoactive Drugs*, *52*(2), 186–194. https://doi.org/10.1080/02791072.2020.1717685

Pro, G., & Zaller, N. (2020). Interaction effects in the association between methadone maintenance therapy and experiences of racial discrimination in U.S. healthcare settings. *PloS one*, *15*(2), e0228755. https://doi.org/10.1371/journal.pone.0228755

Radin, S. M., Banta-Green, C. J., Thomas, L. R., Kutz, S. H., & Donovan, D. M. (2012). Substance use, treatment admissions, and recovery trends in diverse Washington State tribal communities. *The American Journal of Drug and Alcohol Abuse*, *38*(5), 511–517. https://doi.org/10.3109/00952990.2012.694533

Riblet, N. B., Gottlieb, D. J., Shiner, B., Cornelius, S. L., & Watts, B. V. (2020). Associations between medication assisted therapy services delivery and mortality in a national cohort of veterans with posttraumatic stress disorder and opioid use disorder. *Journal of Dual Diagnosis, 16*(2), 228–238. https://doi.org/10.1080/15504263.2019.1701218

Richer, A. M. S., & Roddy, A. L. (2023). Culturally tailored substance use interventions for Indigenous people of North America: A systematic review. *The Journal of Mental Health Training, Education, and Practice*, *18*(1), 60–77. https://doi.org/10.1108/jmhtep-07-2021-0088

Richer, A., & Roddy, A. L. (2022). Opioid use in Indigenous populations: Indigenous perspectives and directions in culturally responsive care. *Journal of Social Work Practice in the Addictions*, *22*(3), 255–263. https://doi.org/10.1080/1533256x.2022.2049161

Rieckmann, T., Moore, L., Croy, C., Aarons, G. A., & Novins, D. K. (2017). National overview of medication-assisted treatment for American Indians and Alaska Natives with substance use disorders. *Psychiatric Services*, *68*(11), 1136–1143. https://doi.org/10.1176/appi.ps.201600397

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University of Colorado Anschutz Medical Campus (www.coloradosph.cuanschutz.edu/caianh)

Running Bear, U., Hanson, J. D., Noonan, C., Muller, C., Trojan, J., & Manson, S. M. (2022). Factors associated with readmission to alcohol and opioid detoxification in the Alaska Interior. *The American Journal on Addictions*, *31*(5), 406–414. https://doi.org/10.1111/ajad.13288

Smith, L. T. (2021). *Decolonizing methodologies: Research and Indigenous peoples.* Bloomsbury Publishing.

Sordo, L., Barrio, G., Bravo, M. J., Indave, B. I., Degenhardt, L., Wiessing, L., ... & Pastor-Barriuso, R. (2017). Mortality risk during and after opioid substitution treatment: Systematic review and meta-analysis of cohort studies. *BMJ*, 357, j1550. https://doi.org/10.1136/bmj.j1550

Substance Abuse and Mental Health Services Administration (SAMHSA). (2025). *DEA and HHS Issue Final Telemedicine Rule for Buprenorphine Access*. Samhsa.gov. https://www.samhsa.gov/about/news-announcements/statements/2025/dea-and-hhs-issue-final-telemedicine-rule-for-buprenorphine-access

Tipps, R. T., Buzzard, G. T., & McDougall, J. A. (2018). The opioid epidemic in Indian Country. *The Journal of Law, Medicine & Ethics*, *46*(2), 422–436. https://doi.org/10.1177/1073110518782950

U.S. Department of Health and Human Services, Office of Inspector General. (2019, July 22). *Case study: Indian Health Service management of Rosebud Hospital emergency department closure and reopening* (Report No. OEI-06-17-00270). https://oig.hhs.gov/documents/evaluation/2993/OEI-06-17-00270-Complete%20Report.pdf

Venner, K. L., Donovan, D. M., Campbell, A. N. C., Wendt, D. C., Rieckmann, T., Radin, S. M., Momper, S. L., & Rosa, C. L. (2018). Future directions for medication assisted treatment for opioid use disorder with American Indian/Alaska Natives. *Addictive Behaviors*, *86*, 111–117. https://doi.org/10.1016/j.addbeh.2018.05.017

Victor, G., Roddy, A., Lenz, D., Willis, T., & Kubiak, S. (2023). Applied machine learning analysis: Factors correlated with injection drug use and post-prison medication for opioid use disorder treatment engagement. *Journal of Offender Rehabilitation*, *62*(5), 297–314. https://doi.org/10.1080/10509674.2023.2213693

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Yang, J. C., Roman-Urrestarazu, A., & Brayne, C. (2020). Responses among substance abuse treatment providers to the opioid epidemic in the USA: Variations in buprenorphine and methadone treatment by geography, operational, and payment characteristics, 2007-16. *PloS One*, *15*(3), e0229787. https://doi.org/10.1371/journal.pone.0229787

Zeledon, I., West, A., Antony, V., Telles, V., Begay, C., Henderson, B., Unger, J. B., & Soto, C. (2020). Statewide collaborative partnerships among American Indian and Alaska Native (AI/AN) communities in California to target the opioid epidemic: Preliminary results of the Tribal Medication Assisted Treatment (MAT) key informant needs assessment. *Journal of Substance Abuse Treatment*, *108*, 9–19. https://doi.org/10.1016/j.jsat.2019.04.003

Zeledon, I., Telles, V., Dickerson, D., Johnson, C., Schweigman, K., West, A., & Soto, C. (2022). Exploring culturally based treatment options for opioid use disorders among American Indian and Alaska Native adults in California. *Journal of Studies on Alcohol and Drugs*, *83*(4), 613–620. https://doi.org/10.15288/jsad.2022.83.613

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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APPENDIX A

Table A1

Studies assessing barriers and cultural integration in MAT in Indian Country

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Anastario et al., 2022	- OK, MT, SD - Tribal	Understanding perspectives of Indigenous persons who use injection drugs (IPWIDs) and key stakeholders across multiple sectors in health care and treatment accessibility on tribal lands.	- Qualitative methods - In-depth qualitative interviews using an inductive analytic approach.	- N = 60 including 30 IPWIDs and 30 stakeholders. - Participants reported current or former injection drug use and/or being a provider of social or health services to injection drug users, living on or near one of the identified tribal sites - Ages between 18-40 years.	Opioid use; Injection of stimulants, opioids and diverted medications	- Participants (IPWIDs) demonstrated significant interest in obtaining a sanctioned MAT, however found it difficult to obtain. - Participants faced geographic barriers to receiving MOUD living far from reservations to ensure access to treatment. - Indigenous-based treatment models (such as programs including Medicine Wheel) and not always desirable in terms of physical accessibility and spiritual and abstinence-based requirements.	4
Boyd et al., 2021	- MN - Tribal	Examine the extent to which the OUD Cascade of Care stages could be quantified for a specific tribal nation in Minnesota using existing data sources and compare the Cascade of Care for that tribal nation to the entire state of Minnesota through a framework that emphasizes Indigenous data sovereignty and governance.	- Mixed methods Community-based participatory research (CBPR) Cross-sectional study - Quantitative analysis of Data obtained from the Minnesota Drug and Alcohol Abuse Normative Evaluation System (DAANES) at different stages in Cascade of Care.	- N = 269 that included clients who were admitted to substance use treatment programs in 2018. - Ages 18 years or older - Identified opioids as a primary, secondary, or tertiary substance needing to be addressed at treatment admission - All clients were AI and admitted to a tribally-run treatment clinic located in the reservation.	Opioid Use Disorder (OUD)	- A larger percentage of the tribal community sample received MOUD compared to the all-Minnesota sample. - Among participants, 65–99 % initiated medications for OUD and 13–41 % were retained in treatment for at least 180 days. - Anji'bide community advisory board highlighted the importance of culture in OUD treatment (such as the use of tobacco, thanking the spirits, drum and sweat lodge ceremonies, holistic wellness approaches, etc.) - Along with culturally tailored treatment, having a community-based approach for both OUD treatment and research surrounding OUD treatment is important. - Although Venner et al. (2018) note a preference among some American Indian communities for OUD treatment without medications, in this sample MOUD was more widely used in the tribal/reservation than in the full-state sample	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						although preference in previous studies demonstrated AI communities preferred OUD treatment without medications. - Cascade of Care in tribal nations utilized community-based approach and culturally tailored approach to OUD treatment (including the adoption of a medicine wheel, multiple dimensions of wellness, and traditional ceremonies).	
Dunphy et al., 2022	- No specified regions in U.S.	Analyze the racial/ethnic disparities in the administration of medications for opioid use disorder among Medicaid patients diagnosed with this condition.	- Quantitative methods - Analyzed data from the Centers for Medicare and Medicaid Services Transformed Medicaid Statistical Information System (T-MSIS) covering 2017 to 2019. - Primarily measured the receipt of buprenorphine or Vivitrol post-diagnosis, excluding methadone and buprenorphine for pain due to data limitations. - Controlled for factors like race/ethnicity, comorbidities, and prescription drug use before diagnosis, and assessed how these factors influenced treatment receipt. - Statistical methods included chi-square tests and logistic regression, controlling for various patient characteristics, and examining potential disparities by the	- 996,641 individuals included - Patients were included if they had a relevant OUD diagnosis, had not received specific treatments prior to diagnosis, and maintained continuous Medicaid enrollment around their diagnosis time. - Ages between 18-64	OUD	- 13.6% received buprenorphine and 2.1% received Vivitrol within 180 days of their first OUD diagnosis. - Significant racial-ethnic disparities in the receipt of buprenorphine and Vivitrol among Medicaid patients diagnosed with OUD were noted. - Non-Hispanic White patients had higher rates of treatment compared to other racial groups, with statistically significant lower receipt rates noted among non-Hispanic Black, American Indian/Alaskan Native/Asian/Hawaiian/Pacific Islanders, Hispanic, and other/unknown race/ethnicity groups. - Multivariable analysis confirmed these disparities, showing reduced odds of receiving buprenorphine or Vivitrol for non-White groups compared to non-Hispanic Whites. - Males and English speakers had higher odds of receiving treatments. - Disparities were found to persist across all 5 settings examined, suggesting that health equity of OUD treatment should be prioritized across multiple health care settings.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			setting of the first OUD diagnosis in 5 settings (hospitalizations, physician and advanced practitioner service, substance use and mental health treatment services, hospital outpatient and emergency department (ED) service, and other settings).				
Duvivier et al., 2017	- South-west, Midwest and Great Lakes regions - Tribal	Develop effective pharmacy-based interventions that reduce harm from opioid use disorders, encompassing responsible opioid prescribing, expanded access to MAT, naloxone distribution, and community interventions.	- Review article/Report - Outcomes assessment/program evaluation review	- Clinical pharmacists who practice in Indian Health Service (IHS) locations in specific areas. - Number of participants not listed.	OUD	- Pursued advanced training in responsible opioid prescribing, enhanced services for broader access to MAT for AI/AN, and improved availability of naloxone for reversing opioid overdoses. - Used novel approaches through patient consultation and education from within the pharmacy, patient management in non-cancer pain clinics and care coordination through MAT programs. - Advocated for expanded MAT in IHS including buprenorphine and naltrexone. - Recognized the bio-psycho-social-spiritual nature of chronic pain and designed individualized multimodal approaches to pain treatment that include physical and occupational therapy, behavioral health, interventional injection treatments, acupuncture and nutritional counseling for safe and effective treatment plans that minimize opioid abuse risk. - Participants developed a comprehensive training program and tools for 350 law enforcement officers serving tribal communities and conducting a mass Naloxone dispensing initiative. - Developed culturally sensitive materials to increase trust and reduce the negative stigma of OUD. - Completed training to improve motivational interviewing techniques, health coaching, and	N/A

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						skills to establish an open, supportive, and nonjudgmental relationship is the key to reducing stigma in AI/AN.	
El Ibrahimi et al., 2022	-Oregon - Urban	- Evaluated the characteristics of Medicaid patients admitted to SUD treatment programs for concurrent heroin and methamphetamine use compared to those admitted solely for heroin use.	- Quantitative methods - Cross-sectional design to compare demographics, type of treatment and substance use characteristics between the two groups. - Logistic regression models to assess differences in odds of opioid-related and all-cause adverse effects. - Data from the Oregon Treatment Episode Data Set linked with Medicaid enrollment, and medical and pharmacy claims describing substances used because it contains many addiction-related details such as the specific substance, route of administration (e.g., injection), use duration, and intensity between 2014-2017. - Used Medicaid medical and pharmacy claims to describe other patient characteristics such	- N = 3802 included of which 319 patients were AI/AN who entered treatment for heroin and meth and those admitted for heroin only	Heroin (OUD) and Meth	- 53% were admitted for combined heroin and methamphetamine use. - Heroin and meth group were found to be generally younger, more likely female, and predominantly White or AI/AN, with more comorbid conditions than those admitted for heroin use only. - Heroin and meth group were less likely to receive any MOUD (56% vs 75%) and had shorter MOUD treatment durations (188 vs. 265 days). - Buprenorphine use was higher among this group (28.1% vs 24.2%), whereas methadone use was lower (39.9% vs 62.5%). - Heroin and meth group began substance use at a younger age and had higher frequencies of use and injection. - 17% lower odds of opioid use disorder-related adverse events and 52% higher odds of all-cause adverse events compared to those admitted for heroin only.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			as comorbidities, OUD treatment medications, duration, and setting. - Hospital and emergency department claims served to identify opioid-related events and other adverse health care events.				
Hirchak et al., 2022	- Across U.S.	- Examine the disparities in the availability of national prescribers with waivers to prescribe Medication for Opioid Use Disorder (MOUD), focusing on how demographic characteristics and the racial and ethnic composition of ZIP codes influence access to such prescribers across the United States.	- Quantitative methods - Cross-sectional study - Utilizing data from the Drug Enforcement Administration (DEA) Registration Controlled Substances Act Information Database for individual and neighborhood-level indicators that may act as barriers or facilitators to accessing treatment. - Association between geographic areas and the number of buprenorphine-waivered prescribers, considering factors like urban/rural designation, insurance status, and socioeconomic characteristics, to better understand and address disparities in treatment access.	- n = 28,993 including 112 AI/AN - Online database that included data on type of business type (e.g., hospital), drug schedules, names and addresses of prescribers, and practitioner type.	OUD	- Among AI/AN and Black/African American neighborhoods, availability of waivered prescribers may not be a primary barrier, however, availability of waivered prescribers and prescribing may be an obstacle for Hispanic/Latinx and rural communities. - Non-Hispanic White (NHW) populations were dominant across all rurality categories, ranging from 80% in metropolitan areas to 94% in rural areas. - Predominantly AI/AN neighborhoods had the highest rate of DEA-waivered prescribers. - Significant interaction between neighborhood type and predominant racial group affecting the rates of DEA-waivered prescribers. - AI/AN neighborhoods generally showed higher availability, especially in less urbanized areas. - DC, Massachusetts, and Rhode Island had the highest per capita numbers of DEA-waivered prescribers, with northeastern states generally having higher levels of such prescribers.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Katzman et al., 2020	- New Mexico, Washington - Tribal	- Assess the effectiveness of Pain Skills Intensive trainings (PSIs) as an adjunct to the Indian Health Service (IHS) and the collaboration of Chronic Pain and Opioid Management TeleECHO Program (ECHO Pain).	- Mixed methods - Continuing medical education (CME) surveys and in-person focus groups at the end of the training.	- 38 IHS clinicians trained in Pain Skills Intensives (PSI) completed surveys and 9 participated in follow-up focus groups.	OUD	- Rated hands-on skills highly with a 99% rating "competent" to "very competent". - Reported above-average confidence in implementing hands-on pain skills and safe opioid prescribing - Provide critical competencies in assessment and screening, pain management and communication skills. - Rurality sufficiently limited access to ancillary and complementary services provided and reported the need for additional training in integrated behavioral health into practice. - Inclusion and respect were key themes identified by non-prescribing clinicians in Albuquerque, highlighting it fostered a successful learning environment increased their confidence in interacting across disciplines and encouraged their participation in future teleECHO sessions. - Information on MAT is crucial to the successful treatment of chronic pain and OUD.	4
Kelley et al., 2021	- Utah - Rural	- Evaluate clinic awareness and access to treatment for OUD among pregnant women in three rural American Indian U.S. counties.	- Quantitative methods - Non-randomized experimental study - Utilized unannounced standardized patients (USPs) methodology to examine access to OUD treatment in appointments for buprenorphine treatment, clinic scheduling practices, and referral to treatment.	- N = 28 Primary care and OB/GYN clinics that provide prenatal care.	OUD	- Rural American Indian and white pregnant women with OUD face barriers to access to care. - Buprenorphine treatment was offered in 26.5% of calls, but only 17.6% scheduled an appointment. - Clinics with a SAMHSA-listed prescriber offered treatment 50% of the time compared to 7.7% for clinics without a prescriber. - Major reasons for not offering appointments included lack of a prescriber (75%), discomfort in treating pregnant patients with OUD (17.9%), Medicaid not accepted (7.1%), and unknown provider availability (3.6%). - When treatment was offered, the median wait time for an appointment was 2.5 days. Most clinics (85.7%) provided referrals when they did not offer buprenorphine treatment, although many referrals were to facilities that did not offer OUD treatment themselves. - Referrals sometimes crossed state lines and involved significant travel distances (up to 126 miles) and times (up to 2 hours and 12 minutes).	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
						- No significant differences in treatment access between white and AI profiles according to the outcome measures.	
Krawczyk et al., 2021	- Across U.S. - Tribal	- Investigate the extent to which substance use treatment facilities that specifically serve AI/AN clients offer MOUD in comparison to facilities that do not focus specifically on this demographic. - Explore individual, clinical, and structural factors that impact the use of MOUD among AI/ANs seeking treatment for opioid use disorder. - Test the hypothesis that AI/ANs have lower access to MOUD at both the facility and client levels compared to clients of other races.	- Quantitative methods - Analysis using two national databases - the 2018 NSSATS (information on the characteristics of substance use treatment facilities, including types of medications offered) and the 2017 TEDS-A (detailed characteristics of clients admitted to specialty substance use treatment programs) to estimate the extent to which MOUD is available and used among AI/ANs across the U.S.	- N = 8,136 facilities serving AI/AN	OUD	- Facilities serving AI/AN clients had lower rates of agonist maintenance therapy like methadone or buprenorphine (22.39% vs. 27.60%). - Facilities operated by tribal governments and those with staff speaking Native languages were less likely to offer agonist maintenance (possibly due to lack of fit of evidence-based practices to community/tribal customs and culture). - Only 1.19% of admissions for OUD were AI/AN who were more likely to be younger, have less education, be unemployed, live in unstable housing conditions, and primarily use prescription opioids. - AI/ANs had slightly higher overall rates of MOUD use (40.04% vs. 38.63%) and were more likely to receive MOUD (adjusted OR: 1.53) compared to other racial groups when adjusted for various factors. - Common factors increasing the likelihood of MOUD receipt included being older, female, a primary heroin user, and having a previous treatment history. - Unique to AI/ANs, identifying as Hispanic increased MOUD likelihood. - AI/ANs were less likely to receive MOUD in the South. - Factors such as homelessness, recent arrests, and co-use of substances like alcohol and benzodiazepines decreased the likelihood.	5
Lillie et al., 2021	- Alaska - Tribal	- Examine variables associated with buprenorphine and naloxone retention among AN/AI people with OUD.	- Quantitative methods - Cohort study of N = 240 AI/AN from EHR data between 2015-2019.	- Patients from Anchorage and the surrounding 50 miles in the database who received buprenorphine/ naloxone and had a	OUD	- Younger patients and those with co-occurring/poly-substance use were at higher risk of discontinuing buprenorphine/naloxone treatment for OUD in this population of AN/AI people. - Having a mood/anxiety disorder was associated with better retention rates, possibly due to	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			- Gathered data from the electronic health record - Survival analysis to explore predictors.	preexisting OUD diagnosis between January 1, 2015, to December 31, 2019 - Included individuals who received 2 or more prescriptions for buprenorphine/naloxone to account for misclassification or mistaken prescriptions.		continued mental health support helping to maintain treatment engagement.	
Marotta et al., 2020	- Across U.S. - Not specified	- Investigate factors associated with discharge from Opioid Agonist Therapy (OAT) due to incarceration.	- Quantitative methods - Analysis of TEDS-D data set from 2015 - Multinomial regression to determine how demographic variables, prior arrest history, referral sources, types of drugs used, length of prior treatment, and intravenous drug use influence the likelihood of being discharged from OAT because of incarceration, compared to completing treatment or being discharged for other reasons.	- N = 64,331 treatment discharges in 43 states in 2015.	OUD	- Native Americans were at greater risk of discharge from OAT due to incarceration compared to Whites. - Substance use like heroin, benzodiazepines, synthetic opioids, cocaine, and non-prescription methadone, were linked to a higher risk of discharge from OAT due to incarceration, particularly for those reporting intravenous drug use and co-morbid psychiatric issues. - Unemployment was linked with an increased risk of discharge due to incarceration. - Drug courts could help reduce attrition from OAT due to incarceration by offering treatment instead of jail for drug-related offences, but most do not provide necessary access to medications like Methadone or Buprenorphine.	4
Morones et al., 2021	-Arizona - Tribal	- Evaluate and implement community-based actions to address the opioid crisis in AI/AN communities served by the Phoenix Area IHS,	- Review article/Report - Looks at the DEHS use of the *Strategy to Combat Opioid Abuse, Misuse, and Overdose: A Framework Based on*	- N/A	OUD	- Suggests equipping first responders with naloxone, particularly in rural areas where they may face longer response times to mitigate the impact of prescription opioid overdoses. - Several of the Phoenix area tribal health care facilities were not able to access MAT training through IHS because they manage their health services and are no longer an IHS health care	N/A

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		using a framework based on the U.S. Department of Health and Human Services' Five-Point Strategy to Combat Opioid Abuse, Misuse, and Overdose.	*the Five Point Strategy* template			facility. DEHS staff facilitated an arrangement with the state resources and university partners to provide MAT training to health care professionals at these facilities.	
Mpofu et al., 2021	- Across U.S. - Tribal	- Review emerging evidence and training needs in managing OUD among rural AI/AN communities.	- Review article/Report - Scoping systematic review to profile the evidence on any gaps and opportunities in OUD care, prevention, and treatment within rural AI/AN communities	- N = 8 studies that focused on OUD among rural AI/AN communities that studied prevention, treatment and care between 2009-2020. - Met PRISMA quality standards	OUD	- Six of eight of the studies (75%) were surveys with community members and other stakeholders on OUD in rural AI/AN communities rather than active interventions. - Five out of eight of the studies (63%) reported a preference for culturally grounded health and wellness interventions with rural AI/AN (involving families, and community interventionists, utilizing community reinforcement approaches. - Three of eight studies (37.5%) reported a need for the cultural adaptation of MAT. - One of eight studies (12.5%) proposed to use culturally adapted contingency management behavioral approaches for OUD treatment.	5
Nalven et al., 2021	- Across U.S. - Not specifie d	- Examine the inclusion of diverse groups in U.S. randomized clinical trials that assess pharmacological treatments for OUD (i.e., methadone, buprenorphine, or naltrexone), specifically focusing on differences across sex/gender, race/ethnicity, and socioeconomic status (SES).	- Review article/Report - Systematic review of 567 articles to examine how diverse groups have been included in randomized clinical trials in the U.S. pharmacological treatments for OUDs.	- N = 50 full-text articles were reviewed that reported in English, in the U.S. and assigned at least five participants per condition to test the efficacy of methadone, buprenorphine, or naltrexone for OUD; and review of at least one opioid use outcome along with diverse groups that were included in RCTs for MAT.	OUD	- Representation of diverse backgrounds in terms of sex/gender, race/ethnicity and SES was inconsistent and not representative, with a majority of participants being male and White. - Articles often reported some SES indicators like employment, income, or homelessness and showed samples that represented lower SES populations who also experienced significant health disparities. - There is a critical need for subgroup analyses to understand how different identities (e.g., sex, race, SES) interact and affect responses to pharmacological treatments. - Underrepresentation of AI/AN in studies on OUD, despite these groups experiencing higher rates of opioid misuse and disproportionate health disparities related to OUD.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
Novins et al., 2011	- Across U.S. - Tribal	- Analyze debates on the effectiveness and cultural fit of substance abuse treatments for AI/AN communities, discussing the integration of traditional practices with EBTs and 12-step programs. - Expand the conversation to include cultural adaptation and resource development necessary to enhance treatment efficacy for these communities.	- Mixed methods - Prevalence study that discusses community participation and research collaboration - Convened an advisory board to discuss controversies that consisted of researchers, and experts from substance abuse programs serving AI/AN.	- Not specified; AI/AN substance use	All substances including opioids	- Importance of considering unique community, policy, and practice contexts in AI/AN communities to improve service quality - Importance of linking research with practice, consumer participation, and community-based research collaboration - Shared concerns between AI/AN and non-AI/AN communities regarding the lack of flexibility in EBTs (such as naltrexone, methadone and buprenorphine and medications to treat comorbid psychiatric conditions) and limited programmatic resources - Highlights the need for tribally specific approaches in substance abuse services for AI/AN communities, considering their unique historical, political, and cultural contexts.	4
Novins et al, 2016	- Across U.S. - Tribal	- Examine the depth of engagement with EBTs in substance abuse treatment programs serving AI/AN communities.	- Mixed methods - Included 3 parts in the study; an advisory board to identify key issues in the study process, qualitative case studies and conducting a national survey of AI/AN substance abuse programs.	- N = 18 qualitative case studies of substance use programs - N = 192 surveys completed - Identified programs that provided substance abuse treatment services to AI/AN communities and then identified a clinical administrator/senior clinical staff to participate in survey.	All substance use including opioids	- CBT (82.2%), Motivational Interviewing (68.6%) and Relapse Prevention Therapy (66.8%) were the most implemented EBTs in substance abuse AI/AN programs (others included 12-Step Facilitation and Matrix Model). - However, only MI and Relapse Prevention Therapy were found as culturally appropriate by programs that had implemented them. - Found the use of medication EBTs for relapse and withdrawal to be particularly uncommon in AI/AN programs, further exploration needed. - Assessed among EBTs, how much engagement there was with MAT; medications for comorbidity were most implemented MAT and medication EBTs were higher in programs receiving Medicaid.	5

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
O'Malley et al., 2008	- Alaska - Rural	- Evaluate the efficacy of naltrexone alone and in combination with sertraline among Alaska Natives and other Alaskans in rural areas.	- Quantitative methods - Randomised controlled trial with 101 Alaskans with alcohol dependence (68 AI/AN and other Alaskans living in rural areas). Participants received 16 weeks of either (1) placebo (placebo naltrexone + placebo sertraline), (2) naltrexone monotherapy (50 mg naltrexone + sertraline placebo) and (3) naltrexone + sertraline (100 mg) plus nine sessions of medical management and supportive advice.	- N =101 Alaskans, including 68 AI/AN - Alaskans with alcohol dependence.	Alcohol dependence	- Naltrexone found to be effective treating alcoholism in remote and rural communities, with evidence of benefit for AI/AN (significantly higher total abstinence).	5
Pro et al., 2022	- Across U.S.	- Evaluate the association between factors of pain medicine, state laws and OUD treatment and positive response using national data.	- Quantitative methods - Cross sectional study - Use of 2018 TEDS-D data to identify outpatient treatment episodes with heroin or other opioids indicated as primary substances of use at treatment admission and with complete data for all study variables.	- N = 162,846 opioid treatment episodes, 1.28% AI/AN. - Response to positive opioid treatment at 2 time points during treatment admission and discharge. - Positive response included reduced use between admission and discharge or no use at admission and discharge.	OUD	- States with low community distress found AI/AN treatment episodes to be 5 times the odds of positive response in high distress communities indicating lower community distress as a strong predictor of better treatment outcomes in AI/AN.	5
Pro et al., 2020	- Across U.S.	- Evaluate the relationship between MAT and reductions in opioid use from the start to the end of outpatient	- Quantitative methods - Cross sectional - 2015-2017 TEDS-D data	- N = 242,547 Treatment episodes, 3717 AI/AN. - Only outpatient treatment episodes excluding inpatient	OUD	- MAT was significantly and positively associated with reduction in opioid use strongest among AI/AN women and AI/AN men. - Explained by recent efforts of IHS investment in resources to improve OUD treatment and preference for cultural and spiritual framing of MAT participation.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		treatment, and to investigate whether this relationship varies by race/ethnicity and gender.		detoxification/residential treatment.			
Pro & Zaller 2020	- Across U.S.	- Quantitatively analyze the association between racialized experiences and discrimination and methadone maintenance therapy (MMT) between racial/ethnic groups.	- Quantitative methods - Prevalence study - Multivariable logistic regression analysis	- N = 766 out of which 2.64% were AIAN - Only restricted to individuals with a lifetime OUD (heroin use disorder and opioid use disorder) who had ever used MMT.	OUD	- MMT status was strongly associated with racial discrimination among AI/AN that indicated to be an additional barrier to health services utilization among AI/AN for OUD Tx. - AI/AN who had used MMT had over thirty times the odds of racial discrimination, compared to their non-MMT counterparts.	5
Rieckmann et al., 2017	- Across U.S.	- Evaluate MAT for substance use for AI/AN and barriers at a broader level impacting these groups by reviewing substance use programs in the country.	- Quantitative methods - Prevalence study through a survey about use of MAT in substance use programs. - Multivariate logistic regression using a stratified sampling approach.	- N = 192 substance abuse Tx programs. - Clinical administrators and staff in substance abuse treatment programs serving AI/ANs use and perceive EBTs.	All substance use including OUD	- Study found a low rate of MAT implementation in the programs (only 25% of programs) highlighting racial disparities in access to MAT for AI/AN - Also, highlighted the important role of treatment culture and organizational fit in the implementation of MAT in treatment programs serving AI/AN populations. - Results also speak to the importance of adapting existing EBTs in a culturally competent way to best serve the needs of the AI/AN community.	5
Running Bear et al., 2022	- Alaska - Urban	- Examine risk and protective factors associated with readmission of patients for alcohol and opioid detoxification to allow for better interventions that focused on transitioning	- Quantitative methods - Prevalence study - Descriptive statistics for risk factors and inferential analysis.	- N = 1014 patients of which 690 were AI/AN - Data were reviewed from electronic medical records for admissions between 2012 and 2016 at an inpatient detoxification facility in Fairbanks, Alaska.	OUD and Alcohol use disorder	- AN/AI single male patients who were jobseekers were at a high risk for readmission but those with stable housing conditions were at a reduced risk. - Family involvement (extended family structure, home sharing responsibilities) in treatment (rather than in general) was found to be a strong protective factor against readmission for opioid and alcohol and interventions that promote this and social connectedness can be integral. - Single individuals who completed detoxification treatment indicated reduced readmission to opioid detox.	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		patients to long-term recovery.					
Tipps et al., 2018	- Across all U.S. - Tribal	- Examine opioid overdoses or OUD in Indian Country and lack of fiscal and policy resources in the Indian Country as an epidemic.	- Quantitative methods - Prevalence study using death data from CDC to describe the extent of the epidemic in Indian Country - Research then looks into innovative medical and legal efforts by tribal nations to combat OUD	- Tribal nations opioid overdose deaths data from CDC	OUD	- Mortality rate due to opioid overdose increased over last 17 years and vary by state (higher mortality rates in Minnesota and Washington - mainly Pacific Northwest and Great Lakes region whereas Southwest - Arizona and New Mexico has lower rates). - Poverty in Northern Plains may have an impact on access to OUD tx. - Urban areas with higher AI/AN population had higher mortality rates. - IHS responded with steps including establishing the Prescription Drug Abuse Workgroup to emphasize education, train and distribute naloxone to law enforcement and continued online opioid treatment training. - Drawbacks of the steps by IHS include inadequate staff, outdated equipment, failing to meet Medicare requirements limiting quality and effectiveness of programs, limiting MAT by location, need to restructure existing Tx programs to shifts in types of substances used by tribe members in opioid use. - Programs that offered cultural and local support on the reservation through encouragement to take ownership of opioid crisis as it impacts family, friends, neighbors building stronger bonds between community members.	5
Venner et al., 2018	- Across all U.S. - Reps from region/ states with high AI/AN - Urban	- Themes emerged from a NIDA meeting of AI/AN community stakeholder was convened to address barriers of MAT delivery and research pathways to address OUD related health	- Qualitative methods - A meeting discussion organized by two moderated panels providing AI/AN community views on MAT for OUD and models of substance use and recovery and the importance of cultural tailored	- Panel included diverse stakeholders (i.e., AI/AN community members, AI/AN and non-AI/AN providers and researchers)	OUD	- Themes that emerged included the need to integrate MAT with the holistic health of AI/AN, differences and conflicts in Western and AI/AN traditional healing in MAT, systemic barriers in MAT and improvements needed in MAT research. - Utilization of Indigenous healing approaches, “two-eyed seeing” in Western MAT interventions so healers can “translate” these treatments to AI/AN. - Eliciting views and perspectives from Indigenous stakeholders such as elders,	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
		disparities among AI/ANs.	programs and barriers in MAT for AI/ANs.			traditional healers, etc. following CPBR can be crucial. - MAT showed better outcomes in treating OUD than treatment without medication or abstinence-based ones along with early adjunctive psychological counseling to balance wellness and motivation.	
Yang et al., 2020	- Across U.S.	- Evaluate how buprenorphine and methadone treatment to manage OUD vary in terms of geographic, organizational, and payment characteristics.	- Quantitative methods - Prevalence study through survey data from questionnaires, telephone interviews and web surveys. - Secondary analyses of the National Survey of Substance Abuse Treatment Services (NSSATS) from 2007–16 using bivariate descriptive statistics of treatment services that offered buprenorphine and methadone treatment. - Use of multiple logistic regression.	- N = 136,143 responses from data from the 2007–16 of N-SSATS. - Respondents categorized by location based on Census Bureau Divisions. - Included private, non-profit, state, local and tribal government facilities. - Facilities that provide sliding fee scale, accepted cash private insurance, Medicare, Medicaid state and federal Military insurance were included.	OUD	- Buprenorphine was found to be increasingly offered in facilities across all divisions, however, remains low outside of the northeast region. - Treatment facilities run by IHS or tribal governments that offered buprenorphine remained low, highlighting the disparity in treating Native Americans. - Facilities offering payment assistance were less likely to offer buprenorphine. - Facilities accepting Medicaid payments were more likely to offer Methadone treatment.	5
Zeledon et al., 2020	- Californi a - Tribal	- Analyze a community- based needs assessment of strengths and weakness among AI/AN members in CA to identify facilitators and barriers to treatment for OUD.	- Qualitative methods - Through Key Informant Interviews (KIIs) - AI/AN substance use care providers that had experience in programs that serve AI/AN people and utilize MAT were interviewed about barriers to accessing care, risk and protective factors, community substance use description and	- N = 21 participants from AI/AN SUD specialists who have experience in AI/AN programs that utilize MAT.	OUD	- Found an increase in SUD and OUD in AI/AN communities highlighting the importance of comprehensive and culturally centered care. - Using residential treatment or aftercare services that include culturally adapted programs to improve the effectiveness of MAT. - Many are unable to access MAT and comparable services due to the location. - Participants highlighted the importance of the system of care approach through a strong patient-provider relationship through active communication and integration of multi-disciplinary providers in AI/AN client treatment plans. - Participants recommended traditional community healers become part of the MAT services to use cultural healing through the	4

Author, year	Region; Urban/ tribal	Study Aims	Methods	Sample size	Substance use addressed	Findings	Quality Assessment
			SUD and OUD services available.			spiritual, mental and physical strengths of AI/AN clients.	
Zeledon et al., 2022	- California - Urban and Tribal	- Analyze the perspectives of AI/ANs in California to assess cultural and traditional healing treatment modalities for OUD treatment.	- Qualitative methods - Research through 21 focus groups across 10 counties in 20 urban and tribal regions of California	- N = 163 AI/AN participants in California who have been impacted by OUD - Adults (18–65 years) who met the selection criteria of self-identifying as AI/AN and being impacted by OUD in their community or actively being in OUD recovery and living in a local AI/AN community.	OUD	- MAT for OUD should include cultural components that resonate with the AI/AN communities. - Components include developing a connection with culture, spreading awareness of OUD treatment and building a sense of belonging were found to be protective factors for OUD treatment (e.g. using Western and Indigenous practices, traditional healers and healing cultural traditions such as sweat lodges, drumming, etc.).	5

APPENDIX B

Search Strategies by Database

PubMed

- **Database:** PubMed
- **Date Searched:** September 30, 2022
- **Search type:** All fields
- **Search String Used:**
    - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
    - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
    - "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

CINAHL

- **Database:** EBSCO

- **Date Searched:** September 29, 2022
- **Search type:** All fields
- **Search String Used:**
    - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
    - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
    - "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

PsycINFO

- **Database:** EBSCO
- **Date Searched:** September 30, 2022
- **Search type:** All fields
- **Search String Used:**

- "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
- "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"
- "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

Academic Search Complete

- **Database:** EBSCO
- **Date Searched:** September 28, 2022
- **Search type:** All fields
- **Search String Used:**
  - "AI/AN" OR "Indigenous" OR "Alaska Native" OR "American Indian" OR "Native American" OR "Indian health" OR "Indian Health Service" OR "IHS";
  - "Substance Use" OR "drug use" OR "drug abuse" OR "substance abuse" OR "problematic drug use" OR "substance misuse" OR "alcohol misuse" OR "alcohol use disorder" OR "addiction" OR "drug dependence" OR "substance use

disorder" OR "SUD" OR "illicit drug" OR "substance-related disorder" OR "Opioid use disorder" OR "narcotics" OR "overdose" OR "poly-drug use" OR "poly-substance use" OR "multiple drug abuse" OR "drug overdose" OR "Prescription drug abuse" OR "prescription drug misuse" OR "heroin" OR "opiate" OR "opium" OR "opioids" OR "codeine" OR "oxycontin" OR "fentanyl" OR "Vicodin"

- "medication assisted treatment" OR "MAT" OR "treatment" OR "recovery" OR "drug treatment" OR "medications for opioid use disorder" OR "MOUD" OR "substance use disorder treatment" OR "methadone maintenance treatment" OR "morphine" OR "methadone" OR "Suboxone" OR "Naltrexone" OR "Disulfiram" OR "Antabuse" OR "Acamprosate" OR "Buprenorphine" OR "Vivitrol" OR "Bunavail" OR "Cassipa" OR "Probuphine" OR "Sublocade" OR "Subutex" OR "Zubsolv"

APPENDIX C

Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-SCR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Pages 3-5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Pages 5-6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Page 6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Pages 7-8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Pages 7-8; Appendix B
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Pages 8-9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and	Page 9

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Pages 11-12
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not Applicable
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 10
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 10
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Page 11-12
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not Applicable
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Pages 19-26, Table 1
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Pages 13-18
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Pages 27-30
Limitations	20	Discuss the limitations of the scoping review process.	Pages 30-31
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Page 31-32
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 32

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.