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Substance Use Disorders in Correctional Health: Evolving Challenges and Emerging Strategies in Prevention, Diagnosis, and Treatment

—Integrated SUD Care in Corrections

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Abstract

Substance use disorders (SUDs) are markedly overrepresented in correctional populations and reflect the convergence of neurobiological vulnerability, trauma exposure, psychiatric comorbidity, and structural inequity. This narrative review synthesizes contemporary evidence (2015-2025) on the epidemiology, neurobiology, genetic influences, treatment strategies, digital innovations, and policy frameworks shaping SUD care in prisons, jails, and community reentry settings. SUDs affect more than half of incarcerated individuals compared with roughly 5% of the general U.S. population, and are strongly associated with adverse childhood experiences and co-occurring psychiatric disorders (Bronson et al., 2017; Fazel et al., 2017). Robust evidence demonstrates that medications for opioid use disorder (MOUD)—including methadone, buprenorphine, and extended-release naltrexone—substantially reduce post-release overdose mortality and improve treatment continuity, particularly when integrated with structured behavioral interventions such as cognitive-behavioral therapy and motivational interviewing. Although no FDA-approved medication exists for methamphetamine use disorder, emerging evidence supports combined extended-release naltrexone and bupropion as a promising approach. Digital modalities, including telehealth and secure tablet-based programming, expand access in resource-limited facilities and support continuity-of-care during high-risk custody transitions. Policy reforms, notably Medicaid Section 1115 Reentry Demonstrations and ADA-aligned standards recognizing MOUD as a clinical necessity, are reshaping correctional health delivery by reducing coverage disrup-

tions and institutionalizing continuity-of-care models. Emerging precision approaches, including pharmacogenomics and digital therapeutics, offer potential scalable pathways toward more individualized treatment. Collectively, the evidence supports a shift from fragmented, crisis-driven responses toward coordinated, recovery-oriented systems that integrate pharmacologic, behavioral, digital, and reentry supports to reduce overdose mortality and improve reintegration outcomes among justice-involved populations.

Keywords

Substance Use Disorders, Correctional Health, Psychotherapy, Medication-Assisted Treatment, Faith-Based Interventions, Pharmacogenomics, Digital Health

1. Introduction

Substance use disorders (SUDs) are among the most prevalent and complex health conditions affecting justice-involved populations, frequently co-occurring with psychiatric illness, trauma exposure, and criminogenic risk factors. Defined by the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) as maladaptive substance use causing clinically significant impairment (American Psychiatric Association, 2013). SUDs affect tens of millions of people worldwide, according to the United Nations Office on Drugs and Crime World Drug Report (United Nations Office on Drugs and Crime, 2023) and occur at rates nearly ten times higher among incarcerated individuals (e.g., state/federal prisoners and jail detainees) than in the general population (Bronson et al., 2017; Fazel et al., 2017).

Incarcerated individuals with SUDs often face layered clinical and psychosocial challenges, as these disorders rarely occur in isolation. High rates of comorbid psychiatric disorders—such as depression, PTSD, anxiety, and bipolar disorder (National Institute on Drug Abuse, 2018; National Institute on Drug Abuse, 2020a; Butler et al., 2022)—underscore the need for integrated rather than fragmented treatment approaches, as poor coordination increases relapse and recidivism risk (Kessler et al., 2005).

Despite progress in neurobiology, psychopharmacology, and psychotherapy, access to evidence-based treatment remains limited in correctional settings, particularly for marginalized groups disproportionately affected by structural inequities including differences by conviction type, race, and ethnicity—further magnify disparities in access and outcomes (Chen et al., 2025). To close these gaps, correctional systems should adopt trauma-informed, integrated, and precision-medicine-oriented models emphasizing standardized screening, timely initiation of medications for opioid use disorder, trauma-focused psychotherapy, and prerelease care coordination (National Academies of Sciences, Engineering, and Medicine, 2019; Green et al., 2018; Mitchell et al., 2012).

Because correctional settings differ substantially in length of stay, treatment capacity, and continuity-of-care infrastructure, this review distinguishes evidence from prisons, jails, and community supervision settings where implementation considerations vary. Accordingly, this narrative review synthesizes evidence on the burden and pathophysiological mechanisms of SUDs in correctional populations. It critically evaluates psychotherapeutic and pharmacological interventions, examines policy and systems-level approaches supporting reentry and continuity of care and identifies future directions leveraging precision medicine and digital therapeutics.

2. Methods

2.1. Literature Search Strategy

We searched PubMed and Scopus for English-language publications published between January 1, 2015 and March 10, 2026. The core PubMed search string included the following terms:

("substance use disorder" OR addiction OR opioid OR methamphetamine OR stimulant) AND (prison OR prisons OR jail* OR correction* OR incarcerated OR "community reentry" OR parole OR probation) AND (treatment OR "medication for opioid use disorder" OR MOUD OR methadone OR buprenorphine OR naltrexone OR "extended-release naltrexone" OR psychotherapy OR "cognitive behavioral therapy" OR "motivational interviewing" OR telehealth OR "digital health" OR reentry).

Equivalent search syntax was adapted for Scopus using TITLE-ABS-KEY fields. In addition to database searches, targeted searches of U.S. government and quasi-government sources—including the U.S. Department of Justice (DOJ), Substance Abuse and Mental Health Services Administration (SAMHSA), National Institutes of Health/National Institute on Drug Abuse (NIH/NIDA), Centers for Disease Control and Prevention (CDC), and Centers for Medicare & Medicaid Services (CMS)—were conducted using keyword combinations such as "MOUD jail," "MOUD prison," "Medicaid 1115 reentry," and "correctional telehealth SUD."

Retrieved records were compiled and screened for eligibility. Duplicate records were removed through automated matching of titles, authors, and publication year, followed by manual verification. Eligibility was assessed through title and abstract screening, with full-text review conducted when necessary. Studies focusing on correctional or reentry populations and addressing epidemiology, mechanisms, screening or diagnosis, treatment, implementation strategies, digital health modalities, or policy were prioritized for inclusion.

2.2. Inclusion Criteria and Narrative Synthesis

Inclusion criteria emphasized research on correctional or reentry populations addressing epidemiologic, neurobiologic, genetic, psychotherapeutic, pharmacologic, or policy aspects of SUD care. Reference lists of key articles were screened to capture implementation and translational studies. Given the heterogeneity of evidence, a narrative synthesis approach was employed to integrate quantitative

findings, policy frameworks, and implementation outcomes and to identify cross-cutting biological, behavioral, and systemic themes.

3. Results

In this review, we use "prisons" to denote longer-term state/federal confinement, "jails" to denote shorter-term local detention with rapid turnover, and "community supervision" to include probation, parole, and community reentry. These settings differ materially in expected length of stay, feasibility of medication induction and stabilization, availability of on-site prescribers/Opioid Treatment Program (OTPs), and the operational capacity to ensure continuity of care across transitions; therefore, implementation implications are described by setting where possible.

3.1. Epidemiology and Burden of SUDs in Correctional Settings

SUDs are vastly overrepresented in correctional populations, with lifetime prevalence exceeding 60% versus ~5% in the general U.S. population (Bronson et al., 2017). Serious mental illnesses—major depression, schizophrenia, and bipolar disorder—frequently co-occur (Fazel et al., 2017). Formerly incarcerated individuals face sharply elevated mortality during the early post-release period, driven primarily by drug overdose, followed by cardiovascular disease, homicide, and suicide (Binswanger et al., 2007; Mennicke et al., 2022). In statewide prison-release cohort studies, overdose mortality risk is highest during the first weeks following release from incarceration, particularly within the first 2 - 4 weeks, highlighting the importance of initiating medications for opioid use disorder prior to release and ensuring rapid linkage to community treatment (Binswanger et al., 2007; Green et al., 2018).

3.2. Etiology and Risk Factors

Addiction in justice-involved populations reflects complex interactions among genetic predisposition, environmental stressors, and psychological vulnerability. Twin and family studies estimate that genetic factors account for approximately 40% - 70% of the vulnerability to SUDs, depending on the substance involved (Goldman et al., 2005; Deak & Johnson, 2021). Addictive disorders arise from dysregulated mesolimbic dopamine and glutamatergic signaling that drive pathological reward learning and compulsive drug seeking (Volkow et al., 2016; Wise & Koob, 2014; Kalivas, 2009). Concurrent prefrontal and frontostriatal impairments weaken executive control and inhibitory regulation, further reinforcing maladaptive drug use patterns (Goldstein & Volkow, 2011; Koob & Volkow, 2010). Interactions between genetic and early-life stress factors further modify these neural systems, increasing susceptibility to addiction (Enoch, 2011).

Chronic stress, adverse childhood experiences (Felitti et al., 1998; Anda et al., 2006), mood and anxiety disorders (Grant et al., 2016), and socioeconomic disadvantage (Hatzenbuehler et al., 2013) compound vulnerability to substance use in incarcerated populations. Early maltreatment alters stress-response systems and

brain development, promoting emotional dysregulation and impulsivity (Anda et al., 2006; Felitti et al., 1998). Incarcerated individuals report disproportionately high adversity—nearly fourfold that of community samples (Reavis et al., 2013). Trauma exposure during adolescence, often through community violence, disrupts regulation and heightens risk for later substance misuse (Morrison et al., 2019). These experiences intersect with stigma and structural disadvantage, limiting coping and recovery resources (Hatzenbuehler et al., 2013). Within carceral settings, untreated psychiatric comorbidities exacerbate SUD severity and impede rehabilitation (Grant et al., 2016). Chronic exposure to stressors, trauma, and dysregulated environments produces lasting disruptions across subjective, cognitive, and neurobiological components of the adaptive stress-response system, increasing craving, relapse risk, and maladaptive coping (Sinha, 2024).

3.3. Neurobiological Underpinnings of Addiction in Justice-Involved Populations

Justice-involved individuals often exhibit neurobiological vulnerability shaped by chronic stress and trauma. These adverse experiences induce lasting changes in reward-stress circuitry, predisposing to compulsive drug seeking (Koob & Volkow, 2016). During withdrawal, within-system reward deficits and stress activation (Corticotropin releasing factor, dynorphin, norepinephrine) contribute to pathological negative affect (Koob, 2020).

Neuroimmune and gut-brain interactions further influence relapse susceptibility (Lucerne et al., 2021; García-Cabrerizo & Cryan, 2024). Environmental stressors common in carceral contexts—poor nutrition, infection, circadian disruption—exacerbate neuroinflammation and cognitive impairment. Social learning frameworks complement neurobiological evidence by showing that drug use persists through reinforcement and environmental contingencies (Smith, 2021).

Effective correctional interventions should therefore address both neurobiological factors and social dynamics.

3.4. Genetic and Pharmacogenomic Factors

Genomic studies (**Table 1**) have identified numerous variants influencing susceptibility, neurobiological signaling, and treatment response in substance use disorders (SUDs) (Deak & Johnson, 2021; Lopez-Leon et al., 2021; Gelernter & Polimanti, 2021). In addition to inherited genetic variation, transcriptional regulators such as immediate early genes (e.g., CREB1 and FOSB) play a key role in linking drug exposure to downstream changes in neuronal gene expression and synaptic plasticity (Orr et al., 2025). Consistent with these mechanisms, variants in *ADH*1B and *ALDH*2 affect alcohol metabolism (Zhou et al., 2023; Edenberg & McClintick, 2018; Gelernter et al., 2013), while *CHRNA*5-*CHRNA*3-*CHRNB*4 influence nicotine dependence through nicotinic acetylcholine receptor signaling that mediates synaptic transmission (Thorgeirsson et al., 2010; Deak & Johnson, 2021). Variants in *OPRM1* (rs1799971), *OPRD1*, and *GABRA2* confer risk for opioid and polysubstance dependence (Haerian & Haerian 2013;

Kember et al., 2022; Zhou et al., 2020; Smith et al., 2017; Nelson et al., 2014; Enoch et al., 2009; Morley et al., 2018; Mallard et al., 2018). Variants in *KCNJ6*, which influence neuronal excitability and neural oscillations, further demonstrate genetic modulation of reward circuitry (Kamarajan et al., 2017). Dopaminergic genes such as *DRD2/ANKK1* and *SLC6A3* highlight the role of mesolimbic reward pathways in addiction vulnerability (Wang et al., 2013; Verdejo-Garcia, 2015; Brown et al., 2009; Kampangkaew et al., 2019).

Table 1. Genes and substances in substance use disorders.

Gene	Substance/ Phenotype	Functional Role	References
ADH1B, ALDH2	AUD	Ethanol metabolism	Edenberg & McClintick, 2018; Gelernter et al., 2013; Zhou et al., 2023
GABRA2	AUD, Polysubstance	GABA-A receptor subunit	Enoch et al., 2009; Morley et al., 2018; Mallard et al., 2018
CHRNA5-CHRNA3-CHRNB4	Nicotine Dependence	Nicotinic acetylcholine receptor	Thorgeirsson et al., 2010; Deak & Johnson, 2021
OPRM1* (*A118G*), *OPRD*, *KCNJ6; FURIN, NCAM1	Opioid Use Disorder (OUD), Pain	μ-Opioid receptor, neuronal plasticity and remodeling	Haerian & Haerian, 2013; Nelson et al., 2014; Kamarajan et al., 2017; Kember et al., 2022, Zhou et al., 2020; Smith et al., 2017
CYP2B6*, *ABCB1	Methadone, Bupropion, Nicotine	Cytochrome P450 drug metabolism	Robinson et al., 2024; Levran et al., 2008
CYP2D6*, *COMT	Codeine, Antidepressançts	Cytochrome P450 drug metabolism	Crews et al., 2021; Hicks et al., 2017
***DRD2/ANKK1* (*Taq1A*)**	AUD, Cocaine, Polysubstance	Dopamine D2 receptor signaling	Wang et al., 2013; Verdejo-Garcia, 2015
FKBP5*, *CRHR1	OUD/Heroin, Stress-related relapse	Hypothalamic-pituitary-adrenal (HPA) axis regulation	Levran et al., 2014; Bernardi et al., 2017
***SLC6A3* (*DAT1*)**	Cocaine, ADHD comorbidity	Dopamine transporter	Brown et al., 2009; Kampangkaew et al., 2019
GRIN2B	Alcohol, Ketamine, Psychostimulants	NMDA receptor subunit	Karpyak et al., 2014; Fan et al., 2020
HTR2A*, *HTR1B	AUD, MDMA, Hallucinogens	Serotonin receptors	Sharp & Ippolito, 2025; Cameron et al., 2023
FOXP2*, *CHRNA2*, *CNR1* (*CB1 receptor*); *MCCC2; SLC36A2	CUD	Endocannabinoid signaling	Loureiro et al., 2023; Levey et al., 2023
BDNF* (*Val66Met*), *SLC6A4, FAAH, SLC18A1*, *SLC18A2	Cocaine, METH, Heroin, MUD, Polysubstance	Endocannabinoid metabolism, Monoamine vesicular transport Neuroplasticity, Serotonin reuptake	Khan et al., 2025; Cheng et al., 2005; Guerin et al., 2021
***CHRM1 & 2* (M1 & M2 muscarinic receptor)**	AUD, Depression	Muscarinic acetylcholine receptor	Walker et al., 2024; Witkin et al., 2014; Luo et al., 2005; Wang et al., 2004

AUD = Alcohol Use Disorder; OUD = Opioid Use Disorder; CUD = Cannabis Use Disorder; METH = Methamphetamine; MUD = Methamphetamine Use Disorder; MDMA = 3,4-methylenedioxymethamphetamine.; GeneCards—Human Genes|Gene Database|Gene Search.

Additional pathways implicated in addiction include serotonergic (*HTR2A*, *HTR1B*), glutamatergic (GRIN2B), and stress-response genes (*FKBP5*, *CRHR1*), which link mood regulation and stress reactivity to addiction risk (Sharp & Ippolito, 2025; Cameron et al., 2023; Levran et al., 2014; Fan et al., 2020; Karpyak et al., 2014; Bernardi et al., 2017). Variants in *CNR1* and *FAAH* modulate endocannabinoid signaling pathways involved in stress response and relapse vulnerability (Loureiro et al., 2023; Levey et al., 2023). Emerging evidence also implicates *BDNF* Val66Met, *FAAH* C385A, and *SLC18A1*/*A2* in methamphetamine use disorder, linking neuroplasticity, cognition, and relapse processes (Khan et al., 2025; Cheng et al., 2005; Guerin et al., 2021). Muscarinic receptor genes (*CHRM1*, *CHRM4*, *CHRM5*) have also shown therapeutic potential in alcohol use disorder and comorbid depression (Walker et al., 2024; Witkin et al., 2014; Luo et al., 2005; Wang et al., 2004).

Pharmacogenomic polymorphisms—particularly in *CYP2B6* and *CYP2D6*—influence metabolism and treatment response to several addiction and psychiatric medications (Robinson et al., 2024; Levran et al., 2008; Hicks et al., 2017; Gill et al., 2021; Gill et al., 2022). Despite growing pharmacogenomic evidence involving these and other genes, genetic testing has not yet been widely implemented in correctional health systems, leaving precision medicine approaches largely unrealized in these settings.

3.5. Challenges in Diagnosing and Screening in Correctional Settings

Substance use disorders (SUDs) are chronic, relapsing brain-based conditions characterized by compulsive substance use despite adverse consequences, arising from alterations in neural circuits governing reward, motivation, and self-control (Volkow & Blanco, 2023). The DSM-5 defines SUDs using 11 diagnostic criteria encompassing impaired control, risky use, social impairment, and pharmacologic dependence (American Psychiatric Association, 2013), while complementary diagnostic classifications are provided by the International Classification of Diseases, 11th Revision (ICD-11) (World Health Organization, 2019).

As summarized in **Table 2**, accurate identification of SUDs in correctional settings is frequently complicated by high rates of psychiatric comorbidity, trauma exposure, and pervasive stigma (Volkow & Blanco, 2023; Kessler et al., 2005; Butler et al., 2022; National Institute on Drug Abuse, 2018; National Institute on Drug Abuse, 2020a) as well as the overall high prevalence of SUDs in incarcerated populations relative to the general population (Bronson et al., 2017; Babor et al., 2001; Yudko et al., 2007). Validated screening instruments—including the Alcohol Use Disorders Identification Test (AUDIT), Drug Abuse Screening Test (DAST), and the Screening, Brief Intervention, and Referral to Treatment (SBIRT) framework—have demonstrated effectiveness in improving early detection and facilitating linkage to treatment services (Bronson et al., 2017; Babor et al., 2001; Madras et al., 2009; Yudko et al., 2007; Substance Abuse and Mental Health Services Administration, 2013). However, many screening tools were originally developed for primary care or

community settings and may require adaptation for carceral environments where privacy, staffing resources, and clinical infrastructure are limited (Taxman et al., 2007; Jack et al., 2024).

Table 2. Challenges and emerging solutions for substance use disorders in U.S. prison populations.

Challenge	Impact	Emerging Solutions /Best Practices	References
High prevalence of SUD	Rates far exceed general population	Universal screening at intake; standardized tools (AUDIT, DAST, TCU)	Bronson et al., 2017; Babor et al., 2001; Yudko et al., 2007
Limited access to evidence-based treatments	Unmet need; higher relapse/overdose	Expand MOUD access (methadone, buprenorphine, naltrexone)	National Academies of Sciences, Engineering and Medicine, 2019; Green et al., 2018
Stigma toward MOUD and MH care	Reduced uptake and retention	Staff training in addiction neuroscience; peer educator programs	National Academies of Sciences, Engineering and Medicine, 2019; Eddie et al., 2019
Co-occurring mental health disorders	Higher relapse/ recidivism; complexity	Integrated dual-diagnosis care; trauma-informed CBT/DBT	Kessler et al., 2005; Butler et al., 2022; National Institute on Drug Abuse, 2018; National Institute on Drug Abuse, 2020a
Disruption of care at release	Early post-release overdose risk	Medicaid suspension vs termination; warm handoffs; pre-release planning	Mitchell et al., 2012; Binswanger et al., 2007
Understaffing of behavioral health providers	Waits; reduced engagement	Telehealth expansion; cross-training custody staff	Sawyer-Morris et al., 2023; Duane & Yahner, 2024
Limited precision medicine integration	One-size-fits-all; suboptimal matching	Pharmacogenomics; digital therapeutics	Borrego-Ruiz & Borrego, 2025; Crews et al., 2021; Hicks et al., 2017; Sawyer-Morris et al., 2023
Coverage gaps at transition (insurance/ benefits)	Delayed treatment restart; overdose risk	Implement Medicaid Section 1115 reentry waivers to activate benefits pre-release; align formularies with community care	Buck et al., 2024; Hinton et al., 2024

MOUD = Medications for Opioid Use Disorder; NASEM = National Academies of Sciences, Engineering and Medicine; AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test; CBT = Cognitive Behavioral Therapy; DBT = Dialectical Behavior Therapy.

Limited access to evidence-based treatments further exacerbates unmet clinical need and contributes to elevated risks of relapse and overdose, underscoring the

importance of expanding access to medications for opioid use disorder (MOUD), including methadone, buprenorphine, and naltrexone (National Academies of Sciences, Engineering and Medicine, 2019; Green et al., 2018). Stigma toward MOUD and mental health care further reduces uptake and retention, although staff training in addiction neuroscience and peer educator programs may im-prove engagement (National Academies of Sciences, Engineering and Medicine, 2019; Eddie et al., 2019). Co-occurring mental health disorders are associated with higher relapse and recidivism and add clinical complexity, supporting the need for integrated dual-diagnosis care and trauma-informed approaches such as CBT and DBT (Kessler et al., 2005; Butler et al., 2022; National Institute on Drug Abuse, 2018; National Institute on Drug Abuse, 2020a).

Disruption of care at release contributes to elevated overdose risk in the immediate post-release period, underscoring the importance of Medicaid suspension (rather than termination), warm handoffs, and pre-release planning (Mitchell et al., 2012; Binswanger et al., 2007). Understaffing of behavioral health providers leads to delays and reduced engagement, though telehealth expansion and cross-training of custody staff may help address these gaps (Sawyer-Morris et al., 2023; Duane & Yahner, 2024). Continued limited integration of precision medicine contributes to suboptimal treatment matching, with emerging approaches such as pharmacogenomics and digital therapeutics offering potential improvements (Borrego-Ruiz & Borrego, 2025; Crews et al., 2021; Hicks et al., 2017; Sawyer-Morris et al., 2023). Coverage gaps during reentry, including delays in insurance activation and access to medications, further increase overdose risk; policy strategies such as Medicaid Section 1115 reentry waivers may help address these barriers (Buck et al., 2024; Hinton et al., 2024).

Accurate disclosure during screening is further hindered by underreporting related to fear of disciplinary or judicial consequences, limited confidentiality during intake assessments, and insufficient training of correctional staff in substance use assessment (Babor et al., 2001; Taxman et al., 2007). Implementation of universal intake screening using validated instruments, combined with trauma-informed clinical assessment—including suicide risk evaluation—represents best practice for identifying SUDs and guiding individualized treatment planning. Evidence suggests that under-detection of SUDs in correctional environments is driven less by diagnostic uncertainty than by structural barriers, including stigma, fear of punishment, and workforce limitations within correctional health systems. Qualitative research further highlights how individuals who co-use opioids and methamphetamine often experience criminal legal involvement and mandated treatment as stigmatizing or coercive, which may undermine trust in treatment systems and reduce engagement in care (Iacobelli et al., 2026).

4. Innovative Treatment and Reentry Strategies for SUDs in Correctional Settings

Emerging innovations in substance use disorder (SUD) treatment within correctional settings span multiple domains, including precision medicine, digital

health, pharmacotherapy, and policy reform (see **Table 3**). Precision medicine approaches—particularly pharmacogenomic-guided prescribing—offer the potential to individualize treatment for co-occurring pain, psychiatric disorders, and addiction, thereby improving medication adherence and clinical outcomes (Borrego-Ruiz & Borrego, 2025; Gill et al., 2021; Gill et al., 2022; Crews et al., 2021; Hicks et al. 2017).

Table 3. Innovations and emerging strategies in prison SUD care.

Innovation	Potential Impact	References
Pharmacogenomic profiling	Enables personalizes medication selection and may improve adherence (Pain, Psychiatric disorders and Addiction Medicine)	Gill et al., 2022; Gill et al., 2021; Borrego-Ruiz & Borrego, 2025; Crews et al., 2021; Hicks et al., 2017
Telepsychiatry and Digital recovery platforms	Expands access to behavioral health services where providers are scarce and supports ongoing engagement, relapse monitoring, and continuity of care during incarceration and reentry	Sawyer-Morris et al., 2023; Deslich et al., 2013; Staton et al., 2024; Marsch, 2020; Bonfiglio et al., 2022; Sawyer-Morris et al., 2025
Extended-release Naltrexone + Bupropion for MUD	Demonstrates emerging pharmacologic efficacy for stimulant use disorder when combined with behavioral therapy	Trivedi et al., 2021
Pre-release Medicaid activation & care navigation (e.g., CalAIM)	Improves continuity and reduces early post-release overdose risk by enabling linkage to MOUD and community care/telehealth follow-up	Friedmann et al., 2025; Cates & Brown, 2023; Allen et al., 2025

MOUD = Medications for Opioid Use Disorder; MUD = Methamphetamine Use Disorder.

Digital health interventions, including telepsychiatry and recovery support platforms, are increasingly critical in correctional environments where provider shortages limit access to care. These technologies expand access to behavioral treatment, enable ongoing monitoring, and support continuity of care during the transition from incarceration to community reentry (Bonfiglio et al., 2022; Deslich et al., 2013; Marsch, 2020; Staton et al., 2024; Sawyer-Morris et al., 2023).

At the pharmacologic level, emerging evidence supports the use of combined ex-tended-release naltrexone and bupropion for methamphetamine use disorder (MUD), representing a promising advancement in a treatment area historically lacking effective medications (Trivedi et al., 2021). When integrated with behavioral therapies, such pharmacologic strategies align with a growing body of evidence demonstrating that combined medication and psychosocial interventions improve retention and reduce relapse among justice-involved individuals (Mitchell et al., 2012; Duane & Yahner, 2024).

Policy innovations further strengthen reentry outcomes by addressing systemic gaps in care continuity. Pre-release Medicaid activation and care navigation pro-

grams (e.g., CalAIM) facilitate timely linkage to medications for opioid use disorder (MOUD), community-based services, and telehealth follow-up, thereby reducing overdose risk during the high-risk post-release period (Cates & Brown, 2023; Friedmann et al., 2025; Allen et al., 2025).

Collectively, these innovations reflect a shift toward integrated, patient-centered, and continuity-focused models of care. As summarized in **Table 3**, their combined implementation has the potential to address longstanding fragmentation between correctional and community health systems, ultimately improving treatment engagement, reducing relapse, and lowering overdose risk during reentry. Despite these advances, implementation remains uneven across correctional systems, particularly in resource-limited settings. Together, these innovations signal a paradigm shift from fragmented, episodic care toward coordinated, continuous, and evidence-based treatment across the incarceration-reentry continuum.

4.1. Evidence-Based Psychotherapies

1) Cognitive-behavioral therapy (CBT): CBT focuses on restructuring maladaptive thoughts and behaviors that contribute to substance use and relapse. In U.S. prison populations, CBT-based interventions have demonstrated moderate efficacy in reducing criminal thinking and recidivism, with meta-analyses consistently identifying structured, group-based CBT programs as among the most effective correctional rehabilitation approaches (Landenberger & Lipsey, 2005; Pearson et al., 2002). Within substance use treatment specifically, CBT-informed therapeutic community and relapse prevention models implemented in U.S. prisons have shown improvements in drug use outcomes and post-release functioning (Wexler et al., 1999; Prendergast et al., 2004).

Trauma-informed interventions such as Seeking Safety reduce PTSD symptoms and improve coping skills among incarcerated women. Group-based CBT and CM interventions enhance engagement and reduce relapse when paired with structured aftercare (Mitchell et al., 2012; Anda et al., 2006).

Clinical trials demonstrate that CBT reduces craving and psychiatric symptoms in individuals with methamphetamine use disorder (Shakiba et al., 2018; Jalali et al., 2018). Similarly, combined MI-CBT formats significantly increase abstinence rates and reduce adverse outcomes associated with methamphetamine use (Baker et al., 2021; Smout et al., 2010). Digital and telehealth platforms now deliver CBT effectively in resource-limited correctional facilities (Rawson et al., 2021; Polcin et al., 2014). These findings support CBT as a foundational modality in correctional substance use disorder programming, consistent with risk-need-responsivity principles and the structured delivery formats typical of U.S. prison systems.

Across clinical trials and implementation studies, no single psychotherapy demonstrates superiority; rather, structured, evidence-based modalities delivered consistently and paired with pharmacotherapy produce the most durable outcomes. Evidence further supports integrated treatment models combining psychotherapy and pharmacotherapy.

2) Motivational interviewing (MI): MI is a collaborative, person-centered approach designed to enhance intrinsic motivation and resolve ambivalence toward change (Burke et al., 2003). MI has been shown to increase treatment engagement and adherence (Lundahl et al., 2013), particularly when combined with other behavioral interventions such as contingency management (Sayegh et al., 2017). In correctional settings, MI is especially effective for individuals entering treatment involuntarily and helps promote sustained participation in treatment programs (McMurran, 2009). Consistent with the Substance Abuse and Mental Health Services Administration's (SAMHSA, 2021) Treatment Improvement Protocol (TIP) 35, MI emphasizes expressing empathy, eliciting clients' own reasons for change, and strengthening commitment by helping individuals align behavior change with their personal values and goals for a healthy life. U.S.-based studies demonstrate that brief motivational interviewing delivered prior to jail release is feasible and associated with increased treatment entry, greater abstinence, and reductions in heavy substance use among incarcerated adults, with participants reporting high acceptability.

Additionally, research in U.S. community corrections and juvenile detention settings (Stein et al., 2011; Owens &McCrady, 2016; Spohr et al., 2016) shows that MI-consistent clinician behaviors predict treatment initiation and improved drug use outcomes, and that brief MI interventions during incarceration can reduce post-release alcohol and marijuana use among justice-involved adolescents.

3) Contingency Management (CM): Although CM demonstrates strong efficacy for stimulant use disorders in community treatment settings, evidence in U.S. correctional populations is more limited; available PubMed-indexed studies suggest that CM can improve substance use and supervision outcomes when implemented with adequate incentive magnitude and structured monitoring, whereas reduced or delayed reinforcement within justice settings may attenuate effectiveness (Friedmann et al., 2012; Prendergast et al., 2011).

Meta-analytic evidence supports CM effectiveness across diverse settings, including criminal justice-involved populations (e.g., Prendergast et al., 2006; Petry et al., 2005), and subsequent implementation research has documented its adaptability to structured environments.

4) The Matrix Model: an integrative treatment approach combining cognitive behavioral therapy, motivational interviewing, relapse prevention, psychoeducation, and structured monitoring—has demonstrated superior abstinence and retention outcomes among stimulant users in U.S. outpatient trials (Rawson et al., 1995; Shoptaw et al., 1994). Although large randomized controlled trials in U.S. prison populations are limited, correctional therapeutic community programs have incorporated Matrix-informed components, including manualized group sessions and relapse prevention strategies. Evaluations of prison-based programs for methamphetamine-using inmates report improvements in treatment engagement and post-release substance use outcomes, supporting the feasibility of structured, CBT-driven stimulant treatment models in custodial settings (Burdon et

al., 2009). Collectively, these findings suggest that the Matrix Model's structured and accountability-focused framework is well aligned with correctional treatment environments and applicable to stimulant use disorders in U.S. prisons.

4.2. Faith-Based and Twelve-Step Facilitation Approaches

Twelve-Step Facilitation (TSF) therapy promotes participation in mutual-help fellowships such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA), emphasizing acceptance, accountability, and peer support (Kelly et al., 2020; Rawson et al., 2021; Humphreys et al., 2020). Faith-based organizations—including Teen Challenge, Celebrate Recovery, and The Lovelady Center—that include overtly religious activities play a significant role in reentry and rehabilitation for justice-involved individuals. While these programs support sustained recovery engagement and reduce stigma, some faith-based interventions historically have not endorsed medication-assisted treatment, underscoring the need for integration with evidence-based pharmacologic care (Mitchell et al., 2012; Dutra et al., 2008; Dooley et al., 2026). Chaplaincy-led recovery groups have demonstrated acceptability and effectiveness in maintaining engagement during incarceration and after release (Schonbrun et al., 2011, 2018).

5. Pharmacologic Therapies for SUDs

Pharmacologic treatment for substance use disorders (SUDs) in correctional settings is most effective when delivered within standardized, system-level frameworks that ensure access, continuity, and equity (**Table 4**). Medications for addiction treatment remain the cornerstone of evidence-based care. Strong evidence supports methadone, buprenorphine, and extended-release naltrexone for opioid use disorder; acamprosate, disulfiram, and naltrexone for alcohol use disorder; and varenicline or bupropion for tobacco dependence (National Institute on Drug Abuse, 2020b; World Health Organization, 2009).

National consensus guidelines emphasize universal access to medications for opioid use disorder (MOUD), trauma-informed care, telehealth-enabled behavioral health services, and comprehensive reentry supports to reduce overdose mortality and recidivism (Substance Abuse and Mental Health Services Administration, 2025a, 2025b; National Academies of Sciences, Engineering, and Medicine, 2019; Hatzenbuehler et al., 2013; Kessler et al., 2005; Glick et al., 2021). As summarized in **Table 4**, these standards increasingly include system-level interventions such as pre-release Medicaid coverage alignment, integrated behavioral health services, and culturally responsive care models (Borrego-Ruiz & Borrego, 2025; Golden et al., 2025; Marsch, 2020; Bonfiglio et al., 2022; Sawyer-Morris et al., 2025; Buck et al., 2024; Centers for Medicare & Medicaid Services, 2023). Aligning correctional health systems with Medicaid and broader public health infrastructure is essential for closing treatment gaps during the high-risk post-release period, particularly during the first weeks following release when mortality risk is highest (Buck et al., 2024; Centers for Medicare & Medicaid Services, 2023).

Table 4. Recommended national standards for correctional SUD treatment.

Standard	Rationale	References
Universal MOUD access for OUD	Reduces overdose and recidivism	Substance Abuse and Mental Health Services Administration, 2025a, 2025b; National Academies of Sciences, Engineering, and Medicine, 2019; Green et al., 2018; Friedmann et al., 2025
Telehealth infrastructure for behavioral health and MOUD	Improves access and continuity	Borrego-Ruiz & Borrego, 2025; Golden et al., 2025; Marsch, 2020; Bonfiglio et al., 2022; Sawyer-Morris et al., 2025
Comprehensive reentry support (housing, employment, treatment)	Addresses social determinants; improves retention	Substance Abuse and Mental Health Services Administration, 2025b
Trauma-informed, culturally competent care	Enhances engagement; equity focus	Hatzenbuehler et al., 2013; Kessler et al., 2005
Inclusion of MUD in SUD standards	Addresses rising prevalence; enables pilots	Glick et al., 2021
Pre-release Medicaid coverage alignment (Section 1115)	Bridges the 2 - 4 week mortality window by enabling MOUD initiation and rapid follow-up	Buck et al., 2024; Centers for Medicare & Medicaid Services, 2023

NASEM = National Academies of Sciences, Engineering, and Medicine; SAMHSA = Substance Abuse and Mental Health Services Administration; MOUD = Medications for Opioid Use Disorder; OUD = Opioid Use Disorder; SUD = Substance Use Disorder; MUD = Methamphetamine Use Disorder.

5.1. Opioid Use Disorder (OUD)

Medications for opioid use disorder (MOUD)—including methadone, buprenorphine, and extended-release naltrexone—have been shown to significantly reduce post-release overdose mortality and improve treatment continuity among incarcerated populations (Green et al., 2018; Evans et al., 2022). National guidelines emphasize offering the full MOUD formulary with continuity across custody transitions (National Academies of Sciences, Engineering, and Medicine, 2019; Substance Abuse and Mental Health Services Administration, 2025b).

The fentanyl crisis has accelerated MOUD adoption. Methadone, buprenorphine, and extended-release naltrexone reduce relapse, all-cause mortality, and reincarceration (Volkow et al., 2014; Wakeman & Barnett, 2018). Individuals receiving MOUD during incarceration are significantly more likely to continue treatment after release and experience lower risks of fatal overdose (Friedmann et al., 2025; Cates & Brown, 2023; Evans et al., 2022; Friedmann et al., 2018). Long-acting buprenorphine formulations further improve retention and social outcomes (Lee et al., 2021; Martin et al., 2022; Pourtaher et al., 2024).

Despite demonstrated efficacy, access to medications for opioid use disorder (MOUD) remains uneven due to stigma, diversion concerns, regulatory con-

straints, and logistical barriers that perpetuate health inequities (Berk et al., 2025). Limited availability of certified OTPs, which are federally regulated facilities authorized to dispense medications such as methadone for opioid use disorder, further restricts treatment access in many correctional and community settings. In addition, genetic variation influences susceptibility and treatment response, with polymorphisms in *CYP2D6* affecting opioid metabolism and variants in *OPRM1* altering receptor sensitivity and treatment outcomes.

5.2. Alcohol Use Disorder (AUD)

Alcohol Use Disorder (AUD) is a chronic, relapsing brain disease characterized by impaired control over alcohol use despite adverse health, social, and legal consequences. Alcohol is implicated in more than half of incarcerations, and 47% of jail inmates meet criteria for alcohol dependence or abuse (Karberg & James, 2005). FDA-approved medications include disulfiram, acamprosate, oral naltrexone, and extended-release injectable naltrexone. A recent systematic review and meta-analysis supports oral naltrexone (50 mg/day) and acamprosate as first-line pharmacotherapies when combined with behavioral treatment (McPheeters et al., 2023). Initiating pharmacotherapy during incarceration and ensuring continuity of care post-release reduces relapse and alcohol-related harms.

5.3. Cannabis Use Disorder (CUD)

Cannabis Use Disorder (CUD) involves a problematic pattern of cannabis use leading to clinically significant impairment or distress. Although no FDA-approved pharmacotherapies currently exist, behavioral interventions—including cognitive behavioral therapy, motivational enhancement therapy, and contingency management—have demonstrated effectiveness (Budney et al., 2007). CUD is prevalent among justice-involved individuals yet remains under-addressed in correctional systems. Structured behavioral treatment during incarceration may reduce post-release relapse and substance-related recidivism.

5.4. Nicotine (Tobacco) Use Disorder (TUD)

Nicotine is a highly addictive compound that binds to α4β2 nicotinic acetylcholine receptors in the brain, stimulating dopamine release and reinforcing dependence. Tobacco use prevalence in incarcerated populations is substantially higher than in the general population (Cropsey & Kristeller, 2005). Combining behavioral therapy with pharmacotherapy significantly increases cessation rates (Cahill et al., 2013). Varenicline, a selective partial agonist at the α4β2 receptor, is recommended over bupropion due to superior quit outcomes (Reed et al., 2024). Comprehensive tobacco treatment programs within correctional facilities are desirable to reduce relapse and long-term health disparities.

5.5. Methamphetamine Use Disorder (MUD)

Methamphetamine overdose deaths continue to rise, and currently no medications are FDA-approved for methamphetamine use disorder. Pharmacologic agents such

as modafinil, varenicline, and atomoxetine have shown modest cognitive benefits but limited impact on sustained abstinence (Moszczynska, 2021; Yates, 2024). The ADAPT-2 trial demonstrated that extended-release naltrexone plus bupropion significantly improved abstinence compared with placebo (Trivedi et al., 2021).

The co-use of opioids and methamphetamine—commonly referred to as "goofballing"—is increasingly documented in polysubstance-use research and is associated with elevated overdose risk and adverse outcomes, as stimulants and opioids have opposing pharmacologic effects that may mask intoxication or delay recognition of respiratory depression (Sun et al., 2024; Lopez et al., 2021). CDC surveillance data further demonstrate rising stimulant involvement in opioid overdose deaths (Tanz et al., 2025). Qualitative research among individuals who co-use opioids and methamphetamine also highlights how treatment systems often struggle to address polysubstance use and may be experienced as fragmented or poorly aligned with patient needs, underscoring the importance of integrated treatment approaches across community and correctional settings (Iacobelli et al., 2026).

Genetic studies indicate that stimulant and opioid use phenotypes share polygenic liability, suggesting overlapping biological risk pathways that may inform future precision interventions. Large genomic studies demonstrate that methamphetamine and broader stimulant use traits are highly polygenic and genetically correlated with other substance use disorders (Lai et al., 2024). Candidate genetic variants—including those affecting dopamine transporter and reward-related signaling pathways—have been explored as potential risk factors influencing susceptibility and treatment response (Khan et al., 2025).

In justice-involved populations, the high prevalence of methamphetamine use, co-occurring psychiatric disorders, and stimulant-related impulsivity underscores the need for integrated behavioral interventions—including contingency management—initiated during incarceration and sustained through community reentry to reduce relapse and overdose risk.

6. Integrated Correctional Innovations and Continuity-of-Care Models

6.1. Operational Implementation Barriers and Mitigation Strategies

Operationalizing MOUD and evidence-based stimulant-treatment approaches in correctional settings commonly involves several practical challenges. These include diversion risk (mitigation: observed dosing, formulary controls, medication counts, and structured diversion-response workflows); induction logistics during withdrawal, particularly in jails with rapid turnover (mitigation: standardized withdrawal protocols, rapid clinical assessment pathways, and low-threshold buprenorphine initiation with clear continuation planning); staffing and licensing constraints (mitigation: telehealth prescribing, telepsychiatry, cross-training nursing staff, and formal partnerships with community opioid treatment programs for methadone continuity); and handoff failures at release (mitigation: "warm handoffs," prerelease appointment scheduling, navigator models, and bridging medication strategies where

permitted) (Binswanger et al., 2007; Moore et al., 2019; Rich et al., 2015; National Academies of Sciences, Engineering, and Medicine, 2019; Wang et al., 2010).

Evidence further suggests that engagement in behavioral health services improves retention on MOUD among justice-involved individuals, highlighting the importance of coordinated treatment and continuity-of-care during reentry (Yatsco et al., 2026). These operational strategies align with emerging statewide models demonstrating feasibility and improved post-release treatment engagement (Clarke et al., 2018; Duane & Yahner, 2024; Green et al., 2018; Staton et al., 2024).

6.2. State Implementation Models

While access to evidence-based SUD treatment remains inconsistent across U.S. correctional systems, several states have implemented comprehensive models integrating medications for opioid use disorder (MOUD), behavioral health services, and structured reentry supports. Evidence supporting integrated treatment models is strong. Meta-analytic evidence indicates that combining pharmacotherapy with structured behavioral therapies such as cognitive-behavioral therapy improves substance use outcomes compared with pharmacotherapy or usual care alone, supporting integrated treatment approaches used in several state correctional health programs (Ray et al., 2020; National Institute on Drug Abuse, 2020b).

Several states have implemented system-level correctional treatment models that illustrate different approaches to integrated care (**Table 5**). In California, the Integrated Substance Use Disorder Treatment (ISUDT) program implemented by California Correctional Health Care Services integrates screening, MOUD (methadone, buprenorphine, and naltrexone), cognitive-behavioral interventions, and prerelease care coordination with community providers to support continuity of treatment following release (Allen et al., 2025; California Department of Health Care Services, 2023; California Correctional Health Care Services, 2024). The Rhode Island Department of Corrections operates one of the first statewide correctional programs providing universal access to all FDA-approved MOUD medications during incarceration, coupled with counseling services and Medicaid-supported linkage to community treatment providers after release (Clarke et al., 2018; Brinkley-Rubinstein et al., 2019; Green et al., 2018). In New York, the New York State Department of Corrections and Community Supervision implements the Comprehensive Alcohol and Substance Abuse Treatment (CASAT) model, combining therapeutic community programming with MOUD access and phased community reintegration designed to support treatment engagement during reentry (Lim et al., 2024; Fallico et al., 2022; New York State Department of Corrections and Community Supervision, n.d.; New York State Senate Bill S7703, 2021; New York Correction Law §626, 2023; Zucker et al., 2015). Similarly, the Minnesota Department of Corrections provides prison-based chemical dependency treatment programs using cognitive-behavioral interventions and structured rehabilitation services, including transitional work-release and community supervision components that support continuity of care after incarceration (Duwe, 2010; Minnesota Department of Corrections, n.d.; Palmieri & Clark, 2024).

Table 5. Comparative overview of SUD treatment programs in selected state correctional systems.

State /System/	Treatment Model	Medications Available	Psychotherapy Approaches	Reentry & Continuity Strategies	Reference
California (CCHCS)	**Integrated Substance Use Disorder Treatment (ISUDT)** program integrating MOUD with behavioral treatment and systemwide screening, assessment, and care coordination. CalAIM supports prerelease Medicaid linkage and community transition	Methadone, Buprenorphine, Naltrexone; AUD meds per clinical guidelines	CBT, MI, CM-based interventions; structured SUD treatment groups	Pre-release planning; linkage to community MOUD; benefits reactivation under CalAIM justice-involved initiatives	Allen et al., 2025; California Department of Health Care Services, 2023; California Correctional Health Care Services, 2024
Minnesota DOC	**Prison-based CD Treatment Programs** and therapeutic community-style substance use treatment integrated with behavioral programming and rehabilitation initiatives; Integrated behavioral health with MAT	Buprenorphine, Methadone, XR-Naltrexone; AUD meds	CBT for criminogenic thinking; **T4C;** trauma-informed care	Work-release and transitional programming in the final months of incarceration; community supervision and treatment referrals after release	Palmieri & Clark (2024); Duwe, 2010; Minnesota Department of Corrections (n.d.)
Rhode Island DOC	First statewide correctional system with universal MOUD access; universal screening for OUD	Methadone, Buprenorphine, XR Naltrexone	Group CBT, behavioral therapy integrated with MOUD; relapse prevention	Universal continuation of MOUD at intake; intensive reentry planning; linkage to community providers	Clarke et al., 2018; Green et al., 2018; Brinkley-Rubinstein et al., 2019
New York (DOCCS)	Statutory MOUD access with mandated conseling; Comprehensive SUD treatment including **ASAT** programs and **CASAT** therapeutic community model,	Methadone, Buprenorphine, Naltrexone (MOUD required in correctional facilities)	Individual and group CBT, peer recovery groups	Discharge planning; CASAT community reintegration phases, work-release treatment, and reentry coordination with community providers and parole supervision	Lim et al., 2024; Fallico et al., 2022; New York State Department of Corrections and Community Supervision, n.d.; New York State Senate Bill S7703 (2021); New York Correction Law §626, 2023; Zucker et al., 2015

ASAT = Alcohol and Substance Abuse Treatment; CASAT = Comprehensive Alcohol and Substance Abuse Treatment; California (CCHCS) = California Correctional Health Care Services; CD = Chemical Dependency; SUD = Substance Use Disorder; MOUD = Medication for Opioid Use Disorder; MAT = Medication Assisted Treatments; New York (DOCVCS) = New York State Department of Corrections and Community Supervision; Rhode Island DOC = Rhode Island Department of Corrections; Minnesota DOC = Minnesota Department of Corrections; T4C = Thinking for a Change; CBT = Cognitive Behavioral Therapy; XR = Extended Release.

Table 5 compares these approaches, illustrating how policy mandates, program design, and Medicaid alignment are being leveraged to improve treatment continuity during incarceration and community reentry. Despite these advances, evidence-based treatment remains unevenly implemented across U.S. correctional

systems, with access often constrained by structural inequities—including disparities by conviction type, race, and ethnicity—that contribute to differences in treatment availability and outcomes (Chen et al., 2025).

6.3. Technology-Enabled Care and Reentry Coordination

Emerging innovations increasingly emphasize continuity of care, technology-enabled treatment delivery, and alignment between correctional and community health systems. Pharmacogenomic profiling—already used in psychiatry and pain management—offers a potential pathway to guide treatment options, including individualized medication selection that may enhance safety, adherence, and outcomes (Robinson et al., 2024; Crews et al., 2021; Gill et al., 2021, 2022).

Telepsychiatry, secure tablet-based programming, and digital recovery platforms can help address workforce shortages while expanding access to behavioral health services during incarceration and community reentry (Deslich et al., 2013; Staton et al., 2024; Sawyer-Morris et al., 2023; Golden et al., 2025). Digital tools supporting real-time monitoring of cravings, triggers, and mood have also shown feasibility and acceptability among justice-involved populations (Sawyer-Morris et al., 2025).

Another major innovation involves activating Medicaid coverage prior to release and incorporating care navigators to coordinate appointments, benefits, and MOUD continuity. Section 1115 Medicaid Reentry Demonstrations allow coverage up to 90 days pre-release and significantly improve engagement during the high-risk transition period (Buck et al., 2024; Chin et al., 2024; Lieber et al., 2024). State initiatives such as California's CalAIM Justice-Involved Demonstration exemplify how aligning correctional and community systems can promote uninterrupted medical and behavioral health care (Allen et al., 2025; California Department of Health Care Services, 2023).

7. Discussion

Synthesizing evidence of effectiveness across clinical, behavioral, and policy domains reveals a consistent pattern: integrated, evidence-based interventions sustained through reentry yield the most durable outcomes for justice-involved individuals with SUDs. Across epidemiologic, neurobiological, pharmacologic, and psychosocial studies, correctional systems that combine MOUD, structured psychotherapies, and continuity-of-care planning demonstrate significant reductions in relapse, overdose mortality, and reincarceration. These findings align with national clinical standards articulated by the American Society of Addiction Medicine (ASAM), which identify MOUD as the evidence-based standard of care across treatment settings, including correctional environments (Kampman & Jarvis, 2020). Correction-specific research reinforces this position; statewide implementation of comprehensive medications for addiction treatment in Rhode Island prisons was associated with a marked reduction in post-incarceration overdose deaths (Green et al., 2018), while initiation of MOUD prior to release—including

extended-release naltrexone and buprenorphine—has been shown to improve post-release engagement and reduce recidivism and mortality (Clarke et al., 2018; Friedmann et al., 2018; Evans et al., 2022). Collectively, these data demonstrate that system-level MOUD implementation in correctional settings is both feasible and lifesaving, consistent with established standards of addiction medicine.

Beyond psychosocial determinants, emerging evidence underscores biological convergence across SUDs. Genomic studies reveal informative genetic loci across neurotransmitter and stress-regulation pathways influencing vulnerability and treatment response. The largest multivariate genome-wide association study meta-analysis to date—encompassing more than one million participants—identified PDE4B, a dopamine-regulating gene, as a shared susceptibility locus across multiple SUD phenotypes (Hatoum et al., 2023). Additional mechanistic insights, including activity-dependent myelin plasticity in ventral tegmental area reward circuits (Yalcin et al., 2024), epigenetic modulation through DNA methylation and histone modification (Stewart et al., 2021; Osborne et al., 2020), and microbiome-brain interactions (García-Cabrerizo & Cryan, 2024; Russell et al., 2021), highlight convergent neurobiological pathways that might inform future precision treatment targets.

Collectively, these findings support a shift from fragmented, crisis-oriented correctional care toward coordinated, biologically-informed, and recovery-oriented systems. Pharmacologic treatment—particularly MOUD—is among the most effective interventions for reducing relapse and overdose mortality, especially when integrated with trauma-informed psychotherapy, peer and faith-based supports, and structured reentry planning (National Academies of Sciences, Engineering, and Medicine, 2019; Wakeman & Barnett, 2018).

7.1. Integrated Care and Delivery Modalities

National bodies and consensus guidelines increasingly endorse integrated models in which MAT is combined with cognitive-behavioral therapy, motivational interviewing, or contingency management (National Academies of Sciences, Engineering, and Medicine, 2019). Statewide implementation of MOUD has been associated with marked reductions in post-release overdose mortality (Green et al., 2018), while telepsychiatry, secure tablet programming, and peer recovery services expand engagement in rural and resource-limited facilities (Eddie et al., 2019, Sawyer-Morris et al., 2023).

CBT programs that address criminogenic thinking further reduce recidivism when paired with aftercare and community linkage (Mitchell et al., 2012). Federal initiatives such as the NIH HEAL and Justice Community Opioid Innovation Network (JCOIN) are actively testing digitally delivered CBT, MI, and peer navigation models that begin during incarceration and extend into community-based care, reflecting growing recognition of the need for longitudinal treatment continuity.

Several state correctional systems illustrate converging best practices. California's Correctional Health Care Services model, aligned with the CalAIM initiative, pro-

vides comprehensive MOUD integrated with CBT, MI, CM, and trauma-informed group interventions, alongside prerelease benefits activation and strong community linkage (Allen et al., 2025). Rhode Island's statewide MOUD program—maintaining treatment from intake through release—demonstrated substantial reductions in post-release overdose deaths (Green et al., 2018, Clarke et al., 2018). Comparable models in New York (Fallico et al., 2022; Lim et al., 2024; New York Correction Law §626, 2023), and Minnesota (Palmieri & Clark, 2024; Duwe, 2010; Minnesota Department of Corrections, n.d.) similarly emphasize universal medication access, telehealth infrastructure, and coordinated reentry supports.

7.2. Public Health and Policy Implications

Translation of clinical advances into population-level impact depends on policies that bridge custody and community while addressing persistent inequities. Access to MOUD and behavioral health services remains highly variable across states, driven by stigma, insurance disruption, workforce shortages, and fragmented data systems (Eddie et al., 2019). Recent DOJ and HHS guidance recognizes MOUD as a clinical standard of care and a protected accommodation under the Americans with Disabilities Act, reinforcing legal and ethical obligations to provide evidence-based treatment in correctional settings (Williamson & Whaley, 2024).

Medicaid Section 1115 Reentry Demonstrations represent a transformative policy lever, allowing states to provide medical and behavioral health services up to 90 days prior to release. Early evaluations indicate that prerelease enrollment, care navigation, and immediate post-release follow-up substantially improve treatment engagement and reduce overdose mortality during the high-risk reentry period (Buck et al., 2024; Chin et al., 2024; Lieber et al., 2024). Sustained success will require continued cross-agency collaboration, standardized outcome metrics, and alignment with National Institute of Corrections behavioral health and reentry frameworks (National Institute of Corrections, 2022).

Evidence-based overdose preventions at release from prison or jail can be deployed at or immediately prior to release include:

1) naloxone distribution with brief training for the individual and, when feasible, family/support persons (as per Centers for Disease Control and Prevention 2025; Substance Abuse and Mental Health Services Administration, 2025a);

2) MOUD continuity measures such as prerelease initiation and/or bridging strategies (e.g., scheduled first-dose appointment within 24 - 72 hours; Extended Release (XR) formulations where appropriate) to mitigate the high-risk transition period (Green et al., 2018; Friedmann et al., 2018; Evans et al., 2022);

3) scheduled rapid follow-up (e.g., appointment made before release, transportation plan, and documented warm handoff) supported by care navigation models (Buck et al., 2024; Chin et al., 2024); and

4) benefits activation (Medicaid reentry demonstration processes and prerelease enrollment) to reduce coverage gaps (Centers for Medicare & Medicaid Services, 2023; Lieber et al., 2024).

This (recommended) multi-focal approach should also provide economic benefit to the post-incarcerated individuals as well as to the communities in which they reside, as a result of improvements in quality of life and reductions in SUD relapse, criminal activities, and recidivism.

7.3. Innovations and Future Directions

Digital therapeutics, telepsychiatry, and data-driven analytics offer scalable solutions to longstanding access challenges in correctional health. Mobile applications, ecological momentary assessment tools, and app-based CBT platforms show promise for real-time monitoring of cravings, triggers, and mood, supporting relapse prevention during both incarceration and reentry (Marsch, 2020; Bonfiglio et al., 2022; Sawyer-Morris et al., 2025).

Pharmacogenomic-guided prescribing (Borrego-Ruiz & Borrego, 2025; Gill et al., 2022) and biomarker-based risk stratification could further personalize treatment, particularly for individuals with co-occurring psychiatric or medical conditions. Novel pharmacotherapies, including combined extended-release naltrexone and bupropion for methamphetamine use disorder, represent important early advances in a domain that has been long neglected in correctional research (Trivedi et al., 2021). Rising opioid-methamphetamine co-use (Hazani et al., 2022) underscores the urgency of prioritizing polysubstance-use research and pragmatic implementation trials within justice settings.

Several pharmacogenomic applications have demonstrated clinical utility and are supported by published prescribing guidance. These include genotype-informed considerations for methadone and other opioid therapies involving *CYP2B6* and *CYP2D6* metabolic pathways, consistent with recommendations from the Clinical Pharmacogenetics Implementation Consortium (CPIC) (Crews et al., 2021; Robinson et al., 2024). As summarized in **Table 3**, pharmacogenomic tools represent one of several emerging strategies aimed at improving treatment personalization in correctional settings. By contrast, broader precision-medicine approaches—such as polygenic risk scoring for relapse prediction, microbiome-informed treatment strategies, or gene-based prediction of stimulant-treatment response—remain largely investigational. Consequently, these approaches should currently be regarded as emerging research avenues rather than established standards of care in correctional health systems.

Pre-release Medicaid activation represents a lifesaving reform, and the Federal initiatives such as Medicaid Section 1115 Reentry Demonstrations and state models like CalAIM exemplify the evolving alignment between correctional and public health systems—an essential step toward reducing overdose deaths, improving reentry outcomes, and advancing equity in correctional health care. Emerging evidence also highlights the promise of digital health tools—such as mobile ecological momentary assessments and app-based cognitive-behavioral platforms—as feasible and acceptable methods for real-time monitoring of cravings, triggers, and mood, thereby enhancing engagement and relapse prevention among justice-involved in-

dividuals (Marsch, 2020; Bonfiglio et al., 2022; Sawyer-Morris et al., 2025).

7.4. Policy Call-to-Action

The evidence synthesized in this review underscores the need for coordinated national strategies that integrate pharmacologic, behavioral, digital, and reentry supports within correctional health systems. Policy initiatives such as Medicaid Section 1115 Reentry Demonstrations represent an important step toward institutionalizing continuity of care across custody and community settings. Consistent evidence indicates that medications for opioid use disorder, when initiated during incarceration and sustained through reentry, significantly improve treatment retention and reduce overdose mortality and reincarceration, reinforcing the need for sustained policy investment and infrastructure to expand evidence-based treatment in correctional systems. Research on restrictive housing underscores the importance of trauma-informed, mental health-protective policies (Hammock et al., 2024). Addressing high rates of substance use disorder among probationers and parolees will require coordinated diversion programs, community-linked treatment, and emerging pharmacogenomic-guided interventions (Borrego-Ruiz & Borrego, 2025; Gill et al., 2021, 2022; Hammock et al., 2024; Fearn et al., 2016; Hicks et al., 2017).

The evidence underscores the urgency of a coordinated national framework that unites pharmacologic, behavioral, digital, and reentry supports under an equity-driven strategy. Rising opioid-methamphetamine co-use ("goofballing") and the absence of approved pharmacotherapies highlight the need to prioritize polysubstance research and pragmatic implementation pilots.

Addressing the growing burden of methamphetamine use disorder, polysubstance use, and trauma-related comorbidity will require coordinated diversion programs, community-linked treatment models, and emerging precision-medicine-guided interventions. Embedding these innovations within reentry frameworks such as CalAIM advances the mission of the National Institute of Corrections to promote equity, improve population health, and strengthen public safety.

7.5. Strengths and Limitations

This narrative review is novel and has several important strengths. First, it integrates evidence across neurobiology, genetics, psychotherapeutics, pharmacology, digital health, and policy, offering a comprehensive and multidisciplinary synthesis that reflects the real-world complexity of SUDs in correctional settings. By spanning the full continuum from incarceration through reentry, the review highlights how biologic vulnerability, trauma exposure, and structural determinants interact to shape outcomes, moving beyond siloed clinical or policy perspectives. The inclusion of emerging domains—such as pharmacogenomics, digital therapeutics, and Medicaid reentry demonstrations—positions this work at the forefront of translational and implementation-oriented correctional health research. Importantly, the review centers equity, emphasizing populations disproportion-

ately affected by incarceration, stigma, and fragmented care systems, and aligns clinical evidence with evolving legal and policy frameworks.

Several limitations warrant consideration. As a narrative review, the study does not employ formal systematic review or meta-analytic methods, which limits the ability to quantify effect sizes or assess publication bias. The correctional health literature remains heterogeneous, with wide variability in facility type, population demographics, treatment availability, and outcome definitions, constraining direct comparisons across studies. Prospective randomized controlled trials in jail and prison settings are relatively scarce due to ethical, logistical, and regulatory barriers, resulting in reliance on retrospective observational studies and quasi-experimental designs for many interventions. Finally, while emerging precision-medicine and digital approaches show promise, empirical data on long-term effectiveness, cost-effectiveness, and scalability in correctional environments remain limited, underscoring the need for pragmatic, equity-focused implementation research.

8. Conclusion

Substance use disorders in correctional settings are chronic, relapsing conditions rooted in biological vulnerability, trauma exposure, and systemic inequity. Correctional health systems must evolve from crisis-driven responses toward a coordinated continuum of care integrating universal access to medications for opioid use disorder, evidence-based psychotherapies, peer- and faith-based supports, and robust reentry planning.

Bridging science, compassion, and policy can reframe incarceration as a foundation for recovery and reintegration. National initiatives such as Medicaid Section 1115 Reentry Demonstrations and NIC-guided behavioral health frameworks embody a shift toward continuous, equitable, and evidence-driven care. Looking ahead, transforming correctional SUDs treatment will require integrating pharmacologic, psychosocial, digital, and precision-medicine tools into seamless systems that bridge custody and community. By doing so, correctional institutions can be reframed from revolving doors of relapse into promoters for recovery, reintegration, and health equity.

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Conflicts of Interest

The authors have no competing interests to report.

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