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Emerging Biopsychosocial Models of Care for Psychostimulant Disorder Prevention and Treatment

Rachel Blanton

ABSTRACT

Psychostimulants remain a concern for providers and communities across the country as overdose rates continue to climb and treatment options remain limited. The use of psychostimulants and associated mortality is intertwined with the opioid epidemic and the fact that stimulant use disorder (StUD) remains one of the few substance use disorders without an FDA-approved pharmacological intervention. As a result, providers and stakeholders are increasingly utilizing a biopsychosocial approach to identification, treatment, and management of this complex and serious condition, and there remain opportunities to enhance the complementary approaches to care and policy related to StUD.

Keywords: Biopsychosocial model, Stimulant use disorder, Contingency management, Naloxone co-prescribing, Harm reduction measures

Background

Stimulant use disorder (StUD) is the condition in which the continued use of stimulants (cocaine, crack, methamphetamine, prescription drugs) causes clinically significant impairment or distress.¹ Associated medical and psychiatric harms associated with StUD include but are not limited to psychosis, agitation, severe anxiety, depression, cardiovascular issues (e.g., arrhythmias, myocardial infarction, and cerebrovascular accidents), infectious diseases (e.g., HIV and hepatitis), and dental problems.² Annual hospital costs related to amphetamines increased nearly 500% between 2003 and 2015 (\$436 million to \$2.17 billion).¹ Annual rates of primary cause of admission due to stimulant use increased by an average of 8.8% per year between 2010 and 2017, with opioid admissions with secondary stimulant use increasing at 24.3% per year over the same time period.³ Current deaths attributed to stimulant use are also at the highest rate in history and are increasing annually at an alarming rate.⁴

Use of stimulants causes brief euphoria, mania, and wakefulness by increasing the availability of free dopamine within the brain.¹ However, repeated use increases the risk of developing substance use disorders (SUD) through the development of tolerance in the (1) acute intoxication/binge; (2) withdrawal; (3) anticipation/craving cycle. This makes cessation of psychostimulants extremely difficult, even with substantial clinical intervention. Recent data shows that within 1 year of intensive treatment, approximately 50–60% of individuals relapse.⁵

Unlike treatment for opioid use disorder, tobacco use, and alcohol use disorder, there is no FDA-approved medication for StUD treatment. As a result, current approaches center on behavioral interventions and supports (Figure 1).

Implementation of best practices related to identification and treatment is more important than ever with overdose rates related to stimulants increasing over the past 10 years. In fact, the age-adjusted rate of drug overdose deaths involving psychostimulants increased more than 34 times from 2002 (0.3) to 2022 (10.4).⁶ This can be attributed to a combination of factors including the adulteration of stimulants with opioids, particularly synthetic opioids such as fentanyl, and the increasing potency of stimulants.⁷ Thus, while overall prevalence rates of use and use disorders related to stimulants remain relatively low, they are of significant concern (see prevalence data in Figure 2).

There are distinct utilization patterns based on the substance of choice within the stimulant category. Among adults, methamphetamine use is correlated with male sex, 26+ age, low education attainment, income less than \$50k per year, Medicaid or no health insurance, and residence in small metro or non-metro (rural) communities.³ Cocaine use is correlated with male gender, 18+ age, Hispanic ethnicity, income less than \$20k per year, polysubstance use, a history of suicidal ideation, and residence in large or small metro communities.⁹ Finally, prescription stimulant misuse is correlated with 18–25 age, white non-Hispanic race/ethnicity, diagnosis of attention deficit hyperactivity disorder (ADHD), a history of mental health comorbidities, and relatively low peer social connection.¹⁰ Key utilization trends show generally lower usage among younger individuals (12–18 years old), but prevention, identification, and treatment of StUD in younger individuals is critical given its profound long-term impacts on brain development during this developmental period.¹¹ Among all individuals with long-term use, permanent damage to major body systems can occur including the brain, cardiovascular system, and dental health.¹

In the last 10 years, there has been a major push among care providers and healthcare researchers to incorporate biopsychosocial models of care in the treatment and management of patients with StUD to prevent these harms. The biopsychosocial model of addiction considers the combination of factors in the development of SUD including genetic, biological, psychological, and cultural features, and calls for all of these factors to be considered in the treatment of SUD in general.¹² The relationship between StUD and social determinants of health (SDoH) and psychosocial factors can be mutually destructive. The physiologic and psychological/behavioral symptoms of chronic stimulant use can further degrade psychosocial functioning such as depression, paranoia, apprehension, extreme fatigue, poor hygiene/self-care, skin disorders, hair loss, impaired sexual performance/reproductive

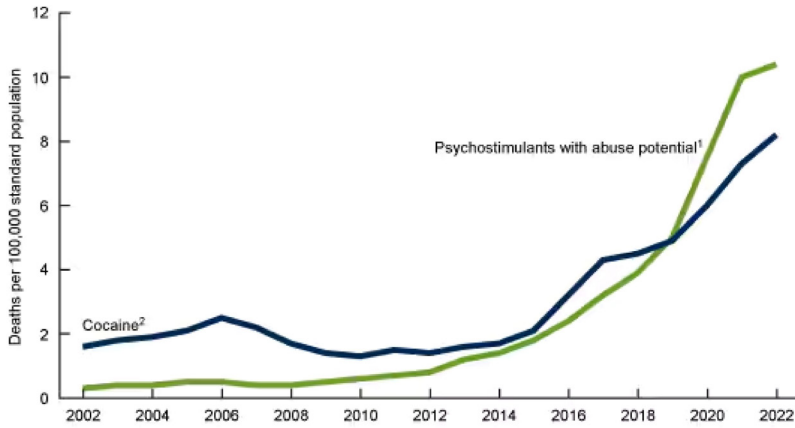
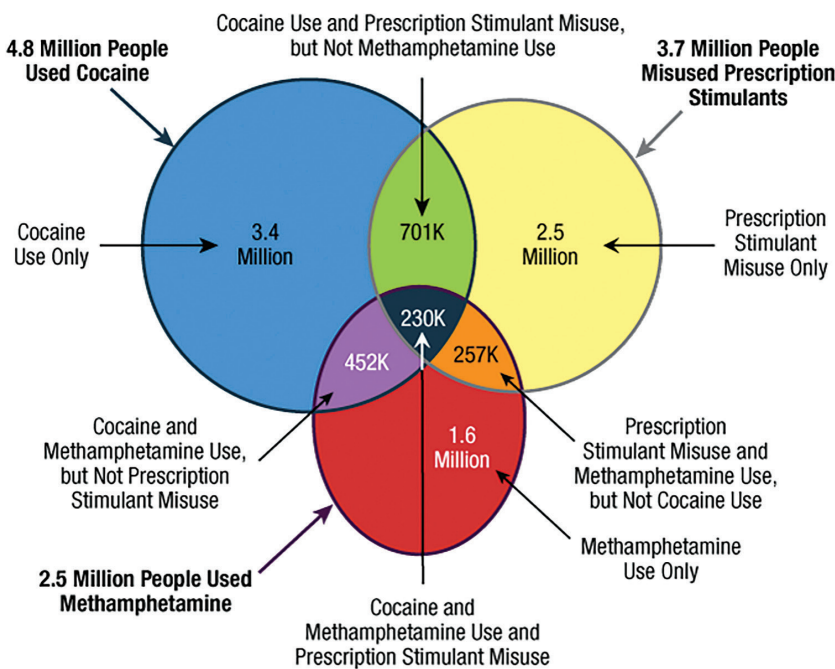


Fig 1 | Overdose deaths involving stimulants by type of stimulant (2002–2022). Republished from NCHS in Public Domain⁴



9.2 Million People Aged 12 or Older with Past Year CNS Stimulant Misuse

Fig 2 | Stimulant use rates in the United States. Republished from SAMHSA report from public domain⁸

functioning, and oral health conditions.¹ Key SDoH drivers of stimulant use initiation and use disorder include low access to healthcare, low economic resources, and poor social connections.¹² As a result, current literature supports a combined psychological and behavioral approach in the biopsychosocial model.¹

Current Recommendations

1. Utilize contingency management where current policies allow with complementary psychosocial interventions

Systematic reviews of the literature consistently show the most promising clinical intervention for StUD is contingency management (CM) and CM plus complementary psychosocial treatments.⁶

CM is the practice of providing a supplemental incentive for remaining abstinent and/or participating in treatment activities and has been demonstrated to be an effective intervention for treatment in a variety of SUD.¹³ Utilization of contingency management may include activities such as offering a cash payment for a negative drug screen, providing childcare supplies for attendance at a mutual aid group, or a lottery system for those participating in a treatment program. Despite their demonstrated efficacy, CM programs have been limited based on regulatory guidelines, stigma, and funding but have been widely adopted by the US Veterans Administration Health System.¹⁴ Lack of widespread adoption of CM can be attributed to a variety of factors including high levels of stigma-characterizing CM as “paying people not to use drugs” and funding preferences for direct pharmacological intervention versus psychosocial supports within the U.S. health system.¹⁴ Combined approaches with cognitive behavioral therapy (CBT) and CM also show a strong evidence base. CBT is a treatment technique based on the identification of negative thought and behavioral patterns and a focused approach to changing underlying thoughts that result in undesirable behaviors.¹⁵ This combined approach has been shown to significantly improve retention in treatment in particular.¹⁶ However, it is important to note that there is not a strong evidence base for psychological treatment interventions alone (CBT, psychodynamic therapy, motivational interviewing, etc.) in promoting long-term abstinence. Studies exploring the impact of intensive motivational interviewing (MI) versus standard MI have found no impact on treatment duration and abstinence.¹⁷ There is a strong literature supporting these interventions in a reduction of drug use frequency for StUD and related risky behaviors.¹⁶ Thus, there has been a recent call for healthcare communities and treatment providers to consider these reductions as meaningful outcomes, as opposed to holding a singular goal or outcome measure of abstinence.¹⁸

2. While there is no currently approved medication for the treatment of StUD, all patients identified with StUD or misuse of stimulants should be provided naloxone and overdose prevention/response education

For many other SUDs, medication-assisted treatment (MAT) is considered a standard of care. Yet there is no currently approved pharmacological treatment for StUD.³ Research to date has found limited or mixed results. In a 2021 multisite, double-blind, two-stage, placebo-controlled trial to assess naltrexone (380 mg every 3 weeks) and bupropion (450 mg per day) regimens against placebo, there was a minor but not significant impact on treatment outcomes.¹⁹

Some studies have found negative effects for antidepressants and disulfiram in people with StUD and opioid use disorder (OUD).²⁰ The

American Society for Addiction Medicine does describe potential off-label therapeutics in the treatment of StUD but provides the caveat that these have not been evaluated or approved by the FDA.²¹ Therefore, additional research and development related to pharmacologic treatments for the primary treatment of StUD is needed.²² Of note, it has been well-established that anyone being treated for StUD should be provided naloxone and education on opioid overdose response given the significant influx of synthetic opioids into the stimulant supply and the increase in polysubstance use.²¹

3. Primary care providers should be provided education on appropriate screening and referral tools, alongside stigma reduction to support patients

Primary care providers are often at the frontlines of identifying SUDs and providing appropriate care/referrals. This is particularly true for StUD, where the patient community tends to have a lower-than-median income and either public insurance or no insurance, reducing their access to more specialty care resources.¹⁰ Unfortunately, primary care providers consistently rate their comfort with treating methamphetamine use as much lower than for treating other SUDs such as OUD.²³ Yet, there are relatively straightforward guidelines for primary care providers based on the screening, brief intervention, referral to treatment (SBIRT) model that have been shown to reduce drug use post-SBIRT administration.²⁴ The SBIRT technique includes screening, brief intervention, and referral to treatment as a first-line identification of SUD, typically in the primary care setting. The stepwise actions recommended by SAMHSA include (1) screen for substance use; (2) if the screen is positive, utilize SBIRT technique; (3) mild to moderate use: education and MI combined with offered peer support services can be beneficial, or if use is severe, refer to a licensed mental health service and/or SUD treatment provider (other tips: follow-up on referrals, utilize a “warm hand-off” when possible, offer education

specifically on the dangers of stimulants laced with opioids and how to utilize naloxone) (Figure 3).²⁴

Other considerations for primary care providers include offering sexually transmitted illness testing due to higher than community average rates in the StUD community, providing naloxone and education to prevent overdose deaths, and working with psychiatric providers to manage any symptoms of acute psychosis.²³ Providers should also work to address co-occurring mental health conditions in the StUD population. These occur at a higher rate than in those who use stimulants as compared to the general population.¹

In addition, healthcare systems and public health groups should aim to provide support to primary care providers to reduce stigma. Experts in the field of provider stigma have noted, “Research consistently demonstrates that healthcare professionals’ attitudes towards patients with addiction problems are often negative and may adversely impact service delivery.”²⁵ While education regarding stigma and neurobiology of addiction can provide mild reductions in stigma, the most significant improvement has been observed through facilitated relationship development and connection to people with SUD.²⁵ This is important given that provider rapport has been identified as an independent predictor of treatment success. In fact, in a study of in-patient methamphetamine treatment programs, positive care team rapport increased abstinence by up to 45%, where treatment duration had to nearly double to 13 weeks of care to achieve a similar improvement in abstinence rate of 43%.²⁶

4. Include social and community connections in clinical treatment and community prevention/response plans

In consideration of the biopsychosocial model of SUD, it is critical to manage StUD at the social and community level. SAMHSA has recommended involving families and close social connections in treatment at the primary and specialty levels of care as appropriate and with patient consent.²⁷ The community reinforcement model (partner of a person with a StUD engaged in therapy, participation in mutual aid groups, etc.) has also been identified as an understudied but high-potential benefit intervention with the most benefit when combined with CM.²⁸ Avoidance of social situations, environments, and individuals associated with drug use has also been shown to reduce the risk of relapse.²⁹ Peer recovery support services can provide another layer of support for those in treatment and recovery. This model staffs people with lived experience as patients with SUD to provide mentoring, education, and support to those in treatment and has been shown to mildly enhance recovery priming, recovery initiation and stabilization, and treatment engagement.³⁰ This can be done in traditional treatment or broader community settings and has been shown to generally improve recovery rates for those with SUD.³¹

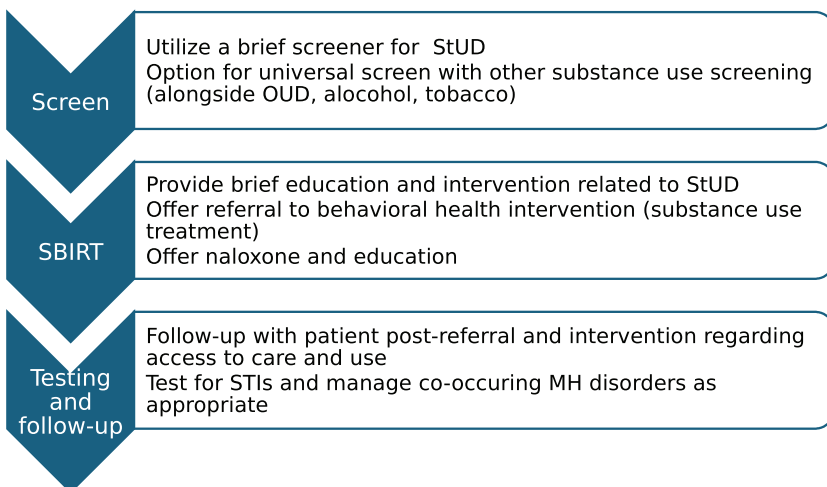


Fig 3 | Primary care workflow for StUD screening and intervention¹

In addition, housing and family impact are of particular note when working with people with StUD. Recent studies have found that housing status independently predicted relapse among women where mental health status, income, and food security did not.³² Family status is also an area of concern given the benefits of positive family interaction on recovery and well-being.²⁷ It is also extremely fragile for people with StUD. People who use methamphetamine are at particular risk of remaining separated from children who have been taken into foster care due to parental substance use. At 210 days post-separation, only 8% of families with methamphetamine-using guardians have been reunited compared with 22% of families separated due to alcohol use and 13% of families separated due to polysubstance use. This is likely due to these parents/guardians consistently receiving a higher “risk score” from Child Protective Services, despite evidence suggesting no greater harm to children as compared to other parental substance use.³³ Within the population of StUD patients with children, perinatal women should receive additional consideration. ASAM recommends utilizing a multidisciplinary care team to care for the parent and child/fetus given the potential impacts of StUD on infant development and health and the complex legal/custody ramifications of a positive laboratory confirmation of stimulant use.²¹ Given that social capital and connection are protective factor in recovery, family separation can be considered a risk. Thus, a wrap-around approach to not only medical care, but additional supports should be considered as best practice (Table 1).³⁴

“While the meta-analyses show that there is less strength for biopsychosocial intervention in significantly improving long-term total abstinence, it is important to note that the National Institutes of Health (NIH) has recently indicated that total reduction in use is a meaningful outcome. Those who reduce their use, have fewer symptoms of depression, lower drug cravings and reduced complications related to drug use. Thus, interventions that achieve this aim should be considered a valuable treatment tool, even when the evidence does not demonstrate a significant impact on absolute abstinence.”¹⁸

5. Harm reduction and drug use reduction should be considered meaningful outcomes of treatment and recovery

While many studies utilize long-term, total abstinence from stimulants and other substances as the

gold standard for treatment and recovery success, the NIH has recently called for a consideration of other harm reduction and utilization reduction measures as meaningful outcomes in research and treatment.¹⁸ As clinicians, researchers, and policy-makers look to evaluate interventions and supports, this could broaden options for care and provide more diverse alternatives depending on the needs and resources of the patient and community.³⁵ For example, a qualitative assessment of the recovery pathways of long-term methamphetamine users found that the majority in recovery for greater than 1 year used replacement substances in a “non-problematic” manner as a tool for recovery maintenance. Less than 15% of participants in the study fit the traditional model of total abstinence from all substances.²⁹ At the same time, as previously noted, there are multiple psychosocial treatment modalities with relatively weak evidence for promoting long-term abstinence that have also been shown to have a stronger effect on reduced drug use, reduced injection of substances, and decreased risky sexual behaviors.⁶ This reframing has the potential to increase adoption of supports such as CM and social supports based on harm reduction impacts and overcome barriers to implementation related to stigma. Thus, broadening future research and treatment goals to include harm reduction measures should be considered in the context of patient impact and intervention development.

Future Directions

Current research, policy, and treatment trends point to key areas of research including expanded access to CM programs, development of pharmacologic interventions, primary care training and engagement, expanded co-prescribing of naloxone for StUD patients, policy development to support social needs of individuals with StUD, and utilization of additional harm reduction measures in StUD utilization research. Each of these areas is summarized below.

Access to CM Treatment

Despite the significant evidence pointing to CM as a best practice for reducing relapse and promoting engagement in treatment for StUD, it shows relatively low implementation due to policy and funding barriers.¹ Policymakers and public/commercial payers should work together to reduce these barriers to this high-evidence intervention by removing existing ceilings to payments, provider and policymaker stigma related to CM, and the bureaucratic program administration obstacles.

Development of Pharmacologic Interventions

As previously stated, StUD is unique among other SUDs in the lack of approved medications for MAT to complement other treatment and support interventions. Fortunately, there is emerging research showing marked differences in brain activity among those who are most prone to StUD relapse.⁵ This presents a promising option for pharmacologic development in the future.

Table 1 | Parental substance use and reunification post foster care placement

Time From Placement In Foster Care (Days)	% Of Families Reunified After Foster Care Placement			
	Alcohol Only (%)	Other Drug Only (%)	Methamphetamine Only (%)	Polysubstance (%)
210	22	13	8	13
360	39	28	27	27
480	49	41	4	38

Presented as data from Lloyd and Akin, 2014³³

Primary Care Engagement and Training

There have been immense strides in the past 20 years to engage and activate primary care related to OUD prevention, identification, and treatment. A similar model could prove highly effective in the prevention, identification, and treatment of StUD.³⁶

Co-prescribing of Naloxone for People with StUD

While naloxone is not considered a direct treatment for stimulant overdose, it is critical given the polysubstance use (intentional) and the increase in the lacing of stimulants with opioids, particularly strong synthetic opioids (unintentional).¹ This will help reduce the overdose death rate that continues to climb in the United States.

Policy Development to Support Social-Ecological Context for Treatment and Recovery

As previously noted, social and community context is often inexorable to StUD. Researchers should continue to explore these connections to provide policymakers with data regarding key SDoH related to StUD such as housing and family connections.

Harm Reduction as a Meaningful Outcome in Research and Treatment

This publication aligns with recent calls to increase emphasis on harm reduction measures as meaningful outcomes for the treatment of StUD. While abstinence should continue to be pursued, other outcomes related to frequency/dose, utilization route, and other risky behaviors should be included as measures.

Conclusion

The burden of StUD has increased significantly in the past 20 years. While research into this condition has continued to improve, clinical care and policy guidelines have remained relatively stagnant. Thus opportunities to improve research, practice, and policy should be pursued to reduce the impact of StUD on individuals and communities.

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