

**PAYING FOR CHANGE: AN ETHICAL ARGUMENT FOR THE USE OF
CONTINGENCY MANAGEMENT IN THE TREATMENT OF SUBSTANCE USE
DISORDERS**

by
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ABSTRACT

The United States is facing a profoundly damaging crisis related to a substance use epidemic. Contingency management (CM) in tandem with standard therapies for substance use disorder (SUD) is a practical, yet largely unembraced, therapy for which an ethical imperative exists for its adoption. The efficacy of CM in promoting sustained abstinence across a wide array of SUDs has been well demonstrated. The upfront and maintenance costs of widely implementing a CM-based SUD treatment strategy will produce a substantial positive return on investment. The most potent barriers to widespread adoption of the addition of CM to SUD treatment strategies is rooted more in ethical objection to implementation than in pragmatic obstacles. Yet the foundation of these ethical objections lack sufficient force to render them dispositive. A review of the efficacy of CM, its cost/benefit ratio, and the tenuous nature of ethical objections will be explored. CM should be widely implemented as a more clinically efficacious and cost-efficient strategy for addressing the drug use crisis compared to current approaches. In addition, this therapy method, possibly the most successful adjunct to standard therapy to treat SUD, will aid the country as a whole in terms of societal benefits associated with effectively treating people struggling with substance misuse.

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THE CRISIS

Since 1999, nearly a million people have died from a drug overdose in the United States and 19.4% of Americans have used illicit drugs or prescription opioids and stimulants without a prescription at least once.¹ Between April 2020 and April 2021, roughly 100,300 people died from a drug overdose. This marks a 28.5% increase from the same period a year prior.² Recent years have seen consistent growth in death rates.³ This rise is likely to be significantly attributable to the current Covid-19 pandemic and the significant stress that has resulted from it. The drugs most often involved in overdose deaths are opioids (67.8%), cocaine (21.2%), and psychostimulants (20.6%). Licit, or legal, drugs or substances are also responsible for significant harm to the wellbeing of Americans. While not illegal (except in the states Idaho, Wyoming, Kansas, and South Carolina, where use is fully illegal), alcohol, nicotine, and cannabis can also result in a substance use disorder.⁴

Substance use disorder (SUD) is defined by the DSM-5 as including at least 2 of 11 diagnostic criteria. These eleven criteria revolve around social and interpersonal problems related to use, hazardous use of a substance, features of dependence, and craving for the substance.^{5,6} SUDs not only have substantial impact on individuals, families, and communities, they also impart significant social and financial burden on the US as a whole in terms of health care costs, lost productivity, and costs associated with the criminal justice system.⁷ In 2019, the total estimated cost of SUDs in the US was approximately \$3.73 trillion.⁸ The United States has recognized that the drug crisis represents a significant social and medical problem and has dedicated a massive \$35 billion federal budget (2020) to control the crisis.¹ Despite this significant expenditure, the crisis continues to grow, evidenced by the growing overdose death rate over time which has been increasing sharply in recent years.^{2,3}

Given the immense costs associated with the crisis, an ethical imperative demanding the US government, clinicians, and public health practitioners to seek effective solutions that could mitigate the tolls associated with substance use and overdose has emerged. Current death rates highlight the failure of our current treatment and law enforcement programs to control this epidemic. The reasons for failure are several-fold, including insufficient access to treatment, stigma against effective medications, employment of treatment modalities with limited efficacy, a focus on punishment in preference to therapy, a legislative and popular view of drug addiction through a lens of morality instead of a national health, social, and economic crisis, and a national focus upon control of drug supply instead of drug demand.^{9,10} Fortunately, there are effective preventive strategies and treatments for some SUDs that are affordable and deployable on scale to meet the moment. FDA-approved medications employed appropriately for addiction treatment can be highly effective. However, not all substance types have an effective medication treatment.^{11,12,13} Substances that do not yet have approved pharmacologic treatments for use disorders include cocaine, methamphetamine, and marijuana. However, psychotherapy, in particular cognitive behavioral therapy (CBT), is endorsed for the treatment of all types of SUD.¹²

For those who receive treatment, relapse remains a substantial risk many years after initial ‘recovery’. It is estimated that as many as 85% of people relapse, returning to drug use within the year after their treatment and roughly $\frac{2}{3}$ of people in recovery relapse within weeks or months of initiating treatment.¹⁴ Opioid use disorder has been found to have the highest relapse rates of all substances. A study has estimated that 90% of people recovered from OUD will relapse, with at least 59% of people relapsing within the first week following treatment “completion” and 80% relapsing within a month following discharge from a detoxification

program.¹⁵ Studies vary significantly on relapse rates for alcohol use disorder (AUD) and have been found to be anywhere from 20% to 80%.¹⁶ An estimated 24% of people relapse to weekly cocaine use following treatment.¹⁷ Within a year following treatment for methamphetamine use disorder, 61% of people relapse.¹⁸ Relapse rates can vary greatly by substance and by study, however, it is clear that overall, relapse rates for substance use disorder are substantial. The failure of our current treatment modalities to more consistently prevent relapse represents one of the greatest shortcomings in our current approach to treating SUDs.

The severity of the drug use and overdose crisis calls for a monumental societal and governmental response. At a minimum society is obligated to employ all effective and affordable tools to mitigate the crisis. CM is one such tool but is vastly underutilized. Careful scrutiny of the principles of CM, its demonstrated efficacy, its cost-benefit ratio, and a review of barriers to effective deployment will bear directly upon an ethical imperative to more systematically and broadly implement CM programs in the treatment of SUD.

CONTINGENCY MANAGEMENT

Contingency management is a type of behavioral therapy derived from operant conditioning principles. CM provides tangible (e.g., monetary, coupons, small prizes) reinforcement upon confirmation of treatment medication adherence, treatment session attendance, and/or drug negative urine samples. The idea to utilize CM for addiction therapy comes from the realization that operant conditioning plays a powerful role in SUDs. Utilizing the same learning principles to ‘unlearn’ behavioral tendencies is often an effective tool in eliminating habitual substance use.^{19,20}

This method of learning, described by psychologist B.F. Skinner, rewards and/or punishes behaviors to condition a subject to adopt some target behavior. Through this conditioning or learning, an association is made between a behavior its consequences.^{19,20} CM was created after the realization that reinforced operant behavior seemed to epitomize substance use disorders.¹⁹ The short term rewards of drug utilization can be vast, providing psychological or emotional relief from pain or suffering or providing euphoria or other pleasurable sensations.^{21,22} This relief or satisfaction then disappears upon cessation of use, leading to a return of feelings of pain, suffering, boredom, or hopelessness, essentially punishing the individual for discontinuing the use of the substance. Intuitively, these rewards would be sufficient to promote a continuation of use. Once physically dependent on a substance, the phenomenon of withdrawal further punishes cessation of use, once again reinforcing the behavior of substance use. This realization led to the idea that the same type of conditioning that led to repetitive substance misuse may be able to be utilized as a treatment for addiction/SUDs.¹⁹

There are two main types of CM that are commonly compared: prize-based (PBCM) and voucher-based (VBCM). PBCM involves drawing a prize from a prize bowl when a desired behavior is demonstrated. Prizes are tangible and receipt is immediate or almost immediate. VBCM rewards contingencies with a voucher which can later be converted to some amount of money after demonstrating the desired behavior.²² Since PBCM involves more concrete and more immediately available rewards it has been shown to be more effective in treatment compared to voucher rewards. The shorter length of time between receiving the reward and the immediate tangibility of the reward likely lead to lower discounting of its value compared to drug use by those with SUDs.^{22,23} Since PBCM utilizes short term rewards, it engages deliberative decision making and small rewards seem to be highly effective in those who have

impaired future-minded decision-making.²³ The greater efficacy of PBCM compared to VBCM implies that people with addiction have more difficulty thinking of long-term outcomes and are more focused on immediacy than typical non-addicted individuals. Just as addictive substance use produces near immediate reward for the user, a counter-mechanism that similarly provides near immediate gratification would be a more promising approach to treatment compared to delayed reward. Similarly, the addicted individual continues in their short term pursuit of drug based reward despite the tremendous and clearly evident delayed adverse consequences associated with substance misuse (substance-related physical and mental health issues, loss of job, family, fortune, etc.).²¹

While CM does rely on classical learning theory, it is likely that multiple decision making pathways explain the effectiveness of CM for people with SUDs. CM is able to encourage drug use behavior change through dual-processing, which proposes that there are two separate decision-making components, one impulsive and the other more rational. CM arguably activates this deliberative decision making and improves one's ability to engage this deliberative decision-making process.²²

PBCM typically consists of drug testing twice per week. Increasing opportunities to win prizes occurs with each subsequent negative urine sample (or subsequent treatment session attendance, or demonstrated continuation of medication adherence). Participants can earn additional draws from the 'prize bowl' up to a certain number of draws (for example, eight draws maximum at one visit). The classic prize bowl or fishbowl contains 500 slips. Half of the slips have encouraging words on them (for example, "Great Job!") and the other half are associated with a monetary prize, ranging from small (for example, \$1) to medium (for example, \$20) to large (\$100). When a patient provides a drug positive sample (or does not attend a scheduled

therapy), the number of draws allowed from the bowl resets to one once they meet the required behavior upon the next visit, with the number of draws escalating for subsequent recurrent achievement of the target behavior. The recommended duration of CM treatment is typically 12 weeks.²⁴ A schedule including an escalating magnitude of reinforcement for consecutive abstinence and a reset of reward amount upon submission of a drug positive sample is the most effective.²⁵ The intervention is highly modifiable to the needs and capabilities of the patient and provider.²⁶ Different targets for therapy can be used, such as provision of drug negative biological samples, attendance to group therapy sessions, or medication adherence for SUDs.^{19,24} There is evolving work to make CM even more modifiable through the use of technology to supplement some aspects of CM. Videoing utilization of portable breathalyzers and sending it to the CM clinic, delivering CM prizes through a mobile app, utilizing computer-based CBT, and remote monitoring of medication adherence at home (biosensors or electric pill-bottle monitors) have all been studied as effective interventions improving SUD treatment outcomes.¹⁹ Despite the impressive modifiability of CM interventions, it should be noted that a failure to adhere to some of the core behavioral principles of effective CM will likely result in non-ideal treatment outcomes.²⁷

Sizeable evidence in favor of CM continues to accumulate heralding it as one of the most effective (if not *the* most effective) behavioral therapy for treating SUDs.^{19,20,28,29} A meta-analysis found that treatment utilizing CM was successful in 61% of cases compared to 39% of cases using other types of treatment modalities.¹⁹ A literature review of CM studies between 2009 and 2014 found that 86% of those studies found significant positive effects of CM on treatment outcomes.³⁰ A review of 74 randomized clinical trials involving 10,444 adults receiving medication treatment for OUD, stimulant use disorder, and polysubstance use found

CM was effective in encouraging abstinence from multiple types of substances. Studies measuring abstinence from two or more substances found that 70% of the 23 studies evaluated reported significant increases in abstinence rates and duration in the CM groups.³¹ Notably, CM has been shown to be effective across all substance types.^{19,32,33} Longer lengths of continuous abstinence during treatment are the best predictor of long-term abstinence following treatment.^{19,28,34–37} The addition of CM to CBT in cocaine use disorder treatments improved treatment outcomes as well as outcomes at follow-up (1 year post-treatment).^{38,39} For the treatment of marijuana use disorders, a combination of motivation enhancement treatment (MET), CBT, and CM were found to be the most successful. CM showed significant effects in establishing early abstinence and skills and coping training was associated with the maintenance of that abstinence.³⁶ Similar results have been produced for tobacco use disorder.⁴⁰

Notably, federal agencies such as the Substance Abuse and Mental Health Services Administration (SAMHSA) and the National Institute on Drug Abuse (NIDA) have expressed their support of CM as an efficacious treatment for SUDs. Despite this support, CM—in particular the offering of incentives in treatment—is outlawed or restricted in the amount of incentive that can be given in many cases. This is the case for federally funded programs and several state programs. The incentives provided to those participating in CM treatments are seen as inducements or kickbacks and are thus illegal or frequently restricted. In cases where the maximum total incentive per subject is limited, efficacy is reduced; annual limits ranging from \$75 to \$100 are common in many jurisdictions, values consistently found to be too low to produce positive effects on abstinence and treatment attendance.⁴¹

SOCIETAL MORAL VIEWS

Societal perception of substance use disorder and the individuals that misuse chemical substances forms the bedrock of the legislative agenda and public messaging regarding “appropriate” approaches to the SUD crisis facing the United States. Mental illness and SUD are both recognized as highly stigmatized conditions. Intriguingly, studies have found that the general population tends to hold significantly more negative views toward people with SUDs than people with mental illness. The public tends to be less sympathetic towards people with SUDs and less willing to support efforts to help those with SUDs.⁴² This attitudinal approach to SUD is not a phenomenon limited to the lay public and political class. Medical professionals hold more stigmatized views of SUD than they do of mental illness.^{42,43} A study from 2019 found even behavior analysts responded more negatively to individuals with SUDs than they did to individuals with mental illness, expressing views of stigmatization and acceptance of discriminatory practices against those with SUDs.⁴³ These views are likely highly attributable to an ingrained substantial moralization of addiction.¹⁰

There has been considerable philosophical and scientific debate regarding the true definition and root causes of addiction.¹⁰ This debate is still ongoing. Historically, substance misuse and addiction has widely been classified as a personal moral failing and a lack of willpower.⁴³ This idea, the “moral model” of addiction, places blame solely or largely upon the individual suffering from addiction.^{10,42,43} There are various theories of addiction, which undergird or contradict the moralistic view of substance use disorders. The two most widely accepted models are the “disease model” of addiction and the “choice model” of addiction. Proponents of the disease model contend that addiction is a chronic and relapsing brain dysfunction characterized by a strong compulsion to use a substance. Despite the general

acceptance of the disease model in much of the medical world, some of the behavior of those with SUDs cannot be explained by compulsion. Additionally, the functional and anatomical brain changes noted in some cases of addiction cannot be outright classified as pathological since it is in the nature of the brain to change overtime and in response to stimuli. The disease model has also been proposed as an avenue to combat the intense stigmatization inherent in the moral model of addiction.¹⁰ Unfortunately, evidence of societal views and health care professional attitudes towards SUDs, despite the dominant acceptance of the disease model of addiction in much of the medical and professional psychiatric community, remain highly stigmatized.^{10,42,43}

Proponents of the alternative “choice model” of addiction hold that the common behaviors associated with substance misuse are a function of will and self-control. Many contend that the choice model of addiction provides ample room for beliefs of moralization. However, the choice model need not inherently invoke moralization.¹⁰ It is generally accepted that decision-making processes are impaired in addiction.^{10,22,23} Additionally, root causes and social constructs promoting addiction, such as poverty, social environment, trauma, etc. are strong influencers of behaviors in SUDs and typically cannot be considered subjectable to individual blame.^{10,45,46} Many factors drive individuals to the choice of substance use and substance use may be considered a “rational” choice in the face of social struggles or physical or emotional pain in many circumstances.^{10,21} The stigma evident in the healthcare and behavioral therapy fields impact the quality of care that people with SUDs receive, also leading to disappointing outcomes.^{10,43} Some scientific evidence does contradict the choice model, such as the finding that the decision making mechanisms involved in drug seeking/using behaviors are disparate from those involved in typical decision-making. Additionally, the understanding of addiction as a chronic and relapsing condition does not cogently support the choice model.¹⁰ It is likely that

SUDs cannot be characterized solely by either of these models. It is possible that SUDs could be characterized by a mixture of these, and potentially other models of the root causes of unhealthful human behaviors.^{10,44}

Whether or not SUDs are a brain disease, a choice, or something else altogether, there are established treatments for SUDs that are effective. The most effective combination of treatments (medication, psychotherapy, and CM) should be used whenever possible, regardless of the source of a disorder. Whether SUD can or cannot be classified as a brain disease, behavioral therapies such as CM are highly effective in encouraging abstinence. SUD, likely a condition with a multifaceted etiology, is best addressed with a multifaceted treatment plan, one including CM, counseling, and medication. The barriers erected to effective treatment by placing SUD within a moralistic context have tethered us to an approach to the chemical dependency and overdose crisis that are less than ideally effective.

PUTTING RESERVATIONS TO REST

Concern 1: Why Should We Reward People Who Use Drugs?

Most legislators and much of the public have difficulty accepting a treatment that rewards someone for refraining from an act that is, in many minds, an immoral and/or illegal one. Some people argue that we have no duty to assist, especially not to reward, those for actually abiding by the law or following community standards which are expected of all members of society.^{27,28} Many believe that the utilization of drugs is in itself immoral and thus consider people who use drugs to be immoral.^{10,42,43} It may be further argued that there are other people, who are not partaking in what is considered to be immoral conduct that are also in need of assistance and are thus far more deserving of societal support and reward than those who use drugs. The popular

moralization of substance use fuels this resistance to CM which is often perceived as a reward for immorality.

Substance use disorders are not conditions of moral or immoral behavior but must be viewed from a more holistic standpoint, as complicated disorders often brought about by a multitude of factors—not choice and not biology alone. Despite significant effort to link the use of substances to a single pathway or cause, it is evident that the initiation and continuation of substance use comes about differently for different people.^{10,21,44,46} Poor life circumstances, depression, hopelessness, boredom, curiosity, availability of substances, genetic predisposition, peer pressure, and the immediate rewards associated with consuming substances, all have been noted as important factors in initiating and perpetuating one's use of substances. Considering the multifaceted initiating, potentiating, and perpetuating underpinnings of substance use disorder, it is important to refrain from generalization of a moral root of substance misuse. In the realm of health, our duty should be less about imparting judgment and more about finding and resolving root causes and instituting effective countermeasures to threats to health and national welfare. Utilizing a more compassionate and pragmatic view of people with SUDs can help to humanize and cease demonization of a group that faces a significant struggle and whose struggle has profound detrimental national impact.

With compassion and pragmatism, we may be reminded everyone has made poor choices that may have led to significant adverse consequences. We do not generally question the expenses spent on the treatment of patients with diabetes mellitus despite the knowledge that many of these patients wittingly contributed to the onset and progression of their disease through the willful consumption of an 'unhealthy' diet and lack of exercise. We do not question the necessity of the provision of healthcare to the patient with skin cancer despite the knowledge that

many of those patients developed cancer, at least in significant part, because of their failure to apply sunscreen or their choice to spend excessive amounts of time in the sun. We do not question the importance of encouraging a depressed patient to seek mental health care despite common difficulty in motivating someone who is severely depressed to take actions to obtain help. Many health issues (both physical and mental) are a result of or exacerbated by poor choices that are made.

The understanding that poor health choices play a role in many common physical and mental health conditions should lead us to realize that the person using substances deserves no less compassion and care than the person with diabetes, depression, or skin cancer, or the multitude of other diseases for which intentional behaviors contribute to disease onset or severity.⁴⁴ What frequently seems to hold us back from sufficiently and comprehensively assisting the person with a SUD are views of the morality of the act of using drugs. But why do we view drug use as immoral? Because it is bad for one's health? Because it represents an expression of inherently immoral hedonism? Because it represents a violation of the law? Because it represents a failure of impulse control? It is likely that these ideas represent the underpinnings of a national moral abhorrence of people who use various substances. But what of all the other actions or inactions that are detrimental to health and the result of insufficient will power that often lead to premature death or disability (overconsumption of unhealthy foods, a lack of exercise participation, excessive time in the sun, unwillingness to engage in activities proven to alleviate depression)? What of our failure to overcome other hedonistic impulses such as overeating, overspending, underworking, video bingeing, etc. Are these acts, too, profoundly immoral? While less than admirable behavioral choices, few would contend they are immoral.

Despite the historical tendency to moralize some health behaviors, unwise choices are a common factor contributing to many diseases and disorders.¹⁰ One cannot reasonably expect to broadly label unwise health decisions as immoral. Societal views towards most unhealthful behavioral choices are generally viewed through a lens of wisdom or lack thereof, and rarely is the ethics of such choices questioned or the merit of an individual as a member of our society called into question. Yet, the choice or compulsion to use potentially addictive substances is most commonly scrutinized through the lens of morality. Society, physicians, and politicians should view the person with a SUD just as they view the person with diabetes or the person with depression, as someone in need of care and assistance to overcome or manage an issue that poses a threat to their wellbeing and the economic and social wellbeing of the nation.⁴⁴ Envisioning a world wherein health care decisions are driven in substantial part based upon judgements of a patient's moral worth would seem to be in direct conflict with the deeply held view that essential health care should be available to all. The slippery slope of best therapies reserved for the morally righteous is the path embarked upon when best practice treatments are not adopted or supported because of pejorative views toward those afflicted.

Concern 2: Are Financial Rewards for Abstinence Coercive to the Financially Underprivileged?

Individuals in opposition of the use of CM in the treatment of SUDs cite the potential of incentives with high monetary value to exert coercive power.⁴⁶ It has been suggested that providing financial or equivalent incentives to low income individuals in effect deprives them of true choice and fails to respect their autonomy.⁴⁷ In particular, a majority of those people with a SUD experience the greatest health and social inequalities or deprivations compared to the general population. Using incentives to treat or encourage treatment of SUDs may unduly coerce

these populations to enter a CM program due to their socioeconomic status. Incentives have been found to particularly target disadvantaged populations. Some opponents of the use of CM may say that these interventions are exploitative of those with SUDs who are more vulnerable because of adverse social, mental, economic, or structural conditions.^{44,46} It may be argued that financial rewards for abstinence promote a choice to abstain in the financially stable person with SUD but take advantage of the inability of the financially disadvantaged to resist the financial incentive for participation. This argument hinges on the condition that participation in CM involves a meaningful sacrifice of something good on the part of the participants. If we accept drug use as a “good” or that participation in a treatment program produces unnecessary suffering or risk in those enrolled, then this argument could have merit. However, it would seem difficult to argue that continued substance use represents a “good” or that efforts to embark upon a substance free life represents a sacrifice or risk which is not in the personal interest of the individual with an addiction. Yet, for some, substance use may represent a “choice” and not a “disease” which the victim wishes they could control. For those freely choosing and truly desiring continued substance use, does CM deprive them of autonomy? Certainly, they can choose to not enroll. Certainly, they can enroll and after a treatment course decide, if they wish, to return to their prior state of substance consumption. Offering a financial reward for declination of use to liberate an individual from addiction actually enhances the autonomy of the individual with SUD by providing the resource to overcome substance misuse and then choose, after treatment, which path is best for them.

Importantly, the focus of treatment utilizing CM should not be on the incentives themselves but on the retraining of learned behaviors and the provision of small reinforcements for target behaviors which are genuinely in the personal interest of the participant. The focus of

CM when used to treat SUD is not to provide financial assistance to populations but to combat the reinforcements that people receive from using drugs (euphoria, escape from negative thoughts or feelings, etc.).

Some may argue that the financially disadvantaged are in fact “coerced” into substance use as they may be the most vulnerable population in need of escape from life circumstances which substance use may transiently offer. Offering a modality which aids in overcoming the coercion of drug use and the institutional/social pressures promoting use is not an act of exploitation of said person's social circumstance; it represents a method to enable an individual to overcome the autonomy limitation resulting from addiction and execute a freer choice regarding future use of potentially addictive substances.

There is a relevant fear that those people with SUDs who are particularly disadvantaged will not receive other vital resources when they receive treatment with CM. Many may contend that what these disadvantaged populations truly need is assistance with food and housing insecurity along with many other social services such as job skill training and employment opportunities.^{46,47} If social/economic disadvantage is a major driver of substance misuse, then arguably attacking the root cause is a better approach than attempting intervention after the onset of addiction. However, CM programs need not neglect other social services; in fact, CM programs may provide a convenient venue to provide such services to those populations receiving SUD treatment who are also in need of other assistance. CM programs provide an excellent opportunity to provide people with multiple interventions in a single setting.³³ Simply, CM and other social services are not mutually exclusive of, nor competitive with each other. Substantial governmental and personal funds are already being utilized to deal with the drug crisis by way of medical costs, carceral costs, etc. As will be described subsequently, support for

and deployment of CM programs provides a sizable return on investment such that they should be seen as cost saving not expense expanding endeavors.

Concern 3: Feasibility

There are significant concerns that this intervention is not financially or logistically feasible. Concerns about cost, infrastructure, and time commitments are predominant in objections to the implementation of CM.^{24,26,27,48,49} These concerns should be put to rest by the wealth of evidence supporting the cost effectiveness of CM. First, one should consider some of the breakdown of estimated annual costs associated with the drug crisis.

The Recovery Centers of America (RCA) estimate at the cost of deaths due to substance use to be at least \$2.6 trillion annually; costs associated with lost quality of life around \$386 million, health costs to be at least \$118.5 million, the cost of productivity loss to be around \$206.8 million, and costs associated with crime, law enforcement, and criminal justice to be about \$98 million. These, along with many other tangible (health, productivity loss, research, social services, etc.) and intangible costs (death, lost quality of life, and crime victimization) amounted to an estimated cost of \$3.73 trillion in 2019.⁸ According to the CDC in 2017, the direct economic cost of opioid use disorder alone in the US was \$471 billion and the cost of fatal opioid overdose was \$550 billion.⁵⁰ Finding and implementing the most effective treatment and prevention measures for SUDs will do much to reduce the burdens of the substance use crisis, both societally and financially. Reducing fatal opioid overdose by only 10% through implementing CM would lead to savings of at least \$55 billion each year. This number is only an estimate applicable to opioid use disorder, but applying the most effective treatment (CM, medication therapy if available, and psychotherapy) for SUDs to all substance types would result

in immense savings. However, to truly ensure that cost savings would be evident, it is important to examine just how much CM would cost to implement.

Various studies have deemed CM to be highly cost effective, with the average cost of prizes per person approximating \$200 over a 12-week treatment period (approximately \$17 per week per client).^{19,35,48,51} Additional costs associated with CM programs include the costs of frequent onsite point of care testing, personnel to manage the program, and additional counseling. The total additional cost to implement CM per patient was found to be ranging around \$300 to \$600, varying from clinic to clinic. Olmstead and colleagues note the strong possibility of considerable cost savings associated with the avoidance of crime and reduced health care expenditures and surmise that these cost savings are likely to be significant in other areas of spending associated with SUDs as well.³⁷ Bolívar et al. reviewed 74 randomized clinical trials of CM and found that mean maximum daily earnings for the treatment of various types of SUDs varied from roughly \$10 to \$15 over the course of 7 to 17 weeks.³¹ Murphy et al. calculated the average costs per person to add CM to treatment as usual for comorbid SUD and serious mental disorders costs about \$396 over a 12-week treatment period. They calculated that CM in addition to treatment as usual has an estimated 85% chance of being considered cost-effective to the provider and payer at 12 weeks and an 89% chance at 24 weeks.⁵² A detailed modeling study found that life-time overdoses were reduced by 31% via a combination of buprenorphine plus CM plus opioid overdose education and naloxone distribution compared to no treatment. This was estimated to produce a cost of \$39,000 per quality adjusted life year saved. When accounting for health care and criminal justice costs, between \$15,000-\$90,000 were saved per patient compared to no treatment.⁵³ Thus, true cost-benefit to the nation was

demonstrated for such an opioid intervention program. For reference, it is widely accepted that therapies with a QALY cost of less than \$95,000 are considered cost effective.⁵⁴

A compelling example of the non-experimental large-scale and successful implementation of CM comes from the Veterans Association (VA). In 2011, 56 addiction treatment stations received \$5,000 and 52 stations were allocated funds ranging from \$4,800 to \$26,700 for the purpose of establishing CM programs in addition to standard therapy. These funds were utilized for incentives, urine testing, and other materials related to CM support. It was estimated that each patient would receive an average of \$150 in prizes over the course of 12 weeks, thus, a clinic receiving \$5,000 could treat 30 to 35 patients utilizing CM methods. It is important to consider that most CM programs employing PBCM had a prize cabinet onsite. Additionally, most VAs have Canteens (discounted retail shopping) and thus many CM programs chose to provide gift cards to these stores. Most VA clinics also had a laboratory onsite, making the same day testing that is needed to properly implement CM more practical. These aspects of the VA system made CM implementation considerably more feasible than would be possible at many treatment centers where all infrastructure is not already existent. In mid-2012, the VA dedicated additional funding to CM initiatives after recognizing the promising start of the programs.²⁴ Roughly 4.5 years after the VA initiated the utilization of CM treatments for SUDs, 94 treatment stations have made the therapy available to 2060 patients. Evaluation of these programs has found that the attendance and substance abstinence outcomes were similar to those reported in controlled clinical trials evaluating CM programs and much higher than standard therapy alone.⁵⁵

Concerns about implementation and time commitments can be answered by research outlining possible avenues of implementation as well as investigations into the best training

methods for implementing CM.^{23,24,26,27,32,39,49,55-57} Without proper training, clinicians are unlikely to utilize CM and those who do are likely to implement it in a way that is poorly controlled or standardized. It is speculated that non-ideal implementation of CM treatments in clinical trials is one of the factors contributing to negative results in those trials. These outlier studies failing to demonstrate benefit has resulted in negative views on the effectiveness of CM maintained by some academicians and policy makers who may focus upon the negative outlier. A study on the VA's implementation of CM found that training CM providers over the course of 1 and a half days can be highly effective in altering clinical perceptions about CM and was found to significantly increase the knowledge necessary to appropriately implement CM. While shorter training periods were shown to have positive effects, longer training periods were found to be ideal.²⁷

Practical barriers to CM such as time commitments and funding are likely to persist despite an understanding that CM is an efficacious and cost-effective addition to standard SUD treatment. Every new evidence-based therapy requires time, commitment, education, and funds to implement. The application of CM therapy in conjunction with standard treatment is proven to be more effective than standard treatment alone and repeatedly demonstrated to be extremely cost-effective. If one considers the relapse and general treatment dropout rates across SUDs following standard treatment, costs of additional rounds of treatment following relapse, the costs associated with overdose death, substance-related hospitalizations, and costs associated with the criminal justice system (legal fees, costs of incarceration, stolen/damaged property, assault, etc.), even marginally improving the efficacy of the current treatment approaches for SUDs would save a considerable sum of money. It is evident that the time commitments and additional resources required to employ this treatment strategy will be well worth it. Unfortunately, many

treatment settings will not have access to additional funds needed to start up CM programs. In view of the considerable return on investment that both local and national government is projected to garner from the wide-spread implementation of CM, governmental support of clinics/organizations wishing to provide or continue providing CM therapy is well warranted.

Since cost is cited as such a pressing issue, it is important to note that research has been done on how to make CM, an already cost-effective intervention, even more pragmatic and self-sustaining. Amongst the start-up costs associated with CM is the need to develop systems that monitor the fidelity of CM programs. Such monitoring usually includes audio or video monitoring of and rating of CM appointments. Since monitoring the effectiveness and correct implementation of CM sessions is paramount to assure the best client outcomes as well as increased acceptability and adoption of CM strategies, alternative, less capital-intensive methods to monitor programs are possible. Forms and checklists are a proposed alternative to more intensive fidelity monitoring methods.⁴⁹ While CM has been repeatedly demonstrated to be an effective and cost-effective add-on intervention to standard therapy, such an add-on will not always be beneficial. Selected standard therapy programs are already successful in achieving high abstinence rates and/or consistent treatment attendance outcomes. These highly effective programs may find implementation of CM is not necessary to bolster already successful treatment.²⁴

Emerging innovations in CM delivery and monitoring of patient progress will likely introduce additional avenues to render CM therapies less costly and more feasible and increasingly accessible for patients and practitioners. Attending visits multiple times a week can be a difficult feat for many patients due to busy schedules or transportation constraints. Additionally, maintaining adequate staffing and physical space to meet with patients multiple

times a week can pose a significant challenge.¹⁹ Technology-enhanced CM presents a potential approach to making CM more feasible for patient and provider.^{19,48} While technology-based CM programs are still very much in the initial phases, studies have shown that utilizing technology to promote remote access to fully or partially supplement parts of in-person CM therapies as well as other SUD treatments (for example, online CBT) is effective and has even been shown to be just as effective as in-person modalities in some studies.^{19,26}

Following this somewhat extensive exploration of the cost-effectiveness of CM interventions, it is paramount to understand that the cost-effectiveness of CM should not be what warrants its wide-spread uptake and general governmental and public support. SUDs, just like diabetes, skin cancer, and depression are serious disorders and can be deadly and treatment of each of these disorders merits treatment, cost-saving or not.⁵³ Many widely accepted treatments for other disorders are not evidently cost-saving but are still widely implemented and enthusiastically embraced by public and policy-maker alike.^{53,58}

This discrepancy in attitudes towards costs associated with treatment for people with SUDs versus those with more ‘mainstream’ health issues (diabetes, cancer, even mental health disorders despite their stigmatization, etc.) likely reveals that society, government, the healthcare sector, etc. value healthcare for other conditions far more, even if that healthcare does not produce a tangible positive return on investment. An objection to CM based upon its upfront costs may indicate that the expenses associated with CM is not truly the primary barrier to implementation, rather that pejorative judgments about people with a SUD is likely the primary driver preventing acceptance of evidence-based and financially sound treatment strategies. While it is understandable that many smaller clinics may be daunted by the start-up expenses posed by CM implementation, many large clinics, medical groups, etc. have not adopted CM as part of

their treatment strategies despite employing other treatments for disorders that are frequently cost ineffective. It will be important for the government, policy-makers, and providers to truly understand the root of what is actually holding them back from initiating CM procedures for the treatment of patients with SUD.

Concern 4: Risks of Recidivism

A common concern of those who are skeptical of the success of CM treatments revolves around the durability of remission and perceived very high rates of relapse.^{24,28,32,33,46} Relapse is accepted as a common feature of recovery from SUDs, and it is important to consider the significant danger associated with drug relapse, which can be deadly.⁵⁹ While research does show that the positive outcomes associated with CM treatment do fade somewhat following the cessation of treatment, the waning of benefit overall does not appear to be significant.³⁰ Importantly, despite a substantial incidence of relapse following CM treatment cessation, these relapse rates (typically measured months to a year following treatment) are far lower than those noted following other standard SUD therapies. Moreover, this cannot serve as an argument against the use of CM, rather an argument to sustain the CM treatment longer than initially intended or to add other maintenance therapies following CM completion so as to assure a more sustained remission of the substance use disorder. Interestingly, relapse of significant symptoms of medical illness following cessation of medication adherence is regarded as evidence of the effectiveness of treatment and the importance of maintaining long-term treatment but in the treatment of SUDs relapse is seen as a failure and evidence of the ineffectiveness of treatment.⁴⁴

Unfortunately, most studies assessing the outcomes of SUD treatment with CM have focused on short term effects, analyzing compliance or abstinence at the end of the intervention

or 4 weeks later. A large meta-analysis conducted by Ginely and colleagues including 23 randomized trials assessing longer term outcomes of CM found that 24 weeks post treatment the rate of abstinence was 22% higher in patients enrolled in CM programs compared to standard therapy.³² CM, when compared to other psychosocial interventions is associated with superior long-term outcomes.¹⁹ This may be because CM has been established as a treatment that can increase the longest duration of continuous verified abstinence or simply longest duration of abstinence (LDA) during SUD treatment, and this LDA is strongly predictive of long-term treatment outcomes.^{19,24,35,36,37} In a study of treatment for cannabis use, motivation enhancement treatment (MET) with CBT and CM resulted in the highest abstinence rates at follow-up eleven and fourteen months later compared to all other treatment conditions. This study also reiterated that early abstinence was a key outcome of CM and that skills and coping training for patients helped to maintain these effects.³⁶ Other clinical trials have found that the reductions in drug use associated with CM are maintained at 12 to 18 months post-treatment.¹⁹

Importantly, expectations of treatments for SUDs do not align with the expectations of treatments for other chronic issues. While the high relapse rates following treatment for SUDs are notable, other very common chronic health concerns have similar recurrence rates of symptoms. Investigations have shown that fewer than 60% of patients with diabetes adhere to their medication regimens fully and less than 40% of patients with asthma or hypertension adhere to their medication schedules. Even more drastic, less than 30% of adult patients with diabetes, hypertension, or asthma follow the prescribed diet and behavioral changes designed to mitigate their disorder and reduce the rates of recurrence. Studies of outcomes in these patients have found that 50% to 70% of adult patients with hypertension or asthma and 30% to 50% of adult patients with diabetes have recurrent symptoms yearly, to the point where they must

receive additional treatment to reestablish control or remission of symptoms.⁴⁴ Despite these significant recurrence rates, medical treatments and behavioral change methods are widely accepted as effective treatment. These stark similarities between some common chronic medical conditions and SUDs should spark some puzzlement as to why medical treatments for SUDs are commonly viewed as failures given the high incidence of relapse. It is almost unfathomable to view the relapse of severe manifestations of diabetes or cardiovascular disease or asthma after treatment cessation as proof of the failure of such treatments. Rather for these diseases, relapse after therapy cessation is viewed as proof of therapeutic efficacy. For some reason, most prefer to view SUD treatment in the direct inverse. Risks of relapse are unlikely to be what has truly convinced many that those with SUDs should not receive evidence-based treatments like CM. Once again, the omnipresent moralization of drug use most likely plays a predominant role in this dichotomy. To reconcile this disparity, scientists, clinicians, and the public must work to reconcile deep rooted judgments about those who use substances and determine whether poor choices really should influence determinations of merit when it comes to the provision of evidence-based treatments. Upon reflection, it should become evident, for numerous reasons, that “poor choices” cannot influence the provision of health care to those who would benefit from it. If it did, most people with diabetes, skin cancer, hypertension, etc. would not be ‘deserving’ of life improving and life-saving medical care.

Concern 5: What about those left behind?

It is important to acknowledge that despite the availability of medication and psychotherapy treatments for SUDs, many individuals with SUDs go without any form of treatment at all. Adding CM to standard treatment will not help the population of patients that currently do

not access any SUD therapy. It is of the utmost importance that treatment access is greatly improved to reach underserved populations and that patients and providers become fully aware of the added effectiveness of CM in the treatment of many SUDs previously resistant to available treatment. Expanding treatment access to all who are interested in receiving therapy should be a national goal. However, the limited accessibility of treatment to certain individuals or groups cannot serve as an ethical argument against the adoption of treatment enhancements where it can be made accessible. A lack of universal availability of SUD treatment is truly problematic. A contention that limited abilities to distribute CM to all persons with a SUDs renders creation of such programs discriminatory or unfair is tantamount to claiming that any and all disease treatment is unethical unless it is distributed to all.

CONCLUSION

The national drug use and overdose crisis has taken a severe toll on the wellbeing of many individuals and of the nation as a whole. SUDs rob victims of quality of life, economic and job security, personal health and welfare, and they take a profound emotional and financial toll on family and friends. The national crisis is forcing tremendous national expenditure on health care and law enforcement which could be spent better elsewhere for the good of the populace. Various evidence-based treatment modalities are available for most types of SUDs. However, there are very high short-term and long-term issues such as relapse rates with each of these approaches. Efforts to determine and deploy the most cost-effective methods to enhance durable SUD remission should be considered a financial and moral imperative.

Numerous small and medium sized clinical and observational trials have been performed assessing feasibility, cost, and short- and long-term impact of the addition of CM to standard

therapies for SUDs. These studies consistently demonstrate a relatively low cost for the addition of CM per patient treated and substantial improvements in short-term and long-term impacts of the addition of CM to standard therapy. Other studies demonstrate an almost certain substantial positive return on investment in a very short period of time when CM is added to standard treatment. This return in investment comes in many direct forms—in reduced health care costs, reduced criminal costs, and enhanced productivity. The indirect costs of emotional and financial damage to families are difficult to calculate but must be entered in some way into a calculus of assessing the benefit of enhanced SUD treatment.

Moreover, whether substance use hinges upon choice or a biological/social origin, the morality of SUD is essentially irrelevant when seeking best methods of treatment. A wide ranging list of ‘diseases’ have substantial roots in chosen behaviors, genetic background, and social circumstances. For virtually all of these diseases/conditions (for example, diabetes mellitus, skin cancer, lung disease, heart disease, and many psychiatric disorders) the national imperative to provide treatment and prevention is essentially never questioned. Furthermore, a positive financial return on investment is not seen as essential for these diseases. The high morbidity and mortality of these disorders is consistently viewed as the justification for full throated and full funded treatment approaches. SUD is no different with choice, biology, and social construct contributing to the condition. The need to offer effective therapy for SUD is no different than the need to find and provide effective therapy for diabetes, heart disease, and cancer.

More work remains to be done regarding how to enhance accessibility to CM and further reduce cost via the use of new technologic methods better enabling remote evaluation and treatment. Ongoing research is needed regarding the ideal length of CM treatment, how to extend

therapeutic benefit duration, and how to best individualize treatment to maximize efficacy dependent upon each patient's individual circumstances and needs.

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