

The Opioid Epidemic Misunderstood (appeared in *Skeptic Magazine*, March 2019)

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Drug overdose is now the leading cause of death for Americans under the age of 50 and has lowered the average life expectancy in the United States.¹ Over the next decade as many as half-a-million people in the United States will die from opioid substances that include heroin, pain-killers such as morphine and oxycodone, and synthetic agents such as fentanyl.²

Public policy to date has failed to counter this epidemic. Standing in the way of effective response are three mistaken approaches to the problem:

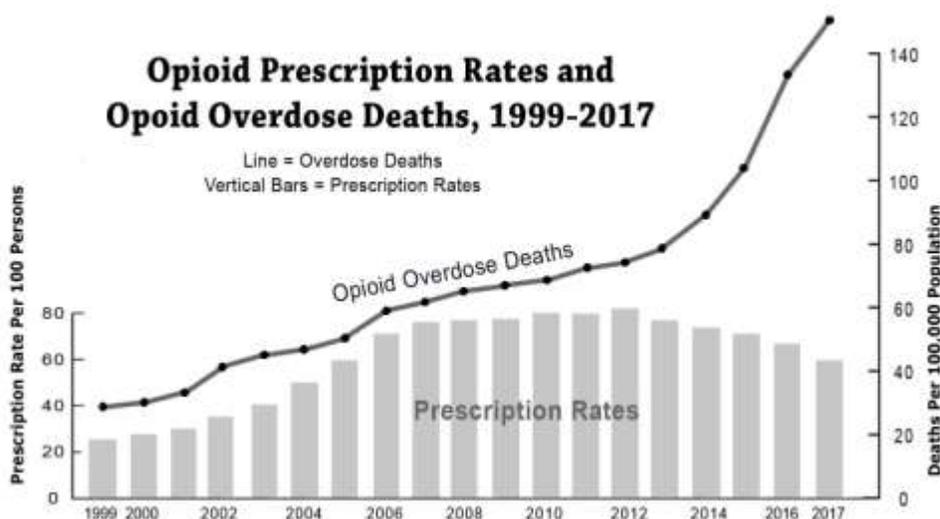
1. Misinterpreting correlation as causation.
2. Misunderstanding the physiology of addiction.
3. Overlooking the social psychology of addiction.

Mistake #1: Misinterpreting Correlation as Causation

Does epidemic opioid overuse result from too many prescriptions of medication for pain relief? In March of 2018 President Trump announced that his administration is “taking action to prevent addiction by addressing the problem of overprescribing.... We’re going to cut nationwide opioid prescriptions by one-third over the next three years.”³ The U.S. Centers for Disease Control and Prevention (CDC) also attribute the overuse of opioids and other addictive substances to prescription practices:

Drug overdose deaths in the United States more than tripled from 1999 to 2015. The current epidemic of drug overdoses began in the 1990s, driven by increasing deaths from prescription opioids that paralleled a dramatic increase in the prescribing of such drugs for chronic pain.... The problem with misuse of prescription drugs of various kinds is related to high levels of prescribing of such medications.⁴

This concern about excessive prescription is certainly legitimate. However, a close look at the historical data clarifies the causal role that prescription plays in the opioid epidemic.

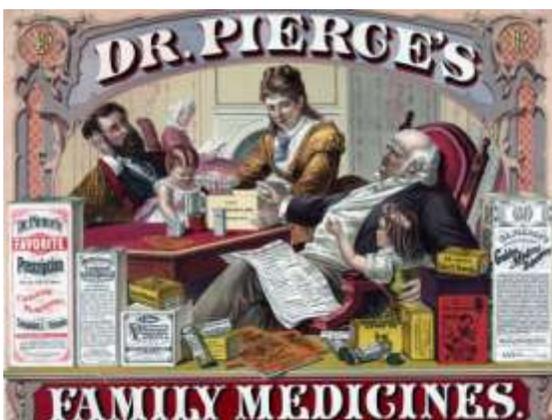


Graph constructed from CDC data.⁵

The years of the steepest increase in overdose fatalities, 2012 to 2017, are also years in which prescription rates *declined*. This divergence between fatality and prescription rate trends is striking, even when we take into account that it might require several years for a lower prescription rate to result in significantly fewer overdose deaths. The sharp rise in recent years of opioid-induced deaths is in fact due to the consumption of drugs that are rarely used for medical pain management: As of 2015 the rate of overdose deaths due to illegally obtained heroin and synthetic opioids had gone up so much that they took more lives than did all of the other prescribed opioids combined.⁶ Synthetic opioids like fentanyl (a drug 50 times more potent than heroin) and carfentanil (5000 times more potent than heroin) are inexpensive to produce and easily shipped to customers through the mail. Moreover, heroin and other street drugs are often mixed with fentanyl and its derivatives, further raising fatal overdose rates.

Even during the years 1999-2012, when opioid prescriptions and overdose mortality rose in tandem, this correlation does not show that the first was a major cause of the second—the addiction rate among patients taking opioid medication for chronic pain is in fact quite low, less than 8 percent.⁷ Over the past two decades, U.S. states have enacted a number of prescription-control laws, most targeting opioid drugs. However, this legislation has had a very limited impact on the rate of overdose fatalities.⁸ The correlation between prescription and overdose of opioids is no more causative than any number of treatment-illness relationships. Surgery, for example, typically makes a patient more susceptible to infection—a fact that supports more attention to sanitizing operating environments, but doesn't justify a reduction in the number of surgeries.⁹ Similarly, taking birth control pills slightly raises a woman's chances of contracting cervical or breast cancer,¹⁰ but this happens sufficiently rarely that it provides little reason to forego this method of contraception.

To be sure, opioids like OxyContin are misleadingly marketed and overprescribed in the United States, and sensible regulation is very much needed. So-called “pill mills” (in which prescribers dispense narcotics without a reasonable medical purpose) should be shut down.



Common in late 19th-century America was the direct marketing to the public of pain-relieving substances with active ingredients that included morphine, cocaine, opium, or heroin.



In the early 21st century, Tramadol, a synthetic opioid used to treat pain, can easily be purchased online.

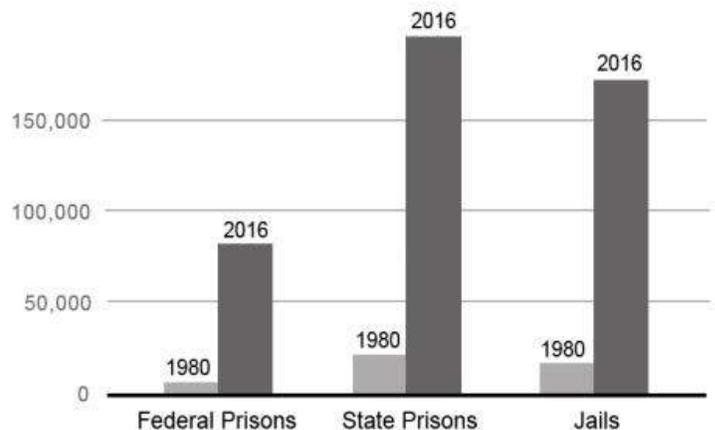
Moreover, patients taking opioids for a legitimate medical purpose sometimes provide these drugs to others, including family and friends. Better education and training of health care professionals can improve prescribing practices. For instance, physicians should not prescribe opioids for a longer duration than effective pain management requires, and should consult a prescription drug monitoring database (PDMP) to track patients' use of controlled substances and prevent "doctor shopping" to obtain multiple prescriptions for the same medical condition. However, the solution that continues to find favor among legislators—enactment of prescription-reduction rules that are insensitive to the complexity of medical pain treatment issues—has proven to be not only largely ineffectual but also medically unjustified; the consequence of too strict prescription requirements is the abandonment of many patients to their suffering. Deprived by their physicians of the pain relief afforded by opioids, they are motivated to look for a solution elsewhere. Commenting in March 2018 on the under-treatment of patients in pain, Jianguo Cheng, President of the American Academy of Pain Medicine, noted that "There are many pain clinics flooded with patients who have been treated previously by their primary care physician."¹¹ While it is true that non-opioid pain relief remedies exist, and that better ones may be developed in the future, for many patients the most effective help still comes from the standard opioid medications.

Mistake #2: Misunderstanding the Physiology of Addiction

Over the past three decades, the neurobiology of addiction has been investigated down to the molecular level. Although there remains much more to learn, scientific research has illuminated how the consumption of opioids initiates certain neural processes that impact the reasoning and executive functions of the frontal cortex and give rise to addictive behaviors. This research has been given a popular, if sometimes oversimplified, gloss by the mass media—e.g., former radio host Bill Moyers' explanation that "drugs hijack the brain." This account diminishes the role of free will in the choices that addicted individuals make and supports the "supply restriction" approach to drug misuse that still prevails in the United States today. The idea here is to remove access to addictive substances, so that the brain, however susceptible it might be to their appeal, is simply unable to develop or sustain an addictive habit.

This approach to substance abuse is certainly an advance beyond the moralistic, often religiously motivated principles that have largely governed U.S. drug policy over the past century. Yet supply restriction policy has a very problematic history. A century ago, Prohibition did reduce the use of alcohol, but resulted also in a thriving black market, corruption of police, and untreated alcohol-related disease. In 1971 President Richard Nixon inaugurated a nationwide "War on Drugs" to curtail the domestic trade in addictive substances and also launched a massive interdiction campaign to halt import

**People Incarcerated for Drug Offenses
1980 Compared to 2016**



Severe punishment of drug offenders in the U.S. has increased the prison population without effectively deterring drug-related crime.¹²

of marijuana from abroad. These efforts were unsuccessful—Columbia replaced Mexico as the major marijuana supplier—as were subsequent attempts on the part of the federal government and border states to curtail drug trafficking.¹³

These failures of the supply restriction approach do not necessarily dampen the enthusiasm of its advocates. Yes, this strategy works imperfectly, they might concede, but isn't policy that makes access to addictive substances more difficult and expensive bound to discourage use? Indeed, if drugs hijack the brain, then this common-sense corollary seems to follow:

Reduced availability of drugs will result in less hijacking.

However, research on the behavioral and biological dynamics of addiction shows that supply restriction may actually *strengthen* addictive habits rather than suppress them. “Prediction error” studies done with rats and non-human primates have indicated that addictive urgency is modulated by the nervous system: *intermittent, unexpected* rewards stimulate the firing of neurons in certain areas of the brain, whereas *anticipated* rewards leave these same neurons quiescent.¹⁴ This dynamic characterizes human addiction too: the thrill of unexpectedly and illicitly obtaining a reward focuses and sharpens desire. Paradoxically, when the supply of an addictive substance becomes risky, intermittent, or limited in some other way—because of a police crackdown, for example—the consequence is sometimes an *increase* in the craving that holds the addiction in place. This occurs not only in the case of substance misuse but in other human risk-taking activities also. Compulsive gambling, for example, is recognized in the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as an addictive disorder. Gambling is similar to drug use in that uncertainty of outcome is apt to reinforce an addictive habit.¹⁵

In the United States, reducing the availability of addictive drugs to zero has never been an achievable aim. Even imprisonment often does not result in total abstinence; inmates manage in one way or another to obtain substances that sustain their habit, and indeed, 95 percent of those addicted at the time of incarceration return to drug abuse upon release.¹⁶ Deterrence targets someone whose rational assessment of costs and benefits informs behavior. But addiction is characterized by a willingness to suffer extreme loss to maintain a habit—the sacrifice of a satisfactory job, dissolution of a marriage and of friendships, deterioration of physical health, and incarceration. Consequently, the legal restriction of supply has not successfully curbed drug misuse.

Mistake #3: Overlooking the Social Psychology of Addiction

The disease model of addiction, which focuses attention on physiological and genetic factors rather than on social-cultural context, is evidence-based and certainly more humane than the “Just Say No” approach that attributes addiction to a deficit of personal



Billboard in Massachusetts

virtue or religious faith. Opioid addiction, like cancer or heart disease, ought not to be regarded as blameworthy and deserving punishment. On the other hand, the disease model can be misleading inasmuch as it suggests that substance misuse is entirely walled off from the will of the afflicted individual.

The difficulty of avoiding or overcoming an addiction varies widely from one person to the next. One individual who has been overusing might experience unbearable anxieties or pain upon discontinuation, while another with a similar history but a different genetic inheritance, for example, might discontinue and experience much less severe symptoms. Many of those who are addicted *can* succeed in diminishing the harmful consequences of their drug use—and sometimes in halting that use altogether. In the 1960s, about 20 percent of the U.S. soldiers in Vietnam became addicted to heroin, but when they returned home more than 95 percent stopped using the drug. Further, these veterans were able to stay clean provided they did not re-enlist and return to the war.¹⁷ Their high rate of recovery is in keeping with subsequent research indicating that addiction can be remedied by a change in environment.¹⁸

Animal research also gives some support to this conclusion (although care must be taken when extrapolating from non-human animals¹⁹). In 1978, a study that became known as the “Rat Park Experiment”²⁰ took a very unorthodox approach to rodent research. In previous studies carried out in the 1960s and 1970s, solitary rats had been placed in small cages and given access to water containing addictive substances such as morphine or cocaine. The animals soon prioritized consumption of this water and drank enough of it to kill themselves. In the Rat Park Experiment, however, rats inhabited a shared environment consisting of a roomy cage providing many amenities: nooks and crannies that the animals could explore, balls and other toys to play with, and places to hide. In this socialized situation they overwhelmingly preferred ordinary to drug-laced water. Many subsequent studies have confirmed the hypothesis that rodents living collectively under low stress conditions do not become substance-addicted.²¹

Of course, humans do not inhabit environments as ideal as “Rat Park.” Poverty, social injustice, and racism are present in many communities. White collar professionals as well as blue collar workers often cope with unrewarding, stressful jobs or unemployment. Friendships and marriages fail. Upon release from prison, many of those incarcerated for drug offenses return to the same life conditions that encourage addiction. Some of these circumstances can be transformed, increasing the likelihood of recovery from an addictive habit. For instance, re-integration of former prisoners into a community that welcomes and supports them raises their prospects for living a non-addicted, fulfilling life.²²

What Must Be Done

A harm-reduction approach to drug misuse replaces criminalization with programs seeking to make addicts active participants in the process of their own recovery. Substitution of less euphoric drugs such as methadone and buprenorphine for more damaging and deadly heroin and fentanyl, combined with counseling and psychotherapy, helps addicts regain control over their lives. This response to addiction has found wide application in Western European nations since the 1980s. Portugal, for example, decriminalized illicit drug use in 2001 and then funded addiction treatment

programs and a public information campaign. Education about drug use became part of the standard Portuguese high-school curriculum. These policies have helped to reduce the country's per-capita drug mortality rate, which today is about 50 times lower than that of the U.S.²³

Although a punitive approach to drug overuse continues to misinform policy in the United States, public opinion is changing. Excessive use of opioids is today widely recognized as a problem that affects relatively affluent Americans as well as those living in poverty, and partly for that reason evidence-based treatment approaches are receiving more attention. In 2017 the U.S. Opioid and Drug Abuse Commission acknowledged that in many situations, opioid substitute treatment achieves better outcomes than coerced abstinence.²⁴ The Commission report recommended better training of drug counselors, therapists, and prescribers; use by police and emergency care workers of naloxone that can be injected to reverse overdose and save lives; and more funding for “drug courts” that send addicts to treatment as an alternative to jail. The Commission also gave some attention to the environmental conditions that encourage drug misuse.

Implementation of the Commission's recommendations depends, however, upon adequate financing, which is uncertain given recent federal cutbacks to Medicaid, the Affordable Care Act, and other health-support programs that provide addiction treatment and recovery services. Nonetheless, we know what must be done to effectively combat the opioid epidemic, and we will succeed if public support is in place.

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Dr. Raymond Barglow majored in physics at Cal Tech and received a doctorate in philosophy at UC Berkeley. He has taught at UC Berkeley and Trinity College and writes on science, ethics, and public policy issues.

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