Causes and Responses to the Opioid Epidemic: A Policy Analysis

Culminating Experience- Northwestern University Masters of Public Health

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Abstract

The opioid epidemic has become one of the largest public health crises of our time. The most important and devastating element of this crisis is the number of fatalities. The Centers for Disease Control and Prevention (CDC) estimates that 130 Americans die from an opioid overdose on a daily basis. [1] Data provided by the Centers for Disease Control and Prevention indicate that between 1999 and 2017 there have been more than 400,000 deaths attributed to an opioid overdose.[1] The U.S. Department of Health and Human Services (HHS) estimates that 10.3 million people misused prescription opioids in 2018 alone. [2] This number does not include the number of people using heroin in the U.S. In 2016 roughly 948,000 Americans reported using heroin in the past year.[3] About 170,000 Americans reported first time heroin use in 2016. Compare this number to the 90,000 first time users in 2006 and it becomes clear how significant the rise in heroin use is. [3] There is now a rising incidence of newborns experiencing withdrawal syndrome due to opioid use and misuse during pregnancies. This means that the opioid epidemic's impact will continue to be felt for generations to come. It is imperative that interventions are developed now to reduce this ripple effect and eventually end this decades-long problem.

Impact on Public Health

The U.S. Department of Health and Human Services declared the opioid epidemic as a public health emergency in 2017. [2] The National Drug Institute on Drug Abuse (NIDA), one of the departments of the National Institutes of Health, specifically explained in their strategic plan from 2016 to 2020 how the opioid epidemic affects public health. Under goal number four, NIDA states," A range of public health issues are associated with the current crisis of opioid

abuse, including opioid use disorders, opioid overdoses, neonatal abstinence syndrome, and increased spread of infectious diseases like HIV and hepatitis C (HCV)". [4] The World Health Organization (WHO) estimates that in 2016 there was a 21% increase in drug overdose deaths from previous years. [5] This crisis has the public demanding more access to treatment and other public health programs. [6] Public health offers an infrastructure for development of strategies preventing and addressing this epidemic.

Methods

The primary goal of this paper is to describe policy responses and discuss how they should be prioritized. The study is based on existing published evidence and interviews of several local Chicago area experts. The opioid epidemic is an area of critical need for investment which must be met with evidence based solutions. In order to gather this information, articles were identified through searches conducted on the Galter Health Sciences Library & Learning Center, PlusOS, Pubmed, Google Scholar, PsycInfo and MedLine using keywords such as opioid epidemic, public health, opioid use trends, and opioid policies. Current policy recommendations available from both the CDC, HHS, and other government entities were reviewed. In addition to these articles, interviews were conducted with three local Chicago-based experts to determine their views on policy prioritization. These local Chicago-based experts were Dr. Howard Kim, Dr. Elizabeth Salisbury-Afshar, and Suzanne Carlberg-Racich PhD.

Timeline of the Epidemic

During the announcement from President Donald Trump labeling the current opioid epidemic as a public health emergency he commented, " Nobody has seen anything like what's

47 going on now." [7] However, it is important to recognize that this comment is inaccurate. The
48 current opioid epidemic is not the first opioid epidemic in the U.S.

49 The first opioid epidemic occurred between 1850 to 1914. During this time unregulated
50 and highly promoted medications with opium and morphine were widely prescribed and even
51 used by children. [8] There was no regulation for when it was appropriate to use these
52 medications and what ailments would require them. At this time, many Americans were widely
53 using opium and morphine for pain management. This prompted the government to pass the
54 Harrison Narcotic Control Act of 1914. This act regulated the sale of narcotics in order to reduce
55 the use of street heroin. [9] In this same timeframe, aspirin was developed as a pain relief
56 alternative as well as publications proving how addictive heroin was in order to reduce use. [10]
57 However, the Harrison act did not prohibit physicians, dentists, and veterinary surgeons from
58 prescribing these medications. There were cities that established narcotics dispensaries to
59 provide users with legal supplies of drugs until treatment facilities could be provided. [10] By
60 the 1920s, these clinics had closed and only the elderly who could die from withdrawal were
61 provided with morphine. While the use of prescription opioids diminished as time continued
62 on, the use of heroin began to rise in the latter half of the 1900s.

63 Heroin use gained popularity in the 1960s-1970s. Heroin is an illicit opioid synthesized
64 from morphine that can be a white or brown powder, or a black sticky substance. [11] The
65 popularity is largely attributed to Vietnam War soldiers being exposed to heroin during their
66 overseas tours. This spike in heroin use was especially seen in urban populations. In New York
67 City, it was noted that the African-American and Puerto Rican adolescents were dying of heroin-
68 related incidents at higher rates than anything else. [7] Additionally, the mean age for heroin

users was about 16.5 years old males and heroin was the first opioid they had abused. [12] This rise in heroin use is one of the primary catalysts for President Nixon's "War on Drugs". This "war" resulted in higher use of law enforcement, harsher sentences for both users and dealers, and a reduction in foreign shipments of heroin and marijuana. [7] These results transitioned the heroin epidemic into the crack cocaine epidemic. In order to understand the magnitude of the current epidemic compared to the earlier epidemics, there were fewer than 3,000 overdose deaths in 1970. [7]

The crack cocaine surge began to rise in the 1980s. It first came in powder form then transitioned into hardened cocaine rocks. Crack cocaine was thought to be less dangerous because it was smoked like marijuana. [7] It was also an alternative for those who were afraid of needles and wary of heroin.[7] The crack cocaine increase use resulted in the Anti-Drug Abuse Act of 1986.[13] This act increased prison sentences for crack cocaine and other illegal substances which disproportionally impacted African-Americans. The American Civil Liberties Union (ACLU) released a statement in 2006 acknowledging that in the 20 years since this law was enacted it, "effectively transformed federal prisons into institutions increasingly dedicated to incarcerating African Americans."[14] African Americans made up 15 percent of the country's drug users, yet they made up 74 percent of those sentenced to prison for a drug offense. [14] Even with the current epidemic rising, heroin use never went away.

There have been three "waves" of opioid overdose deaths in the United States during the current epidemic. These "waves" are best visualized in Figure 1. The first wave began in the 1990s with the increased prescribing of opioids. The impacts of these prescriptions are discussed in the next section of this paper, focusing on natural and semi-synthetic opioids as

well as methadone prescriptions. Natural opioids include morphine and codeine.[11] Semi-synthetic opioids include oxycodone, hydrocodone, hydromorphone, and oxymorphone. [11] The overdose death toll saw a significant increase by 1999. [1]

The second wave began in 2010 involving an increase in heroin deaths in addition to the prescription opioid deaths continuing from the first wave. In 2012 alone, 259 million prescriptions were written for opioid painkillers. [6] In addition to (or as a consequence of) the increase in legal prescribing since the first wave there was an escalation in illegal heroin use overdoses. The increase in heroin overdose deaths increased from 3,036 in 2010 to 8,257 in 2013. [6] The rise in use of heroin is largely attributed to its low cost and easy accessibility.

The third wave began in 2013 and included significant increases in overdose deaths involving synthetic opioids (specifically focusing on illicitly manufactured fentanyl). [1] Fentanyl is a synthetic opioid that is 50 to 100 times more powerful than morphine.[15] This new illicit opioid of choice is considered to be cheaper and up to fifty times more potent than heroin. The opioid epidemic now spans almost 30 years with currently no end in sight.

Causes of the Epidemic

Chronic Pain Management

Opinions vary on the primary root causes of the epidemic. A recent poll indicated that 33% of the public blame doctors who inappropriately prescribe painkillers. [16] This is an important belief that has a traceable history in the context of chronic pain management. Pain is a complex disease that involves subjectivity. Pain burden reduces quality of life and imparts high socioeconomic and health care costs. [17] In 1973 in the Annals of Internal Medicine, a manuscript described a failure to treat patients in severe pain with adequate doses of opioid

analgesics. [18]This was then brought up again in 1990 by Max stating, "'therapeutic use of opiate analgesics rarely results in addiction.'' [19] This misconception was further enforced with the belief that opioids should not only be reserved for cancer patients but should be freely used for all those in chronic pain. [20] In 1995, the American Pain Society began their "pain as the fifth vital sign" campaign. [21]The Veteran's Health Administration in 1999 decided to adopt the American Pain Society's initiative. [22] This thinking is believed to have kicked off the first wave.

There was a change in attitude towards opioid prescribing beginning around 2000. The Federation of State Medical Boards and the Drug Enforcement Agency both issued statements that indicated less scrutiny over opioid prescribers from a regulatory standpoint. [23] The relaxing of these regulations allowed pharmaceutical companies to step into the arena. Pharmaceutical companies saw the opportunity to begin heavily marketing their opioid products and developing new ones for this new pain management era. OxyContin, extended release oxycodone, became one of the new pain management favorites . The number of prescriptions for it increased from 670,000 to 6.2 million between 1997-2002. [24] This reframing of pain management was felt world-wide. In Scotland, dispensation of oxycodone, fentanyl, and morphine increased five- fold between 1995 and 2010.[25] The number of opioid prescriptions quadrupled between 2000 and 2010 in the United Kingdom.[25] However, prescription opioids have not been shown to be effective in treating long-term pain. A study involving the review of evidence on the effectiveness and harms of long-term (>3 months) opioid therapy for chronic pain in adults concluded that there is insufficient evidence opioid therapy is effective in long-term chronic pain care. [26] This same study also finds there is no research on long-term effectiveness of prescription opioids for use of greater than one year.

Another article in the Clinical Journal of Pain reviewed the evidence on opioid efficacy. This article found that analgesic efficacy, although initially good, is not always sustained during continuous and long-term opioid therapy (months to years). [27] Therefore, based upon recent evidence, use of prescription opioids for chronic pain lacks efficacy in pain management and advance the possibility of addiction. This leaves those living with chronic pain to seek alternatives when they hit their tolerance to these prescription opioids. The alternative in this case seems to be heroin and fentanyl. Evidence points to prescription opioid turning to heroin in part because it has become more accessible and far less expensive than prescription opioids. [12]

Deaths of Despair

Job losses due to globalization has now become implicated as another cause of this epidemic. Job losses related to trade have impacted the Appalachian region hardest. Over the last 20 years, this region has accounted for 16% of trade-related job losses while only accounting for 8% of the United States population. [28] In this same region, the death rates of overdoses are 65% higher than in the rest of the United States as seen in Figure 2. [29] This has become so common that the Appalachian Regional Commission has termed these “deaths of despair”. In the U.S., every 1,000 trade-related job losses led to an 11.3% increase in overdose deaths. [28] Additionally, the National Bureau of Economic Research found a correlation between the rise imports from China and rise in overdose deaths. [30] Trade-related jobs generally requires physical labor that leads workers to suffer from chronic pain, use opioids during employment, and therefore face an increased risk of transitioning from prescribed opioids to heroin.[31]

When workers find new employment due to trade-related job loss, the resulting dislocation increases the risk of opioid-related overdose deaths.[31] Finkelstein, et al conducted a review of those enrolled in Social Security Disability Insurance (SSDI) to determine if there is a link between prescription opioid abuse and location. [32] Those enrolled in Social Security Disability Insurance were selected by these authors due to roughly half receiving an opioid prescription each year. Additionally, this group are on a fixed level of income therefore less likely to move and are automatically enrolled in Medicare allowing for accessible data. Finkelstein, et al concluded based upon the data that place-specific such as physician prescribing behavior largely contribute to the prescription opioid epidemic. One such examples is when an individual in this study moved from a county at the 25th percentile of prescription opioid use rates to the 75th percentile, there was a 20 percent increase in the probability of opioid abuse. [32]

The impact of public health impact of rising income and wealth inequality in the US is not limited to the opioid epidemic. The other two epidemics that, in combination with the opioid epidemic, produced rising middle age death rates are obesity and depression. Additionally, these three epidemics appear to reinforce each other to continue the cycle. For example, studies have found that obesity is a significant predictive factor for subsequent depression, while depression is a predictive factor for subsequent obesity. [33] Depression has a high correlation with substance use. Additionally, job loss and unemployment increase the risk of depression and drug misuse, specifically among less-educated workers.[31] The combination of these three epidemics are to blame for the lowering of life expectancy in the United States. In December 2017, the CDC found that U.S. life expectancy had declined for the

second straight year, declining 0.1 years between 2015 to 2016 following a decline of the same magnitude between 2014 and 2015. [33] America's healthy life years were 4.3 years lower than the average of the top five countries in 2015 (Japan, Korea, Switzerland, Italy, and Israel).[33] As time progresses, the gap will likely continue to widen.

Epidemiologic Trends

A study published in the Journal of Addictive Diseases reviewed the Researched Abuse, Diversion and Addiction-Related Surveillance System poison center data and census data between 2003-2006 to determine the epidemiologic trends in prescription opioid use. [34] This study found that there was a strong positive trend indicating that prescription opioid drug rates increase as poverty rate and unemployment rate increased. In regards to heroin use, trends have changed from an inner-city, minority-centered problem as noted in the 1960s-1970s to one that has a more widespread geographical distribution, involving primarily white men and women in their late 20s living outside of large urban areas.[12] The Council on Foreign Relations cited that non-Hispanic white Americans make up close to 80 percent of the annual total of those who overdose. [35] The Robert Wood Johnson Foundation did a county-by-county study on opioid use which demonstrated that the increase in premature deaths in 15- to 44-year-olds is due to drug overdoses.[36] Heroin use increased significantly among those with a high school education or less and in those who lived at less than 100% of the federal poverty line.[36] Furthermore, heroin use patterns exhibit the same drug use patterns as those abusing prescription opioids. [12] Geographically, the opioid epidemic has hit Appalachia, the Southwest, and the New England regions hardest. [37] This directly reflects the previous

section's discussion of deaths of despair. These racial and geographic trends have resulted in increased political interest in addressing opioid overdose in these hard-hit regions. [37]

Cost of the Epidemic

There have been a variety of estimates on the monetary impacts of this epidemic. In 2013, Florence et al. estimated that prescription opioid overdose, abuse, and dependence in the United States in 2013 cost $78.5 billion. [38] The estimated costs encompass the increased use of healthcare services, substance use treatment centers, criminal justice, and loss in productivity (related to both fatal and nonfatal overdoses). Additionally, it is estimated that one-third of this cost-estimate is attributable to the increased use of healthcare services alone (see Figure 3). The Council of Economic Advisers (CEA) disagreed with Florence et al.'s estimate arguing the need to account for the additional role of heroin abuse. They argue there is evidence that fatality statistics understate the number of opioid-related deaths. [39] In order to better estimate the cost for the epidemic, the CEA took into account the same components of Florence et al. and added the value of lives lost. The CEA argues that determining the "value of a statistical life" (VSL) should include more than lost earnings due to premature death. They continue that, "earnings do not take into account other valuable activities in life besides work" [39] The CEA determined the VSL should include a range to explain the variation in how different groups of people value reductions in fatality risks. Therefore, VSL will vary with age to control for the age distribution of overdose deaths, account for wage-distributions, and occupational risk. In regards to the nonfatal costs of opioid use, Florence et al. only accounted for the costs associated with prescription opioid use. The CEA used those costs and applied them to heroin disorders as well to determine the total cost. Using this model, the CEA

estimates the opioid crisis cost $696 billion in 2018—or 3.4 percent of GDP—and more than $2.5 trillion for the four-year period from 2015 to 2018. [39]

Current Policies in the United States

There are many stakeholders in the ending of this epidemic. This results in a variety of policies and procedures aimed at reduction of opioid use. These policies include anywhere between tracking prescriptions to legal penalties for using opioids. A state-level policy that is gaining more attention is mandatory provider use of prescription drug monitoring programs (PDMPs). These monitoring programs are used to by these states to track pharmacy dispensation of controlled-prescriptions and the providers who are prescribing them. This helps the state track which providers and pharmacies are over-prescribing and over-dispensing. Additionally, providers can use the system to track a patient's controlled substance history. This history includes if a patient is receiving opioids from multiple providers and the total amount prescribed. Providers can use this information to determine if a patient is at a higher risk of opioid overdose. This allows both the providers to deliver preventative care and the states to monitor overprescribing physicians. In Kentucky, this type of system was mandated in July 2012. The system resulted in an increase of providers requesting patient reports from 811,000 in 2011 to nearly 4.6 million in 2013. [40] While this does not mean these providers are using the information regularly, it does indicate there can be more monitoring of patients to prevent overprescribing.

The FDA has played a large role in policies associated with the opioid epidemic. An example is when the FDA made an attempt to influence prescribing practices by providing an outline for provider education through the creation of Risk Evaluation and Mitigation Strategies

(REMS) in 2007. [41] According to the FDA, REMS are, “designed to reinforce medication use behaviors and actions that support the safe use of that medication.”[42] In 2012, there were two opioid-related REMs constructed one for extended-release and long-acting (ER/LA) opioids and another for transmucosal immediate-release fentanyl (TIRF) products, such as fentanyl lozenges.[43] While the intensions from the FDA were risk reduction while not impacting patient access to certain medications, according to Melissa Schulman, Senior Vice President for Government and Public Affairs at CVS Health, the lack of standardization in the current REMs program, “creates an unnecessary burden and practical impediment to their implementation.” [44] In addition to this lack of standardization, critics also point out that REMs often require significant additional amounts of time from physicians and pharmacists. There are some drugs that require additional certifications for pharmacists and physicians prior to dispense and for patients to complete mandatory tests. [44] It is important to note that no REMs were produced for short-acting opioids and does not impact illicit opioid use. Additionally, a study in 2015 noted that REMs merely shifted the pattern of opioid use with decreases in in misuse of oxycodone ER to increased initiation of heroin use. [45] This study noted that the odds of initiation of heroin increased by 71%. Opioid policies must target the use of both prescription and illicit use.

Policy Prioritization Proposal

In order to combat this epidemic, policies must be prioritized to focus on overdose death prevention, addiction recovery, reduction of addiction stigma, decriminalization, and preventing new addictions. These policies aim to target both prevention and treatment of current opioid users.

Overdose Deaths

Another policy priority involves medications that reverse and prevent overdoses. Naloxone is an opioid antagonist that reverses the effects of opioid overdose. [46] Naloxone does not work with other drugs and can only reverse overdose if opioids are in the person's system. Since 1996, there have been community-based programs focusing on overdose prevention programs that include dispensing naloxone. The CDC found that programs in 15 states and the District of Columbia reported training and providing naloxone between 1996-2010 resulting in 10,171 drug overdose reversals using naloxone.[47] Naloxone Access Laws (NALs) have been on the rise since 2005. NALs provide immunity from civil and/or criminal prosecution to naloxone prescribers, dispensers, and/or laypersons who administer it to individuals who have overdosed on an opioid. In 2005 there were only 2 states that had NALs and by 2016 there were 46 states with NALs. [48] Additionally, naloxone prescriptions doubled from about 270,000 to 556,000 between 2017 and 2018. [49]

Naloxone is not without its critics and complications. Maine's Governor Paul LePage vetoed a 2016 bill that sought to expand naloxone access, writing to the legislature, "Naloxone does not truly save lives; it merely extends them until the next overdose."[50] This seems to be reiterated in a 2017 survey of 405 US adults, in which 51% of respondents believed that having naloxone enabled people to abuse opioids.[51] In Butler County, Ohio Sheriff Richard Jones echoed a similar sentiment, "All we're doing is reviving them, we're not curing them." [50] However, a study of 12,192 naloxone administrations by emergency medical services in Massachusetts between 2013 and 2015 suggested that 94% of recipients survived the day of administration and 84% were alive after 1 year. [52] This study seems to rebuke this idea

though this does little to change the overall mindset associated with overdose. Naloxone's accessibility is also a problem. The CDC's review of opioid overdose prevention programs reported problems obtaining naloxone related to cost and the supply chain. [47] A JAMA article noted that one-third of patients prescribed naloxone have out-of-pocket costs exceeding $50 which impacts those of lower socioeconomic status.[49] The supply chain access issue is evident through data showing US pharmacies dispensed only 1 naloxone prescription for every 69 high-dose opioid prescriptions in 2018. [50] The data on naloxone is promising, however if access is not expanded and education provided to refute baseless claims, the overdose death rates will continue rather than be reversed.

Decriminalization

Virginia's Secretary of Public Safety and Homeland Security recently stated during a federal hearing that, ""We cannot arrest our way out of the heroin and opioid addiction crisis."[7] The history of the "War on Drugs" has shown us it is ineffective. In 2017, it was estimated that 58 percent of people in state prisons and 63 percent of people serving sentences in jail meet the criteria for diagnosis of drug abuse or dependence. [53] Suzanne Carlberg-Racich, PhD MSPH is an associate professor at DePaul University whose research focuses on HIV/AIDS (Harm Reduction, Cultural Competency, Stigma, Behavior Change) and Harm Reduction (Safer Injection, Overdose Prevention, Service Delivery).[54] During our interview, she stated, "we don't make people better by punishing them" while also advocating for decriminalization similarly to cannabis. Overzealous law enforcement can lead to fewer people to coming forward when their companions are overdosing, thereby increasing health risks. [37] Another result is the "balloon effect" when the government cracks down on one

source of supply for drugs, drug users simply turn to another source. [6] Federal laws are now moving towards reducing the minimum amount of fentanyl that will activate the mandatory sentencing. This could embolden the sale and distribution of even more concentrated fentanyl doses, which would increase the drug's lethality. [37] Regulatory agencies such as the US Drug Enforcement Agency (DEA) would also need to buy in to this policy proposal. The DEA has focused on the criminal justice metrics and seems to lack the scientific expertise to appropriately regulate patient care.[37] The Federal Controlled Substances Act requires the DEA have direct influence over pharmacy practices as related to controlled substances which includes prescription opioids. A recently completed Pew Research Center report found that 63% of people believe that states moving away from mandatory prison sentences for non-violent drug offenders is a good thing. [55] In 2000, Portugal passed a law to decriminalize certain levels of drug possession. If a person is stopped with up to a 10-day supply of drugs are released and instructed to appear at a non-court based setting where they can be referred to treatment or other forms of support. After 9 years, data showed there was no major increase in drug use and injection drug use fell from 3.5 to 2.0 injecting drug users per 1,000 people.[53] Decriminalization would also bring down the criminal justice monetary costs attributed to this epidemic. Continuing with Portugal as an example, after the enactment of this law, arrests on drug-related offenses dropped from 14,000 in 2000 to an average of 5,000-5,500 per year from 2001 to 2008. [53] This policy has a history of working in other countries, such as Portugal, and should be implemented in the U.S. to determine its efficacy on a larger scale.

Stigma Reduction

Stigma associated with opioid use has large implications for whether prevention policies can be implemented. An example of how much stigma impacts the population's perspective of opioid use is a survey of 347 US adults published in 2014 that found that 90% did not want people with drug addiction to marry into their family, 78% did not want to work closely with them, and 49% opposed increased government spending on treatment of drug addiction.[56] This attitude towards those with drug addiction limits how impactful interventions can be. Stigma is not limited to public stigma but can also manifest into self-stigma. This self-stigma leads to higher internalized shame and can be a major barrier for individuals to enter treatment for their substance use disorder. [57] Stigma can also be impactful on the type of treatment a person with substance use disorder will receive. One study examined perceptions from healthcare providers and noted that they perceived violence, manipulation, and poor motivation as impeding factors to treatment of patients with substance use disorder. [58] This same study also determined that healthcare providers had a lack of sufficient education, training, and support to help their patients. Coupling these items resulted in negative attitudes from these providers leading to patient's perceptions of diminished treatment options and lack of empowerment. This demonstrates how important stigma reduction is especially in the healthcare profession. Stigma can be reduced when healthcare providers reported more positive attitudes when they had personal or work experience or contact with substance abuse. [58] This means that the more widely available information and work experience with addiction treatment can lead to treating patients with substance use disorder with empathy. Once patients feel empowered, they are more likely to seek treatment.

Safe Injection Sites

One major consequence of the opioid epidemic is the high rates of hepatitis C, HIV, and other diseases, mainly due to shared syringes.[35] The sharing of syringes stems from the lack of sterile equipment and fear of social stigma. Those who inject drugs have noted their anxiety of social rejection and fear of the criminal justice system drive their use into "shooting galleries" (structures such as homes—privately owned, abandoned, and otherwise). [59] These structures and non-sterile spaces increase the likelihood of contracting blood-borne diseases such as HIV. In order to avoid sharing syringes, safe injection sites are an advocated intervention. In fact, some 40 cities worldwide have introduced safe injection facilities (SIFs). [59] SIFs are facilities that allow injection drug users (IDUs) to inject drugs while being supervised by licensed health personnel. These personnel do not help IDUs inject the drugs, instead they provide sterile injection supplies, safe disposal, monitor for overdose, provide referrals for substance treatment, and answer questions from IDUs about injections.[59] There is evidence available to prove SIFs are vital in harm reduction. In Sydney, 41% of SIF clients reported adopting at least 1 safer injection technique since using the facility.[59] In Vancouver, SIFs were associated with less-frequent reuse of syringes, less outdoor injecting, using clean water for injection, cooking or filtering drugs prior to injecting, and injecting in a clean location.[59] A visual walkthrough survey conducted to determine whether needle and syringe programs (NSPs) were impactful on the amount of improperly discarded syringes in the two large cities. The results of this survey resulted in proving that eight-fold more improperly disposed syringes were seen on walkthroughs in the city without NSPs compared to the city with NSPs.[60] Due to this risk reduction by SIFs, some have argued that there would be a

reduction of public cost due to prevention of diseases such as HIV, death, and crime. However, there is limited data to back-up this theory.

The prevention of SIFs ability to open safely without fear of being shut down is threatened by two federal statues under the Controlled Substances Act. The first is section 856, known as the Crack House Statute. This law makes it illegal to "knowingly open or maintain . . . [or] manage or control any place . . . for the purpose of unlawfully . . . using a controlled substance." [59] This law outright prohibits use of illicit drugs which would outlaw SIFs. The other is Section 844 which prohibits drug possession in its entirety. [59] These laws do not allow SIFs on a federal level, however some states are moving forward through state authorization of SIFs. This becomes a fight similar to the decriminalization of marijuana and the fight between state and federal laws. Another argument against SIFs is that they could become a drug trafficking center and that they help addicts maintain their addictions. [61] William McSwain, the U.S. district attorney of the Eastern District of Pennsylvania illustrated this line of thinking when he said, "they are designed to encourage, perpetuate and normalize behavior that is going to kill you." [62] These arguments have not been substantiated by evidence, however they provide insight into the stigma associated with IDUs and how hard it is to overcome. Overall, SIFs have data proving their effectiveness but there must be cooperation from both the federal and state governments to ensure they can be established safely.

Medication-Assisted Treatment (MAT)

In 2016, the Surgeon General report on alcohol, drugs and health, noted that only one in 10 of those with a substance use disorder receive any treatment. [36] Dr. Elizabeth Salisbury-Afshar, the Director of the Center for Addiction Research and Effective Solutions (AIR CARES),

described treatment for substance use disorder as tending to follow “abstinence-based philosophy”. Currently physicians can offer three types of medication-assisted therapies (MATs) for treating patients with opioid addiction: methadone, buprenorphine, and naltrexone.[63] These drugs work because they are opioid agonists that bind to the same receptors in the brain that were activated by the drug of abuse, but in a safer and more controlled manner.[64] These MATs have been proven through a plethora of research studies. For example, a study of heroin-overdose deaths in Baltimore between 1995 and 2009 found an association between the increasing availability of methadone and buprenorphine and an approximately 50% decrease in the number of fatal overdoses. [63] Dr. Salisbury-Afshar, among other addiction physicians, advocates for MATs such as buprenorphine and methadone because they drastically reduce the risk of fatal overdose and reduce both withdrawal symptoms and opioid cravings.[65] Additionally, buprenorphine treatment is also associated with long term benefits such as increased retention in treatment, decreased illicit opioid use, and decreased behaviors associated with the transmission of HIV and Hepatitis C.[65] About 80% of opioid-dependent patients remain in methadone treatment after 6 months.[64] Naltrexone is a newer MAT option however, it carries more risk due to its formulation which differs from methadone and buprenorphine. Naltrexone prevents all effects of any opioid drugs taken while naloxone remains in a person’s system because it blocks opioid receptors.[64] This blocking of effects has led to patients trying to “test” it by using opioids.

However, even with these evidence-based interventions, physicians are often hesitant to prescribe MATs due to the stigma associated with what is viewed as swapping one drug for another. The problem with this line of thinking is that it ignores the fact that substance use and

addiction are chronic diseases. One such study explained that like other chronic diseases such as diabetes and hypertension, addiction is generally unable to be cured, but effective treatment and functional recovery are possible.[63] There is also lack of access to MAT treatments for those who would benefit. The Drug Addiction Treatment Act of 2000 (DATA) increased availability of MAT to patients by allowing their primary care physicians to prescribe these medications. [65] DATA also allowed primary care physicians, addiction physician specialist, or psychiatrists to treat their patients in an outpatient setting. Prior to DATA, MATs could only be provided to patients with a freestanding opioid treatment program (OTP), although methadone is still only accessible through these OTPs.

Caleb Banta-Green, an associate professor of health services at the University of Washington best describes the need for long-term treatment, “Heroin use disorder is a serious medical condition with which individuals are likely to struggle for the rest of their life. We need to give them the tools they need to survive and thrive."[36] The evidence is clear that MATs should be one part of the long-term treatment needed for opioid abuse recovery.

Alternatives to Opioids

Legislation is often the first thought when discussing solutions to this epidemic. However, the medical profession plays a large role in altering the future of this epidemic. Dr. Howard Kim, an associate professor in Northwestern University’s Department of Medicine [66], emphasized that the number one priority should be to make sure those individuals who are opioid naïve stay opioid naïve if possible. Dr. Kim pointed out in our interview that emergency departments are often the first time people are introduced to opioids. His recommendation is to have providers focus on opioid alternatives for pain management wherever possible. In 2013

more than half of all white heroin users started by initially using prescription drugs,[36] thus prevention of initial prescription opioid use may have prevented later heroin use.

In a study conducted by researchers including Dr.Kim , there was a significant reduction in opioid prescribing rates once providers were presented with their prescribing rates as compared to their peers. [67] There are currently a variety of nonopioid medications for treatment of various chronic-pain syndromes such as gabapentin (Neurontin), pregabalin (Lyrica), milnacipran (Savella), and duloxetine (Cymbalta) for providers to choose from. [68] Illinois created the Opioid Alternative Pilot Program (OAPP), which allows access to medical cannabis for individuals who have or could receive a prescription for opioids as certified by a physician licensed in Illinois. [69] However, alternatives to prescription opioids may not reduce addiction overall. In 2017 gabapentin was involved in more than a third of Kentucky overdose deaths last year.[70] Gabapentin is also described by users as being able to enhance the euphoric effects of heroin. Abuse of opioid alternatives could be the beginning of the next widespread epidemic. This is why it is imperative that chronic pain management providers treat patient with both pharmaceuticals and appropriate therapies.

Prescription Drug Monitoring Programs (PMDPS) and Pain Clinic Laws

In a 2018 review of public opinion on which level of government was responsible for combating the epidemic, “36% said the federal government was most responsible, followed by state (28%) and local (21%) governments”. [16] Of particular interest is the fact that 82% of the public believe monitoring doctors’ painkiller-prescribing habits would be an effective policy. [16] This is an important opinion to consider in prioritization of policies that have public buy-in.

A current policy that is documented as working is the coupling of PMDPs and pain clinic laws. PDMPs can result in better pain clinic laws. These pain clinic laws aim to reduce the amount of inappropriate prescribing. These laws require such things as registration of pain clinics, registration of which physician(s) own these clinics, prescribing restrictions, and requirements on record-keeping of prescriptions. Florida is an excellent example of the importance of these pain clinic laws. Florida is home to 98 of 100 of the highest quantity of opioid prescribing physicians. In 2010, the state implemented several laws with prescribing restrictions and pain clinic laws. After these measures went into effect, the number of drug overdose deaths decreased by 16.7% between 2010-2012. [71] Furthermore, there was a reduction in overall prescription drug overdose rate of 23.2% as shown in Table 4. These laws also resulted in closing 250 pain clinics. Data collected by Dowell et al. indicates that coupling the pain clinic laws and PMDPs has resulted in reduced the prescribing rates by 80.1 morphine milligram equivalents (MMEs). Additionally, the same data set also noted a reduction in the opioid overdose death rate of 1.2 per 100,000. There were no significant reductions noted when pain clinic laws or PMDPs were implemented seperately.

Florida is a successful case study of this coupling. This policy should be expanded to the federal level. Especially when taking into account the public's perception that the federal government is most responsible. A national database would allow providers to see when patients are going to multiple states to gain their opioid prescriptions. This means the public would likely be onboard with a federal set of laws aimed at PMDPs and pain clinic laws. The largest problem with regulating physician prescribing behavior is that it has no way to track

heroin or other illicit opioid use. This system could simply force those who are using prescription opioids to turn to illicit drug use.

Conclusion

The Trump administration announced $1.8 billion in federal funding to combat this epidemic. [72] However, this announcement lacks any solid plan for what the funding will go towards. Andrew Kolodny, a physician and a director of opioid policy research at the Heller School for Social Policy and Management at Brandeis University, was interviewed by the New York Times to comment on this new funding announcement. Dr. Kolodny summed up what this announcement means without a plan, " It's like pointing to a burning building, saying there is an emergency, then not calling the fire department." [72] In order to appropriately distribute this funding, we must focus on evidence-based interventions that target both current use and prevention of future use. The policies outlined above all have pros and cons, however these policies have research evidence and opioid expert buy-in on their effectiveness. The opioid epidemic will continue on unless we, as public health professionals, take the time to examine these policies and push for their use. Otherwise, we should simply become accustomed to this epidemic as our new normal.

506 Figure 1.[1]

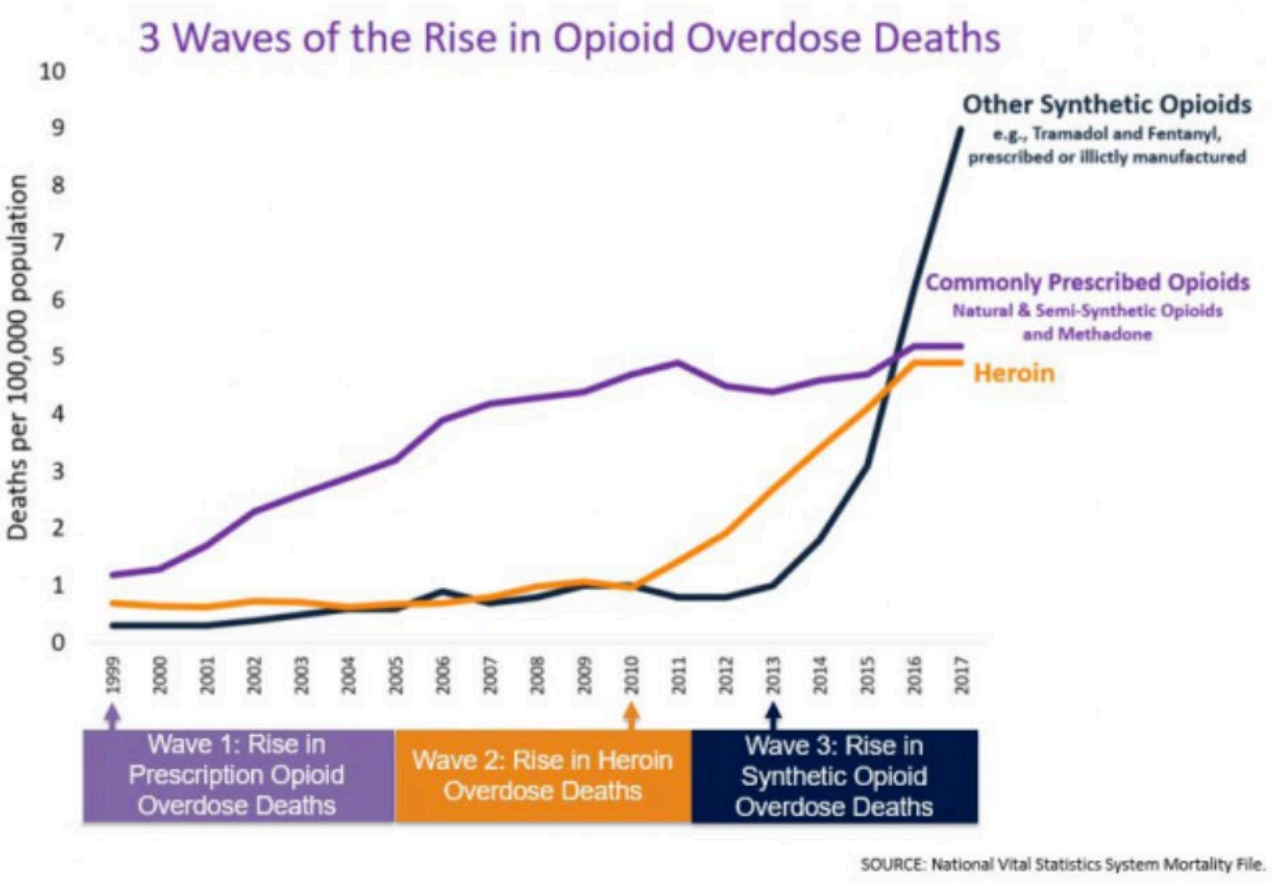

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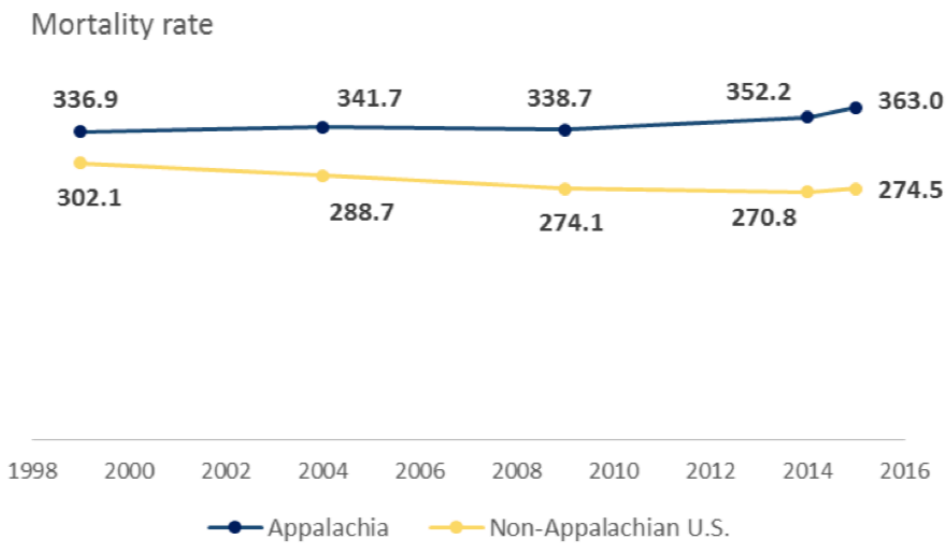
Figure 2. [29]

Exhibit 2. All-cause annual mortality rates, ages 15–64, by region (1999–2015)‡*



‡Rates are presented as deaths per 100,000 population. Rates are age-adjusted.
*For all years, the Appalachian rates are significantly different from the non-Appalachian U.S. rate, $p \leq 0.05$

529 Figure 3. [38]

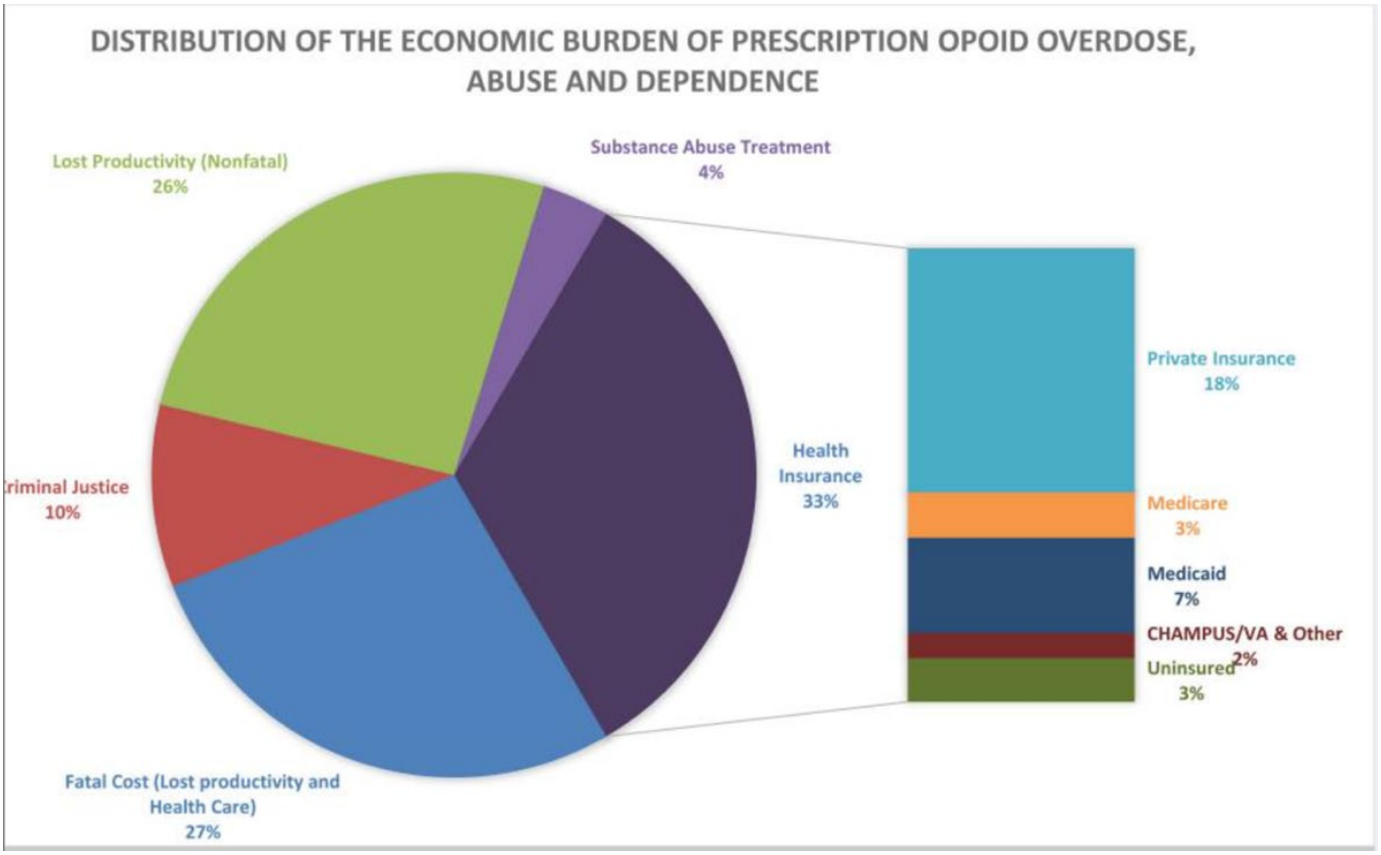


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Figure 4.[71]

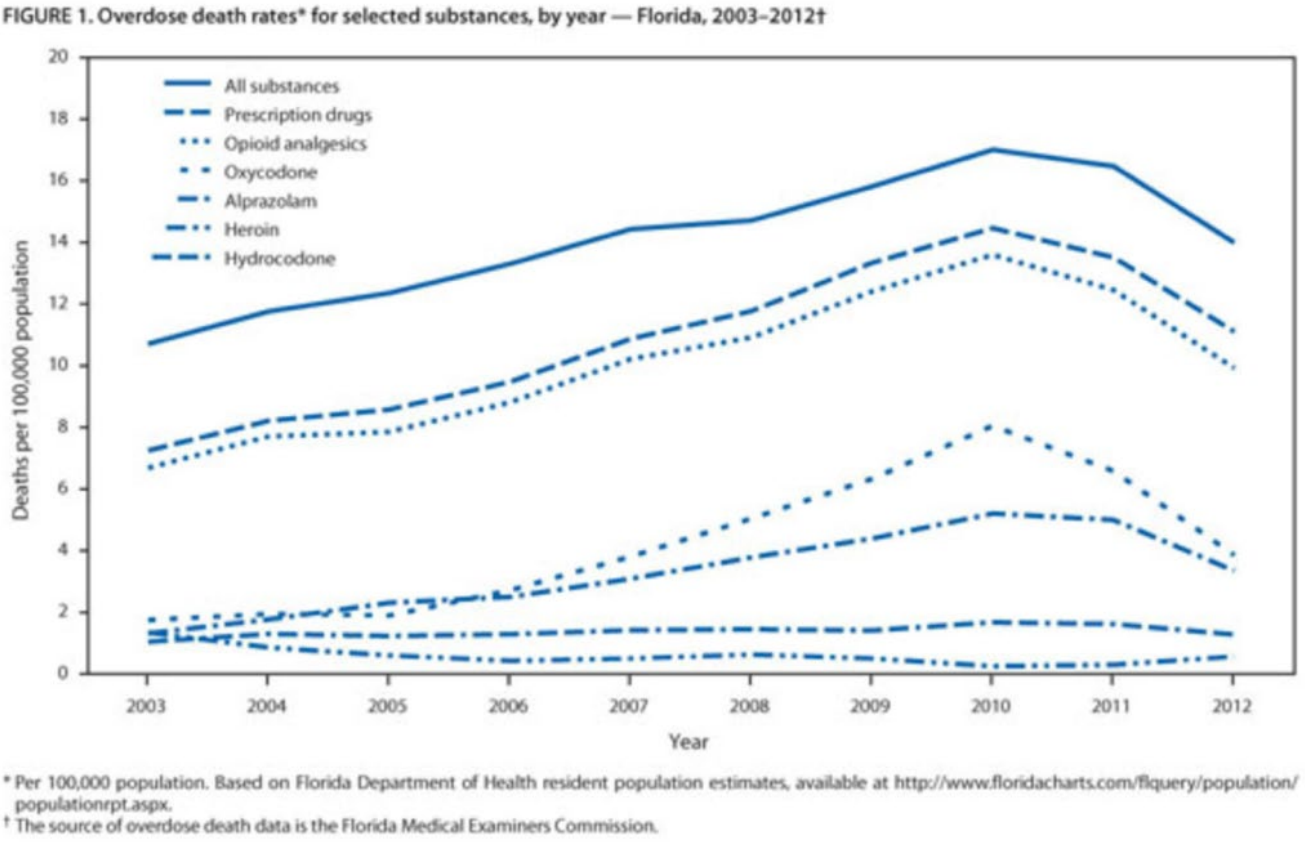

FIGURE 1. Overdose death rates* for selected substances, by year — Florida, 2003–2012†

* Per 100,000 population. Based on Florida Department of Health resident population estimates, available at http://www.floridacharts.com/flquery/population/populationrpt.aspx.

† The source of overdose death data is the Florida Medical Examiners Commission.

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