

A Population Health Approach to America's Opioid Epidemic

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The United States is in the midst of a nationwide public health emergency: an epidemic of opioid misuse and abuse that has been called the deadliest drug crisis in American history. This article reviews the current status of the opioid epidemic, the trends over the last 30-40 years that may have contributed to the epidemic, and a population health approach to addressing the epidemic. The epidemic is conceptualized from a population health perspective—an upstream and midstream perspective focusing on prevention and a downstream perspective targeting access to evidence-based interventions and maximizing health whether using or abstaining. Within the context of acute care, this approach will include patient screening for opioid use and other risk factors for addiction, use of opioid-sparing analgesics, and follow-up care that addresses pain and pain relief without opioids. For individuals who need addiction treatment, a gradualism philosophy is put forward. Gradualism recognizes the incremental nature of behavior change and recommends strategies to maximize health and functioning—through harm reduction—at all points along the journey to overcome addiction. Working within communities to address the broad factors that contribute to opioid-related substance use disorder is also essential.

The misuse of and addiction to opioids, including prescription opioids, heroin, and synthetic opioids such as fentanyl, is a serious problem that affects not only the health of many Americans but social and economic welfare of our country (National Institute on Drug Abuse [NIDA], 2018a). Across America, “individuals, communities and health care systems are struggling to cope with substance use, misuse, and substance use disorders” (U.S. Department of Health and Human Services, 2016, p. 1) and the problem is becoming deadlier than ever. In 2013, the U.S. Department of Health and Human Services declared the misuse of prescription opioids an epidemic. In October 2017, President Trump declared the opioid epidemic a national public health emergency (Mercia, 2017). It is critical that all clinicians understand the scope of the opioid epidemic and recognize that medical treatment, although important, is only part of the solution. Awareness of upstream, population, and community health approaches to arrest the growing epidemic is needed.

Current Status of the Opioid Epidemic

Opioid addiction includes the abuse of prescription, nonprescription, and illegal pain relievers that are derived from the opium poppy plant or man-made using the same chemical structure. Opioids include oxycodone, hydrocodone, codeine, fentanyl, tramadol, morphine, and heroin. The current opioid crisis is officially the deadliest drug crisis in American history (Katz, 2017). Nearly 200 Americans die each day from drug overdose (NIDA, 2018b). In August 2018, the NIDA reported that there were more than 72,000 drug overdose deaths in the United States in 2017. This is more than four times the rate of overdose deaths from 1999. Drug overdoses are now the leading cause of death for Americans under the age of 50 years. Overdoses killed more Americans in 2017 than guns (37,400), car accidents (38,000), or breast cancer (40,000) (Cullen, 2017). Recent UN data show that although America has around 4% of the world's population, it experiences 27% of the world's drug overdose deaths (United Nations Office on Drugs and Crime, 2016).

The overdose rate has increased an average of 10% per year from 1999 to 2006, when the epidemic slowed down, increasing just 3% per year from 2006 to 2014. The number of drug overdose deaths began to rise again from 2014 to 2016, increasing by 18% per year; the increase from 2016 to 2017 was 13%. This increase is primarily attributable to the use of synthetic opioids, particularly illicit fentanyl either alone or mixed with other opioids such as heroin (Centers for Disease Control and Prevention [CDC], 2018).

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Drug overdoses are a nationwide problem as evidenced by the national overdose death rate of 19.8 in 2016; however, there is significant variation in rates between and within states. The states with the lowest drug overdose death rates are Iowa (10.6), North Dakota (10.6), Texas (10.1), South Dakota (8.4), and Nebraska (6.4). The four states with the highest age-adjusted drug overdose death rates were West Virginia (52.0), Ohio (39.1), New Hampshire (39.0), and Pennsylvania (37.9) with the District of Columbia rounding out the top five (38.8). Twenty-six states experienced statistically significant drug overdose death rate increases from 2015 to 2016—all were in the Northeast, Midwest, and South, and none were in the West (Hedegaard, Warner & Minino, 2017).

Demographics of the Opioid Crisis

A closer examination of who is dying from opioid overdose shows that rates are higher for males than for females, although women aged 40–64 years represent the fastest growing demographic for rates of death and emergency department visits (Brandeis University Heller School for Social Policy and Management, 2013). Death rates increased for all age groups, upending the myth that the opioid crisis is solely or even primarily an issue affecting young people. As shown in Figure 1, opioid overdose rates were highest for persons aged 25–34 (34.6 per 100,000), 35–44 (35.0), and 45–54 (34.5) years.

Seventy-nine percent of individuals who overdose on opioids are non-Hispanic White, 10% are Black and non-Hispanic, and 8% are Hispanic (Henry J. Kaiser Family Foundation, 2018). Some attribute this to the fact that providers are more cautious in prescribing opioids to non-Whites perhaps from unconscious bias and prejudices that non-Whites were more likely to abuse or sell drugs (Hansen & Netherland, 2016). Consequently this “white privilege” led to Whites being more likely to get prescription opioids and the subsequent rise in opioid use, addiction, and overdose in the White population. In the past several years however, the rate of overdose death for Blacks has been rising as the pattern of the epidemic shifts

from being primarily about opioid pain killers and more about heroin and fentanyl (Hansen & Netherland, 2016).

Beyond age and race, individuals who exhibit mental health conditions like anxiety and depression are three times more likely to use opioids. In a cross-sectional study using data from the Medical Expenditure Panel Survey for 2011 and 2013, it was found that of the 38.6 million Americans with anxiety and depression, 7.2 million or 18.7% took opioids (as compared with 5% in individuals who did not have anxiety or depression). Translated, this means that adults with mental health conditions receive about 51.4% (60 million of 115 million prescriptions) of the total opioid prescriptions given each year (Davis, Lin, Liu, & Sites, 2017).

The depression–opioid connection may be linked to what some have argued—that opioid overdose deaths may, in fact, be “deaths of despair,” similar to suicides and alcoholic liver disease (Dasgupta, Beletsky & Ciccarone, 2018). Examining death rates, economists have found that the hardest hit have been white Americans without college degrees in rural areas and regions where manufacturing and construction jobs have been decreasing over the past decades. Financial strain associated with job loss and wage stagnation is associated with pain, distress, social dysfunction, and desperation and may explain why these areas have the starkest increase in premature mortality due to preventable deaths (Case & Deaton, 2017; Hoban, 2017).

Another at-risk group for possible opioid misuse are individuals with physical ailments—a back or knee injury, for example—for which a narcotic analgesic is prescribed as well as patients who have had surgical procedures. Højsted and Sjøgren’s (2007) literature review of addiction to opioids in patients with chronic pain reported that up to 50% of patients who take opioids for chronic noncancer pain become addicted. An older but one of the few prospective studies on the problem reported that 24% of patients who were taking opioids for chronic pain for an average of 36 months became addicted (Bouckoms et al., 1992). Brummett et al. (2017) found that of 36,177 surgical patients, the incidence of

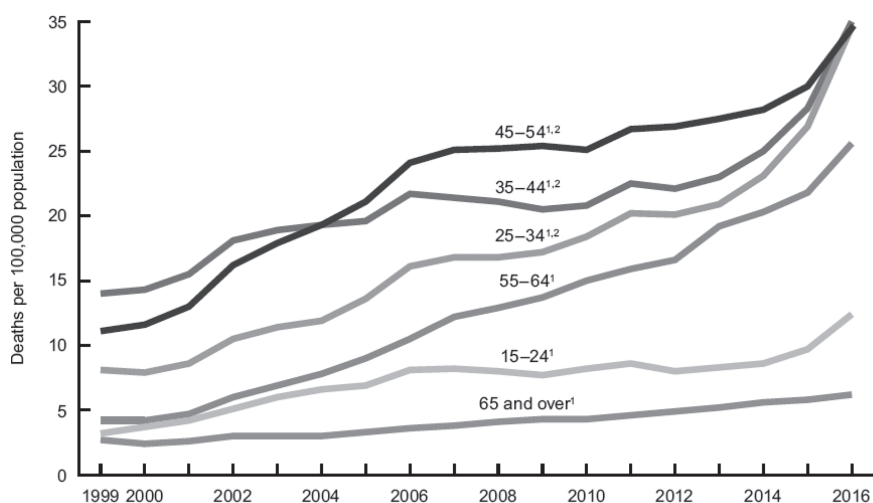


FIGURE 1. Drug overdose death rates, by selected age group, United States, 1999–2016. From “Drug Overdose Deaths in the United States, 1999–2016,” by H. Hedegaard, M. Warner, and A. M. Minino, NCHS Data Brief, No. 294. December 2017. <https://www.cdc.gov/nchs/data/databriefs/db294.pdf>

new persistent opioid use after surgical procedures was between 5.9% and 6.5%. They also found that the incidence did not differ between major and minor surgical procedures. Even when opioids were prescribed for low-pain, outpatient, or short-stay surgeries, there was an increased risk of persistent opioid use. They concluded that persistent opioid use can be considered one of the most common complications after elective surgery.

Tip of the Iceberg

One must keep in mind that overdose deaths are the most visible and easily enumerated symptom of this crisis, the proverbial tip of the iceberg. The portion of the iceberg above the water represents the approximately 72,000 deaths per year; the portion of the iceberg below the water's surface represents the number of nonfatal overdoses (estimated to be 30 nonfatal overdoses for every opioid-related death; Hsu, 2017) as well as the many biopsychosocial and economic consequences of opioid use. A 2003 Australian study estimated that the ratio of nonfatal to fatal overdoses is 31.3:1 (with a range of 23.8:1–37.5:1; Darke, Mattick, & Degenhardt, 2003). Generalizing the study to the United States would mean that more than 2.26 million people experienced a nonfatal drug overdose in 2017.

Although most individuals recover from the effects of an opioid overdose, some have persistent long-term consequences, including injuries such as fractures, muscle tissue breakdown, peripheral neuropathy, kidney failure, heart problems, seizures, nerve damage, temporary motor paralysis, fluid build-up in the lungs, pneumonia from inhaling vomitus, stroke, and other neurological consequences (Clark, 2014). Larochelle et al. (2018) examined overdose survivor data and found that there was an increased risk of death in the 12 months after an overdose.

Opioid misuse impacts one's ability to concentrate, causes mood fluctuations, and is likely to be accompanied by changing interests as drug cravings become compulsive. This leads to social consequences, which often encompass job loss, relationship changes, divorce, and isolation from friends, family, and normal activities. Other indirect consequences of opioid misuse include risky behaviors that impair judgment and contribute to driving under the influence, unprotected sex, and needle/syringe sharing. Using 2013 data, it was estimated that America's prescription opioid epidemic cost our country \$78.5 billion, including \$26 billion in healthcare (Florence, Luo, Xu, & Zhou, 2016). That number is most certainly much higher today.

Context Leading to the Opioid Epidemic

The term "opioid epidemic" conflates two related issues: one is the misuse and abuse of prescription drugs, and the other is the abuse of illegal opioid drugs such as heroin and fentanyl. A history of the current epidemic, as well as a description of the natural history of addiction for the typical overdose victim, is warranted.

It is well established that the roots of our current opioid epidemic date back to the 1980s when physicians

were incorrectly reassured that the risk of addiction was low when opioids were prescribed for chronic pain. A one-paragraph letter appeared in the *New England Journal of Medicine* in 1980 claiming that there were only four cases of documented addiction out of 11,882 patients who were given at least one narcotic preparation. The article concluded that "despite widespread use of narcotic drugs in hospitals, the development of addiction is rare in medical patients with no history of addiction" (Leung, MacDonald, Stanbrook, Dhalla, & Juurlink, 2017). Despite the fact that this short article was not evidence-based, it has been cited hundreds of times in the literature and even more often by representatives of drug manufacturers (Meier, 2007) who used it to aggressively market drugs like OxyCotin (oxycodone HCL). Likewise, the Joint Commission, in a book published in 2000 targeting doctors as part of required continuing education seminars, cited studies claiming, "there is no evidence that addiction is a significant issue when persons are given opioids for pain control" (Moghe, 2016); the book was sponsored by Purdue Pharma. It is now widely accepted that addiction is a significant issue when prescribed for pain.

Others have also blamed the increasing use of opioids for chronic pain on the more recent emphasis on pain as the fifth vital sign (Mandell, 2016; Volkow, 2014, May 14). In the mid-1990s, the American Pain Society aggressively encouraged the concept of pain as the fifth vital sign. Their aim was to raise awareness that patients with pain were undertreated, in part because pain was not regularly assessed in either primary or tertiary care. In late 1990s, the Joint Commission and others who joined the campaign emphasized that pain needs to be assessed regularly and that as pain is a subjective measure, that providers should respect patient self-reporting of pain. Given that providers were told that prescription opioids were unlikely to be addictive, the number of prescriptions in the United States skyrocketed from about 76 million in 1991 to nearly 207 million in 2013 (Volkow, 2014).

Another aspect of the opioid epidemic that is often raised, but not understood, is the role that patient satisfaction plays in "over"-prescribing. Patient satisfaction is one of the pillars of patient-centered care. Although patient feedback generally promotes improvements in care and practice, it may, at the same time, promote overprescribing of unnecessary medications, including opioids and other addictive medications. A study by Fenton, Jerant, Bertakis, and Franks (2012) concluded that "In a nationally representative sample, higher patient satisfaction was associated with less emergency department use but with greater inpatient use, higher overall healthcare and prescription drug expenditures, and increased mortality." Not that anyone would recommend treating patients in a way that decreased their satisfaction with the care they receive, but it does emphasize the importance of following evidence-based guidelines and excellent patient-provider communication, particularly when following the guidelines means making a decision with which your patient might disagree.

Americans consume prescription opioids at a greater rate than any other population in the world (Humphreys, 2018). The United States consumes almost 100% of the world's hydrocodone and 81% of the world's oxycodone

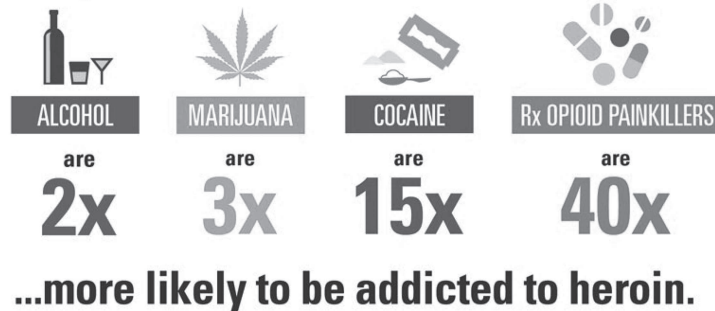
Heroin use is part of a larger substance abuse problem.

Nearly all people who used heroin also used at least 1 other drug.

Most used at least 3 other drugs.

Heroin is a highly addictive opioid drug with a high risk of overdose and death for users.

People who are addicted to...



SOURCE: National Survey on Drug Use and Health (NSDUH), 2011-2013.

FIGURE 2. Heroin use is part of a larger substance abuse problem. From “Today’s Heroin Epidemic Infographics,” by Centers for Disease Control and Prevention, July 7, 2015. <https://www.cdc.gov/vitalsigns/heroin/infographic.html>.

(Volkow, 2014). The CDC reported that between 1999 and 2010 there was a fourfold increase in opioid prescriptions. In 2012, providers wrote 259 million prescriptions for analgesics, enough for every American adult to have their own bottle of pills (CDC, 2014). In a study examining chronic pain and opioid use in developed and underdeveloped countries, the United States was found to have similar age standardized prevalence of chronic pain as in France and Italy. However, per capita daily opioid consumption was 6–8 times more in the United States than in Italy (6,246) and France (8,706) (Humphreys, 2018), with a staggering per capita figure of 50,142 (Humphreys, 2018).

One of the unanticipated problems with the level of prescribing is the volume of prescribed opioids diverted for recreational use. Drug diversion occurs when unused prescription drugs are stolen from home medicine cabinets (typically by family or friends), when medication is traded at school, and when drugs are shorted (“undercounting), pilferage, and recycling of medications at pharmacies”; as a result of the illegal sale of prescriptions by providers and pharmacists; when patients “doctor shop” wherein patients visit multiple physicians to obtain multiple prescriptions; when prescriptions are “doctored”; and from theft or cross-border smuggling (Inciardi, Surratt, Lugo, & Cicero, 2007). Hydrocodone and oxycodone are the most frequently diverted opioids followed by fentanyl, hydromorphone, and methadone. Lankenau et al. (2012) interviewed a sample of young, urban injection drug users and found that 86% had used opioids recreationally before using heroin, and their initiation into recreational use was characterized by three main sources of opioids: family, friends, or personal prescriptions.

The availability of opioids is not surprising when one considers that 72% of opioids prescribed after general

surgery go unused. Hill, McMahon, Stucke, and Barth (2017) speculated that providers overprescribe because they do not know how many pills most patients actually take to relieve postoperative pain and tend to estimate on the basis of the needs of the patients requiring the most. Another reason might be the desire to avoid the inconvenience (to both the patient and the provider) of a return trip to obtain a refill; this is particularly an issue in rural communities where patients might live far from their provider. Unused opioids left in the medicine cabinet are easy fodder for diversion. Data from the CDC (2017, par. 6) state that “Most people who abuse prescription opioids get them for free from a friend or relative.” Individuals at the highest risk of overdose “get opioids using their own prescriptions (27%), from friends or relatives for free (26%), buying from friends or relatives (23%), or buying from a drug dealer (15%).”

The Connection Between Prescription Drugs and Heroin

Diversion, misuse, and abuse of opioids resulted in a 493% increase in the rate of opioid use disorder between 2010 and 2016 (Lopez, 2017). Prescription medications make up about 63% of overdose cases (Hedegaard et al., 2017). Cicero, Ellis, Surratt, and Kurtz (2014) did a retrospective analysis of heroin use in the United States over the past 50 years and documented a shift over the last two decades in the demographics of heroin users from an inner-city, minority population to one of a wider suburban geographical spread, involving primarily White women and men in their late 20s. Of note is that approximately 75% of heroin users in treatment started their opioid misuse with prescription analgesics.

Muhuri, Gfroerer, and Daies (2013) pooled data from the National Survey on Drug Use and Health, the primary

source of statistical information on the use of illicit drugs, alcohol, and tobacco by the U.S. civilian noninstitutionalized population aged 12 years or older and reported that the incidence of heroin initiation was 19 times higher among people who reported prior recreational pain reliever use. Similarly, a 2015 CDC report found that people who are addicted to prescription opioids are 40 times more likely to be addicted to heroin. Figure 2 shows that the connection between heroin use and use of pain killers is stronger than with alcohol, marijuana, and cocaine.

Trajectory analysis of patterns of recreational use of prescription opioids shows that people generally start with oral opioids. As tolerance develops to oral opioids, the individual must use more medication to achieve the same effect (Compton, Jones, & Baldwin, 2016). An alternative to the expense of using more medication is changing the route of administration. More powerful effects can be achieved through inhalation, smoking, or injection. A shift to illegal opioids such as heroin may ultimately occur as it is readily available, more potent, cheaper, and easier to manipulate for nonoral administration (Compton et al., 2016).

Despite the fact that the majority of current heroin users have a history of using prescription opioids non-medically prior to heroin use, the trajectory from recreational opioid use to heroin use is the exception, rather than the rule. Muhuri et al. (2013) reported that 3.6% of recreational opioid users initiated heroin use within 5 years after beginning recreational use of prescription opioids; Jones, Mack, and Paulozzi (2013) found a rate of 4.2%. Although these percentages are small, the fact that there are a large number of recreational users means that several hundred thousand persons may be on a trajectory to heroin use. According to national surveillance data, 914,000 people reported heroin use in 2014, a 145% increase since 2007 and mortality due to heroin overdose more than quintupled, from 1842 deaths in 2000 to 10,574 deaths in 2014 (Compton et al., 2016). In 2016, prescription drugs were involved in 23% of all deadly overdoses, heroin in about a quarter, and synthetic opioids such as fentanyl played a role in nearly a third (Kounang, 2017). In 2017, fentanyl was responsible for nearly 42% of overdose deaths (NIDA, 2018a). So, although the bulk of overdose opioid deaths are from illegal drugs, many of the individuals addicted to street drugs actually started, innocently enough, with a prescription as the “gateway drug.”

Where Is the Epidemic Heading?

Despite intensive efforts to reduce the risks from prescribed opioids with prescribing guidelines, prescription-monitoring programs, and other risk mitigation programs, the opioid epidemic is worsening. However, the illicit manufacturing of synthetic opioids has presented a new, more dangerous problem. In 2016, synthetic opioids surpassed prescription opioids as the leading cause of drug overdose deaths. Increased availability of illicitly manufactured fentanyl and heroin laced with fentanyl (100 times more potent than morphine and 50 times more potent than heroin) (The Recovery Village, 2018) and carfentanil (10,000 times more potent and deadly with a dose the size of a grain of salt) (“A New Front,” 2016) is a major treatment and public health crisis. The

potency of fentanyl and carfentanil presents multiple dangers. Individuals are often unaware of the potency of what they are taking, leading to accidental overdosing on fentanyl-laced heroin and synthetic opioids (Hayes & Manos, 2018). This presents treatment challenges: individuals tolerant to such high-potency opioids may appear to be resistant to naloxone when in fact they need extremely large doses (Rao & Nelson, 2017).

Stopping the deadly trend in the use of highly potent synthetic opioids will require stopping the inflow of synthetic opioids. A recent Senate Homeland Security subcommittee investigation found that synthetic opioids are readily available and cheap and can be purchased on the web (darkweb) predominantly from China and delivered through the U.S. Postal Service, which does not have the regulations that private carriers have requiring information about packages (where it is from, where it is going, and what is in it) (Portman, 2018).

Addressing the Epidemic: A Focus on Population Health, Prevention, and Risk Reduction

Given the status of the epidemic, nearly everyone knows someone (or knows someone who knows someone) who is addicted or has died from an opioid overdose. Those who do not know anyone personally certainly know of celebrities who have died from opioid abuse—Tom Petty, Philip Seymour Hoffman, Bruce Lee, Elvis Presley, Heath Ledger, and Prince, to name a few. Many of us wonder what we can do to help, personally and professionally.

Efforts must be taken to consider the opioid crisis from a population health perspective from an upstream and midstream perspective focusing on prevention to a downstream perspective targeting access to evidence-based interventions and maximizing health whether using or abstaining. This requires proactive partnerships across sectors involving government agencies, healthcare clinicians and providers, pharmaceutical industries, police and judicial personnel, emergency management personnel, and individuals and families within the community. Such coalitions can examine their own population/community to address prevalence, disparities, root causes, system and care gaps, and community knowledge and attitudes to prevent opioid misuse and abuse, implement evidence-based policies and treatment practices, and ensure that there are affordable and accessible community-based treatment and recovery supports.

Traditional approaches to addiction therapy have mandated abstinence from all drugs. This has left individuals who were using but unwilling or unable to abstain outside the care system, exposed to growing risks because of the dangers associated with opiate use. A newer philosophy known as gradualism has gained greater recognition in the addiction field (Brandeis University Heller School for Social Policy and Management, 2013). Gradualism recognizes the incremental nature of human behavior change and recommends strategies to maximize health and functioning at the different points or stages of addiction recovery such as currently addicted and using, trying to cut down on use, or trying to control/abstain. At each point,

the focus is on maximizing health and reducing harm for the individual through harm-reduction strategies.

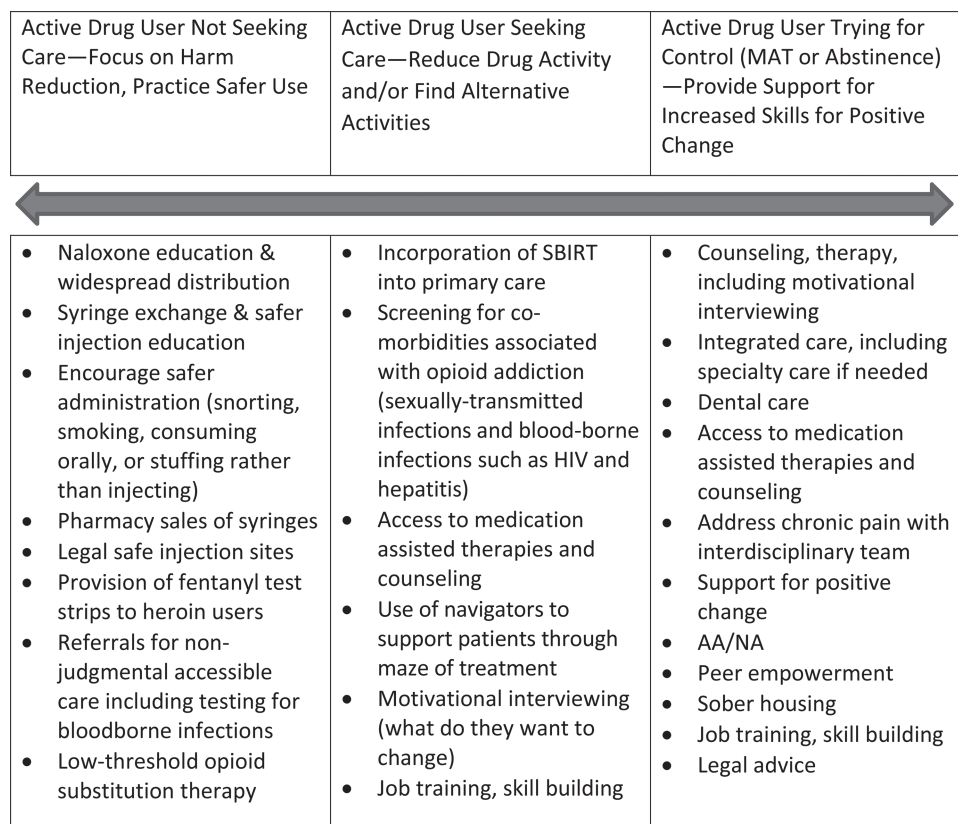
The aim of harm-reduction strategies is to minimize tragic deaths, injuries, and disability related to opioid use, misuse, or abuse (Brandeis University Heller School for Social Policy and Management, 2013). Harm reduction is not an alternative to treatment but rather a support to people who use drugs to improve health and functioning through safer practices. Harm reduction acknowledges that when people are unable or unwilling to abstain from drug use, they can make positive choices to protect their health and well-being and the well-being of their communities (Brandeis University Heller School for Social Policy and Management, 2013). Harm reduction is both a philosophy and a set of activities inclusive of “medical services, public health interventions, expanded access to treatment, and social services, as well as activities designed to counteract adverse consequences from policies that rely on prosecution and incarceration of drug users” (Brandeis University Heller School for Social Policy and Management, 2013, p. 6). In the United States, harm reduction is often met with resistance based on the perception that it supports drug behavior. Harm-reduction activities aim to move the person who uses drugs toward healthier behaviors. As shown in Figure 3, strategies aim to improve health at each point in the continuum, from active user to trying to reduce to trying for control/abstinence.

The goal of all care is to improve or maintain health, whether that should be to prevent a problem or maximize health once a problem exists. Table 1 illustrates the population-health prevention continuum extending from health to disease and encompassing primary, secondary, and tertiary prevention or what public health refers to as upstream, midstream, and downstream.

PRIMARY PREVENTION

Primary or universal prevention is an upstream approach—addressing broad factors that contribute to opioid-related substance use disorder (ORSUD). It targets the entire population whether that is a neighborhood, school, community, state, or nation. The primary goal of primary prevention is to thwart the onset of ORSUD by raising community knowledge and awareness, improving communication and coordination across agencies, disseminating surveillance information, and policy and infrastructure development that supports harm reduction (Brandeis University Heller School for Social Policy and Management, 2013).

A key aspect of primary prevention is confronting the stigma associated with the ORSUD and its treatment with medications. Stigma limits the availability of care and discourages people with opioid misuse problems from seeking effective services (Olsen & Sharfstein, 2014; Gourevitch, 2017). To overcome stigma, we must educate the community that ORSUD is a medical illness, not a moral weakness.



*Adapted from Brandeis University Heller School for Social Policy and Management, 2013

FIGURE 3. Gradualism applied to treatment of opioid use disorder. Adapted from *Upstream opportunities for Reducing the Harm of Alcohol and Drug Use* by Brandeis University Heller School for Social Policy and Management, 2013. <https://sihp.brandeis.edu/ibh/pdfs/OSI-Final-Report-10302013-MJL.pdf>.

TABLE 1. POPULATION HEALTH PREVENTION CONTINUUM

Prevention		
Primary/Universal	Secondary/During Development of Condition	Tertiary/After Condition Has Occurred
<ul style="list-style-type: none"> • Increased community knowledge of addiction and treatment as a chronic illness—a brain disease not a sign of personal weakness • Increased community awareness and knowledge of risks of opioids, overdose and overdose-prevention strategies <ul style="list-style-type: none"> ◦ Community education ◦ Websites to provide information and EB approaches that can be adopted by practitioners and communities ◦ Tool kits • Policies that support therapeutic treatment versus criminal justice response—jail and court diversion • Advocacy for comprehensive naloxone overdose prevention laws including good Samaritan laws that protect prescribers and drug administrators • Integrated use of data from state PDMPs, law enforcement, and medical examiner to provide “real-time” surveillance information that can be used in community prevention efforts • Integration of PDMPs from all 50 states • Robust health information systems that are mineable for surveillance and treatment functionality • Clinician and provider education <ul style="list-style-type: none"> ◦ Comprehensive education to students and practitioners regarding pain management approaches, opioid prescribing practices/guidelines, screening & symptoms of abuse, MAT ◦ Education on drug overdose and reversal ◦ Educational programs for specialty areas, i.e., pediatrics, public health, emergency care • Increased community knowledge of value of harm-reduction strategies and partnerships with law enforcement to advance harm-reduction strategies available in community • Mental health services integrated within primary care 	<ul style="list-style-type: none"> • Respectful care without stigma • Targeted at-risk populations: Those with debilitating or painful injuries or conditions; those with mental health problems; pregnant mothers at risk of using opioids; homeless or other marginalized populations <ul style="list-style-type: none"> ◦ Education on risks of opioid therapy/use ◦ Access to comprehensive pain management approaches including complementary therapies, pain specialists, palliative care ◦ Screening for anxiety, depression, and PTSD so that problems can be recognized and treated early ◦ Screening for drug problems, using e.g., SBIRT ◦ Vocational training ◦ Drop in or sidewalk care with coordination of psychiatric medications ◦ Trauma-informed counselling/communication approaches ◦ Supportive housing (Housing First) without requirements for abstinence or treatment • Identification of high-risk target populations <ul style="list-style-type: none"> ◦ Data mining/hot spotting ◦ Community needs assessments of high risk • Screening in primary care with appropriate handoffs for support and care coordination <ul style="list-style-type: none"> ◦ Screening to Brief Intervention for adolescent patients ◦ Brief Screener for tobacco, alcohol, and drug use for adolescent patients ◦ Tobacco, alcohol, prescription medication, and other substance use ◦ NIDA Quick Drug Use Screening Tool for Adults ◦ Opioid Risk Tool ◦ SBIRT • Clear identification of community-based recovery/treatment/support programs that reinforce integrated care and facilitates patient choice so information • Harm-reduction programs <ul style="list-style-type: none"> ◦ Widespread distribution of naloxone and training for community members ◦ Needle exchange programs ◦ Safe injection sites ◦ Employment training to empower drug users ◦ Housing First—providing permanent housing and then providing services as decided by patient • Peer advocate training targeting harm reduction and navigation • Clear identification of network of support within the community and active referral/connections to support • Access to resources (toolkits, pamphlets, websites) for those identified at risk and those caring for those at risk 	<ul style="list-style-type: none"> • Respectful care without stigma • Overdose protection in emergency rooms with naloxone treatment and buprenorphine • Harm reduction through access to psychosocial services and case management/care coordination even when actively using • Peer navigators and counseling • Proactive screening for comorbid problems associated with drug use—blood-borne infections including HIV & viral hepatitis, sexually transmitted infections, tuberculosis • Motivational interviewing to facilitate behavioral change and allow patients to make own decisions about therapy goals • Voucher-based incentives combined with skill/vocational training • Improved access to care inclusive of MAT with and without abstinence in combination with behavioral therapy • Support/expanded recovery communities for those receiving MAT • Continued care and recovery support services providing care coordination and peer recovery support • Expanded number and scope of treatment and recovery support services available • Better access to long-term care support • Specialty programs caring for mothers and neonates exposed prenatally to opioids

Note. EB = evidence based; MAT = medication-assisted treatment; PDMP = Prescription Drug Monitoring Program; SBIRT = Screening, Brief Intervention, and Referral to Treatment.

Recovery is not simply a matter of willpower and treatment programs that mandate abstinence may be fine for some but block recovery for other individuals with ORSUD. Access to medication-assisted treatment (MAT) services, along with behavioral health counselling, is an important addition to

the services available in the community. Extended treatment that includes prescribed medications has been shown to enhance recovery and has a lower risk of relapse. In fact, “there is no other treatment approach supported by the same level of evidence” (Olsen & Sharfstein, 2014, p. 1393).

Much of primary prevention is public education such as raising awareness of the risks of opioids and ORSUD and approaches to preventing harm and treating the problem (see Table 1). Although nurses in any specialty may care for persons with ORUSD, they may not be up-to-date on risk-reduction approaches and treatment. Box 1 provides resources for educating professionals and the community on the opioid epidemic and treatment.

Educating the community about harm reduction is important so that communities can develop resources to maximize the health of users that are either not yet ready for treatment or for whom treatment is a challenge. Table 2 provides information on proposed harm-reduction programs for active drug users. There is some resistance in the United States to harm-reduction programs because of the belief that such programs support drug use. In actuality, harm-reduction programs “help the drug community to be safer and help society as a whole by reducing death, hospitalizations, and the tremendous subsequent cost” (Dubois, 2017, p. 41). Harm-reduction programs provide opportunities for people who are addicted to be safe while working toward or

considering recovery. Such programs give drug users a fighting chance to change and to be safer.

SECONDARY PREVENTION

Secondary prevention, or indicated prevention, are mid-stream approaches addressing subsets of the population who are at a higher risk for ORSUD because of biological, psychological, or social risk factors common to that group or capturing people in the early stages of the problem. The goal is early recognition, prevention of high-risk behavior and for individuals who have initiated opioid use, halting progression to opioid dependence or harm.

Secondary prevention looks at Interventions targeting the entire at-risk subgroup, regardless of the identified need or risk of any individual within the group. People are recruited to participate in prevention activities based on their high-risk subgroup characteristic. For example, secondary prevention may target children at risk and strategies may include groups for children of substance abusing parents or families living in high crime or impoverished neighborhoods. Other high-risk groups may be children or adolescents experiencing

Box 1. RESOURCES ON THE OPIOID EPIDEMIC

- Opioid Abuse Toolkit developed by Rutgers' Ernest Mario School of Pharmacy. <https://pharmacy.rutgers.edu/info-for/opioid-abuse-toolkit/>
- Centers for Disease Control and Prevention. *Understanding the opioid epidemic*. <https://www.cdc.gov/drugoverdose/epidemic/index.html>
- Canadian Nurses Association. (2017). *Harm reduction & illicit substance use implications for nursing*. <https://www.cna-aic.ca/-/media/cna/page-content/pdf-en/harm-reduction-and-illicit-substance-use-implications-for-nursing.pdf?la=en&hash=5F5BBCDE16C7892D9C7838CF62C362685CC2DDA7>
- NIH. *Opioid overdose crisis*. <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis>
- Department of Health and Human Services. *What is the U.S. opioid epidemic?* <https://www.hhs.gov/opioids/about-the-epidemic/index.html>
- Opioid Epidemic Resource Center (Elsevier). <https://www.elsevier.com/connect/opioid-epidemic-resource-center>
- The Opioid Epidemic-Resources for Parents <http://www.episcenter.psu.edu/OpioidResourcesParents>
- Health Resources and Services Administration (HRSA). *Opioid crisis*. <https://www.hrsa.gov/opioids>
- Health Resources and Services Administration (HRSA). *Primary care health digest, Special Edition: The opioid epidemic*. <https://content.govdelivery.com/accounts/USHHS/HRSA/bulletins/1e8d493>
- American Medical Association. *Reversing the opioid epidemic resources*. <https://www.ama-assn.org/delivering-care/reversing-opioid-epidemic>
- Rural Hub Information Hub. *Rural response to the opioid crisis*. <https://www.ruralhealthinfo.org/topics/opioids>
- American Society of Addiction Medicine. *Patient resources*. <https://www.asam.org/resources/patient-resources>
- American Pharmacy Association. *Opioid abuse, misuse and abuse resource center*. <https://www.pharmacist.com/opioid-use-abuse-and-misuse-resource-center>
- California Healthcare Foundation. *California Opioid Safety Network*. <https://www.chcf.org/resource-center/cosn/>
- North Carolina AHEC. *Opioid training resources for prescribers*. <https://www.ncahec.net/news/opioids/>
- Substance Abuse and Mental Health Services Administration (SAMHSA). *Your guide to SAMHSA's resources*. <https://store.samhsa.gov/product/Your-Guide-to-SAMHSA-s-Resources/PEP12-RESOURCEGUIDE>
- Substance Abuse and Mental Health Services Administration (SAMHSA). *SAMHSA publications and resources on medication-assisted treatment (MAT)*. <https://www.samhsa.gov/medication-assisted-treatment/training-resources/publications>
- Substance Abuse and Mental Health Services Administration (SAMHSA). *Evidence-based practices resource center*. <https://www.samhsa.gov/ebp-resource-center>
- National Council of State Board of Nurses (NCSBN). *Opioid toolkit*. <https://www.ncsbn.org/opioid-toolkit.htm>
- American Nurses Association (ANA). *The opioid epidemic*. <https://www.nursingworld.org/practice-policy/work-environment/health-safety/opioid-epidemic/>
- Duke University. *Strategies for promoting the safe use and appropriate prescribing of prescription opioids landscape analysis*. https://healthpolicy.duke.edu/sites/default/files/atoms/files/landscape_analysis_-_opioid_safe_prescribing_strategies.pdf
- *Medication-assisted treatment*. <https://www.integration.samhsa.gov/clinical-practice/mat/mat-overview>

TABLE 2. HARM-REDUCTION PROGRAMS FOR ACTIVE DRUG USERS

Program	Purpose/Activities	Outcomes
Widespread naloxone distribution	<ul style="list-style-type: none"> Naloxone is a μ-opioid antagonist with well-established safety and efficacy that can reverse opioid overdose and prevent fatalities. Broadened accessibility to naloxone for individuals commonly in a position to initiate early response to evidence of opioid overdose including family and companions. Laws that allow prescribers to give naloxone prescriptions to friends/family of users (rather than the end-user). Access to naloxone at pharmacies either by a standing prescription for eligible individuals or by designating naloxone as an over-the counter medication. Good Samaritan laws that provide persons administering naloxone in emergencies immunity from prosecution and civil liability. 	<ul style="list-style-type: none"> A naloxone distribution program in Massachusetts reduced opioid overdose deaths by an estimated 11% in the 19 communities that implemented it without increasing opioid use (Walley et al., 2013). A trial published in 2016 found that coprescribing naloxone rescue kits to patients treated with opioids for chronic pain in primary care resulted in reduced opioid-related emergency department visits (Coffin et al., 2016). A systematic review showed that evidence from 21 studies demonstrated that educational and training interventions for peers and family members, complemented by take-home naloxone, may help decrease overdose-related mortality (European Monitoring Centre for Drugs and Drug Addiction, 2015).
Needle or syringe exchange program (NSP)	<ul style="list-style-type: none"> Provide injection drug users with clean needles and a way to safely dispose of used needles, generally free of charge. Provide access to education and counseling—geared to meeting the person where they are, and gradually move them across the therapeutic continuum from harm reduction to moderation of use, to substance use treatment, to control of addiction. Nurses enhance the services of many syringe exchange programs by providing counseling about reproductive health; conducting pregnancy, HIV and STD testing; offering adult vaccines; teaching safer injection practices; providing wound care consultation; and arranging referrals for care (Wodak & Cooney, 2006). 	<ul style="list-style-type: none"> An international review of the evidence of needle syringe programs to reduce HIV infection among injecting drug users found compelling evidence of effectiveness, safety, and cost-effectiveness (Wodak & Cooney, 2006). In addition to reducing rates of blood-borne infections, syringe exchanges also provide users with access to treatment. Outcome research of the impact of needle exchange programs as part of the HIV epidemic has shown that they reduced HIV incidence by 93% in New Haven and 70% in New York City (Hilton, Thompson, Moore-Dempsey, & Janzen, 2001). Improved environmental safety as contaminated needles are kept off streets, parks, and dumpsters.
Pharmacy sale of needles/syringes	<ul style="list-style-type: none"> In many states, people who inject drugs can also obtain sterile needles and syringes at pharmacies without a prescription. 	<ul style="list-style-type: none"> Pharmacy-based syringe purchases have been shown to increase the number of pharmacy-based syringe purchases while reducing the sharing of syringes between injecting drug users (Cotten-Oldenburg, Carr, DeBoer, Collison & Novotny, 2001).
Medication-Assisted Treatment (MAT)	<ul style="list-style-type: none"> MAT, which combines behavioral therapy and medications to treat substance use disorders, can be prescribed by clinicians who are registered with the Drug Enforcement Administration (DEA) to dispense controlled substances. MAT can include methadone, buprenorphine (a combination of opiate mimic and blocker that can be taken as a sublingual tablet), Suboxone (buprenorphine combined with naloxone to discourage abuse as it does not produce a “high” if injected or snorted), or Vivitrol (an extended-release formulation of naltrexone, an opioid receptor antagonist) (Balhara, 2016). 	<ul style="list-style-type: none"> Patients on MAT have been consistently shown to use fewer illicit opiates, commit fewer crimes, and reduce their odds of contracting infections, such as hepatitis C virus and HIV, compared with those not taking substitution (Drug Policy Alliance, 2015; Kastelic, Pont & Stöver, 2008). When it comes to treatment, overwhelming evidence shows that MAT, when combined with behavioral therapy, is vastly more effective than behavioral therapy alone. Statistics show that a person with an opioid addiction is more likely to die from an overdose after attending a behavioral therapy-only treatment program than if they had not sought treatment at all.
Legalized safe injection houses	<ul style="list-style-type: none"> Safe injection houses are supervised injecting facilities that provide injecting drug users with a safe, medically monitored space in which to shoot up. Safe houses provide injecting drug users with access to clean needles, emergency care in cases of overdose, and (if they are ready) counseling about rehabilitation, treatment, and other health service options. 	<ul style="list-style-type: none"> A 2014 systematic literature review found that “all [of the 75 relevant articles] converged to find that SISs [supervised injection services] were efficacious in attracting the most marginalized PWID [people who inject drugs], promoting safer injection conditions, enhancing access to primary health care, and reducing the overdose frequency” (Potier, Laprèvote, Dubois-Arber, Cottencin & Rolland, 2014, p. 48). SISs were not found to increase drug injecting, drug trafficking, or crime in the surrounding environments. SISs were found to be associated with reduced levels of public drug injections and dropped syringes. At least eight countries worldwide host safe or supervised injection spaces. Most of these sites are in Europe; the only North American site was in Vancouver, Canada (Beach House, 2018).

(continues)

TABLE 2. HARM-REDUCTION PROGRAMS FOR ACTIVE DRUG USERS (Continued)

Program	Purpose/Activities	Outcomes
Safe disposal of unused opioids	<ul style="list-style-type: none"> Programs that allow members of the public to dispose of unused and expired medications anonymously, 365 days a year, at prescription drug drop boxes generally located within the headquarters of participating police departments, sheriff offices, and State Police barracks. The National Prescription Drug Take-Back Day and the American Medicine Chest Challenge are both 1-day events to dispose of unused medications. They are typically sponsored by the state DEA in collaboration with local partners. 	<ul style="list-style-type: none"> Opioid prescriptions returned for disposal had greater than 60% of the amount dispensed remaining unused (Welham, Mount, & Gilson, 2015). In comparing data from prescription drug monitoring database to drugs returned at a “take-back” program, authors concluded that controlled medications collected by take-back events and permanent drug donation boxes constituted a minuscule proportion of the number dispensed. The findings suggested that organized drug disposal efforts might have a minimal impact on reducing the availability of unused controlled medications at a community (Egan, Gregory, Sparks, & Wolfson, 2017).

academic failure, interpersonal social problems, antisocial behaviors, and behavioral health issues such as depression. At-risk youth may be linked to a program to increase school performance, decrease drug involvement, and decrease emotional stress. Building resiliency in the high-risk indicated group may prevent progression toward ORSUD (SAMHSA, 2018).

Secondary prevention also involves screening approaches in primary care or settings that target high-risk populations. Screening in primary care can use multiple approaches as indicated in Table 1 “Secondary/During Development of Condition.” A screening is a brief process that should occur for all persons in the setting and indicates whether the individual is likely to have or be at risk for a substance use disorder. Individuals who screen positive should then receive an in-depth assessment.

To reduce the supply of opioids vulnerable to misuse and mitigate risks of opioid use, efforts promoting safe prescribing of opioids are a key midstream strategy (Duke University Margolis Center for Health Policy, 2018). (Preservice education can be considered an upstream approach, whereas in-service training is a midstream approach.) Education of prescribers and clinicians is critical to this approach. There are many programs available to educate clinicians on substance abuse recognition and care. Some examples include the Opioid Prescribing Course for Health Care Providers through the Substance Abuse and Mental Health Services Administration, the Food and Drug Administration (FDA) Scope of Pain program (www.scopeofpain.org) developed to meet the template guidelines from the Federal Drug Administration risk evaluation and mitigation strategy, and Harvard University’s comprehensive online course on the opioid epidemic for professional and nonprofessional audiences, OpioidX: The Opioid Crisis in America. Participating in educational programs has been shown to improve knowledge, attitudes, confidence, and safe-opioid prescribing (Alford et al., 2016).

Preventing initial exposure to opioids should be considered whenever possible and is particularly warranted for minor surgical procedures in which nonopioid modalities can provide effective postsurgical analgesia (Mancini, 2017). Patients with preexisting psychiatric comorbidities or those with family histories of opioid dependence would also benefit from opioid-sparing analgesic strategies. For the acute care surgical patient, the use of multimodal analgesic regimens, including the use of long-acting local anesthetics, has become an approach for expediting movement away from opioid-centric pre-

scribing practices for postsurgical pain management (Chou et al., 2016). Clinicians should follow the CDC guidelines for prescribing opioids for chronic pain (<https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>) and incorporate the free CDC resources (fact sheets, user-friendly checklist decision aids, and smartphone apps for clinicians; <https://www.cdc.gov/drugoverdose/prescribing/clinical-tools.html>). For patients who are prescribed opioids, clinicians must provide an overview of the alternatives, benefits, risks, and how to minimize the risks. Table 3 provides guidelines for education when prescribing opioids for short-term use or for chronic pain.

Another strategy to facilitate safe prescribing and monitoring of opioids is Prescription Drug Monitoring Programs (PDMPs). The purpose of PDMPs is to help prevent and detect the diversion and abuse of pharmaceutical controlled dangerous substances (CDSs), including opioids, by enhancing the ability of state-level regulatory and law enforcement agencies to collect and analyze CDS prescription data through a centralized, state-administered database. PDMPs focus on the retail level where prescribed medications are purchased. As of June 2018, all U.S. states with the exception of Missouri had a PDMP, as does the District of Columbia (Prescription Drug Monitoring Program Training and Technical Assistance Center, 2018). Accessing this information online can identify if a patient is “doctor shopping”—visiting multiple providers in a short time span and receiving opiates. The effectiveness of PDMPs is limited in states where providers are not required to check the PDMP before prescribing an opioid. Efforts to embed PDMPs into the electronic medical record could decrease the burden of needing to check and facilitate this becoming part of normal workflow. Although the establishment of the PDMP is an upstream approach, encouraging its use by prescribers is a midstream approach.

TERTIARY PREVENTION

Downstream treatment of the person with an addiction requires respectful, nonjudgmental care and treatment of substance use as a chronic disease. Howard and Chung’s 2000a, 2000b, 2000c) comprehensive research on healthcare professionals’ attitudes toward alcohol and drug misusers showed that nurses were more judgmental than other professionals toward patients who misuse drugs. Emergency room nurses regarded patients with drug use disorders as troublesome and disliked caring for them. Replacing negative attitudes

TABLE 3. PRESCRIBING OPIOIDS FOR SHORT-TERM USE OR CHRONIC PAIN: EDUCATIONAL GUIDELINES

Educate: If you do prescribe opioids, patient education is key. Explain to the patient:

- Why opioids are being prescribed and any alternative treatments that may be available
- Proper use of the pain reliever, side effects
- The risks and harms of taking unnecessary opioids, including the risks of dependence, addiction, and overdose
- The importance of keeping all medications out of children's reach
- The dangers of taking opioid drugs with alcohol, benzodiazepines, and other central nervous system depressants
- How to properly dispose of unused opioids (see Table 2)
- Risk associated with diversion, warning never to share a prescription medication
- Timeline for tapering off opioids and weaning the patient onto nonopioid pharmacological therapy

Use a pain management: For those at risk for misuse, consider a "Pain management agreement," i.e., a written contract or agreement that is executed between a practitioner and a patient, prior to the commencement of treatment for chronic pain using an opioid or other controlled dangerous substance. The aim of such an agreement is to prevent misuse of a prescription pain medication. It also:

- Documents the discussion between the provider and the patient
- Establishes the patient's rights and obligations regarding responsible use, discontinuation, refills and storage
- Lists the nonopioid and nonpharmacological interventions recommended to complement and eventually replace the opioids as part of the pain management plan
- Specifies how the provider may monitor patient compliance, including random specimen screens and pill counts
- Outlines the process for terminating the agreement, including consequences if the provider has reason to believe that the patient is not complying with the terms of the agreement.

Prescribe electronically: When prescribing, use electronic prescriptions for opioids, prescribe for the shortest time reasonable, and consider having the patient return before renewing the prescription. Electronic prescriptions provide improved monitoring and reduce forgery.

with evidence-based interventions is paramount to helping patients reach the highest level of health possible (Bartlett, Brown, Shattell, Wright, & Lewallen, 2013).

Replacing negative attitudes with evidence-based interventions to treat persons with ORSUD is key in helping them achieve the highest level of health possible. Education of all care providers about the risk factors for opioid overdose; the signs of tolerance, dependence, and addiction; signs of overdose; naloxone rescue; other harm-reduction strategies; the nature of and treatment for addiction, with a focus on MAT; and where to refer patients for treatment are needed to improve healthcare.

Like other chronic diseases such as asthma and diabetes, addiction is generally refractory to cure, but effective treatment and functional recovery are possible (Volkow, Frieden, Hyde & Cha, 2014). Medication-assisted treatment for substance use disorders involves the use of medications (methadone, buprenorphine, and naltrexone) that target the brain, and psychosocial interventions (e.g., counselling, skills development) aimed at improving treatment outcomes. Evidence has shown that treatment with methadone or buprenorphine reduces risk of death by 60% and 40%, respectively (Larochelle et al., 2018). Medication-assisted treatment has also been shown to increase patients' retention in treatment, improve social functioning, reduce the risks of infectious-disease transmission, and decrease engagement in criminal activities (Volkow et al., 2014). Yet despite excellent outcomes, only about 30–34% of eligible patients receive MAT (Larochelle et al., 2018; Volkow et al., 2014). Low adoption of MAT may be related to a long-held preference for abstinence models. In line with the gradualism model and the strong evidence on the benefits of MAT, the FDA as well as SAMHSA has prioritized the expansion of treatment using MAT.

Psychosocial interventions are an important part of the care of the person with opioid use disorder. Motivational interviewing is a recommended technique for moving persons along the continuum toward taking action. Addiction counseling, mutual help groups, cognitive and behavioral therapies, and contingency management have been the most common counselling approaches. However, there are very few studies testing the efficacy of psychosocial approaches (SAMHSA, 2005).

Conclusion

With more than 700,000 drug overdose death between 1999 and 2017, the United States is facing the deadliest drug crisis in its history. A crisis that could claim 1 million lives by 2020 unless the course of the epidemic can be changed (Mitchell, 2018). In the wake of this devastating epidemic, it is important for nurses and other healthcare professionals to consider how they can use their training and skills to make a positive impact.

The FDA Commissioner, Dr. Scott Gottlieb, stated that this crisis would require concerted action by a number of actors in federal, state, and local governments, healthcare providers, the medical products industry, policymakers, patients, and their families to address the crisis from both supply-and-demand perspectives (Gottlieb, 2017). Concerted action is most effective if led by multisectoral coalitions at national, state, and local levels that ensure that reduction in demand for opioids is addressed with a population health perspective that considers upstream, mid-stream, and downstream factors for individuals and the population as a whole. Such a holistic approach must embrace prevention, including responsible prescribing, harm minimization for individuals who are using but not yet willing or able to abstain as well as

MAT as a component or mode of treatment. Nurses have an important role to play at all points in the population health spectrum from patient education to screening, identification of opioid-sparing alternatives, reviewing the PDMP before prescribing, and referral to care and services.

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