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United States Schools and the Opioid Crisis: Charting New Directions

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ABSTRACT

Background: The opioid epidemic has created unprecedented challenges in the United States (US), including hundreds of thousands of lives lost to overdose in the past five years. Expansion of prevention and treatment for opioid use disorder (OUD) is urgently needed, as evidence-based strategies exist but many remain unable to access life-saving services.

Purpose: To inform school health and mental health providers, educators and school administrators about the causes and consequences of the US opioid epidemic and to provide practical solutions for engineering multi-tiered systems of support for children and families affected by the epidemic, including through opioid misuse, OUD, and opioid overdose.

Methods: We review the literature on the history of and current challenges associated with the opioid epidemic in the US.

Results: The collateral damage of OUD is pervasive, impacting children and families across the US. We found no health education programs focusing on this topic in US schools, underscoring a critical need and cogent practice/policy avenue.

Discussion: Schools are uniquely positioned to respond to the opioid epidemic, but school health and mental health providers, educators, and other professionals who work in schools must have accurate knowledge of the opioid epidemic, understand the challenges it is causing for children and families, and be familiar with best practices in prevention and treatment.

Translation to Health Education Practice: This review provides a succinct overview of the history of the opioid epidemic, examines its impacts on children and families, and provides a call to action for schools to partner in our national response.

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IMPACT STATEMENT

The US opioid epidemic has caused broad devastation in homes, schools, and communities across the country. Increases in mental health disorders and isolation associated with the COVID-19 pandemic have only worsened the epidemic. School health and mental health providers, along with educators and school administrators, can play a critical role in delivering prevention messages, providing screening and linkage to evidence-based services, and offering psychosocial support for children and families impacted by opioid misuse and opioid use disorder (OUD). Decreasing the stigma surrounding the opioid epidemic is also critical, and school professionals/educators are well-positioned to play a key role in stigma reduction efforts in schools and communities. There is a critical absence of health education programs in the US focusing on this topic, underscoring the need for the development and expansion of such programs.

Background

The over prescription of the pain medication OxyContin, from ~1996–2014, created the largest base of opioid-dependent individuals in United States (US) history.[1] Though initially slow to act, policymakers ultimately took action to reduce the supply of prescription opioids in the US. However, as regulation increased, market forces drove the production and distribution of illicit opioids, beginning with heroin and transitioning now to fentanyl (i.e., a much cheaper, more potent, and more easily produced synthetic opioid), culminating in what is now known as the US opioid epidemic. The burden of this epidemic is widespread, decimating communities' resources, producing unprecedented childhood trauma, and increasing intergenerational dependence on opioids. While most individuals with opioid use disorder (OUD) are adults, the pathway to substance use disorder (SUD) often starts in childhood. For example, youth who have experienced more than four adverse childhood experiences (ACEs) are over 1,000 times more likely to use injection drugs later in life.[2] If the nation is to abate the growing opioid epidemic, prevention and early intervention services for children and families will be critical.

Efforts to mitigate the supply of illicit opioids have largely failed to this point, and overdose deaths in the US

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reached a crescendo during the COVID-19 pandemic.[3] Despite communities being ravaged by the epidemic, schools have largely remained aloof toward prevention efforts, and youth affected by caregivers' dependence, or their own misuse are too often left to fend for themselves. The purpose of this review is to inform school health and mental health providers, educators and school administrators about the causes and consequences of the US opioid epidemic and to provide practical solutions for engineering multi-tiered systems of support for children and families affected by the epidemic, including through opioid misuse, OUD, and opioid overdose.

To date, there have been three prominent phases of the US opioid epidemic.[4] Phase I included the emergence of a growing base of opioid-dependent people created by egregious over-prescription of OxyContin in the US.[1] Phase II was categorized by the transition from purchasing illicit pills of OxyContin to buying Mexican trafficking groups' cheaper alternative, heroin. Phase III represents the post-heroin opioid market in the US and is characterized by the import of highly potent synthetic fentanyl and fentanyl analogs, purchased cheaply and illicitly. Overdose deaths steadily grew through phases I and II (1996–2014) and have increased exponentially following the dominance of fentanyl-related compounds in the US drug market (~2015 – present).[5,6]

The current review provides school health professionals with a succinct history of the opioid crisis in the US. Following, we examine the prevention and treatment of opioid use disorder (OUD), as well as the multi-level impacts of OUD on children and families. Finally, we discuss the critical role of comprehensive, integrated school behavioral health systems in abating this epidemic. Addressing this issue is vital in the era of fentanyl; a time when ~108,000 overdose deaths occurred in 2021 and ≥100,000 drug-related fatalities for 2022, with this trend very likely to worsen in the next few years.[5] As a point of comparison, more people now die from overdose deaths every year in the US than the total number of US citizens killed in the Vietnam war.[4]

Heroin: an old familiar

A full overview of Phase I of the US opioid epidemic is beyond the scope of the present review. A comprehensive account of Purdue Pharmaceuticals' role in the over prescription of OxyContin can be read in Quinones' seminal text *Dreamland* ,[1] as well as in Macy's *Dopesick*[7]; both are highly suggested to readers interested in the details of this important phase of the epidemic. As opioids began to flood the US market, through both legitimate prescription practices and "pill mills" (i.e., clinics, healthcare providers, or pharmacies known to distribute large quantities of opioids), drug diversion—or the illegal distribution of prescription drugs for purposes not intended by the prescriber—skyrocketed. Thus, a massive market was created in which millions of US residents became increasingly dependent on highly addictive opioids.

The present review begins in Phase II, the period when Mexican trafficking groups targeted the emerging base of opioid-dependent people in the US and provided them with heroin as a viable, albeit dangerous, alternative to OxyContin. Before explaining how heroin outcompeted OxyContin in the US drug market, we provide basic information about heroin and a brief history of its exportation to the US.

The manufacture of heroin relies strongly on the agriculture of the opium poppy (*Papaver somniferum*). First, the sap that oozes from the mature seed pod upon scoring is called raw opium. The three main constituents of opium – morphine, codeine, and thebaine – are categorized as *opiates*, as they are the natural products of the plant. The term *opioid* refers to semi- and fully synthetic drugs that act on the body's endogenous opioid system—a system that plays a central role in regulating and processing pain, as well as motivation and other reward-seeking behaviors. Heroin, a semi-synthetic opioid, is the result of a chemical alteration of the morphine molecule. Oxycodone, the drug in OxyContin®, is also a semi-synthetic opioid and is made by altering the structure of the opiate thebaine. Hydrocodone, the most prescribed opioid in the US, is a semi-synthetic drug derived from opiate codeine.[8] Fully synthetic opioids do not require one of the naturally occurring products of the poppy for synthesis. Fentanyl and fentanyl analogs, described later in this review, are examples of fully synthetic opioids. To avoid confusion of terms, most contemporary pharmacology texts use the term *opioid* for any substance that acts on the body's opioid system, and we follow this practice through the remainder of the paper.

Heroin is primarily produced in four regions of the world: Northeast Asia, Southeast Asia, Mexico, and South America. From 1977–1979, Mexican trafficking groups exported most of the heroin to the US.[9,10] The US government began eradication of the opium poppy in Mexico through exposure to the chemical herbicide Agent-Orange in 1978,[11] allowing Northeast and Southwest Asian heroin manufacturers to become the major contributors to the US heroin supply from ~1980–1994.[9] Following the disruption of these Asian supply chains around 1994, the heroin manufactured in Columbia dominated the US market thereafter, until 2011. Over the next six years, the Mexican trafficking groups escalated the exportation of heroin to meet the demands of the growing opioid crisis in the US; thereafter, financial support for poppy agriculture in Mexico was substantially reduced to

focus on the synthesis of novel, more powerful synthetic opioids for the US market.[4,9]

The forms of heroin exported to the US during the growth of the opioid epidemic, from ~2000–2017, varied in available formulations.[12] Brown and white heroin powder initially came from Columbia, and later from select regions of Mexico (i.e., the Sinaloa valley). Heroin exported in the form of black tar – black tar heroin – is a semi-processed form of heroin that dominated sales west of the Mississippi River, and primarily was distributed by the Xalisco trafficking group from the state of Nayarit in Mexico.[1] During this time, heroin could be smoked, "sniffed," or injected intravenously, depending on the formulation.

Emerging US 'markets' of opioid dependence: heroin as a cheaper alternative to OxyContin

In 1998, the Xalisco trafficking group created new heroin "cells" in Columbus, Ohio, a region of the US known for the OxyContin "pill mills",[1] and rapidly expanded these cells across the eastern portion of the US in order to increase profits by selling black tar heroin to people in areas most affected by the OxyContin-driven opioid epidemic (i.e., Indiana, Kentucky, North Carolina, Ohio, Tennessee, and West Virginia).[4] The competition between Mexican drug trafficking groups to dominate the US opioid-dependent market during the years 2000–2017 drove a steady increase in opium poppy production in Mexico.[13]

The Xalisco trafficking group's business model capitalized on preexisting opioid dependence, as well as widespread poverty in many of these communities that often made it difficult for individuals who were now dependent on opioids to afford to purchase illicit OxyContin. The Xalisco traffickers' business practices were notable for their "on-demand" customer service model (i.e., operating akin to pizza delivery systems); Xalisco distributors also, as a general rule, did not carry firearms—thus reducing violence and minimizing potential criminal charges. They offered black tar heroin that was more potent and relatively less expensive than illicitly purchased OxyContin or powder heroin exported from Columbia and Sinaloa trafficking groups. The National Drug Intelligence Center (NDIC) reports that in 2000, the average cost of illicit OxyContin during this time was ~$0.50–$1.00 per milligram.[14] Individuals who have developed tolerance to OxyContin (i.e., through repeat use) may consume over 100 mg per day, for example, making it costly to buy.[1,14] According to Quinones,[1] if opioid-dependent individuals could no longer afford the cost of diverted OxyContin, a phone call could secure delivery of relatively affordable heroin in a safe environment, such as the parking lot of a grocery, mall for example, or even their home. Thus, the Xalisco trafficking groups managed in a relatively short time period to shift many people with OUD away from OxyContin pills to illicitly-purchased black tar heroin.

Introduction of synthetic opioids into the US opioid market

Fentanyl was first synthesized in 1960 by the chemist Paul Janssen at Janssen Pharmaceuticals in the pursuit of novel analgesic drugs that could provide greater pain relief than morphine, a natural constituent of the poppy, and meperidine, a fully synthetic opioid available during the 1950s.[15] Fentanyl is a fully synthetic opioid, and its primary behavioral effects are analgesia, euphoria, and sedation. Like morphine and meperidine, fentanyl induces analgesia through the activation of naturally-occurring mu-opioid receptors throughout the central nervous system, however, with much greater potency.[16,17] Regarding pain relief, fentanyl is ~50X more potent than morphine at the mu receptor to produce analgesia.[17,18] It is also unique in comparison to morphine, heroin, and OxyContin® in that a relatively low dose of fentanyl engages processes that promote skeletal muscle rigidity, and subsequent respiratory depression (i.e., slowed breathing), the major contributor to fentanyl-induced overdose.[17,19]

The Federal Drug Administration (FDA) approved fentanyl for the treatment of cancer pain in 1968, and it is now formulated for multiple routes of administration including intravenous injection (Sublimaze; Ultiva®), transdermal patch (Duragesic®), sublingual spray (Subsys™), nasal spray (Lazanda®), sublingual tablet (Abstral®), effervescent buccal tablets (Fentora™), and oral transmucosal lozenges or "lollipops" (Actiq®).[20] To preclude fentanyl misuse, the DEA designated fentanyl as a schedule II drug, according to the Controlled Substances Act of 1970. A schedule II designation indicates that a drug has approved medicinal use in humans yet possesses a high dependence liability.[12]

As early as 2006, one Sinaloan trafficking group based in Chicago experimented with a mixture of heroin and fentanyl so to increase the potency and analgesic effects of the substance, with synthesis performed by a clandestine chemist working in Mexico.[4] While this new combination resulted in pockets of overdose deaths and media coverage,[21] it also resulted in an expanded market of users—heavily tolerant heroin users who unknowingly used the fentanyl-laced product, lived through the experience, and then sought more of the highly potent drug.[4] The interest in continuing this practice largely ceased following the incarceration of the clandestine fentanyl chemist that same year, and overall, the Mexican trafficking groups did not begin widespread fentanyl exportation to the US until ~2018.

The online sale of pure fentanyl represents a significant turn of events in the evolution of the US opioid crisis. Beginning around 2014, entrepreneurial trafficking groups based in China advertised fentanyl via illegal web-based platforms (i.e., the "dark web").[22] Obtaining pure fentanyl in powder form permitted retail-level dealers to combine fentanyl with heroin purchased from Columbia or Mexico to stretch the product and increase profit. The practice of mixing small amounts of fentanyl into larger quantities of heroin has produced multiple mass overdose deaths in various communities in the US.[4,21]

Naturally, reports of overdose deaths from fentanyl-laced heroin alarmed the field of emergency and healthcare professionals, and naloxone—an opioid overdose reversal medication—became a well-known pharmacological tool to save lives, not only in medical settings but also in private homes and community locations. Naloxone (i.e., available both as an injectable and as prepackaged nasal spray Narcan®) is an opioid antagonist at the mu receptor, meaning that it occupies the receptor and prevents other agonists and endogenous neurotransmitters from activating the receptor to induce, for example, analgesia, respiratory depression, euphoria, and sedation caused by opioids. Narcan® thus reverses the effects of heroin, OxyContin, and fentanyl. It is now carried by a wide range of emergency specialists for use in the event of an overdose and is also increasingly available for laypeople without a prescription.[23]

Fentanyl use rapidly replacing heroin use in the US

As greater demand for and dependence on synthetic fentanyl developed among US residents, interest in heroin decreased, and, with it, the price of raw opium, marked the end of widespread agricultural production of the opium poppy across Mexico.[13] Trafficking groups shifted their focus to synthesizing and exporting fentanyl to the US. The precursor chemicals needed to synthesize fentanyl were typically purchased from web-based/dark web companies, and fentanyl was presented to the US drug market as a more potent substitute for heroin.[4] In this transitional period, many heroin users were unaware that the opioid they were purchasing was fentanyl and were ignorant of the high danger of using the substance, both in terms of high potential for dependence and risk of overdose death.

Recently, heroin sales have declined dramatically in the US, and most available opioids on the illicit market are now fentanyl-related.[22] Fentanyl's increased potency relative to heroin means that significantly less fentanyl is needed to achieve the same psychopharmacologic effect as heroin (e.g., analgesia, euphoria). When considering drug markets, the concept of "consumption demand" refers to the amount of a drug needed to supply the demand of a particular population. The Commission on Combating Synthetic Opioid Trafficking produced a report showing that 125 metric tons of pure heroin represents the demand for the US consumer market in ~2017, prior to its substitution with fentanyl.[22] In stark contrast, the equivalent of pure fentanyl required to meet that need is estimated at 5 metric tons, an approximately 25-fold difference in consumption demand. Thus, relative to heroin, much less fentanyl is needed to make the same profits through exportation. The economic decision to replace heroin with fentanyl proved to be immensely profitable for Mexican trafficking groups, as they are projected to have collectively earned tens of billions of dollars by exporting opioids into the US in 2020.[22]

Fentanyl is now increasingly being distributed through counterfeit pills. From 2018–2020 the number of pills with fentanyl obtained by law enforcement increased exponentially throughout the US.[24] There were ~290,304 pills confiscated in 2018 and 9,649,551 in 2020.[25] In recent years, Mexican traffickers have begun pressing pure fentanyl (i.e., no other drugs present) into primarily blue-colored pills. The fentanyl is pressed into these pills to mimic the look of OxyContin 30 mg pills, and, less frequently, to mimic Xanax® and Adderall®.[25,26] Such counterfeit pills carry a high risk of inadvertent overdose as users may be unaware that the substance they are consuming is fentanyl.

The saturation of the opioid market with fentanyl is increasingly costly to US residents. From 2016 to 2020, a total of 363,086 overdose deaths occurred in the US, with one-quarter of these occurring in 2020 alone, as isolation and mental health impacts of the COVID-19 pandemic began to accumulate.[27] The estimated number of drug overdose deaths in the US exceeded 100,000 over a 12-month period for the first time in 2021, with the majority of these involving synthetic opioids, primarily fentanyl and illicit fentanyl analogs.[28] In addition to the human toll, costs associated with the US opioid epidemic are tremendous. In 2020, the economic toll—including costs related to healthcare, criminal justice, and lost productivity—was estimated to be ~$1.5 trillion.[29]

Impact of fentanyl on schools and communities

Beyond economic considerations, the emerging fentanyl crisis is causing vast trauma exposure, psychological distress, and mental health concerns that have important implications for schools and communities. However, many school health professionals and educators lack knowledge of this rapidly accelerating crisis and feel ill-equipped to respond. Most or all schools in

the US have opioid-affected children and families, and all communities and socio-demographic groups experience overdose deaths. For example, in one Tennessee community, children as young as six years old have been taught to administer Narcan® to revive caregivers experiencing an overdose, such as a parent, grandparent, or sibling.[30]

Adolescents are also at risk for opioid misuse, OUD, and overdose. Data from the 2015 and 2016 National Survey on Drug Use and Health show that 21.0% of adolescents (i.e., ages 12 to 17 years) used prescription opioids in the past year, with 3.8% of adolescents reporting opioid misuse.[31,32] As fentanyl has increasingly come to dominate the US supply of illicit opioids, direct impacts on children and adolescents have been magnified. Fentanyl-involved fatalities among US adolescents have increased dramatically in recent years, from 253 (i.e., rate of 1.21 per 100,000) in 2019 to 884 (i.e., rate of 4.23 per 100,000) in 2021, by which time fentanyl was identified in over 77% of adolescent overdose deaths.[33] Important disparities exist that should be understood by school professionals. Notably, the highest rate of adolescent overdose deaths in 2021 was found among American Indian and Alaskan Native adolescents (i.e., rate of 11.79 per 100,000), followed by Latinx adolescents (i.e., 6.98 per 100,000), and Latinx adolescents are showing higher rates of overdose deaths compared to Latinx adults.[33,34]

Increases in overdose deaths among young children are also occurring. From 1999 to 2018, drug overdose deaths among children <12 years of age more than doubled, with opioids causing the large majority of deaths from 2010 onward.[35] Important differences exist in opioid exposure and opioid-related death for young children when compared to adolescents. While opioid-related overdose deaths remain rare among young children (i.e., 28 deaths among children <6 years of age from July 2010 to December 2018), pediatric exposure to fentanyl has significantly increased, and, in total, more than 48 000 young children experienced opioid exposure across this time period.[36] The vast majority of these exposures are unintentional and occur within the child's home, with hydrocodone, oxycodone, and tramadol being the most commonly involved opioids for non-fatal exposures, and methadone the most common cause of fatal overdoses ($n = 16$ of 28 total deaths).[36] Importantly, after adjusting for dispensed prescriptions, buprenorphine and methadone (i.e., medications prescribed to treat OUD) had the highest exposure rate among very young children.[36] These findings highlight the importance of counseling individuals who are using opioids and/or on medication-assisted treatment (MAT) for OUD on safe storage and other prevention practices to prevent unintentional ingestion by young children.

Morbidity and mortality associated with opioids reached new peaks during the COVID-19 pandemic, exacerbating other challenges experienced by children and families during this time period. The overdose crisis during the early waves of the pandemic was unprecedented and driven largely by illicitly manufactured fentanyl in the US drug supply.[28] The peak in overdose deaths also corresponds with the COVID-19-related mental health crisis that continues to impact children and families across the US. In addition, important shifts also occurred in the communities impacted by the opioid epidemic during the pandemic, with the rate of overdose deaths among Black individuals overtaking that of White individuals in the US in 2020 for the first time since 1999.[27,34] In light of these devastating impacts, school professionals/educators have a key role to play in prevention, linkage to care, and psychosocial support for impacted children, families, and broader communities. However, as presented, this review identified no health education programs being implemented in the US focusing on this topic, emphasizing a critical unmet need, and call for the development and expansion of such programs.

School-based prevention of opioid misuse, Opioid Use Disorder (OUD), and opioid overdose

Comprehensive and integrated prevention services for children and families at-risk for opioid misuse and OUD

In the National Drug Control Strategy from the US Office of National Drug Control Policy (ONDCP), prevention and early intervention beginning in childhood are listed as central components of the nation's strategy to reduce illicit drug use.[37] Extending the National Drug Control Strategy, Fishbein and Sloboda prescribe a series of recommendations and models designed to bolster prevention efforts, including systematic efforts to target key causal and maintaining factors associated with the development of substance use disorders, including OUD.[38] For instance, individuals with more adverse childhood experiences are at a dramatically increased risk of becoming dependent to and overdosing on opioids later in life.[2] However, childhood protective factors including safe, stable, and supportive relationships; nurturing schools; academic competence; and involved caregivers, are all associated with decreased risk.[38] In summarizing well-established risk and protective factors Fishbein and Sloboda write:

> Research has convincingly established that these multiple life-course conditions, influential in whether an individual will initiate use of substances or develop a SUD, are alterable and, in many cases, preventable. Protective conditions and resiliency can be strengthened, while detrimental influences can be attenuated or eliminated altogether. (p. 4)[38]

Many of the prevention strategies put forth by Fishbein and Sloboda are consistent with the overarching goals of multi-tiered systems of support in schools: improving population-wide social-emotional, behavioral, and academic outcomes, while responding to children and families with greater need through systematic tiered service delivery models.[38] Yet, there are many aspects of the strategies that schools have yet to realize at scale, namely well-established community-school-agency partnerships specifically focused on identifying children and families who are at risk for or affected by opioid misuse or OUD and who may need or benefit from additional support services. Examples of such partnerships include the Community HUB model,[39] wherein agencies identify and refer populations who are at risk for substance use to a centralized agency that coordinates care among systems that serve children and families (e.g. departments of mental health, schools, healthcare systems, etc.).

Strategies like Community HUB are consistent with the Interconnected Systems Framework (ISF) designed to integrate school mental health services and Positive Behavioral Interventions and Supports (PBIS), as they involve a strong education-mental health system partnership and training and support for mental health clinicians who can deliver evidence-based programming within multi-tiered systems of support (MTSS).[40–42] Notably, the "triangles" that are now prominent in academic, mental, and behavioral support systems in schools (e.g., PBIS, MTSS) have their roots in public health models of prevention,[43,44] and thus are well-suited for adaptation for school-based efforts to deliver prevention, early intervention, and treatment-related services to address OUD. In summary, if the opioid epidemic is to be curtailed, strong school-community-agency partnerships and a focus on evidence-based prevention strategies need to be prioritized.

Effective prevention messages for children, caregivers, and communities

Within existing multi-tiered, integrated systems of support, schools can deliver specific prevention messages about the risks of opioid misuse. Prevention messaging targeting the opioid epidemic should include a continuum of activities, ranging from universal educational messages to the distribution of information on policies and best practices for treatment of OUD.[45] Prevention messages should aim to reframe opioid misuse and/or dependence as a health issue rather than a delinquency issue.[45] The shift to frame opioid misuse and OUD as a public health problem is critical to reduce stigma and to engage necessary partners in prevention and treatment.

Messaging on medical-related aspects of the opioid epidemic is especially important since medication-assisted treatment (MAT) is the gold standard for the treatment of OUD.[46,47] There is robust evidence that MAT, including methadone, buprenorphine, and naltrexone, are safe and effective treatments for OUD; these medications are approved by the US Food and Drug Administration (FDA), and the American Academy of Pediatrics (AAP) also recommends their use for adolescents with severe OUD.[48,49] While methadone is available for OUD in the US only through opioid treatment programs that are certified by SAMHSA and registered with the DEA, buprenorphine and naltrexone are increasingly available in primary care settings to manage opioid withdrawal symptoms[50,51]; all three medications are associated with marked reductions in all-cause and opioid-related mortality for individuals with OUD.[52]

In addition to information about evidence-based treatment, schools are also well-positioned to share other key prevention messages including information about community-based medication disposal programs, such as "take back" programs and community drop boxes for unused and/or expired prescription medications. These programs are important for reducing misuse of prescription pills among young people, with recent national data showing that adolescents and young adults in the US most often obtain opioids from family and friends.[31]

Increasing awareness of the risks of counterfeit pills

Since the onset of the pandemic, adolescents have experienced greater relative increases in overdose deaths than the overall population, largely due to increases in fentanyl-related fatalities.[33] Counterfeit pills containing fentanyl are increasingly causing unintentional overdoses and deaths. Emerging qualitative work with adults who use opioids indicates that the use of counterfeit pills is viewed as less risky than heroin use, is less stigmatized, and is more socially acceptable.[53] Additional research, including studies that focus on adolescents' perceptions of counterfeit pills, is urgently needed. However, given the rapid increase in dangerous counterfeit pills containing fentanyl, there is a clear need for enhanced prevention messaging. Specifically, school

professionals/educators should convey to students and families that the use of any pills not directly prescribed by a healthcare professional is dangerous and can be fatal. To deliver this message to adults and children alike, the Department of Justice and the Drug Enforcement Agency (DEA) recently issued the "One Pill Can Kill" campaign, which features side-by-side pictures of a blue OxyContin 30 mg pill and a counterfeit example that are indistinguishable from each other.[26]

Recognizing and responding to signs of an opioid overdose

Given the rapid increase in opioid overdoses, individuals who work in schools and communities should be prepared to identify the signs and symptoms of such an event. Overdoses can occur from the use of prescription opioids (i.e., prescribed for pain relief and/or MAT), as well as illicit opioids such as heroin and fentanyl. Overdoses can also occur when individuals combine—intentionally or unintentionally—opioids and other substances, including other prescription medications, over-the-counter medications, illicit substances, and/or alcohol. Children are particularly vulnerable to accidental overdoses. All school-based professionals should be aware that an opioid overdose is a serious and potentially life-threatening event that requires immediate medical attention. Signs of an opioid overdose may include any of the following: pale and/or clammy face, limp body, purple or blue tint to fingernails or lips, vomiting and/or gurgling noises, inability to awaken or to speak, and slow or stopped breathing or heartbeat.[54]

If an individual is experiencing an opioid overdose, the National Harm Reduction Coalition recommends a progressive five-step approach, which includes: 1) attempting to stimulate the individual awake by yelling their name and administering a hard sternum rub to their chest plate; 2) using naloxone/Narcan® if available; 3) calling 911 (i.e., explain the person is not responsive and not breathing); 4) providing rescue breathing, and 5) rolling the person into a recovery position on their side if they begin to breathe regularly on their own.[55] Fear of arrest is a common barrier to calling 911 for individuals experiencing an overdose.[56,57] Fortunately, Good Samaritan laws have been enacted in many jurisdictions that provide immunity from arrest, charge, or prosecution for individuals who are experiencing or witnessing drug-related overdoses. Good Samaritan laws show evidence that they help to reduce drug overdose deaths, and school professionals/educators should become familiar with the status of overdose-related Good Samaritan laws in their state.[58]

Prevention of overdose-related fatalities—expanding access to Narcan®

Naloxone is an FDA-approved medication that rapidly reverses the potentially fatal effects of an opioid overdose. It is currently available in three approved forms: injectable, auto-injector, and nasal spray (i.e., Narcan®).[59] Narcan® has quickly become a critical front-line defense in the US response to the opioid epidemic. It is simple to administer and is not harmful to a person who does not have opioids in their system. In addition, there are no age restrictions on use, and Narcan® is increasingly available without a prescription to individuals who may need it for themselves or for someone else who might be at risk of an opioid overdose.

States have worked rapidly to expand the availability of naloxone through a variety of mechanisms, including direct prescription, indirect prescription through standing orders, and distribution without a prescription (e.g., through community distribution programs, overdose prevention programs, and some pharmacies).[60] Training in Narcan® administration has been integrated successfully into some programs for high-risk adolescents, including those involved with the juvenile justice system.[61] Importantly, the National Association of School Nurses (NASN) endorses that school nurses should facilitate access to naloxone as part of their school's emergency preparedness plans.[62] NASN has developed a "Naloxone in Schools Toolkit" and has a number of other resources available to help school nurses assist their communities and school administration in preventing and responding to potential opioid overdoses. Other school professionals/educators should be aware of the life-saving benefits of naloxone and become familiar with distribution sites and practices within their communities. Online training and resources on how to access naloxone are available through the GetNaloxoneNow program (http://getnaloxonenow.org).

Services and support for youth and families at-risk of or experiencing opioid misuse and dependence

Beyond prevention, school professionals/educators should become familiar with the support and services that are needed for children and families who are already affected by ongoing opioid misuse and dependence. Within multi-tiered systems of support, many schools across the US have developed targeted programs to reduce risk among children and adolescents at greater risk of experiencing negative academic and/or behavioral outcomes. Schools are also equipped to provide intensive, individualized

interventions to students experiencing serious challenges. Importantly, the widespread uptake of multi-tiered systems of support has increased the capacity for interdisciplinary collaboration among school-based professionals (e.g., school psychologists, counselors, social workers school nurses, teachers, administrators, school resource officers), who can work together using proactive and preventive frameworks to achieve positive outcomes for students. Given the diffuse impacts of the opioid epidemic, these multi-tiered systems have utility for school-based prevention and response to the opioid epidemic, as they are being used broadly to promote the effective implementation of a range of programs focused on promoting positive social-emotional, behavioral, health-related, and academic functioning in students.[63] Within this context, health education programs focusing on prevention of opioid use and providing guidance/support to students in families contending with substance misuse and addiction are critically needed.

Schools are deeply embedded within their communities and typically have established connections to key social services and local providers.[64] In addition, they are staffed with an array of professionals with expertise in mental and behavioral health, including school psychologists. Not only may referrals for services for affected children and families be needed, but direct service provision from competent professionals can help to identify and address underlying reasons for substance use and misuse, as well as help individuals and families cope with and mitigate the negative impacts of addiction behaviors, such as school-related and interpersonal challenges.

Screening and diagnosis of Opioid Use Disorder (OUD)

Given the large number of adolescents who misuse opioids, school health professionals and other professionals involved in school behavioral health programming (e.g., psychologists, counselors, social workers, nurses, and collaborating community providers) should understand the diagnostic criteria for OUD and be familiar with tools to screen for opioid misuse and dependence. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) provides clear diagnostic criteria for substance use disorders (SUDs), including OUD.[65] Clinicians evaluate for 11 symptoms (i.e., each scored as either met or not met), with six items addressing physiological and cognitive-behavioral aspects (i.e., tolerance, withdrawal symptoms, using more of the substance than intended, having difficulty controlling use, time spent using, distressing cravings) and five items assessing risk and harm associated with use (i.e., physically hazardous use, use despite health problems, failure to meet role obligations due to use, continued use despite social problems, activities reduced or given up due to use).[65,66] The severity of the SUD is determined by the total number of criteria met, ranging from mild (i.e., 2–3 symptoms) to severe (i.e., ≥6 symptoms).

Recently, two brief online screening tools have been developed by the National Institute of Drug Abuse (NIDA) that can be used to assess SUD among adolescents, aged 12–17 years. The Brief Screener for Tobacco, Alcohol, and other Drugs (BSTAD) is a quick screening tool to assess adolescents' problematic substance use, including the use of heroin and prescription pain medications (e.g., Oxycontin, Percocet, Vicodin).[67] Adolescents who screen positive for the BSTAD should receive further care, including intervention, as warranted, and the BSTAD is available for free online (http://nida.nih.gov/bstad/) and can be either self-administered by the adolescent or administered via interview by a clinician.[67] In addition, the Screening to Brief Intervention (S2BI) is another web-based, brief, and effective screening tool that queries adolescents (ages 12–17 years) about their past-year experiences with eight commonly misused categories of substances, including illegal drugs and prescription drugs not prescribed for them.[68] A benefit of the S2BI is that it triages adolescents into four clinically meaningful categories based on their experience with (nontobacco) substance use in the past year, including 1) no use in the past year, 2) past year alcohol or drug use without a SUD, 3) mild or moderate SUD, and 4) severe SUD.[68] Though SB2I is a screener and should not be used to diagnose SUD, it is a helpful tool to categorize adolescents into different risk categories for tiered service delivery and subsequent referrals/linkage to care.

Linkage to Medication Assisted Treatment (MAT) and other supportive services

For individuals with OUD, including adolescents, school-based professionals should be aware that effective, life-saving treatments exist in the form of MAT. Medications, including buprenorphine (i.e., Suboxone®, Subutex®), methadone, and naltrexone are effective for treating OUD. Notably, MAT has been shown to decrease opioid use, opioid-related overdose deaths, engagement in criminal activity, and transmission of infectious diseases associated with opioid-related injection drug use.[69–71] Put in plain language, MAT saves

lives and increases the likelihood of long-term recovery for individuals with OUD. NIDA further recommends that medications to treat OUD be combined with behavioral counseling, utilizing a "whole person" approach to recovery.[72]

For adolescents, MAT has been shown to be effective in reducing the misuse of opioids and related injection drug use.[73] Many youth with OUD in the US have difficulty accessing MAT and scaling up MAT in pediatric practices is important to address this gap.[74] School health/mental health professionals should become familiar with local providers of MAT in their area, and, in particular, any that offer adolescent-focused MAT.

Reducing stigma associated with opioid misuse and dependence

School professionals/educators can play a key role in reducing the stigma associated with OUD. Reducing stigma is critical to make progress in ending the US opioid epidemic as stigma stymies prevention and treatment efforts, contributes to misinformation, and increases the marginalization and maltreatment of individuals and families affected by OUD. Stigma, which has been deeply explored in the context of the HIV epidemic, is a multi-faceted construct that includes labeling, stereotyping, and devaluing of individuals with discredited identities and/or attributes; stigma arises and is shaped by socio-cultural contexts and power dynamics.[75,76]

Stigma associated with opioid misuse and dependence is deeply rooted in US society, as evidenced by beliefs about the perceived dangerousness of individuals who use illicit drugs and conceptualizations of SUD as a moral failing.[77] Just as mental and behavioral health professionals have helped to reduce the stigma associated with mental health disorders, including in relation to school behavioral health,[78] their commitment and efforts are urgently needed to reduce stigma associated with OUD. Efforts to de-stigmatize mental health have often adopted rights-based and/or social justice models, and have included a wide variety of programming, such as awareness-raising campaigns, literacy programs, educational efforts to increase knowledge, structural changes (i.e., in organizations, in laws, in policy), and advocacy efforts.[79] A number of evidence-based "guiding principles" have been established to shape nascent efforts to reduce stigma surrounding OUD, such as adopting the use of person-centered language, emphasizing societal versus individual causes of addiction, and messaging on the existence of effective treatment.[80] Comprehensive school behavioral health services have been heralded as critical for expanding access to care and reducing the stigma associated with seeking services.[81] Thus, integrating prevention and treatment of opioid misuse and OUD into existing programs and services may be another important avenue for stigma reduction.

Conclusion

Building from schools' MTSS, comprehensive programs with health education as a cornerstone are critically needed to address the impact of the opioid crisis on students, prevent opioid use, and help to address the impact of substance misuse and addiction in families. Such programming has the potential to transform the way that children and families access critically needed services. Schools are increasingly equipped with well-trained health and mental health professionals—yet too often, these professionals are ill-prepared to address opioid misuse and OUD, with this review finding no health education programs focused on this topic. Building the capacity of schools, educators, and school health mental health staff to engage in the prevention of opioid misuse and dependence and to link affected youth and families to treatment is critical to ending the US opioid epidemic. This paper provides a brief review of the history of this rapidly worsening societal problem and points to a much-needed and cogent practice/policy avenue to expand school-based programming focusing on opioids, familial substance misuse, and addiction, with effective health education as a cornerstone of these efforts.

Translation to Health Education Practice

- Health Education Specialists can play a key role in needs assessment to identify direct and indirect impacts of the opioid crisis on schools, including identifying impacted populations and determining resources (i.e., existing and needed) for integrated prevention and intervention services.
- Health Education Specialists can coordinate the delivery of programming in schools to address opioid misuse, opioid dependence, and opioid-related overdose.
- School-based programming may include prevention messaging, information on the risks of counterfeit pills, the importance of access to naloxone to reverse opioid overdoses, and screening and referral services for those at risk for or experiencing opioid dependence.
- Health Education Specialists can also be strong advocates for evidence-based approaches to prevent and treat opioid use disorder (OUD) and work within schools to reduce stigma toward individuals and communities impacted by the opioid epidemic.

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