

Supervised Injection Sites: A Viable Option To Save Lives

J Kelly, R Ahluwalia, S Yong, P A Clark, J Szabo, A Colman, A Fogarty, C Do, J Issac

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Abstract

As the current interventions against the opioid crisis in the US fall short and the death toll of the epidemic reaches new peaks, a call for a new approach to the issue is warranted. The most recent report by the CDC has predicted a record high amount of opioid related overdose deaths in the US with over 110,000 predicted deaths in 2023.² In an effort to acknowledge the shortcomings in the efforts against this epidemic, this paper will review the current state of the opioid epidemic around the country, with an emphasis on Philadelphia, and propose the supervised injection site (SIS) as a viable option to best serve those in need. The implementation will be analyzed medically, ethically, and financially to show how this effort will benefit both the individuals suffering with substance use disorder and the city of Philadelphia as a whole. The paper will also serve to review the established SIS in NYC, OnPoint, and analyze its effectiveness since its development. Finally, the paper will propose a design and implementation plan for a SIS in Kensington, Philadelphia and as a paradigm for other SISs around the country. If the city of Philadelphia, and other cities around the US struggling with the epidemic are to truly care for their citizens, it is time for them to take action against the epidemic.

INTRODUCTION

As the opioid epidemic continues to expand around the country, efforts to slow it down remain insufficient, evidenced by the rapid spike in opioid related overdose deaths in the US in recent years, "... [deaths] rose from 21,089 in 2010 to 47,600 in 2017 and remained steady through 2019."¹ This was until a major increase in 2021 when over 100,000 overdose deaths were reported in the US.² The latest CDC report has 110,469 predicted overdose deaths in the US over a 12-month period from March 2022 to March 2023.² Some of the main contributors to the recent surge in overdose deaths has been the prevalence of fentanyl, a deadly synthetic opioid and xylazine, often referred to as "tranq", a sedative often used in veterinary medicine. Both of these substances have been introduced into drug supplies around the country and have been linked to the growing rates of overdose deaths. Fentanyl related overdoses alone "continued to rise with 70,601 overdose deaths reported in 2021".¹ These trends are not only occurring at the national level but have also been observed on the micro level as well as seen by the status of the epidemic in the city of Philadelphia alone where, "In 2022, the Philadelphia Department of Public Health recorded 1,413 unintentional

overdose deaths. This is an 11% increase from the previous high of 1,276 in 2021."³ The city is recognizing this issue as severe and calling for a shift in momentum in dealing with the epidemic.

This surge in overdose deaths begs the question of what can be done to work against this seemingly growing issue. A difficulty with working against the epidemic is that it is always changing and evolving, with new deadly drugs being introduced into the drug trade and an inadequate amount of focused effort being put towards stopping this influx. Jim Kenney, The Former mayor of Philadelphia quite correctly claims that "It is no longer accurate to call this an opioid epidemic; it is an overdose epidemic driven by an increasingly contaminated drug supply."² With modern technology, contaminated drugs are able to be detected, yet this technology does not always find itself in the hands of the user. Similarly, almost all opioid overdose deaths can be prevented through the timely use of Naloxone, which is widely available yet not always accessible to the individuals who need it most. In all, there are a range of resources available for individuals suffering from substance use disorder, but they are not always reaching the individuals

who are most in need due to an insufficient amount of focused care towards the issue. Supervised Injection Sites (SISs) allow for all of the resources available for saving the lives of individuals with substance use disorder to be directly accessible to them so that they can be comprehensively cared for while in their battle against addiction.

This paper's focus is to review the state of the epidemic, analyze the existing SISs, and make a recommendation about how the available resources for the epidemic can be best delivered to those who can maximally benefit from them. We will analyze SISs from pharmacological, medical, ethical, and financial perspectives and ultimately render a recommendation for how the city of Philadelphia can utilize the design to begin to slow down the epidemic and save the lives of individuals struggling with substance use disorder. This paper is to serve as an overview of SISs, a comprehensive justification of their potential benefit to society and to slowing the opioid epidemic, and a paradigm for their implementation.

SUBSTANCE BACKGROUND

The primary drugs being used on the street and contributing to overdose deaths are opioids like heroin and fentanyl and more recently the nonopioid xylazine, a veterinary tranquilizer not intended for human use. The use of opiates dates back to ancient civilizations as a potent analgesic.⁴ There are three types of opiates: natural, semi-synthetic, and synthetic. Examples of these in the following order include morphine, heroin, and fentanyl, each increasing in potency as they become more synthetically refined, respectively. Heroin was initially regarded as a miracle drug for its effectiveness in clinical applications; however, the drug eventually posed a problem as it created high levels of tolerance in those who used it, and ultimately resulted in addiction.⁴ Fentanyl is approved by the FDA within medicine for its pain relieving properties which are 100 times more potent than morphine.⁵ Such potency is the exact reason that fentanyl is so deadly and is connected to such a high proportion of overdose deaths.

Xylazine, the animal tranquilizing drug, has forced its way onto the illegal drug scene of Philadelphia in recent years. Xylazine is a non-opioid sedative often used on horses that has not been approved for use in humans. However, it is now being found in numerous drugs including heroin, fentanyl, PCP, cocaine, and amphetamines.⁶ Between 2010 and 2015, xylazine was found in only 2% of heroin and/or fentanyl overdoses in Philadelphia. This number has since

skyrocketed. In 2021, over 90% of the city's lab-tested opioid samples contained xylazine.⁸⁴ In 2022, xylazine was found in 34% of all overdose deaths.⁸¹ The drug causes intense sedation, lowers blood pressure, and slows heart rate. It has also been shown to cause serious skin lesions, namely on the forearms and shins, due to its ability to cause the constriction of blood vessels.⁸⁴ In many instances, the necrosis caused by xylazine use cannot heal properly, leading many individuals to require amputation of the affected limb.⁸⁴ Additionally, since xylazine is not an opioid, Narcan cannot be used upon overdose.

Street drugs are typically administered in three different ways: snorting via the nasal passage, inhalation by smoking, or injection, which has the most potent effect.³ Heroin is classified as a Schedule One drug, which the FDA classifies as a drug with the highest risk of abuse without any therapeutic benefit.⁷⁻⁸ Fentanyl is a Schedule II drug, which the FDA classifies as having a high potential for abuse but does have a recognized therapeutic effect. Xylazine is a schedule III drug, having a moderately low chance of developing physical and psychological dependence.⁹ Despite the potential uses for any of these drugs in medicine, they are being misused and abused around the country by the general population and contributing to a growing death toll.

MEDICAL ANALYSIS

1. Prognosis of Opioid Addiction

Opioid use disorder is a chronic concomitant brain disorder that results from continued opioid use, characterized by unmanageable drug-seeking behavior despite adverse effects. Recognized as a brain disorder, it entails functional alterations in brain circuits related to reward, stress, and self-control.¹⁰ Opioid use disorder encompasses dependence and addiction, with addiction representing the most severe manifestation.¹¹ Other than these behavioral and physical effects, long-term opioid use brings about physical changes to the brain as white matter deteriorates, ultimately affecting decision-making and behavior control. Once entrenched in this disorder, individuals prioritize obtaining and using their drugs over almost anything in their lives. Understanding the profound and enduring impact of drug use emphasizes the importance of holistic approaches to addiction prevention, treatment, and recovery for those in need.¹²⁻¹³

Addictive disorders typically exhibit recurrent or cyclical patterns. Periods marked by diminished control over consumption alternate with phases of extended or brief abstinence, often culminating in substance use relapses.

Breaking this cycle proves challenging due to the reinforcing nature of repeated intoxication. Environmental cues linked to substance use can persistently trigger cravings and drug-related behaviors, establishing a profound routine that continues to fuel a strong desire for the drug even after cessation.

Intoxication induced by drug use may lead to behavioral changes and accidents. Such alterations in personality and behavior include lack of motivation, irritability, bloodshot eyes, frequent bloody noses, shakes, tremors, slurred speech, changes in daily routines, neglect of personal hygiene, and financial issues, are indicative of drug addiction.¹⁴

Experiencing intense cravings for the drug, developing tolerance over time, engaging in actions like theft to acquire the drug, failing attempts to quit, and facing withdrawal symptoms upon cessation are common signs of drug addiction.¹⁵ Prolonged consumption can result in various medical issues, including cognitive function impairment. Frequently, addictive disorders coexist with other mental health conditions such as depression, schizophrenia, and bipolar disorder. Individuals engaging in substance use are also susceptible to infections, particularly when sharing paraphernalia or engaging in unprotected sexual activity.¹⁶ Unfortunately, the persisting stigma surrounding mental illnesses may hinder open discussions about these conditions in certain settings, leaving individuals feeling compelled to conceal their struggles.

1b. Signs and Symptoms of Heroin Abuse:

Runny nose without apparent illness, infections or sores at injection sites, cuts or scabs from skin picking, slurred speech, impaired coordination, confused thoughts, depression, anxiety, and social withdrawal are observable indicators of heroin abuse.¹⁷ The classical findings of heroin toxicity are Miosis, CNS Depression, Respiratory Depression. Other findings include hyporeflexia, hypothermia, dermal "track marks", flushing, pruritus, bradycardia, hypotension, or decreased bowel sounds.¹⁸

1c. Signs and Symptoms of Fentanyl Abuse:

Seeking multiple doctors for prescriptions, forging prescriptions, declining performance at work or school, slurred speech, insomnia, impaired memory, suicidal thoughts, euphoria followed by apathy are discernible signs of fentanyl abuse.¹⁹ Overdose may result in stupor, changes in pupillary size, cold and clammy skin, cyanosis, coma, and respiratory failure leading to death. The presence of triad of

symptoms such as coma, pinpoint pupils, and respiratory depression are strongly suggestive of Fentanyl poisoning.²⁰

1d. Signs and Symptoms of Xylazine Abuse:

The most common presenting signs of xylazine abuse are sedation, difficulty breathing, low blood pressure, slow heart rate, infection-prone wounds, severe withdrawal symptoms.²¹ Xylazine-involved overdose symptoms include central nervous system (CNS) depression, respiratory depression, Bradycardia, Hypotension, Constricted pupils, Hyperglycemia.

2. Clinical Treatment

Opioid addiction and overdoses arise both in individuals using opioids for medical purposes and individuals who are not using them in a medically appropriate manner. There stands to be more substantial research and work focused on this topic, and one approach is focusing on the different stages of prevention so that we can prioritize preventing new cases by identifying early signs of opioid addiction, and ensuring access to effective addiction treatment while preventing further complications.

Before we discuss the treatment options for opioid addiction, it is important to assess how prescribers can prevent addiction in the first place. One initial step would be education for prescribers as they play a role in possibly creating this issue. There stands the opportunity for better guidelines for prescribing opioids and also substituting them for non-opioid analgesics whenever possible in conditions that require pain relief. It is important for prescribers to correctly understand the safety and efficacy of opioids as some states such as Iowa, Kentucky, and Massachusetts have set legislation on mandatory prescriber education legislation.²² There can possibly be a limit of duration of opioids for patients who require a short course to limit their potential to be addicted. For the opioids that were not used, pharmacies can accept them back to prevent others in the same household from improper use.²³ There is also mention of possible pharmacist interventions in deprescribing opioids, however, further research on its potential and specific ways to impact this issue are required.²⁴ Prior to prescribing opioids, providers can also do additional research by seeking collateral information from loved ones to confirm actual need for opioids to treat pain. It has been shown that nonelderly and elderly people in excellent health and better socioeconomic status required less use of prescription opioids, further indicating the importance of

health promotion.²⁵⁻²⁶ If we continue targeting the most vulnerable in society and provide them with personalized education and support, we could prevent opioid addiction, rather than treating it.

When it is deemed that patients will benefit from opioids, there are many systems in place for providers to help patients reduce their risk for addiction. Urine drug screens are often used to verify whether patients are taking what they have been prescribed.²⁷ It allows for further discussion if their drug screening is positive for other medications that they were not prescribed. All of this discussion can only benefit the patient as sometimes patients rely on opioids to deal with previous and current stressors including past adolescent pain and sexual violence.^{28,29,30}

The implementation of a prescription drug monitoring program (PDMP) before prescribing opioids has become more commonplace to verify and assess one's history of opioid use and to assess further for possible drug seeking behavior such as visiting multiple providers. Some states have even mandated prescribers to check a patient's PDMP.³¹ For patients that seem to continually require stronger doses of opioids, there stands the opportunity to refer them to pain management specialists who can better curtail a regimen to address their pain.

2b. Heroin and Fentanyl

In terms of opioid addiction to fentanyl and heroin, there are currently a few pharmacological treatments, including opioid agonists such as methadone plus buprenorphine, and an opioid antagonist such as naltrexone. Naltrexone is not widely preferred as it requires patients to be closely monitored due to potentially inducing opioid withdrawal symptoms among active opioid users prior to starting the opioid antagonist. However, once started, its effectiveness is similar to buprenorphine, staving off further opioid use.³² Opioid agonists have been better shown through various data, including observational studies, to have reduced mortality compared to patients who do not undergo treatment.^{33,34,35} At this time, buprenorphine is preferred for users with moderate to severe use as there is a lower risk of overdose, fewer drug-drug interactions, and easier access. Patients initiated with buprenorphine are assessed on a weekly basis for any dose adjustments, while those undergoing methadone are assessed daily at methadone clinics.³⁶

Effective treatment response is considered after sustained

abstinence for at least 6 months. If there is poor response after 6 to 12 months of treatment, the plan needs to be reexamined completely and assess whether various social factors or treatment management is not conducive to each individual's life. It is easy to see how one's life stressors and psychological pain can lead to reliance on opioids for an escape from reality. There have been recommendations for psychosocial interventions for all patients undergoing an opioid treatment program, but it has been difficult to ascertain its true benefits as various studies assessing the efficacy of counseling have shown little to no difference in treatment retention.^{37,38,39}

For patients that are not able to remain adherent with current opioid addiction treatment, there are clinical trials that have found other formulations including implants, such as buprenorphine to be comparable to standard sublingual formulation.^{40,41,42} There also stands efficacy of injectable extended-release naltrexone compared to placebo.⁴³⁻⁴⁴ There have been implementations including access to clean syringe exchange to prevent further HIV infections.⁴⁵ In addition, there are ongoing interventions involving education of family members and how to properly give naloxone to loved ones with opioid use, which has helped reverse overdoses.⁴⁶ Recommendations also suggest the co-prescription of naloxone whenever giving opiates to patients to alleviate the risk of overdose and ultimately death.

The opportunity for residential treatment is available anywhere from short stays of four weeks to up to 12 months where patients go to a 24-hour care facility that provides support in a community fashion. One study shares a common belief that by the time people exit a residential treatment, it is expected to have improvements in abstinence of substance use, which has been shown.⁴⁷ On the other hand, one study comparing Medicaid enrollees with opioid use disorder across nine states, only 7.5% of participants engaged in residential treatment.⁴⁸ One systematic review mentioned the mixed reviews regarding residential treatment and the potential for high up-front payments in both nonprofit and for-profit programs.⁴⁹ Another study noted reduced substance use in these settings, but relapse was common after subjects left the residential facility.⁵⁰ At this time, this option appears to be a field in need of more research before it can be truly recommended on a consistent basis.⁵¹

2c. Xylazine

Xylazine is an alpha 2 agonist similar to clonidine, however

it is mainly used in veterinary medicine for sedation and analgesia. Not approved in humans, it has been a drug of abuse found in pill or powdered forms often mixed in with heroin and illicit fentanyl. Its overdose consists of coma, apnea, bradycardia, hypotension as well as severe necrotic ulceration of the skin.^{52,53,54,55}

Since 2010, there has been a big rise of xylazine detected in opioid overdose cases in the city of Philadelphia.⁵⁹ Despite the urgent need to better understand the impacts of xylazine use, there is limited criteria on xylazine withdrawal and no standardized treatment that has been established.⁵⁶

As xylazine is often an adulterant with opioids, clinical findings of withdrawal and management should be similar with that of opioid withdrawal. In addition, it also leads us to think that as we continue to find ways to prevent and treat opioid use, the rates of xylazine use should start to decrease as well. As of now, it is safe to say that supportive care is reasonable to follow including administration of naloxone for respiratory depression. With mostly case reports at this time to better understand this rising issue, one report discussed the utilization of dexmedetomidine infusion, phenobarbital, and clonidine on a known opioid and xylazine user's withdrawal symptoms.⁵⁷

One hallmark among chronic xylazine users are xylazine-induced skin ulcers, likely related to injection site vasoconstriction causing reduced skin perfusion leading to tissue necrosis. At this time, there have been discussions of the benefits of proper wound care, including debridement of nonviable tissue and applying dressings to prevent infection and promote the healing cascade. If there are signs of infection, the application of topical and oral antibiotics can be considered. Since these wounds take a long time to heal, there is shared belief in the value of community-based organizations providing wound care as it is a low barrier access site compared to traditional clinical settings that will only improve adherence and treatment response.^{58,59,60,61}

HARM REDUCTION THEORY

The driving ethical force behind the push for SISs to be made available as a viable option for PWID (Persons Who Inject Drugs) is their potential to be used under the harm reduction idea. Harm reduction is an approach focused on minimizing the negative results that go hand-in-hand with drug abuse⁶²⁻⁶³. Harm reduction techniques have both a medical and ethical impact on the individual and society as a whole. Harm reduction techniques accept the individuals as they are, while also tailoring that person's treatment to fit his

or her needs⁶⁴. Furthermore, there are certain principles that are quintessential to an understanding of harm reduction, as listed by the Harm Reduction Coalition:

- Accepts, for better and/or worse, that licit and illicit drug use is part of our world and chooses to work to minimize its harmful effects rather than simply ignore or condemn them.
- Understands drug use as a complex, multi-faceted phenomenon that encompasses a continuum of behaviors from severe abuse to total abstinence and acknowledges that some ways of using drugs are clearly safer than others.
- Establishes quality of individual and community life and well-being—not necessarily cessation of all drug use—as the criteria for successful interventions and policies.
- Calls for the non-judgmental, non-coercive provision of services and resources to people who use drugs and the communities in which they live to assist them in reducing attendant harm.
- Ensures that drug users and those with a history of drug use routinely have a real voice in the creation of programs and policies designed to serve them.
- Affirms drug users themselves as the primary agents of reducing the harms of their drug use and seeks to empower users to share information and support each other in strategies that meet their actual conditions of use.
- Recognizes that the realities of poverty, class, racism, social isolation, past trauma, sex-based discrimination, and other social inequalities affect both people's vulnerability to and capacity for effectively dealing with drug-related harm.
- Does not attempt to minimize or ignore the real and tragic harm and danger associated with licit and illicit drug use⁶⁴.

The SISs' ability to allow PWID to have a safe environment to inject drugs gives itself the potential to be used as a harm reduction agent in and of itself. Furthermore, many individuals who die from opiate overdoses, such as heroin, did not receive the necessary medical treatment in time to save them; allowing PWID access to the SISs could possibly save many preventable deaths. If we, as a society, value human life as sacred, we must find a way to prevent these deaths. The SISs program, such as Insite in Vancouver, supervised by trained medical personnel as a harm reduction agent could present a viable alternative to address the growing heroin addiction epidemic and save thousands of lives. The heroin epidemic is growing, fatal overdoses are increasing, and people are becoming more and more frustrated by legal and political barriers to new forms of treatment being put in place to stop this problem. As shown above, SISs like Insite have been shown to decrease heroin abuse, disease, and mortality rate in Canada and Europe. In the United States, overdoses have led to 45,000 opioid overdose deaths in a 12-month period that ended in September 2017. This number is unacceptable by any

standards⁶⁵. Therefore, harm reduction initiatives like Insite and a SIS must be introduced.

ECONOMIC ANALYSIS

Along with the rise in overdoses and fatalities, the long-standing opioid epidemic has taken an economic toll on society. Although the exact costs cannot be quantified for the overall problem, there have been a number of studies that examine its economic implications in terms of various categories.⁶⁶ As estimated by the Council of Economic Advisors (CEA), the United States faced US\$504 billion in total costs for the opioid epidemic in 2015, with a projection of exponential growth if the problem persisted. During this same year, the per capita costs of the opioid epidemic in Pennsylvania totaled nearly US\$2,000. As predicted, these figures would rise, and according to the CDC, the cost for opioid overdoses and opioid use disorder in the U.S. in 2017 was approximately US\$1.02 trillion.⁶⁷ Opioid use disorder (OUD), if left untreated, has consequential financial implications on individual people, their loved ones, and society as a whole, and it contributes to increased healthcare spending, criminal justice concerns, and a significant loss of productivity.⁶⁸ A 2021 research study found that overdoses, misuse, and dependence related to opioids accounted for US\$35 billion in healthcare costs overall, with US\$1.94 billion being in hospital expenses for opioid overdose. Further, the United States experienced US\$14.8 billion in criminal justice costs, and US\$92 billion in lost productivity as a result of the epidemic. The Federal Reserve Bank of Philadelphia made it apparent that the nature of the opioid crisis is intertwined with the declining labor market, as well as the broad state of the U.S. economy.¹⁰⁷ Individuals impacted by the epidemic are less likely to be suitable for professional positions, and the declining demand for low-skilled jobs disvalues their qualifications. Given the average age of an overdose fatality is around 40, productivity loss could also be attributed to premature death due to overdose, or opioid related incarceration.¹⁰⁷⁻¹⁰⁸ Societal organizations have already been overwhelmed by the rise of fentanyl in the opioid market. The crisis continues to pose threats and new costs to the labor force, productivity, the healthcare system, the criminal justice system, and communities overall. Each of these sectors are now working to discover how to withstand the newly introduced xylazine, with limited preventive resources.

The United States healthcare system continues to grapple with the abundant challenges related to the opioid epidemic. Not only are doctors, nurses, administrators, and other

healthcare professionals placed on the frontlines of the crisis, but the expenses associated with caring for opioid users have been shown to have a detrimental financial impact on healthcare facilities nationwide.⁶⁹ This impact is even greater in areas with prominent addiction rates, and costs continue to rise for hospitals as the opioid epidemic persists. The financial burden tends to stem from emergency room visits due to overdose or severe infection, ambulance rides, and the use of naloxone to reverse an overdose. According to data from Premier, a healthcare improvement company, the United States spends more than US\$95 billion treating OUD in emergency rooms each year.⁷⁰ Further, a study from the CDC reports that as of 2017, opioid use disorder accounted for US\$471 billion for the United States, and US\$480.7 billion was determined to be the value of life lost due to overdose deaths.¹⁰⁸ Particularly following the Covid-19 pandemic, the U.S. healthcare system has experienced financial challenges, and opioid related hospital visits only exacerbate that strain.¹¹⁰ As previously stated, the Philadelphia Department of Public Health disclosed that in 2021, the city experienced a total of 1,276 overdose deaths, and 82% of those deaths included fentanyl, which is increasingly related to the use of xylazine.⁷¹

According to a recent article from the New York Times, over 48 million Americans are currently enduring a substance use disorder, while only approximately 5 percent of these individuals are receiving any type of treatment for their condition.⁷² For decades, the approach to substance use and abuse in the United States has come from a criminal justice standpoint, but the death toll is continuously rising.⁷³ Many studies on the opioid epidemic have demonstrated that this approach needs to be transformed, and harm reduction strategies will prove to be beneficial. The idea of a SIS is being explored in various cities across the country as an avenue to reduce rates of infection, overdose, opioid-related mortality, public drug consumption, litter of needles used for drug consumption, and crime. Further, existing sites have been found to be a cost-effective strategy to benefit the healthcare and criminal justice systems, people who use drugs, as well as the surrounding communities. Amongst a lot of political and community pushback, a prominent barrier to the creation of these programs is the limited resources available for harm reduction organizations. The following analysis will demonstrate the economic benefit of a SIS in general, and more specifically for the city of Philadelphia.

The “first sanctioned supervised drug consumption site in North America” was founded in Vancouver in 2003.⁷⁴ A

study was conducted in 2008 to determine the cost-effectiveness of Insite, the SIS in Vancouver, particularly through the rate of HIV infections and deaths prevented each year since the creation of the site.⁷⁵ A mathematical model used for the study revealed that the annual operational cost of Insite as of 2007 was approximately US\$1.5 million, and the total lifetime cost for an HIV infection was US\$150,000 for one individual. As a result of the implementation of Insite, an average of 35 new HIV infections and 3 deaths were prevented each year, yielding an economic benefit of more than US\$6 million in savings for Vancouver. Given that this study was conducted over a decade ago, a more recent analysis from 2022 confirms that Insite in Vancouver continues to demonstrate positive social and economic results as the program expands.⁷⁶ This same study also focused on a nurse-led harm reduction program in Calgary, Alberta that offers supervised consumption services, counseling, risk reduction supplies and information, and more.¹¹⁷⁻⁷⁷ Safeworks Harm Reduction Program, established in 2017, encourages client education and overdose prevention. In just over 2 years, it was seen to yield more than US\$2 million in savings by providing services on site, avoiding the need for emergency department and ambulance services.

Various cities in the United States have conducted studies to determine the potential cost-benefit of implementing a SIS. In conjunction with the overdose rates in Seattle, Washington in 2019, a SIS implemented in the city was projected to “annually reverse 167 overdoses and prevent 6 overdose deaths, 45 hospitalizations, 90 emergency department visits, and 92 emergency medical service deployments”.⁷⁸ In addition to enrolling 41 clients into medication-assisted treatment programs, the SIS programs would correspond with an estimated monetary cost value of US\$5,156,019. Through a mathematical model and city estimates, the annual cost of running the site would be US\$1,222,332, yielding savings of US\$4.22 for every dollar of operational costs. In terms of healthcare expenses such as overdose management, treatment of infection, and social services, the Seattle pilot program would save the city over US\$500,000. Similarly, a cost-benefit analysis conducted in San Francisco, California found that for one SIS, US\$2.33 in savings would be generated for each dollar spent, “for a total annual net savings of US\$3.5 million”.⁷⁹ Further, another study predicted that in Baltimore, approximately US\$7.8 million would be saved for US\$1.8 million in spending towards a SIS, while preventing a large number of infections and overdose deaths annually.⁸⁰ It was estimated that the

implementation of a facility would avoid nearly 100 opioid-related ambulance calls and emergency room visits, and more than 20 hospitalizations. These models demonstrate that SISs significantly boost the public health system by reducing opioid-related death and infection in a cost-effective manner.¹²⁰

The first managing deputy director for the City of Philadelphia, Pennsylvania, Eva Gladstein, estimated in 2018 that the opioid epidemic costs Philadelphia more than US\$26 million annually.⁸¹ It is evident that this value continues to rise. Considering the average healthcare costs in Philadelphia, the Institute for Clinical and Economic Review conducted a case-base analysis to outline the cost-effectiveness of adding a SIS to a needle exchange program in the city.⁸² Overall, the study yielded nearly US\$4 million in savings. This total includes savings in terms of ambulance costs, emergency department visits and hospitalizations, and a decreased number of overdose deaths. Although cost is a primary component of the economic benefit that SIS would have on society, an impact can also be seen through longevity and decreased opioid-related mortality.¹²² The services offered with these strategies support individuals entering rehabilitation programs, thus increasing productivity and yielding a long-term benefit for society as a whole. Further, the various studies analyzed have demonstrated how SISs are effective in cleaning up the streets in their community by offering needle exchange programs, as well as decreasing crime rates by decriminalizing addiction through the harm reduction approach.¹²³⁻⁸³

ONPOINT NYC ANALYSIS

Despite the aforementioned justification for the implementation of SISs, which focuses on the reduction of harms associated with the use of illicit drugs, many Americans are still uncomfortable with the thought of an SIS in their neighborhood. With that public sentiment in mind, many lawmakers are actively working against the installation of these SISs by leveraging an outdated law against those working toward harm reduction. This outdated law was passed in 1986, and it is commonly referred to as the Crack-House Statute. Originally passed during the height of the crack-cocaine epidemic of the 1980s, this statute prohibits the use, ownership, management, maintenance, and general existence of any place for the purpose of using controlled substances.⁸⁴ From a legal perspective, a SIS is in direct violation of this law, as health officials maintain their spaces for the purpose of injecting or using illicit drugs, even

if it is aimed at harm reduction. Today, the Crack House Statute is being revitalized to specifically target SISs. In February of 2022, the House of Representatives saw the introduction of H.R. 6741, which is a bill aimed at prohibiting federal funding of any injection center (government or private) that is in violation of the Crack House Statute.⁸⁵ The introduction of such a bill is directly targeting SISs. It is interesting to note that this bill was brought to the house floor by a member of the House of Representatives from New York City, as the first two officially sanctioned SISs were opened in the Manhattan Borough of New York City in 2021. Despite the potential for government interference, these two SISs, which are operated by OnPoint NYC, are thriving.

OnPoint NYC has two SIS locations in Manhattan, with one in East Harlem and the other in Washington Heights. Both of these sites are staffed seven days a week by medical and social work professionals dedicated to reducing harm associated with drug use. According to their website, both OnPoint locations have served 4,372 participants a total of 112,902 times and have prevented over 1300 overdoses since their openings in late November of 2021, and these numbers can only be expected to grow as the sites' popularity increases.⁸⁶ As of December of 2023, there were zero deaths reported at both sites.⁸⁷ A study published in July of 2022 in JAMA Network Open analyzed the first two months of OnPoint NYC's operation (November 2021 to January 2022) at both locations. The study concluded that "supervised consumption in these sites was associated with decreased overdose risk."⁸⁸ This same study also provided demographic data about the site, finding that 78% of patrons were male, 53.3% of patrons were Hispanic, and 36.9% of patrons were experiencing homelessness.⁵ In just the two months that this study was being conducted, OnPoint staff administered Naloxone 19 times, and Emergency Medical Services were called only 5 times.⁵ Furthermore, of all the patrons that visited OnPoint in its first two months of operation, 75.9% of them said that the sites provided them with a place to use instead of using a public space.⁵ One could assume that had these individuals used drugs off of OnPoint premises, they would have incurred an increased risk of overdose and death as opposed to using at OnPoint. Thus, by providing a safe environment in which individuals who inject drugs can use, OnPoint NYC has reduced the risks of overdose and death in the surrounding communities.

One of the main arguments against SISs contends that they lead to an increase in crime, disorder, and unsanitary

conditions in the neighborhoods that surround them. Indeed, this same argument is included in those used by lawmakers to leverage the Crack House Statute against the establishment of SISs. Former Deputy U.S. Attorney General Jeffery Rosen published an op-ed in the Philadelphia Inquirer arguing against SISs, saying "injection sites may also endanger the surrounding community."⁸⁹ Rosen goes on to outline some dangers associated with SIS installation, including an increase in violent crime due to drug trafficking.⁶ However, as previously stated, OnPoint NYC provides a private place in which people who inject drugs can use and dispose of their equipment instead of a public space like a train station or a sidewalk.⁵ Such a space subsequently reduces the potential for needle littering or any other unsanitary conditions produced as a byproduct of drug use. Furthermore, the neighborhoods surrounding both of OnPoint's facilities saw no significant increases, and some decreases, in 911 calls for medical emergencies, violent crime, or property crime after the installation of the sites.⁹⁰ Specifically, in terms of crime, the immediate vicinity surrounding the OnPoint facilities (6 blocks) saw a 7.8% decrease in violent crime reports, while arrests made for drug and firearms possession also decreased by 82.7% in the same area.⁷ The presence of OnPoint NYC in Manhattan has, so far, had a positive impact on the surrounding areas.

The debate around New York City's first SISs is contentious, but the preliminary data regarding their impact on the overall health of the city's addicted population and the overall community is positive. It is true that the OnPoint facilities are illegal federally and on a state level, but through close cooperation with the city government and its police, the sites have remained free of any legal setbacks for now.⁹¹ This same cooperation between city officials and OnPoint staff has allowed the two facilities to provide essential harm reduction services to part of a city that saw over 3,000 overdose deaths in 2022.⁹² In its first year of operation, OnPoint facilities and staff were involved in 636 overdose interventions, saving numerous lives and possibly reducing the number of overdose deaths in the city.⁹³ Although two different cities, New York and Philadelphia have the similar problem of mass drug use and overdoses, and the benefits produced by OnPoint NYC's Overdose Prevention Centers would be equal in Philadelphia.

DESIGN OF SISS IN PHILADELPHIA

a. Location

Location is a key factor involved in making the SIS as

successful as possible in Philadelphia. Although drug use is rampant throughout the city, it is heavily concentrated in the Kensington neighborhood. Sales of amphetamines, cocaine, and opioids including heroin have become the livelihood of many individuals in this once predominantly working-class neighborhood. Although Kensington was once a manufacturing leader of the 19th and 20th centuries, in recent decades, the neighborhood has become the East Coast's largest "open-air narcotics market" for heroin.⁹⁴ Plagued with substantial drug trafficking and gang violence, homelessness has since skyrocketed in Kensington as well. As of now, Kensington is home to the most people experiencing homelessness in the city, with numbers continuing to rise as the opioid epidemic persists.⁹⁵ Given the uncontrollable state of drug use, poverty, and homelessness in Kensington, this neighborhood is a prime location for the nation's next, and Philadelphia's first, SIS.

b. Layout

The SIS in Philadelphia will have a similar layout to that of New York's OnPoint and Vancouver's Insite. Upon entering the facility, PWID will first visit a reception area to receive a card with an anonymous identification number. This card will also contain the address and phone number of the SIS, the phone number for counseling and rehabilitation services, and the phone number for emergency services in the case of an overdose. It is important to note that the SIS User ID card would not contain personal information of the user. Rather, the card is to be used as a resource for PWID and will only include information about the facility and where to contact if an emergency should arise. The cards will also be used to collect data to determine if the SIS is effectively serving PWID.

PWID will be required to provide basic information about themselves including their age, gender, ethnicity, how they heard about the facility, and whether they are interested in rehabilitation, psychiatric services, wound care, clean needle exchange, and/or other services addressed later in this section. The ID card will allow the participant to swipe in and out of the SIS, enabling staff to monitor the facility's traffic. If the user does not have a clean needle, one will be provided for them. However, it is crucial to emphasize that the SIS will not provide drugs for users to inject. PWID must bring their own substances for use. Purity testing kits will be available for those who wish to determine if their drugs have been laced with other substances such as fentanyl and xylazine.

After checking in at the reception area, PWID will enter a large room with multiple benches at which they may safely inject while under the supervision of trained medical professionals. The SIS will provide PWID with the sterilized supplies or kits they may need for substance use. This would include sterilized syringes, disposable cookers, matches, bottled water, and tourniquets. The benches themselves will be sectioned off to create a semi-private space for each individual. Moreover, a box in which used needles can be safely disposed of will be placed on each bench. In the instance that an overdose does occur, trained medical professionals will be readily available and prepared to administer naloxone to reverse the overdose. Medical students will also be prepared to clean and care for wounds that arise due to prolonged IV drug use. Medical oxygen supplies will also be available if needed.

After safely injecting, PWID may visit a lounge area for a designated amount of time (30 minutes). During this time, staff will gauge if any participant is receptive to having a conversation about recovery. If a user seems open to the conversation, the designated time restriction will be set aside as staff members and recovering individuals attempt to build a relationship with the receptive user. It is at this point in the communication process that educational material, counseling, and rehabilitation programs will be offered to PWID. The ultimate goal of the lounge area is to provide a safe space where staff members can foster relationships with PWID and guide them into rehabilitation and recovery.

c. Supervised Injection Services

The SIS in Philadelphia will be modeled after successfully established supervised injection facilities such as OnPoint in New York and Insite in Vancouver. However, the Kensington SIS will include additional services for PWID. These services will provide additional opportunities for individuals in recovery and place greater emphasis on the early education of future healthcare professionals. The services include fentanyl and xylazine screenings, wound care, Hepatitis C/HIV screenings, a needle exchange program, Narcan distribution and training, counseling for rehabilitation and detoxification provided by individuals currently in recovery, and early education for healthcare personnel.

d. Fentanyl and Xylazine Screenings

In the past decade, fentanyl has become a fatal component of the Philadelphia opioid crisis. In 2022, over 80% of all

overdose deaths involved opioids, with 96% of the opioid-implicated deaths involving fentanyl.⁹⁶ These numbers continue to rise since individuals are often unaware of the fentanyl-laced substances they use.⁹⁷ Because of this, the SIS would be prepared to offer fentanyl screenings. These screenings would not only prevent the number of overdoses, but they may change the behavior of people who inject drugs. A study done by Johns Hopkins and Brown University investigating the effects of fentanyl screenings with PWID found that people who received positive fentanyl results tended to use less, inject while supervised more frequently, and/or use more slowly.⁹⁸ These results suggest PWID become more aware of their current circumstances and cautious of drug use upon learning of fentanyl lacing. Therefore, offering fentanyl testing strips at the SIS would allow PWID to be more cognizant of their safety and conscious of reality, which may prompt them to seek assistance in rehabilitation and detoxification.

Following the same line of thought, the SIS must provide xylazine testing strips for PWID. Not only could the testing strips prevent future xylazine overdoses, but individuals who receive positive tests may experience similar behavioral changes to those seen in users who obtained positive fentanyl screenings. After learning of the xylazine laced in substances they use, PWID may begin to use less and/or be more cautious when using.

e. Wound Care

Wound care is another key component of the OnPoint and Insite supervised injection facilities. The use of unsterile needles for intramuscular and subcutaneous injections contributes to the rise in blood-borne diseases and other infections. Many of these diseases are bacterial infections of the skin and soft tissue such as cellulitis, subcutaneous abscesses, and venous thrombophlebitis that may not require hospitalization. However, these infections, if left untreated, can result in more severe infections including bacteremia, endocarditis, osteomyelitis, and central nervous system abscesses.⁹⁹ Additionally, improper needle use alone can cause lacerations that require professional wound care, and xylazine has been shown to cause necrotic skin ulcerations far from injection sites.¹⁰⁰ Therefore, the SIS would provide an immediate wound care service run by healthcare personnel including physician assistants, nurse practitioners, and medical students. By managing wounds and mitigating the spread of secondary infections, the SIS could potentially reduce future healthcare costs that arise when individuals seek help for severe infections that were left untreated.

Furthermore, the wound care services would pose an opportunity for students to acquire practical medical experience and allow future healthcare professionals to witness the effects of opioid usage within marginalized populations first-hand.

f. Hepatitis C/HIV Screenings

Opioid injections can cause numerous blood-borne infections, the most prevalent being the hepatitis C virus (HCV) and the human immunodeficiency virus (HIV). In 2021, there were 140 known cases of acute HCV in Philadelphia. 52% of the acute HCV cases were individuals who reported having injected drugs.¹⁰¹ Although acute HCV arises within 6 months of infection and can be a short-term illness, it often leads to chronic infection.¹⁰² In chronic HCV, the virus may remain silent for decades but cause serious health problems such as liver damage, cirrhosis, and cancer that may eventually lead to death.⁸⁸ In 2021, there were 1,070 newly reported cases of chronic HCV in Philadelphia and an estimated 52,640 people living with chronic HCV in all, or 3.3% of the city's residents.⁸⁷

Furthermore, 18,250 people were reported to be living with HIV in Philadelphia in 2021, with 362 newly diagnosed cases within the year.¹⁰³ HIV attacks and destroys the body's CD4 cells which help the immune system battle infections. As the number of CD4 cells drops, the body becomes unable to fight illnesses and infections, leaving individuals more susceptible to secondary infections or cancers. If left untreated, HIV can advance to its latest stage, acquired immunodeficiency syndrome (AIDS), in which the infected person has fewer than 200 CD4 T-cells per cubic millimeter of blood.¹⁰⁴ At this point, the immune system has become so weak that the individual is at great risk for developing other illnesses.⁹⁰ According to the Philadelphia Department of Public Health, 75.3% of diagnosed HIV cases from 2018 to 2021 were persons who injected drugs.¹⁰⁵ Additionally, HIV and HCV are often coinfections amongst PWID, who are less likely to afford the health insurance needed to cover the cost of antiviral treatment.⁹¹

The initial regimen of antiviral therapy that is recommended for people with HIV costs over \$36,000 per patient per year, and the Center for Disease Control estimates the lifetime cost of HIV-related medical treatment to be \$398,668.¹⁰⁶⁻¹⁰⁷ In 2020, the cost of a 12-week course of HCV treatment ranged from \$43,300 to \$103,700, with an average cost of \$70,900.¹⁰⁸ Because of these expenses, PWID tend to wait until symptoms progress to severe stages before seeking

medical attention, ultimately costing healthcare systems. To combat these issues, the SIS will offer both HIV and HCV screenings. OraQuick Rapid HCV and HIV tests will be used to detect antibodies for the two respective viruses. Both tests will provide results within 20 minutes of an initial finger-prick.¹⁰⁹⁻¹¹⁰ This is a proactive step for PWID and healthcare systems. HIV/HCV screenings encourage positive individuals to seek early treatments that could guide them to rehabilitation care. As such, these screenings could result in an overall reduction in healthcare costs.

g. Needle Exchange Program

Prevention Point Philadelphia was instituted in 1992 as the city's first legal syringe exchange program.¹¹¹ This program, also known as the needle exchange program, sought to reduce the number of blood-borne diseases such as HCV and HIV caused by the sharing and reuse of unsterile needles amongst PWID. In this program, people can exchange unclean needles for sterile ones while becoming educated on the risks and implications of needle sharing. Since its inception, Prevention Point has become the largest and sole city-sanctioned needle exchange program in Philadelphia. From 1992 to 2016, Prevention Point helped to steadily reduce the number of PWID newly diagnosed with HIV.¹¹² In Philadelphia, the number of HIV transmissions due to needle sharing dropped from 46% in 1992 to 5.4% in 2014.¹¹³ Although the new number of registrants in the program has also declined from 2168 in 1999 to 1295 in 2014, PWID have been utilizing the needle exchange program more in recent years than in the past. This is especially apparent within the younger generation.⁹⁹ However, despite the originally positive results of the needle exchange program, the number of new HIV diagnoses in Philadelphia has continued to rise since 2016. Following an HIV outbreak, the city saw an 184% increase in new HIV diagnoses amongst PWID from 2016 and 2019.⁹⁹ The COVID-19 pandemic further exacerbated this increase by disrupting the city's HIV testing and care infrastructures.⁹⁹ Therefore, the SIS must implement a needle exchange program to combat this increase in blood-borne disease transmissions. The SIS would provide the space needed to educate individuals on the risks of opioid usage and needle sharing as well. By learning of these health risks and the various opportunities and support available to them, participants may be more inclined to seek rehabilitation and detoxification. It is also important to emphasize that the SIS would implement a needle exchange program as opposed to needle distribution. By doing so, the SIS would serve as a

means to help clean up the Kensington area of discarded needles to prevent future wounds and blood-borne infections as well.

h. Narcan Distribution and Education

Narcan is the intranasal form of naloxone, an opioid antagonist. Both naloxone and Narcan act on the central nervous system to reverse respiratory depression, the main cause of overdose deaths.¹¹⁴ When used correctly, the effects of naloxone occur within 2 to 3 minutes of administration.¹¹⁵ Therefore, educational Narcan distribution will take place within the SIS as an attempt to reduce the number of fatal opioid overdoses in Philadelphia. In 2018, the Surgeon General, Jerome Adams, urged Americans to carry naloxone:

“For patients currently taking high doses of opioids as prescribed for pain, individuals misusing prescription opioids, individuals using illicit opioids such as heroin or fentanyl, healthcare practitioners, family and friends of people who have an opioid use disorder, and community members who come into contact with people at risk for opioid overdose, knowing how to use naloxone and keeping it within reach can save a life...Be prepared. Get Naloxone. Save a life”.¹¹⁶

Furthermore, the Pennsylvania Legislature passed Act 139, known as “David’s Law” in 2014. This statute allows Narcan to be prescribed to 3rd parties, including friends, family, and loved ones, as a way to guide individuals toward substance use treatment.¹¹⁷ Act 139 also allows Narcan to be administered by law enforcement and firefighters, and it outlines the Good Samaritan Provision, which provides legal protection for witnesses, or good Samaritans, who seek emergency medical services upon witnessing an overdose.²⁵

In 2018, Independence Blue Cross began offering Narcan at no cost to members with prescription drug benefits through the company. This program was renewed in 2022, demonstrating the company's continued commitment to fighting the opioid crisis by eliminating financial barriers that prevent access to this life-saving drug.¹¹⁸ Narcan was recently approved for over-the-counter sale on March 29, 2023 and is available for free at select city libraries such as the Lucien E. Blackwell Library in West Philadelphia.¹¹⁹ Prevention Point, the sole city-sanctioned needle exchange program, also distributes Narcan kits and provides education on how to properly administer the drug.¹²⁰ Given the support from federal, state, and insurance agencies, Narcan

distribution and training would be essential components of the SIS. Having immediate access to Narcan could help participants proactively save themselves and others from fatally overdosing. Narcan distribution further encourages participants to seek help and may reduce the total healthcare cost in Philadelphia by decreasing the number and length of hospital stays attributed to opioid overdoses.

i. Counseling for Rehabilitation and Detoxification Done by Individuals in Recovery

Along with the medical support available to PWID within the facility, the SIS would contain an information center to connect participants to other necessary resources. Unlike the health, nutrition, and safety expertise provided by medical professionals, the information center would be run predominantly by people in recovery. Through personal interactions, participants would build relationships with individuals in recovery, which may compel PWID to utilize the resources available to them. By exposing participants to the opportunities that are offered such as rehabilitation, detoxification, medication-assisted therapies, grooming services, counseling, etc., they may be more inclined to use them.⁷⁶ If a recovering individual does experience a relapse in substance use, the SIS would further serve as a space with accessible medical personnel, who are ready to provide emergency care should it be needed. Additionally, the information centers would give recovering individuals a sense of purpose in facilitating conversations with and encouraging PWID. Not only is this role important for PWID who need guidance to recovery, but it would help those in recovery maintain the motivation needed to remain abstinent.

j. Early Education

Despite the government's continued emphasis on the early education of new and future healthcare professionals, the U.S. continues to fall short of reaching its educational goals. By limiting early education, previous health initiatives have inadvertently failed to buffer the opioid epidemic as well. Providing healthcare students with the opportunity to witness the SIS first-hand is essential in diminishing the opioid crisis. As such, introducing young healthcare professionals to the SIS would benefit all parties involved:

Healthcare institutions: By allowing students to participate in the SIS, healthcare institutions would prove their dedication to fighting the opioid crisis and commitment to helping the most vulnerable population of our countries.

Students: By gaining practical experience early in their careers, students will acquire the skills needed to deal with the ongoing opioid epidemic. Additionally, the experience will help students to be more proficient in caring for underserved populations.

SIS facilities: This initiative will allow SIS to obtain the services they need from trained medical personnel and help to destigmatize the public's perception of SIS by emphasizing their focus on educating young healthcare professionals.

RECOMMENDATIONS/CONCLUSION

As the opioid epidemic continues to not show any signs of slowing down, a change in the approach of dealing with this issue seems reasonable. This paper has shown that the current methods of working against the epidemic as a whole are inadequate, evidenced by the current rates of overdose death hitting new peaks each year. From the medical perspective, the best treatment for individuals suffering with substance abuse disorder is going to occur at the level of the SIS. Ethically, the SIS is justified through the application of the harm reduction theory. From an economic perspective, the implementation of a SIS in the city of Philadelphia would be financially advantageous for the city and those like it who's citizens are battling with substance abuse disorder. The analysis of OnPoint NYC showed that this method of harm reduction has proven effective in saving lives. Finally, we have proposed an updated design for a supervised injection site in Kensington, Philadelphia, which would be fully equipped to handle the rapidly evolving epidemic. The recommendation of the authors is that Philadelphia, and cities struggling from similar issues, take an involved approach in working against this epidemic. By facing the problem head on and providing the necessary care that these vulnerable individuals need, the city may be able to begin to beat the epidemic back and deliver the utmost dignity and respect to some of its most vulnerable populations.

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Author Information

Joseph Kelly

Senior Research Fellow, Institute of Clinical Bioethics, Saint Joseph's University
Philadelphia, PA, USA

Radhika Ahluwalia, M.D.

PGY-3 Internal Medicine Mercy Catholic Medical Center
Darby, PA, USA

Stanley Yong, M.D.

PGY-1 Internal Medicine Mercy Catholic Medical Center
Darby, PA, USA

Peter A. Clark, Ph.D

Director-Institute of Clinical Bioethics, Saint Joseph's University
Philadelphia, PA, USA

Jenna Szabo, B.A.

Graduate Assistant, Institute of Clinical Bioethics St. Joseph's University
Philadelphia, PA, USA

Alexandra Colman

Research fellow, Institute of Clinical Bioethics St. Joseph's University
Philadelphia, PA, USA

Aidan Fogarty

Research fellow, Institute of Clinical Bioethics St. Joseph's University
Philadelphia, PA, USA

Christ Do

Research fellow, Institute of Clinical Bioethics St. Joseph's University
Philadelphia, PA, USA

Joel Issac

Research fellow, Institute of Clinical Bioethics St. Joseph's University
Philadelphia, PA, USA