



THE OPIOID CRISIS IN AMERICA
Domestic and International Dimensions

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for fentanyl and other
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BROOKINGS

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Executive summary

The synthetic opioid crisis in North America has increased fatal overdose rates to unprecedented levels within a matter of a few years. It involves new technologies, a new source of supply (the chemical industry in China), and new forms of distribution (the internet and mail). These elements are perhaps even more difficult to suppress than other supply sources from foreign countries. This has led to an assumption that nothing can be learned from prior experience in trying to control drug markets.

In this paper, we first explore what might be learned from some notable past successes. We begin by examining a set of episodes in which enforcement against a specific illegal drug market had more than a brief impact on supply, though the enforcement may have caused other harms. Examples include the near-elimination of the quaaludes market in the 1980s and the “heroin drought” in Australia in the early 2000s. Exploring common features of these past successes reveals insights that may reduce the risk of fatal overdose.

We then examine the characteristics of fentanyl distribution in detail, noting that taken individually, the differences (such as the low costs of fentanyl production and its distribution by mail) are in fact not so distinctive: it is the combination of many differences that creates the unique threat.

In response, authorities need to change priorities in supply control domestically. Prior to the arrival of fentanyl and other synthetic opioids, it was reasonable for police and prosecutors to focus on (1) raising prices and restricting availability to reduce consumption and (2) minimizing the violence and disorder around street markets. Yet today, a more important goal may be to reduce the *toxicity* of the supply and thus the number of drug overdoses. This paper applies the insights of the “focused deterrence” approach developed by David Kennedy and Mark Kleiman, which involves using multiple levers to attain a specific policy goal.

We conclude with some specific suggestions for local and national supply-control agencies—including the need to focus more on regulating rather than reducing markets to minimize harm, and to distinguish between markets not yet swamped by fentanyl or in transition and those where the drug is entrenched. Strategies appropriate in one context may not serve well in another.

Introduction

This Time is Different is the title of a seminal book about fiscal crises by Carmen Reinhart and Ken Rogoff (2009). The title refers to the fact that every fiscal crisis is treated by the market as so unique that little can be learned from studying history. Reinhart and Rogoff examine eight centuries of such crises to show that they have, in fact, a great deal in common and that history has many predictive lessons.

Similarly, the United States has experienced many drug problems over the last century, but the ongoing opioid crisis, having worsened so unexpectedly in the last half decade, seems different. The current overdose problem began with an oversupply of prescription pain relievers, but the potency and cheap production costs of synthetic opioids, particularly fentanyl, make them attractive alternatives for drug suppliers. By our estimates, at the import level, fentanyl is perhaps 99 percent cheaper per dose than heroin (Pardo et al, 2019).¹ Profit-seeking drug dealers embrace these more potent alternatives, which are now driving the country's worsening overdose crisis.

While deaths involving synthetic opioids have jumped by a factor of ten in less than six years, they remain geographically concentrated east of the Mississippi River. The 2018 overdose rate for synthetic opioids was more than 25 per 100,000 in New Hampshire, Ohio, and West Virginia compared to less than 2.3 per 100,000 in California, Oregon, and Washington, though death counts for more recent years indicate that synthetic opioids have moved further west (Pardo et al, under review). These potent opioids offer a new and particularly daunting challenge to drug policy for two important reasons. First, the quantities necessary to cause great harm are truly tiny—almost trace amounts in the case of some fentanyl analogs. Second, sufficiently large quantities are cheaply manufactured in distant countries, particularly China, with which the U.S. is well connected by traffic and commerce. These two factors complicate counter-narcotics efforts and explain why it is feasible to supply the U.S. market with powerful opioids using regular commercial channels rather than through the complex smuggling ventures often involved in importing cocaine, heroin, and methamphetamine. Enforcement efforts need to be reoriented.

Because fentanyl and other synthetic opioids are frequently mixed with heroin or pressed into counterfeit tablets and presented as prescription medications, users—and many dealers—are unaware of what they are handling. This adds an additional layer of complexity, with both operational and legal consequences. Retailers and low-level wholesalers are sold white powder that is asserted to be heroin or fake tablets purported to be legitimate. The recipient may suspect that the powder contains fentanyl or some other synthetic opioid but has no information about the exact composition. The counterfeit tablet phenomenon is more worrying, given that these fakes are made to look like genuine products of consistent dose, whereas illegal manufacturers do not sample product to ensure an even distribution of active ingredient in these fraudulent tablets. Technology exists to cheaply test for the presence of fentanyl but

¹ A kilogram of nearly pure fentanyl can cost about \$5,000 when purchased online. A kilogram of heroin costs \$50,000 (purity-adjusted) when purchased in the United States (See UNODC, https://dataunodc.un.org/drugs/heroin_and_cocaine_prices_in_eu_and_usa). Since fentanyl is about 30 times as potent as heroin, the reduction in price per dose at the wholesale level is more than 99 percent.

not for the purity. Quantifying the amount increasingly matters when doses for these powerful substances are measured in single milligrams.

The arrival of potent synthetic opioids to illicit drug markets feels different, but is it? Can we learn from prior drug problems? We begin this paper agnostic on the question. The challenge of controlling supply has always been daunting. Many synthetic drugs, like methamphetamine, can be manufactured in small clandestine labs in the United States or in larger facilities in countries with weak enforcement, such as Mexico or Myanmar (UNODC, 2017; 2019). Small quantities, such as a few grams, constitute a valuable shipment for drugs such as MDMA (3,4-methylenedioxy-methamphetamine, commonly known as ecstasy or molly) and methamphetamine. The internet facilitates purchase of these synthetics. And though heroin and cocaine come from plants that can be targeted for eradication, once the raw material is refined it is valuable enough for shipment through the mail. A five gram shipment of 80 percent heroin would generate perhaps \$3,000 in retail sales.²

So, it has long been feasible to import valuable quantities in the mail. However, the inputs and processes needed to manufacture fentanyl are even easier to obtain and hide than those for methamphetamine. There are many uncontrolled precursors or pre-precursors, such as phenylethylamine, which are used in the manufacture of many legitimate products. The chemicals used to produce fentanyl and other analogs consumed in illegal drug markets in America, and much of the finished product, come from abroad—mostly China. Producers are therefore largely outside the reach of U.S. law enforcement. Illicit fentanyl manufacturers in China may easily hide among the large numbers of pharmaceutical and chemical manufacturers (O'Connor, 2017; Pardo, 2019). Given these developments, law enforcement may need to prioritize reducing overdose risk in contemporary drug markets over traditional goals of reducing availability and raising price.

Section 2 examines a set of episodes in which enforcement against a specific illegal drug market had more than a brief success, though it may have caused other harms; most but not all examples come from the U.S. It notes some factors behind these successes. Section 3 then examines the distinctive features of fentanyl distribution in more detail. This leads to a lengthy section 4 on areas of potential innovation for enforcement against the fentanyl market. Section 5 summarizes how law enforcement could approach this task, and the prospects for success in controlling fentanyl.

Learning from past drug enforcement disruptions

Critics of U.S. drug supply reduction point to its many failures or excesses (Kleiman, 1992; Nadelmann, 1989). Many resources have been poured into policing, prosecution, and incarceration without suppressing the mass markets for cocaine, heroin, cannabis, and methamphetamine. We do know that once established, illegal drug markets are resilient (Babor et al., 2018, chapter 5). The limitations of drug law enforcement's capacity to reduce availability and raise the price of drugs are troubling given the high costs of such interventions (Pollack and Reuter, 2014). There is, however, an asymmetry in our understanding of the

² Heroin imported in kilogram shipments is worth only \$50 per gram. However, the relevant comparison is its cost to retail dealers who obtain the drug from their suppliers; at that stage it may be worth \$200 per gram.

effectiveness of enforcement; we do not observe and cannot measure those markets that did not form because of effective enforcement. It is plausible that there are many such aborted markets.

Whether or not a market takes root depends on a variety of factors, including the local environment, the level of access or penetration of supply of drugs, and the efforts of local authorities to respond early on. As compared to other illegal drugs, traditional responses are not well suited to synthetic opioids, but perhaps something can be learned from analyzing the occasional past successes. Table 1 documents some major supply disruption cases known to drug policy researchers. This is not an exhaustive list, but each case is selected for its relevance to the ongoing fentanyl problem due to its source, the status of the drug in contemporary markets, and the impacts the disruption had in both the short and long term.

Drug law enforcement's prior successes are often limited to temporary, but sometimes important, disruptions. We use the term "disruption," noting the general ability of alternative sources to fill shortages in the long term. Nevertheless, even though disruption often does not eliminate the source of drugs, closing trafficking routes or successfully controlling precursors have had impacts in shaping supply—albeit sometimes for the worse. Examining what makes these cases successes or failures offers insights to law enforcement eager to disrupt fentanyl supply.

The dismantling of the French Connection of heroin trafficked from France, coupled with a ban on poppy growing and opium production in Turkey during the 1970s, had cut heroin flows into the United States deeply enough and for long enough to raise prices sufficiently to deter use. As a result, overdoses and heroin treatment admissions declined (Musto, 1999; DuPont and Greene, 1973). This, and the expansion of methadone treatment, seemed to reduce American heroin problems until the late 1970s, when Mexico and Southeast Asia replaced Turkey as sources of heroin for the U.S. market. Mexico had been a minor source previously but flows had dropped substantially due to a combination of eradication and drought (Reuter and Ronfeldt, 1992). There is not much evidence that heroin users switched to other illegal drugs, though many may have increased their alcohol consumption.

The near complete eradication of quaaludes (methaqualone) is a rare instance of drug control efforts removing a popularly abused drug from markets in less than half a decade. This prescription sedative was diverted and abused during the 1960s and 1970s, but its reclassification to Schedule I in 1984 banned production. International efforts at controlling precursors were successful in eradicating illegal production and trafficking (UNODC, 2019; Wantanabe, 1996). Methaqualone precursors are controlled in many developed countries and such regulations have been successful at eradicating supply. It is, however, reported now that methaqualone produced in India has been a popular recreational drug in East and South Africa since the early 1990s (UNODC, 2019; Wantanabe, 1996).

Table 1. Selected prior drug enforcement disruptions

Supply-disruption case	Drug and period	Interventions	Short-term outcomes	Long-term outcomes	Confounders	Sources
French Connection and Turkish opium ban	Heroin during the early 1970s	Poppy ban in Turkey in 1971 Police break up of major smuggling networks from refineries in France in 1972	Disruption in heroin supply in U.S. markets Decline in heroin problems (lower initiation and higher desistance) for 5+ years	Mexico, Pakistan, Southeast Asia eventually replaced Turkey as U.S heroin source	Expansion of methadone Droughts in poppy-growing areas	Musto, 1999; DuPont and Greene, 1973
Quaaludes (methaqualone) in the US	Late 1970s, early 1980s	Up-scheduling to Schedule I Enhanced international diversion, control, and investigation	Near complete global disruption Appearance of counterfeit tablets	Successful monitoring of precursors Possible shift in consumption towards benzodiazepines	Declining popularity of quaaludes	UNODC, 2019; Wantanabe, 1996
Australian heroin drought	Heroin in 2000/2001	Increased law enforcement resulting in extremely large seizure in Fiji and arrest of principals in major Chinese heroin trafficking ring	Steep decrease in availability and purity and sharp increase in price of heroin Decline in heroin problems but rise in methamphetamine problems	Market stabilization, but recent prevalence remained lower than pre-drought era	Global supply constraints, e.g., declining poppy production in Southeast Asia	Degenhardt, et al, 2004
Meth precursor control in the U.S.	Meth in 1990s and early 2000s	Series of state and federal laws aimed at curbing access to precursor chemicals (bulk and retail)	Decline in small clandestine labs Decline in methamphetamine problems	Shift in production to larger industrial labs in Mexico Very high purity and potency today, so deaths are climbing		DEA, 2018; Dobkin et al., 2014
Nascent fentanyl outbreaks in the U.S.	Fentanyl in early 1990s and mid-2000s (separate cases)	Closure of clandestine lab	Decline in fentanyl availability Decline in overdoses and related problems			Pardo, et al., 2019

The Australian heroin drought of late-2000 and early-2001 that resulted in a sharp decrease in heroin availability and purity is a peculiar case that cannot easily be attributed to any single event or intervention. Australian law enforcement began focusing greater attention and resources to stem the country's growing heroin problem in the late 1990s. This resulted in a series of large seizures and significant arrests, leading to a spectacularly large seizure in Fiji and the arrest of the principals in a Chinese smuggling ring. Heroin markets in both Australia and British Columbia were disrupted (Caulkins and Reuter, 2006). For some reason, the British Columbia market recovered quickly. Yet, the heroin smuggling ring was not replaced in Australia. At about the same time, the Taliban Afghan poppy ban of 2001 severely curtailed global opium stocks, preventing would-be importers from finding alternative sources. There is no strong analysis of the source of the disruption; Degenhardt et al. (2004) make the case by elimination that it was a supply shock but cannot be more specific than that.

Closer to home, efforts have been made by the federal government and U.S. states to reduce access to precursor chemicals used in the manufacture of methamphetamine. Since the mid-1990s, the federal government has reduced access to several precursors like pseudoephedrine and phenylpropanolamine. Several states have passed laws that have made it harder to obtain cold medications that contain pseudoephedrine or ephedrine sold in pharmacies. Analysis suggests that indeed these laws are associated with reductions in clandestine labs, ER visits, and crime (Dobkin et al, 2014; Cunningham and Liu, 2003; Cunningham et al., 2016). Methamphetamine production in the U.S. has been supplanted by production in Mexico, which, since 2012 has exported an increasing amount of higher potency product (DEA, 2019).

Though the ongoing fentanyl outbreak is the most severe, it is not the first. Since the 1980s, there have been several documented instances of clandestine production of fentanyl in the United States that were associated with increased numbers of overdose deaths. The limited nature of some of these outbreaks sometimes reflected the lack of a distribution network that could connect the supply to users (Pardo et al, 2019). Though fentanyl made its way into the heroin supply during several of these outbreaks, once the lab was located, law enforcement was successful in eradicating it. This is true for the most recent prior outbreak, when a lab in Mexico was producing fentanyl sold as heroin in street drug markets in parts of the Midwest from 2005 to 2007, resulting in over 1,000 fatal overdoses (Centers for Disease Control and Prevention, 2008).

What can be learned from these prior disruptions? Scheduling and precursor control efforts helped disrupt the availability of methaqualone and methamphetamine. However, these particular synthetic drugs are derived from chemicals with narrow uses. Though several fentanyl precursors, such as NPP and 4-ANPP, are only used in the manufacture of fentanyl, there are some pre-precursors that are used in a variety of legitimate products, limiting the utility of such regulatory approaches. The single source and limited distribution networks for previous fentanyl outbreaks, and for the heroin coming from Europe via the French connection in the 1970s, created bottlenecks in supply such that disruption was possible. Further, plant-based drugs, like heroin, are geographically fixed. This means that source-country controls aimed at reducing the primary inputs may have had more long-term downstream effects as it can take time for other source countries to emerge.

Today's fentanyl outbreak is characterized by: 1) multiple labs with access to precursors or other suitable and easily obtained chemicals, so that any single successful enforcement effort cannot shut down overall production; and 2) access to broader distribution networks and capabilities, such as the internet. Shutting down a single lab or arresting a distribution ring will not be enough to disrupt the importation as was the case for the French Connection or the Australian heroin drought. Law enforcement could successfully disrupt these operations by

focusing on the weakest link in supply. Locating and dismantling a lab or smuggling ring, or curtailing the availability of precursor chemicals generated downstream effects, such as increased prices and reductions in availability, that were reflected in drug-use indicators. This was even true for early fentanyl outbreaks, which involved efforts aimed at producers and traffickers. Today, it is possible to produce small quantities of fentanyl without specialized facilities or highly technical skills, allowing many different points of supply to emerge. Therefore, the focus on production and trafficking of fentanyl are unlikely to generate a lasting disruption.

The differences relating to distribution closer to retail markets identified earlier may turn out to be merely details. To some extent, these problems are similar to those that have confronted enforcement for the last fifty years, since heroin first emerged as a substantial problem in modern America. Users have little knowledge of what is in the bundle they are buying (Reuter and Caulkins, 2004).

Heroin and fentanyl distribution

To understand enforcement options, we need to know how heroin and fentanyl are distributed. It is easy to be seduced by anecdotes about the easy access to drugs being supplied by the internet. Though ordering drugs online will account for an increasing share of the retail market, to date neither the open web nor the dark web account for more than a tiny share of the opioids directly supplied to users. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, 2017) estimates the darknet comprises a “modest” share of the revenues of all drugs sold illegally in Europe. Van Buskirk et al. (2016) found that across several darknet market places, cannabis, diverted pharmaceuticals, MDMA, and cocaine made up the majority of listings, while illicit opioids (mostly heroin) made up 7 to 11 percent. Similarly, by one estimate the total monthly revenues of illicit opioids sold on the darknet is small, comprising about 6 percent of wholesale revenue across all drug listings (Aldridge and Decary-Hetu, 2016). Though illicit opioids make up a small percentage of listings and revenues for marketplaces analyzed, many synthetic opioids are extremely cheap per morphine milligram equivalent, suggesting that even a small number of sales may represent a substantial amount supplied to a market.

Instead of serving end users, the internet may appeal to importers and distributors who source wholesale quantities of fentanyl and other synthetic opioids which are then distributed downstream. The mode of supply of these drugs is qualitatively different. The ease with which a single individual, with no prior criminal history, can obtain a kilogram of nearly pure fentanyl online without leaving the comfort of home challenges existing law enforcement efforts.³ However, much less fentanyl shipped in an envelope could be enough to supply a small market. Five grams of fentanyl is perhaps equivalent to 150 grams of pure heroin and enough for 1,000 ten-dollar “dime bags” sold at retail. This allows the recipient to serve as a low-level wholesaler. Acquiring so much of the drug without interacting with a criminal organization in the United States has never been possible before.

One explanation for the failure of the internet to appeal to chronic heroin users is that such individuals have needs that are urgent. They also have little capacity to accumulate the funds required to purchase more than a few doses, let alone the wherewithal to obtain cryptocurrency or to access darknet markets through anonymous browsing software. The

³ The skeptical reader is encouraged to type “buying fentanyl online” into an internet search, like duckduckgo.com.

rational and regular heroin user would purchase multiple doses at a much lower price per pure gram; the rational and tech-savvy heroin user is a rare, perhaps mythical, figure. Field research still reports individuals on the street making purchases of one or two doses multiple times per day reflecting their hand-to-mouth existence, dependent on low-yield criminal activity and ill-paid work (Mars et al., 2015; Mars et al., 2016). For such immediate needs, the internet fails most chronic users. Surely some individuals who use opioids purchase these drugs online, but that is likely a very small share.

Almost all of the heroin consumed in the United States originates in Mexico, trafficked by Mexican transnational crime organizations (DEA, 2019). Several of these organizations are now increasingly supplying fentanyl in addition to or in lieu of heroin, as noted by increasing seizures of clandestine labs in that country (Fliez et al., 2019). The fentanyl is delivered to domestic U.S. markets overland through existing drug trafficking routes after crossing the border, hidden along with shipments of legitimate goods or concealed in vehicles (CBP, 2019). Fentanyl is imported from Mexico as counterfeit prescription tablets or powder, which is then mixed into the retail drug supply by domestic criminal groups. In some cases, fentanyl powder from Mexico is pressed into counterfeit tablets closer to end markets. The retailing of illicit opioids appears still to involve mostly face-to-face exchanges of drugs for money even if buyers use cell phones or social media to arrange deals (Mars et al., 2015; Mars et al., 2016).

One important puzzle, which points to our limited understanding of drug markets, is that, anecdotally, the (limited, lagging, and flawed) drug-price monitoring systems have failed to detect any evidence of fentanyl lowering the retail price of street opioids. The purity-adjusted price for heroin at the retail level in the United States has largely been trending downward as far back as the data series goes (ONDCP, 2016; Midgette et al., 2019). Although there have been short-lived increases (i.e. of less than 12 months), the 2016 price per pure gram of heroin at the retail level was at the lowest level recorded: approximately \$750 (in 2018 dollars), or roughly one-third of what it was 20 years earlier, after adjusting for inflation (ONDCP, 2016; Midgette et al., 2019).

However, the data series on *heroin* prices tell U.S. next to nothing about trends in *opioid* prices, when the opioid sold contains fentanyl. None of the standard methods of tracking drug prices is designed to handle a situation in which a given drug listed in the pricing data series (in this case, heroin) appears in a mixture with another drug that has similar effects—let alone when that is happening in only select parts of the country and the goal is to report national prices. Fentanyl, for example, is much more common east of the Mississippi river, and at least as of 2018 was not so common west of the Mississippi river. Furthermore, there appears to be a discrepancy in two estimates of heroin price trends in the years after fentanyl's arrival. In 2018, the DEA published a chart indicating that heroin prices largely declined from 2012 to 2014 and then significantly increased from 2014 to 2016 (DEA, 2019; see Figure 16), contradicting the more recent and transparent RAND price series (Midgette et al., 2019). The series produced by Midgette et al. (2019) showed that purity-adjusted heroin prices have declined by about 20 percent between 2006 and 2016.

Given our failure to understand the determinants of opioid prices in the presence of cheap fentanyl, it is hard to recommend strategies to raise the price of illicit opioids—a longstanding goal of drug law enforcement. Indeed, in the era of cheap, mass-produced fentanyl it is increasingly hard to see this as a feasible objective.

Options for enforcement against fentanyl

Here, we consider potential innovative strategies for law enforcement to more effectively address the realities of fentanyl supply and distribution. These include shifting enforcement goals toward reducing the lethality of the supply; focusing deterrence on changing dealer behavior; and looking at an expanded and more proactive range of action by federal authorities.

Shifting goals to reducing the lethality of the illegal opioid supply

The lethality of the opioids sold in illegal markets has increased substantially since 2014. About ten years ago, there were roughly 3,000 heroin overdoses annually. Synthetic opioids accounted for another 2,000 or so, but most of those involved diverted pharmaceutical products, such as transdermal fentanyl patches, and not illegally imported powders. In 2017, there were 15,000 heroin overdoses, of which a little over half involved a synthetic opioid as well; there were another 20,000 synthetic opioid overdose deaths that did not involve heroin (but may or may not have involved some other primary drug, such as cocaine). Thus, over a decade, the number of overdoses from illegal opioids (putting aside prescription opioids) rose by almost an order of magnitude to about 28,000. It seems likely that the number of people with opioid use disorder (OUD) who used illicitly sourced opioids rose over that time, but certainly less than ten-fold. So the death rate per person with OUD has gone up considerably. It is possible that the number of people with OUD purchasing street drugs has doubled or tripled, as indicated by the National Survey on Drug Use and Health (NSDUH) dubious estimates of the number of past month heroin users (SAMHSA, 2019), and the death rate has increased three-fold, or five-fold.

In addition, there have been several thousand overdoses that involved stimulants—primarily cocaine—and synthetic opioids but no heroin. It appears that fentanyl may be entering some portion of the cocaine supply. In 2017 in Ohio, analysis of retail seizures (<1g) of cocaine that did not contain heroin indicated that 7.1 percent had fentanyl or carfentanil (Zibbell et al., 2019). The number of individuals dying because of a cocaine overdose has increased substantially; all of that increase is accounted for by deaths for which a synthetic opioid was also involved.

This increase in deaths related to illegal opioid and cocaine use has profound consequences for drug enforcement. Prior to the arrival of fentanyl and other synthetic opioids, it was reasonable for police and prosecutors to focus on (1) raising prices and restricting availability to reduce consumption and (2) minimizing the violence and disorder around street markets. Yet today, perhaps a more important goal is to reduce the *toxicity* of the supply and thus the number of drug overdoses, which now vastly exceed the total number of homicides and is on par with firearms deaths on a national basis. We note that reducing toxicity should not be mistaken for reducing exposure to fentanyl. Though removing fentanyl from a heroin market would invariably reduce an individual's exposure to toxic substances, it may be increasingly difficult in markets where fentanyl is entrenched. As we explain later, reducing toxicity may look different in a market swamped by fentanyl versus one where the drug has yet to make substantial inroads. Other efforts to reduce toxicity include mechanisms aimed at increasing the transparency and reducing the variability in purity of opioids sold in illegal markets. The traditional goals don't disappear but are less important in this new world. Law enforcement's focus on reducing marketplace violence and disorder will continue to be important, as some drug marketplaces can become increasingly violent as they are penetrated by more potent opioids.

Using focused deterrence

Illegal drug markets sometimes generate conflict as dealers compete over territory or settle disputes. Though few prefer to live or work in a neighborhood where public drug consumption is common, it is often the violence and disorder associated with drug distribution that produces the most serious collateral harms and general concern. The drug market intervention (DMI) developed by David Kennedy (Kennedy, 2008) is perhaps the most promising application of focused deterrence related to violence reduction. It offers an alternative to traditional place-based enforcement. Focused deterrence aims to use multiple “levers,” including various sanctions (e.g. prosecuting to the fullest extent) and supports (e.g. labor force training programs). From the outset, the DMI prioritizes violence reduction rather than drug dealing. Under the DMI program, law enforcement identifies and builds cases on drug dealers in a market, typically arresting the most violent offenders while dissuading non-violent dealers from further criminal activity by suspending their cases so long as they refrain from selling drugs, especially openly and violently. The strategy involves bringing together non-violent offenders with family members, service providers, and other community leaders in a meeting that explains to offenders that their criminal behavior must stop, while offering them job opportunities or other services; if dealing resumes, then cases are prosecuted to the fullest extent (Braga, Weisburd and Turchan, 2018; Kennedy, 2008). The approach has had successes but has proven difficult to recreate (Corsaro et al., 2012; Saunders et al., 2016). Findings from a recent meta-analysis of focused deterrence strategies, like the DMI, suggest that they are associated with “moderate crime reduction” (Braga, Weisburd and Turchan, 2018).

In essence, focused deterrence is a crime reduction strategy that is both pragmatic and targeted. It leverages a full set of resources (both public and private) against the most egregious individuals, while putting forward a credible threat to the remaining actors in order to gain compliance. Such an approach to controlling what is available in drug markets, suitably modified, might be promising for lowering the toxicity of the illegal opioid supply. We suggest some possible methods that draw on the insights of focused deterrence without being able to say which of them are practical or politically feasible. They all reflect the notion that police can help shape the behavior of market actors. While the original version of DMI focuses on violence, here illegal drug markets are to be made less toxic and more transparent. This assumes that distributors respond to incentives and that police know how to systematically provide credible signals to dealers about what behavior is punished.

Focused deterrence would work differently in markets where fentanyl is common as opposed to the many markets where it has hardly entered.

In places with little fentanyl

Law enforcement should send an explicit message to dealers, informing them that they are responsible for keeping fentanyl out of the drug supply. They should be encouraged to acquire and freely use fentanyl test strips, returning to their supplier any purchase that contains fentanyl. This of course requires either that test strips and other detection equipment are not prohibited by laws that consider them to be “drug paraphernalia,”—as they are in many U.S. jurisdictions (Davis, Carr, and Samuels, 2019)—or that the police will not enforce such prohibitions. Meetings with market actors, such as dealers and regular users, may be part of the process to get the word out, but also to help study the unique dynamics of fentanyl procurement and supply. Such meetings are common in other strategies such as Baltimore’s Safe Streets program, in which the city’s Health Department hires experienced individuals from the community to try to resolve disputes before they become violent (Wen, 2018).

Though focused deterrence requires that law enforcement attention is on the most harmful actors, police must remain aware of market-wide changes. There is a need to collect real-time information on the presence of illicitly manufactured fentanyl or other analogs using a variety of indicators: wastewater testing,⁴ routine drug monitoring purchases, drug seizures, drug residues on syringes, intelligence, or toxicology data from postmortems or emergency departments.⁵ When indicators suggest that fentanyl or some other analog has arrived, then the goal is to trace it to the specific dealer and the dealer's supplier.

The sentencing statutes for fentanyl sellers do not have to be more severe than for other opioids, given what most states provide as a maximum sentence length for heroin distribution: more than five years is common. Rather, the aim is to increase the certainty of punishment, conditional on selling fentanyl—especially when the supply results in death. Criminology literature shows substantial evidence that certainty of punishment is more important than severity (Nagin, 2013). Dedicating more resources to rapidly investigating and closing cases when there is evidence that synthetic opioids caused a fatal overdose might deter some dealers.⁶ Focusing a police department's attention on the most problematic actors (e.g., dealers that handle fentanyl) means that there will be less attention paid to other drug dealing activities. Other things being equal, a community may prefer that dealers sell heroin instead of fentanyl.

In places where fentanyl is entrenched

The goal here is to increase the information for both dealers and users. The message from police should be that they will aggressively target dealers who are irresponsible in their handling of fentanyl. No one knows what constructive role law enforcement can play, but one theory is that overdoses stem primarily from misunderstanding of what is in the bag. That theory suggests that if law enforcement can somehow improve market participants' knowledge about the products ("information" in economists' jargon) that might make the market safer. There is not yet any case study of successful implementation of this theory, but we'll describe one possible implementation of that strategy.

Distributors that sell or manufacture fentanyl concealed in counterfeit tablets made to look like prescription medications or concealed in stimulants are extremely dangerous. The supply of fentanyl in this form creates confusion and increases the risks faced by those who use drugs, but particularly those who may not inject heroin, or youth who experiment with such medications. As already noted, illegal pill-pressing operations are unlikely to provide consistent doses from pill to pill and may appeal to infrequent opioid users who are less likely to inject heroin. Similarly, those that import or distribute more potent variants of fentanyl, such as carfentanil, should be the primary focus of law enforcement.

Test strips may be more helpful to stimulant users who want to avoid opioids. Perhaps the most dangerous mode of distributing fentanyl is mixing it with non-opioids. A cocaine user who

4 Wastewater testing is a technology that takes advantage of the fact that the fentanyl metabolites are excreted by the body. These make their way into public sewer systems and can be analyzed to provide near-real-time feedback on drug consumption patterns in a local market (Castiglioni et al., 2014). As it pertains to fentanyl, the Australian Criminal Intelligence Commission has used wastewater testing to show that fentanyl metabolite loads have increased between 2017 and 2018, suggesting that this technology can be used to detect fentanyl (ACIC, 2018).

5 In markets where fentanyl has not yet arrived, the emergency departments do not need to report regularly, say monthly, since they will generally report 0. Instead, they should be asked to report an admission involving fentanyl at any time. Similarly, recent studies have studied residue on syringes to detect various fentanyl and fentanyl-related substances (Fleiz et al. 2019; Blachman-Forshay, et al, 2018).

6 This is not the same as prosecuting these cases as homicides, but that treating them with the same sense of urgency may increase the operational risk, and therefore certainty of punishment, faced by distributors who flagrantly or negligently supply these more potent opioids.

does not also use opioids has a very low tolerance for fentanyl; mixed with cocaine or methamphetamine, a very small amount may be lethal. Thus, in any market, frequent testing of stimulants to identify dealers who are adding fentanyl will be valuable. Similarly, presumptive tests for super potent opioids, like carfentanil, may also help.

Focusing law enforcement efforts on dealers who put their customers in harm's way by exposing them to potent opioids without informing them may encourage dealers to be more transparent. The lack of transparency in fentanyl distribution, especially when it initially arrives in a market, contributes to a higher overdose risk. From our analysis of Estonia—which has had a fentanyl problem for almost 20 years and reports the highest overdose rates in Europe—we have found that the number of fatal overdoses stabilize over time but spikes when new analogs are introduced (Pardo et al, 2019). Recent analyses of Ohio seizure and death data show that the arrival of various analogs correlates with the number of overdoses (Rosenblum et al., 2020). Nevertheless, overdose rates in Latvia, which neighbors Estonia and has recently witnessed the arrival of more potent fentanyl analogs displacing heroin, have not increased as dramatically. Observers there suggest that dealers warn users about the dangers of these potent opioids, rather than falsely advertise them as heroin (Pardo, et al., 2019). This suggests that one way of reducing harm is to shape how fentanyl and other synthetic opioids are marketed.

To better inform focused deterrence efforts, more research is needed in understanding the variations in not only markets but dealers. Online sourcing is a new phenomenon. Greater efforts should be made to study dealers. A better understanding of operations and decisions may be obtained through interviews with market participants, such as buyers and dealers.

Putting federal agencies on a more proactive footing

Working up the supply chain, federal authorities focus on preventing fentanyl and other synthetics from entering the country or investigate inter-state trafficking and distribution rings that use the postal system to distribute these drugs. Federal agencies, such as the Drug Enforcement Administration, Homeland Security Investigations within the Department of Homeland Security, and the U.S. Postal Inspection Service, are crucial to investigating online vendors that sell these drugs on both the surface and dark web, distributing them by mail. Reproducing the supply disruption successes examined earlier will be challenging though, and while investigations remain important, the novelty and ease of online sourcing of fentanyl requires additional innovation.

Instead of playing defense, what if federal agencies took a more offensive posture? Dismantling or seizing a darknet marketplace may disrupt the problem for a short time, but new websites emerge; this history of replacement is documented by law enforcement (Pardo, Davis and Moore, 2019). This approach may even be less fruitful when targeting surface level vendors who often have multiple copies of websites (e.g., mirrors). Instead, federal law enforcement could create websites that purport to sell these substances but never fulfill orders. Sowing confusion in online sourcing may dissuade some would-be importers from buying fentanyl from surface web vendors in China.

Even if orders are fulfilled from a domestic warehousing facility, Chinese producers are able to reach buyers around the world because of the internet and package delivery services. That advantage is also a weakness. Federal agencies can learn about vendors by initiating buys and tracking their delivery through the postal system. Making routine buys can help drug law enforcement efforts improve their metrics by providing insights into the methods used to avoid detection by customs or postal inspectors. Yet, the reported warehousing of fentanyl in the United States may continue to complicate drug interdiction efforts at ports of entry. Foreign

producers report maintaining such facilities in the U.S. for fulfillment via the domestic postal system (Pardo, Davis and Moore, 2019b). Federal authorities should make targeting these warehousing facilities a priority. This will require initiating controlled purchases to determine the domestic source of fentanyl shipments.

When it comes to fentanyl supply from Mexico, the federal government, alongside its Mexican counterparts, can focus on drug trafficking organizations that are involved with synthetic opioids. Per Vanda Felbab-Brown, two Mexican drug trafficking groups, the Sinaloa Cartel and the Jalisco New Generation Cartel, are involved in fentanyl supply (DEA, 2018). Like the focused deterrence efforts of the DMI, U.S. and Mexican law enforcement can be brought to bear on transnational criminal groups manufacturing and trafficking fentanyl—especially those involved with the production of counterfeit prescription tablets. This idea is taken from Mark Kleiman who proposed that such a strategy might reduce drug violence in Mexico (Kleiman, 2012). Here we substitute supply of fentanyl for violence, but the idea remains the same. Kleiman argued that enforcement should de-emphasize drug quantities in favor of targeting the most violent organizations, and that publicly doing so could disincentivize the propensity for violence among the major drug trafficking organizations vying for access to U.S. markets. If U.S. and Mexican law enforcement could make such credible threats to Mexican crime organizations involved in the supply of fentanyl, then perhaps such a strategy might deter other criminal groups from becoming involved in fentanyl production or trafficking. The Trump Administration’s designation of drug trafficking groups as terrorist organizations (Stevenson, 2019) might create opportunities, as well as problems, when it comes to targeting fentanyl.

Federal authorities and resources will also be needed at home to improve our understanding of these new illicit opioid markets. Currently, the DEA is the only agency examining the synthesis methods used in manufacturing fentanyl (DEA, 2019). Customs and Border Protection are using pollen analysis on seized parcels to determine where they originated (CBP, 2019). These data help provide a clearer picture of the source and routes used to traffic fentanyl. While they inform the traditional law enforcement goal of investigating a drug’s origin, they do little to improve transparency or reduce toxicity in retail markets. Nonetheless, quantitative analysis of seizures is needed to better understand the purity and consistency of drugs offered in street markets. Currently, not many state crime laboratories report data on seizures that allow U.S. authorities to understand these markets with greater detail. Analyses that report purity are expensive but increasingly necessary. This is a new threat, so it merits investing in understanding it and how operations work beyond collecting measures for investigation or prosecution. The DEA’s fentanyl profiling program offers just one important glimpse, but these efforts need to be expanded, focusing more on regional markets where fentanyl is entrenched. Federal agencies and resources are key to that end.

Concluding comments: Regulating instead of reducing markets

The success of drug-supply efforts in eradicating established markets or sources has been limited. Meaningful supply disruptions often require that a substantial portion of the target drug or its inputs are seized or controlled, or that organizations responsible for a large portion of production or throughput capacity be disabled. In the long term, markets have mostly adapted, and new sources or new drugs have emerged to replace those targeted. Critics also note that the limited success of these efforts has often come at a high cost. In newer markets, the same might not be true: swift intervention by law enforcement at early stages may help

prevent a market from becoming established. Differentiating between markets where fentanyl is entrenched and those in transition, and still others not yet established, may aid in the way enforcement approaches fentanyl.

Given that fentanyl can be made from cheap and easily obtained pre-precursors, it is unlikely that traditional law enforcement or regulatory approaches aimed at producers will reduce imports. The situation is worsened by the fact that fentanyl is synthesized in countries that lack sufficient oversight of chemical or pharmaceutical manufacturers. Federal law enforcement will need to improve its ability to map online networks and screen suspected cargo shipments, while continuing to locate and shut down domestic fentanyl warehouses and investigate the use of the mail to send shipments to buyers. At the same time, greater efforts should be made to deter online sourcing by creating fake websites that purport to sell fentanyl. Federal efforts will be needed to improve market transparency, and more resources need to be dedicated to understanding chemical variations and purity levels, not just prices.

At the retail level, local law enforcement has a growing responsibility to shape these markets. It still might be possible for law enforcement to strangle a young fentanyl market before it takes hold (DOJ, 2018). This requires market vigilance by both standard public health and safety authorities, but also by other market actors like drug dealers and users. Providing equipment, such as test strips, and communicating to dealers that those handling fentanyl will be prioritized, might slow the advancement of such potent opioids. Yet, such efforts are unlikely to work in places where the drug has already displaced heroin. Local law enforcement will need to adapt to new realities. Some may find it disheartening that eradicating an entrenched fentanyl market is impossible through law enforcement efforts alone. But in this new era, such a sober recognition brings with it a pragmatic view that law enforcement efforts might be properly channeled to shape how retail markets operate.

In times and places where fentanyl will likely overtake heroin, law enforcement may need to rethink prioritizing traditional goals of reducing availability and raising prices. As these become increasingly difficult—given the ubiquity of cheap, mass-produced synthetic opioids—law enforcement instead may want to focus its efforts on shaping the behaviors of market actors. It is uniquely positioned, through routine retail buys and drug seizure analyses, to understand variations in the composition of synthetic opioids in a drug market and send signals to market actors that may reduce the confusion and toxicity that elevate overdose risk.

There is no need to return to an era of excess—including severe sentencing—when it comes to drug law enforcement. Focused deterrence has been successful in some instances in reducing drug market violence without making reductions in drug dealing the primary operational goal. A similar shift in thinking is needed in markets that are increasingly lethal due to the presence of fentanyl and other potent synthetic opioids. Dealers may respond to credible threats from law enforcement to elevate their risk of detection and prosecution. Here we argue that local law enforcement should communicate the rules of acceptable drug handling in such markets by going after dealers that conceal fentanyl in counterfeit tablets, deal in analogs, mix these potent opioids into stimulants, or fail to warn users about the elevated risk of overdose. At the federal level, there might be an opportunity to export focused deterrence efforts aimed at Mexican drug trafficking organizations that supply fentanyl. Such a strategy will require enhanced U.S.-Mexican cooperation and a declaration that enforcement efforts will prioritize organizations involved in fentanyl. Doing so might deter other transnational organizations from becoming involved in fentanyl supply.

The traditional goals of elevating prices and reducing purity may have worked in an era when the dominant drugs of harm were confined to a few plant-based substances. These efforts indirectly aimed to reduce drug harm by reducing demand. Yet today, that strategy seems

increasingly ineffective when suppliers can tap alternative and more potent synthetic chemicals that are cheaply and easily produced in labs far away. Instead, we argue the new goals should be to directly reduce drug harm by reducing the toxicity of substances illegally sold. This may require a more nuanced understanding of law enforcement's regulatory capacity to shape market behaviors.

References

- ACIC, December 2018. *National Wastewater Drug Monitoring Program: Report 6*. Canberra: Australian Criminal Intelligence Commission. As of July 11, 2019: https://www.acic.gov.au/sites/default/files/2019/02/ww6_300119.pdf?v=1561684377
- Aldridge, J. and Décary-Héту, D., 2016. Hidden wholesale: The drug diffusing capacity of online drug cryptomarkets. *International Journal of Drug Policy*, 35, pp. 7-15.
- Babor, T.F., Caulkins, J.P., Edwards, G., Fischer, B., Foxcroft, D.R., Humphreys, K., Obot, I.S., Rehm, J. and Reuter, P., 2010. *Drug Policy and the Public Good*. Oxford University Press.
- Blachman-Forshay, J., Nolan, M.L., McAteer, J.M. and Paone, D., 2018. Estimating the risk of exposure to fentanyl in New York city: testing drug residue in used syringes. *American journal of public health*, 108(12), pp. 1666-1668.
- Braga, A.A., Weisburd, D. and Turchan, B., 2018. Focused deterrence strategies and crime control: An updated systematic review and meta-analysis of the empirical evidence. *Criminology & Public Policy*, 17(1), pp. 205-250.
- Castiglioni, S., Thomas, K.V., Kasprzyk-Hordern, B., Vandam, L. and Griffiths, P., 2014. Testing wastewater to detect illicit drugs: state of the art, potential and research needs. *Science of the Total Environment*, 487, pp. 613-620.
- Caulkins, J.P. and Reuter, P., 2006. Heroin supply in the long-term and the short-term perspectives: comments on Wood et Al. 2006. *Addiction (Abingdon, England)*, 101(5), pp. 621-2.
- Centers for Disease Control and Prevention, 2008. Nonpharmaceutical fentanyl-related deaths—multiple states, April 2005-March 2007. *MMWR: Morbidity and Mortality Weekly Report*, 57(29), pp. 793-796.
- Corsaro, N., Hunt, E.D., Hipple, N.K. and McGarrell, E.F., 2012. Overview of: “The impact of drug market pulling levers policing on neighborhood violence: An evaluation of the high point drug market intervention”. *Criminology & Public Policy*, 11(2), pp. 165-166.
- Cunningham, J.K. and Liu, L.M., 2003. Impacts of federal ephedrine and pseudoephedrine regulations on methamphetamine-related hospital admissions. *Addiction*, 98(9), pp. 1229-1237.
- Cunningham, J.K., Liu, L.M. and Callaghan, R.C., 2016. Essential/precursor chemicals and drug consumption: impacts of U.S. sodium permanganate and Mexico pseudoephedrine controls on the numbers of U.S. cocaine and methamphetamine users. *Addiction*, 111(11), pp. 1999-2009.
- Davis, C.S., Carr, D.H. and Samuels, E.A., 2019. Paraphernalia laws, criminalizing possession and distribution of items used to consume illicit drugs, and injection-related harm. *American Journal of Public Health*, 109(11), pp.1564-1567.
- Degenhart, L., Reuter, P., Collins, L. and Hall, W., 2005. Evaluating factors responsible for Australia’s heroin shortage” *Addiction*, 100, pp. 459-469.
- Dobkin, C., Nicosia, N. and Weinberg, M., 2014. Are supply-side drug control efforts effective? Evaluating OTC regulations targeting methamphetamine precursors. *Journal of Public Economics*, 120, pp. 48-61.

- DuPont, R.L. and Greene, M.H., 1973. The dynamics of a heroin addiction epidemic. *Science*, 181(4101), pp. 716-722.
- EMCDDA. 2017. *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*. Luxembourg: EMCDDA–Europol Joint publications, Publications Office of the European Union.
- Fleiz, C., Arredondo, J., Chavez, A., Pacheco, L., Segovia, L.A., Villatoro, J.A., Cruz, S.L., Medina-Mora, M.E. and de la Fuente, J.R., 2019. Fentanyl is used in Mexico's northern border: current challenges for drug health policies. *Addiction*, 15(4), pp. 778-781.
- Kennedy, D.M., 2008. *Deterrence and Crime Prevention: Reconsidering the Prospect of Sanction*. Routledge.
- Kleiman, M.A., 2012. Targeting drug-trafficking violence in Mexico: an orthogonal approach. *Rethinking the “War on Drugs” through the US-Mexico Prism*, p.125. New Haven: Yale Center for the Study of Globalization.
- Kleiman, M.A., 1992. *Against Excess: Drug policy for Results*. New York: Basic Books.
- Mars, S.G., Bourgois, P., Karandinos, G., Montero, F. and Ciccarone, D., 2016. The textures of heroin: User perspectives on “black tar” and powder heroin in two U.S. cities. *Journal of Psychoactive Drugs*, 48(4), pp. 270-278.
- Mars, S.G., Fessel, J.N., Bourgois, P., Montero, F., Karandinos, G. and Ciccarone, D., 2015. Heroin-related overdose: The unexplored influences of markets, marketing and source-types in the United States. *Social Science & Medicine*, 140, pp. 44-53.
- Midgette, G., Davenport, S., Caulkins, J.P. and Kilmer, B., 2019. *What America’s Users Spend on Illegal Drugs, 2006–2016*. Santa Monica: Rand Corporation. https://www.rand.org/pubs/research_reports/RR3140.html.
- Nadelmann, E.A., 1989. Drug prohibition in the United States: Costs, consequences, and alternatives. *Science*, 245(4921), pp. 939-947.
- Nagin, D.S., 2013. Deterrence in the twenty-first century. *Crime and justice*, 42(1), pp. 199-263.
- O’Connor, S. 2017. *Fentanyl: China’s Deadly Export to the United States*, Washington, D.C.: U.S.-China Economic and Security Review Commission.
- Office of National Drug Control Policy, 2016. *National Drug Control Strategy: Data Supplement 2016*, Washington, D.C.: The White House. As of July 23, 2019: https://obamawhitehouse.archives.gov/sites/default/files/ondcp/policy-and-research/2016_ndcs_data_supplement_20170110.pdf
- Pardo, B. 2019. *Illicit Supply of Fentanyl and Other Synthetic Opioids: Transitioning Markets and Evolving Challenges*. Santa Monica: RAND Corporation.
- Pardo, B., Taylor, J., Caulkins, J.P., Kilmer, B., Reuter, P. and Stein, B.D., 2019. *The Future of Fentanyl and Other Synthetic Opioids*. Santa Monica: RAND Corporation.
- Pardo, B., Taylor, J., Caulkins, J., Reuter, P., and Kilmer, B. *The Dawn of a New Synthetic Era: The Need for Innovative Interventions*. Under Review.
- Pardo, B., Davis, L.M. and Moore, M., 2019. *Characterization of the Synthetic Opioid Threat Profile to Inform Inspection and Detection Solutions*. Santa Monica: RAND Corporation.
- Pollack, H.A. and Reuter, P., 2014. Does tougher enforcement make drugs more expensive? *Addiction*, 109(12), pp. 1959-1966.

Reinhart, C.M. and Rogoff, K.S., 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press.

Reuter, P. and Caulkins, J.P., 2004. Illegal 'lemons': price dispersion in cocaine and heroin markets. *Bulletin on Narcotics*, 56(1-2), pp. 141-165.

Reuter, P. and Ronfeldt, D., 1992. Quest for integrity: The Mexican-US drug issue in the 1980s. *Journal of Interamerican Studies and World Affairs*, 34(3), pp. 89-154.

Rosenblum, D., Unick, J. and Ciccarone, D., 2020. The rapidly changing U.S. illicit drug market and the potential for an improved early warning system: Evidence from Ohio drug crime labs. *Drug and Alcohol Dependence*, 208(107779).

Saunders, J., Ober, A.J., Kilmer, B. and Greathouse, S.M., 2016. *A community-based, focused-deterrence approach to closing overt drug markets*. Santa Monica: RAND Corporation.

Stevenson, M., November 28, 2019. "Mexico Is Infuriated by Trump's Pledge to Designate Drug Cartels as Terrorist Organizations". Associated Press.

U.S. Customs and Border Protection, 2019b. *CBP Strategy to Combat Opioids*. Washington, D.C.. As of November 11, 2019:
<https://www.cbp.gov/sites/default/files/assets/documents/2019-Mar/CBP-Opioid-Strategy-508.pdf>

U.S. Department of Justice, July 12, 2018. "Attorney General Jeff Sessions Announces the Formation of Operation Synthetic Opioid Surge (S.O.S.)" Available at:
<https://www.justice.gov/opa/pr/attorney-general-jeff-sessions-announces-formation-operation-synthetic-opioid-surge-sos>

U.S. Drug Enforcement Administration, October 2018. *2018 National Drug Threat Assessment*, Springfield, Va. DEA-DCT-DIR-032-118. As of November 11, 2019:
<https://www.dea.gov/sites/default/files/2018-11/DIR-032-18%202018%20NTA%20final%20low%20resolution.pdf>

United Nations Office on Drugs and Crime, 2017. *The Challenge of Synthetic Drugs in East and South-East Asia: Trends and Patterns of Amphetamine-Type Stimulants and New Psychoactive Substances*. Bangkok, Thailand: UNODC Regional Office for Southeast Asia and the Pacific. As of November 24, 2019:
https://www.unodc.org/documents/scientific/Trends_and_Patterns_of_ATS_and_NPS_2017.pdf

_____, June 2019. *World Drug Report 2019*. Vienna. As of November 23, 2019:
<https://wdr.unodc.org/wdr2019/>

Van Buskirk, J., Naicker, S., Roxburgh, A., Bruno, R. and Burns, L., 2016. Who sells what? Country specific differences in substance availability on the Agora cryptomarket. *International Journal of Drug Policy*, 35, pp. 16-23.

Watanabe, K., 1996. Studies on colour tests for field detection of narcotic drugs and psychotropic substances under international control (No. II). Screening colour test and specific colour test for the detection of non-barbiturate sedatives and hypnotics methaqualone and mecloqualone. Vienna: United Nations International Drug Control Programme.

Wen, L., June 8, 2018. "Note from the Commissioner: The power of safe streets." Baltimore City Health Department. <https://health.baltimorecity.gov/news/bmore-healthy-blog/2018-06-08-note-commissioner-power-safe-streets>

Zibbell, J.E., Aldridge, A.P., Cauchon, D., DeFiore-Hyrmer, J. and Conway, K.P., 2019. Association of law enforcement seizures of heroin, fentanyl, and carfentanil with opioid overdose deaths in Ohio, 2014-2017. *JAMA Network Open*, 2(11), pp. e1914666-e1914666.