

LETHAL EXCHANGE: SYNTHETIC DRUG NETWORKS IN THE DIGITAL ERA



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COVER IMAGE

Front cover art by Nguyen Anh Nghiet

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EXECUTIVE SUMMARY

The illicit synthetic drug networks that fuel the ongoing opioid epidemic in the United States continue to evolve and adapt to changing incentives and pressures, finding innovative ways to exploit technology and increased global interconnectivity. C4ADS investigated these drug supply chains, conducting extensive multilingual analysis of Chinese corporate entities, the clear web, and social media, in order to better understand the methods by which they operate. This research has led to several conclusions:

The digital age has had a transformative role in allowing synthetic drug networks to take root.

Fentanyl networks are among the world's first **digital native** drug networks. Global internet connectivity has opened a new era of drug distribution by facilitating direct-to-consumer transactions, rapid reaction to enforcement trends, and the delivery of retail, rather than wholesale, drug volumes through licit commercial delivery services. Fentanyl is readily discoverable for purchase on the clear web, though it is unclear how persistent this trend will be over time. Once established, digital interconnectivity makes it a relatively easy process for buyers and producers to communicate and transact directly, even though they may be located on opposite sides of the world.

Chemical and pharmaceutical companies producing illicit synthetic drugs are primarily located in China.

Many entities selling synthetic opioids on the open internet are **identifiable**, and can often be linked to formally registered businesses in China, home to one of the world's largest pharmaceutical industries.¹ Chinese entities have been able to produce and export illicit synthetic drugs with relative freedom for several reasons. For instance, until recently, many chemicals required to synthesize fentanyl were unregulated in China, and were therefore legal to manufacture and sell.

Entities producing and selling illicit synthetic drugs display common attributes and patterns of behavior online.

Our investigations into Chinese companies and networks potentially involved in the production of illicit fentanyl revealed that these entities exhibit similar characteristics. Chinese entities supplying illicit opioids are **overt**, and actively and openly advertise on the clear web. These same networks are **adaptive** and quickly respond to enforcement pressure or legal restrictions by adjusting advertising techniques or changing chemical formulas to develop substances that mimic the desired effect and fall outside of existing drug controls. Relatedly, many illicit fentanyl manufacturers are **diversified** and typically produce or sell a wide array of chemicals, pharmaceuticals, and controlled drugs.

Supply chains for illicit synthetic drugs have a global reach due to innovations in chemical synthesis and the exploitation of the international trade infrastructure.

The digital age and global trade have allowed Chinese synthetic drug networks to have a **transnational** reach and establish relationships with clients abroad. The synthesis of an ever-evolving array of chemical substances keeps producers one step ahead of international drug controls. The extreme potency of these substances also facilitates easy concealment in small packages and envelopes. In light of the volume of international mail and trade that occurs on a daily basis, it becomes a nearly impossible task to detect or interdict all illicit substances. These factors, however, are not unique to China, and the geographic scope of synthetic drug supply appears to be becoming more diffuse, with India, Mexico, and Southeast Asia's Golden Triangle region all emerging as new or potential production hotspots.

The emergence of fentanyl and other synthetic drugs has become a US and international public health crisis due to the convergence of complex, disparate global trends. The factors underlying the US opioid epidemic will continue to evolve as technology and chemical synthesis adapt to external pressures and incentives. Likewise, understanding, anticipating, and disrupting these global synthetic drug networks will require consistent adaptation and creative solutions.

ABBREVIATIONS & DEFINITIONS

Benzodiazepines	A class of psychoactive drugs that are intended to combat anxiety and insomnia. The most well-known benzodiazepines are Xanax and Valium.
Buyer	An individual purchasing opioids or other synthetic drugs
CAS	CAS: Chemical Abstracts Service
CBP	CBP: United States Customs and Border Protection
CDC	CDC: United States Centers for Disease Control and Prevention
Chemical Aggregator	An online platform that brings together product information, product listings, company profiles, and often e-commerce capabilities from different companies.
Chemical Registration Number	A numeric, universal identifier used to codify chemical substances.
Clear Web	The collective internet that is openly accessible on standard web browsers and is indexed by standard online search platforms.
CND	The United Nations Commission on Narcotic Drugs
Custom Synthesis	A service offered by chemical and pharmaceutical companies, sometimes licitly and sometimes illicitly, for clients to request synthesis, production and/or sale of chemical substances not listed on a given website.
Dark Web	A collection of websites not accessible by standard web browsers and not indexed by clear web online search platforms. Encrypted browsers, such as Tor, are required to access dark web sites.
DEA	United States Drug Enforcement Administration
Deep Web	A collection of websites that are accessible on standard internet browsers but are not indexed by standard search platforms.
Drug Scheduling	The practice of classifying, or listing, a drug based on its medical utility and potential for harm.
E-commerce Platforms	Websites used to engage in the electronic buying or selling of products over the internet.
Fentalogue	A portmanteau of fentanyl and analogue. A chemical substance that has a base chemical structure of fentanyl, with particular changes made to the chemical make-up to create a different form of the drug, producing varied effects for users. Sometimes referred to as a “fentanyl-related substance.”
Fentanyl	A short-acting, highly potent synthetic opioid with narcotic analgesic properties. ²
INCB	International Narcotics Control Board
Masked Precursors	Term for precursors that are uncontrolled but can be easily converted into a controlled precursor. Also referred to as “pre-precursors.” ³

Novel Synthetic Opioids	An emerging class belonging to new psychoactive substances (NPS) that includes various analogs of fentanyl and newly emerging non-fentanyl compounds.
NFLIS	The National Forensic Laboratory Information System (NFLIS), a program of the DEA that collects data relevant to illicit drug seizures, overdoses, and toxicology reports.
NPS	New Psychoactive Substances, as defined by the UNODC, are “substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat.” According to the UNODC, “the term ‘new’ does not necessarily refer to new inventions — several NPS were first synthesized decades ago — but to substances that have recently become available on the market.” ⁴
Online Marketplace	An online platform where a buyer is able to purchase goods.
Opioid	A generic term applied to opiates and their synthetic analogues, which can be semi- or fully synthetic, with actions similar to those of morphine. Synthetic opioids are structurally diverse, can be extremely potent, and include a variety of substances, including a number of fentanyl derivatives. ⁵
Precursor Chemical	Broadly refers to chemicals that are employed in the manufacture of drugs. ⁶
PAI	Publicly available information, which is any general media, social media, public record, commercial database, gray literature, audio, imagery or expert interview that can be legally purchased, obtained, or created by the public. ⁷
Research Chemical	A term used to refer to a chemical substance which is not sold for human consumption, but rather for research purposes. This terminology is often used by illicit drug vendors to maintain plausible deniability in online advertisements.
Synthetic Cannabinoid	A synthetic chemical that, upon consumption, binds to the same receptors as cannabis. Illegal Synthetic Cannabinoids (often known as “incense,” “spice,” or “K2”) are often diluted into liquid spray, applied to dried vegetable matter, and sold as cannabis alternatives.
Synthetic Cathinone	A synthetic chemical that is structurally related to the substance found in khat, a plant grown in East Africa and southern Arabia. Synthetic Cathinones (often known as “bath salts”) are often used as cheaper substitutes to stimulants.
Synthetic Drug	Synthetic drugs are chemical compounds produced in a laboratory. They can be produced commercially by drug manufacturers for valid medical purposes or illegally in clandestine laboratories for recreational use.
UNODC	The United Nations Office on Drugs and Crime
Vendor	A single seller of products, either a company or an individual.

METHODOLOGY

The research contained in this report is the result of extensive multilingual analysis of publicly available information. To understand global supply chains for illicit synthetic drugs, we collected information from a wide array of sources, including social media, e-commerce platforms, company websites, corporate records, cryptocurrency transactions, and the dark web. Our research was also informed through discussions with a number of partners and collaborators in government, academia, the private sector, and international organizations.

We employed a variety of tools and software to gather and analyze data, including Palantir to assess connections between entities and analyze large datasets. We relied on Webhose to collect data from marketplaces on the dark web and, when necessary, accessed these marketplaces directly for follow-up research. The tool Cobwebs was particularly valuable for researching known identifiers of entities of interest and discovering additional linkages in open source media, including on social media accounts. Finally, CipherTrace was used for blockchain analysis of Bitcoin transactions.

In order to gain a more comprehensive view of illicit synthetic drug supply chains, we collected and analyzed data on all identified synthetic drug seizures globally from January 1, 2017 to July 31, 2019.⁸ This database, the **C4ADS Synthetic Drug Seizure Database**, contains 4,621 seizures, 1,333 of which included fentanyl.

We also built a **Synthetic Drug Supplier Database** containing information on 103 entities that openly advertised synthetic drugs on a variety of websites, prioritizing those located in China. This database – which includes physical addresses, affiliated individuals, e-mail addresses, and, when available, corporate registry information – was not intended to represent the entire marketplace for illicit synthetic drugs online, but rather to reveal commonalities in the operations of synthetic drug suppliers.

Gaps & Biases

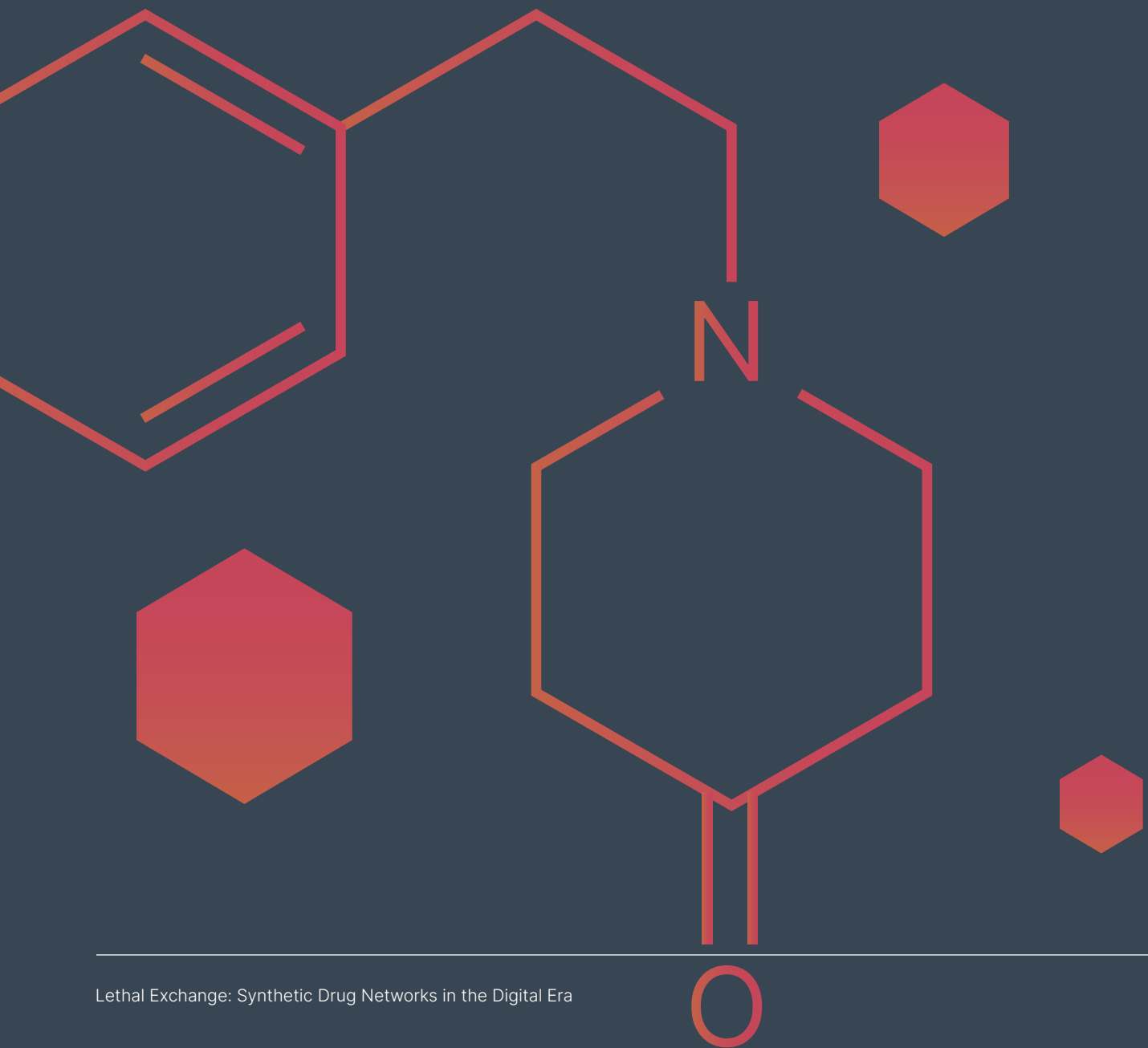
The reliability of the data we compiled on synthetic drug seizures and online sellers is dependent on and limited by a variety of factors.

Drug seizures, while important for estimating the scale of total drug flows, represent only a fraction of trafficking attempts, and do not necessarily reflect the main trends in drug supply chains. Moreover, drug seizures represent only those “unsuccessful” trafficking instances wherein a shipment fails to reach its intended end-user. Public reporting of drug seizures also tends to lack important contextual information, such as product origin and final destination, the results of laboratory tests to determine the specific analogue or type of substance seized and its purity, or the precise volume or quantity of drug seized. These limitations inhibit our ability to trace individual seizures to specific production networks or to fully understand the true scale of synthetic drug supply.

Separately, two distinct problems accompanied the collection of synthetic drug seller data. First, an ever-changing global legal regime and growing attention placed on fentanyl resulted in many websites and advertisements being removed, blocked, or altered during the course of our research, which distorted the picture we were able to paint of the global fentanyl trade.⁹ Second, a number of obstacles made it difficult to prove the authenticity of data provided by company profiles or websites. For instance, synthetic drug supply chains rely on anonymous and/or encrypted communication channels and platforms, and many sellers use false or incomplete information. In cases where information, such as a factory address, appeared to be falsified, we conducted extensive investigations into the company’s activities on both the clear and dark web, and potential corporate registration information, to find more reliable identifying information.

SECTION I

THE ORIGINS OF SYNTHETIC OPIOID SUPPLY



Since the turn of the millennium, opioid abuse in the United States has skyrocketed – the US Center for Disease Control and Prevention (CDC) estimates that between 1999 and 2018 nearly 450,000 people died from an opioid overdose.¹⁰ In 2018 alone, opioids were involved in approximately 47,000 overdose deaths – nearly six times the number of deaths in 1999.¹¹ Of these deaths in 2018, over 31,000 (67%) involved synthetic opioids.¹² These changes – the increasing lethality of opioids and the emergence of synthetic opioids – took place as part of three distinct waves of opioid use in the United States.¹³

The first wave of the opioid epidemic began in the late 1990s with the over-prescription of opioid pain relievers, which pharmaceutical companies assured the medical community were non-addictive.^{14,15} Contrary to these initial claims, however, opioids can be addictive,¹⁶ and their widespread over-prescription corresponded with increased levels of drug misuse and dependence.

A second wave began in 2010, when many users, now addicted but unable to obtain renewed doctor prescriptions, turned to alternative substances. This included heroin, the use of which led to rapid increases in overdose deaths.¹⁷

The third (and current) wave of the opioid epidemic began in 2013. This wave is characterized by “significant increases in overdose deaths involving synthetic opioids, particularly those involving illicitly manufactured fentanyl.”¹⁸ The advantage of fentanyl, from the perspective of a producer or supplier of black-market narcotics, is that it can be made in a laboratory

relatively cheaply.¹⁹ Its extreme potency also means it can be diluted with other substances, or “cutting agents,” to create more product, thereby increasing profits.²⁰ As a result, suppliers began mixing fentanyl, a synthetic opioid 50 to 100 times more potent than morphine,²¹ with heroin and other illicit substances, as well as pressing it into counterfeit pills to mimic the look of mainstream prescription painkillers.²² The unfortunate consequence of this is that many users, who are not necessarily demanding fentanyl, are unaware that it is in their drugs, and subsequently overdose.

The three waves of the US opioid crisis have presented distinct challenges compared to past drug epidemics. For one, it has affected the US population across a broad demographic and socioeconomic spectrum, as compared to the crack cocaine epidemic in the 1980s or the methamphetamine crisis of the 1990s.²³

It has also seen innovations in how drug supply chains operate, with technology and the internet increasingly serving as a means for buyers and sellers to connect. Furthermore, since agricultural inputs are not needed for synthetic drug production – in contrast to heroin, which is made from poppy plants – manufacture can occur wherever the appropriate lab equipment and chemical ingredients exist.

Overall, increased global trade and internet connectivity has disrupted traditional drug supply networks, reducing barriers to entry and linking buyers and sellers. This, in turn, has created new challenges for understanding and countering the international networks supplying illicit synthetic drugs.

DRUG SCHEDULING & FENTALOGUES

Chinese synthetic drug trafficking networks are responsive to shifts in the regulatory framework governing chemical substances, which are controlled and catalogued under a number of different conventions at both the national and international level.

Drug scheduling refers to the practice of classifying drugs, substances, and certain chemicals used to make controlled drugs (precursor chemicals) based on their medical utility and potential for abuse or dependency.²⁴ The US Drug Enforcement Administration (DEA), for instance, classifies drugs into five schedules. Schedule I drugs “have no accepted medical use” and “a high potential for abuse,” whereas Schedule V drugs “represent the least potential for abuse.”^{25, 26}

“Fentanyl” itself is perhaps best understood as an umbrella term for numerous forms of fentanyl that differ slightly in chemical formula. The DEA lists the majority of fentanyl variations as Schedule I drugs, though a number are Schedule II substances (alfentanil, carfentanil, remifentanil, sufentanil, thiafentanil, fentanyl, and norfentanyl), meaning there are accepted medical applications for those drugs but also a high potential for abuse.²⁷ Any substances “scheduled” by the DEA cannot be sold in the United States without proper accreditation.²⁸

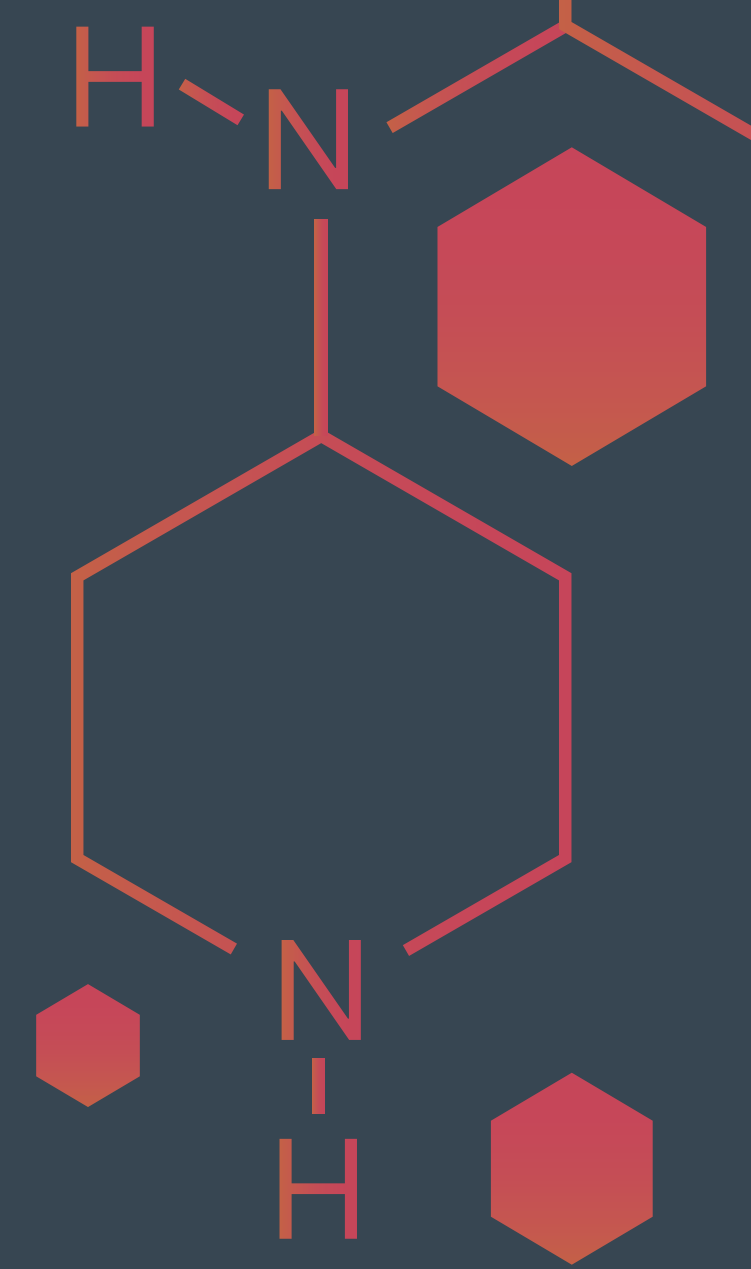
Similarly, multiple forms of the precursor chemicals required to produce fentanyl also exist. The two main fentanyl precursors are NPP and 4-ANPP, but structurally-analogous forms of these chemicals may also be used in fentanyl synthesis.^{29, 30} Importantly, some of these alternative precursor chemicals remained uncontrolled in the United States and China, even after the Chinese government announced a ban against all “fentanyl-like substances” in May 2019.^{31, 32, 33}

In addition to drug scheduling, the technical nomenclature for categorizing chemicals has directly influenced the advertising of illicit synthetic drugs. The **Chemical Abstract Services (CAS)**³⁴ and **International Union of Pure and Applied Chemistry (IUPAC)**³⁵ provide two standardizations for chemical identification. A CAS number is a unique numerical code that refers to one specific chemical product. For instance, a common form of illicit fentanyl, fentanyl hydrochloride, has CAS number 437-38-7.³⁶ An IUPAC name, however, is the technical terminology for a specific compound’s chemical composition. Fentanyl hydrochloride has the IUPAC name “N-phenyl-N-[1-(2-phenylethyl)piperidin-4-yl]propanamide;hydrochloride.”³⁷ Online synthetic drug sellers use the complexity and abstract nature of these chemical categorizations to their advantage, often advertising drugs by these identifiers alone as a means of evading scrutiny and detection.

SECTION II PRODUCER & SELLER TYPOLOGIES

To meet burgeoning US and global demand for opioids, producers of fentanyl and other synthetic drugs have consistently modified their operations to evade investigation and prosecution. Whether by altering chemical production or online sales techniques, we found that players in the global market for illicit fentanyl were quick to adapt to shifts in international and domestic chemical controls. The influence of legal changes on synthetic drug supply is perhaps best illustrated by the Chinese government’s decision to institute a ban on all “fentanyl-like substances” in May 2019.³⁸ This led to a noticeable shift in the types of chemicals that were overtly advertised on the internet and how such products were marketed, with uncontrolled substances in particular becoming more prevalent.

Distinguishing drug producers from suppliers, and identifying companies engaged in illicit drug synthesis, is a persistent challenge due to the use of misleading or incomplete identifying information. We identified many online sellers that claimed to produce their own substances and were often able to link these entities to legitimately registered businesses in China’s corporate registry system. One specific company, Gaosheng Biotechnology Co., Ltd., seemed to exemplify how many synthetic drug sellers systematically exploit the internet, and is further discussed below.

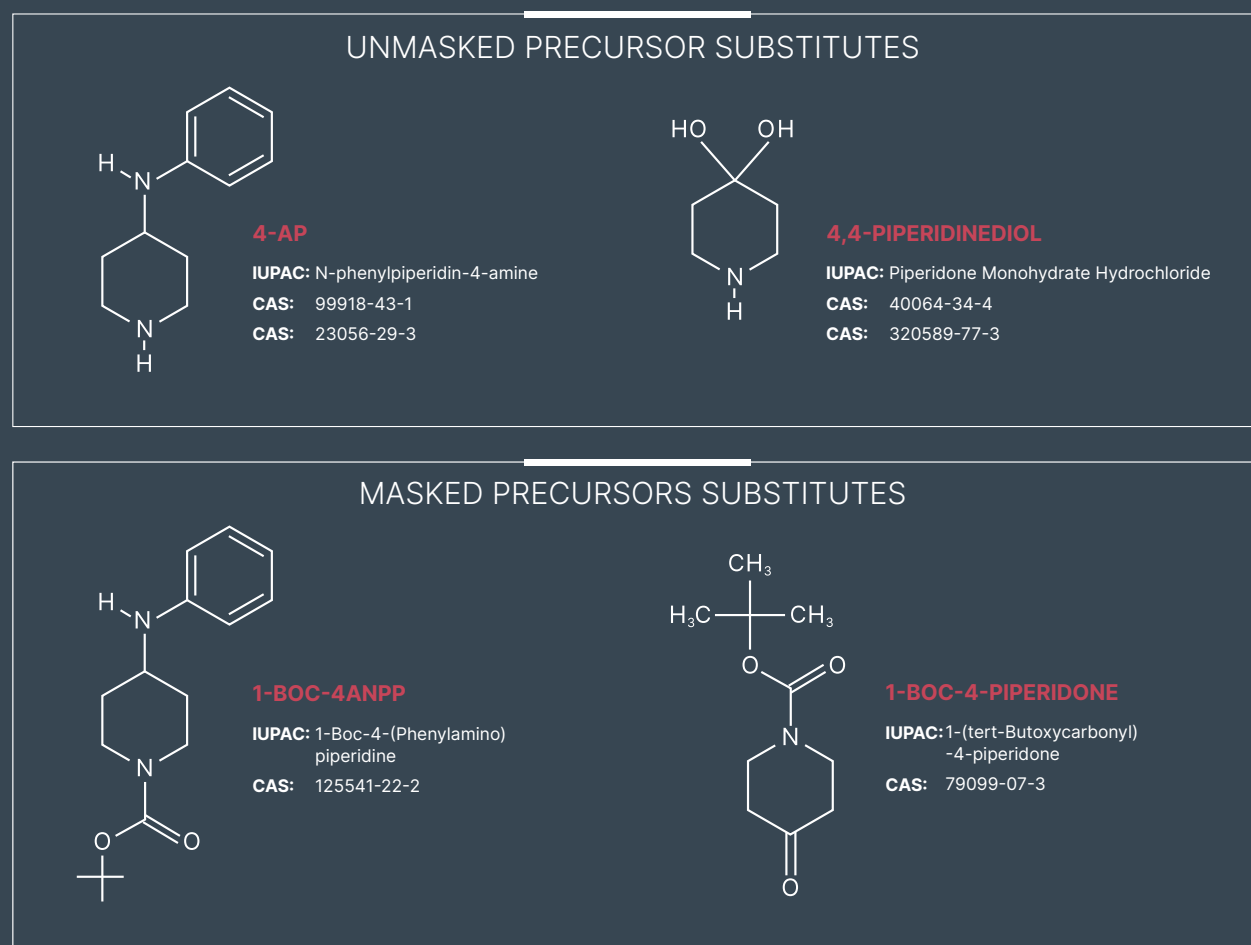


Fentanyl Synthesis & China's Ban

In April 2019, the Chinese government announced that, effective May 1, 2019, it would control all fentanyl analogues in the country.³⁹ The decision, in part, was due to US pressure on China to increase oversight of fentanyl production and curb exports of the drug to the United States.⁴⁰ Instead of halting the production of fentanyl, however, China's ban led to a shift in advertising and production techniques designed to exploit loopholes in the new chemical controls.

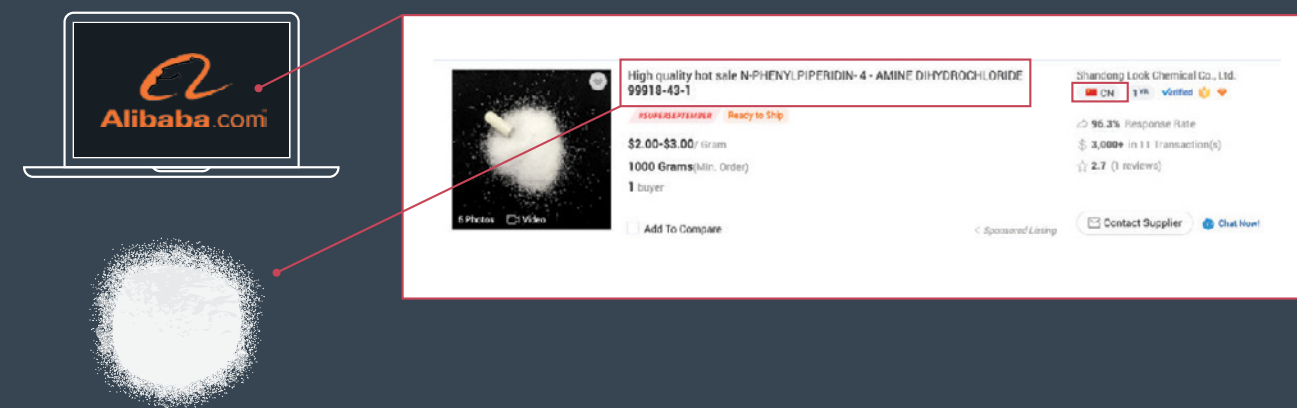
Importantly, while China's May 2019 ban made all forms of fentanyl illegal, it did not schedule all precursor chemicals used to make fentanyl.⁴¹ Prior to the ban, China had already scheduled the two main fentanyl precursors: NPP and 4-ANPP.⁴² After May 2019, marketing for at least four fentanyl precursor substitutes for NPP and 4-ANPP became increasingly common on the clear web. All four of these substances were uncontrolled in both the United States and China at the time.⁴³ These substitutes included "masked" precursors, or chemicals that are designed to disguise their relation to a scheduled substance, but from which scheduled precursors can be easily obtained.^{44, 45}

Figure 1: Four fentanyl precursor substitutes that became increasingly advertised after May 2019.



For instance, in September 2019, months after China's fentanyl ban took effect, searching Alibaba for "99918-43-1," the CAS number for the fentanyl precursor 4-AP, yielded over 100 different sales listings from 29 different companies (for an example, see Figure 2). The companies posting these advertisements often claimed to synthesize the chemicals themselves.

Figure 2: An example advertisement for the fentanyl precursor 4-AP on Alibaba. Source: Alibaba.com



This transition by Chinese chemical companies to marketing uncontrolled fentanyl precursors is indicative of the creative modifications possible for producing illicit synthetic opioids that, though chemically "different," can be used to synthesize fentanyl. Such adaptations are facilitated by the fact that many illicit synthetic opioid manufacturers offer a diverse array of chemicals or drugs, including legal products. This variety not only allows manufacturers to shift from illegal to legal chemical production quickly in order to circumvent controls, but also offers opportunities to hide illicit chemical production. This last point highlights one of the challenges in identifying actual companies and facilities involved in the production of illicit synthetic drugs.

Chinese Chemical Labs

Conclusively identifying Chinese facilities where fentanyl and other substances are produced is difficult absent an analysis of chemicals leaving a known laboratory. Nonetheless, clear web advertisements offer useful information when searching for physical locations where fentanyl production occurs.

To conduct a more systematic analysis of companies potentially involved in the manufacturing of fentanyl and synthetic drugs, and to understand the geographic distribution of illegal drug production in China, we developed the Synthetic Drug Supplier Database. This dataset contains attributable information for producers obtained from the clear web and, when possible, the Chinese corporate registry. In total, the database consists of 103 different Chinese entities that advertised synthetic drugs on a variety of websites.

We uncovered several related trends when we analyzed the Synthetic Drug Supplier Database.

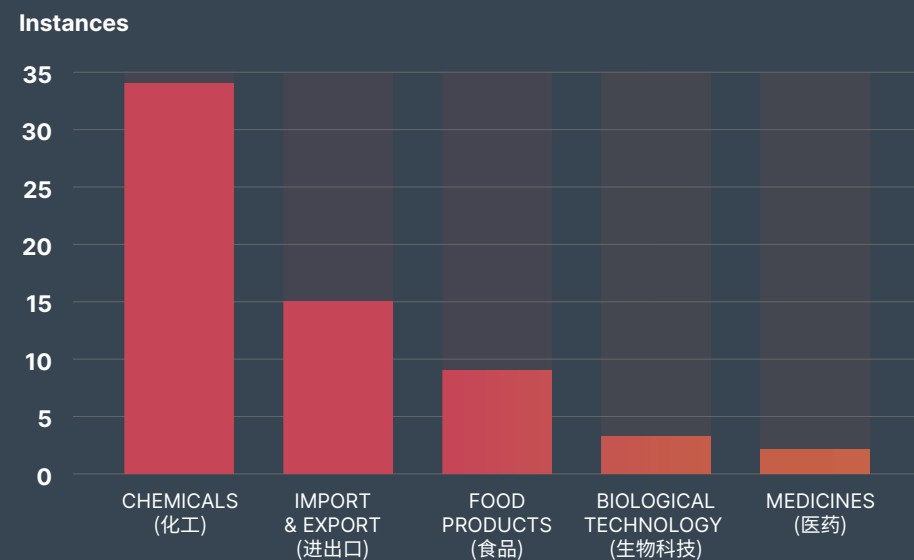
First, of the 103 entities examined, over 50% advertised fentanyl along with other synthetic drugs – the most common being synthetic cannabinoids, synthetic cathinones, methamphetamines, and novel dissociatives with effects similar to ketamine. This suggests that most fentanyl suppliers have diversified product offerings.

Second, 65% of the suppliers analyzed have filings in the mainland China and/or Hong Kong corporate registries.⁴⁶ Many of these companies have links to larger corporate networks in China. In many of the identified instances, it appeared that companies affiliated with multiple entities used these linkages to obfuscate ownership through a complicated hierarchy of layered corporations.

Chinese corporate registry documents also reveal how illicit synthetic chemical suppliers describe their own business operations. All companies registered in mainland China must include a description of their legal scope of business (经营范围). For companies in the Synthetic Drug Supplier Database, the following keywords were particularly common in scope of business descriptions and may be indicators of high-risk activity:

Figure 3: Keywords common in scope of business descriptions for companies in the Synthetic Drug Supplier Database.

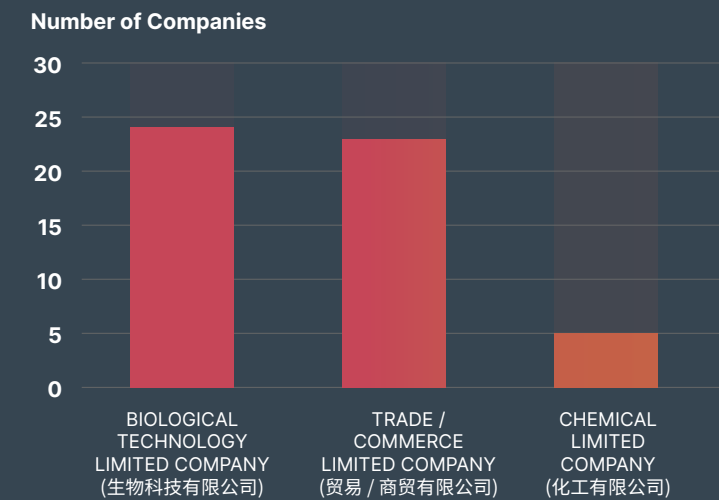
HIGH RISK KEY WORDS



Company naming conventions also offer insight into how illicit synthetic drug suppliers may operate. Chinese business names are generally structured to include an operating location (e.g. Shanghai), industry (e.g. management consulting), and corporation type (e.g. limited partnership). A company's industry and corporation type are typically included at the end of their full business name.⁴⁷ Of the registered companies included in the Synthetic Drug Supplier Database, the three company "types," or name endings, seen in Figure 4 were most prominent.

Figure 4: The three most prominent name endings for companies in the Synthetic Drug Supplier Database.

COMPANY TYPES

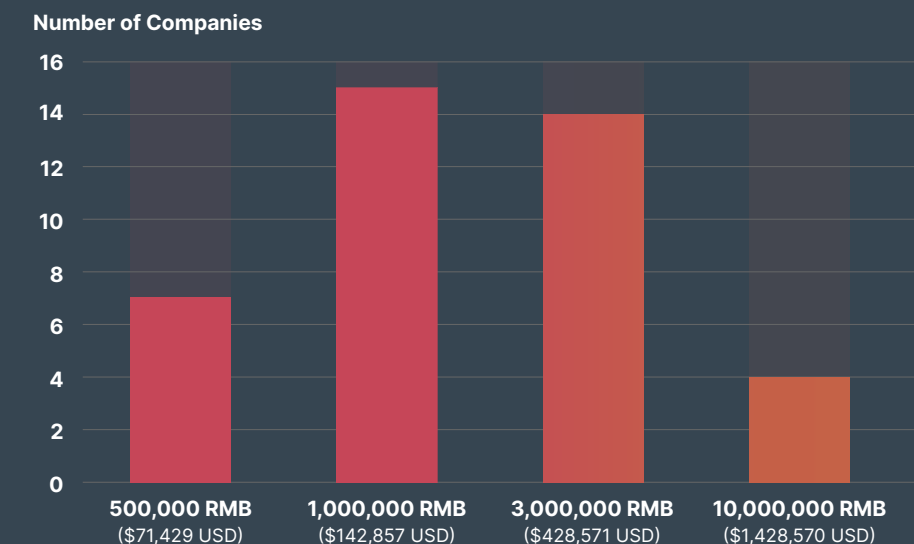


"Biological technology" companies are not only prevalent within our Synthetic Drug Supplier Database, they are also a relatively common "type" of company within the Chinese pharmaceutical and chemicals industries, with more "biological technology" companies than any of the other name endings listed in Figure 4.⁴⁸

The Synthetic Drug Supplier Database also includes 51 companies that provide information on their registered capital (注册资本).⁴⁹ A majority (40) listed their registered capital as one of the four amounts seen in Figure 5.

Figure 5: The four most common registered capital amounts for companies in the Synthetic Drug Supplier Database.

REGISTERED CAPITAL

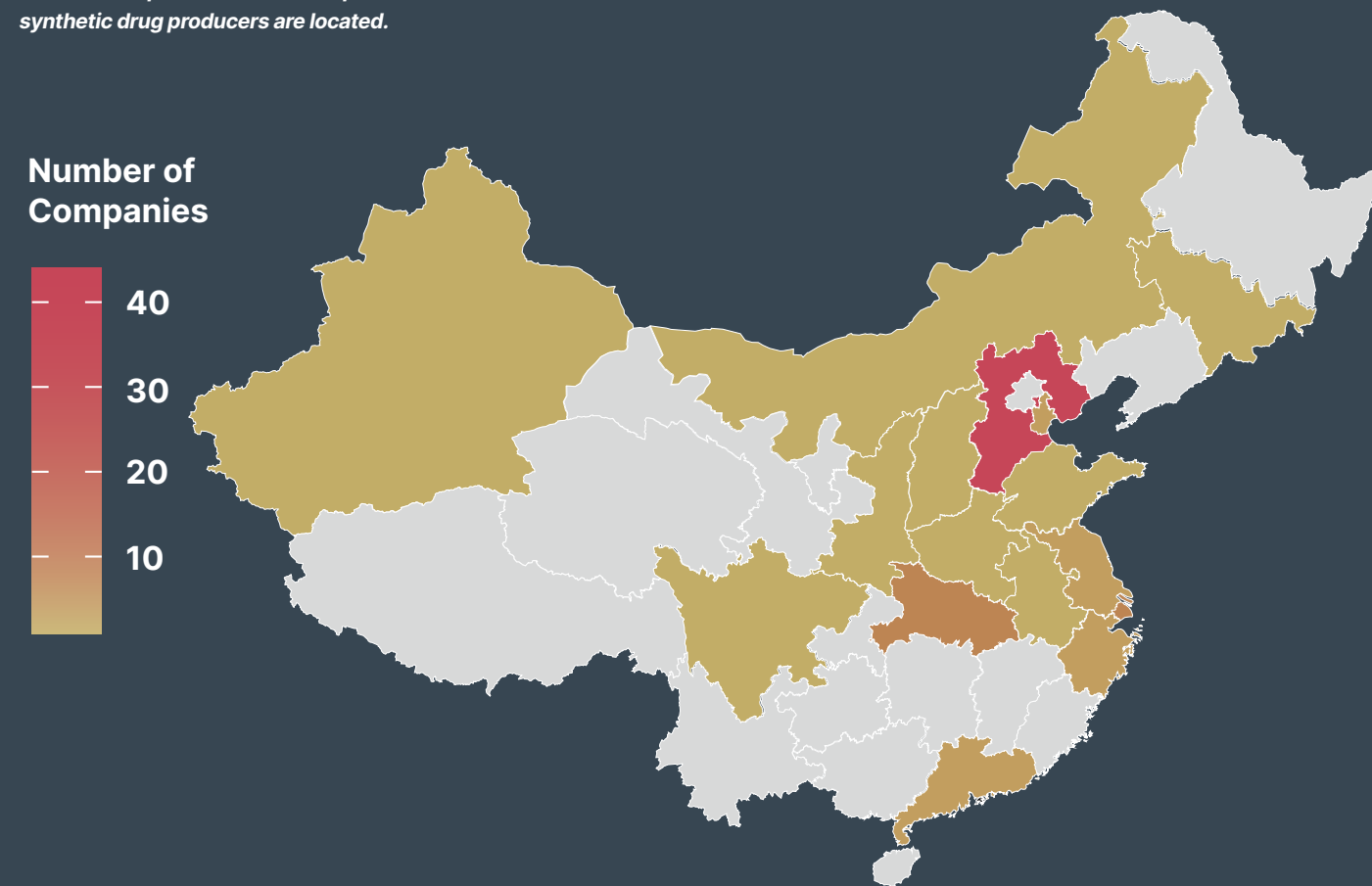


Registered capital values for companies in our Synthetic Drug Supplier Database are within the average for similar types of companies within mainland China.⁵⁰

Together, the prevalence of common naming conventions and registered capital amounts among Chinese companies highlights one of the challenges in identifying illicit chemical suppliers in China: they are often legitimately registered and relatively indistinguishable from licitly operating chemical and pharmaceutical companies.

Lastly, the Synthetic Drug Supplier Database identified modest patterns in the geographic distribution of Chinese synthetic drug producers. A heatmap of 89 companies that had available location data is shown in Figure 6:

Figure 6: A heatmap of the provinces where Chinese companies identified as potential synthetic drug producers are located.



The city of Shijiazhuang in Hebei Province is home to 36% (32) of all producers included in the database. The next two most represented cities are Shanghai (10) and Wuhan (8). Interestingly, the listed location of companies in the Synthetic Drug Supplier Database does not correlate with the geographic distribution of registered Chinese biological technology, trade/commerce, chemical, and pharmaceutical companies.⁵¹ That is, alleged Chinese producers of illicit synthetic drugs tend not to be located in regions with a known concentration of pharmaceutical and chemical companies.⁵²

Online Advertising

The companies included in the Synthetic Drug Supplier Database were originally identified through online advertisements. One of these companies in particular provides unprecedented insights into how Chinese illicit drug manufacturers seem to maintain their online operations and conduct transactions.

While searching through online synthetic drug advertisements, we found advertisements seemingly for the company “Gaosheng Biotechnology Co., Ltd. (高盛生物科技有限公司).” These advertisements offered an array of drugs for sale, such as: synthetic cannabinoids and cathinones; Etizolam⁵³; “2FDCK” (2-fluorodesochloroketamine, a ketamine analogue); “A-PVP” (α-Pyrrolidinopentiophenone, also known as “flakka” or “bath salts”); and, furanylfentanyl, a popular fentanyl analogue.⁵⁴

Gaosheng Biotech has a history of activity on a number of online marketplaces, trade platforms, and social media websites. The company’s apparent pages on these websites not only offered insights into the company’s online sales activity, but also contained valuable identifying information, including physical addresses and unique domain names. Using this information, we identified a LinkedIn profile likely associated with a Gaosheng Biotech sales representative.

Most interestingly, this LinkedIn profile had a link to a 27-page document that appears to be a resource for company representatives to maintain profiles on various online platforms. For instance, the document includes large bodies of standardized text to use when making new profiles, including the following text:⁵⁵

Attach our best-selling lines and in stock products for your reference, And the purity is above 99%,the price will be very competitive .

Meanwhile I advice you can see our samples (free shipping) ,I think you will be satisfied with them.

Best-selling products : BK-2C-B (crystal) 2-NMC(powder and crystal) 4- CEC(crystal) FUB-AMB TH-PVP 4mpd NM-2201 MMBC 5-methylethylone BK-EBDP U-47700

AMB-FUBICANA ADB-FUBINACA 5F-PCN BK-EBDP(crystal) AB-Chminaca 2- NMC(crystal or powder) 4-CPRC (crystal or powder) 4-EMC 4F-PHP 4F- PV8(crystal) 4C-PVP

5F-PV8(crystal) 5f-mn-24 5FSDB005 5FNPB22 FAB-144 EG-018 MDPHP 4-CL-PVP

ADRAFINIL(crystal or powder) DOC25 (white powder) Dibutylone(crystal) THJ- 018 5FSDB005 5FNPB22 FUBPB22 ADRAFINIL(Powder and crystal)

Waitting for your early reply!

Thanks & Regards

Kathy

This document provides several important clues about synthetic drug operations. First, according to the document, shipping takes three to five days, with products able to be sent in “aluminum alloy” bags to the United States, Canada, and Europe. The mention of aluminum alloy bags is presumably intended to assure customers their drugs will be harder to detect by X-ray machines, despite little evidence to suggest this is an effective smuggling tactic.

Second, over 100 websites are listed in this document – including Facebook, Twitter, Reddit, and Drugs-forum.com – along with e-mail addresses and passwords, which are likely used to create accounts on these websites.

Third, the document also provides text that may be intended for use in company descriptions on new webpages. In the course of our research, we observed multiple instances where sellers appeared to have used copied and pasted text across multiple websites and profiles, similar to the following:⁵⁶

Gaosheng Biotechnology Co., Ltd. is a production and sales LLC (wholly state-owned), specialized in producing and exporting Pharmaceutical Intermediates which located in Shanghai, China. We own six subsidiary and we enjoy tax exemption privileges.

As an ISO 9001:2000 certified manufacturer, we have been awarded the title of “Good Faith Enterprise” by customers for good quality and reasonable price.

1. we have rich experience in this area.

2. The products we provide are high in quality and our best selling lines in the world market.

3. We supply competitive price with top purity, quality.

4. We have a long business relationship with many countries, such as United States, Mexico, United Kingdom, Russia, Germany, Brazil, Philippines, Belgium, Netherlands, Denmark ect.

*If you have any other questions, pls do not hesitate to contact me. My Skype: kathy0229@outlook.com
email: winter@cn-gaosheng.com*

Overall, the information uncovered for Gaosheng Biotech is emblematic of broader trends and patterns of behavior we observed when analyzing potential synthetic drug producers. Many of the companies we examined appeared to exhibit similar characteristics, suggesting illicit drug suppliers use common operational approaches and techniques to sell a diverse array of products. The ability of Chinese companies to supply international demand for illicit synthetic opioids, however, is largely due to increasing global interconnectivity, with the internet playing a key role in establishing networks of buyers and sellers.

Gaosheng Biotech’s Finances

The document connected with Gaosheng Biotech’s LinkedIn profile also contained financial information, including a credit card number, Bitcoin address, MoneyGram account, and bank account information, including the beneficiary’s account number and name. Historical transaction information for drugs sold by Gaosheng Biotech, including names of buyers, e-mails, physical addresses, and phone numbers of buyers, were also included. Many of these transactions had parcel tracking numbers.

This data alone does not definitively prove that Gaosheng Biotech produces and exports illicit drugs. The financial information does, however, allow further analysis of the company’s monetary transactions and shipment history – which may be indicative of broader financial trends and typologies for Chinese manufacturing of illicit synthetic drugs.

For instance, a Bitcoin address (13itGxzHdRYSFBcj7H15ns4f8p4B6krDuQ, “13it”) is also included in the document associated with Gaosheng Biotech. According to the public blockchain, 13it recorded 71 total transactions between March 2016 and June 2017, including 36 received and 35 sent transactions. The 71 total transactions involved the inward and outward movement of 41.4 bitcoins – a total worth of roughly \$75,000 given bitcoin values during this time.⁵⁷

Figure 7 represents two financial transactions associated with 13it, as analyzed in CipherTrace, a cryptocurrency analysis tool. On the left, one address sent 0.33 bitcoin to 13it on March 14, 2017. 13it, seen as one circle within the middle column, then sent 0.33 bitcoin to another address, which is owned by BTCC,⁵⁸ a Chinese-based cryptocurrency exchange. This 0.33 bitcoin was included in a single transaction that bundled bitcoin from 35 other BTCC-affiliated addresses, totaling 2.51615 bitcoin.

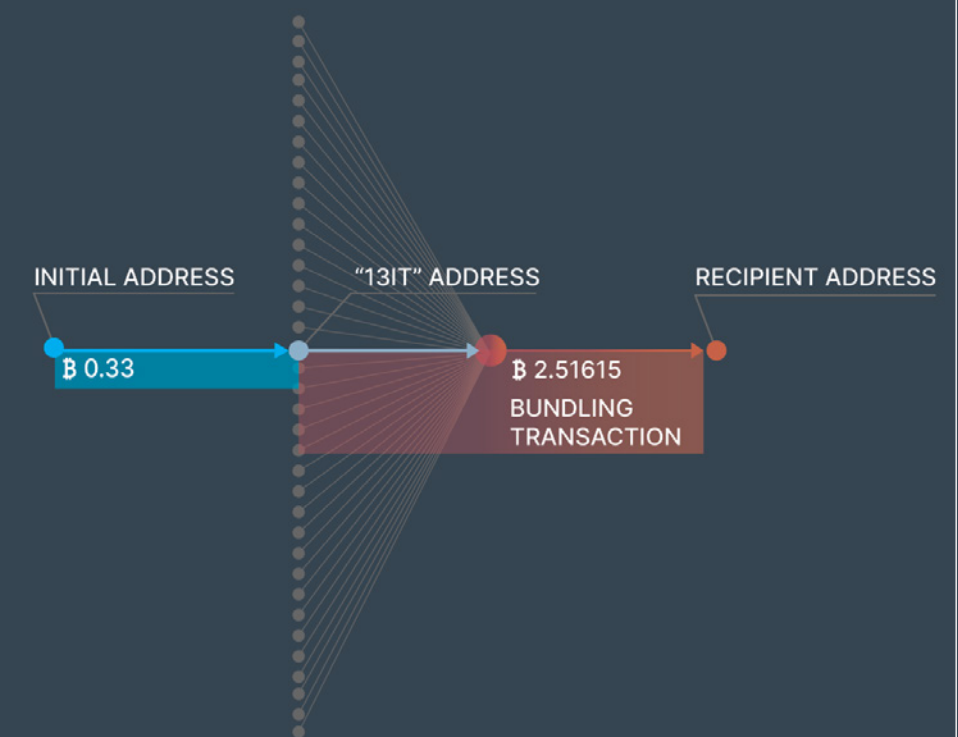


Figure 7: A visualization of two cryptocurrency exchanges involving Gaosheng Biotechnology.
Source: ciphertrace.com

Further analysis using CipherTrace revealed 13it is owned by BTCCPool, a now-defunct mining pool run by BTCC. When an address is owned by an exchange, it is common for the address to be generated by the exchange as a receiving address for one individual. That is, 13it is likely an address unique to one account holder, Gaosheng Biotech. Therefore, the incoming transactions into 13it were likely sent to the address with the intention of transferring money to Gaosheng Biotech.

However, because 13it is owned by the BTCC exchange, any analysis on outgoing transactions is difficult. It is generally difficult to differentiate between outflowing bitcoin movements initiated by the account holder and those initiated by the exchange itself. For example, the 13it account holder could immediately convert incoming bitcoins into fiat currency because the address is owned by an exchange; no additional steps within the blockchain are required for conversion. Gaosheng Biotech could also personally transfer the bitcoin to a subsequent address, which may be owned by an ultimate beneficiary. In the case of 13it, the majority of outgoing transactions (31 of 35) were sent to a single, BTCC-owned address, which could indicate the address is controlled by an end beneficiary.

But, outgoing transactions may also be associated with the exchange's own movements (e.g. moving bitcoin to exchange-owned hot wallets, taking bitcoin for another account holder's conversion from fiat currency). In other words, analysis on bitcoin outflow cannot be definitively linked to intentional choices on the part of an address's unique account holder when the address is owned by an exchange.

Gaosheng Biotech's bitcoin address transactions highlight the difficulty in conducting comprehensive analysis on the financial flows of synthetic drug sales; determining an end beneficiary is often difficult.

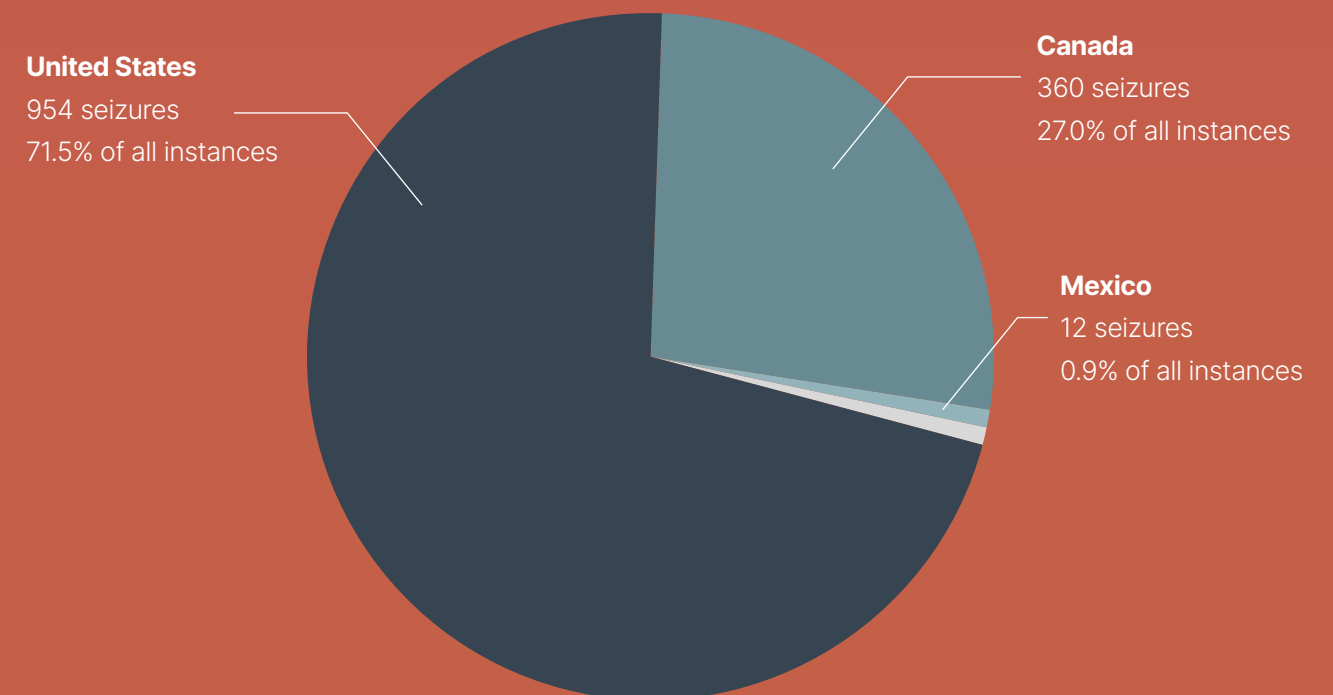
DETERMINING FENTANYL'S ORIGIN

The international community believes that most fentanyl trafficking originates in China, although the Chinese government denies this.⁵⁹ Such denials are inherently difficult to disprove for a variety of reasons. For instance, seizure data, one of the most tangible pieces of evidence in determining the point-of-origin for an illicit substance, is often incomplete or presents only a limited view of drug supply chains. Despite these limitations, seizure data still provides an opportunity to uncover and understand fentanyl trafficking trends.

Rising synthetic opioid usage has been accompanied by increased fentanyl seizures by US law enforcement. In fiscal year 2019, US Customs and Border Protection (CBP) reported seizing 2,545 pounds of fentanyl.⁶⁰ Only five years prior,

CBP had no reported fentanyl seizures.⁶¹ Similarly, the US Drug Enforcement Administration (DEA), in its 2019 National Drug Threat Assessment (NDTA), also noted that "fentanyl availability was high and increasing across the majority of the United States in 2018," adding that it is "the primary driver behind the ongoing opioid crisis, with fentanyl involved in more deaths than any other illicit drug."⁶²

To gain a more nuanced view of seizure trends, we collected information on known fentanyl and synthetic drug seizures between January 2017 and July 2019. This Synthetic Drug Seizure Database contains information on 4,621 seizures, including 1,333 fentanyl seizures, nearly all of which (1,326, or 99.5%) occurred in North America.⁶³



The number of seizure instances and total weight of fentanyl seized per state are represented in Figure 8 and Figure 9, respectively.

Figure 8: Number of fentanyl seizures per US state between January 2017 and July 2019.

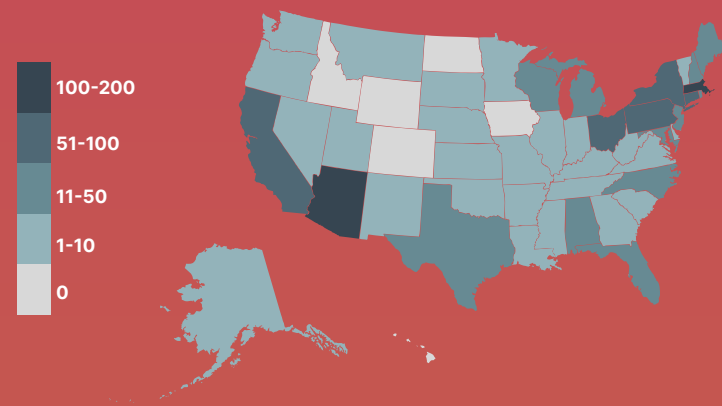
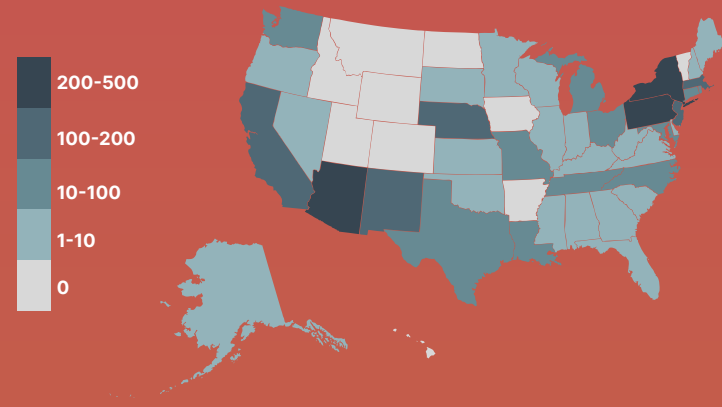


Figure 9: Weight (kg) of fentanyl seized per US state between January 2017 and July 2019.



Our Synthetic Drug Seizure Database includes, when available, information on known points of origin, transit, and destination. For the 18-month period when seizures were recorded, 133 fentanyl seizures had a non-US origin, with Mexico (98 seizures) and China (26 seizures) the most commonly reported origin countries.⁶⁴ Additionally, almost 9% of all fentanyl seizures occurred in states along the US Southwest Border (SWB). Ports of entry in California were the main transit point for fentanyl entering the United States from Mexico.⁶⁵

This data largely corresponds with the DEA's 2019 NDTA, which states that Mexico and China are the primary suppliers of fentanyl seized in the United States. Yet, as the DEA notes, "it is currently not possible to identify whether China or Mexico is the primary fentanyl supplier to the United States."⁶⁶ This is largely a result of differences in purity levels. That is, while fentanyl trafficked from Mexico represents "a significantly larger total gross weight of fentanyl seized in the United States compared to fentanyl originating in China," it typically tests at less than 10% pure.⁶⁷ This low purity means "a relatively small portion of a given fentanyl seizure [from Mexico] is actually fentanyl as opposed to other adulterants and diluents." Fentanyl shipped directly from China is typically seized in smaller quantities but commonly tests at purities over 90%.⁶⁸

This suggests, and DEA reporting corroborates, that Mexican traffickers order finished fentanyl from China, dilute it, and smuggle it into the United States -- meaning an unknown quantity of Mexican-sourced fentanyl may have been originally synthesized in China.⁶⁹

SECTION III

WHERE PRODUCTION MEETS DEMAND

Evolutions in digital communication platforms have altered the methods that recreational drug users rely on to find and buy controlled substances. Some users of synthetic opioids, for instance, unable to obtain painkillers from pharmacies or reluctant to engage in face-to-face transactions with illicit drug suppliers, use the internet to buy directly from drug producers. A myriad of encrypted messaging and payment tools, such as Wickr, WhatsApp, or Bitcoin, facilitate these online transactions, offering a layer of anonymization and protection for sensitive or illegal activity.

The marketing and selling of illicit fentanyl, however, rather than being secluded to the dark corners of the web, often occurs on the normal, open internet, or clear web. Interactions between buyers and sellers happen on a variety of clear web platforms, but are concentrated on e-commerce websites (e.g. Alibaba.com), online chemical marketplaces (e.g. ECHEMI.com), and social media.⁷⁰ Illicit synthetic drug sellers often use marketing techniques that appear intended to avoid law enforcement scrutiny and obfuscate their true activities, such as the use of a chemical's technical name to advertise controlled substances.

Additionally, many online synthetic drug sellers operate across multiple public platforms and maintain independent websites. Synthetic opioid sellers appear to use this collection of websites to cultivate a client base and ultimately direct traffic to a seller's own site to carry out transactions. Social media, particularly Facebook, has had an important role in creating these trusted networks of vendors and buyers.

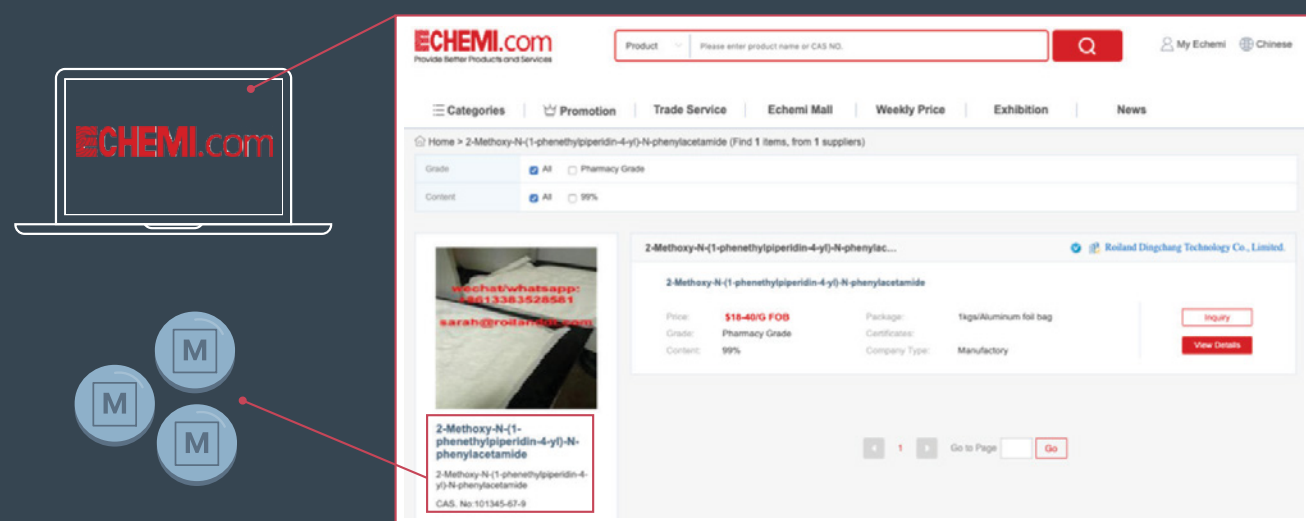
Clear Web Sales Platforms & Advertising Tactics

Illicit drug vendors operating on clear web platforms have used a variety of techniques to obfuscate their activities. For instance, one commonly used tactic is to market fentanyl and other drugs as “research chemicals,”⁷¹ a label ascribed to synthetic substances that are relatively obscure but may have similar effects to controlled drugs. Similarly, some chemical companies advertise “custom synthesis,” whereby clients can request substances not included on a list of available products. This may include illicit or controlled substances.

Rather than risk detection by openly using the word “fentanyl,” drug sellers advertising on the open web often use chemical nomenclature associated with the Chemical Abstract Services (CAS)⁷² and International Union of Pure and Applied Chemistry (IUPAC)⁷³ as a kind of euphemism. Given their complex format and obscurity, online drug vendors began using CAS numbers or IUPAC names in lieu of more recognizable terms to advertise synthetic drugs on the clear web, particularly as scrutiny of web platforms increased.

For example, Figure 10 is an advertisement for the fentanyl analogue “methoxyacetylfentanyl” on the chemical marketplace ECHEMI.com.

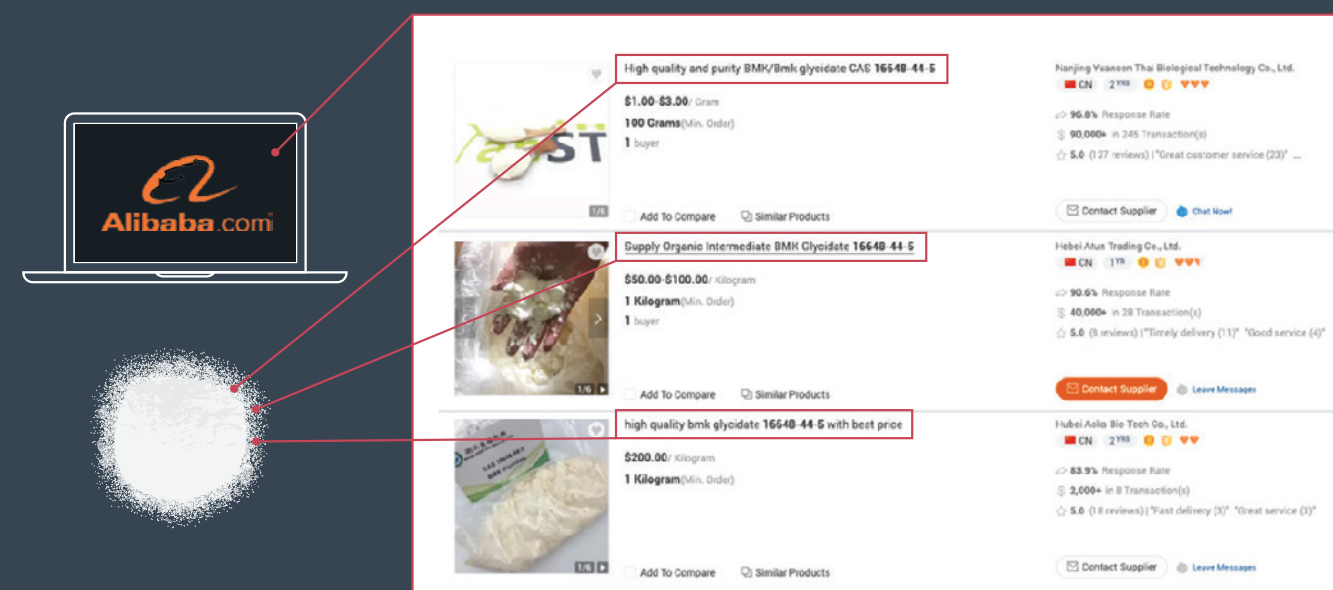
Figure 10: An advertisement for methoxyacetylfentanyl using only its CAS and IUPAC identifiers. Source: Echemi.com



The term “fentanyl” does not appear anywhere in the advertisement. Instead, only the IUPAC and CAS identifiers are used.

This clear web advertising tactic also appears in sales listings for other synthetic drugs. Figure 11 shows three advertisements on Alibaba for the methamphetamine precursor “Methyl 2-phenylacetoacetate” (MAPA), which the UNODC’s Commission on Narcotic Drugs (CND) included on international controls in May 2020.⁷⁴ All three advertisements use the CAS number for this precursor: 16648-44-5.

Figure 11: Advertisements for the meth precursor Methyl 2-phenylacetoacetate on Alibaba. Source: Alibaba.com



In contrast to the fentanyl advertisement, however, these three advertisements use a known term for a methamphetamine precursor, “BMK Glycidate,” providing a clearer indication of illicit activity. Benzyl methyl ketone (BMK), also known as phenylacetone (P2P), has been a DEA Schedule II controlled substance since 1980,⁷⁵ and is used to manufacture methamphetamines and amphetamines. The inclusion of the term BMK Glycidate, which has a different CAS number than MAPA but can act as a substitute for that chemical, suggests that suppliers may be signaling to potential buyers that CAS 16648-44-5 is an adequate precursor for methamphetamine synthesis.

After the Chinese government’s May 2019 ban against all “fentanyl-like substances,”⁷⁶ the use of CAS numbers and IUPAC identifiers in online drug advertisements became more pronounced.

That a change in Chinese legislation had such a visible impact on online advertisements strongly suggests that many of these companies or producers have ties to China. This is supported by the fact that most apparent illicit drug sellers on these platforms self-identify as Chinese, and report a Chinese address. For example, Figures 10 and 11 contain four advertisements for illicit substances, all of which were posted by vendors that self-described their location as China. Similarly, the company name listed on the ECHEMI advertisement in Figure 10, Roiland Dingchang Technology Co., Limited, is registered in Hong Kong and is affiliated with a legitimately registered company in mainland China.

Independent Websites & The Supporting Role of Social Media

E-commerce websites and marketplaces are not the only clear web platforms synthetic drug sellers use to find customers and retail products. Many vendors also operate independent websites where they list available chemicals for sale, and use social media to help build a network of clients and direct traffic to their sites.

For instance, Huilitongda Biological Technology Company (HBTC) is a Chinese pharmaceutical company whose name has appeared in advertisements for fentanyl and other drugs online. We originally found an online profile for HBTC via a search for fentanyl analogues, which returned a Google Image result with a visible email address: "huilitongda.rc@gmail.com" (Figure 12)

Subsequent searches of this e-mail address showed it was linked to a number of fentanyl advertisements that provided further identifying information, including: company name, address, phone number(s), WhatsApp number, Telegram ID, and Wickr ID. These advertisements, an example of which is seen in Figure 13, also detailed the quantity, purity, and price of fentanyl and other synthetic drugs available for purchase.

Figure 12: The Google Image result for fentanyl analogue "Fu-F" that includes the email huilitongda.rc@gmail.com.

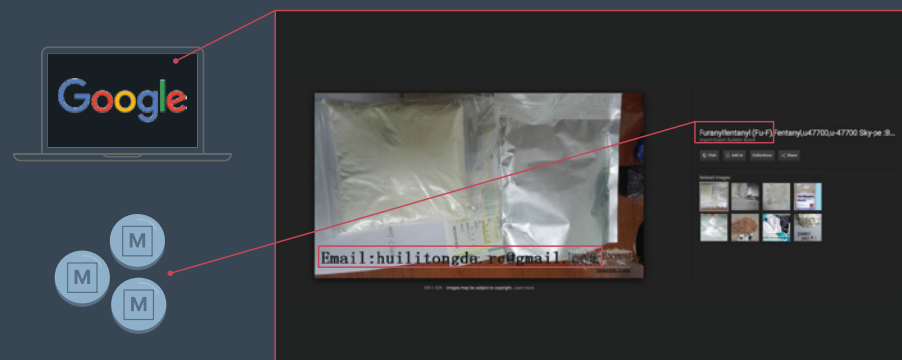
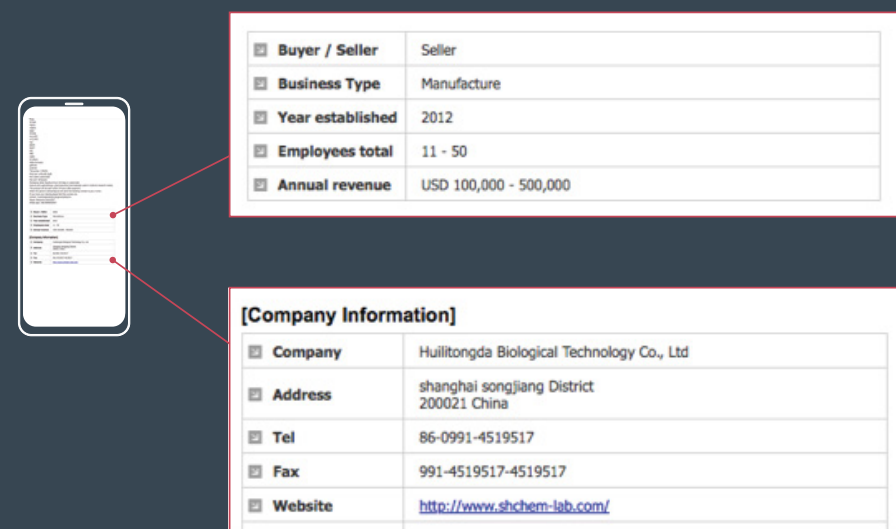


Figure 13: A fentanyl advertisement connected to the email huilitongda.rc@gmail.com.



Additionally, the listing seen in Figure 13 provides a URL, www.shchem-lab.com, as the website for HBTC. This site, which was still active as of October 2020, is a marketplace that has listed multiple forms of fentanyl for sale alongside images that appear to be stock photos (Figure 14).

The use of generic stock photos is a possible red flag that HBTC is not a genuine vendor. To help determine HBTC's legitimacy as a fentanyl supplier, we analyzed the company's social media presence.

Research into HBTC revealed information, including a phone number and Skype account, that led us to a HBTC Facebook page that listed "Benjamin Chen" as its administrator. This name matched an email address, Benjamin.chen2557@gmail.com, seen in other fentanyl advertisements posted by HBTC.

Analyzing Benjamin Chen's Facebook activity revealed he belonged to the private group "Research Chemicals Group for Trusted Buyers and Reliable Vendors." Facebook groups such as this serve as forums for sellers and buyers to connect with one another. In these groups, which tend to be private, products are advertised or reviewed, relevant drug laws are discussed, and buyers alert one another to potential seller scams (e.g. outing "sellers" who initiate a sale for a drug but never ship a product after receiving payment).

In November 2018, the aforementioned "Research Chemicals Group" had over 1,100 members interacting with one another, ostensibly to advertise, review, and buy synthetic drugs. An example of this, seen in Figure 15, includes product recommendations and Wickr IDs for direct communication with suppliers.

Figure 14: A view of products for sale on the website www.shchem-lab.com.

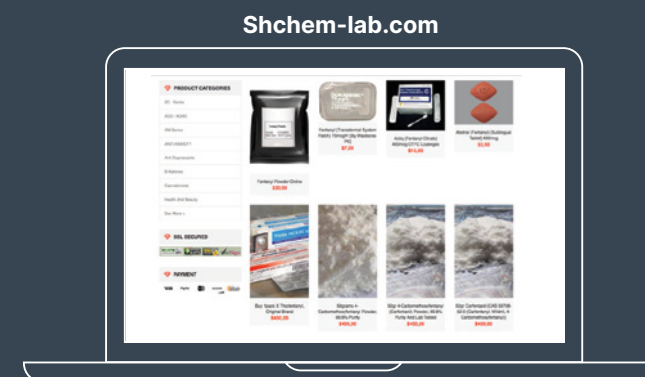
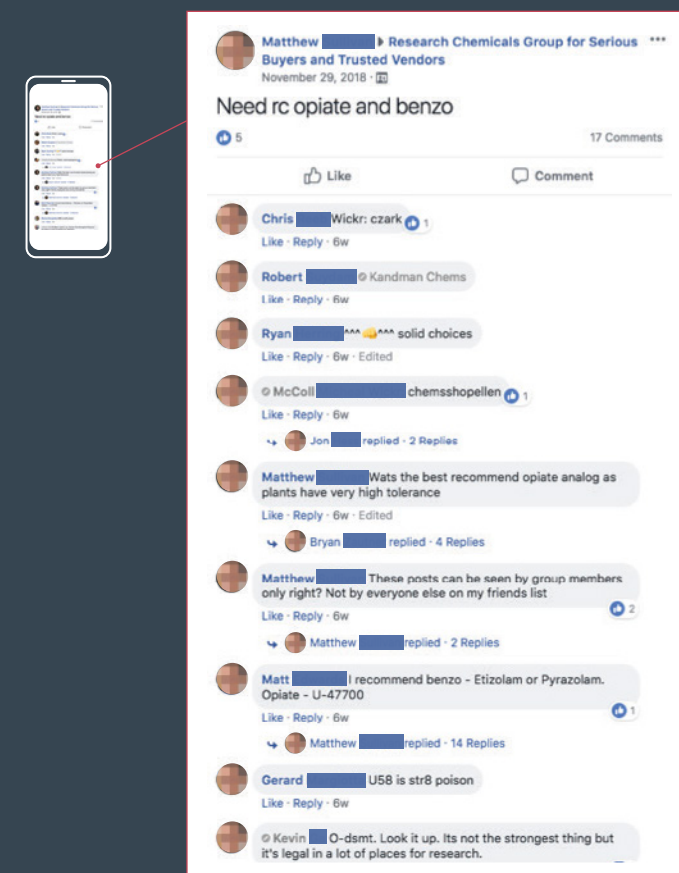
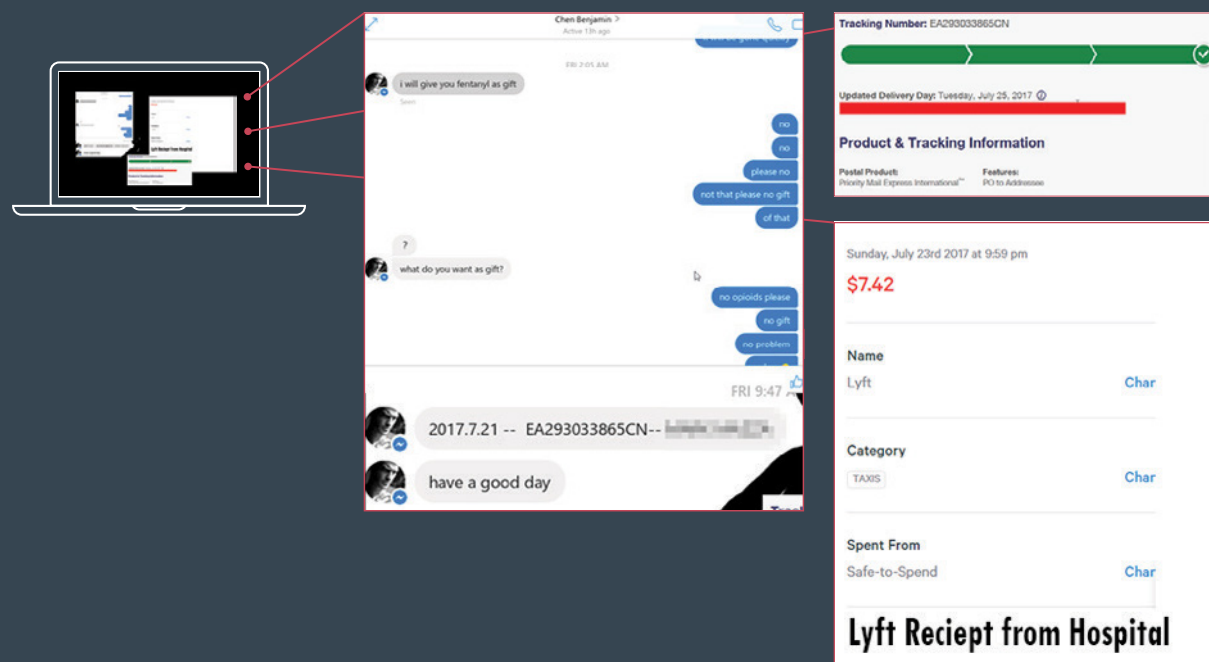


Figure 15: A conversation thread within the private Facebook group "Research Chemicals Group for Trusted Buyers and Reliable Vendors."



One particular post by the “Benjamin Chen” account in this Facebook group speaks to the immediacy and direct digital relationship between buyers and sellers of synthetic drugs on the clear web, as well as the real-world impacts fentanyl can have on users. Figure 16 is a compilation of screenshots posted by Chen’s account in the group. One of the screenshots seems to show Chen offering fentanyl as a “gift” to a buyer who had overdosed on a previous shipment. Another screenshot includes a postal tracking identification number and proof of the shipment’s delivery. Chen also included a receipt for a Lyft the individual allegedly took from the hospital after overdosing. This ride was paid for by Chen, supposedly as a demonstration of good faith and his reliability as a vendor.

Figure 16: An image posted by “Benjamin Chen” in a Facebook group for suspect substances. The included screenshots appear to show Chen offering fentanyl as a “gift” to a customer.



Further analysis of the “Research Chemicals Group” on Facebook indicated that Benjamin Chen is an actual Chinese individual named 陈以见 who is listed as HBTC’s director on company incorporation documents. Moreover, it appears Chen has operated at least five different online profiles for companies whose actual existence could not be verified. The use of such “phantom companies” may be a strategy that illicit Chinese chemical suppliers use to shift their online activities to avoid legal risk.

At least another eight companies, all legally registered with the Chinese corporate registry, were affiliated with other profiles in this Facebook group, suggesting at least several Chinese synthetic drug vendors rely on Facebook to connect with customers and conduct sales. Regardless, it appears the use of Facebook by Chinese synthetic drug vendors to conduct sales was not limited to HBTC.

Ultimately, the HBTC example highlights how social media facilitates direct interactions between synthetic drug vendors and buyers, helping them to establish sales networks built on trust. In the future, increased web monitoring may prompt these networks to move their operations to more secure platforms in order to remain undetected.

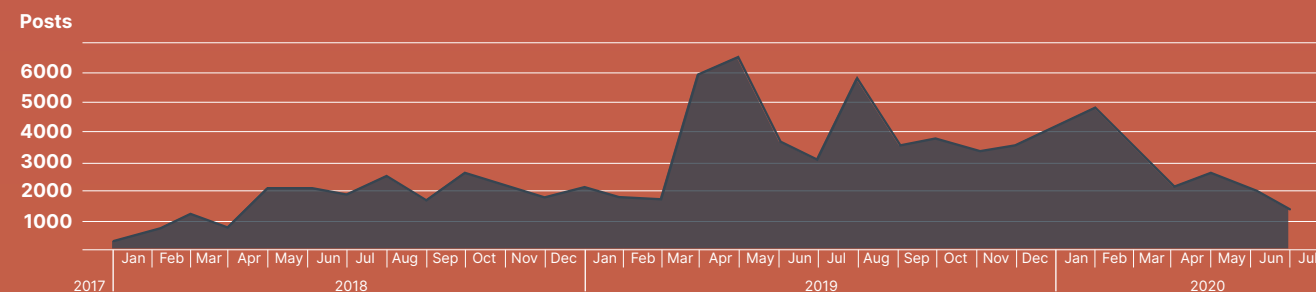
DARK WEB TRENDS

While our research indicates the clear web has been the primary avenue for online sales of illicit fentanyl and other synthetic drugs, the dark web offers an alternative, more discreet option for those engaging in nefarious conduct.⁷⁷

In contrast to the clear web, the dark web is not indexed by search engines and can only be accessed via an anonymizing browser, such as Tor. Similar to the clear web, marketplaces and forums are the main platforms for advertising illicit products on the dark web. These sites, typically referred to as darknet marketplaces (DNMs), are where sellers post advertisements, often without disguising the illicit nature of products for sale.

To research synthetic drug sales on the dark web, we analyzed two years of web scrapes that contained over 216,000 posts from more than two dozen DNMs. Overall, we found that in recent years, the number of fentanyl-related postings on the dark web appears to have steadily risen. We also tracked frequent shifts in activity from recently-closed DNMs to live DNMs. DNM closures were sometimes a result of law enforcement action, but also frequently occurred due to “exit scams,” in which vendors or marketplace administrators defraud buyers and abscond with funds held in escrow.⁷⁸ This speaks to the notorious unreliability of the dark web environment: though its lack of regulation is attractive to users, it also means that websites frequently go offline for varying periods of time or disappear entirely.

Figure 17: A timeline showing fentanyl-related activity across dark web marketplaces.



Postings for fentanyl in DNMs are rarely detailed enough to identify the specific individuals involved in a potential transaction. But these posts do typically include some form of contact information – such as a Wickr ID, email address, or WhatsApp number – that clients can use to directly communicate with sellers and finalize transactions.

Another primary identifier seen on DNMs is the “author,” or username, associated with each post. These monikers are sometimes used across different DNMs, and occasionally appear as pseudonyms on the clear web. This suggests that certain fentanyl vendors active on DNMs also maintain a presence on the clear web, using websites such as Reddit or other messaging forums to communicate with the broader synthetic drugs community. Disparate dark web monikers can also sometimes be linked by cross-referencing identifying information to reveal, for instance, usage of the same email address or phone number – providing a sense of the scale and extent of a single vendor’s operations.

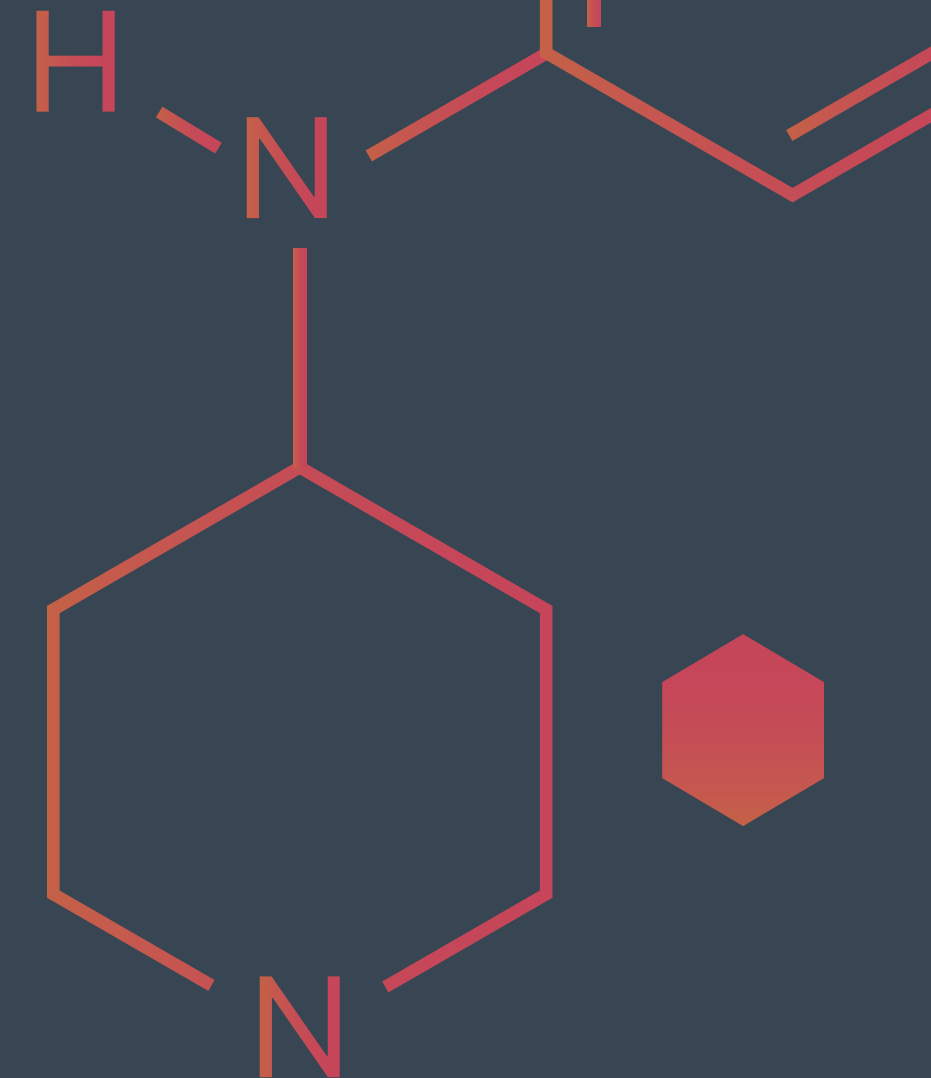
In a further contrast to the clear web, synthetic opioid vendors on DNMs appear to primarily be located in the United States,⁷⁹ and may be selling fentanyl or other drugs originally acquired from China via the clear web, though this usually cannot be definitively proved.

Ultimately, despite the dark web’s general unpredictability and penchant for fraudulent activity, its encryption, anonymity, and higher barriers to entry continue to offer advantages for those willing to engage on a comparatively unregulated platform. As such, DNMs are likely to continue to play a role in the online sale of synthetic drugs, particularly if clear web regulations and monitoring become more rigorous

SECTION IV

EMERGING TRENDS

Synthetic drug networks continue to rapidly evolve in response to law enforcement and policy action. Recent developments offer insights into how drug supply chains may continue transforming. In particular, our analysis suggests that we can expect the appearance of new synthetic substances in global supply chains, the emerging use of alternative clear web platforms, and a diffusion of fentanyl production from China to other regions of the world in the near future.



Isotonitazene

The benzimidazole group of synthetic opioids, which are distinct from fentanyl but have similar effects, has emerged recently in international drug markets. The most prevalent benzimidazole has been isotonitazene, which is an opioid analgesic similar in potency to fentanyl. Though technically not a new substance – having been synthesized in the 1950s⁸⁰– isotonitazene began appearing in global seizure data around April 2019,⁸¹ and we noticed an increase in online advertising for isotonitazene in early 2020. According to the Center for Forensic Science Research and Education, it has ranked among the substances with the highest positivity rates in analysis of synthetic opioids in the United States during 2020.⁸²

This spike in seizures and advertisements, however, has led to increased law enforcement scrutiny of isotonitazene. In August 2020, for instance, the DEA, noting a rise of isotonitazene in illicit drug markets, made it a Schedule I controlled substance.⁸³ The European Commission also initiated a process to ban isotonitazene in September 2020,⁸⁴ and the World Health Organization has been discussing placing the substance under international controls.⁸⁵

Such heightened awareness may already be prompting a shift to more obscure, alternative substances. The synthetic opioid brophine, for instance, has become increasingly prevalent in the United States in 2020.⁸⁶

Password-Protected Marketplaces

In early 2020, many synthetic drug groups on public websites – including Discord, Facebook, Reddit, and others – began enforcing strict rules, likely to reduce exposure and detection by law enforcement. These rules often include restricting sourcing (e.g. not allowing members to post their location information or website referrals) as well as banning users that encourage private messaging.

To mitigate concerns of law enforcement monitoring, some illicit drug networks on the clear web have built password-protected websites for trusted individuals to securely and anonymously sell products. These websites depend on closed communities of drug buyers that migrate away from more commonly used clear web platforms. In early 2020, we gained access to three such websites and one Discord channel, including:

- Predator-rc.nl
- Therealrc.com
- Mu-story.website

All three of these websites require registration approval and offer analogues of controlled drugs, and in some cases, illicit opioids and other synthetic drugs. As of publication, at least one of these websites, therealrc.com, was still active.

Figure 18: The homepage of predator-rc.nl.



Figure 19: Products offered on Mu-story.website.

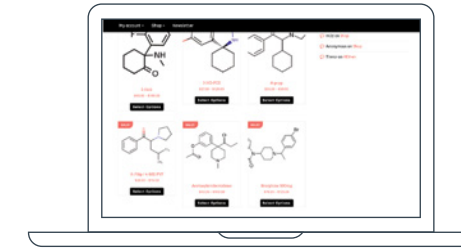


Figure 20: Novel synthetic opioids offered by TheRealRC.com.



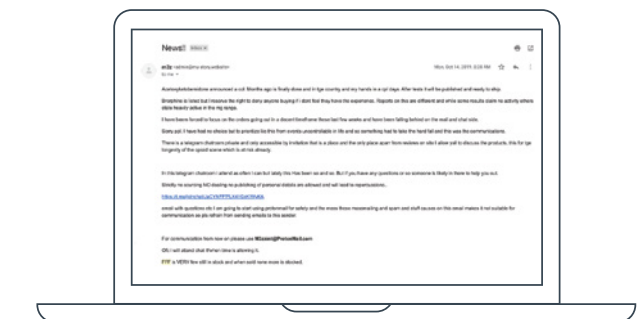
These websites also offer insight into the emergence of novel synthetic opioids (NSOs) and other drug analogues, which are often introduced to these closed communities before becoming more mainstream. For example, on Mu-story.website, isotonitazene was offered as early as February 2020. Therealrc.com also has a section in its sales offerings specifically for NSOs, which includes products that are difficult to find anywhere else, such as metodesnitazene hydrochloride and acetoxymethylketobemidone (O-AMKD).

Mu-story.website also provided regular e-mail updates from its administrator, including information on which countries are currently receiving packages, as well as supply updates for new and old products.

Figure 21: Email from Mu-story.website discussing Fluorofuranylfentanyl and how the group must remain secret.



Figure 22: Email from Mu-story.website mentioning new opioids as well as a Telegram group.



Monitoring such websites is important for understanding how online drug markets shift in response to web monitoring and anticipating the use of new substances by recreational drug users. Yet many questions remain about networks operating on these private platforms. For example, it is still not clear who manufactures the drugs these websites offer, nor how suppliers actually ship products and bypass customs or inspection services. Understanding such nuances will be critical for countering the changing nature of synthetic drug supply chains moving forward.

COVID-19 & “Dropshipping”

Like many industries, synthetic drug supply chains appear to have been disrupted to some extent by the outbreak of COVID-19 in China. As COVID-19 began to spread abroad, the global supply for personal protective equipment (PPE), ventilators, respirators, and other vital medical supplies could not meet demand.⁸⁷ Networks previously engaged in illicit synthetic drug sales were quick to capitalize on this supply gap.

Similar to synthetic drug sales, clear web marketplaces and social media quickly became the primary venues for the sale of medical equipment. For instance, some Facebook groups, whose members represented companies in China, India, the Philippines, and the United Arab Emirates, had members offering up to 20 million masks for global export. Alibaba and IndiaMart also saw many companies advertising hydroxychloroquine and Remdesivir.⁸⁸

The ease with which these companies modified their business operations may, in part, be linked to the practice of “dropshipping.”⁸⁹ Often, companies that describe themselves as import/export or trading companies on online marketplaces are not the manufacturers of those goods. Rather, they are a brokerage company, or “dropshipper,” that has no standing inventory but instead sources from another company to fulfill orders. This allows small, opaque trading companies to advertise and fulfill sales for a variety of disparate goods, and for the actual manufacturer of illicit or grey-area products to reduce their exposure.

By revealing the flexibility and versatility of alleged illicit synthetic drug vendors, the COVID-19 pandemic has highlighted the potentially key role of dropshipping in moving illicit products, such as fentanyl.



Emerging Production Hotspots

Efforts by the US and Chinese governments to curb Chinese synthetic drug production have raised concerns that illicit fentanyl synthesis may shift to other countries. Indeed, China may gradually play a diminishing role in global fentanyl supply chains as synthetic drug production becomes displaced or adopted by illicit networks in other regions of the world. Several countries and regions in particular are at high risk.

India

India, which has the third largest pharmaceutical industry in the world,⁹⁰ has the potential to offset any reductions in Chinese synthetic opioid production. Currently, India is the primary source of tramadol, a narcotic-like pain reliever, with the UNODC reporting that a majority of tramadol seized worldwide between 2017 and 2018 originated from India.^{91, 92} An unclassified January 2020 intelligence report from the DEA also notes that India is emerging as a source for finished fentanyl powder and fentanyl precursor chemicals.⁹³ This trend, according to the DEA report, may accelerate if “China-based traffickers work with Indian nationals to circumvent China’s new controls on fentanyl.”⁹⁴

There have already been several major public cases of fentanyl trafficking networks operating in India. For instance, in late 2018, India’s Directorate of Revenue Intelligence arrested three individuals, including an Indian PhD chemist and a Mexican national, for illicitly manufacturing fentanyl hydrochloride and shipping it to Mexico.⁹⁵ Separately, in June 2019, the US Department of Justice indicted an Indian national for importing controlled substances into the United States, including tapentadol, tramadol, carisoprodol, and modafinil.⁹⁶



Southeast Asia's Golden Triangle

Southeast Asia's Golden Triangle, consisting of parts of Myanmar, Laos, and Thailand, is already a major center for methamphetamine and heroin production.⁹⁷ Methamphetamine synthesis in particular has risen considerably in recent years, with the UNODC's 2019 annual report noting over 82 tons of methamphetamine were seized in the region in 2017 – the largest amount ever reported there. Available data for 2018 showed 116 tons seized, a 41% increase from 2017.⁹⁸

Various transnational criminal organizations control the drug trade in the Golden Triangle, concentrating in Myanmar's conflict-prone border regions and operating in partnership with non-state armed actors, such as ethnic militias.^{99, 100} The UNODC notes that these criminal organizations are becoming more deeply integrated into the region and have established a global reach.¹⁰¹ In recent years, regional and international law enforcement officials have warned about the possibility of these criminal networks producing fentanyl and other synthetic opioids.¹⁰² The UNODC representative for Southeast Asia and the Pacific, Jeremy Douglas, said that "given their sophistication ... we think it is only a matter of time [until] they do it." Golden Triangle drug syndicates, Douglas added, "are ruthless and the region has the conditions necessary for production and pre-existing market demand to capitalize on."¹⁰³



Mexico

Mexico is already a major player as a transit country for illicit fentanyl shipments destined for the United States (see page 24), and may also play an increasing role in fentanyl synthesis.^{104, 105} For instance, one notable June 2019 raid in Nuevo León led to the seizure of an industrial-scale fentanyl production operation in a warehouse.¹⁰⁶ A smaller seizure in July 2020 led to the arrest of two individuals running a pill press in Mexico City and the confiscation of 377,402 fentanyl pills, 36 kilograms of fentanyl, and nearly one kilogram of precursor chemicals.¹⁰⁷

These seizures suggest a potential move by Mexico's sophisticated and opportunistic criminal structures, particularly the Sinaloa Cartel and Jalisco Cartel New Generation (CJNG), to control all portions of the fentanyl supply chain. Such networks are well-placed to move into wholesale fentanyl synthesis given pre-existing chemical expertise and ability to procure precursors for methamphetamine production.¹⁰⁸ The plummeting price of poppy¹⁰⁹, the central ingredient in heroin, suggests that Mexican drug trafficking organizations are increasingly moving away from heroin production and making fentanyl central to their business model.

CONCLUSION & RECOMMENDATIONS

Global illicit synthetic drug networks continue to evolve and adapt in order to supply a shifting drug market and circumvent increasing legal pressures and public scrutiny of their activities. Nonetheless, through the course of our investigations into illicit synthetic drug networks, we have arrived at several key takeaways and recommendations:

The primacy of the clear web:

Synthetic drug sellers and buyers rely on the clear web to connect and form trusted client networks based on a system of reviews and referrals. Interactions between buyers and sellers occur on a variety of platforms, including e-commerce websites, online marketplaces, and social media. Dark web marketplaces play a lesser but still important role in illicit drug sales, functioning as both a complement and an alternative to the clear web.

Recommendation: As scrutiny and regulation of more mainstream clear web platforms increases, attention and awareness should be given to the potential displacement of synthetic drug networks toward alternative, less visible platforms. One method for detecting such shifts is to monitor sudden drops in activity by previously known advertisers. This may be indicative of a migration to alternative platforms. Additionally, social media groups of identified drug vendors and buyers should be monitored for any mentions of movement to new or harder-to-access platforms.

Advertisements contain traceable identifying information:

Synthetic drug advertisements frequently contain unique identifiers, such as email addresses or phone numbers. This identifying information can often be traced in order to identify individuals or companies involved in the production and sale of illicit substances.

Recommendation: Investigators and researchers should use publicly available information, such as corporate records and trade data, to the highest degree possible. Email addresses, phone numbers, and other identifying selectors should be systematically collected alongside more traditional information during the course of investigations into synthetic drug networks. Such information can be used to better understand these networks and reveal links to previously unknown entities that play a role in facilitating supply chains for illicit substances.

Use of chemical nomenclature to avoid detection:

Chinese sellers of illicit synthetic drugs increasingly use chemical nomenclature in advertisements rather than recognizable drug names. This technique appears to be intended to help vendors avoid unwanted scrutiny and bypass web filters that search for and censor advertisements that use more well-known drug names.

Recommendation: To monitor illicit activity, online marketplaces, e-commerce websites, and social media platforms should maintain a regularly updated list of drug-related keywords, such as CAS and IUPAC identifiers. This will require staying informed on trends in synthetic drug use and being aware of any emerging novel substances. To that end, the International Narcotics Control Board publishes a list of fentanyl-related substances with no known legitimate uses.¹¹⁰ This list contains known names and identifiers for those substances, which could be used to create screening lists of high-risk terms for online marketplaces.

Rapid evolution of novel synthetic opioids (NSOs):

Identifying new substances and recognizing when they begin appearing in supply chains for illicit drugs can be difficult and time consuming. As a result, global regulations and law enforcement will always be a step or two behind drug producers, who are able to create new substances quickly and easily.

Recommendation: Governments and international organizations need to react quickly to innovations in chemical synthesis and the appearance of NSOs. Monitoring closed groups, such as password protected websites, where some NSOs seem to first appear for sale, may help regulators to anticipate the emergence of new substances in global drug supply chains. Additionally, issuing generic drug controls that are designed to target a class of drugs, rather than a single substance, may be more effective for quickly responding to and regulating new illicit drugs.

Our report intended to help relevant governments, law enforcement bodies, non-governmental organizations, investigative reporters, and technology companies better identify, understand, and counteract illicit synthetic drug networks. By taking the actions outlined above, relevant stakeholders can enhance the effectiveness of their counter-opioid trafficking efforts by more quickly identifying likely vendors, pseudonyms for banned substances, and novel substances created to evade existing regulations. To be most effective, however, those on the frontlines of countering synthetic drug trafficking, from law enforcement to social media companies, must continue to coordinate and share pertinent information with one another. The combined effect will be more targeted and comprehensive investigations that create a higher cost of doing business for vendors and, ultimately, the significant disruption of the illicit networks facilitating synthetic drug trafficking.

Endnotes

- 1 "Where are the pharma manufacturing hotspots?" Pharmaceutical Technology, 2 April 2018, <https://www.pharmaceutical-technology.com/features/pharma-manufacturing-hotspots/>.
- 2 "Terminology and Information on Drugs – Third Edition." United Nations Office on Drugs and Crime (UNODC), https://www.unodc.org/unodc/en/scientists/terminology-and-information-on-drugs_new.html
- 3 "Extent of Licit Trade in Precursors and the Latest Trends in Precursor Trafficking." Precursors, INCB, 2017, pp. 12-36, https://www.incb.org/documents/PRECURSORS/TECHNICAL-REPORTS/2017/Report_breakdown/English/7a_Extent_of_licit_trade_in_precursors_2017.pdf
- 4 "What are NPS?" Laboratory and Scientific Section Portals, United Nations Office on Drugs and Crime (UNODC), <https://www.unodc.org/LSS/Page/NPS>.
- 5 Terminology and Information on Drugs – Third Edition." United Nations Office on Drugs and Crime (UNODC), https://www.unodc.org/unodc/en/scientists/terminology-and-information-on-drugs_new.html
- 6 "Precursor Control." World Drug Report 2014, UNODC, 2014, pp. 55-93, https://www.unodc.org/documents/wdr2014/Chapter_2_2014_web.pdf
- 7 Johnson, David E.A., Varun Vira, and Thomas Ewing, Constructive Disruption: Exploiting Publicly Available Information to Address Today's Security Challenges, C4ADS, February 2019 <https://static1.squarespace.com/static/566ef8b4d8af107232d5358a/t/5cb4e002919c96000155db0d/1555357705746/White+Paper+Constructive+Disruption.pdf>
- 8 To develop this database, we used Feedly, a platform that collects open source news and reporting across 11 different languages. Sources were collected by Feedly based on a list of keywords related to fentanyl and US drug seizures. Information from these sources was then coded into a spreadsheet and structured to facilitate analysis and expose locations where fentanyl is commonly produced, trafficked, and seized. <https://feedly.com/>.
- 9 For example, while we were collecting vendor data – between approximately January 2019 and May 2019 – roughly 80 listings were removed. In such cases, however, cached or archived copies of these websites were often still available for review.
- 10 Not all areas of the United States, however, have been impacted equally by the effects of synthetic drug abuse. For instance, data from the National Institute of Drug Abuse (NIDA) shows that, in 2018, West Virginia had the highest rate of opioid-involved overdose deaths (42.4 per 100,000), while Hawaii had the lowest (4.1). "Opioid Data Analysis and Resources." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/data/analysis.html> ; "Opioid Summaries by State." National Institute on Drug Abuse, 16 April 2020, www.drugabuse.gov/drug-topics/opioids/opioid-summaries-by-state.
- 11 "Opioid Data Analysis and Resources." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/data/analysis.html> ; "Understanding the Epidemic." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/epidemic/index.html>.
- 12 "Synthetic Opioid Overdose Data." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/data/fentanyl.html>.
- 13 "Understanding the Epidemic." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/epidemic/index.html>.
- 14 "Opioid Overdose Crisis." National Institute on Drug Abuse, 27 May 2020, www.drugabuse.gov/drug-topics/opioids/opioid-overdose-crisis.
- 15 "Understanding the Epidemic." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/epidemic/index.html>.
- 16 "Opioids." National Institute on Drug Abuse, <https://www.drugabuse.gov/drug-topics/opioids>.
- 17 "Understanding the Epidemic." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/epidemic/index.html>.
- 18 Ibid.
- 19 "Fentanyl DrugFacts." National Institute on Drug Abuse, February 2019, <https://www.drugabuse.gov/publications/drugfacts/fentanyl> ; University of California, San Francisco. "Drug wholesalers drove fentanyl's deadly rise, study shows: Cheap, plentiful drug entered wholesale markets following heroin supply shocks." ScienceDaily, ScienceDaily, 5 December 2018, www.sciencedaily.com/releases/2018/12/181205093801.htm.
- 20 "What Is Heroin Cut With?" Edited by Marisa Crane. American Addiction Centers, <https://americanaddictioncenters.org/heroin-treatment/cut-with>
- 21 "Fentanyl." Opioid Overdose, Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/drugoverdose/opioids/fentanyl.html>.
- 22 O'Donnell JK, Halpin J, Mattson CL, Goldberger BA, Glad-den RM. "Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 — 10 States, July–December 2016." Morbidity and Mortality Weekly Report, vol. 66(43), pp. 1197–1202, Centers for Disease Control and Prevention (CDC), 27 October 2017, <https://www.cdc.gov/mmwr/volumes/66/wr/mm6643e1.htm>.
- 23 Kamp, Jon and Arian Campo-Flores. "Hooked: One Family's Ordeal With Fentanyl." The Wall Street Journal, 19 May 2016, www.wsj.com/articles/hooked-one-familys-ordeal-with-fentanyl-1463158112?mod=article_ ; Peterson, Kristina and Stephanie Armour. "Opioid vs. Crack: Congress Reconsiders Its Approach to Drug Epidemic." The Wall Street Journal, 5 May 2018, <https://www.wsj.com/articles/opioid-v-crack-congress-reconsiders-its-approach-to-drug-epidemic-1525518000>.
- 24 "Drug Scheduling." United States Drug Enforcement Administration (DEA), <https://www.dea.gov/drug-scheduling>.
- 25 "Drug Scheduling." United States Drug Enforcement Administration (DEA), <https://www.dea.gov/drug-scheduling>.
- 26 On an international level, chemical substances are controlled by the United Nations Office on Drugs and Crime (UNODC) under three main drug conventions: the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol; the Convention on Psychotropic Substances of 1971; the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988. Countries party to these conventions "are required to ensure that the respective mandatory control measures are applied to substances" listed in the schedules of these conventions. "International Drug Control Conventions." United Nations Commission on Narcotic Drugs (UNCND), United Nations Office on Drugs and Crime (UNODC), <https://www.unodc.org/unodc/en/commissions/CND/conventions.html>.
- 27 "Controlled Substances – Alphabetical Order." Diversion Control Division, United States Drug Enforcement Administration (DEA), 20 August 2020, https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf

- 28 "Drugs of Abuse (A DEA Resource Guide: 2017 Edition)." United States Drug Enforcement Administration (DEA), 15 June 2017, https://www.dea.gov/sites/default/files/drug_of_abuse.pdf.
- 29 Van Bever, W.F., et al. "Synthetic Analgesics. Synthesis and pharmacology of the diastereoisomers of N-[3-Methyl-1-(2-phenylethyl)-4-piperidyl]-N-phenylpropanamide and N-[3-Methyl-1-(1-methyl-2-phenethyl)-4-piperidyl]-N-phenylpropanamide." *Journal of Medicinal Chemistry*, vol. 17, no. 10, 1974, pp. 1047-1051.
- 30 At present, there may be more than 20 different chemical substances that could act as substitutes for NPP and 4-ANPP. For additional information, see: Wong, Liqun L. "Precursor Chemicals Trends: U.S. Perspectives." Drug & Chemical Evaluation Section, United States Drug Enforcement Administration (DEA), <http://www.cicad.oas.org/cicad-docs/Document.aspx?ld=5288>.
- 31 "April 2019 – China: Announcement to place all fentanyl-related substances under national control." Laboratory and Scientific Section Portals, United Nations Office on Drugs and Crime (UNODC), April 2019, <https://www.unodc.org/LSS/Announcement/Details/f2adea68-fbed-4292-a4cc-63771c943318>.
- 32 While this ban made any form of synthesized fentanyl illegal, it did not schedule all precursor chemicals used to make fentanyl. Myers, Steven Lee and Abby Goodnough. "China Bans All Types of Fentanyl, Cutting Supply of Deadly Drug to U.S. and Fulfilling Pledge to Trump." *The New York Times*, 1 April 2019, <https://www.nytimes.com/2019/04/01/world/asia/china-bans-fentanyl-trump.html>; McNeil, Sam and Erika Kinetz. "China to regulate all fentanyl drugs as controlled substance." Associated Press, 1 April 2019, <https://www.apnews.com/d7e292d2b634411d86924bf4034cd62d>; Ingber, Sasha. "China To Close Loophole On Fentanyl After U.S. Calls For Opioid Action." *National Public Radio (NPR)*, 1 April 2019, <https://www.npr.org/2019/04/01/708801717/china-to-close-loophole-on-fentanyl-after-u-s-calls-for-opioid-action>.
- 33 United States, Department of Justice, Drug Enforcement Administration (DEA). "Schedules of Controlled Substances: Temporary Placement of Fentanyl-Related Substances in Schedule I." 83 Fed. Reg. 5188. 6 February 2018.
- 34 "CAS REGISTRY - The gold standard for chemical substance information." CAS, a division of the American Chemical Society. <https://www.cas.org/support/documentation/chemical-substances>.
- 35 International Union of Pure and Applied Chemistry (IUPAC). <https://iupac.org/>.
- 36 US National Institutes of Health (NIH), National Library of Medicine. "Substance Name: Fentanyl." ChemIDplus. <https://chem.nlm.nih.gov/chemidplus/rn/437-38-7>. Accessed on June 20, 2019.
- 37 It is possible for substances to have multiple, equally valid IUPAC names. NIH, National Library of Medicine. "Substance Name: Fentanyl." ChemIDplus. <https://chem.nlm.nih.gov/chemidplus/rn/437-38-7>.
- 38 Myers, Steven Lee and Abby Goodnough. "China Bans All Types of Fentanyl, Cutting Supply of Deadly Drug to U.S. and Fulfilling Pledge to Trump." *The New York Times*, 1 April 2019. <https://www.nytimes.com/2019/04/01/world/asia/china-bans-fentanyl-trump.html>; McNeil, Sam and Erika Kinetz. "China to regulate all fentanyl drugs as controlled substance." Associated Press, 1 April 2019. <https://www.apnews.com/d7e292d2b634411d86924bf4034cd62d>; Ingber, Sasha. "China To Close Loophole On Fentanyl After U.S. Calls For Opioid Action." *National Public Radio*, 1 April 2019. <https://www.npr.org/2019/04/01/708801717/china-to-close-loophole-on-fentanyl-after-u-s-calls-for-opioid-action>.
- 39 Myers, Steven Lee and Abby Goodnough; McNeil, Sam and Erika Kinetz; Ingber, Sasha.
- 40 Wee, Sui-Lee. "Trump Says China Will Curtail Fentanyl. The U.S. Has Heard That Before." *The New York Times*, 3 December 2018. <https://www.nytimes.com/2018/12/03/business/fentanyl-china-trump.html>.
- 41 United States, Department of Justice, DEA. "Schedules of Controlled Substances: Temporary Placement of Fentanyl-Related Substances in Schedule I." 83 Fed. Reg. 5188. 6 February 2018.
- 42 Van Bever, W.F., et al. "Synthetic Analgesics. Synthesis and pharmacology of the diastereoisomers of N-[3-Methyl-1-(2-phenylethyl)-4-piperidyl]-N-phenylpropanamide and N-[3-Methyl-1-(1-methyl-2-phenethyl)-4-piperidyl]-N-phenylpropanamide." *Journal of Medicinal Chemistry*, vol. 17, no. 10, 1974, pp. 1047-1051.
- 43 In April 2020, the US Drug Enforcement Administration (DEA) designated the fentanyl precursors 4-AP and Benzylfentanyl as Schedule I substances. Yet these scheduling designations only apply in the United States, meaning Chinese companies would still be able to legally produce and ship these precursors abroad unless also controlled domestically in China. United States, Department of Justice, DEA, Diversion Control Division. "Designation of Benzylfentanyl and 4-Anilino-piperidine, Precursor Chemicals Used in the Illicit Manufacture of Fentanyl, as List I Chemicals." *Federal Register*, vol. 85, no. 73, 15 April 2020, pp. 20822-20829. https://www.deadiversion.usdoj.gov/fed_regs/rules/2020/fr0415.htm.
- 44 According to the UNODC, "masked" precursors "present a significant challenge to control measures as there is theoretically an almost infinite number of ways to 'mask' or disguise scheduled precursors from existing controls." United Nations Office on Drugs and Crime (UNDOC). "An expanding synthetic drugs market – Implications for precursor control." *Global Smart Update*, vol. 23, March 2020. https://www.unodc.org/documents/scientific/Global_SMART_23_web2.pdf
- 45 International Narcotics Control Board (INCB). "Precursors and chemicals frequently used in the illicit manufacture of narcotic drugs and psychotropic substances." 2019. http://www.unis.unvienna.org/pdf/2019/INCB/Precursors_without_annexes_E_ebook.pdf.
- 46 Cyber Search Centre of the Integrated Companies Registry Information System (ICRIS) 公司註冊處綜合資訊系統. <https://www.icris.cr.gov.hk/csci/>.
- 47 Slater, Matt. "5 Key Features of Chinese Company Names." *Safer, Better Business in China*. China Checkup, 25 May 2016. <https://www.chinacheckup.com/blogs/articles/chinese-company-names>.
- 48 C4ADS identified 543,132 registered biological technology, trade/commerce, chemical, and pharmaceutical companies with location data in the Chinese corporate registry. The industry sample was collected using a 2019 scrape of the Chinese corporate registry, and filtered for the following name endings: biological technology limited company (生物技术有限公司), trade / commerce limited company (貿易/商贸有限公司), chemical limited company (化工有限公司), and pharmaceutical limited company (医药有限公司).
- 49 Registered capital is the amount of money a company had upon registration.
- 50 Registered capital data for similar types of companies (i.e., biological technology, trade/commerce, chemical, and pharmaceutical companies) was pulled from the previously referenced 543,132 company industry sample. In this sample, the most commonly registered capital value is 0.5 million RMB (\$71,429 USD), with 106,860 companies. The second most frequently registered capital is 1 million RMB (\$142,857 USD), with 100,902 companies.
- 51 Of the 543,132 companies in the previously referenced sample, the majority are located in Shanghai (41,853), with Guangzhou a close second (41,474). Beijing is the third most frequent location, with 24,574 companies. Wuhan ranks 15th (7,292) and Shijiazhuang ranks 19th (5,791).
- 52 One hypothesis for this divergence is that Shijiazhuang, where the economy has traditionally relied on low-end manufacturing and coal-fired power plants, has struggled to achieve Chinese national and regional GDP growth goals – state and local level production must increase annually by 6.5%. Given Shijiazhuang's reliance on manufacturing, shifting to the production and sale of illicit chemical products could be intended to supplement low GDP numbers. Specifically, China's State Council established the Shijiazhuang High-tech Industrial Development Zone (Shijiazhuang HIDZ) in 1991, designating the following industries as the HIDZ's primary focus: information technology, biopharmaceuticals, machinery, automobiles, fine chemicals and logistics. Reuters Staff. "China to close more than 1,000 coal mines in 2016: energy bureau." *Reuters*. 22 February 2016. <https://www.reuters.com/article/us-china-energy-coal/china-to-close-more-than-1000-coal-mines-in-2016-energy-bureau-idUSKCN0VV0U5>.
- 53 Etizolam falls in a legal grey area. As of October 2020, the DEA has not issued any scheduling controls for etizolam, though there has been a rise in illicit distribution of the substance for recreational use in the United States. United States, DEA. "Etizolam." *Diversion Control Division: Drug & Chemical Evaluation Section*. March 2020. https://www.deadiversion.usdoj.gov/drug_chem_info/etizolam.pdf.
- 54 US National Institutes of Health (NIH), National Library of Medicine, National Center for Biotechnology Information. "Compound Summary: Fluoroketamine." *Pubchem*. <https://pubchem.ncbi.nlm.nih.gov/compound/Fluoroketamine>.
- 55 --陈. "Buy 25i-Nbome,2-FMA, 3-FMC, 3,4DMMc,Pain Killers,Mephedrone,Heroine,LSD, ketamine,MDMA,Ephedrine,4meo-pcp,4-CAB,4-FA,JWH018,Ephedrine." SlideShare. 11 May 2017. <https://pt.slideshare.net/ssuser968761/buy-25inbome2fma-3fmc-34dmmcpain-killersmephedrone-heroinelsd-ketaminemdmaephedrine4meopcp4cab-4fajwh018ephedrine>.
- 56 --陈. "Buy 25i-Nbome,2-FMA, 3-FMC, 3,4DMMc,Pain Killers,Mephedrone,Heroine,LSD, ketamine,MDMA,Ephedrine,4meo-pcp,4-CAB,4-FA,JWH018,Ephedrine." SlideShare. 11 May 2017. <https://pt.slideshare.net/ssuser968761/buy-25inbome2fma-3fmc-34dmmcpain-killersmephedrone-heroinelsd-ketaminemdmaephedrine4meopcp4cab-4fajwh018ephedrine>.
- 57 An in-depth analysis of cryptocurrency is beyond the scope of this report. For more details pertaining to 13it's blockchain, and inward and outward movements associated with the address, please reference: <https://www.blockchain.com/btc/address/13itGxzHdRYSFBcj7H15ns4f8p4B-6krDuQ?page=1>
- 58 Manning, Landon. "BTCC Announces The "Indefinite" Closure Of Its Mining Pool." *Bitcoin Magazine*. 6 November 2018. <https://bitcoinmagazine.com/articles/btcc-announces-indefinite-closure-its-mining-pool>.
- 59 In November 2019, however, a Chinese court did convict nine individuals for being members of an international fentanyl smuggling operation. Jiang, Steven and Westcott, Ben, "China sentences fentanyl drug ring in rare public trial amid US trade talks." *CNN.com*, CNN, 7 November 2019, <https://www.cnn.com/2019/11/07/asia/china-us-fentanyl-trump-hebei-intl-hnk/index.html>. Ting, Fu and Wang, Yanan. "China says Trump's claims about fentanyl origin are false." *APNews.com*, The Associated Press, 3 September 2019, <https://apnews.com/7010fb02262f49f585347490cdd950b8>.
- 60 CBP's fiscal year 2019 was Oct. 1, 2018 – Sept. 30, 2019. Through March of FY 2020, CBP has seized 1,074 pounds of fentanyl. "CBP Enforcement Statistics Fiscal Year 2020." *CBP.gov*, US Customs and Border Protection, September 2020, <https://www.cbp.gov/newsroom/stats/cbp-enforcement-statistics>.
- 61 Ibid.
- 62 According to the 2019 NDTA, the total number of fentanyl reports submitted to the National Forensic Laboratory Information System (NFLIS) increased by 65% between 2016 and 2017, from 34,204 to 56,530. Ohio, Pennsylvania, Massachusetts, New York, and New Jersey had the most fentanyl reports in NFLIS in 2017. 2019 National Drug Threat Assessment. *DEA.gov*, US Drug Enforcement Administration, December 2019, https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-Dir-007-20_2019.pdf.
- 63 For the purposes of analyzing the Synthetic Drug Seizure Database, C4ADS considered North America to consist of Canada, Mexico, and the United States.
- 64 Of the 26 seizures where China was the origin country, 24 occurred in the United States, 1 in Canada, and 1 in France.
- 65 Seizure instances collected by C4ADS also indicate that, of the US ports of entry along the Mexico border, Nogales, Arizona had the largest weight of fentanyl seized (259 kilograms) between January 2017 and July 2019. These findings correspond to those of CBP, which seized, 681 kilograms of fentanyl along the SWB in 2018, the majority of which was seized in California (75.7%), followed by Arizona (20.2%). 2019 National Drug Threat Assessment. *DEA.gov*, US Drug Enforcement Administration, December 2019, https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-Dir-007-20_2019.pdf.
- 66 Ibid.
- 67 Ibid.
- 68 Ibid.
- 69 Ibid.
- 70 Non-medical fentanyl and other unregulated chemical products started being actively advertised and marketed on the clear web between 2010 and 2011. See: *Fentanyl and Related Threats*. The United States' Attorneys' Bulletin, United States Department of Justice, Volume 66, Number 4, July 2018, <https://www.justice.gov/usao/page/file/1083791/download>.
- 71 实验室毒品 in Chinese characters.
- 72 CAS, a division of the American Chemical Society. <https://www.cas.org/> <https://www.cas.org/support/documentation/chemical-substances>.
- 73 International Union of Pure and Applied Chemistry (IUPAC). <https://iupac.org/>.
- 74 On November 3, 2020, MAPA was included in Table I of the Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988. "May 2020 – UNODC: CND decision on international control of two fentanyl analogues enters into force – remaining decisions will enter into force in November 2020." *UNODC.org*, United Nations Office on Drugs and Crime, May 2020, <https://www.unodc.org/LSS/Announcement/Details/64167b6d-968d-4d0c-bc65-5deb99683191>.
- 75 Lists of: Scheduling Actions Controlled Substances Regulated Chemicals. *USDOJ.gov*, US Drug Enforcement Administration, August 2020, <https://www.deadiversion.usdoj.gov/schedules/orangebook/orangebook.pdf>.

- 76 See: Goodnough, Abby and Myers, Steven Lee. "China Bans All Types of Fentanyl, Cutting Supply of Deadly Drug to U.S. and Fulfilling Pledge to Trump." *NYTimes.com*, *The New York Times*, 1 April 2019, <https://www.nytimes.com/2019/04/01/world/asia/china-bans-fentanyl-trump.html>; Kinetz Erika and McNeil, Sam. "China to regulate all fentanyl drugs as controlled substance." *APNews.com*, *The Associated Press*, 1 April 2019, <https://www.apnews.com/d7e292d2b634411d86924bf4034cd62d>; Ingber, Sasha. "China To Close Loophole On Fentanyl After U.S. Calls For Opioid Action." *NPR.org*, *National Public Radio*, 1 April 2019, <https://www.npr.org/2019/04/01/708801717/china-to-close-loophole-on-fentanyl-after-u-s-calls-for-opioid-action>.
- 77 Sources containing a more in-depth discussion on the dark web's role in drug sales include: *Drugs and the darknet: Perspectives for enforcement, research, and policy*. EMCDDA – Europol, European Monitoring Centre for Drugs and Drug Addiction, 2017, <https://www.emcdda.europa.eu/system/files/publications/6585/TD0417834ENN.pdf>; Kruihof, Kristy, Judith Aldridge, David Déarcy Héту, Megan Sim, Elma Dujso, and Stijn Hoorens. *The role of the 'dark web' in the trade of illicit drugs*. *RAND.org*, *RAND Europe*, 2016, https://www.rand.org/pubs/research_briefs/RB9925.html.
- 78 Christian, Jon. "The 'Exit Scam' is the Darknet's Perfect Crime." *Vice.com*, *Vice News*, 4 February 2015, https://www.vice.com/en_us/article/xyw7xn/darknet-slang-watch-exit-scams; Redman, Jamie. "Darknet Users Allege Wall Street Market Exit Scammed, Possibly Snatching \$30M." *Bitcoin.com*, *Bitcoin News*, 20 April 2019, <https://news.bitcoin.com/darknet-users-allege-wall-street-market-exit-scammed-possibly-snatching-30m/>.
- 79 The DEA also makes note of this in their 2019 National Drug Threat Assessment. 2019 National Drug Threat Assessment. *DEA.gov*, *US Drug Enforcement Administration*, December 2019, https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-Dir-007-20_2019.pdf.
- 80 "June 2020 – UNODC – SMART: Emergence of the new synthetic opioid isototonazene." *UNODC.org*, *United Nations Office on Drugs and Crime*, June 2020, <https://www.unodc.org/LSS/Announcement/Details/2d09cc01-3272-45e1-a898-b98898b9215c>.
- 81 "EMCDDA initial report on the new psychoactive substance N,N-diethyl-2-[[4-(1-methylethoxy)phenyl]methyl]-5-nitro-1H-benzimidazole-1-ethanamine (isotonitazene)." *EMCDDA*, *European Monitoring Centre for Drugs and Drug Addiction*, April 2020, https://www.emcdda.europa.eu/publications/initial-reports/isotonitazene_en.
- 82 Krotulski, Alex J., Logan, Barry K., and Mohr, Amanda L.A., "Trend Report: Q1 2020." *NPSDiscovery.org*, *NPS Discovery and the Center for Forensic Science Research and Education (CSFRE)*, 2020, https://www.npsdiscovery.org/wp-content/uploads/2020/04/2020-Q1-NPS-Opioids_Trend-Report.pdf; Krotulski, Alex J., Logan, Barry K., and Mohr, Amanda L.A., "Trend Report: Q2 2020." *NPSDiscovery.org*, *NPS Discovery and the Center for Forensic Science Research and Education (CSFRE)*, 2020, https://www.npsdiscovery.org/wp-content/uploads/2020/07/2020-Q2-NPS-Opioids_Trend-Report.pdf; Krotulski, Alex J., Logan, Barry K., and Mohr, Amanda L.A., "Trend Report: Q3 2020." *NPSDiscovery.org*, *NPS Discovery and the Center for Forensic Science Research and Education (CSFRE)*, 2020, https://www.npsdiscovery.org/wp-content/uploads/2020/10/2020-Q3-NPS-Opioids_Trend-Report.pdf.
- 83 U.S. Department of Justice, "Schedules of Controlled Substances: Temporary Placement of Isotonitazene in Schedule I," *Federal Register*, Vol. 85, Number 118, June 18, 2020. Available at https://www.deadiversion.usdoj.gov/fed_regs/rules/2020/fr0618.htm
- 84 "Commission initiates ban on new harmful psychoactive substance isototonazene," *EU Commission Press*, September 2, 2020. Available at <https://www.pubaf-fairsbruxelles.eu/fight-against-drugs-commission-initiates-ban-on-new-harmful-psychoactive-substance-isotonitazene-eu-commission-press/>
- 85 "Eleven New Psychoactive Substances to be considered for international control by 43rd ECDD," *World Health Organization*, July 21, 2020. Available at <https://www.who.int/news/item/21-07-2020-eleven-new-psychoactive-substances-to-be-considered-for-international-control-by-43rd-ecdd>
- 86 "NPS Opioids in the United States, Trend Report Q2," *NPS Discovery*, Available at https://www.npsdiscovery.org/wp-content/uploads/2020/07/2020-Q2-NPS-Opioids_Trend-Report.pdf ; "NPS Opioids in the United States, Trend Report Q3," *NPS Discovery*, Available at https://www.npsdiscovery.org/wp-content/uploads/2020/10/2020-Q3-NPS-Opioids_Trend-Report.pdf
- 87 Will Weissert, "DHS report: China hid virus' severity to hoard supplies," *Associated Press*, May 4, 2020. Available at <https://apnews.com/bf685dcf52125be54e030834ab7062a8>
- 88 The former is an anti-malarial drug that some world leaders touted as effective at preventing COVID-19 and the latter is a drug for which the US Food and Drug Administration (FDA) granted Emergency Use Authorization for the treatment of COVID-19. <https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-issues-emergency-use-authorization-potential-covid-19-treatment>
- 89 Daniel Threlfall, "What is Dropshipping?" *Oberlo*, July 1, 2020. Available at <https://www.oberlo.com/blog/what-is-dropshipping>
- 90 Avi Krish Bedi, "How India Could Fuel the Global Synthetic Drug Epidemic," *The Wire (India)*, June 26, 2019. Available at <https://thewire.in/health/how-india-could-fuel-the-global-synthetic-drug-epidemic> ; "India Pharma 2020 Propelling access and acceptance, realising true potential," *McKinsey & Company*, 2020. Available at https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/Pharma%20and%20Medical%20Products/PMP%20NEW/PDFs/778886_India_Pharma_2020_Propelling_Access_and_Acceptance_Realising_True_Potential.ashx
- 91 "World Drug Report 2018: Executive Summary," *UN Office on Drug Control*, June 2018. Available at https://www.unodc.org/wdr2018/prelaunch/WDR18_Booklet_1_EXSUM.pdf; Avi Krish Bedi, "How India Could Fuel the Global Synthetic Drug Epidemic," *The Wire (India)*, June 26, 2019. Available at <https://thewire.in/health/how-india-could-fuel-the-global-synthetic-drug-epidemic>
- 92 Natalie Tecimer, "Tramadol: The Dangerous Opioid From India," *The Diplomat*, January 19, 2018. Available at <https://thediplomat.com/2018/01/tramadol-the-dangerous-opioid-from-india/>
- 93 "Fentanyl Flow to the United States," *DEA Intelligence Report*, January 2020. Available at https://www.dea.gov/sites/default/files/2020-03/DEA_GOV_DIR-008-20%20Fentanyl%20Flow%20in%20the%20United%20States_0.pdf
- 94 Ibid
- 95 "Doomsday chemical lab ran for a decade," *Times of India*, October 3, 2018. Available at <https://timesofindia.india-times.com/india/fentanyl-lab-ran-in-dark-for-a-decade/articleshow/66047362.cms>; "Breaking Bad: Deadly fentanyl worth Rs 100 cr recovered from MP, three including scholar nabbed," *DNA (India)*, September 30, 2018. Available at <https://www.dnaindia.com/india/report-breaking-bad-deadly-fentanyl-worth-rs-100-cr-recovered-from-mp-three-including-scholar-nabbed-2669769>
- 96 "Indian Businessman Charged with Drug Importation, Smuggling, and Money Laundering Offenses," *Department of Justice*, June 27, 2019. Available at <https://www.justice.gov/usao-wdpa/pr/indian-businessman-charged-drug-importation-smuggling-and-money-laundering-offenses>
- 97 "Synthetic Drugs in Southeast Asia," *UN Office on Drugs and Crime*, March 2019. Available at https://www.unodc.org/documents/southeastasiaandpacific/Publications/2019/2019_The_Challenge_of_Synthetic_Drugs_in_East_and_SEA.pdf
- 98 Ibid. This production largely gets trafficked to markets in neighboring and regional countries, such as China, Australia, New Zealand, South Korea, and Bangladesh.
- 99 Tom Allard, "The Hunt for Asia's El Chapo," *Reuters*, October 14, 2019. Available at <https://www.reuters.com/investigates/special-report/meth-syndicate/>
- 100 Duc Hoang, Hoang Phuong, Thanh Lam, "Vietnam's fight against drug cartels on Laos border," *VN Express (Vietnam)*, 2019. Available at <https://e.vnexpress.net/projects/vietnam-s-fight-against-drug-cartels-on-laos-border-3890848/index.html> ; Chris Uhlmann and Joel Tozer, "Inside the Golden Triangle, where warlords and drug barons reign," *South China Morning Post*, March 15, 2020. Available at <https://www.smh.com.au/world/asia/inside-the-golden-triangle-where-warlords-and-drug-barons-reign-20200310-p548io.html>
- 101 Inshik Sim, Shawn Kelley, Magali Lapouge, and Akara Uma-pornsakula, "Transnational Organized Crime in Southeast Asia: Evolution, Growth and Impact," *UN Office on Drugs and Crime*, 2019. Available at https://www.unodc.org/documents/southeastasiaandpacific/Publications/2019/SEA_TOCTA_2019_web.pdf
- 102 "Golden Triangle's drug production surges amid opioid worries," *Al Jazeera*, November 7, 2018. Available at <https://www.aljazeera.com/news/2018/11/golden-triangle-drug-production-surges-opioid-worries-181107034455846.html>
- 103 Ibid.
- 104 Mexican authorities seized a fentanyl laboratory as early as May 2006, in the city of Toluca. "Fentanyl Situation Report SR-000001," *US Department of Justice National Drug Intelligence Center*, June 5, 2006. Available at <https://www.justice.gov/archive/ndic/pubs11/20469/index.htm>
- 105 Steven Dudley, Deborah Bonello, Jaime Lopez-Aranda, Mario Moreno, Tristan Clavel, Bjorn Kjelstad, and Juan Jose Restrepo, "Mexico's Role in the Deadly Rise of Fentanyl," *InsightCrime*, February 2019. Available at <https://www.insightcrime.org/investigations/mexico-deadly-rise-fentanyl/>
- 106 "Fentanyl Lab busted by the FGR in Garcia," *Borderland Beat*, June 17, 2019. Available at <http://www.borderlandbeat.com/2019/06/fentanyl-lab-busted-by-fgr-in-garcia.html>
- 107 "Comunicado FGR 220/20. FGR obtiene vinculación contra dos hombres, a quienes se les aseguró más de 300 mil pastillas de fentanilo," *Fiscalia General de la Republica*, July 12, 2020. Available at <https://www.gob.mx/fgr/prensa/comunicado-fgr-220-20-fgr-obtiene-vinculacion-contra-dos-hombres-a-quienes-se-les-aseguro-mas-de-300-mil-pastillas-de-fentanilo?idiom=es>
- 108 Sean O'Connor, "Meth Precursor Chemicals from China: Implications for the United States," *U.S.-China Economic and Security Review Commission*, July 18, 2016. Available at <https://www.uscc.gov/research/meth-precursor-chemicals-china-implications-united-states>
- 109 Romain Le Cour Grandmison, Nathaniel Morris, and Benjamin Smith, "The Last Harvest? From the US Fentanyl Boom to the Mexican Opium Crisis," *Journal of Illicit Economies and Development*, November 29, 2019. Available at <https://jied.lse.ac.uk/articles/10.31389/jied.45/>; Kirk Semple, "Mexican Opium Prices Plummet; Driving Poppy Farmers to Migrate," *New York Times*, July 7, 2019, Available at <https://www.nytimes.com/2019/07/07/world/americas/mexico-drugs-migration.html>
- 110 "Establishing a list of fentanyl-related substances with no known legitimate uses," *International Narcotics Control Board*, Available at https://www.incb.org/incb/en/opioids_project/fentanyl-related-substances-with-no-known-legitimate-use.html. Last accessed 11/2/2020