“They say it’s fentanyl, but they honestly look like Perc 30s”:

Increasing street availability of counterfeit pills containing non-pharmaceutical fentanyl

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  PI: Raminta Daniulaityte and Natasha Mendoza
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Acknowledgments of research team members

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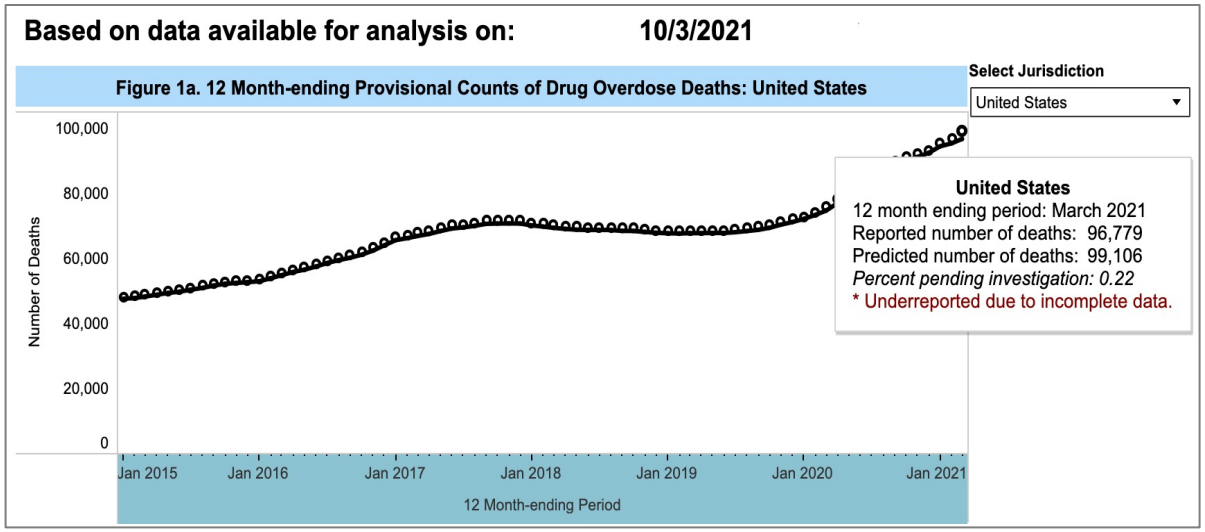
Increasing overdose mortality



Arizona:

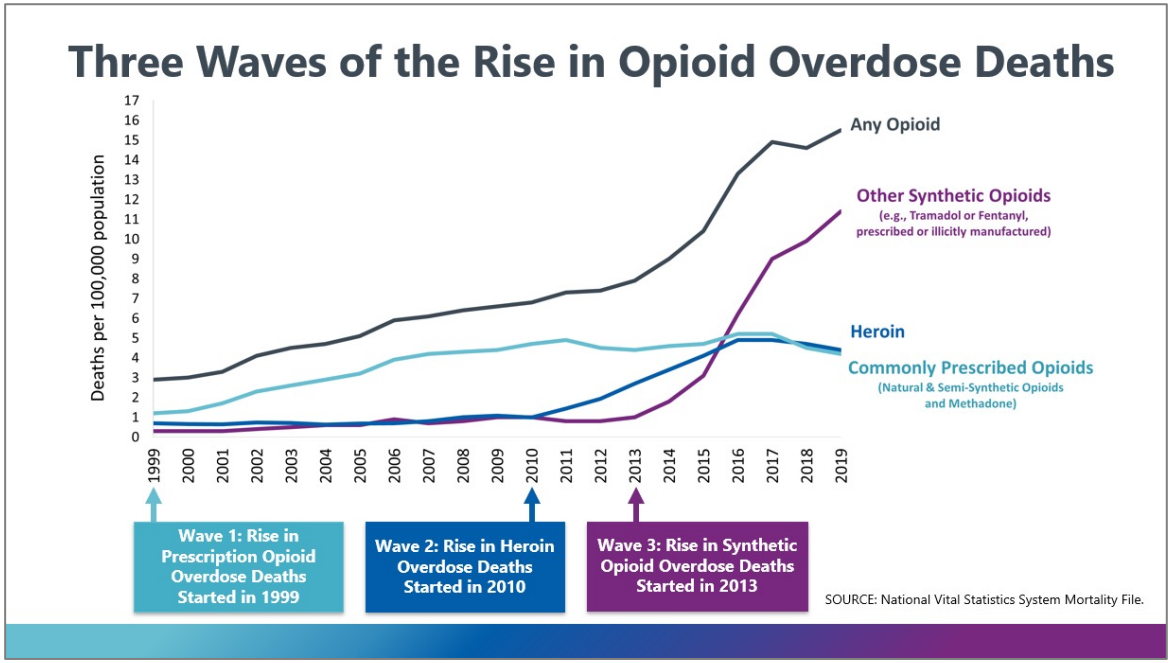
- **2,735** overdose deaths in the 12 months period ending in **March 2021**, **the highest ever recorded.**
- About 30% increase, compared to the prior period of 12 months ending in March 2020.

National Trends:

Over **96,000** overdose deaths in the US in the 12 months ending in **March 2021, the highest number ever recorded** in a 12-month period (over **30%** increase).

Source:
Ahmad FB, Rossen LM, Sutton P. Provisional drug overdose death counts. National Center for Health Statistics. 2021.

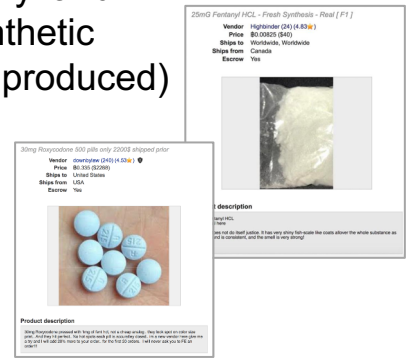
Historical Perspective: Three Waves



Wave 1: Pharmaceutical opioids (e.g., Vicodin, Percocet)

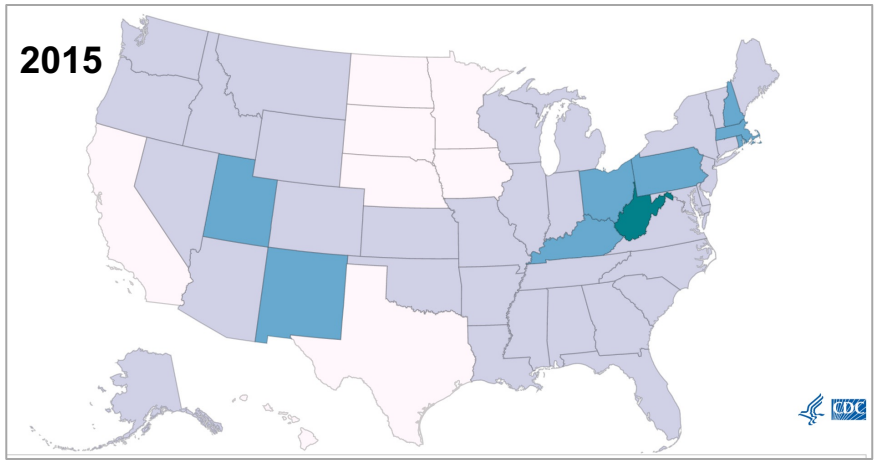
Wave 2: Heroin (Powder-type, Black tar-type)

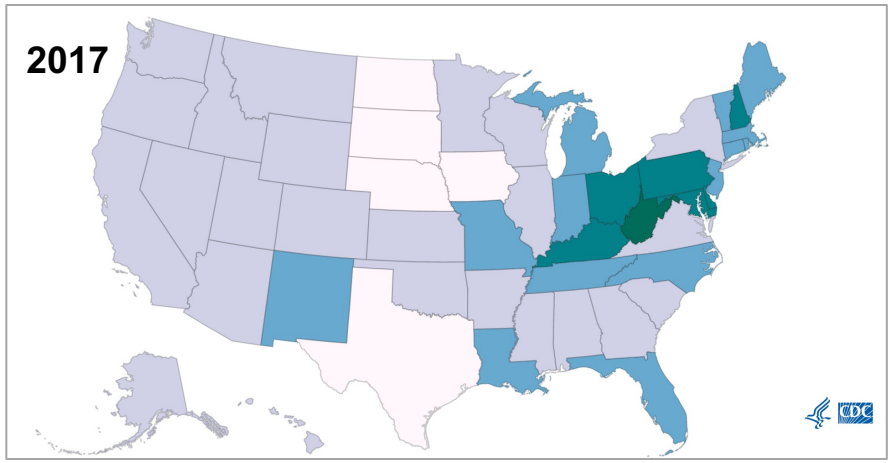
Wave 3: Fentanyl and other novel synthetic opioids (illicitly produced)

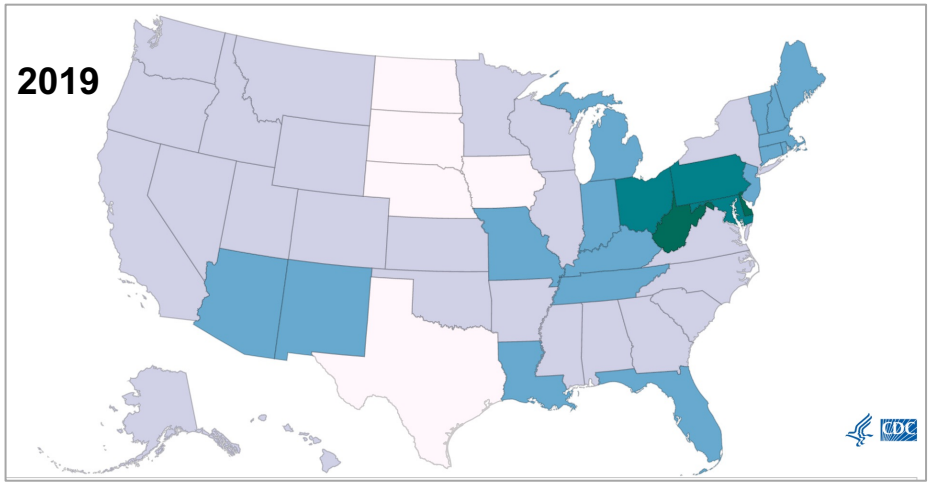


Reference: CDC. Three Waves of Opioid Overdose Deaths. https://www.cdc.gov/drugoverdose/epidemic/index.html#three-waves, Accessed on November 12, 2021

Regional Variability: Drug Overdose Mortality by State







Age-Adjusted Death Rates[1]

0 — < 11.6
11.6 — < 23.2
23.2 — < 34.8
34.8 — < 46.4
46.4 — 57.8

Reference: CDC/National Center for Health Statistics. Drug OD Mortality by State. https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm

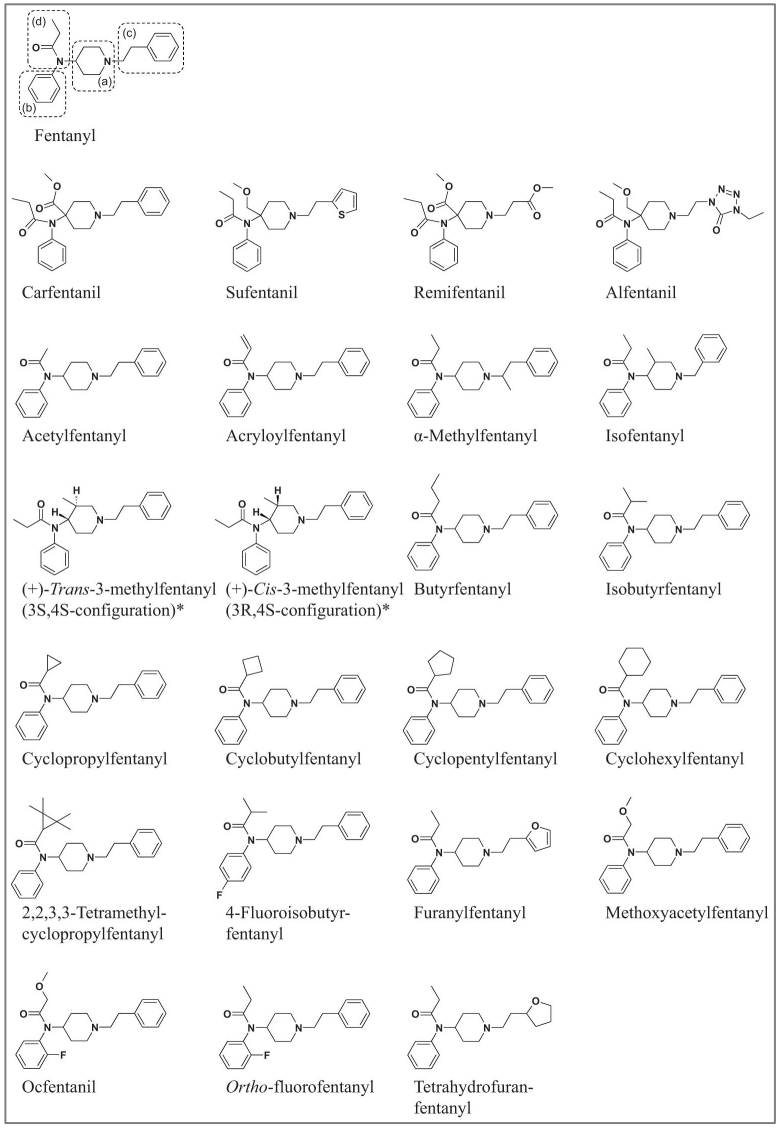
One of the key reasons for regional differences: **different patterns and timing in increased market contamination with fentanyl-type drugs**

The importance of black tar vs. powder-type heroin

Influx of fentanyl-type drugs: supply side decisions and market contamination

- Illicitly produced or non-pharmaceutical fentanyl (not pharmaceutical products like Duragesic).
- First entered the drug markets as an adulterant of heroin
- Influx of synthetic opioids is driven by supply-side decisions and strategies to lower production/transportation costs, increase profits, and evade drug control laws.
- It's expansion was driven by increased production in China and growing popularity of dark web markets (cryptomarkets).

Unprecedented levels of uncertainty and risk



- In addition to non-pharmaceutical fentanyl, street drugs may be adulterated with a wide range of fentanyl analogs (e.g., carfentanil) and other novel synthetic opioids (U-47700). (Many states may lack testing capacity to detect analogs/other synthetics)
- **Highly potent opioids, analogs vary in potency:**
  - Fentanyl is 50–100 times more potent than morphine and 25–40 times more than heroin
  - Carfentanil is estimated to be about 10,000 times more potent than morphine, and up to 100 times more potent than fentanyl
  - Acetylfentanyl has 0.3 potency of fentanyl

Reference: Wilde M, Pichini S, Pacifici R, Tagliabracci A, Busardò FP, Auwärter V and Solimini R (2019) Metabolic Pathways and Potencies of New Fentanyl Analogs. *Front. Pharmacol.* 10:238. doi: 10.3389/fphar.2019.00238

Ohio experiences

ACS OMEGA
Article
Cite This: ACS Omega 2018, 3, 514−523

LC-MS/MS-Based Method for the Multiplex Detection of 24 Fentanyl Analogues and Metabolites in Whole Blood at Sub ng mL^{-1}

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Morbidity and Mortality Weekly Report

Overdose Deaths Related to Fentanyl and Its Analogs — Ohio, January–February 2017

Raminta Daniulaityte, PhD[1]; Matthew P. Juhascik, PhD[2]; Kraig
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Research Paper

Street fentanyl use: Experiences, preferences, and concordance between self-reports and urine toxicology

Raminta Daniulaityte[a,*], Robert R. Carlson[a], Matthew P. Juhascik[b], Kraig E. Strayer[c],
emore[c]

"Gary," a 55-year old white man (Dayton, OH): "I did heroin for years. That's what I grew up on, spent my whole life on heroin without a hitch, no problems! And the first time fentanyl came around, I was getting the carfentanil… Two or three specks of that […], and it dropped me like a sack of potatoes… And I was used to, you know, I became a heavy user [of heroin] over the years… Well, it was my first go-around with the carfentanil, and I've been scared of fentanyl ever since. It just dropped me, I think, maybe 11-12 times."

	All Cases, N=59		Any NPF Positive, N=52	
Drug	N	%	N	%
Any NPF (LC-MS/MS testing)	52	88.1%	52	100%
Fentanyl[a]	51	86.4%	51	96.2%
Carfentanil	28	47.5%	28	53.8%
Acetyl Fentanyl	25	42.4%	25	48.1%
Despropionyl Fentanyl[b]	22	37.3%	22	42.3%
Para-Fluorobutyryl	14	23.7%	14	26.9%
Cyclopropyl Fentanyl	7	11.9%	7	13.5%
Furanyl Fentanyl[c]	5	8.3%	5	9.6%
Benzyl Fentanyl	4	6.8%	4	7.7%
Acryl Fentanyl	2	3.4%	2	3.8%

“Here and Now”: qualitative interviews with people who use illicit opioids in Arizona

Methods

- 22 qualitative interviews were conducted between December 2020 and May 2021.
- Participants were recruited through referrals by Sonoran Prevention Works, social media and craigslist ads, and referrals by other study participants.
- Eligibility criteria: 1) at least 18 years old; 2) residing in Arizona; 3) use of illicit opioids in the past 30 days and/or participation in treatment for opioid use disorder in the past 12 months.
- Due to COVID-19 restrictions on in-person meetings, all interviews were conducted via Zoom teleconferencing.
- Interviews lasted about 1h and participants were compensated $40 (e-gift card).
- Interviews were audio-recorded and transcribed.
- NVivo software was used to assist with qualitative coding and analysis.
- The study was approved by the ASU Institutional Review Board.

Participants (N=22): Socio-demographics

- 14 were male and 8 were female
- Ethnic/racial background:
  - 12 were non-Hispanic White
  - 7 were of Hispanic/Latinx ethnic background
  - 1 American Indian
  - 1 African American/Asian
  - 1 Asian/White

- Age ranged from 25 to 51 years old, with a mean age of 33.9 years

- Area of current residence:
  - Maricopa – 11 participants
  - Pima – 4 participants
  - Yuma – 2 participants
  - Mohave – 3 participants
  - Pinal – 1 participant
  - Yavapai – 1 participant

Participants (N=22): Drug use characteristics

- Past 30 day use of opioids:
  - 18 participants reported using heroin in the past 30 days
  - 18 participants reported use of fentanyl
  - 2 participants used non-prescribed pain pills

- Most frequently used opioid:
  - Fentanyl – 14 participants
  - Heroin - 7 participants
  - Non-prescribed pain pills – 1 participant

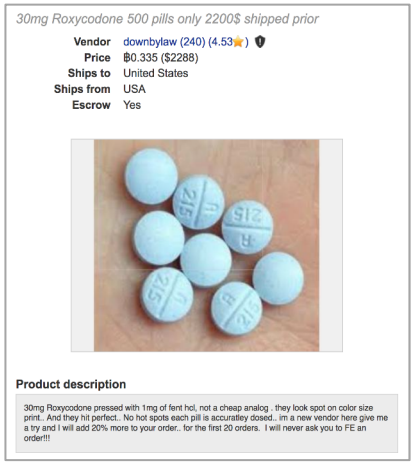
- First fentanyl use within the past 1-2 years.

Dramatic increases in fentanyl availability in AZ in 2020, decreasing prices

- Fentanyl is easier to get than heroin; ”real” pain pills are extremely difficult to find.
- Decreasing prices in 2020 (e.g., from about $8-$10 per fentanyl pill to around $4-$7, bulk prices: $300 per 100 pills).

“Dan”, a 34-year old white man, currently using fentanyl (Gilbert, AZ): **“**It [heroin] is still available, but not as much especially here in the valley, in the Phoenix area. It's not nearly as common as it was, it's harder to find now. For every, you know, probably 8-9 people that are selling the fentanyl, you might have 1-2 they're selling heroin now, and it used to be the other way.”

Types of products: Fentanyl pills or “Blues”



- Most common: pressed tablets mimicking 30mg generic oxycodone
- Referred to as “blues,” “dirty oxys,” “Mexican oxys”
- Target group: individuals who used heroin and also those who used non-prescribed pharmaceutical opioids

“Jeff,” a 42-year-old white man, currently using illicit fentanyl (Phoenix, AZ): “As I said, I didn't do ‘blues’ [illicit fentanyl pills] before but it's so much easier to get… Like my roommate, he's got to drive like 8 miles to buy heroin when I could literally walk out in the apartment courtyard and find 3-4 people selling ‘blues,’ because the only reason I started doing it because it was cheaper and more accessible.”

Fentanyl was spreading before COVID, but the trend escalated dramatically during the pandemic:

“Ariana,” a 27-year-old Hispanic woman (Tucson, AZ):
“At first, the availability plummeted, drugs got a lot more expensive…. You know, here's the thing about COVID too, it's also **pushed people to a new level of desperation**. Like for me personally, like with my financial situation, I ended up you know trafficking for a minute… It was twofold—one, I needed access to what I used; two--I needed to make money.”

Types of products: Heroin contamination

- Initially, it was thought that black tar form of heroin is less prone to being contaminated with fentanyl (as opposed to powder-type). It was thought to be a protective factor against fentanyl spread in states like AZ (western part of the US).

- However, some participants reported increased instances of heroin contamination with fentanyl, which eventually facilitated transition to fentanyl pills.

"Juan Pablos" 31-year-old Hispanic male, currently using fentanyl pills (Phoenix, AZ): "Last year, before I had made the switch, we had found—pretty much everyone started realizing--that the heroin had a different feel to it. It seemed like it was stronger… but the high was different… That's when a lotta people started realizing well, they're putting fentanyl into the heroin to make it seem like it's stronger, and it's better… Most people didn't really like that. They decided, well, if most of the heroin is just gonna be cut with fentanyl anyways, then you might as well just do the [fentanyl] pills because at least we know what we're getting in that sense."

Types of products: powder form or "pure"?

- Predominant form in the Midwest and Northeast, not very common in Arizona
- Initial market introduction targeted people who use heroin; can be used by injection; initially sold as heroin (or "dope").

A 25-year-old woman (Phoenix, AZ): "I have access to pure fentanyl, the powder…. It's not [common]. It's really expensive. Most of my people that sell the [fentanyl] pills don't also have access to the "pure." But I've come across it quite several times… Then it just kind of weird because some of the powder is white, some is pink, some is purple, and you're not really sure what you're getting. I guess, or why it's different colors. But it's great when you do find it. **You can smoke it or shoot up and it's just really strong**."

A 25-year-old man (Yuma, AZ): "Here [local region]… for the most part the cartels are just pushing the pills. They don't wanna sell the pure thing, or obviously they'll be killin' the client base. For the most part you only find pills out here. You're not gonna find pure fentanyl unless you're buying it from China yourself."

Initiation: reduced access to heroin

- Most commonly, the first use of fentanyl pills occurred in the context of reduced access to heroin.
- Initiation decisions and circumstances were determined by shifting drug market conditions.

"Scott," a 30-year-old white man (Tucson, AZ): "Actually, I live in Tucson now, but I actually ended up going back home—back to Scottsdale where I grew up—where my parents live. I went back for Christmas with my girlfriend at the time. We both did heroin. I got back to Scottsdale. We actually ran out of black—out of heroin—and we were trying to get more. I, actually, couldn't find heroin. The people… that I'd known from growing up, didn't have heroin. They had, actually, these pills. These fentanyl pills. They were actually the only thing I was able to get at that time. I ended up getting them. I wasn't very happy about it. I didn't really know about them. I knew about them, but in my opinion, I didn't really care because I did heroin. I didn't care to try anything else or try something different. Heroin worked for me. I didn't really have a choice in the matter 'cause I was gonna get sick. I actually ended up buying the fentanyl pills."

Initiation: no access to pharmaceutical opioids

- Fentanyl in the form of pressed 30mg oxycodone pills has appeal to individuals with prior and current experiences of pharmaceutical opioid use
- Increased presence of counterfeit pills is filling the void created by the stringent regulatory measures to control prescription of opioids

”Jeff” (40-year-old white man, Phoenix, AZ): “All the pain management places that you go to, now they're so afraid because of the opiate epidemic that they don't want to put you on what you need to be on… after being out of the nursing home for a few months, and they cut my pain pills down again and it just wasn't enough. And I couldn't function, I couldn't walk when you have two shattered legs. And… somebody ended up giving me one of those fentanyl pain pills and you know it helped you know it was way better than what I was getting from my pain management.”

The process of switching: liking or disliking fentanyl effects

- Varying experiences of fentanyl effects: Some emphasized that they enjoyed the potency of fentanyl, which contributed to more rapid transition to daily fentanyl use.
- Others emphasized that fentanyl did not provide the same euphoric feeling they associated with heroin use.

“Antonio” (25-year-old white man, Yuma, AZ): “Fentanyl was just more powerful to me. It calmed me down faster, got me in a high zone a lot faster than heroin did. I didn’t hafta use as much of it. That was like the key thing for fentanyl and for everyone else I know ‘cause we didn’t hafta use that much fentanyl to get high, half a pill, a pill, not even that. With heroin you hafta use a bigger ram sometimes.”

“Beth” (40-year-old white woman, Phoenix, AZ): “"No. I've tried it with those little pills that they had that they smoke now. I've had it a couple of times. I don't like it. I don't like the way it makes me feel. I've done it, but it's not something I would continue to go back and do."

The process of switching: liking or disliking fentanyl effects

- Some participants emphasized that fentanyl use was often seen as more disrupting to daily routines because of the need to use more frequently and because of its overpowering effects.

“Francisco” (51-year-old Hispanic man, Yavapai, AZ): "Well, [with heroin] you only gotta do one shot [laughter] in the morning and you’re good all day. Fentanyl is one of them things. It’s like coke, man. Even though it doesn’t make you feel like coke, when you do smoke a fentanyl pill and you’re good for a little while, and then you gotta smoke another one. You’re good for a little while, and then the times get shorter and shorter…."

“Sofia” (28-year-old white woman, Tucson, AZ): “I feel like how I’ve watched blues affect other people… All everyone is doing is blues. It makes people nod out. It puts people asleep—looks like they’re sleeping all the time… I don’t enjoy spending my entire day with my head sunk between my legs nodded out. That’s what fentanyl does to everybody, at least, that I see. I don’t enjoy that. I believe that heroin is better for me to do if I’m gonna do it because I don’t nod out on heroin.”

Perceived benefits of switching: injection vs. smoking

- Change in route of administration from injection to smoking was linked to less stigma, greater convenience, lower risks of overdose

"Juan Pablo" (31-year-old Hispanic man, Phoenix, AZ) :"Gradually, I started picking a couple of them [fentanyl pills] up along with some heroin… and then after a while, I just started to like the pills better, and or just it's funny 'cause it's like it was like my saving grace from a worse evil I guess you could say. Surprisingly, just one day, I put the needle. I put the needle and the heroin down, and I just started smoking. I guess I could say it's a matter of opinion, but it's—I say it's the lesser of the two evils when it comes to how you're doing it as **I think smoking is obviously a lot better than injecting**."

"Scott" (30-year-old white man, Tucson, AZ): "I know that you can overdose on a shot of heroin real quick and easily. I've seen more people overdose from doing shots of heroin… than I have seen people smoking pills. 'Cause honestly, I never really knew that you could overdose from smoking a pill—a fentanyl pill—or any kind of pill or any kind of heroin."

Perceived risks of switching: greater overdose risks

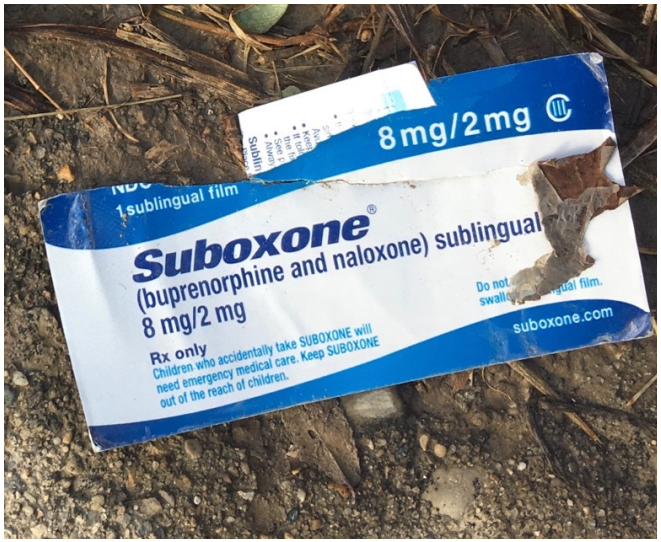
- Viewed as a “super” opioid; high unpredictability and variations in potency.

“Antonio” (25-year-old white man, Yuma, AZ) :“I’d rather have my little brother using heroin than I would—or meth—than him using fentanyl. He uses fentanyl right now, and I’d rather have him doing that than fentanyl because I know fentanyl will kill him. There's not without a doubt about it. Just not a matter of if, it’s just a when ‘cause you don’t know where you’re getting these pills or how much you’re getting.”

“Alex” (43-year-old white man, Mohave, AZ): “I tended to stay more towards heroin. I did smoke my share of those pills. A lotta people die from 'em. That’s why it scared me.”

Perceived risks of switching: "A lot harder to get off of"

- Many participants felt that fentanyl is more difficult to quit than heroin
- Induction of buprenorphine-based treatment is more difficult



"Nora," 37-year-old white woman, Phoenix, AZ: "With heroin and pain pills, you can take Suboxone after 24 hours of being sick… It's a lot easier. With fentanyl to switch to Suboxone, you have to wait 36 to 70—two to three days, especially if you use a lot and you have a lot stored in your body, you have to wait a long time before you can take Suboxone. That's my issue with getting clean. I can't get that far."

"Dakota" 25-year-old woman, American Indian, Phoenix, AZ: "It's very addictive. It's a lot stronger than heroin so it's a lot harder to get off of than heroin. And that's another thing that I've noticed…. I've had a lot of people tell me **that it's almost impossible to get off of**. That's what I heard."

Limitations

- Small, qualitative sample
- Zoom-based interviews worked great, but reduced engagement, technical difficulties
- Need to engage individuals who have no history of heroin use but use non-prescribed pharmaceutical opioids and other prescription drugs (and/or counterfeit alternatives)
- Need to engage older individuals
- Need to conduct toxicology analysis to identify fentanyl, fentanyl analogs and other drugs

Implications

- Expansion of drug checking services and other harm reduction approaches
  - Fentanyl testing strips?
- Information to first responders and people using drugs about emerging new substances (better testing and identification of analogs and other synthetics)
- Established treatment protocols have to be re-calibrated for people exposed to fentanyl and other novel synthetic drugs
- Focus on the unintended consequences of policy and regulatory changes

Next steps

Non-pharmaceutical fentanyl use and opportunities for intervention through the expansion of drug checking services

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Thank you!