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Xylazine and HIV in the Era of Synthetic Street Drugs

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Learning Objectives

- Understand how the sudden expansion of xylazine, fentanyl, and crystal methamphetamine use is related to the history of US drug markets since 1990
- Understand how each of these substances relate to one another in the experience of consumption and in their public health impact, including on HIV and drug overdose risk
- Examine avenues for novel public health interventions to minimize the risk of HIV, drug overdose, and related comorbidities, as well as to regulate drug markets to make them less toxic and less economically exploitative for both people who use drugs and people who sell them

Xylazine: Overview and Pharmacology

- Alpha-2 adrenergic agonist: veterinary analgesic, sedative, and muscle relaxant designed for large animals (horses and cattle)
- As heroin adulterant, first detected in the 2000s in rural Puerto Rican drug markets
- Puerto Rican public health literature first to identify link between xylazine adulteration, extended periods of sedation/sleep, and novel types of skin wounds ([Rodriguez et al. 2008](#); [Reyes et al. 2012](#); [Torruella 2011](#))

Recent History of US Street Opioid Supply

1991-2013: Mexican black tar heroin west of Mississippi River; Colombian powder heroin east of the Mississippi; mixed supply in Midwestern cities like Chicago ([Ciccarone & Bourgois 2003](#))

2013-2019: Mexican powder heroin displaces Colombian heroin from East Coast markets and fentanyl enters opioid supply chains primarily on the East Coast ([Ciccarone 2021](#))

2017: Xylazine becomes increasingly prevalent in Rustbelt region, beginning in Philadelphia ([Friedman, Montero, Bourgois et al. 2022](#)), as fentanyl begins to spread west ([Shover et al. 2020](#))

2020-present: Opioid supply on East Coast increasingly becomes a mix of **fentanyl** and **xylazine** (“tranq”) as heroin disappears; Mexican methamphetamine enters East Coast/Rust Belt street markets formerly dominated by heroin and cocaine. The West Coast opioid market becomes a predominantly pill-oriented market where PWUD crush and smoke fentanyl pills often advertised as Oxycontin or Percocets ([Montero et al. 2022](#))

Fentanyl Beyond “Potency”

- Experience of fentanyl consumption (vs. heroin)
- Duration of effect / withdrawal symptoms / frequency of injection
- Quality of “high” (Montero et al. 2022; Ciccarone, Ondocsin, and Mars 2017)
- Fentanyl shapes later changes as its deficiencies open space for new additives and substances (xylazine, meth)

Why Xylazine? Why Now?: Lived Experience

Tom, male, white, unhoused 35-year-old person who injects opioids and meth in Philadelphia:

“Fentanyl is such a short-lived high, that the high... It’s a good high but it’s so short that the nod is over real quick and you get sicker faster. See, the tranq extends the high, it gives the dope more of a heroin effect, it’s a good rush with the heroin-like ‘legs’ [duration of high].

"But they straight put bags out there that are just all tranq. You shoot it, you feel no rush. Tranq-fent is like you shoot it; you get the rush of the fentanyl; then the tranquilizer comes in; you nod; and you fall asleep. A straight tranq bag is like, you shoot it; you get no rush; you’re sitting there for a second talking; and then you’re waking up 2-3 hours later in a weird position. Like one case, I lit a Newport [menthol cigarette]; I shot a bag with a Newport; I woke up with a hole of Newport burnt into my stomach [showing the scar, laughing]. You could literally drown in a half-inch of water if you did a tranq bag and you fell out.”

Source: [Montero et al. 2022](#)

Why Xylazine? Why Now?

- Limits of fentanyl adulteration
 - Length and quality of “high”
 - Fentanyl cannot serve as diluent or bulk of substance sold as “dope”
- Xylazine compensates for deficiencies introduced by fentanyl

Xylazine in the Overdose Crisis: Current Trends

- In 10 jurisdictions—representing all 4 US Census Regions—xylazine increasingly implicated in overdose mortality, rising from 0.36% of deaths in 2015 to 6.7% in 2020.
- In 2020, highest xylazine prevalence observed in Philadelphia (34.7% of overdose deaths), followed by Maryland (19.2%) and Connecticut (10.2%)
- In Philadelphia in 2020, fentanyl present in 98.4% of xylazine-involved-overdose deaths

Source: Friedman, Montero & Bourgois 2022

Xylazine in the Overdose Crisis: Current Trends in Philadelphia

- Most recent drug testing data in Philadelphia shows relative concentration of xylazine and fentanyl in local “dope” supply
- Average “dope” sample consists of 2-10% fentanyl, 30-40% xylazine, and no heroin ([CSFRE 2022](#))

Source: Friedman, Montero & Bourgois 2022

Xylazine in the Overdose Crisis: Current Trends by Region

(U) Figure 2. Number of Xylazine-Positive Overdose Deaths by Region

| <i>Region</i> | <i>2020</i> | <i>2021</i> | <i>Percent Increase</i> |
|------------------|-------------|-------------|-------------------------|
| <i>Northeast</i> | 631 | 1,281 | 103% |
| <i>South</i> | 116 | 1,423 | 1,127% |
| <i>Midwest</i> | 57 | 351 | 516% |
| <i>West</i> | 4 | 34 | 750% |

Source: DEA

Source: DEA 2023

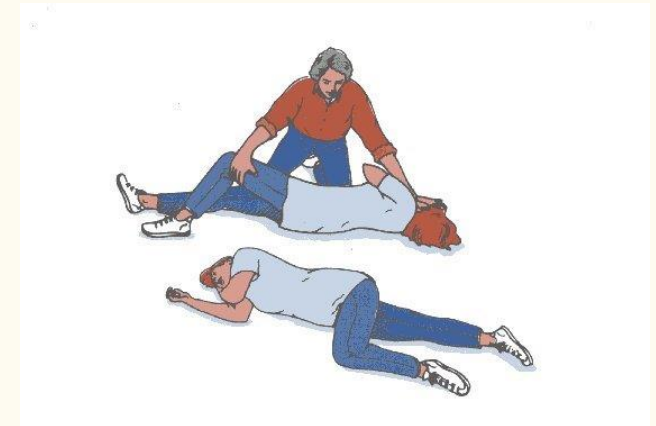
Xylazine and Transformations to Harm Reduction Landscape

-Xylazine has introduced new problems:

- Not opioid (need for new overdose reversal agents to complement, *not replace*, naloxone)
- Ulcers/extensive skin wounds
- Risk of sexual assault and muggings (HIV risk)
- Withdrawal and detox

Xylazine-Involved Suspected Overdoses

- Recovery position, airway maneuvers to clear airway
- Pulse oximetry, airway monitoring, supplemental oxygen as needed
- No known antidote
- Naloxone administration recommended if uncertain cause of OD
- Try to move patient semi-regularly if in deep xylazine nod – prevent rhabdomyolysis



Xylazine-Related Skin Wounds

- The biological mechanisms behind xylazine-related skin wounds have not been fully elucidated in the clinical and public health literature (as of fall 2023)
- However, clinicians and the Puerto Rican public health literature have offered the following likely explanations:
 - Lack of oxygenation to skin (xylazine is a vasoconstrictor)
 - PWUD often inject into wounds due to difficulty finding veins
 - PWID also inject into wounds to provide pain relief, as xylazine is an anesthetic
 - “Bed sores” / concrete bruises from xylazine-induced sleep
 - Skin picking leads to excoriation

WARNING

The next slide contains graphic depictions of
xylazine-related skin wounds

Images of Xylazine-Related Skin Wounds



Photos by Kimberly Sue, MD/PhD, Yale University

Methamphetamine

- Methamphetamine entered non-MSM street drug markets in the Northeast/Rust Belt roughly at same time as xylazine (and has analogous impact on opioid high)
 - “Fentanyl is so short-lived that we gotta get high every 6 hours. But sometimes, let’s say things were tough or whatever, if we were 10 hours in and you started getting sick, a nice shot of meth will hold you over for another 6 hours, as far as not being sick altogether. You just wouldn’t be as sick, I mean eventually it would turn against you but it would keep you feeling better to get up and make a move to make money.”
 - “Meth does its part too, because if you really don’t have the money, meth can keep you well for a little bit longer, it kind of will help you like, give you some time to gather up money to find some dope, you know what I mean? And you can stay up later, scheming to get money, or if you do your thing at night, boosting or whatever. I scrap, so a lot of my work is nighttime stuff.”
- Methamphetamine as inverse of fentanyl in terms of duration and bodily experience

The Increasingly Synthetic Polydrug Context

- Impact on HIV and HCV risk: an era of countervailing forces
 - Xylazine vs. methamphetamine
 - Psychostimulant overdose deaths in the US rose by 625% between 2012 and 2019 ([Hedegaard, Minino & Warner 2020:4](#))
 - Plenty of room for expansion east of the Mississippi River: CDC reports that age-adjusted death rates for drug overdoses involving psychostimulants ranged from 1.2 [per 100,000] in the Northeast to 5.3 in the West ([CDC 2019:37](#))

Looking Ahead

- Overdose prevention centers will prevent both overdoses and sexual assault
- Support for community-based gas chromatography-mass spectrometry testing in addition to FTS and XTS
- Safe Supply

Towards Supply-Side Harm Reduction

- Importance of not vilifying people who sell drugs (street sellers)
- It is crucial to understand socioeconomic organization of narcotics markets at all levels of supply chain (vs. simply drug use)
- Enhances understanding of how supply changes happen and how public health can intervene more efficiently and non-punitively to prevent HIV infection and drug overdoses

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