

On the Rise: Soft Tissue Infections Associated with People Who Inject Drugs

Combined Sections Meeting of the
APTA
Boston, Massachusetts
February 15, 2024

Thomas J. Shaughnessy, PT, DPT, CWS
Karen A. Wientjes, PT, DPT, MPH, CWS

Disclosures

- The speakers have no financial arrangements to disclose.

Objectives

- Describe the public health crisis related to injection-drug use.
- Identify common drugs associated with injection.
- Describe common bacterial infections and predictors of infection in this population.
- Discuss the clinical presentation, assessment, and management of injection-related wounds.
- Recommend physical therapy wound care interventions and education to support harm reduction.



An epidemic of injection drug use

Opinion

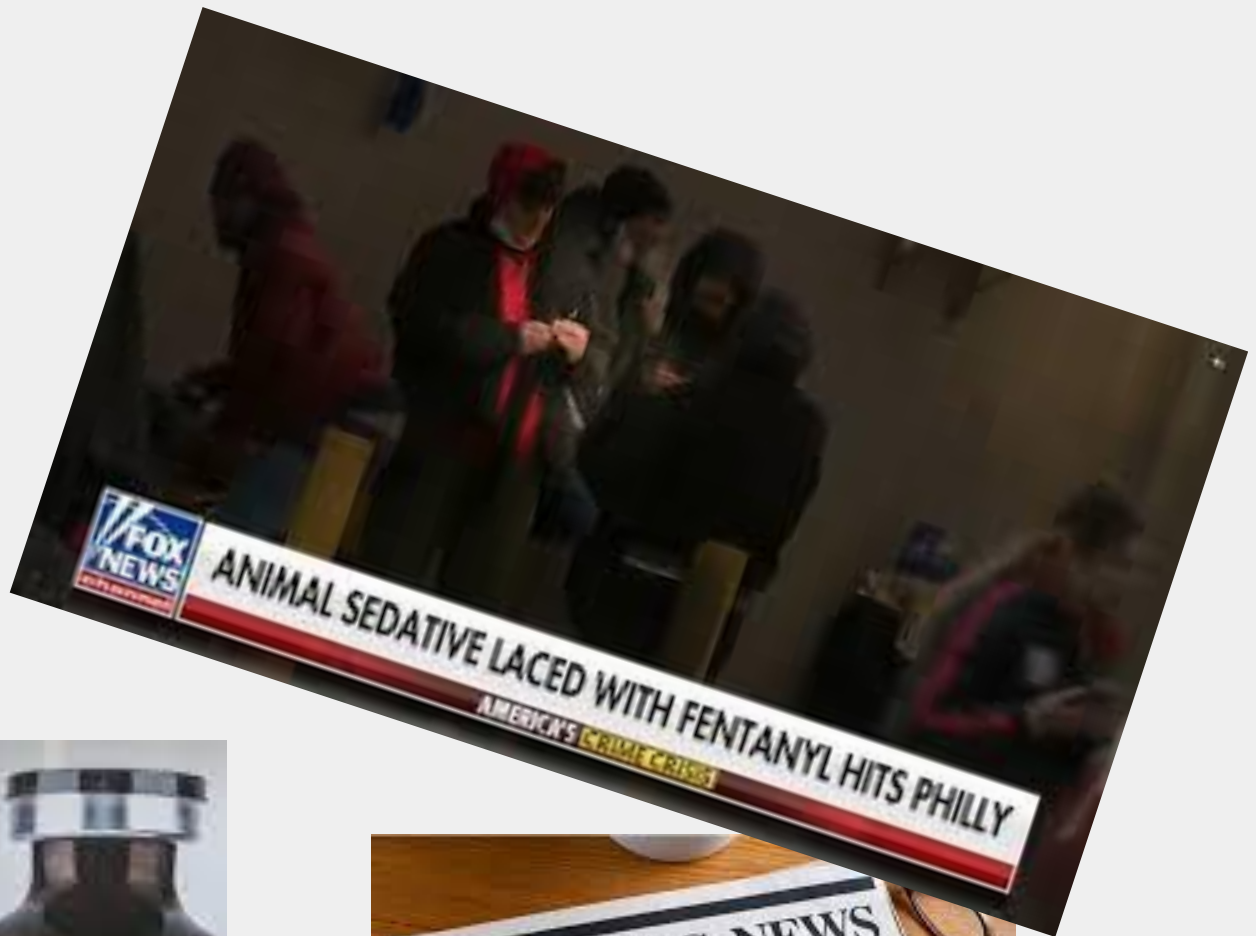
Ohio's entire supply of illegal drugs contaminated



Paul Hogg
@PaulHogg

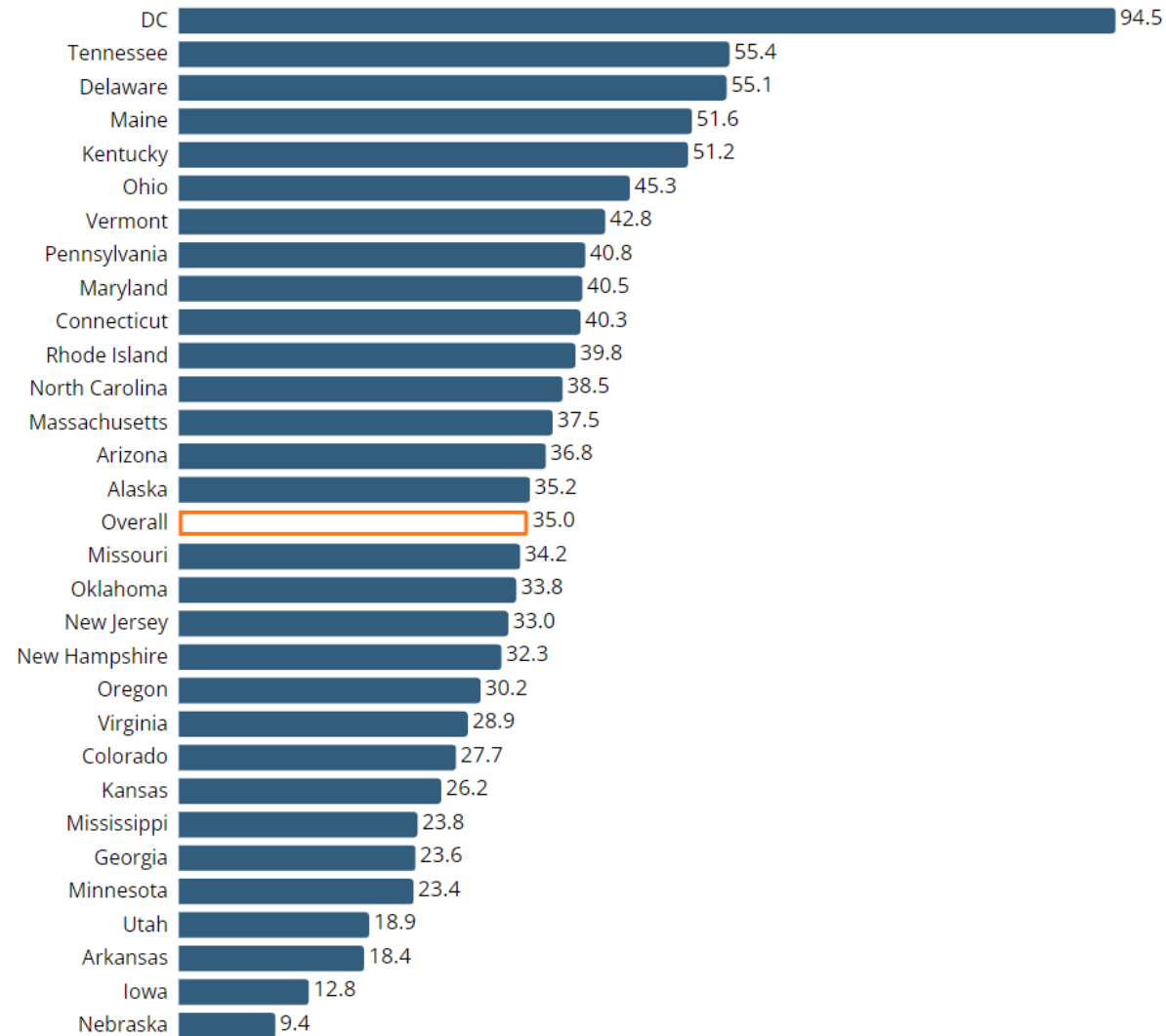


It's time to stop talking about others' "bad choices." We need to look at the real problem: a vast, unregulated supply of illegal drugs. Ohio's entire supply of illegal drugs is contaminated. This is a massive public health crisis that needs to be addressed. The state's entire supply of illegal drugs is contaminated. This is a massive public health crisis that needs to be addressed. The state's entire supply of illegal drugs is contaminated. This is a massive public health crisis that needs to be addressed.



Google images

Unintentional Drug Overdose Reporting (SUDOR)



<https://www.cdc.gov/drugoverdose/fatal/dashboard/index.html>

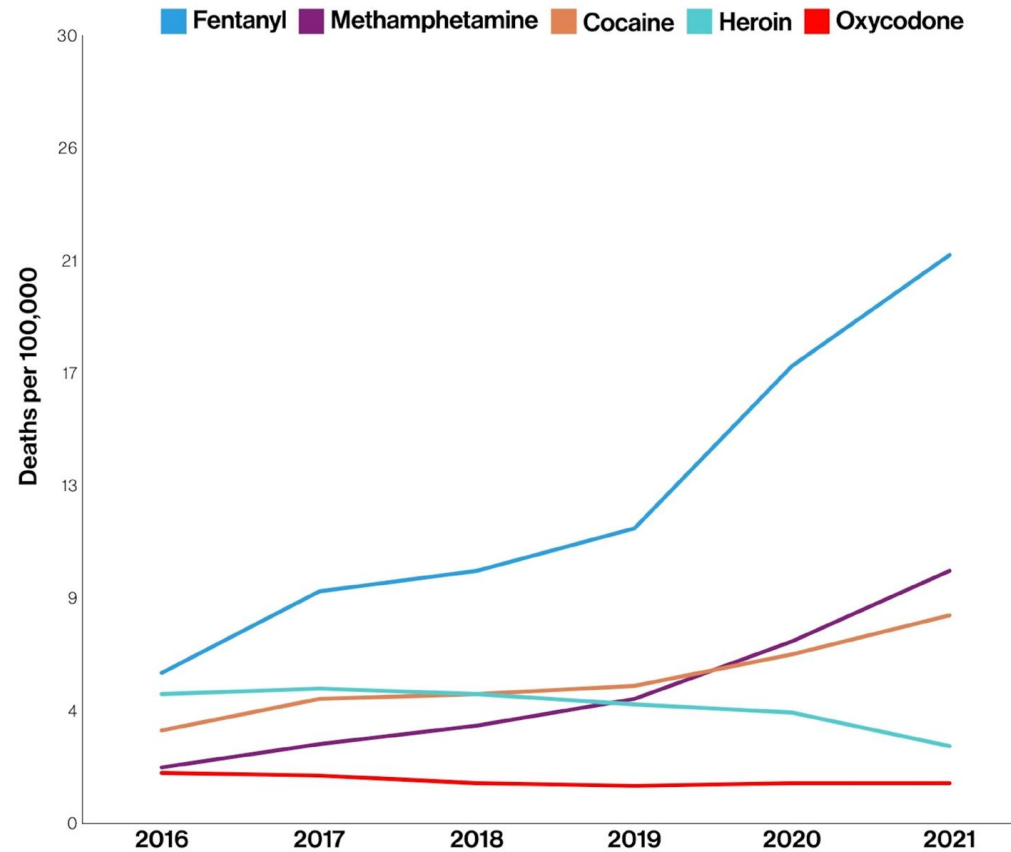
2022 data

All drugs: Age-adjusted rate of death per 100,000 persons

Rate of US Drug Overdose Deaths by Drug

Rate of Drug Overdose Deaths in the United States

2016-2021



SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, NATIONAL VITAL STATISTICS SYSTEM

abc NEWS

Growing Infection Concerns

- Bacterial skin and soft tissue infections (SSTIs)
- US incidence of 155,000-540,000 cases annually
- Increased infection risk associated with:
 - High frequency of use
 - Sharing of equipment
 - Specific formulation of opioids

Hrycko et al., 2022

Heightened Risk for Infections

- SSTIs
 - Co-injection of stimulants with opioids
 - Higher rates of SSTIs reported among people who inject primarily heroin compared with people who inject cocaine or methamphetamine
- Endocarditis- especially when injected into larger vessels
- Viral hepatitis and HIV, as well as SSTI, linked to injection of:
 - stimulants
 - stimulants and heroin or fentanyl simultaneously

Types of Injected Drugs

- Fentanyl
- Heroin
- Cocaine
- Xylazine



Pharmaceutical Fentanyl

- Synthetic opioid approved for treating severe pain
- 50-100 times more potent than morphine
- Prescribed as transdermal patches, lozenges, or injection



CDC, 2023

Fentanyl

- Fentanyl-related harm, overdose and death in the US are linked to illegally-made fentanyl
- Often mixed with heroin and/or cocaine to increase its euphoric effects
- This may occur with or without the user's knowledge
- Rate of overdose deaths due to synthetic opioids in 2021 was 22 times the number of deaths in 2013
- Overdose deaths increased over 22% from 2020 to 2021

Illegal Fentanyl

- Sold as a powder
- Dropped onto blotter paper, put in eye droppers and nasal sprays, or made into pills
- Produces a quick high
- It may be mixed and injected with other drugs, such as heroin, cocaine, methamphetamine and methylenedioxymethamphetamine (MDMA)
- Fentanyl-substituted heroin- majority of “heroin” is testing positive for fentanyl



National Institute on Drug Abuse (NIDA), 2021

Heroin

Big H, Black tar, Chiva, Hell dust, Horse, Negra, Smack, Thunder

- Opioid made from morphine
- Can be a white or brown powder, or a black sticky substance
- People can inject, sniff, snort, or smoke heroin



Black Tar Heroin

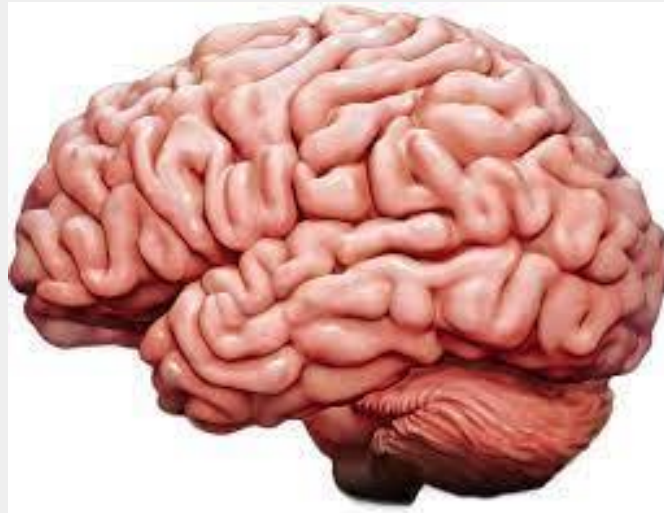


Brown or White Heroin

NIDA, 2021

Heroin

- Binds to opioid receptors in brain
- Prescription opioids, OxyContin and Vicodin, have effects similar to heroin
- 4-6% who misuse prescription opioids switch to heroin
- 80% of people who used heroin had first misused *prescription opioids*



Cicero et al., 2017

“I would prefer good heroin, but it’s hard to find. Because fentanyl bro, it don’t hold you. You’ll be sick in like 2 or 3 hours, your withdrawals come on faster with fentanyl, with heroin you hold it longer.

I compare it to cocaine and crack, right? Cocaine would last a long time and wouldn’t be as intense of a high. Then crack came along, and it’s like a minute long high and then you fiend for it.

That’s how heroin was like cocaine, and fentanyl is like the crack.”

-Eli, age 30

Cocaine

- Powerfully addictive stimulant drug, that has the potential to alter brain structure and function
- Cocaine hydrochloride was isolated from the plant more than 100 years ago
 - Used as a tonic or elixir
 - A local anesthetic to



NIDA, 2021

Cocaine

- Schedule II drug- has a high potential for abuse, but can be administered by a doctor for legitimate medical uses
 - Local anesthesia for some eye, ear, and throat surgeries
- Dealers often dilute, or “cut” it with non-psychoactive substances such as cornstarch, talcum powder, flour or baking soda
- Adulterate cocaine with other drugs like procaine (a chemically-related anesthetic) or amphetamine (another psychoactive stimulant)



Cocaine Abuse

- Two chemical forms
 - Water-soluble hydrochloride salt
 - Users inject or snort the hydrochloride salt, which is a powder
 - Water insoluble cocaine base (freebase)
 - Created by processing the drug with ammonia (freebase cocaine) or sodium bicarbonate (crack cocaine) and water, then heating it to remove the hydrochloride, making it a smokable substance



Crack

Freebase



“Almost everybody I know won’t even do one [fentanyl] without the other [cocaine] and vice versa.

I think it’s because fentanyl is so strong it will just make you nod out, and then you don’t enjoy it when you’re asleep for your high. So then people want to be up and active; then you addicted to the euphoria of the cocaine, so before you know it, you have two addictions.”

- John, age 30

Xylazine



- Approved as a non-opioid, veterinary sedative, with analgesic and muscle relaxant properties
- First synthesized in 1962 by Bayer Pharmaceuticals; was investigated for potential human use in clinical trials as an analgesic, sleeping aid and anesthetic
 - Not approved for human use
- In April 2023, The White House Office of National Drug Control Policy (ONCDP) designated fentanyl adulterated or associated with xylazine an emerging threat.

Xylazine (Tranq)

- Also called tranq dope or zombie drug
- Has an onset of action within 10-15 minutes after intramuscular injection
 - Causes a sleep-like state, which is dose-dependent, usually maintained for 15-30 minutes



Xylazine

- CNS depressant that causes drowsiness, amnesia, slow breathing, bradycardia, and hypotension to dangerously low levels
 - Other toxic effects: blurred vision, disorientation, staggering, coma, miosis, and hyperglycemia
 - Severe skin lesions have been observed in individuals taking fentanyl contaminated with xylazine
 - Withdrawal:
 - agitation
 - severe anxiety

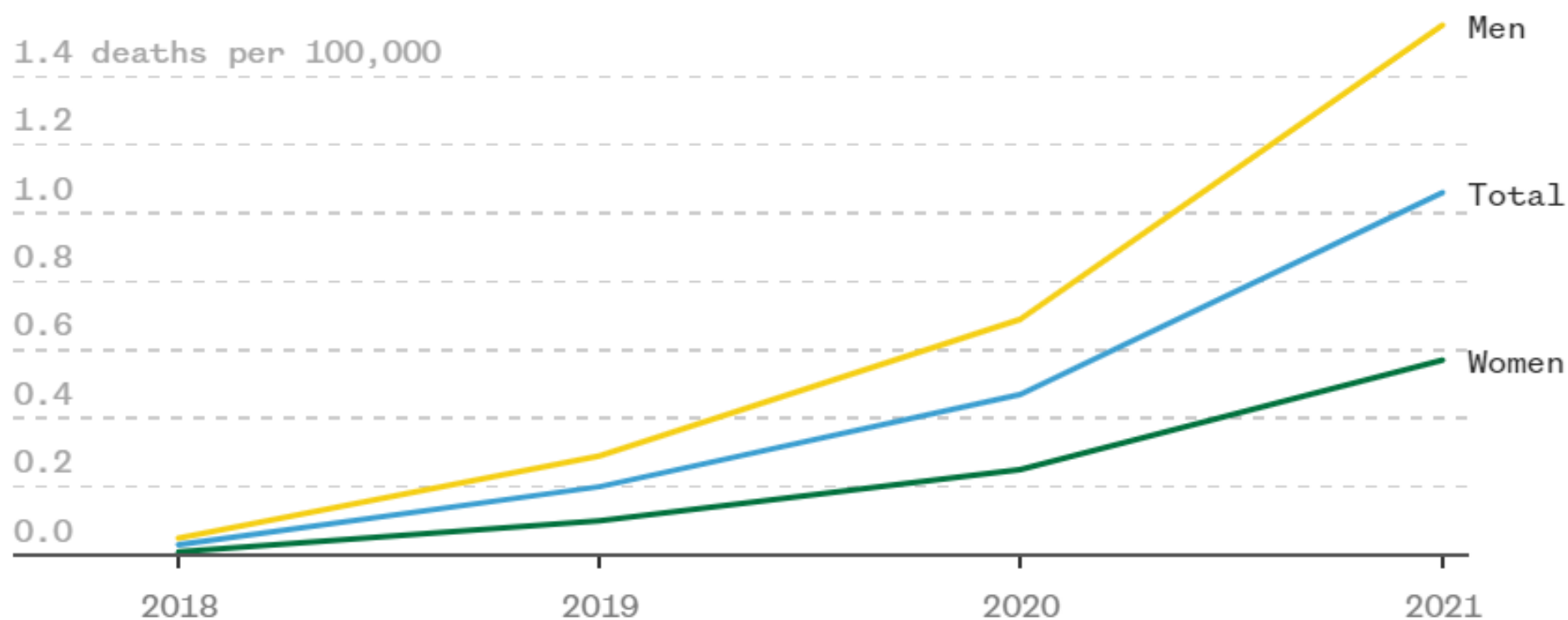


DEA, 2023

Photo by RandLab

Overdose deaths that involved xylazine

Since 2018, the rate of overdose deaths that involved xylazine increased significantly, especially among men. In 2021, xylazine, sometimes referred to as “tranq,” was a factor in 3,468 deaths; 73% of them men.



Source: National Center for Health Statistics

Graphic: Randi Selvey / NBC

Xylazine

- Taking opioids in combination with xylazine and other CNS depressants like alcohol or benzodiazepines increases the risk of life-threatening overdose
- Fatalities linked to xylazine involved fentanyl, heroin, benzos, alcohol, gabapentin, methadone, prescription opioids and cocaine
 - *However*, since xylazine is not an opioid, naloxone (opioid antagonist) does not address the impact on breathing

Key predictors for infection

Predictors of Infection

- Injection frequency, site, hygiene
- Polysubstance use
- How long injecting
- Sex work, and HIV



- “Missing shots” -18% more SSTIs
- Environmental constraints on the use of sterile water for drug preparation

Figgatt et al., 2021

Mediators of Infection

- Having a trusted doctor for drug-related concerns was protective for recent SSTIs
 - 27% less SSTI with access to a doctor they trusted compared to those without
 - Reduced SSTI when given education regarding preventative behaviors and skin hygiene

Figgatt et al., 2021;
Phillips et al., 2021

Common infections associated with injection

Skin and soft tissue infections (SSTI)

SSTI

- Bacterial and fungal infections
- Range from typically not severe to life-threatening infections
 - Infectious endocarditis
 - Bone and spine infections
- SSTIs commonly include abscesses and cellulitis
- Over 50% of PWID have experienced SSTIs at some point in their lifetime

Phillips et al., 2021

SSTIs

- Often self-resolving and localized bacterial infections
- More virulent SSTIs can result in serious systemic infections, requiring hospitalizations or surgery
- Both SSTIs and IE are commonly caused by *staphylococcus aureus*



Photo by American College of Emergency Physicians

Multiple Sources of Contamination

- Bacteria from skin's surface
- Contaminated drugs or injection equipment
- Foreign bodies and substances delaying local immune response
 - Impairing blood and lymphatic drainage
- Cutting or diluting agents
 - Lidocaine, quinine, talc, mannitol, acids, lemons, limes
- Contaminants from manufacturing or storage

Mixing of Injected Drugs

- Cocaine causes increased vasoconstriction
- Methamphetamines may directly impair the immune response to infection
- Long term use of heroin associated with collapsed veins, infection of the heart lining and valves

Saldana et al., 2020;

Mihu et al., 2015

Injection Methods

- Speedballing
- Vein fishing
- Skin popping
- Booting, jacking, and flushing



Clinical Presentation of SSTIs

Vein Fishing



Photo by K. Wientjes



Photo by K. Wientjes

Often Require Debridement



Photos by K. Wientjes

Skin Popping



Photo by K. Wientjes



Photo by K. Wientjes



Photo by K. Wientjes

Not all wounds are injection-site related



Photo by K. Wientjes

Measurement



Photo by K. Wientjes



Photos by K. Wientjes

Abscess



Photo by K. Wientjes

Xylazine-related Wounds

- Present differently than abscess and cellulitis
- May develop at injection site or other areas away from injection
- Increased risk for pressure injury, rhabdomyolysis, and compartment syndrome

NIDA, 2023



Photo by K. Wientjes



Photo by K. Wientjes



Photo by K. Wientjes

Interventions for SSTI

Clinical Setting

Challenges:

- Triage
- Wound treatment
- Withdrawal
- Elopement

PT Role:

- Assessment
- Debridement
- Cleansing and moist wound dressings
- Compression
- Recommendations

Street-level

- Observations from street medicine
- Type of care rendered
- Challenges
- Distribution of supplies



Syringe Service Programs (SSPs)

- Community based prevention programs that provide a range of services, including linkage to substance use disorder treatment, access to and disposal of sterile syringes and injection equipment and vaccination, testing and linkage to care and treatment for infectious diseases



National Center for HIV, Viral
Hepatitis, STD and TB Prevention,
2023

Syringe Service Programs (SSPs)

- Comprehensive SSPs are safe, effective and cost-saving
 - They do not increase illegal drug use or crime
 - Play an important role in reducing the transmission of viral hepatitis, HIV and other infections
- Reducing drug equipment-sharing has been successful in reducing infection incidence

CDC, 2023

Hrycko et al., 2022

What Can Be Done?

- Expand distribution and use of naloxone
- Provide overdose prevention education
- Expand awareness about and access to availability of treatment for substance use disorders
- Intervene early with individuals at highest risk of overdose
- Improve detection of overdose outbreaks to facilitate a more effective response



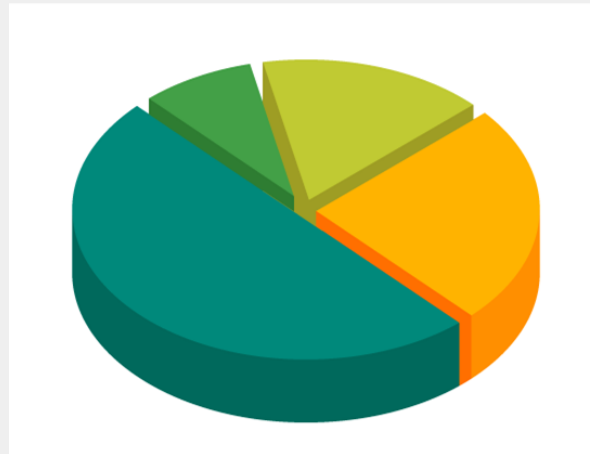
Figgatt et al., 2021

Figgatt et al., 2021

- 105 participants
- 51% were male, 87% white, median age 39 years old
- 34% had health insurance coverage, 29% had a doctor they trusted with health concerns relating to drug use
- 93% had injected some type of drug in the last 12 months
 - Most common drugs injected were heroin (80%), fentanyl (72%), methamphetamine (59%) and cocaine (59%)

Figgatt et al., 2021

- Overall, 64% of the participants had a lifetime history of SSTIs and 46% had a history of SSTI in the previous 12 months
 - Among those who had a lifetime history of SSTIs, 38% had an SSTI in the previous 12 months and 45% had two to four in the previous 12 months



Figgatt et al., 2021

- 71% reported an SSTI that did not resolve on its own
 - 63% reported taking antibiotic pills that were not prescribed to them
 - 98% reported *delaying* treatment
 - 72% reported not receiving care at all



Barriers to Care

- Reasons for delaying or not receiving care
 - Judgment or medical mistreatment from medical staff (54%)
 - Previous bad experiences with seeking treatment (28%)
 - Self-treatment (52%)
 - Time commitments (37%)
 - Legal concerns (30%)

Figgatt et al., 2021;
Monteiro et al., 2020

Strategies to Improve SSTI Treatment Experiences and Reduce Harm

- Trust
- Respectful and judgment-free patient/provider relationships
- SSPs may serve as an ideal setting for SSTI treatment services
- Education about SSTI prevention should be offered at SSPs
- Additional resource allocation such as funding wound care programs and SSP-based clinical services

Figgatt et al., 2021;

Monteiro et al., 2020

Wound Care Considerations for PWID

- Dressings that maintain moisture balance
- Protective
- Affordable
- Ease of application
- Education
 - Cleansing
 - Signs and symptoms of infection
 - Infection control

The Role of PT in Caring for People Who Inject Drugs

- Stay informed
- Consider differential diagnosis
- Reduce risk of infection
- Provide triage wound care
- Support efforts to reduce harm



Google images

In Summary

- Injection drug use and soft tissue skin infections are increasing at an alarming rate
- Knowingly or unknowingly injecting with polysubstances has contributed significantly to wound contamination and infection
- PTs may see an increase in SSTIs and sequelae associated with PWID
- Increased healthcare provider awareness may reduce barriers to harm management

Thank you!

Questions?

References

- Center for Disease Control and Prevention. Opioids: Fentanyl. Published August 8, 2023. Accessed January 4, 2024.
<https://www.cdc.gov/opioids/basics/fentanyl.html>
- Cicero TJ, Ellis MS, Kasper ZA. Increased use of heroin as an initiating opioid of abuse. *Addict Behav.* 2017 Nov;74:63-66. doi: 10.1016/j.addbeh.2017.05.030. Epub 2017 May 23. PubMed PMID: 28582659
- Drug Enforcement Administration. Diversion Control Division. Drug and Chemical Evaluation Section: Xylazine. Published May 2023. Accessed January 4, 2024
https://www.armyresilience.army.mil/ard/images/pdf/Xylazine_DEA.pdf

References

- Feldman, B. YouTube. Caring for the homeless with radical humility. 4 May 2020.
[.https://www.youtube.com/watch?v=Wajr21K87U0](https://www.youtube.com/watch?v=Wajr21K87U0)
- Figgatt, M. C., Salazar, Z. R., Vincent, L., Carden-Glenn, D., Link, K., Kestner, L., Yates, T., Schranz, A. Joniak-Grant, E., & Dasgupta, N. (2021). Treatment experiences for skin and soft tissue infections among participants of syringe service programs in North Carolina. *Harm Reduction Journal*, 18(1), 1-9.
<https://doi.org/10.1186/s12954-021-00528-x>
- Harris, M., Scott, J., Wright, T. *et al.* Injecting-related health harms and overuse of acidifiers among people who inject heroin and crack cocaine in London: a mixed-methods study. *Harm Reduct J* 16, 60 (2019).
<https://doi.org/10.1186/s12954-019-0330-6>

References

- Hrycko, A., Mateu-Gelabert, P., Ciervo, C., Linn-Walton, R., & Eckhardt, B. (2022). Severe bacterial infections in people who inject drugs: the role of injection-related tissue damage. *Harm Reduction Journal*, 19(1), 1-13.
<https://doi.org/10.1186/s12954-022-00624-6>
- Mihi MR, et al. Methamphetamine alters the antimicrobial efficacy of phagocytic cells during methicillin resistant staphylococcus aureus skin infection. *mBio* 2015; 6(6). E01622-15
- National Institutes on Drug Abuse. Drug Topics: Fentanyl. Published June 2021. Accessed January 4, 2024.
<https://nida.nih.gov/publications/drugfacts/fentanyl>

References

- Monteiro, J., Phillips, K. T., Herman, D. S., Stewart, C., Keosaian, J., Anderson, B. J., & Stein, M. D. (2020). Self-treatment of skin infections by people who inject drugs. *Drug and alcohol dependence*, 206, 107695.
<https://doi.org/10.1016/j.drugalcdep.2019.107695>
- Phillips, K. T., Stewart, C., Anderson, B. J., Liebschutz, J. M., Herman, D. S., & Stein, M. D. (2021). A randomized controlled trial of a brief behavioral intervention to reduce skin and soft tissue infections among people who inject drugs. *Drug and alcohol dependence*, 221, 108646. <https://doi.org/10.1016/j.drugalcdep.2021.108646>
- Saldana, C. S., Vyas, D. A., & Wurcel, A. G. (2020). Soft tissue, bone, and joint infections in people who inject drugs. *Infectious Disease Clinics*, 34(3), 495-509.
<https://doi.org/10.1016%2Fj.idc.2020.06.007>

Nitrazines

Synthetic opioids from China, starting to see in US in 2022

not FDA approved

10x stronger than Fentanyl

Associated with a high rate of cardiac arrest; may require multiple doses of naloxone

PWID do not usually know it has been added