

The Webinar will begin promptly at 12 pm

Due to the number of participants, you will be automatically placed on mute as you join to ensure good quality sound. If you would like to comment or ask a question, please use the “chat feature”

Send your questions to the host via the chat window in the Zoom meeting.

Q+A will open at the end of the presentation.

Follow-up questions?

Contact



Samantha Di Paola

sdipaola@healthmanagement.com



FENTANYL: IS IT DIFFERENT FROM OTHER OPIOIDS?

PRESENTED BY:
Shannon Robinson, MD
Sari Frankel, MPH
Alexandra Evans, MFS

Tuesday,
June 14, 2022
12:00pm – 1:00pm EST

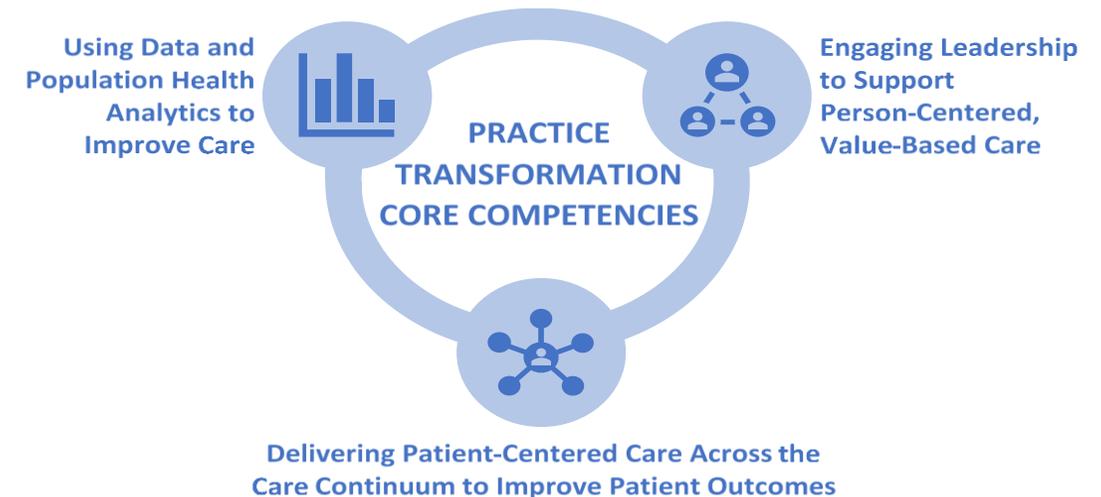
Integrated Care DC is managed by the DC Department of Health Care Finance (DHCF) in partnership with the DC Department of Behavioral Health (DBH). This project is supported by the Centers for Medicare and Medicaid Services (CMS) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling \$4,616,075.00 with 100 percent funded by CMS/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, or an endorsement by, CMS/HHS, or the U.S. Government.

WHAT IS INTEGRATED CARE DC?



- » Integrated Care DC is a five-year program aimed to enhance Medicaid providers' capacity and core competencies to deliver whole person care for physical, behavioral health, SUD and social needs of beneficiaries.
- » Integrated Care DC is managed by the DC Department of Health Care Finance (DHCF) in partnership with the DC Department of Behavioral Health (DBH). Health Management Associates will provide the training and technical assistance.

The goal is to improve care and Medicaid beneficiary outcomes within three practice transformation core competencies:



- » The program offers several components of coaching and training. Material is presented in various formats. The content is created and delivered by HMA subject matter experts with provider spotlights.
- » All material is available on the project website: [Integratedcaredc.com](https://integratedcaredc.com)
- » Educational credit is offered at no cost to attendees for select elements.



>> Are you receiving our Integrated Care DC Newsletters?

Check your inbox at the beginning of the month for the Monthly Newsletter and around the 15th for the Mid-Month Update.



>> Got ideas?

Take this short survey to share suggestions and requests for trainings.

<https://www.integratedcaredc.com/survey/>



PRESENTERS



Shannon Robinson, MD
TA Coach/SME

srobinson@healthmanagement.com



Sari Frankel, MPH
DC Dept of Behavioral Health

sari.frankel@dc.gov



Alexandra Evans, MFS
DC Dept of Forensic Sciences

alexandra.evans@dc.gov

| | | | | | | |
|-------------------------------|--------------------------------------------------|-------------------------------------------|---------------------------------------------|-----------------------------|--------------------------|-----------------------------|
| Faculty | Elizabeth Wolff, MD, MPA CME Reviewer | Shelly Virva, LCSW CE Reviewer | Mauriel Kramer, LCSW CE Reviewer | Shannon Robinson, MD | Sari Frankel, MPH | Alexandra Evans, MFS |
| Company | No Financial Disclosures | No Financial Disclosures | No Financial Disclosures | No Financial Disclosures | No Financial Disclosures | No Financial Disclosures |
| Nature of relationship | N/A | N/A | N/A | N/A | N/A | N/A |

HMA discloses all relevant financial relationships with companies whose primary business is producing, marketing, selling, re-selling, or distributing health care products used by or on patients.

- ❖ Health Management Associates, #1780, is approved to offer social work continuing education by the Association of Social Work Boards (ASWB) Approved Continuing Education (ACE) program. Organizations, not individual courses, are approved as ACE providers. State and provincial regulatory boards have the final authority to determine whether an individual course may be accepted for continuing education credit. Health Management Associates maintains responsibility for this course. ACE provider approval period: 09/22/2021 – 09/22/2022. Social workers completing this course receive 1 continuing education credits. To earn CE credit, social workers must log in at the scheduled time, attend the entire course and complete an online course evaluation.
- ❖ Application for CME credit has been filed with the American Academy of Family Physicians. This session is approved by AAFP for up to 1 AMA Level 1 CME credit.
- ❖ **If you would like to receive CE/CME credit, the online evaluation will need to be completed.** You will receive a link to the evaluation shortly after this webinar.
- ❖ Certificates of completion will be emailed within 10-12 business days of course completion.

Fentanyl: is it different from other opioids?

- » Welcome and Program Announcements
- » Background on fentanyl
- » Pharmacological properties of fentanyl
- » Inadvertent exposure
- » Adulterant testing
- » Treatment of fentanyl overdose and fentanyl use disorder
- » Closing Remarks/Q&A

OBJECTIVES

1. Outline pharmacological properties of fentanyl contributing to fentanyl's lethality
2. Describe prevention of and intervention for inadvertent fentanyl exposure
3. Compare and contrast treatment of overdoses for fentanyl versus heroin
4. Describe the difference in initiating buprenorphine for fentanyl compared to other opioids



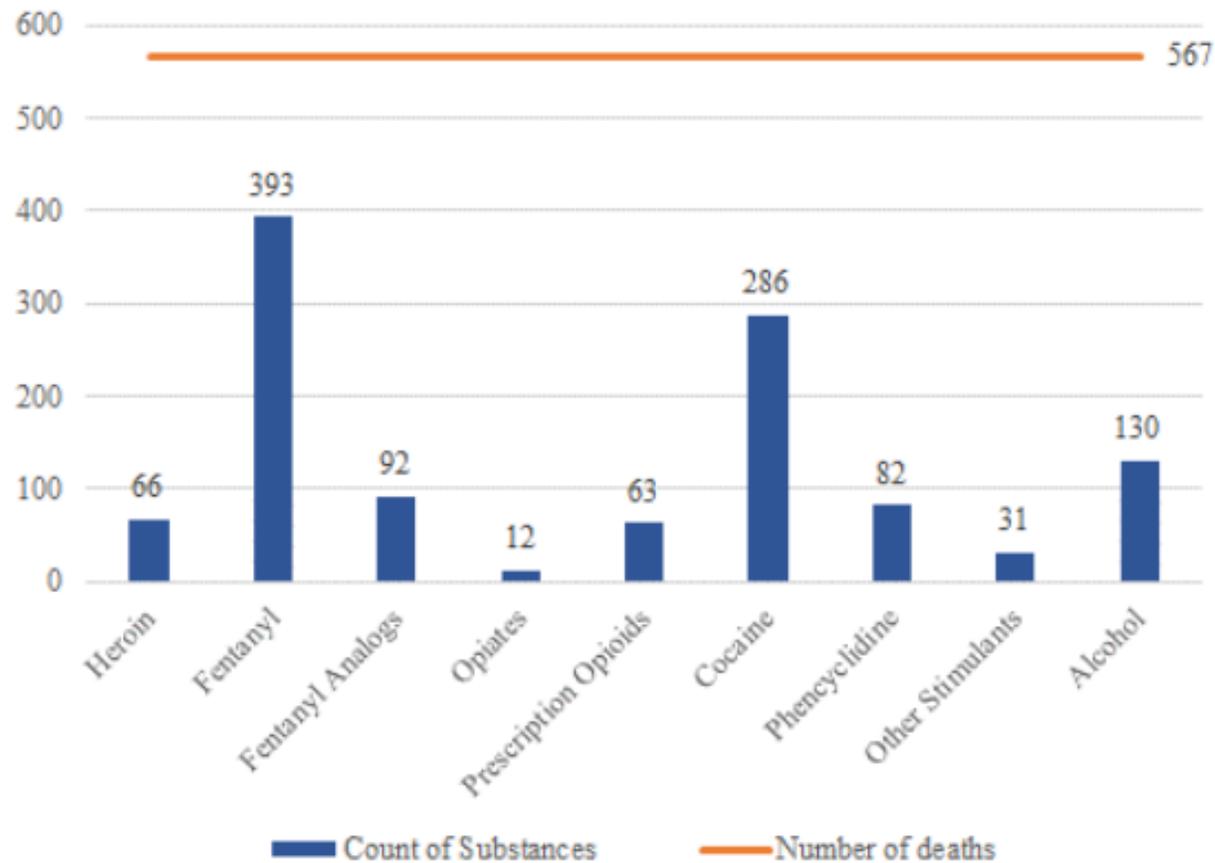
Image permitted by DC Department of Health Care Finance

BACKGROUND AND PHARMACOLOGY

FENTANYL LEADS OVERDOSE DEATHS IN DC

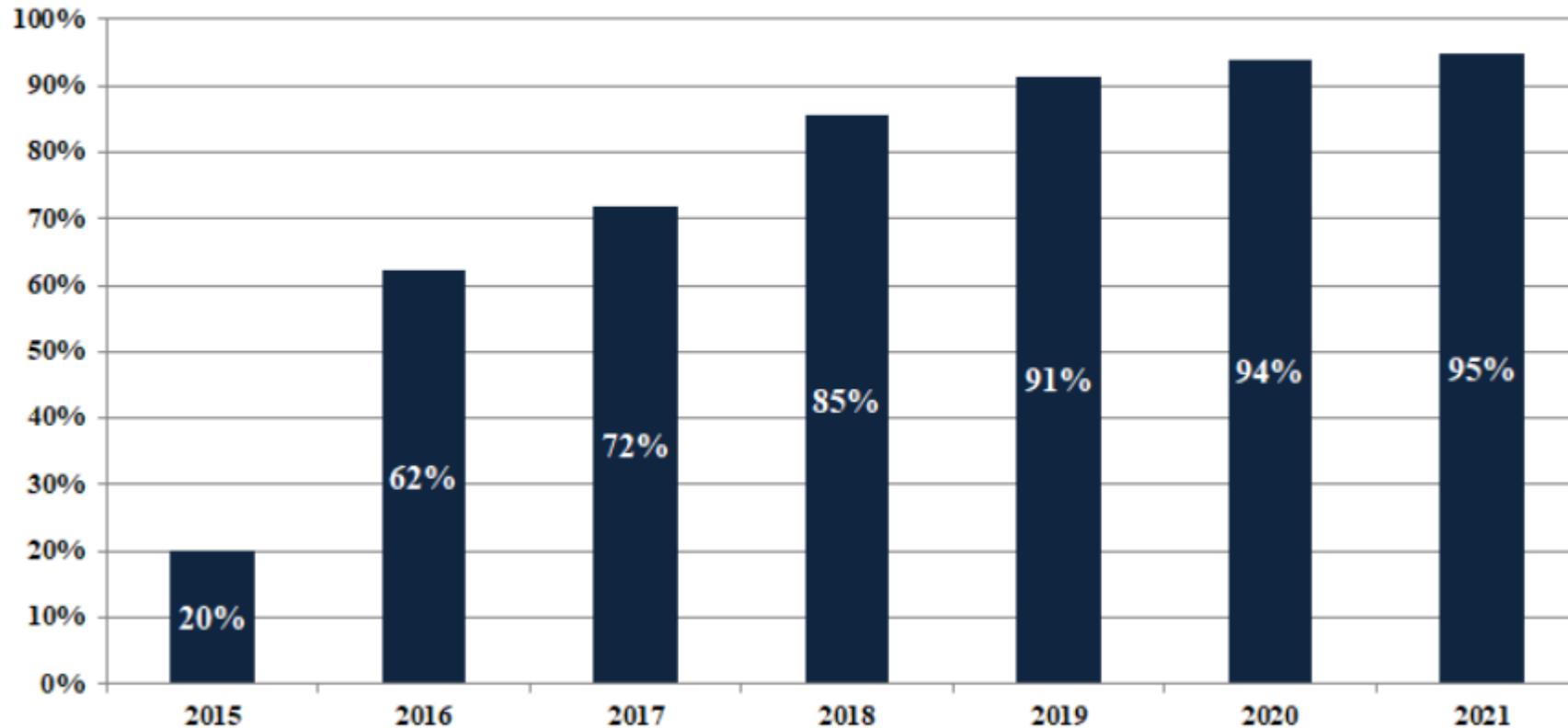


Fig 2: Breakdown of Substances Leading to Death



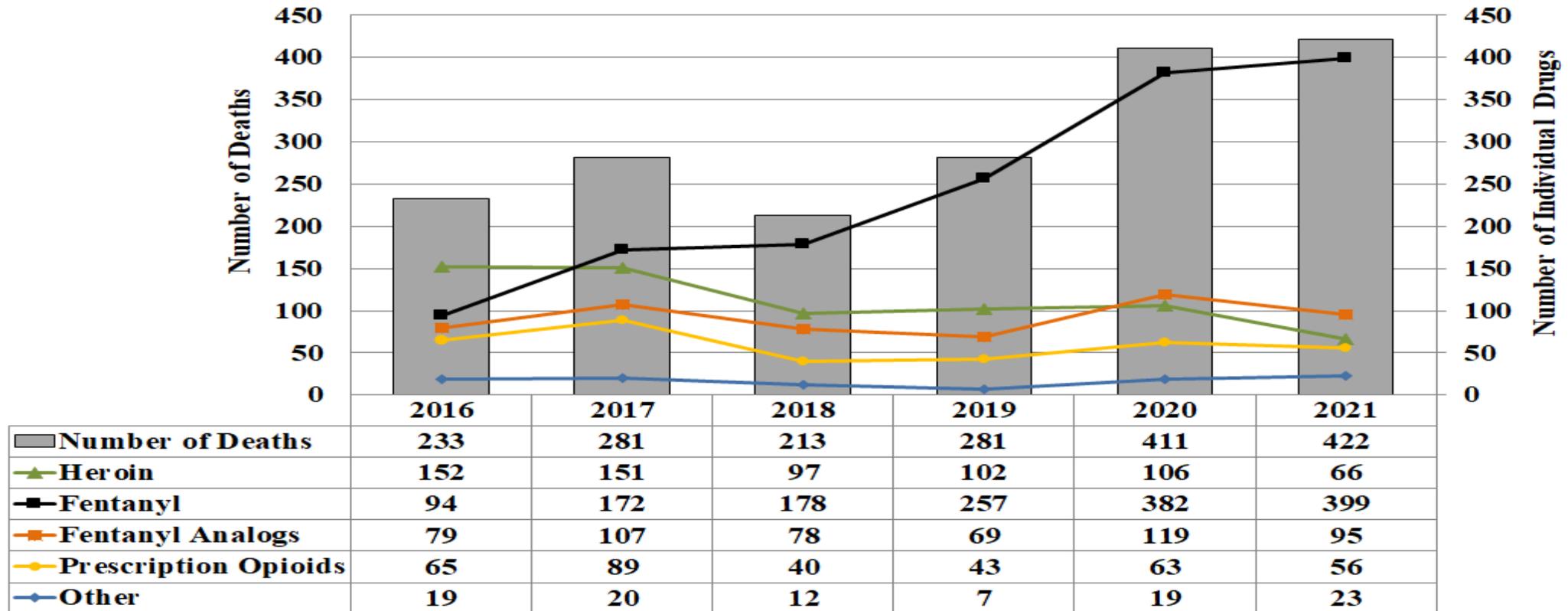
Source: DC Office of Chief Medical Examiner, Drug related fatal overdoses Jan 1, 2021 to December 31, 2021:20.22, District of Columbia.
https://ocme.dc.gov/sites/default/files/dc/sites/ocme/agency_content/2021%20Drug%20related%20Overdoses%20Deaths%20FINAL.pdf

Figure 3: Percent of Overdose Deaths Involving Fentanyl 2015-2021



Source: https://ocme.dc.gov/sites/default/files/dc/sites/ocme/agency_content/Opioid%20related%20Overdoses%20Deaths%203.16.21%20FINAL%20%28002%29.pdf

Fig. 2: Total Number of Opioid Drugs Contributing to Drug Overdoses by Year (All Opioids)

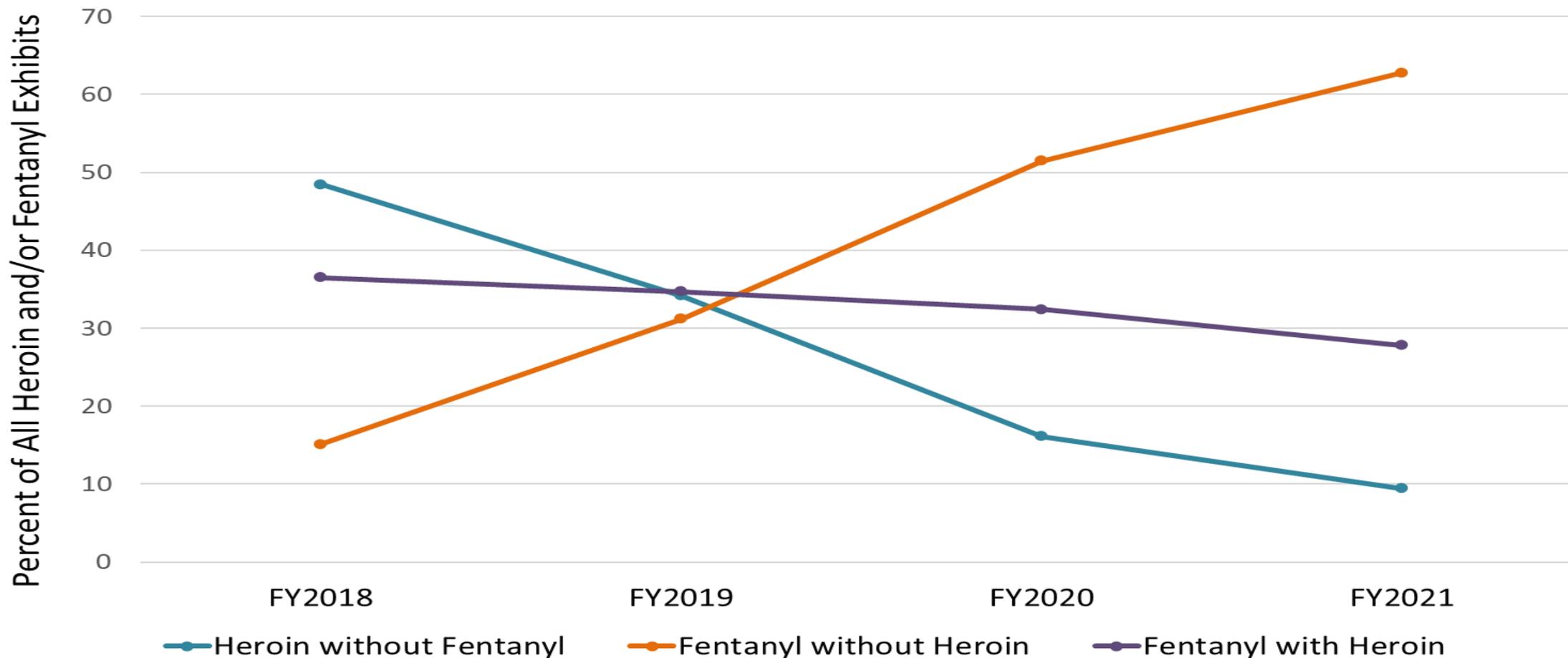


Source: DC Office of the Chief Medical Examiner (3.16.2022) Opioid-related fatal overdoses: January 1, 2016 to December 1, 2021. District of Columbia.
https://ocme.dc.gov/sites/default/files/dc/sites/ocme/agency_content/Opioid%20related%20Overdoses%20Deaths%203.16.21%20FINAL%20%28002%29.pdf

OPIOID SURVEILLANCE – FENTANYL INCREASE



Heroin to Fentanyl Shift Across Years



Source: Opioid Response Symposium 4.18.22 DC Department of Forensic Services

- Fentanyl is a potent opioid medication synthesized in 1960
- Approved in 1968 for analgesia and anesthetic during surgery and later for break through cancer pain
- It can be used orally, IV, in epidurals, or absorbed through the skin when delivered via a specially designed patch

Many routes of drug use related to fentanyl deaths:

Injecting

Snorting

Smoking

Oral

FENTANYL FOUND IN...

>> Fentanyl is found in

- In liquid form
 - Eye drops, nasal spray, dropped onto paper
- Illicit opioids, stimulants, cannabis vape products
- Illicitly manufactured stimulant, benzodiazepine & opioid pills
- 99% of oxycodone pills submitted to crime lab contain fentanyl

>> Pills look identical to legally manufactured pills

- 40% contain a potentially fatal dose of fentanyl

Sources:

<https://www.dea.gov/onepill>

https://www.fentanylawarenessday.org/files/ugd/89faea_e40da0d83dd745a1bf1139db47af8bba.pdf

https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf

<https://drugabusestatistics.org/drug-overdose-deaths/>

<https://www.cdc.gov/drugoverdose/featured-topics/VS-overdose-deaths-illicit-drugs.html>

<https://www.cdc.gov/stopoverdose/fentanyl/>

https://www.dea.gov/sites/default/files/2021-12/DEA-OPCK_FactSheet_December%202021.pdf

https://www.dea.gov/sites/default/files/2020-09/Fentanyl%20Used%20in%20Vape%20Pens_PRB%20FINAL.pdf



Source: Drug Enforcement Agency (DEA)



Fentanyl is 100 times more potent than morphine and at least 10 times as potent as heroin.

This photo is of 2 mg of fentanyl powder; a lethal dose in an average adult

Source: U.S. Drug Enforcement Administration <https://www.nist.gov/image/fauxfentynallethaldose005jpg>

»» One pill can kill?

- True
- False



Source: PowerPoint stock image

ONE PILL CAN KILL

» Potency

- Morphine, heroin, fentanyl, carfentanyl/ sufentanyl
- Other opioids: DC Dept of Forensic Sciences
 - Nitazenes: protonitazene and isotonitazene
 - 3-10 times more potent than fentanyl

» Potency within pills and inside pill varies

- Range from 1mg to 5mg fentanyl in pill
- Inter pill inconsistencies from different parts of pill



Comparing the size of lethal doses of heroin, fentanyl, and carfentanil. The vials here contain an artificial sweetener for illustration. (New Hampshire State Police Forensic Laboratory)

Sources:

Baumann, 2018

Boas, 1985

Hug, 1981

Roy, 1988

Torralva, 2019

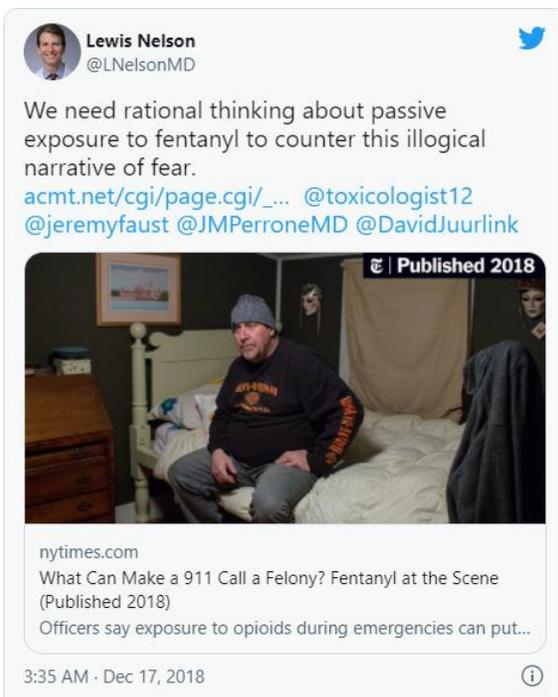
<https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-fdas-new-resource-guide-support-responsible-opioid>

https://www.washingtonpost.com/local/dc-politics/new-opioids-more-powerful-than-fentanyl-are-discovered-in-dc-amid-deadly-wave-of-overdoses/2021/11/29/680afb2c-4d43-11ec-94ad-bd85017d58dc_story.html

https://www.dea.gov/sites/default/files/2021-12/DEA-OPCK_FactSheet_December%202021.pdf



“Any fentanyl exposure can kill innocent law enforcement, first responders and the public. Deputy Attorney General, Rod Rosenstein” – Sept. 2016



SOURCE: DEA

Opinion: ‘Passive’ fentanyl exposure: more myth than reality

SOURCE: PBS Science, December, 2018

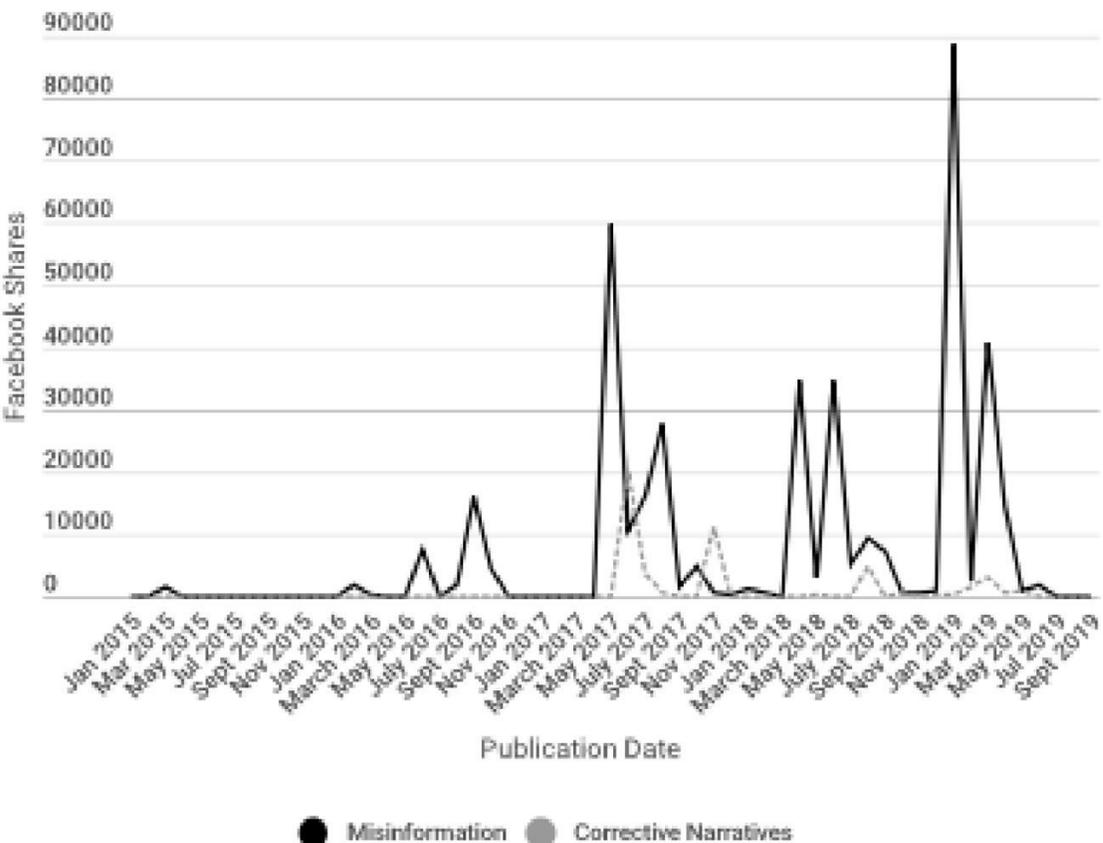


SOURCE: Voice of San Diego, Aug. 2021; Sept. 2021; Oct. 2021

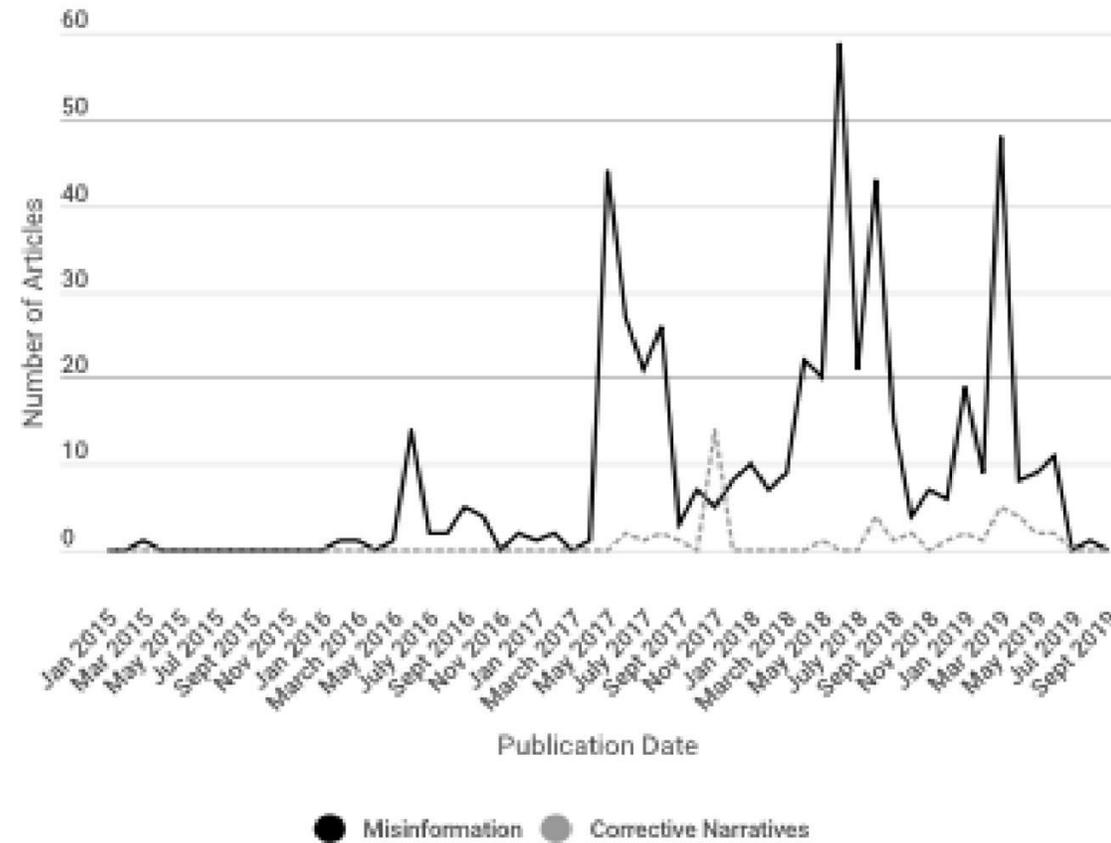
MISINFORMATION AND THE MEDIA



Facebook Shares of Misinformation vs. Corrective Narratives



Mainstream Media Stories with Misinformation vs. Corrective Narratives



Source: Beletsky L, Seymour S, Kang S, et al. Fentanyl panic goes viral: The spread of misinformation about overdose risk from casual contact with fentanyl in mainstream and social media. *Int J Drug Policy*. 2020;86.

CONSEQUENCES OF FENTANYL EXPOSURE FEARS



- » Slow or no response to overdose calls (awaiting PPE, or just reluctant to engage)
- » 911 calls for overdose leading to felony arrests
- » Resource expenditures on PPE and related equipment

| Fentanyl Overdose | Panic/Anxiety Attack |
|--------------------------------|-------------------------------------|
| Profoundly slowed heartbeat | Rapid heartbeat and/or palpitations |
| Very low blood pressure | Sweating, chills, flushes |
| Dangerously low breathing rate | Breathing difficulties |
| Dizziness | Dizziness |
| Confusion | Chest pain |
| Sleepiness | Sudden overwhelming sense of doom |
| Loss of consciousness | Trembling |
| Bluish lips and nails | Numbness, tingling of extremities |
| Pinpoint pupils | Sense of choking |
| Weak muscles | Chest pain |

- »» “For routine handling of drugs nitrile gloves provide sufficient dermal protection”
- »» “Exceptional circumstances where there are drug particles or droplets suspended in the air, N95 mask provides sufficient protection”
- »» “In the unlikely event of poisoning naloxone should be administered”

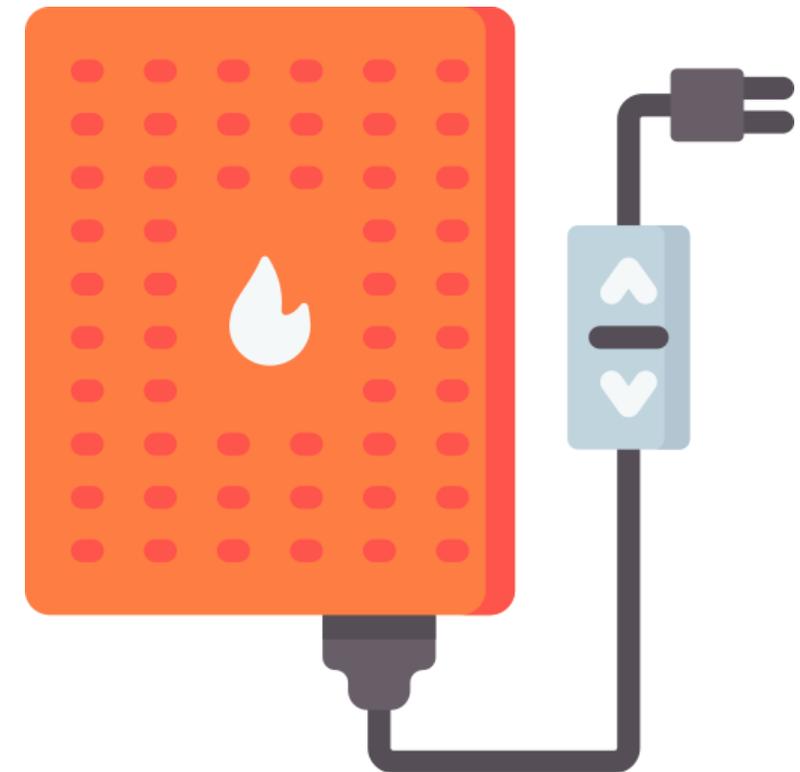


Source: iStock

Source: AMCT & ACCT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5711758/>

>> Dermal

- Patches take 3-13 hour to produce therapeutic blood concentrations of fentanyl
 - Patches are designed to deliver the medication
 - Adhere to skin
- If both palms were covered in fentanyl patches it would take 14 minutes to get an effect
- Increased absorption from
 - Large surface areas, broken skin and heat
- Tablets & powders require dissolution for absorption
- Powder sits on skin, easy to brush or wash off
 - Don't use alcohol-based hand sanitizers to wash off



Source: AMCT & ACCT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders

https://www.acmt.net/Library/Positions/Fentanyl_PPE_Emergency_Responders_.pdf?utm_medium=email&_hsmt=212519078&_hsenc=p2ANqtz-Mv68iwd-0UFpxVlbgqVW5UhxpyJy8JHBoa3McPJ_yNgzhZqQ-nuf7Mbjkj7RSksS4Dr0kypS-qdb2jk3f5rDcY0ZfzPZYOlloguaLeLbbfhfnvxVRk&utm_content=212519078&utm_source=hs_email

Photos from PowerPoint Source of photo <https://www.flaticon.com/free-icons/healthcare-and-medical> title="healthcare and medical icons">Healthcare and medical icons created by Freepik

>> Inhalation

- Unprotected individual would require 200 minutes of exposure to reach a concerning blood level of fentanyl

>> Mucous membranes

- 30-fold absorption compared to skin
- Splash to eyes or mouth
- Wash immediately
- Be prepared to administer naloxone
- Be prepared to provide rescue breathing



Source: AMCT & ACCT Position Statement: Preventing Occupational Fentanyl and Fentanyl Analog Exposure to Emergency Responders

https://www.acmt.net/Library/Positions/Fentanyl_PPE_Emergency_Responders_.pdf?utm_medium=email&hsmi=212519078&hsenc=p2ANqtz-Mv68iwd-0UFpxVlbgqVW5Uhxpy8JHBoa3McPJ_yNgzhZqQ-nuf7Mbijkj7RSksS4Dr0kypS-qdb2jk3f5rDcY0ZfzPZYOloguaLeLbbfhfnvxVRk&utm_content=212519078&utm_source=hs_email

Photos from PowerPoint

» Suspect that illicit drugs may be present, but no illicit drug products are visible

- Example: An EMS response to a suspected drug overdose where information indicates illicit drug products are suspected but are not visible on scene
- Wear nitrile gloves
- No mask required



Source: <https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

2019 PPE Basics for First Responders Exposed to Fentanyl retrieved from <https://www.safetyandhealthmagazine.com/articles/18841-ppe-basics-for-first-responders-exposed-to-fentanyl-niosh-releases-video#:~:text=NIOSH%20recommends%20wearing%20nitrile%20gloves,R100%20respirator%3B%20and%20protective%20eyewear.>

Photo from Canva

» Small amounts of illicit drugs
in powder or liquid are visible

- Example: An EMS response to a suspected overdose where small amounts of powder or liquid are visible
- Wear nitrile gloves
- Wear a fitted mask
- Wear eye protection



Source:

<https://www.cdc.gov/niosh/topics/fentanyl/risk.html>

2019 PPE Basics for First Responders Exposed to Fentanyl retrieved from <https://www.safetyandhealthmagazine.com/articles/18841-ppe-basics-for-first-responders-exposed-to-fentanyl-niosh-releases-video#:~:text=NIOSH%20recommends%20wearing%20nitrile%20gloves,R100%20respirator%3B%20and%20protective%20eyewear.>

Photo from PowerPoint

» Liquid or large amounts of powder form are visible

- Example: An illicit drug storage or distribution facility, milling operation, or production laboratory
- Wear gloves
- Wear mask
- Wear eye protection
- Wear coveralls



Source:
<https://www.cdc.gov/niosh/topics/fentanyl/risk.html>
Photo from PowerPoint and Canva

» Inadvertent fentanyl exposure leads to overdose regularly of first responders. Is this a legend or reality?

- Legend
- Reality

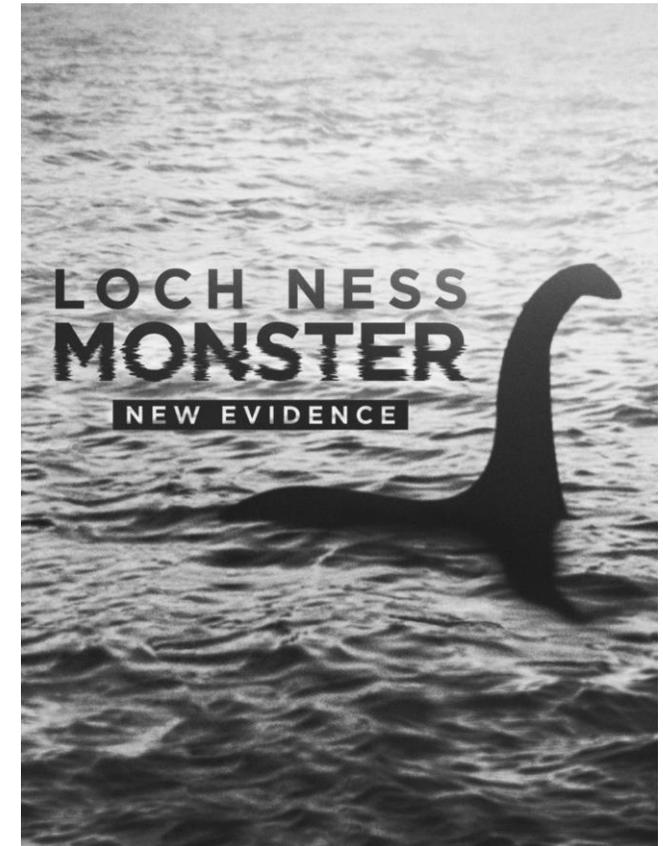


Photo from IMDb

- » Testing syringes from death investigations began 2017
- » Testing syringes from syringe exchange in 2020
- » It isn't always about the fentanyl



- » DC collaborated with Center for Forensic Science Research & Education (CFSRE) on their Survey of Toxic Adulterants in 2021
- » DC is one of nine locations providing specimens
- » Compared to other locations, D.C. had the highest amount of toxic adulterants present

Percentage of Washington DC Samples Containing Adulterants (n=91)

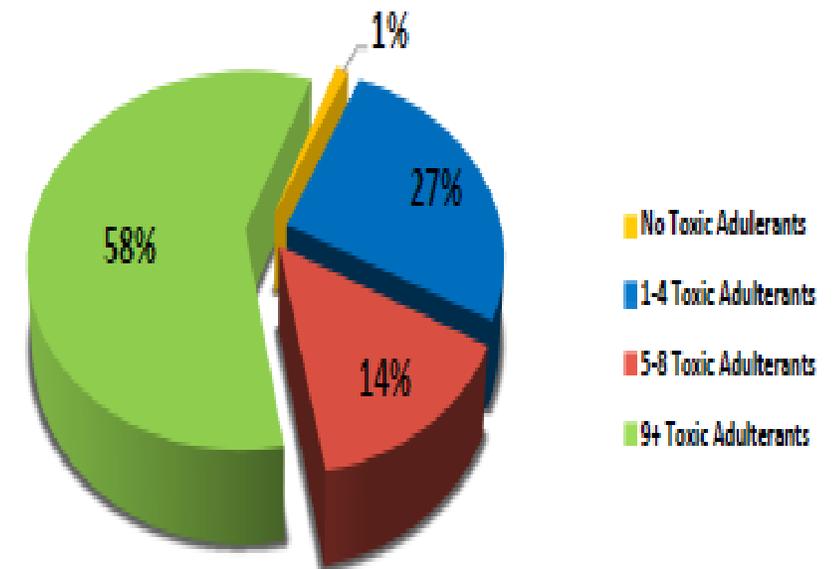
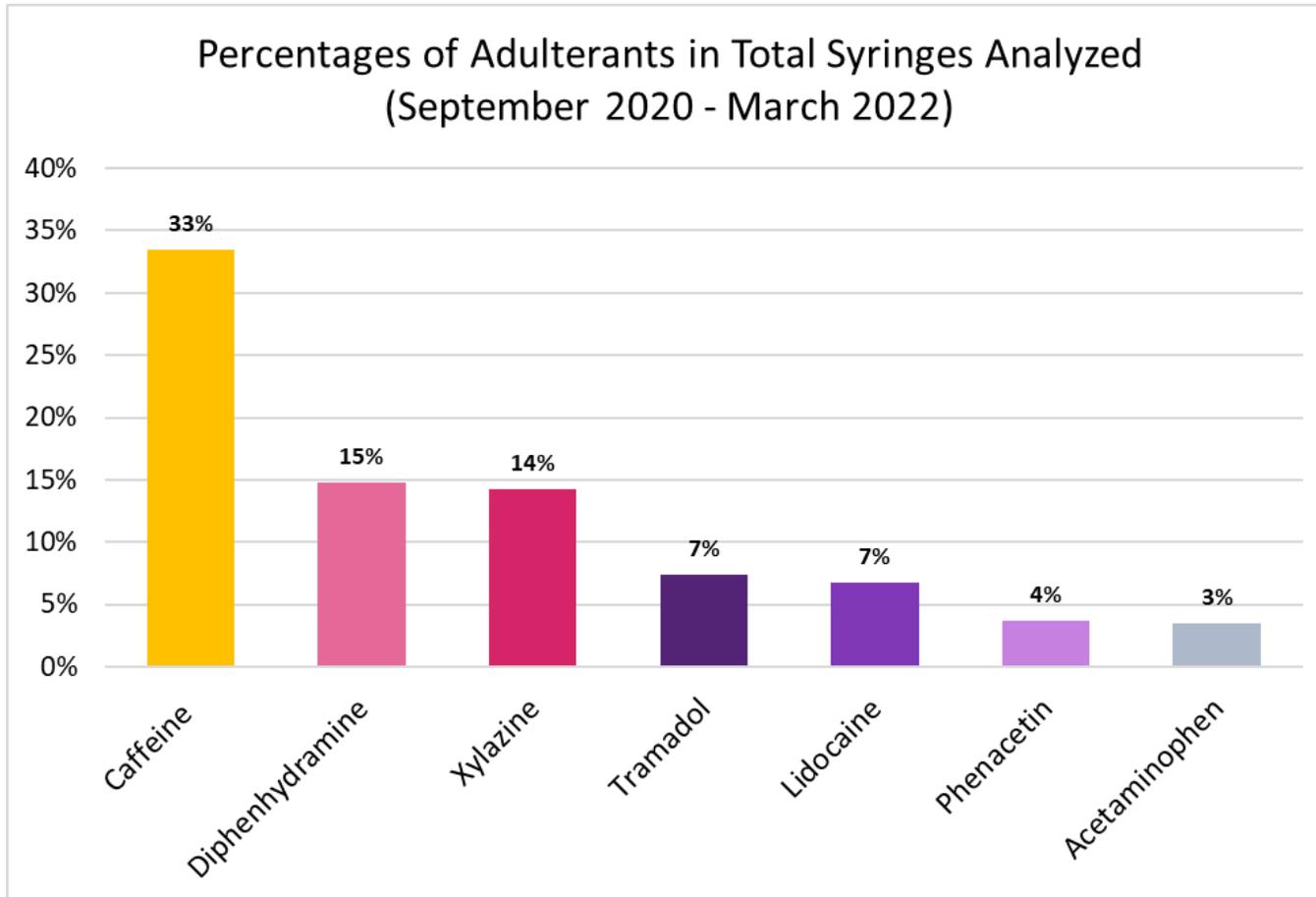


Figure 13. Percentage of Washington DC samples (n=91) containing 1 – 4, 5 – 8 and 9 or more adulterants.

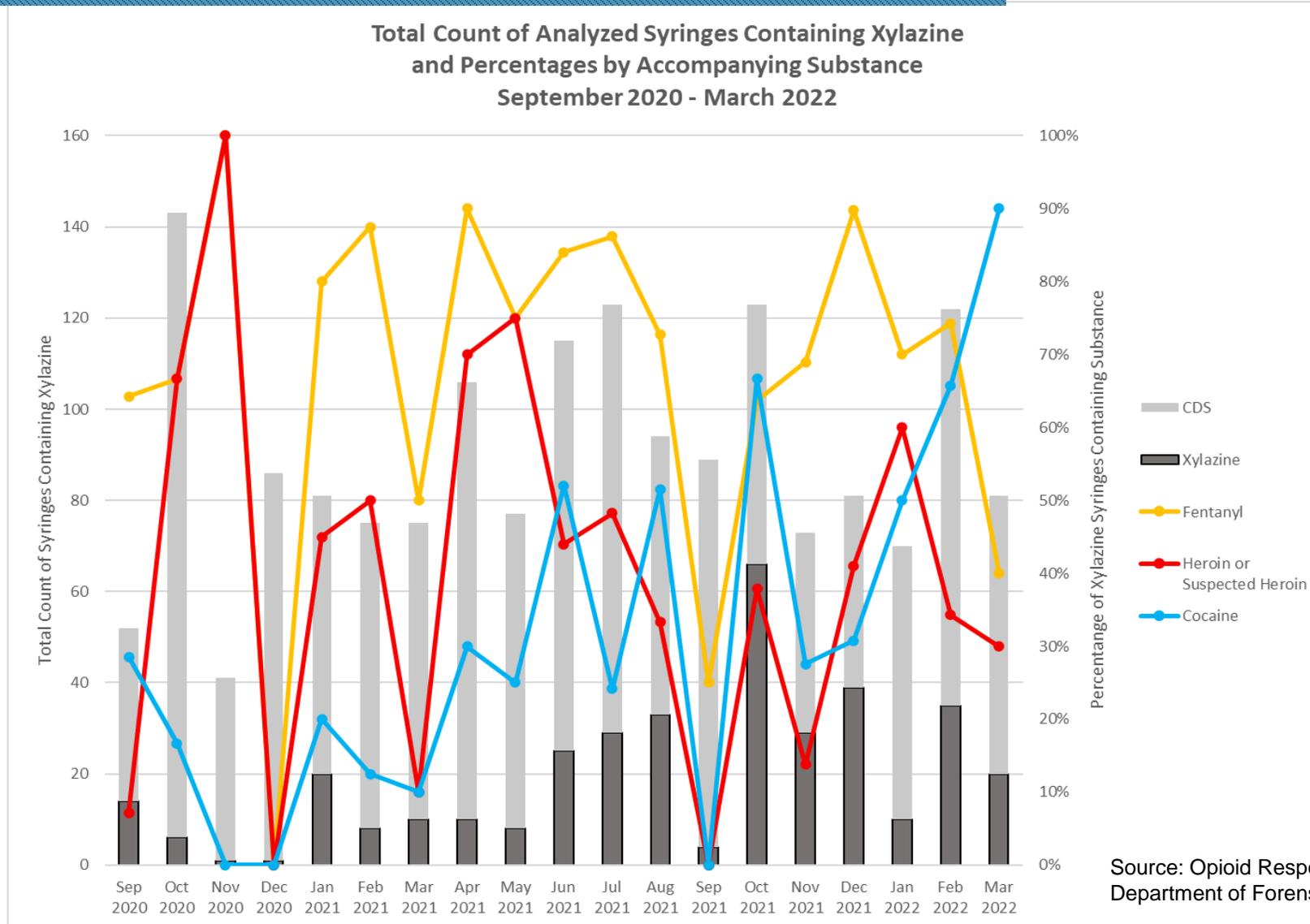
- » First Observed in DC August 2018
 - Death investigation (spoon residue)
- » Regularly occurs in used syringes from syringe exchange
- » Associated dangers
 - skin necrosis
 - Increased risk of overdose
- » What is it?
 - Agonist at alpha 2 adrenergic receptors
 - Decreases release of norepinephrine and dopamine
 - Approved by FDA as a veterinary anesthetic (sedating and muscle relaxing)
- » Sought after by some for its effects



FIGURE 1: Black and green necrotic and scaly lesions of the patient's forearms.



Xylazine is 3rd most common pharmacologically active adulterant in DC needle-exchange syringe drug supply



Source: Opioid Response Symposium 4.18.22 DC
Department of Forensic Services

| CODETECTION SUBSTANCE WITH XYLAZINE | CODETECTION PERCENTAGE |
|-------------------------------------------|---------------------------|
| Fentanyl | 24.4% |
| Heroin | 23.2% |
| Cocaine | 31.5% |

Source: Opioid Response Symposium 4.18.22 DC
Department of Forensic Services

»» Has anyone seen or heard directly from a patient about xylazine?

- Yes
- No



FIGURE 1: Black and green necrotic and scaly lesions of the patient's forearms.

Source: Photo New Jersey State Police Drug Monitoring Initiative Office of Drug Monitoring & Analysis, Drug Monitoring Initiative (DMI) 2.2022

**COMPARE & CONTRAST
TREATMENT OF
FENTANYL
VERSUS HEROIN
OVERDOSE**

DO YOU NEED MORE NALOXONE FOR FENTANYL OD?

Some sources say there is not a need for more naloxone for fentanyl overdoses

- Bell 2019
- Carpenter 2020



This Photo by Unknown Author is licensed under [CC BY-NC-ND](#)

Some sources suggest need for more naloxone for fentanyl overdoses

- Mayer 2018
- Schuman 2008
- Slavova 2017
- Somerville 2017
- Sutter 2017

FACT: WE DON'T KNOW IF YOU NEED MORE NALOXONE

TAKE HOME POINTS:

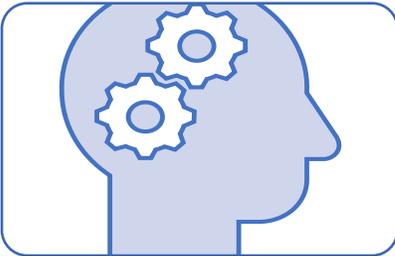
- Call For Help
- Administer Naloxone
- Rescue Breathing
- Repeat Steps As Needed

WHAT ELSE COULD EXPLAIN DIFFICULTY IN RESUSCITATION?



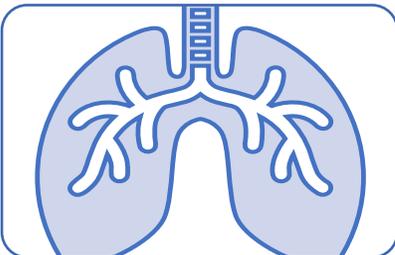
FIGURE 1: Black and green necrotic and scaly lesions of the

Xylazine



Hypoventilation leading to brain damage

- Naloxone to reverse respiratory depression
- Rescue breathing to ensure oxygen circulation

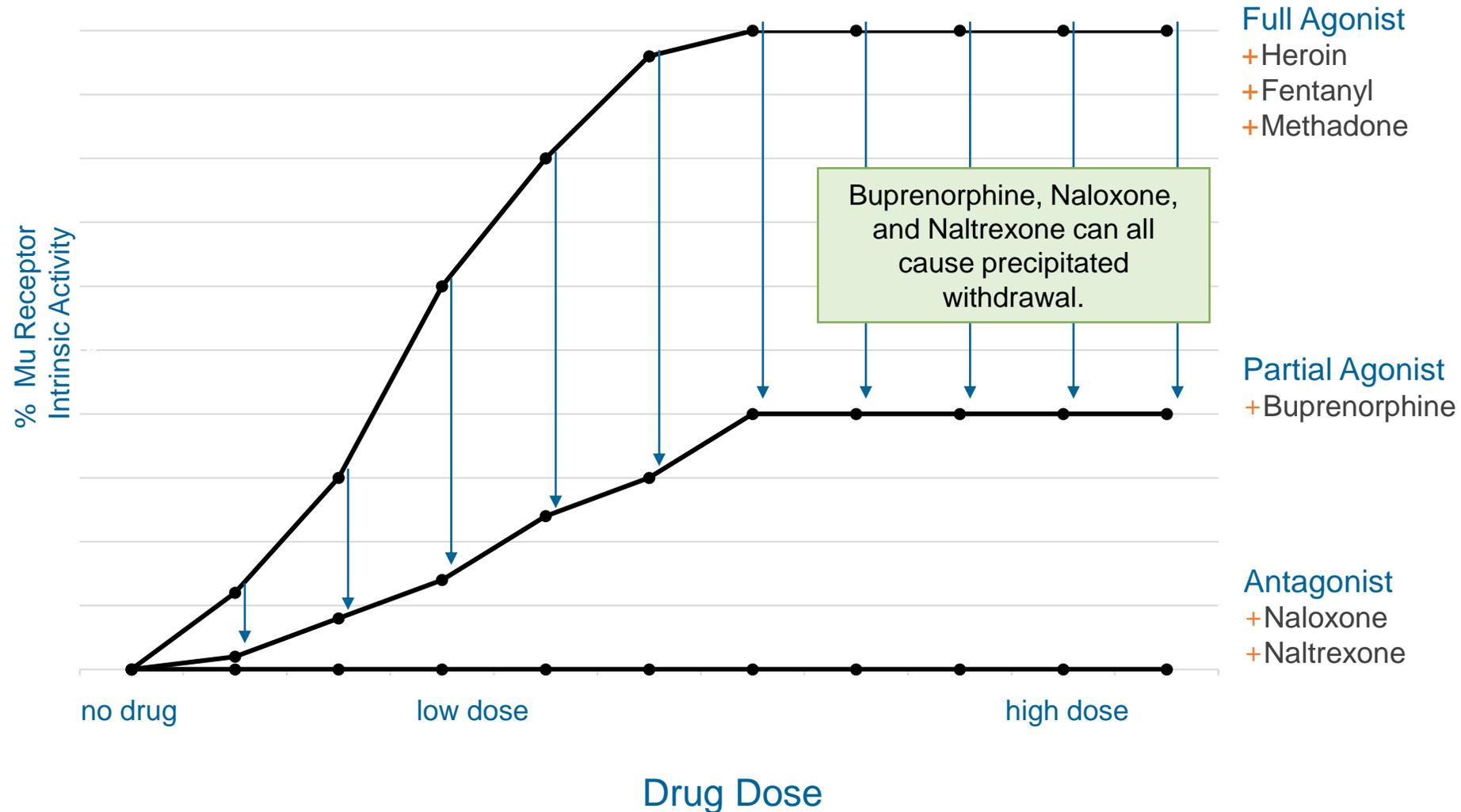


Fentanyl overdose is not just about respiratory depression from opioid receptors

- Additional properties of fentanyl
- Wooden Chest syndrome

DISTINGUISH TREATMENT OF OPIOID WITHDRAWAL RELATED TO FENTANYL VS. HEROIN

MECHANISM OF ACTION: MU OPIOID RECEPTOR BINDING



>> Methadone

- Full opioid agonist; no risk of precipitated withdrawal
- Can be started prior to going into withdrawal
- Takes longer to reach therapeutic dose than buprenorphine
- Federal regulations regarding daily observed dosing, who & where

>> Naltrexone (Vivitrol®)

- Opioid antagonist; need to complete withdrawal prior to initiation
- Will not treat opioid withdrawal
- Will not treat dopamine depletion in brain
- No federal regulations on who can prescribe or where prescribing can occur

- » Precipitated withdrawal described when buprenorphine given after fentanyl cessation: even 24 hours after last use
 - Possible explanation
 - Delayed clearance from body related to fentanyl in the adipose tissue

- » Withdrawal protocol modifications have been suggested
 - 48 hours after last use & COWS >13
 - 2mg buprenorphine/naloxone; additional 2mg doses at 60-90 min intervals
 - Symptomatic treatments prior to initiating buprenorphine

“COMFORT MEDICATIONS” WHILE AWAITING BUPRENORPHINE INITIATION



1. **Clonidine** start 0.1 mg twice/day for bone pain & arousal; may increase dose, but watch for hypotension
2. **Imodium**® (loperamide) 4mg 1-2 tabs q1 hour for diarrhea, NTE 16 mg/day
3. **Motrin**® (ibuprofen) 600 mg every 6hours for bone pain or NSAID of your choice
4. **Tylenol**® (acetaminophen) 975 mg up to 4 times/day for pain not relieved by NSAIDs
 - Can use both Tylenol and NSAIDS at the same time
5. **Benadryl**® (diphenhydramine) 25 to 50 mg every 6 hour for nasal congestion, insomnia or anxiety
6. **Compazine**® (prochlorperazine) 10mg up to 4 times/day for nausea/vomiting; give by any route available
7. **Bentyl**® (dicyclomine) 10 mg up to 4 times/day for abdominal cramping, not relieved by controlling diarrhea
8. **Valium**® (diazepam):10-15 mg for muscle spasms and insomnia

- »» Various schedules giving small doses of buprenorphine (most for 4-8 days)
 - 0.2 to 4mg starting dose of SL buprenorphine
 - No randomized controlled trials; no quasi experimental or case control or cohort studies
 - **NO CONSENSUS REGARDING A SINGLE MICRODOSING APPROACH**

- »» May be considered in those
 - Who have failed buprenorphine initiation
 - Those with chronic pain; exacerbation of pain during withdrawal may now be unnecessary
 - High dose methadone where the standard taper to 30 mg per day is time consuming
 - Recent use of fentanyl

- » Buprenorphine within 30-120 minutes **post naloxone** for fentanyl overdose
 - First dose 4-8mg; total 16-24mg given

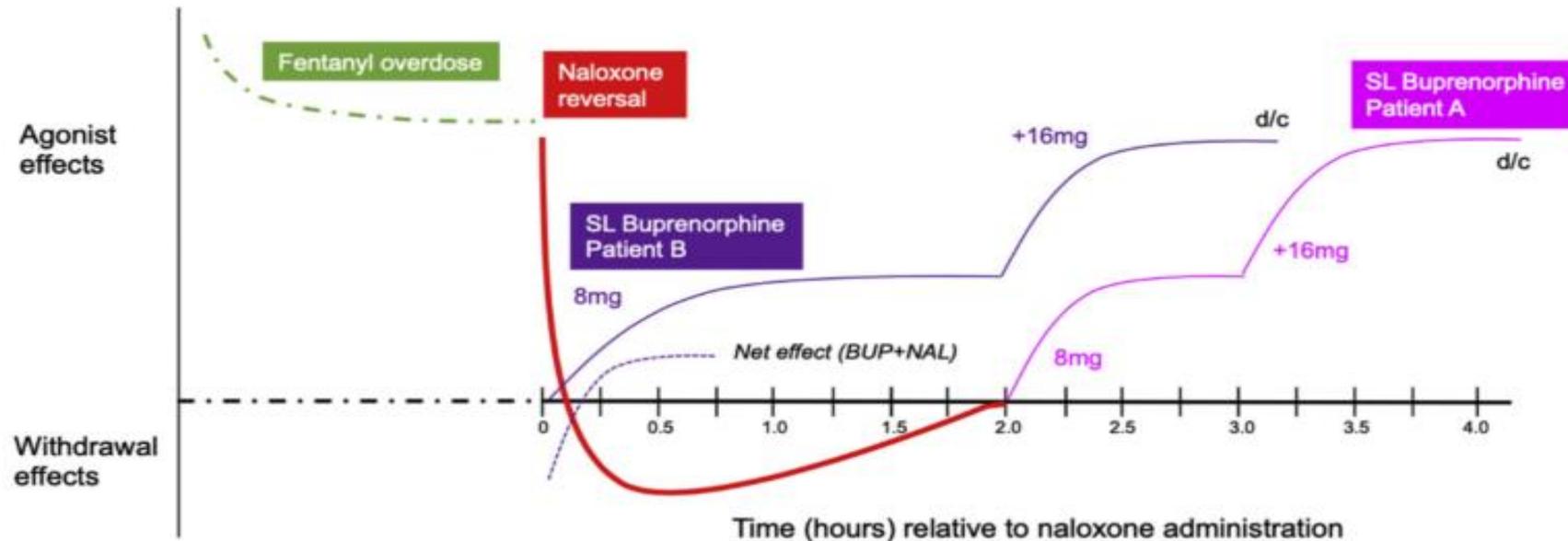


Fig. 3. Hypothesized opioid agonist/withdrawal outcome of ED-based naloxone reversal and buprenorphine administration for patients A and B following fentanyl overdose.

>> 6-month treatment retention rates for buprenorphine

- At baseline: Fentanyl positive, “other” opioid positive or negative
 - Groups did not differ

>> 6-month opioid abstinence rates

- Fentanyl positive group had the same abstinence rate as those who tested positive for other opioids
- Both groups that tested positive at study entry had lower abstinence rates than those who tested negative at study entry

FENTANYL TEST STRIPS (FTS)

- » Fentanyl test strips (FTS) are a simple, inexpensive, and evidence-based method of averting drug overdose.
- » Receiving a positive test was associated with positive change in OD risk behavior.
- » Federal funds can be used to purchase FTS.



Sources: <https://www.technologynetworks.com/applied-sciences/news/fentanyl-test-strips-help-to-prevent-overdoses-310792> photo

<https://www.healthaffairs.org/doi/10.1377/hblog20210601.974263/full/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6701177/>

<https://www.samhsa.gov/newsroom/press-announcements/202104070200>

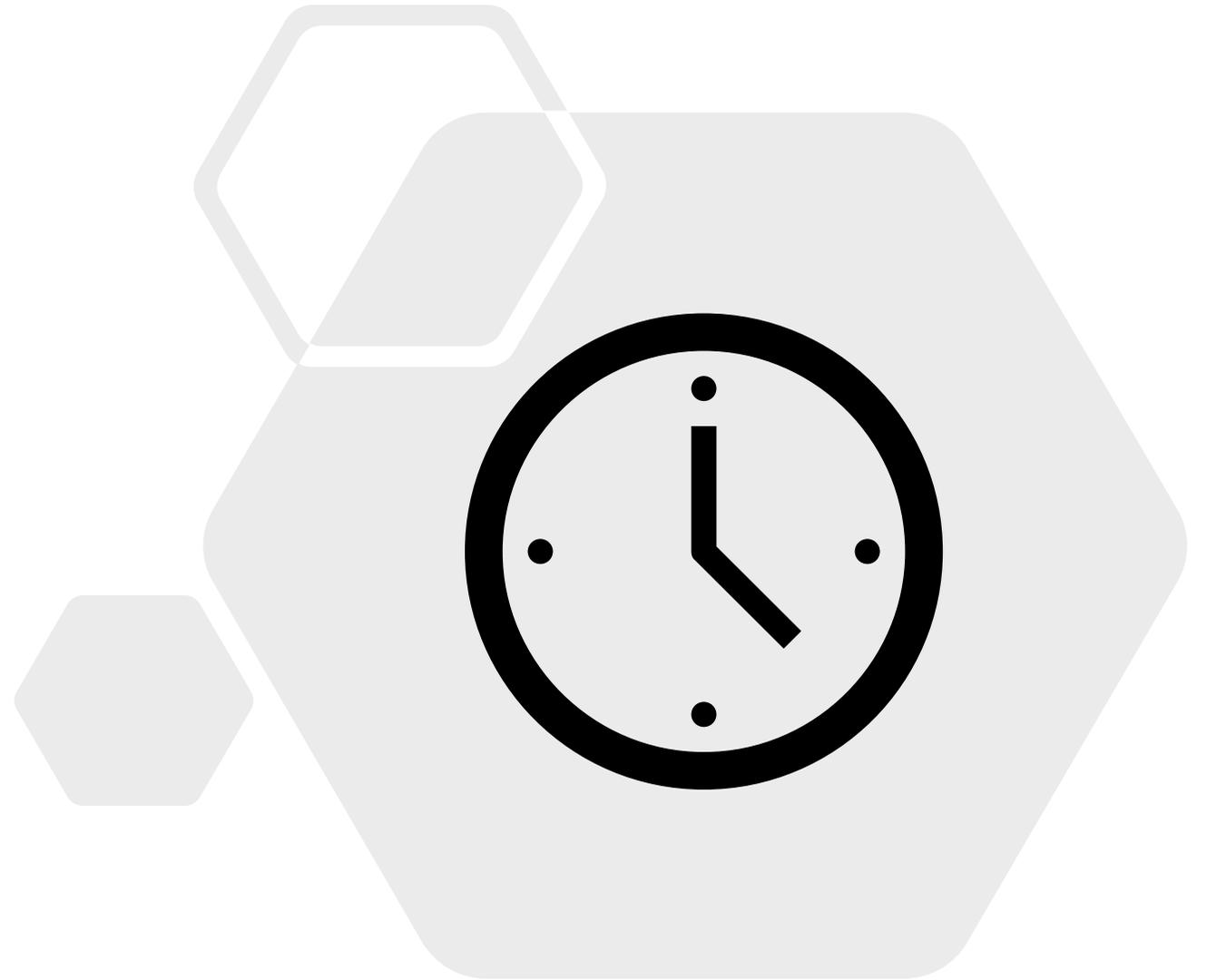
- » Inadvertent fentanyl exposure does not result in death of first responders
- » Treatment of fentanyl overdose
 - Naloxone and rescue breathing
- » Treatment of OUD related to fentanyl
 - Use comfort medications until ready to start buprenorphine
 - Start low dose buprenorphine when in moderate withdrawal
 - Alternatively use methadone



TIME FOR Q&A

I BELIEVE YOU ALL HAVE MORE EXPERIENCE THAN THE PEER REVIEWED CASE LITERATURE DISCUSSED HERE. *ARE YOU HAVING MORE TROUBLE WITH PRECIPITATED WITHDRAWAL RELATED TO FENTANYL?*

TYPE IN THE CHAT BOX



1. Overall, today's webinar was:

- A. Very useful
- B. Somewhat useful
- C. Not very useful
- D. Not useful at all

2. The material presented today was:

- A. At the right level
- B. Too basic
- C. Too detailed

- >> Please complete the online evaluation! **If you would like to receive CME or CE credit, the evaluation will need to be completed.** You will receive a link to the evaluation shortly after this webinar.

- >> The webinar recording will be available within a few days at:
<https://www.integratedcaredc.com/learning/>

- >> **Upcoming Webinar:**
 - ***Understanding Primary Health Requirements for Incentive Payments Part 2: What does it take to create a path towards incentive payment?***, June 21, 2022, 12:30 – 1:00 pm EST

- >> For more information about Integrated Care DC, please visit:
<https://www.integratedcaredc.com/>

REFERENCE LIST



- >> Fentanyl frequently asked questions. CA Bridge. (2022, February 3). Retrieved June 8, 2022, from <https://cabridge.org/resource/fentanyl-frequently-asked-questions/>
- >> Ahmed S, Bhivandkar S, Lonergan BB, Suzuki J. Microinduction of Buprenorphine/Naloxone: A Review of the Literature. *Am J Addict*. 2021 Jul;30(4):305-315. doi: 10.1111/ajad.13135. Epub 2020 Dec 30. PMID: 33378137
- >> American Society of Addiction Medicine, (2020) National Practice Guidelines for the Treatment of OUD 2020 Focused Update. Rockville, MD.
- >> Armenian P, Vo KT, Barr-Walker J, Lynch KL. Fentanyl, fentanyl analogs and novel synthetic opioids: A comprehensive review. *Neuropharmacology*. 2018 May 15;134(Pt A):121-132. doi: 10.1016/j.neuropharm.2017.10.016. Epub 2017 Oct 14. PMID: 29042317.
- >> Antoine D, Huhn AS, Strain EC, Turner G, Jardot J, Hammond AS, Dunn KE. Method for Successfully Inducting Individuals Who Use Illicit Fentanyl Onto Buprenorphine/Naloxone. *Am J Addict*. 2021 Jan;30(1):83-87. doi: 10.1111/ajad.13069. Epub 2020 Jun 23. PMID: 32572978; PMCID: PMC7755703.
- >> Baumann MH, Kopajtic TA, Madras BK. Pharmacological Research as a Key Component in Mitigating the Opioid Overdose Crisis. *Trends Pharmacol Sci*. 2018 Dec;39(12):995-998. doi: 10.1016/j.tips.2018.09.006. PMID: 30454770.
- >> Boas RA, Villiger JW. Clinical actions of fentanyl and buprenorphine. The significance of receptor binding. *Br J Anaesth*. 1985 Feb;57(2):192-6. doi: 10.1093/bja/57.2.192. PMID: 2982388.
- >> Bell A, Bennett AS, Jones TS, Doe-Simkins M, Williams LD. Amount of naloxone used to reverse opioid overdoses outside of medical practice in a city with increasing illicitly manufactured fentanyl in illicit drug supply. *Subst Abus*. 2019;40(1):52-55. doi: 10.1080/08897077.2018.1449053. Epub 2018 Jun 25. PMID: 29558283.
- >> Beletsky, L., Seymour, S., Kang, S., Siegel, Z., Sinha, M. S., Marino, R., Dave, A., & Freifeld, C. (2020). Fentanyl panic goes viral: The spread of misinformation about overdose risk from casual contact with fentanyl in mainstream and social media. *The International journal on drug policy*, 86, 102951. Advance online publication. <https://doi.org/10.1016/j.drugpo.2020.102951>
- >> Carroll GG, Wasserman DD, Shah AA, Salzman MS, Baston KE, Rohrbach RA, Jones IL, Haroz R. Buprenorphine Field Initiation of Rescue Treatment by Emergency Medical Services (Bupe FIRST EMS): A Case Series. *Prehosp Emerg Care*. 2021 Mar-Apr;25(2):289-293. doi: 10.1080/10903127.2020.1747579. Epub 2020 May 4. PMID: 32208945.
- >> Clark AK, Wilder CM, Winstanley EL. A systematic review of community opioid overdose prevention and naloxone distribution programs. *J Addict Med*. 2014 May-Jun;8(3):153-63. doi: 10.1097/ADM.000000000000034. PMID: 24874759.
- >> Cook RR, Torralva R, King C, Lum PJ, Tookes H, Foot C, Vergara-Rodriguez P, Rodriguez A, Fanucchi L, Lucas GM, Waddell EN, Korthuis PT. Associations between fentanyl use and initiation, persistence, and retention on medications for opioid use disorder among people living with uncontrolled HIV disease. *Drug Alcohol Depend*. 2021 Nov 1;228:109077. doi: 10.1016/j.drugalcdep.2021.109077. Epub 2021 Sep 20. PMID: 34600253; PMCID: PMC8595584.
- >> Carpenter J, Murray BP, Atti S, Moran TP, Yancey A, Morgan B. Naloxone Dosing After Opioid Overdose in the Era of Illicitly Manufactured Fentanyl. *J Med Toxicol*. 2020 Jan;16(1):41-48. doi: 10.1007/s13181-019-00735-w. Epub 2019 Aug 30. PMID: 31471760; PMCID: PMC6942078.

REFERENCE LIST (CONT.)



- >> D'Onofrio, G 2022 personal communication with Shannon Robinson
- >> Fairbairn N, Coffin PO, Walley AY. Naloxone for heroin, prescription opioid, and illicitly made fentanyl overdoses: Challenges and innovations responding to a dynamic epidemic. *Int J Drug Policy*. 2017 Aug;46:172-179. doi: 10.1016/j.drugpo.2017.06.005. Epub 2017 Jul 4. PMID: 28687187; PMCID: PMC5783633.
- >> Herring AA. Postoverdose Initiation of Buprenorphine After Naloxone-Precipitated Withdrawal Is Encouraged as a Standard Practice in the California Bridge Network of Hospitals. *Ann Emerg Med*. 2020 Apr;75(4):552-553. doi: 10.1016/j.annemergmed.2019.12.015. PMID: 32216889.
- >> Herring AA, Schultz CW, Yang E, Greenwald MK. Rapid induction onto sublingual buprenorphine after opioid overdose and successful linkage to treatment for opioid use disorder. *Am J Emerg Med*. 2019 Dec;37(12):2259-2262. doi: 10.1016/j.ajem.2019.05.053. Epub 2019 May 29. PMID: 31239086.
- >> Hill R, Santhakumar R, Dewey W, Kelly E, Henderson G. Fentanyl depression of respiration: Comparison with heroin and morphine. *Br J Pharmacol*. 2020 Jan;177(2):254-266. doi: 10.1111/bph.14860. Epub 2019 Dec 23. PMID: 31499594; PMCID: PMC6989952
- >> Hug CC Jr, Murphy MR. Tissue redistribution of fentanyl and termination of its effects in rats. *Anesthesiology*. 1981 Oct;55(4):369-75. doi: 10.1097/00000542-198110000-00006. PMID: 7294371.
- >> Huhn AS, Hobelmann JG, Oyler GA, Strain EC. Protracted renal clearance of fentanyl in persons with opioid use disorder. *Drug Alcohol Depend*. 2020 Sep 1;214:108147. doi: 10.1016/j.drugalcdep.2020.108147. Epub 2020 Jul 2. PMID: 32650192; PMCID: PMC7594258.
- >> Klebacher R, Harris MI, Ariyaprakai N, Tagore A, Robbins V, Dudley LS, Bauter R, Koneru S, Hill RD, Wasserman E, Shanes A, Merlin MA. Incidence of Naloxone Redosing in the Age of the New Opioid Epidemic. *Prehosp Emerg Care*. 2017 Nov-Dec;21(6):682-687. doi: 10.1080/10903127.2017.1335818. Epub 2017 Jul 7. PMID: 28686547.
- >> Mayer, S., Boyd, J., Collins, A., Kennedy, M. C., Fairbairn, N., & McNeil, R. (2018). Characterizing fentanyl-related overdoses and implications for overdose response: Findings from a rapid ethnographic study in Vancouver, Canada. *Drug and alcohol dependence*, 193, 69–74. <https://doi.org/10.1016/j.drugalcdep.2018.09.006>.
- >> Moss RB, Carlo DJ. Higher doses of naloxone are needed in the synthetic opioid era. *Subst Abuse Treat Prev Policy*. 2019;14(1):6. Published 2019 Feb 18. doi:10.1186/s13011-019-0195-4
- >> Government of the District of Columbia Office of the Chief Medical Examiner. (2022, March 16). Opioid-related Fatal Overdoses: January 1, 2016 to December 31, 2021. Retrieved June 8, 2022, from https://ocme.dc.gov/sites/default/files/dc/sites/ocme/agency_content/Opioid%20related%20Overdoses%20Deaths%203.16.21%20FINAL%20%28002%29.pdf
- >> Government of the District of Columbia Office of the Chief Medical Examiner. (2022, April 20). Drug-related Fatal Overdoses: January 1, 2021, to December 31, 2021. Retrieved June 8, 2022, from https://ocme.dc.gov/sites/default/files/dc/sites/ocme/agency_content/2021%20Drug%20related%20Overdoses%20Deaths%20FINAL.pdf

REFERENCE LIST (CONT.)



- >> Roy SD, Flynn GL. Solubility and related physicochemical properties of narcotic analgesics. *Pharm Res.* 1988 Sep;5(9):580-6. doi: 10.1023/a:1015994030251. PMID: 2907788.
- >> Schumann H, Erickson T, Thompson TM, Zautcke JL, Denton JS. Fentanyl epidemic in Chicago, Illinois and surrounding Cook County. *Clin Toxicol (Phila).* 2008 Jul;46(6):501-6. doi: 10.1080/15563650701877374. PMID: 18584361.
- >> Silverstein SM, Daniulaityte R, Martins SS, Miller SC, Carlson RG. "Everything is not right anymore": Buprenorphine experiences in an era of illicit fentanyl. *Int J Drug Policy.* 2019 Dec;74:76-83. doi: 10.1016/j.drugpo.2019.09.003. Epub 2019 Sep 25. PMID: 31563098; PMCID: PMC6914257.
- >> Slavova S, Costich JF, Bunn TL, Luu H, Singleton M, Hargrove SL, Triplett JS, Quesinberry D, Ralston W, Ingram V. Heroin and fentanyl overdoses in Kentucky: Epidemiology and surveillance. *Int J Drug Policy.* 2017 Aug;46:120-129. doi: 10.1016/j.drugpo.2017.05.051. Epub 2017 Jul 18. Erratum in: *Int J Drug Policy.* 2018 Aug;58:92. PMID: 28735777.
- >> Somerville NJ, O'Donnell J, Gladden RM, Zibbell JE, Green TC, Younkin M, Ruiz S, Babakhanlou-Chase H, Chan M, Callis BP, Kuramoto-Crawford J, Nields HM, Walley AY. Characteristics of Fentanyl Overdose - Massachusetts, 2014-2016. *MMWR Morb Mortal Wkly Rep.* 2017 Apr 14;66(14):382-386. doi: 10.15585/mmwr.mm6614a2. PMID: 28406883; PMCID: PMC5657806.
- >> Sutter ME, Gerona RR, Davis MT, Roche BM, Colby DK, Chenoweth JA, Adams AJ, Owen KP, Ford JB, Black HB, Albertson TE. Fatal Fentanyl: One Pill Can Kill. *Acad Emerg Med.* 2017 Jan;24(1):106-113. doi: 10.1111/acem.13034. Epub 2016 Oct 31. PMID: 27322591.
- >> Torralva R, Janowsky A. Noradrenergic Mechanisms in Fentanyl-Mediated Rapid Death Explain Failure of Naloxone in the Opioid Crisis. *J Pharmacol Exp Ther.* 2019 Nov;371(2):453-475. doi: 10.1124/jpet.119.258566. Epub 2019 Sep 6. PMID: 31492824; PMCID: PMC6863461.
- >> Wakeman SE, Chang Y, Regan S, Yu L, Flood J, Metlay J, Rigotti N. Impact of Fentanyl Use on Buprenorphine Treatment Retention and Opioid Abstinence. *J Addict Med.* 2019 Jul/Aug;13(4):253-257. doi: 10.1097/ADM.0000000000000486. PMID: 30550392.
- >> Jamison, P. (2021, November 29). New opioids, more powerful than fentanyl, are discovered in D.C. amid deadly wave of overdoses. *The Washington Post.* Retrieved June 8, 2022, from https://www.washingtonpost.com/local/dc-politics/new-opioids-more-powerful-than-fentanyl-are-discovered-in-dc-amid-deadly-wave-of-overdoses/2021/11/29/680afb2c-4d43-11ec-94ad-bd85017d58dc_story.html