

Fentanyl

Join with Dr. Jennifer Londgren to learn more about fentanyl: what it is, its fascinating history, and its impact on the opioid crisis. Dr. Jennifer Londgren is the Program Coordinator of Alcohol and Drug Studies at Minnesota State University, Mankato. The following slides are adaptations from Dr. Londgren's excellent talk.

Please click the link below to listen:

https://www.youtube.com/watch?v=Y4lNonsriIw&ab_channel=StrengtheningtheHeartland

Jeffrey E. Hansen, Ph.D.
Center for Connected Living, LLC



What is Fentanyl?

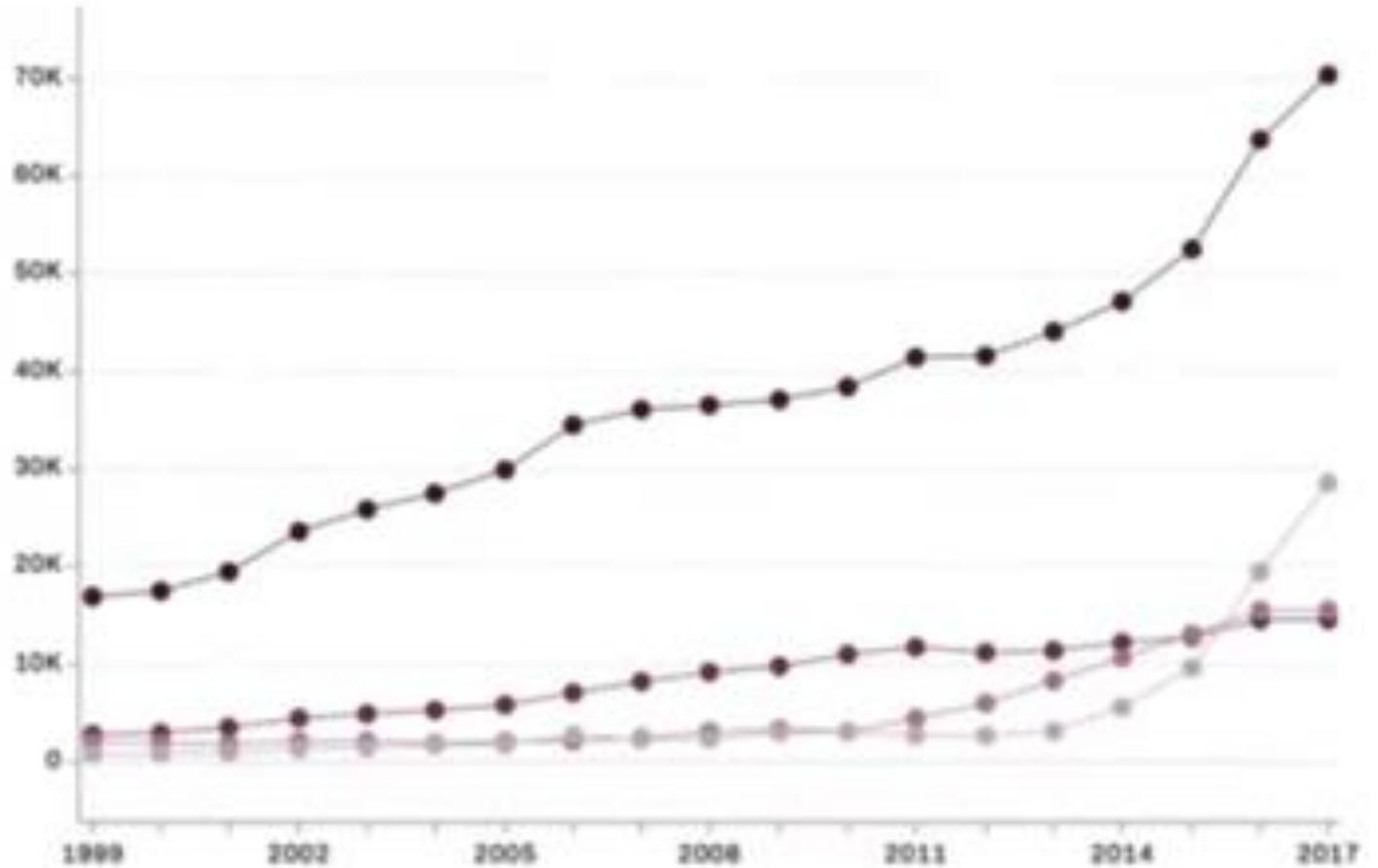
- Synthetic opioid
- 80-100 times stronger than morphine
- 25-50 times more powerful than heroin
- Schedule II drug
- Used for pain management (treatment of cancer patients)
- Wide therapeutic index



Drug Overdose Deaths in the US

Drug overdose deaths in America

*Some deaths on this chart may overlap if they involve multiple drugs.



■ All drugs ■ Opioid painkillers (natural and semisynthetic) ■ Heroin
■ Fentanyl and other synthetic opioids (minus methadone)

Source: Centers for Disease Control and Prevention

History of Fentanyl

- Synthesized by Dr. Paul Janssen and the Janssen Company of Belgium in December 1960
- Used as an intravenous analgesic in Europe in 1963 and in the U.S. In 1968
- Has become one of the world's most important and frequently used opioid analgesics



- 1953 morphine and meperidine widely used to treat pain
- Both slow-onset (could not easily penetrate the central nervous system)
- Janssen team worked with meperidine molecule
- Created new, lipid-soluble drugs
- 1957 phenoperidine created (25x more potent than morphine)
- First synthesized fentanyl in 1960
- Most potent opioid in the world

- Anesthesiologist Gorge de Castro became interested in "stress-free anesthesia"
- Found large doses of intravenous fentanyl could provide stress-free anesthesia
- Mid 1960's fentanyl was achieving success and enjoying popularity in Europe
- Difficult to get through FDA approval process in United States
- One opponent Dr. Robert Dripps
- Dr. Janssen and Dripps met and negotiated that fentanyl would only be approved in combination with droperidol (Called Innovar)

Transdermal Fentanyl



- Fentanyl patch for patients with pain
- Mid to late 1990's it was clear that transdermal fentanyl was a preferred way for patients to get analgesia for intense chronic pain of cancer and other conditions
- Sales in 2004 exceeding 2.4 billion
- Produces steady-state blood level of fentanyl that lasts 2-3 days with a single patch

Transmucosal Delivery

- Lollipops
- Idea began by giving carfentanil to monkeys in sugar cubes
- Sparked idea about method of delivery for patients experiencing stress and anxiety prior to surgery, especially children



Figure 5. The Oralet buccal transmucosal delivery system of fentanyl.



Figure 6. The Actiq buccal transmucosal delivery system of fentanyl.

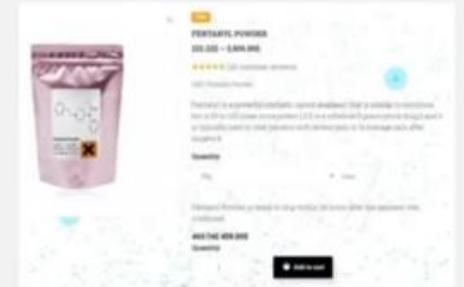
Fentanyl Pharmacology

- Onset of action and peak plasma concentrations dependent on dosage used and method of delivery
- Analgesia may occur as soon as 1-2 minutes after intravenous administration
- Transmucosal delivery systems produce analgesia in 10-15 minutes
- Sublingual and intranasal sprays of fentanyl may produce analgesia in 5-10 minutes or sooner
- Significant analgesia occurs with as low as .2 nanograms
- Duration of action 2-4 hours

Illicit Fentanyl



- Most illicit fentanyl originates in China
- Cheaper than heroin
- China has cracked down on fentanyl and some of its subtypes, or analogues
- Online dealers often tweak the formulas of their drugs slightly to stay ahead of bans



Overdoses on Fentanyl

- Overdoses first appeared a few years after approval in the 1970's
- Heroin laced with fentanyl to improve potency
- Drug users don't know (dealers measuring equipment isn't fine tuned enough to ensure non toxic levels)
- Street fentanyl impure
- Looks identical to heroin



Overdoses on Fentanyl

- Most fentanyl overdoses occur in the Eastern part of the country
- In Maine in 2015, 32 percent of drug-related deaths involved fentanyl
- In Philadelphia, 27 percent of overdose deaths included Fentanyl
- In parts of Florida, fentanyl-related deaths increased over 500 percent in three years

Combating the Crisis

- Tens of thousands of overdoses reversed
- Most saves done by amateurs
- Black tar heroin harder to adulterate
- Some organizations give out 250 kits per month
- Fentanyl testing strips



Treatment

- Detox
- Medication assisted treatment
- Treatment (Inpatient, outpatient, mental health therapy)