

OPIOIDS

A photograph showing various items associated with drug use on a wooden surface. In the foreground, a silver spoon is filled with a white, crystalline powder. To the right, a syringe with a needle is partially filled with a yellowish liquid. In the background, there is a vial with a red cap and a small white bag. The overall scene is dimly lit, emphasizing the textures of the powder and the metallic surfaces.

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OPIUM

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- Dried latex extracted from the opium poppy
- Oldest evidence comes from the Sumerian people (3000 BC)
- Morphine is the active ingredient



https://en.wikipedia.org/wiki/File:Restout_-_Morpheus.jpg

(Brownstein, 1993)

OPIATES VS. OPIOIDS

Opiates

- Natural substances derived from opium
- Ex. Morphine, Codeine



<https://www.stopyouraddiction.com/drugs/5-things-about-opiates-you-didnt-know/>

Opioids

- Synthetic and semi-synthetic substances
- Ex. Fentanyl



<https://www.cnn.com/specials/health/painkiller-opioid-addiction>

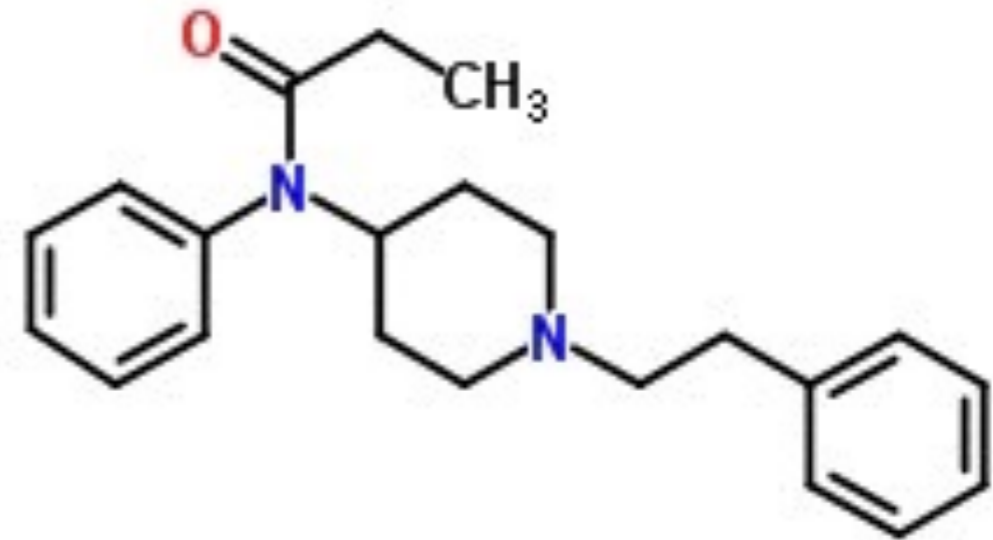
FENTANYL

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- Analgesic
- Anaesthetic

Effects

- Euphoria
- Drowsiness
- Nausea
- Confusion
- Sedation
- Warmth



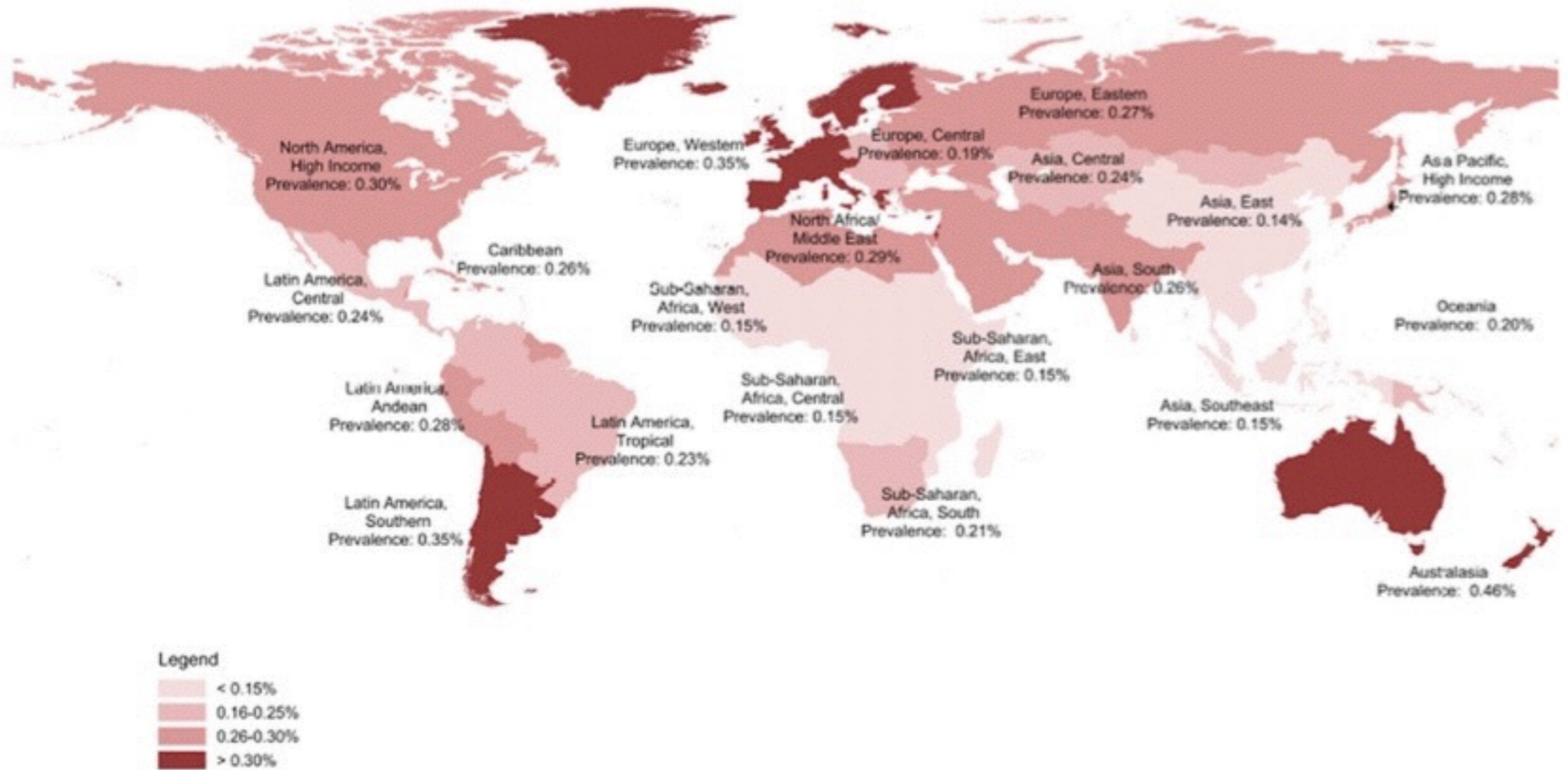
<http://www.chemspider.com/Chemical-Structure.3228.html>



Charles McQuillan/ Pacemaker

<http://www.dailymail.co.uk/health/article-2009405/Charles-McQuillan-Photographer-captures-life-saving-surgery-operating-table.html>

OPIOID DEPENDENCE

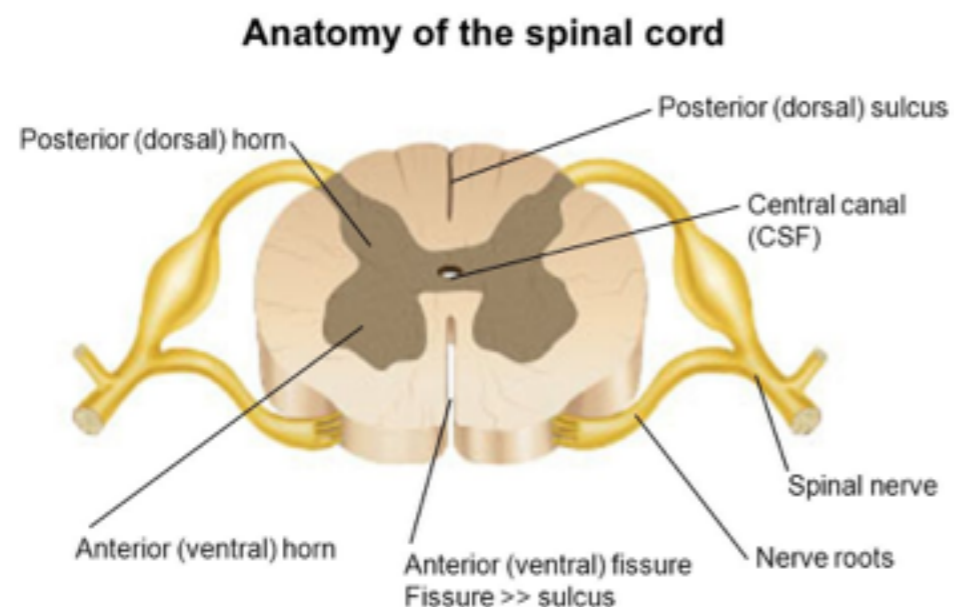


OPIOIDS IN THE BODY



PAIN

- Subjective
- Sensory + Psychological
- Opioids inhibit neurotransmitter release in the dorsal horn



<http://slideplayer.com/slide/9985164/>

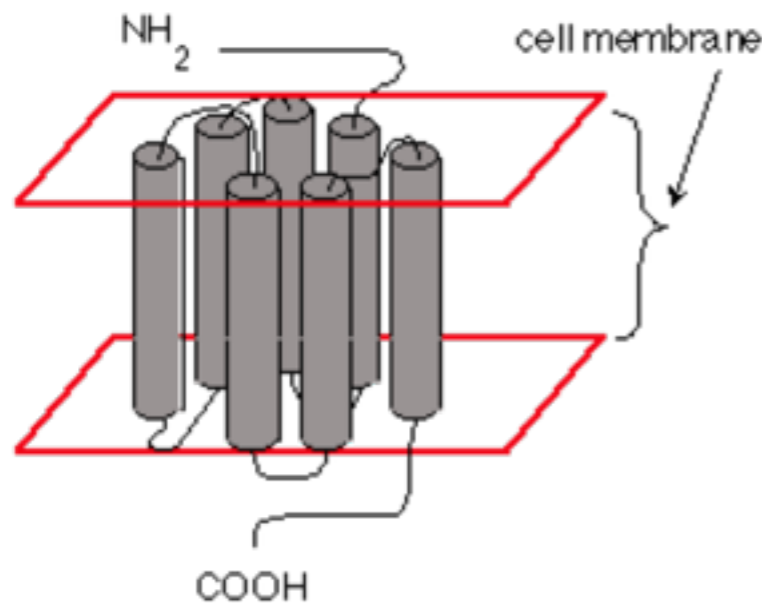
(Chahl, 1996)



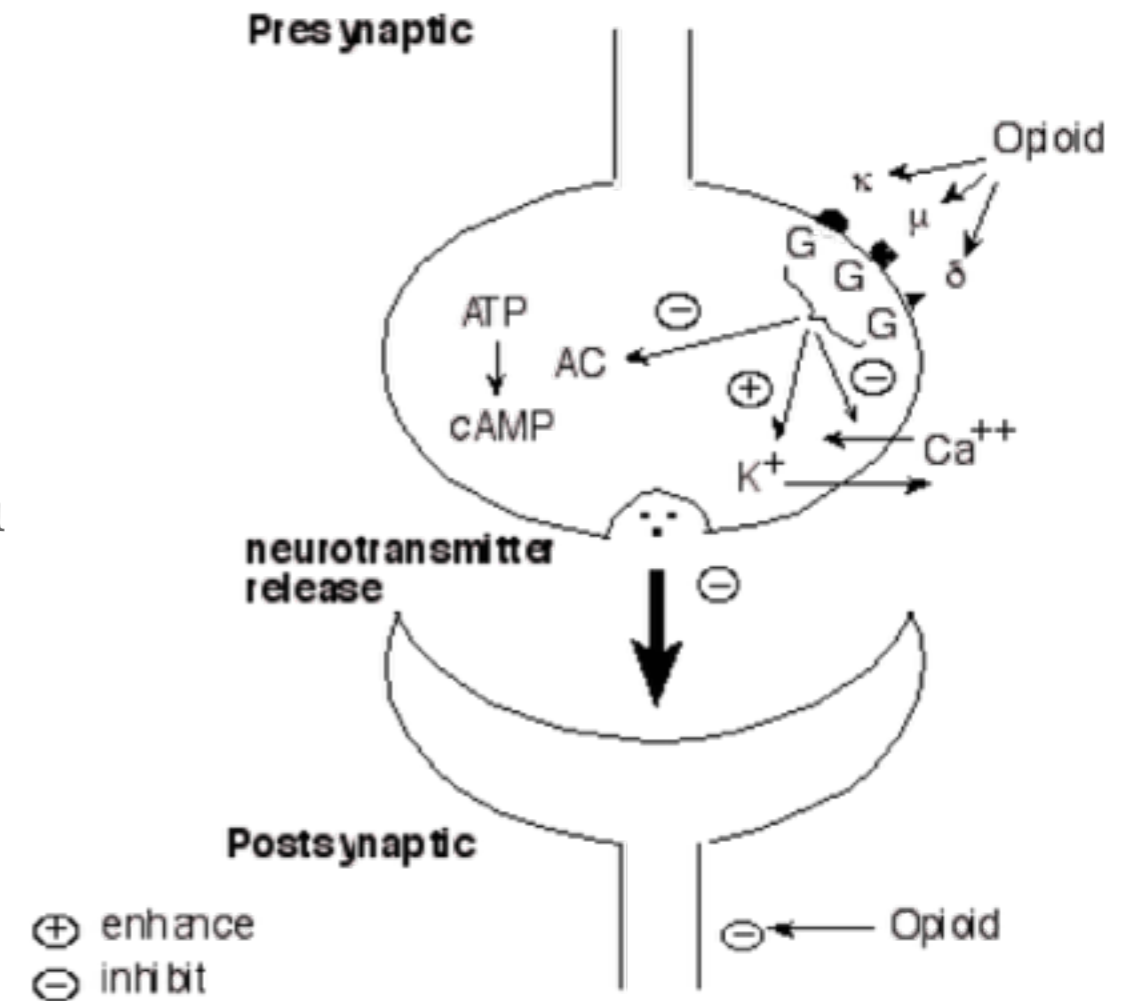
<https://www.arthritis.org/toolkits/arthritis-pain/>

MECHANISM OF ACTION

- Opioid receptors: μ , δ and κ
- Fentanyl mainly targets the μ receptor
- Activates G-protein receptors
- \uparrow pain tolerance and \downarrow pain perception

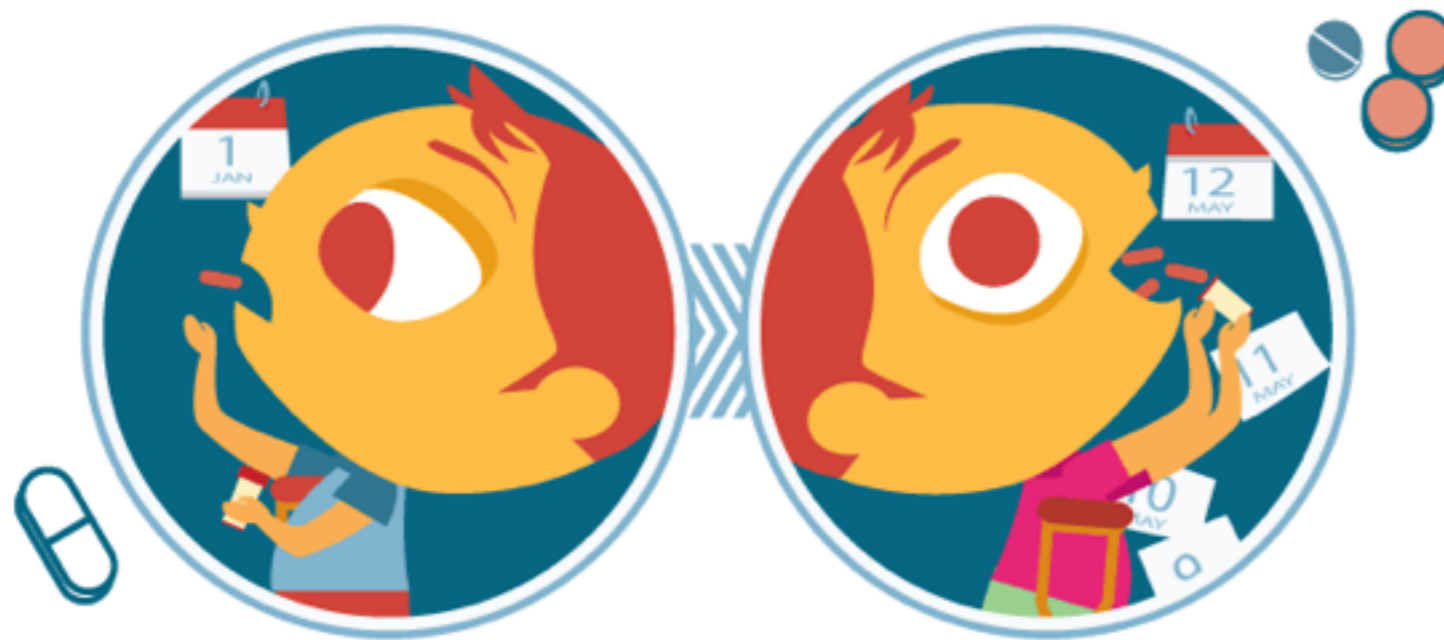


Human mu opioid receptor (Chahl, 1996)



Mechanism of action (Chahl, 1996)

TOLERANCE AND DEPENDENCE



<http://anotherchancecounselingcenter.com/tell-tale-signs-addiction>

Tolerance

- Due to prolonged exposure to the drug
- Receptor desensitization

(Chahl, 1996)

Dependence

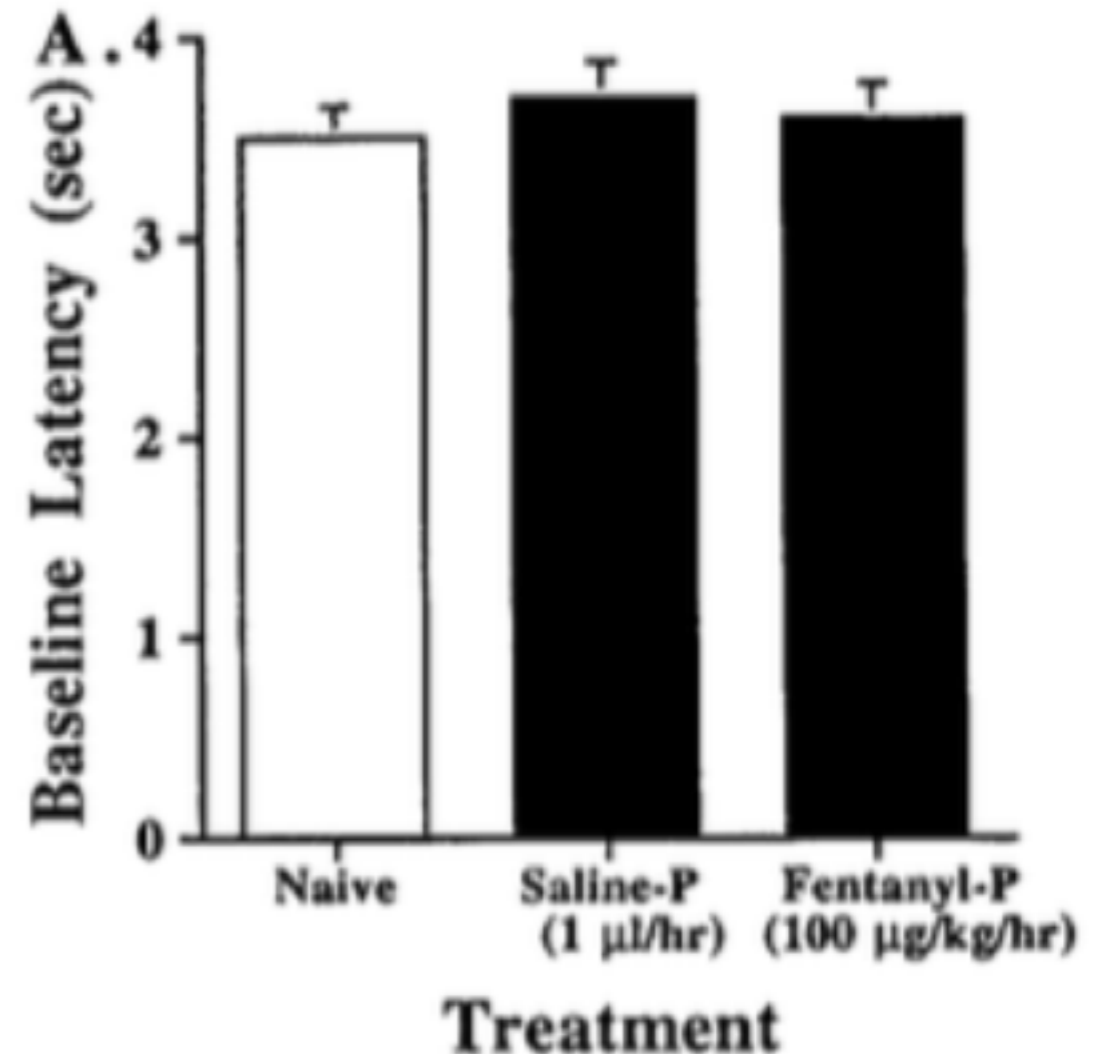
- Removal of the drug leads to withdrawal symptoms
- Sweating, insomnia, diarrhea, irritability

ANALYZING TOLERANCE AND DEPENDENCE

- Effects of fentanyl were analyzed in neonatal rats

Intervention

1. Continuous infusion of fentanyl (72 HR)
2. Continuous infusion of saline (72 HR)



No significant difference between the naive, saline-infused and fentanyl-infused rats.



MEDICAL USE: PAIN MANAGEMENT

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Fentanyl is administered through two methods:

1. Transdermal patch
2. Intravenous injection



<http://www.lyndon.org.au/wp-content/uploads/2016/03/Fentanyl-patch.jpg>

(Janssen, 2014; Joranson et al., 2000; Fentanyl Transdermal, 2018)

MEDICAL USE: EMERGENCE AGITATION

- Administered following anaesthesia
- Common in young children

Symptoms

- Crying
- Disorientation
- Excitation
- Delirium

(Janssen, 2014; Kim et al., 2012)



RECREATIONAL USE



<https://angeliadesign.com/2017/07/01/cartoon-recreational-drugs/>

- Highly addictive
- Extreme potency
- Users seek short-term euphoria and relaxation

(Cunningham et al., 2015; Lautieri, 2016)

ADVERSE EFFECTS OF OPIOIDS

1. Respiratory System
 - Respiratory Depression
2. Central Nervous System
 - Neurotoxicity
3. Gastrointestinal System
 - Constipation
4. Cardiovascular System
 - Heart failure



<https://www.respiratorytherapisteducation.com/respiratory-system/respiratory-system-luxury-respiratory-system-achim/>



https://www.psqh.com/app/uploads/2017/02/Venella_cover.jpg

(Boom et al., 2012; Chen & Ashburn, 2015; Voon, Karamouzian & Kerr, 2017)

OPIOID OVERDOSE



OPIOID OVERDOSING



<https://www.princeedwardisland.ca/en/information/health-and-wellness/preventing-opioid-related-overdoses>

➤ Toxicity due to excessive opioids

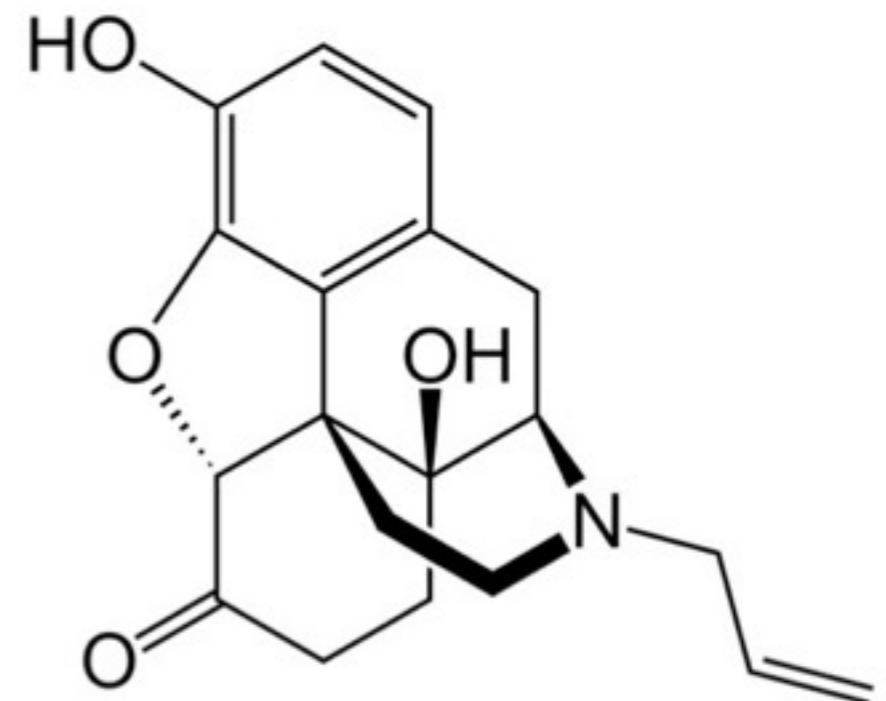
(Boyer, 2012)

NALOXONE - WHAT IS IT?

- Invented by Dr. Jack Fishman
- Used to treat effects of opioids
- Patented in 1961 and FDA approved in 1971

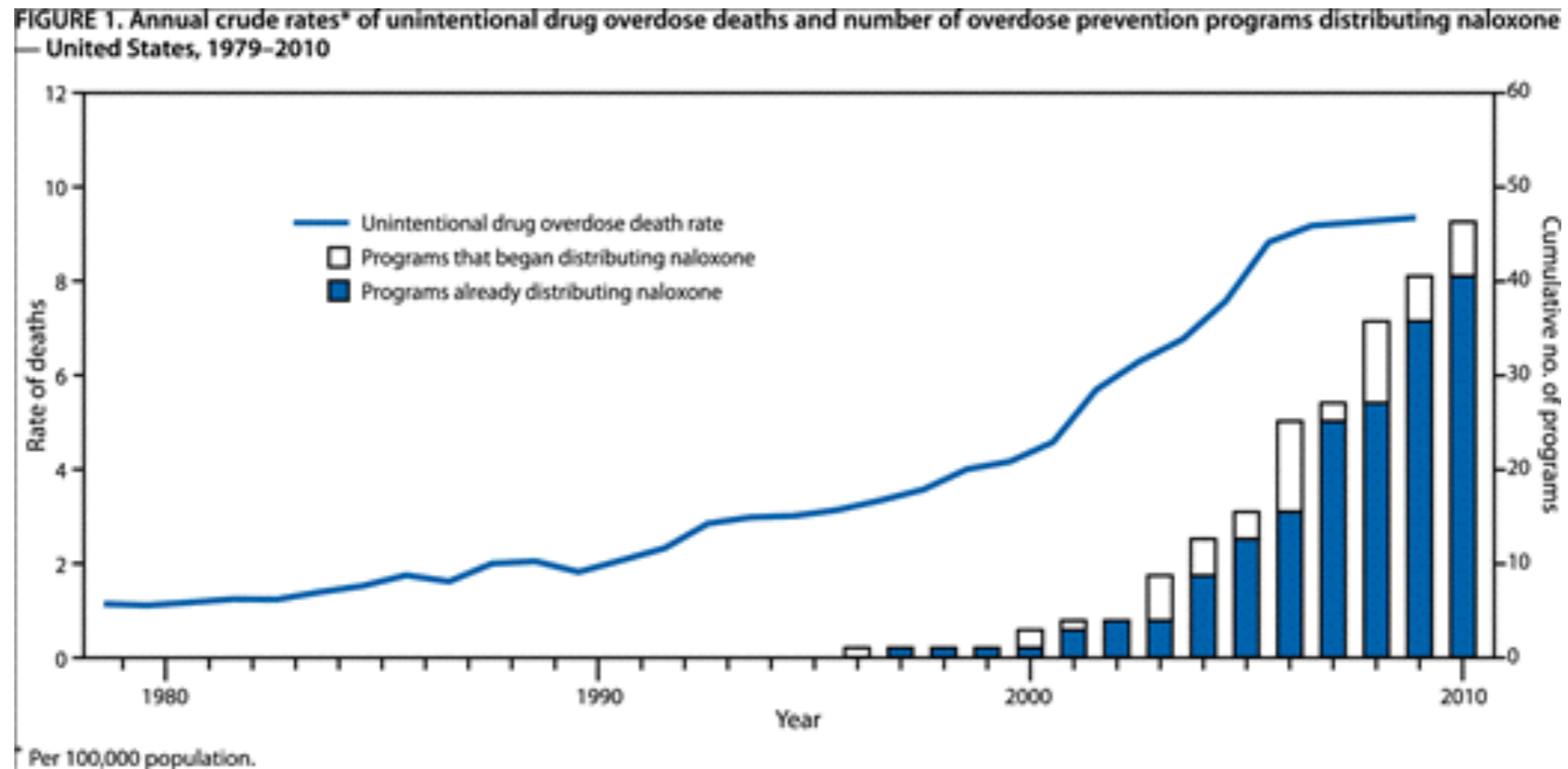


<http://www.nytimes.com/2013/12/15/business/jack-fishman-who-helped-develop-a-drug-to-treat-overdoses-dies-at-83.html>



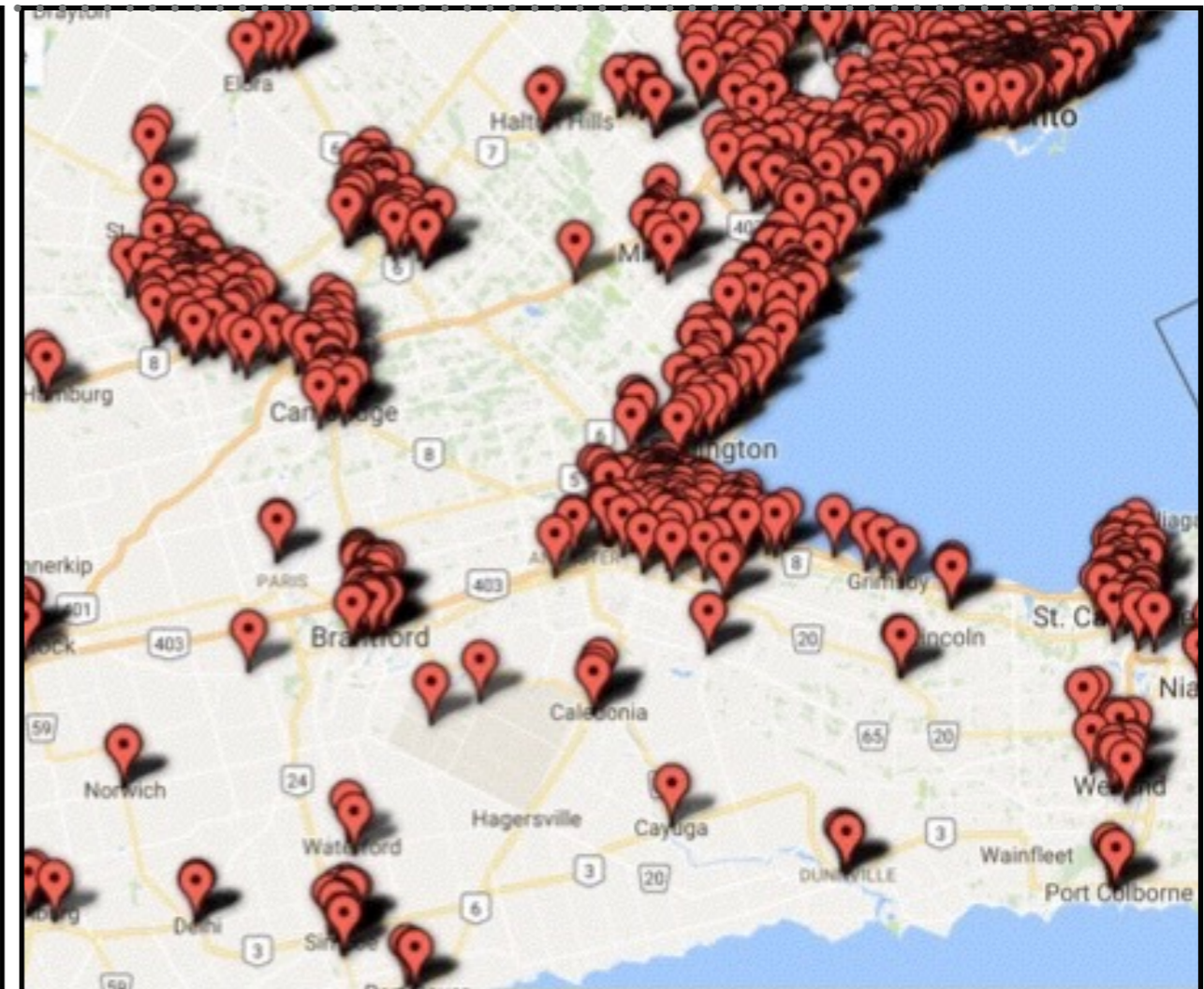
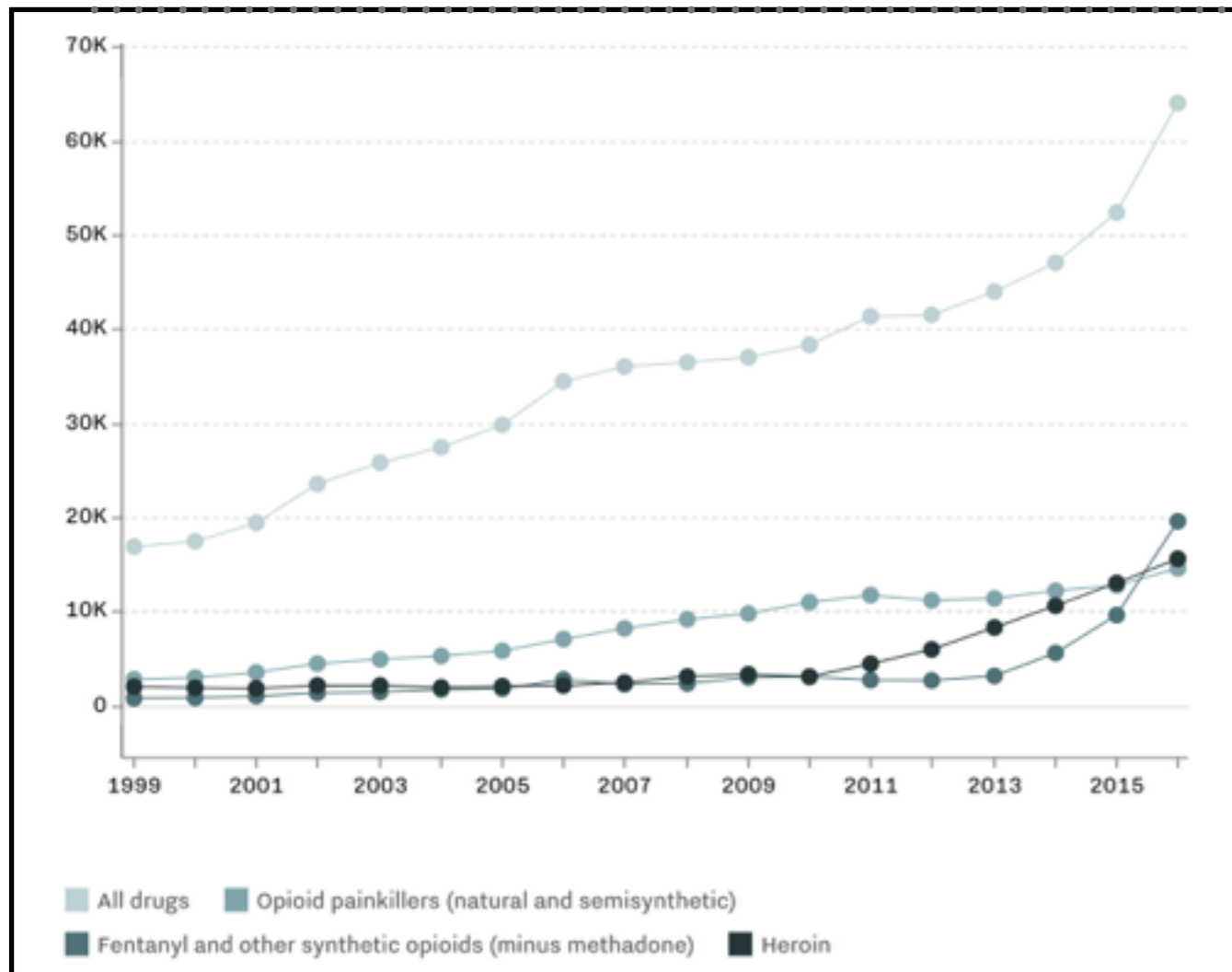
<https://en.wikipedia.org/wiki/Naloxone>

COMMUNITY BASED STUDY PROGRAM



- Mueller et al., 2015 conducted research to collect data on naloxone programs.
- Research suggests that individuals at risk and bystanders were willing to be trained to administer naloxone to prevent overdoses

HOW DOES IT RELATE TO ONTARIO?

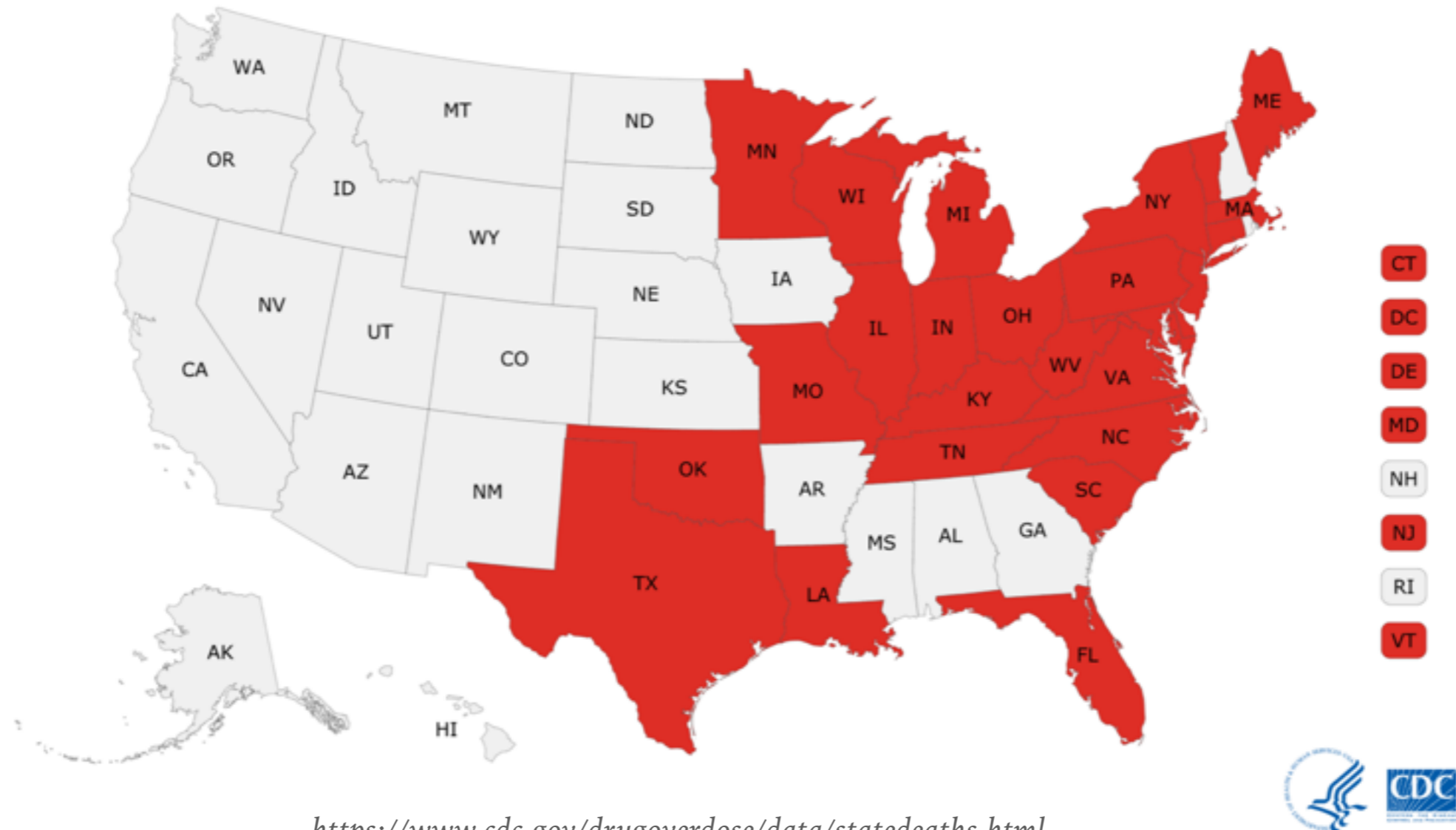


<https://www.vox.com/policy-and-politics/2017/9/5/16255040/opioid-epidemic-overdose-death-2016>

<https://www.ontario.ca/page/get-naloxone-kits-free>

- Major issue in Ontario and across Canada
 - 336 opioid related deaths from May - July 2017
 - 2,449 emergency room visits due to opioid overdoses from July - September.

(Jones, 2017)

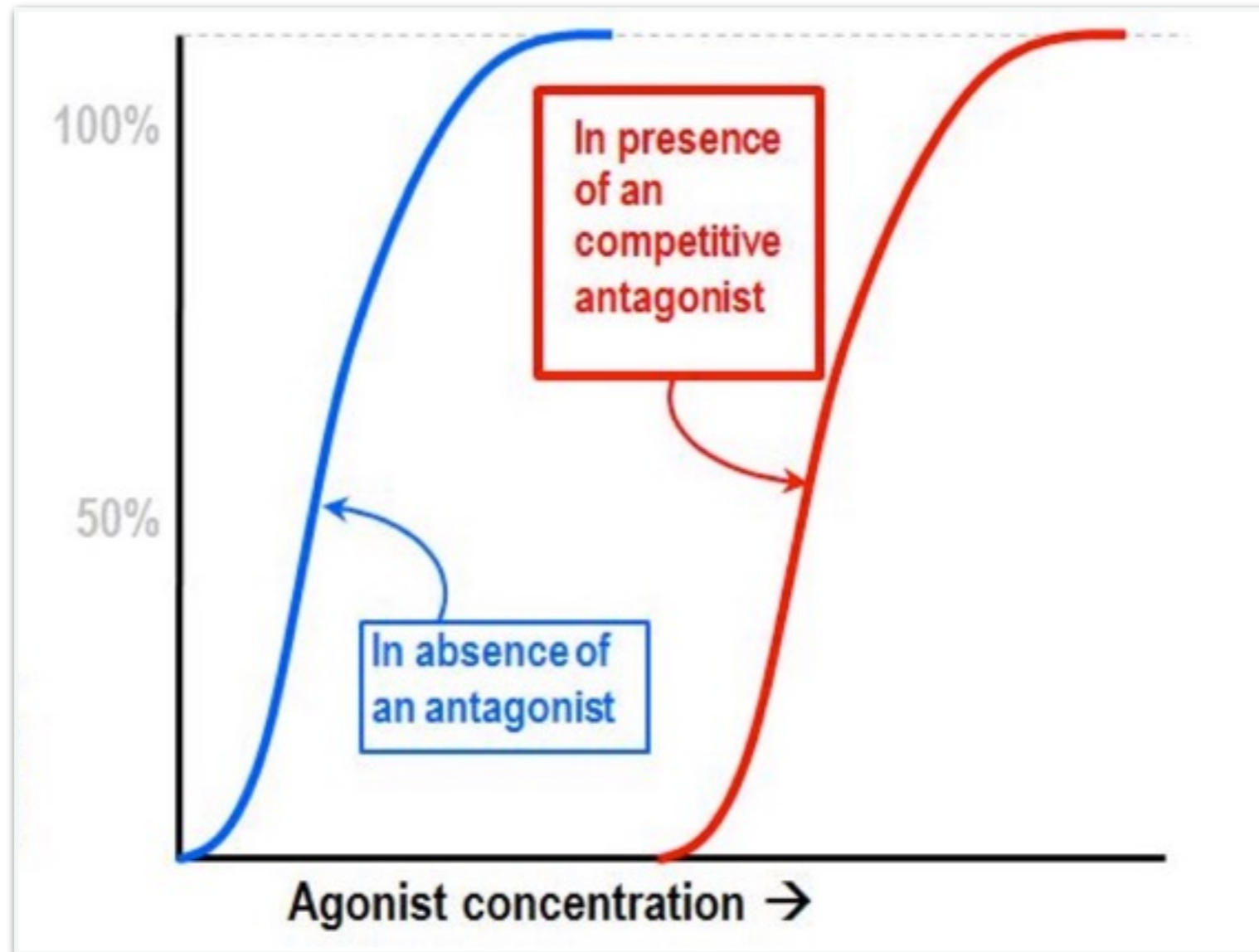


- Opioid related deaths in the US are 6 times higher from 1999 - 2016.
- The price of auto-injectors increased from \$690 - \$4500 from 2014-2016. Ethical issue?

HOW TO ADMINISTER NALOXONE

- <https://www.youtube.com/watch?v=oT8EsHuikwY>

NALOXONE – HOW DOES IT WORK?



- Lipophilic compounds that acts as a non-selective competitive opioid receptor antagonist
 - (-) naloxone is the pharmacologically active compound which binds to μ -opioid receptors

(Dowling et al., 2008)

EFFECTS OF NALOXONE

- Higher affinity for opioid receptors
- Effects
 - Dizziness
 - Weakness
 - Fever
 - Nausea
 - Chills
 - Shortness of breath
 - Seizures

(Cunha, 2016; Dowling et al., 2008; Sauro & Greenberg, 2018)



DRUG CUTTING

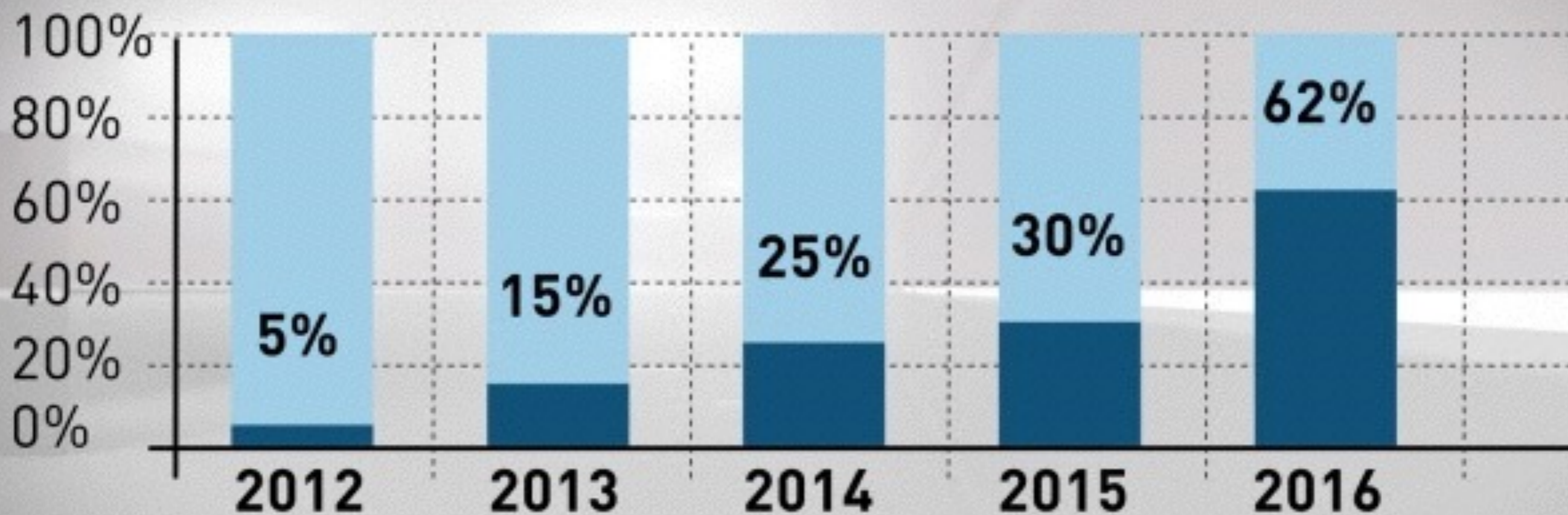
- Addition of different substances to a pure drug
- Reduces the cost of producing the drug
- Drugs can be cut with baking soda, rat poison or other drugs



<https://www.gov.uk/government/news/drugs-stronger-powers-to-seize-drug-cutting-agents>

(American Addiction Centre, 2018)

Percentage of illicit drug deaths in which fentanyl detected 2012-2016



<http://www.cbc.ca/news/canada/british-columbia/fentanyl-science-potent-deadly-1.3760244>

HOW MUCH FENTANYL DOES IT TAKE TO KILL YOU?



<http://nbc4i.com/2017/05/04/police-show-how-much-fentanyl-it-takes-to-kill-you/>

QUESTIONS?



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