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Opioid Addiction 101: A brief primer for the Criminal Justice System

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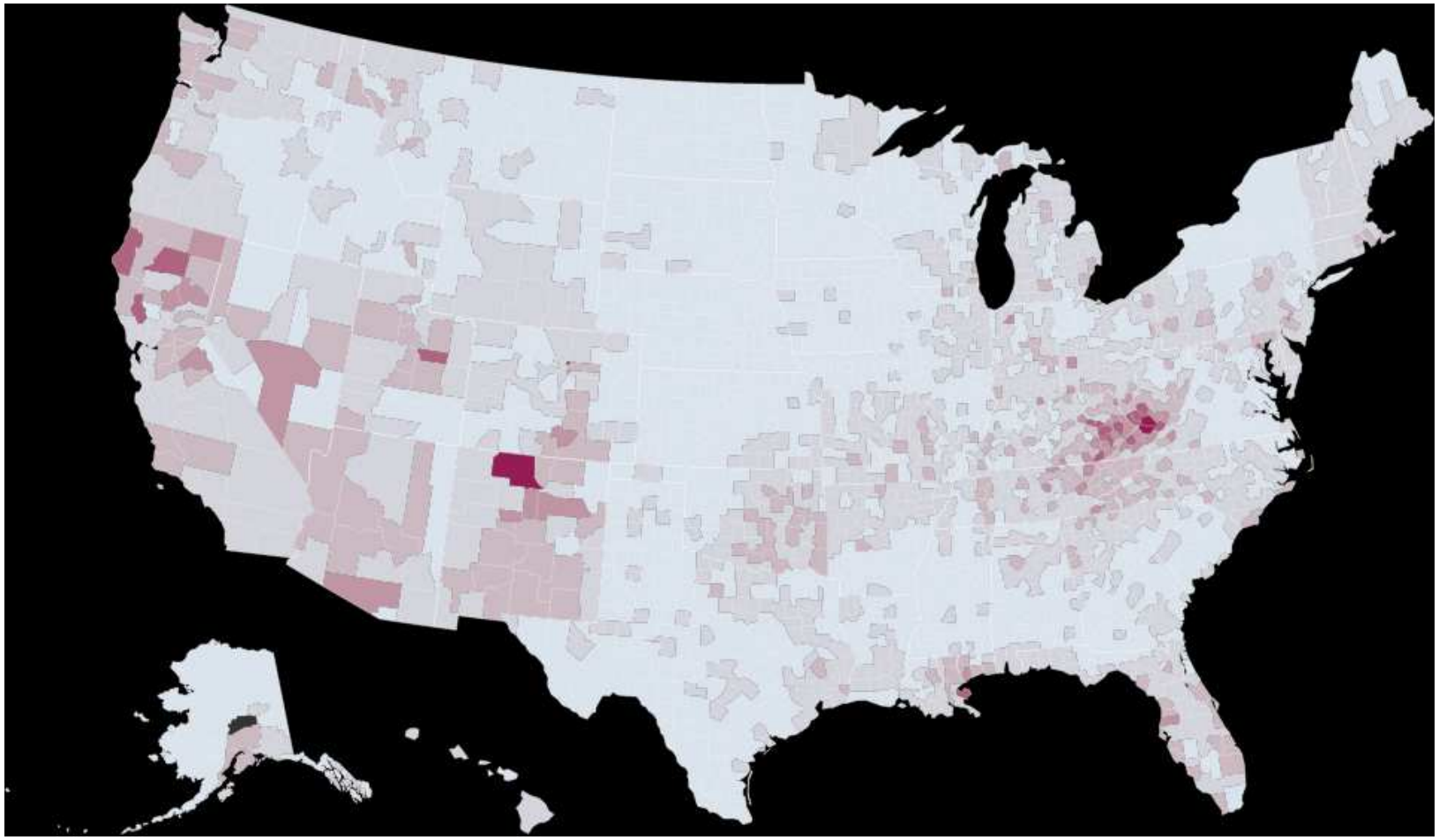
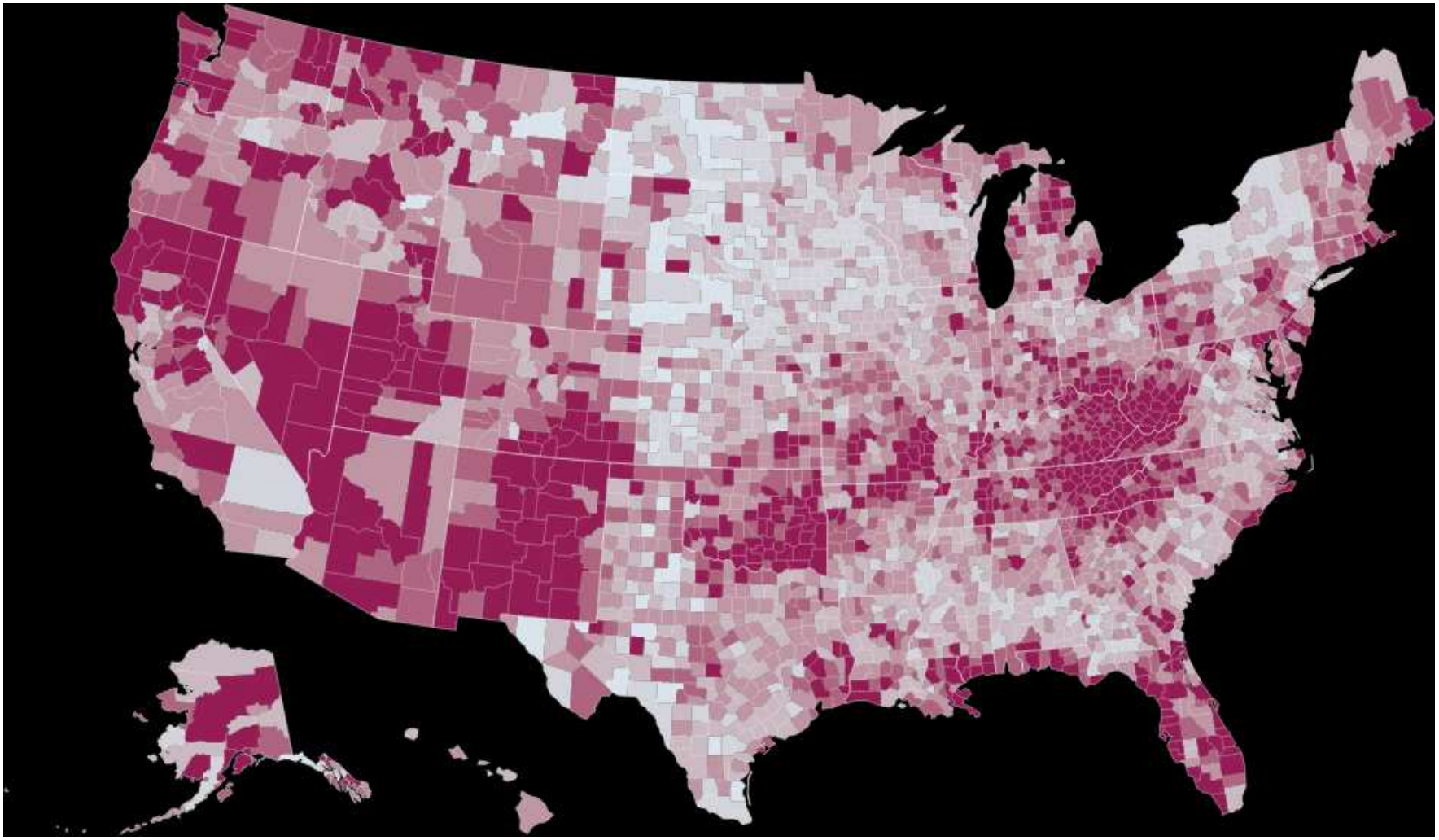
Questions to address

- Our current opioid crisis: what is the extent, who is affected, how did we get here?
- What does it mean to be “addicted?”
- Why do some people become addicted?
- What accounts for the transition from use to addiction?
- What are the consequences of that transition?
- Why can’t someone who has become addicted just stop and stay off opioids?
- What interventions are (ineffective or harmful) or effective?

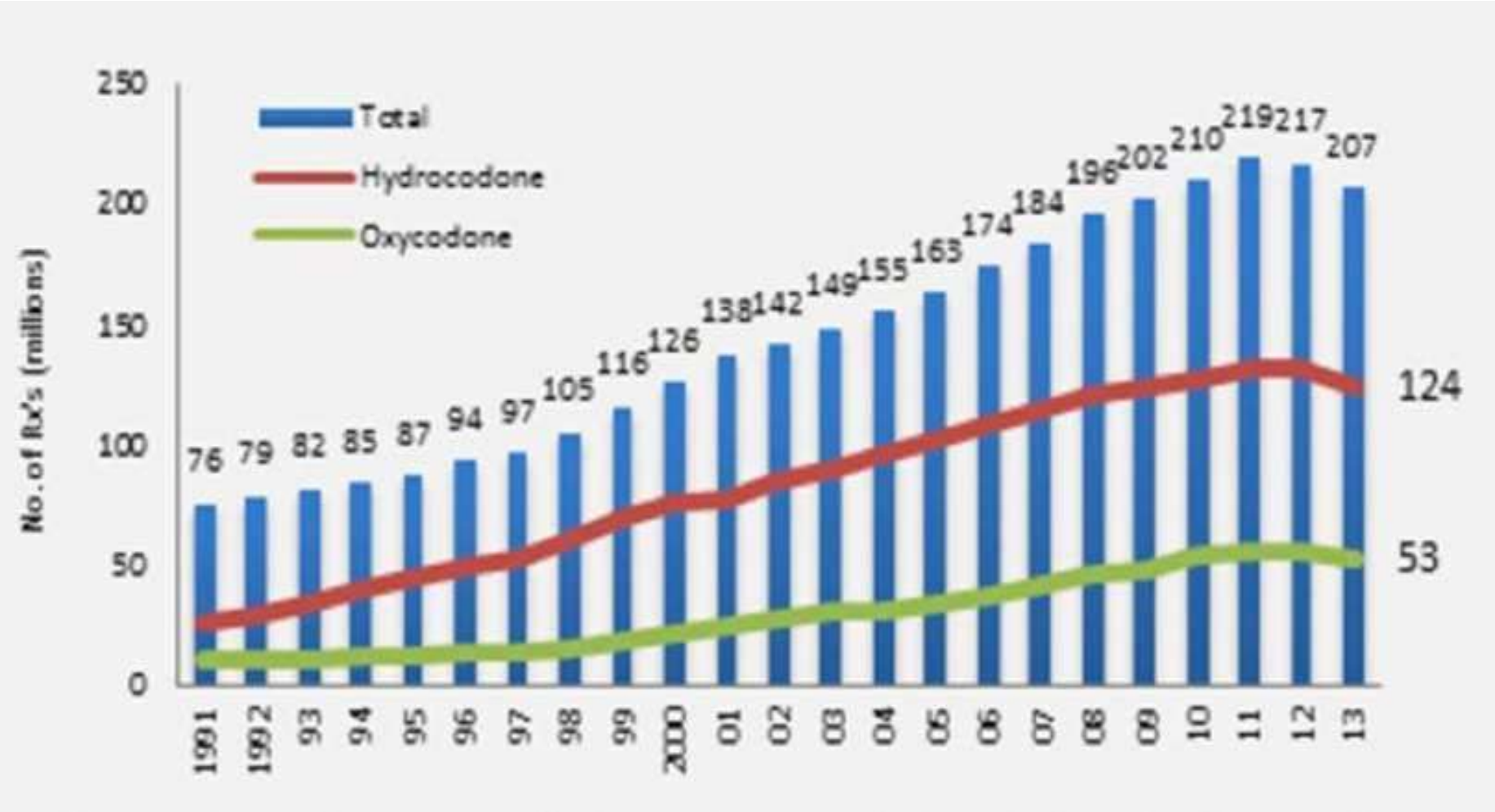
Our current opioid epidemic: 1999 overdose deaths hotspots

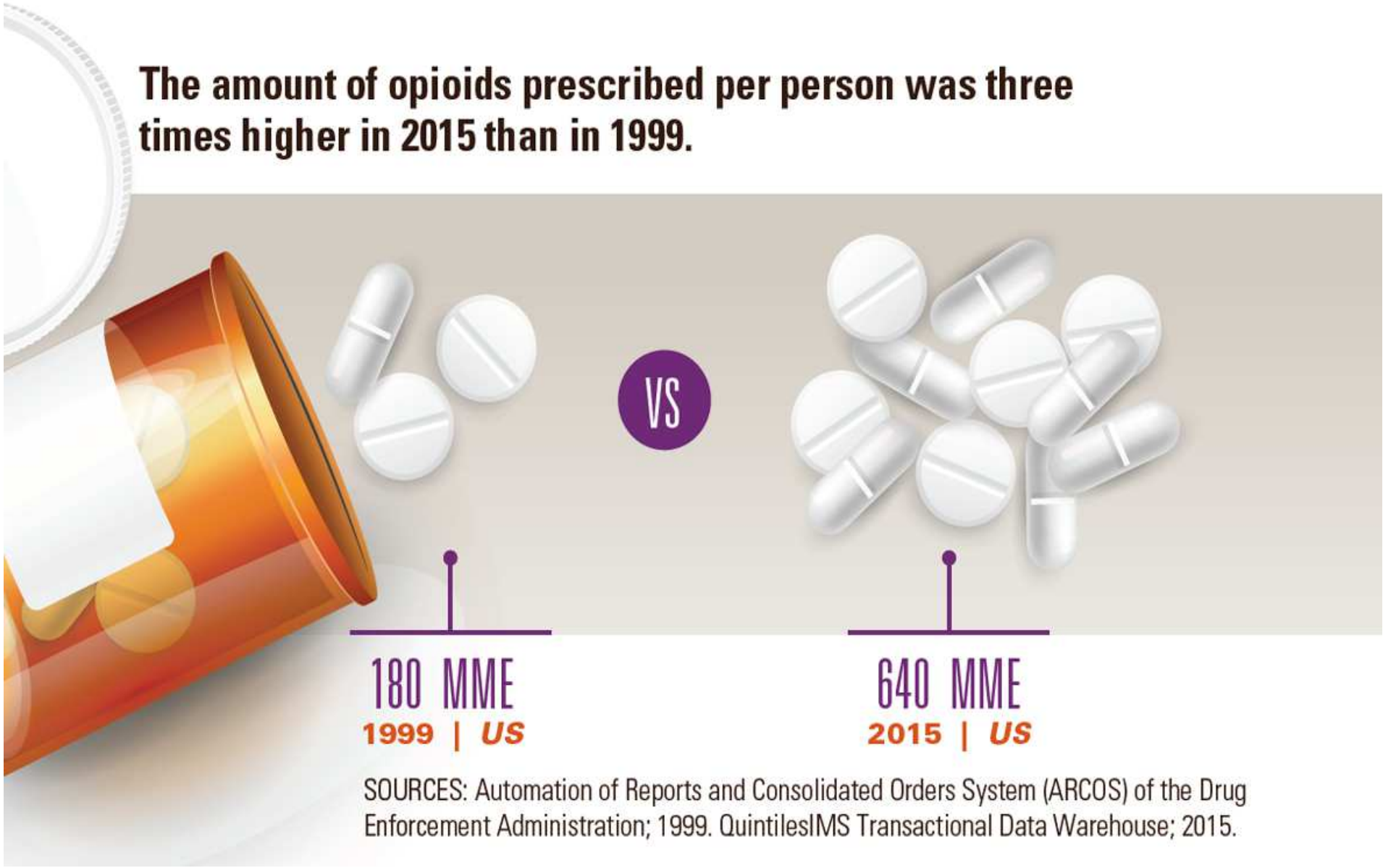


Our current opioid epidemic: 2014 overdose deaths hotspots



What happened? Increased prescribing of opioid pain medications





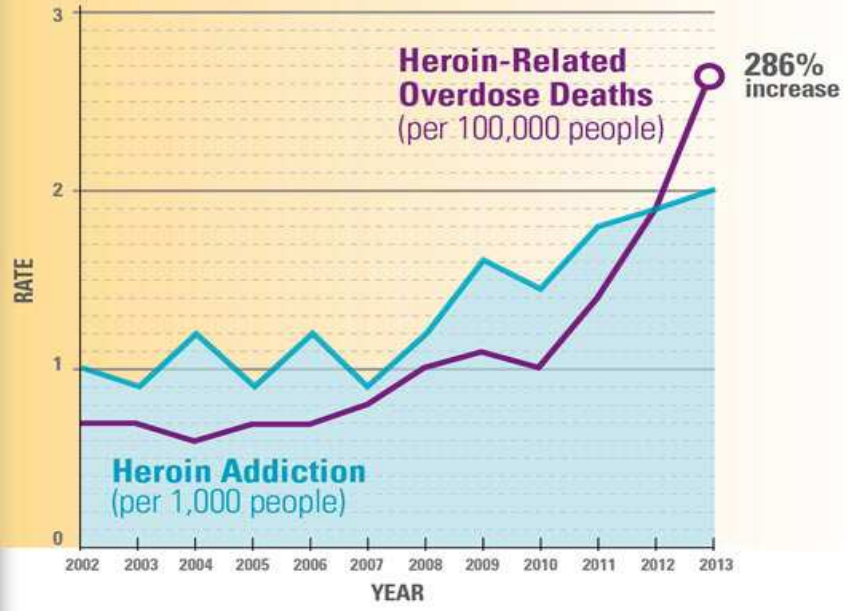
Sources: CDC [Automation of Reports and Consolidated Orders System (ARCOS) of the Drug Enforcement Administration; 1999. Quintiles. IMS Transactional Data Warehouse; 2015.]

From prescription opioids to heroin: Heroin use rising rapidly in the U.S. over past decade

Heroin Use Has INCREASED Among Most Demographic Groups

	2002-2004*	2011-2013*	% CHANGE
SEX			
Male	2.4	3.6	50%
Female	0.8	1.6	100%
AGE, YEARS			
12-17	1.8	1.6	--
18-25	3.5	7.3	109%
26 or older	1.2	1.9	58%
RACE/ETHNICITY			
Non-Hispanic white	1.4	3	114%
Other	2	1.7	--
ANNUAL HOUSEHOLD INCOME			
Less than $20,000	3.4	5.5	62%
$20,000–$49,999	1.3	2.3	77%
$50,000 or more	1	1.6	60%
HEALTH INSURANCE COVERAGE			
None	4.2	6.7	60%
Medicaid	4.3	4.7	--
Private or other	0.8	1.3	63%

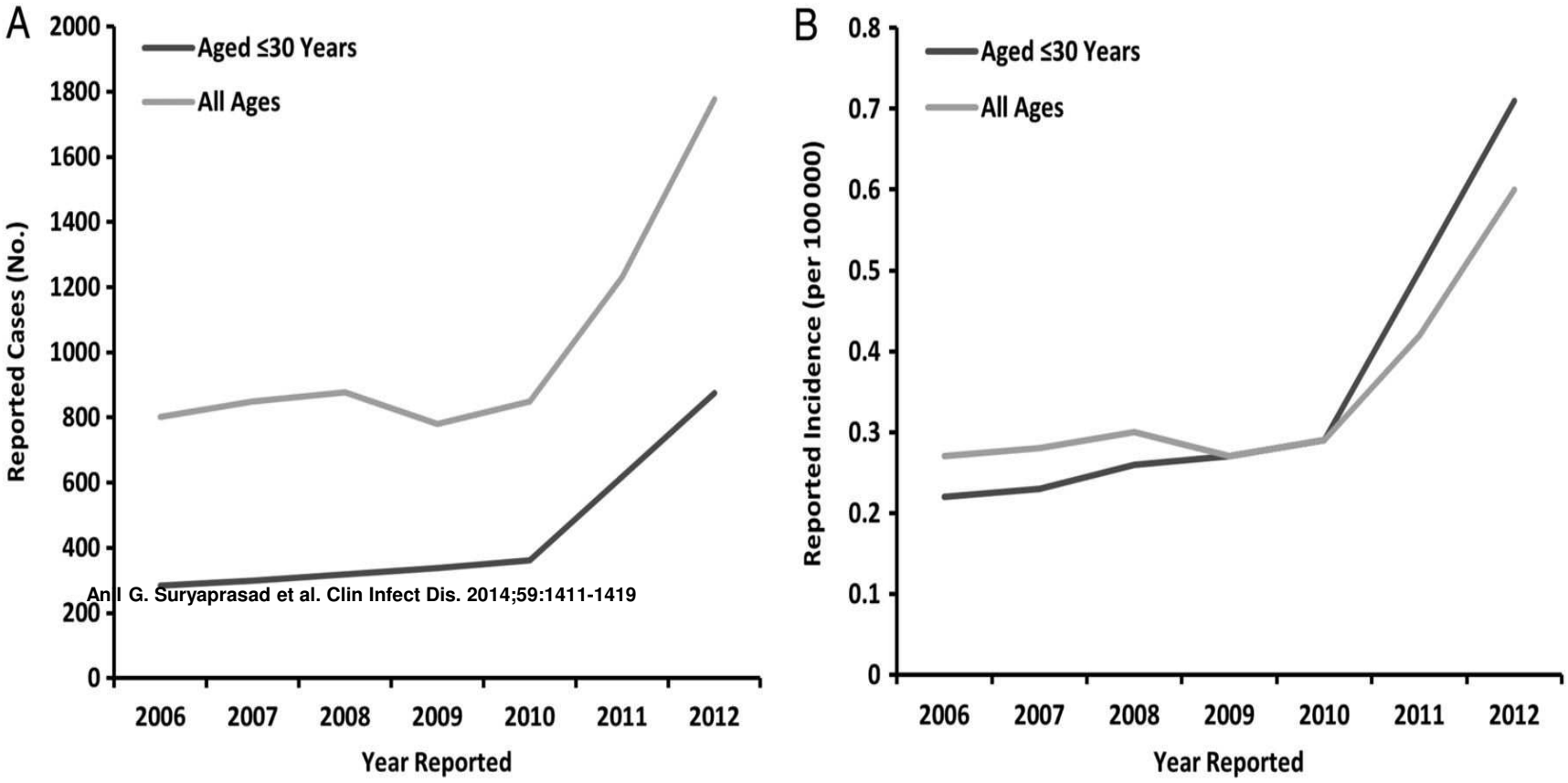
Heroin Addiction and Overdose Deaths are Climbing



SOURCES: National Survey on Drug Use and Health (NSDUH), 2002-2013.
National Vital Statistics System, 2002-2013.

Transition to heroin and injection opioid use is fuelling a new Hepatitis C epidemic

Number of cases (A) and incidence (B) of acute hepatitis C reported to CDC by year among young persons and all persons, United States, 2006-12.



Anil G. Suryaprasad et al. Clin Infect Dis. 2014;59:1411-1419

Key Points

- Not everyone who uses becomes addicted:
  - ~1 out of 5 (or 1 out of 7) people who use become addicted.
- With so many people exposed, ~ 2.6 million addicted.
  - Even if we curtail overprescribing and reduce the number of people becoming addicted, we are left with millions of people who are already addicted: the horse is out of the barn.
- Anyone can become addicted.
- The likelihood that a person transitions from use to addiction is affected by many factors, including:
  - situational (suffering from depression, anxiety, loss, or pain; stress; reward deprivation or frustration), genetic, psychological or emotional vulnerability.
- Final common pathway: Regardless of risk factors, addiction fundamentally results from drug-induced changes in the person's brain reward, motivational, memory, and impulse control systems.

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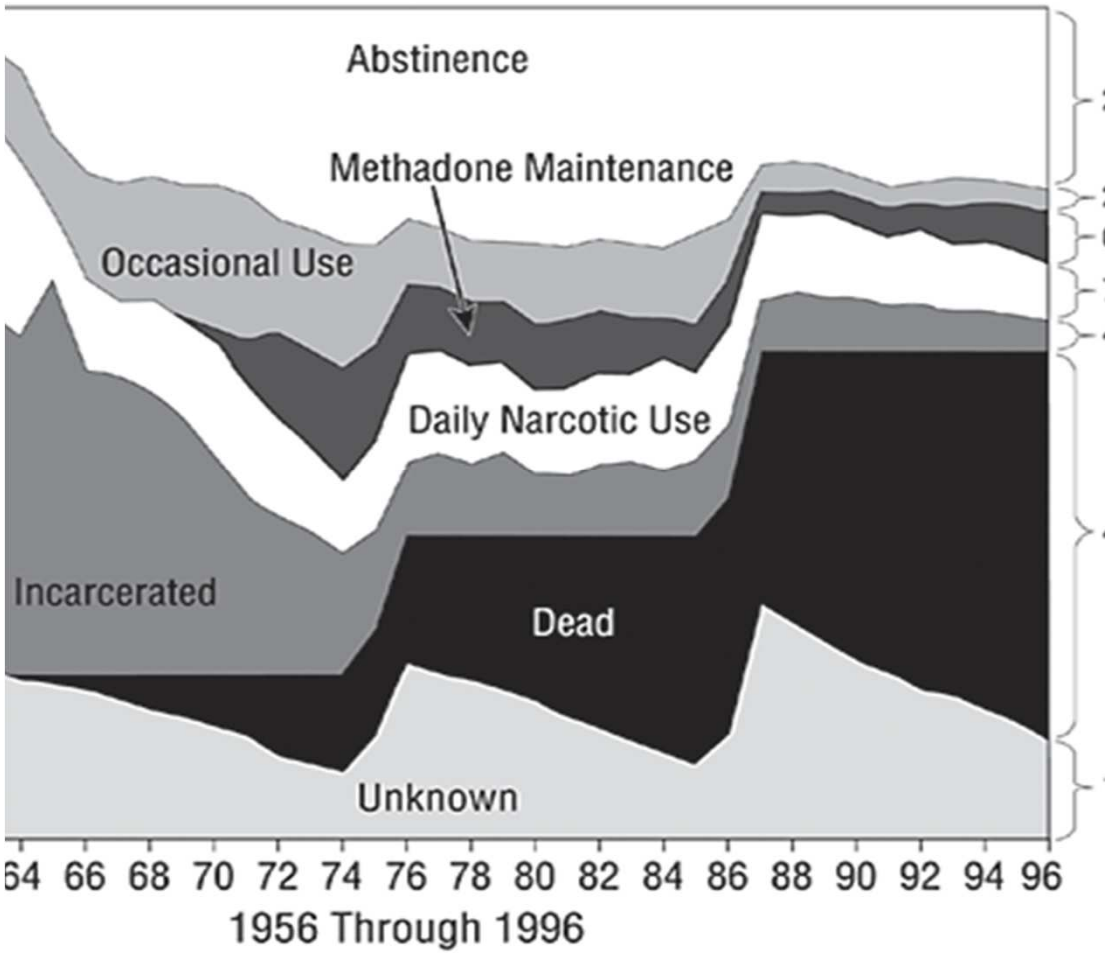
Physical dependence ≠ addiction

- **Physical Dependence:** Prolonged use of opioid medications leads to tolerance (need higher doses to get effects) and physical dependence (withdrawal, feel sick when stop opioid use)
- **Addiction (Substance Use Disorder):** Opioid drug becomes the central focus and primary reward; hallmarks include preoccupation/craving, continued use despite bad consequences of use
- Brain "rewired" so drug more important than anything else, all person thinks about or wants, person feels awful without it, relapse common

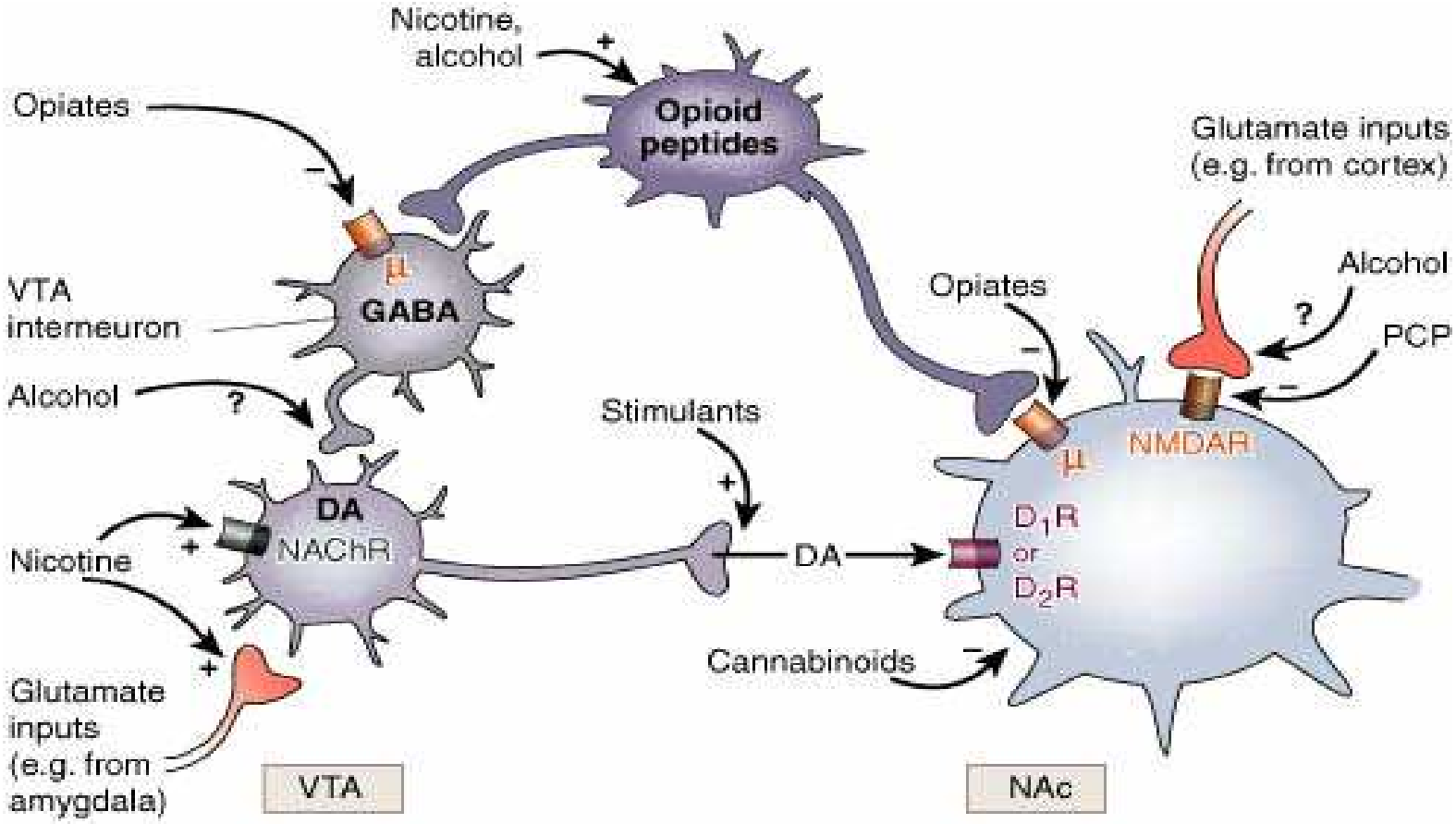
What happens when someone becomes addicted to opioids? Disease with dire consequences

- 33-year follow, patients treated in CAP:
- 48 % died; mainly due to opioid use disorder
- Very few (<20%) achieve long-term abstinence
- ~1/6 of those using at 20-year follow-up were abstinent 10 years later
- ~1/6 of those abstinent for <5 years at 20-year follow-up were abstinent 10 years later
- High relapse even after long-term abstinence: ¼ of those abstinent >15 years relapsed over next 10 years



Source: Yih-Ing, et. al., 2001. A 33-Year Follow-up of Narcotics Addicts. Archives of General Psychiatry, 58:503-508)

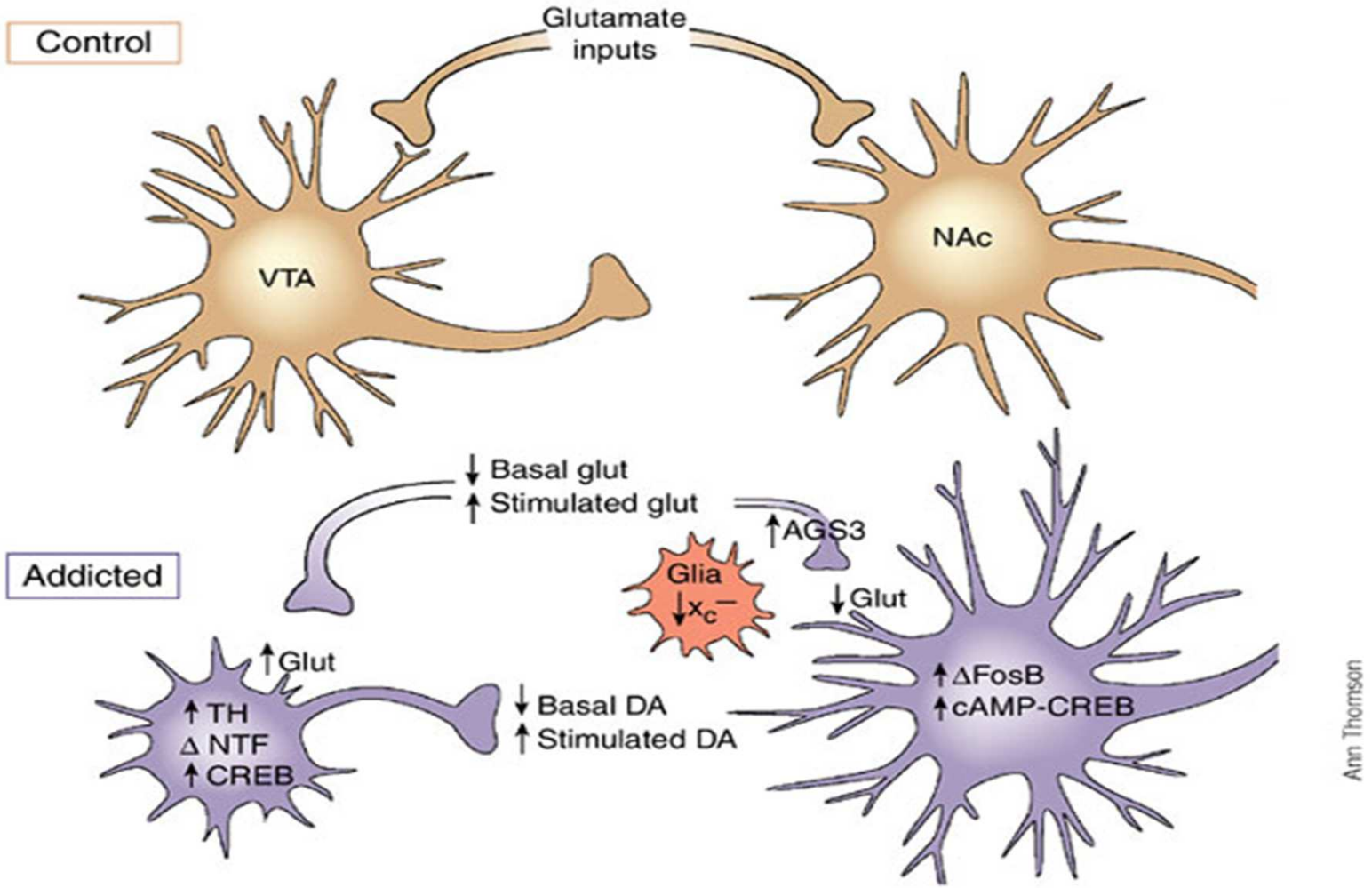
Addiction Is a Brain Disease: Drugs of Abuse Act on Brain Reward Circuits



Hyman SE, et al. 2006.
Annu. Rev. Neurosci. 29:565–98

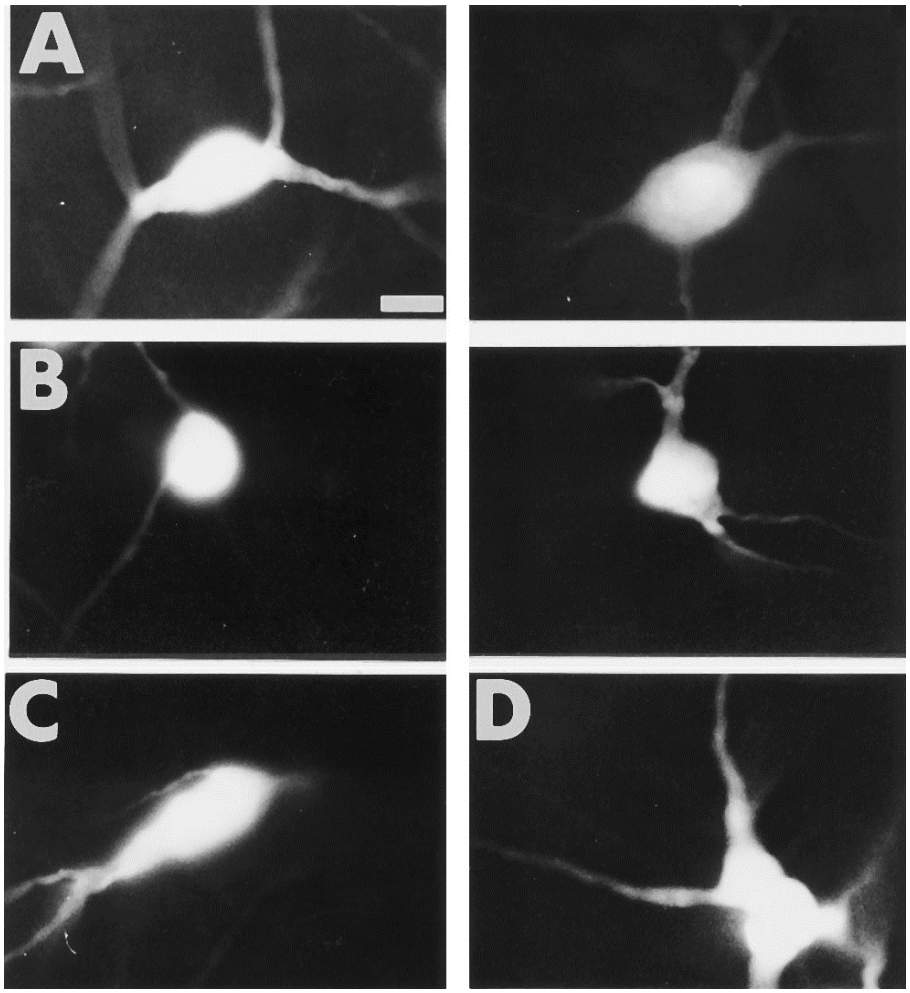
Repeated use changes brain reward system

Nestler E. Nature Neuroscience (2005), 8:1445-1449



Morphine effects on brain cells in the brain reward system

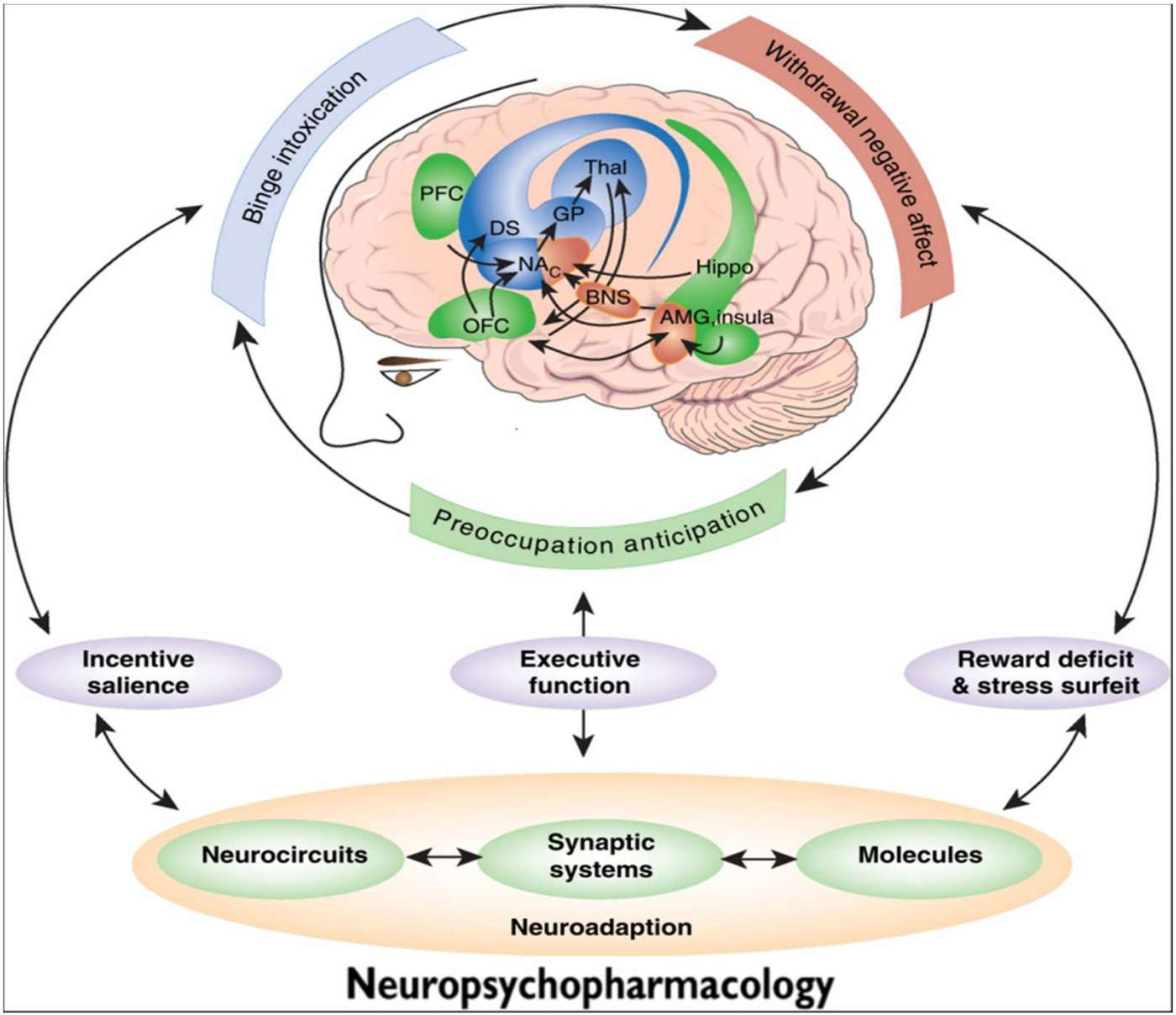
Sklair-Tavron, Proc. Natl. Acad. Sci 93:11202-11207, 1996



- A) Control rats; normal nerve cell in brain reward system
- B) Morphine-treated rat; altered nerve cell in brain reward system
- C) BDNF-treated
- D) BDNF+morphine (BDNF blocks damaging effects of morphine)

Neurobiology of addiction schematic

Wise RA and Koob GF. Neuropscyhopharmacology (2014), 39:254-262



Drugs hijack critical brain circuitry

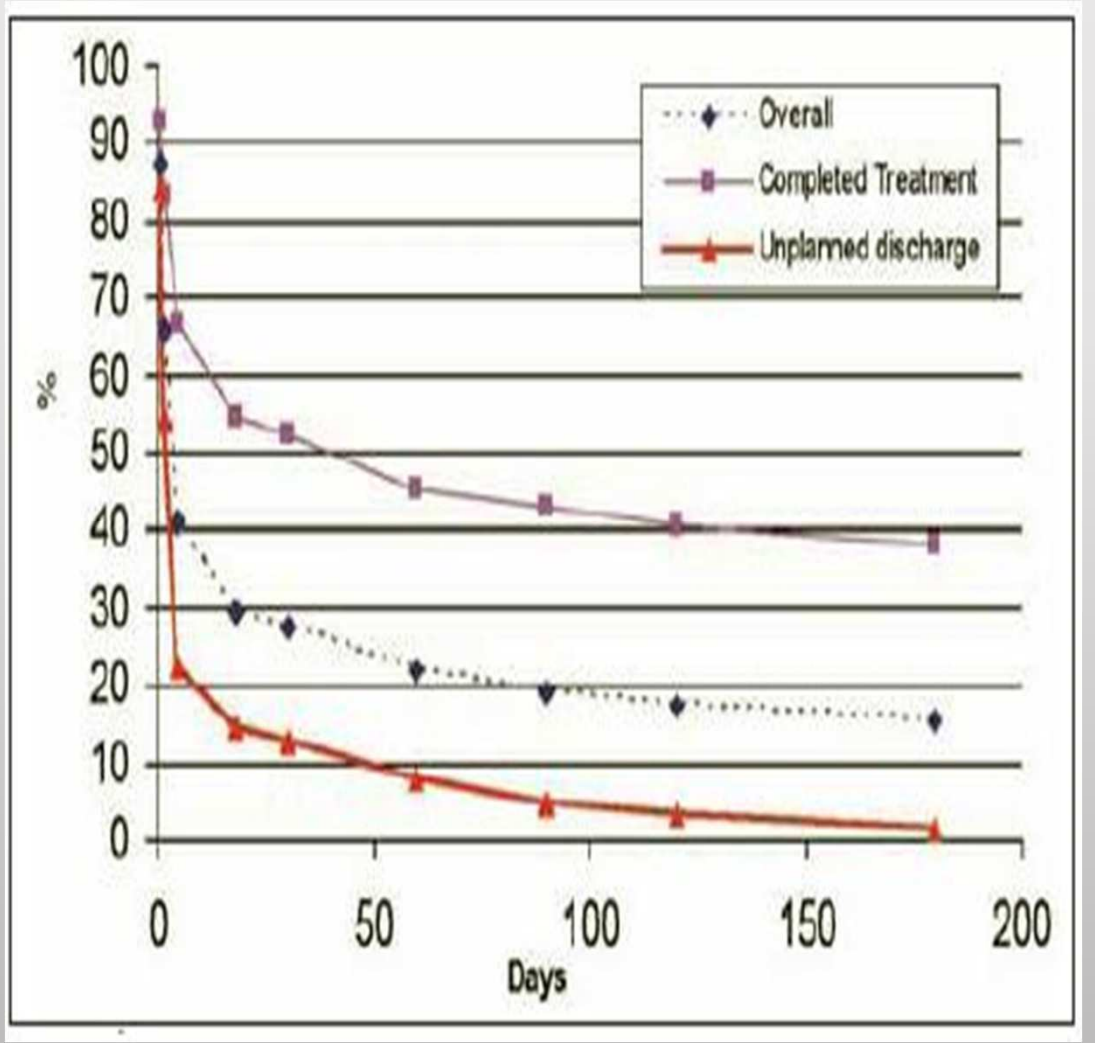
- We (our brains) are hard-wired to pursue our vital needs (food, oxygen, reproduction, care of offspring) at all costs
- Pursuit of these needs is driven by phylogenetically old areas of our brain (“lizard brain”)
- These brain structures are highly conserved, essential to survival
- Infant survival depends on parent “falling in love” with baby
  - being preoccupied about and wanting to be with/protect the baby,
  - feeling bad when away from the baby,
  - being willing to sacrifice all other interests to take care of the baby
- When vital needs are threatened, we pursue/defend them, often without thinking, at all costs

The most commonly used approach (detoxification/residential) doesn't work

- Irish study: 6-week residential detox/treatment
- 149 patients enrolled; **5 patients died;** follow-up on 103 patients
- Within 6 months, 103 (94%) of the 109 reported a lapse; 99 (91%) relapsed. Within one week of discharge, 72 (66%) had lapsed and 64 (59%) had relapsed

- Source: Smyth, B. P., et al. "Lapse and relapse following inpatient treatment of opiate dependence." *Irish medical journal* (2010).

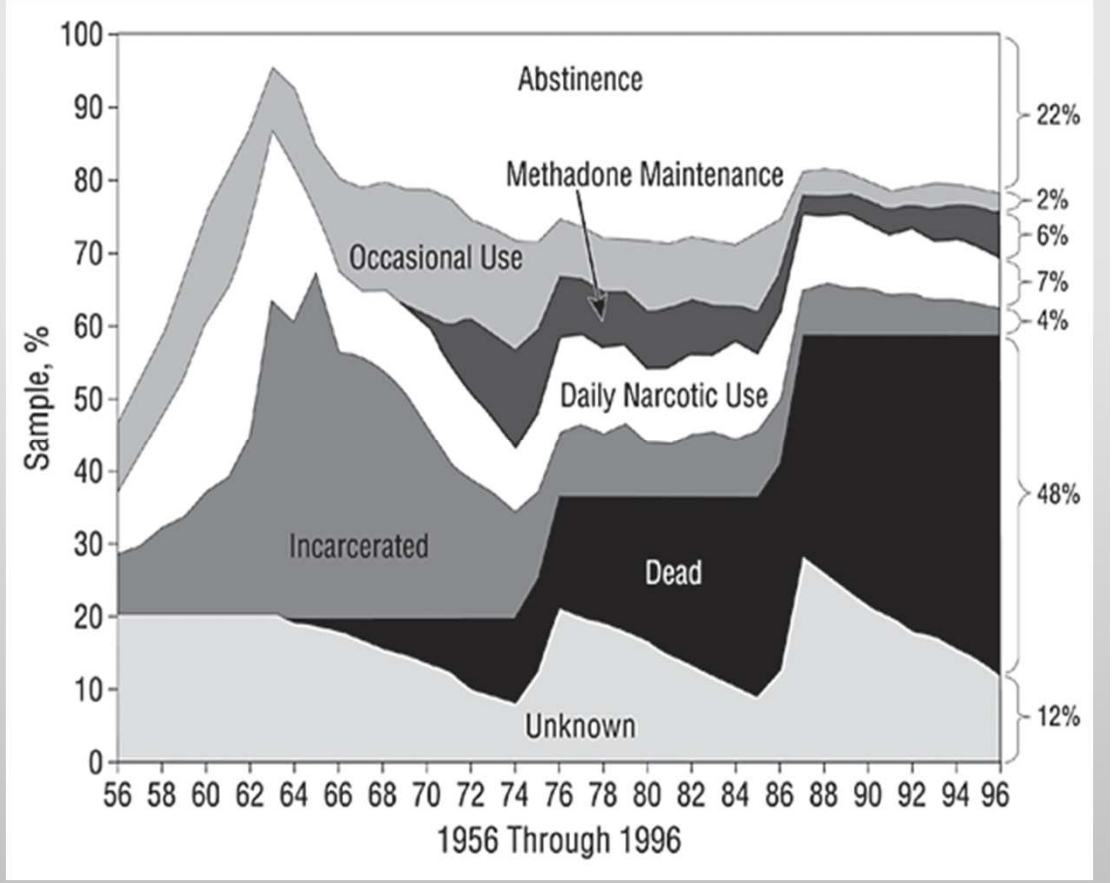
Relapse rates



What harm is there to detox? Doesn't it sometimes take a few tries before it works?

- 33-year follow-up of patients treated in CAP: **48 % died**
- Irish 6-week residential treatment: **5 of the 149 patients died during the 6-month follow-up period**; 35 could not be traced
- Lethal disease; **Overdose (and infectious disease) risk substantially increased following detoxification or incarceration!**

33-year follow-up, CAP



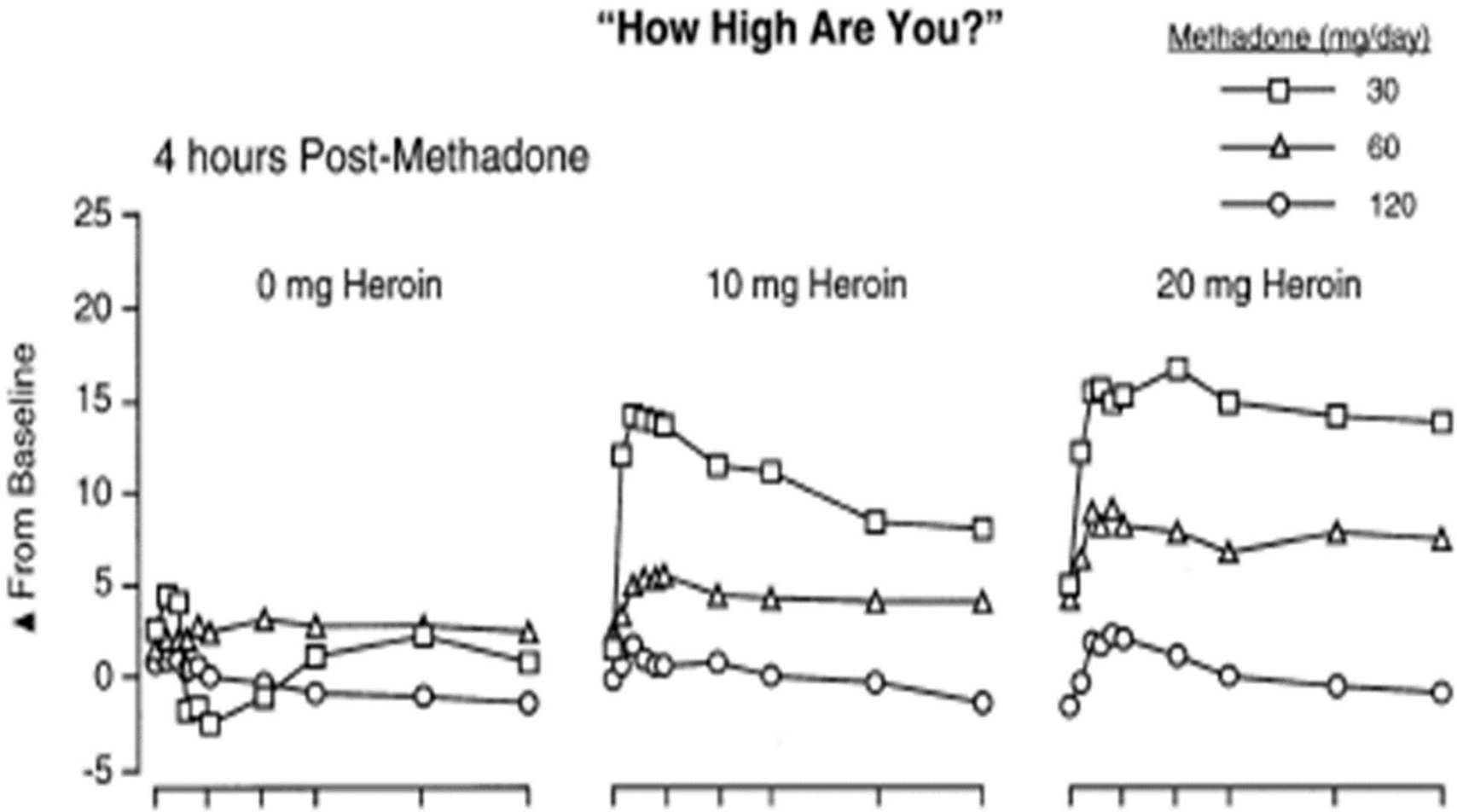
What treatments are effective?

- Medication Assisted Treatment (MAT): The use of a medication to help promote recovery
- What medications: agonist (methadone), partial agonist (buprenorphine), long-acting injectable antagonist (naltrexone)
- Medications: platform to support recovery
- MAT **improves health and reduces drug use, overdose and infectious disease transmission risk, criminal activity**
- Strongest evidence for MAT with methadone or buprenorphine

Rationale: buprenorphine or methadone

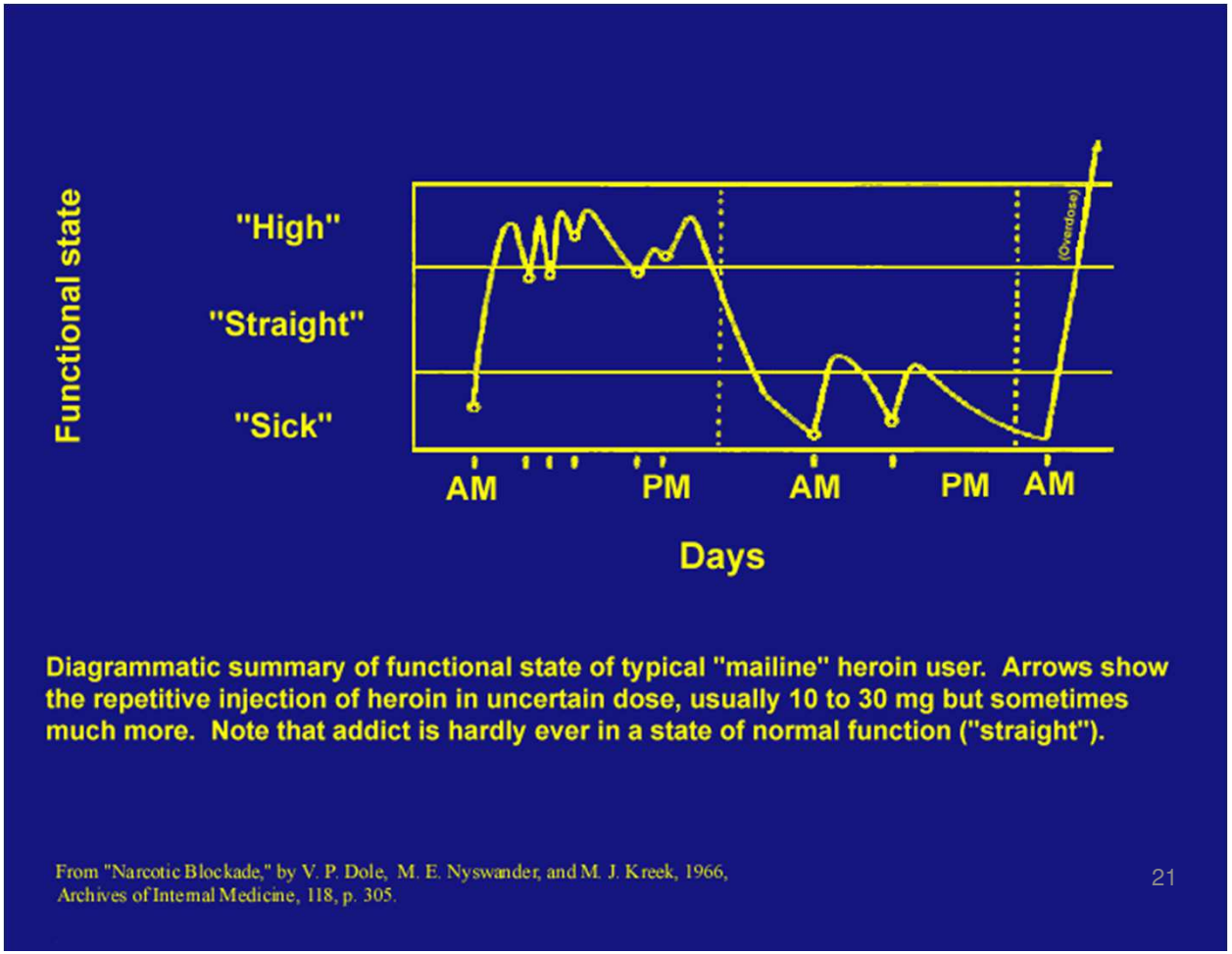
- **I.** Substitute long-acting oral or sublingual medication (administered daily) or monthly injection for short-acting drug (heroin) used by injection
- **II.** Steady-state plasma levels--**no "rush," "nod" or withdrawal during maintenance**
- **III.** At sufficient doses, methadone and buprenorphine **prevent withdrawal, block or attenuate drug craving and euphoric effects of heroin or other opioids**

Methadone dose-dependent attenuation of heroin effects



Source: Donny EC, Walsh SL, Bigelow GE, Eissenberg T, Stitzer ML. High-dose methadone produces superior opioid blockade and comparable withdrawal suppression to lower doses in opioid-dependent humans. Psychopharmacology. 2002 May 1;161(2):202-12.

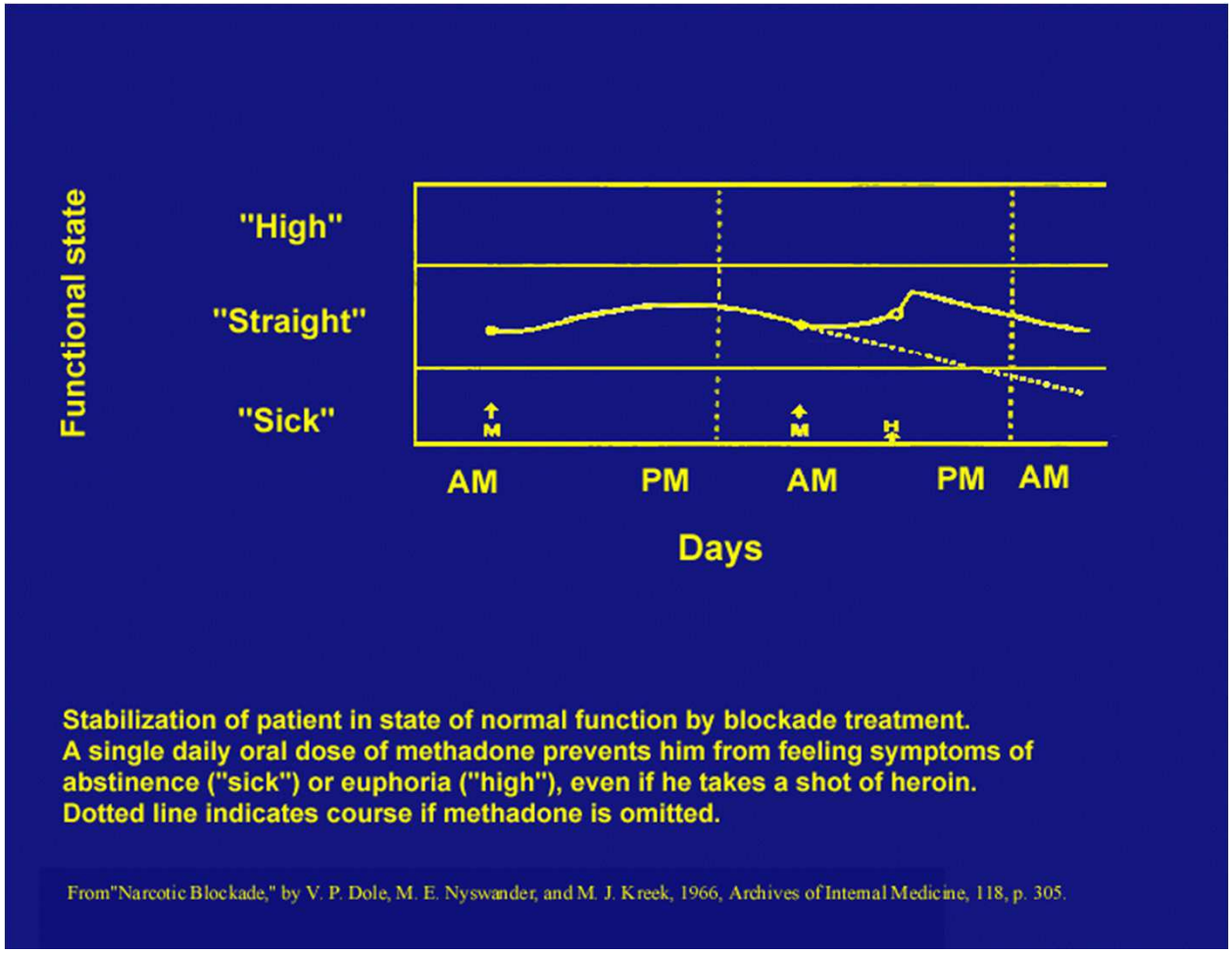
What does it feel like to have opioid use disorder?



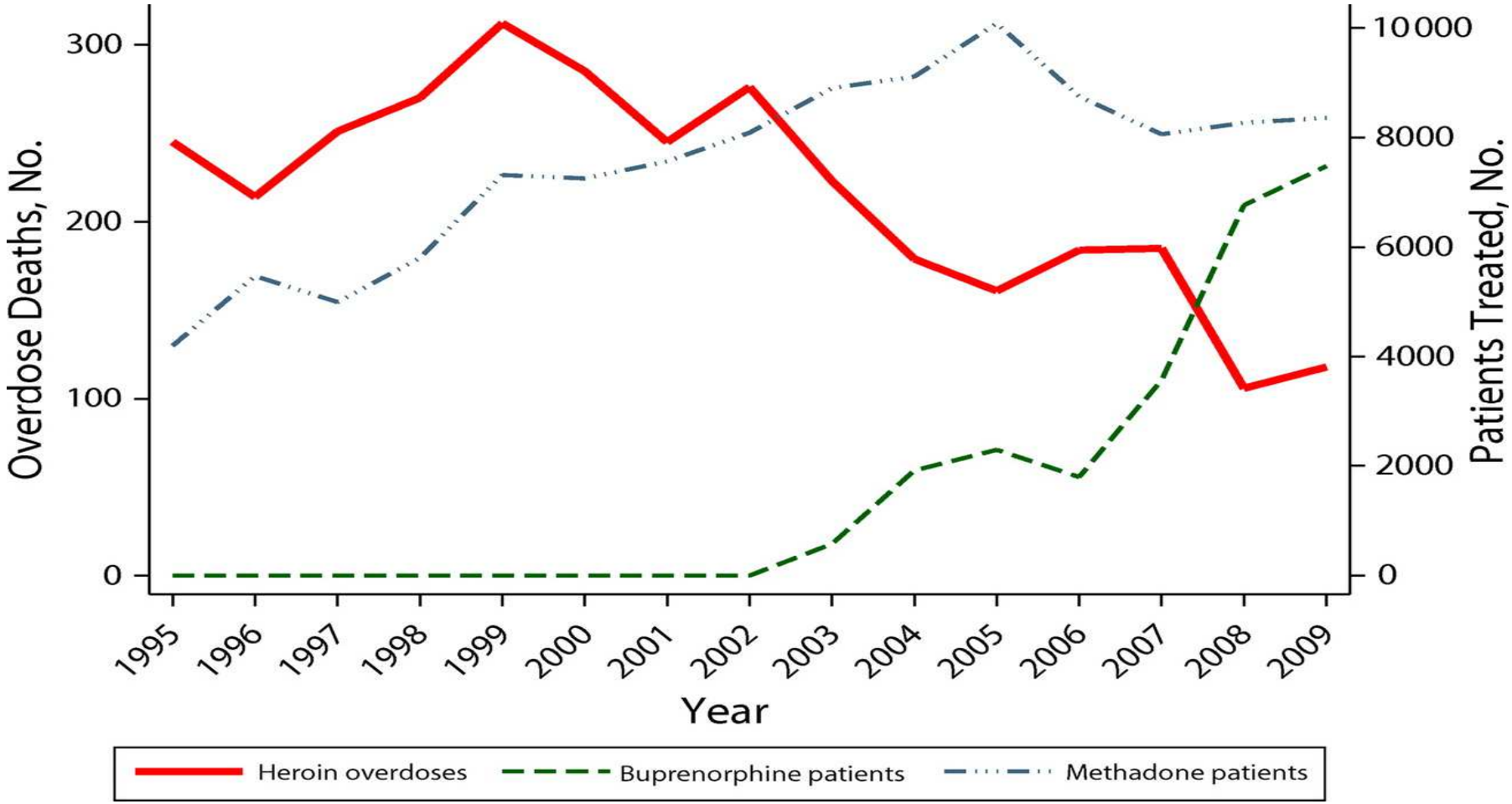
Diagrammatic summary of functional state of typical "mailine" heroin user. Arrows show the repetitive injection of heroin in uncertain dose, usually 10 to 30 mg but sometimes much more. Note that addict is hardly ever in a state of normal function ("straight").

From "Narcotic Blockade," by V. P. Dole, M. E. Nyswander, and M. J. Kreek, 1966, Archives of Internal Medicine, 118, p. 305.

What does it feel like with MAT?

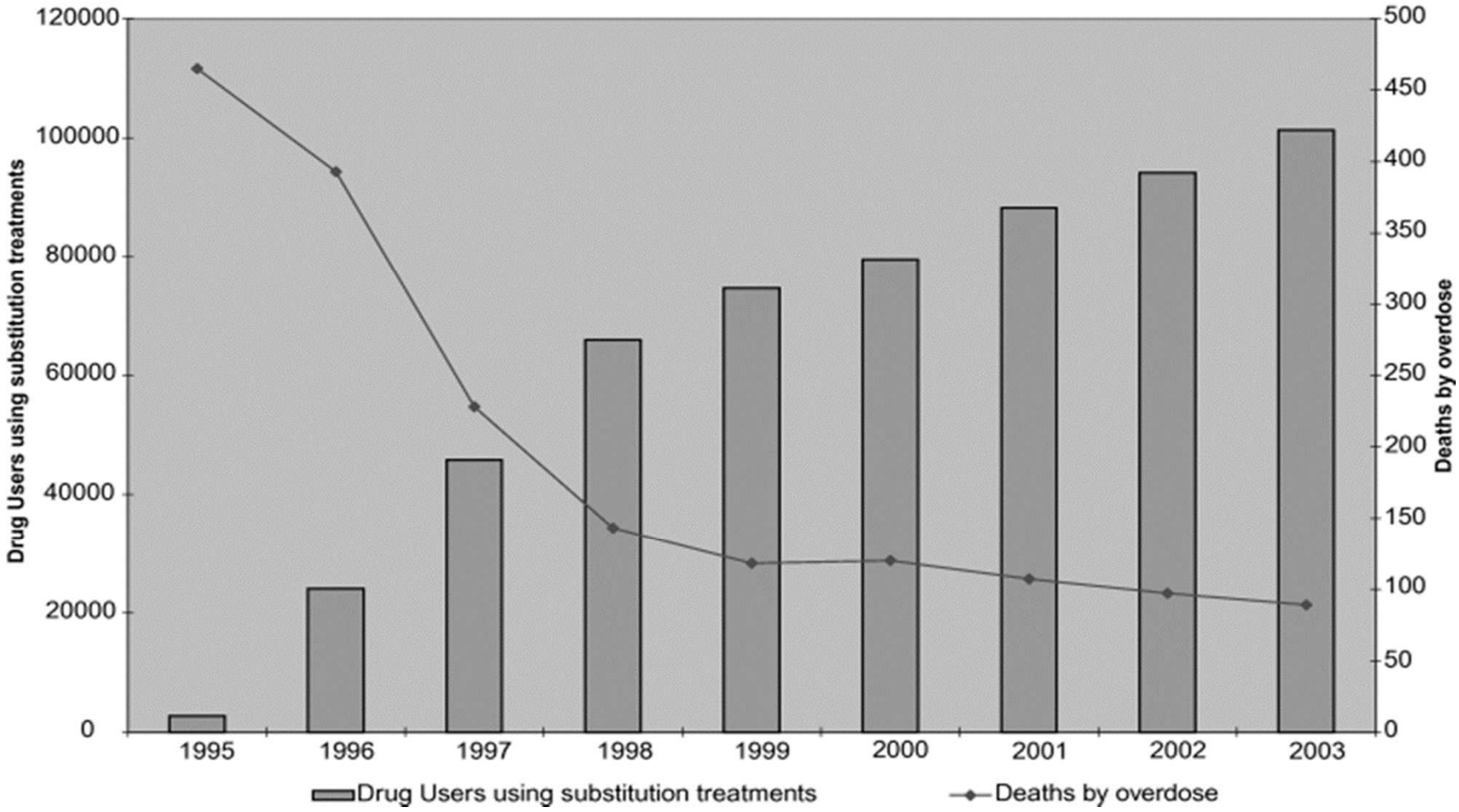


How effective is MAT? Scale-up reduced overdose deaths, Baltimore



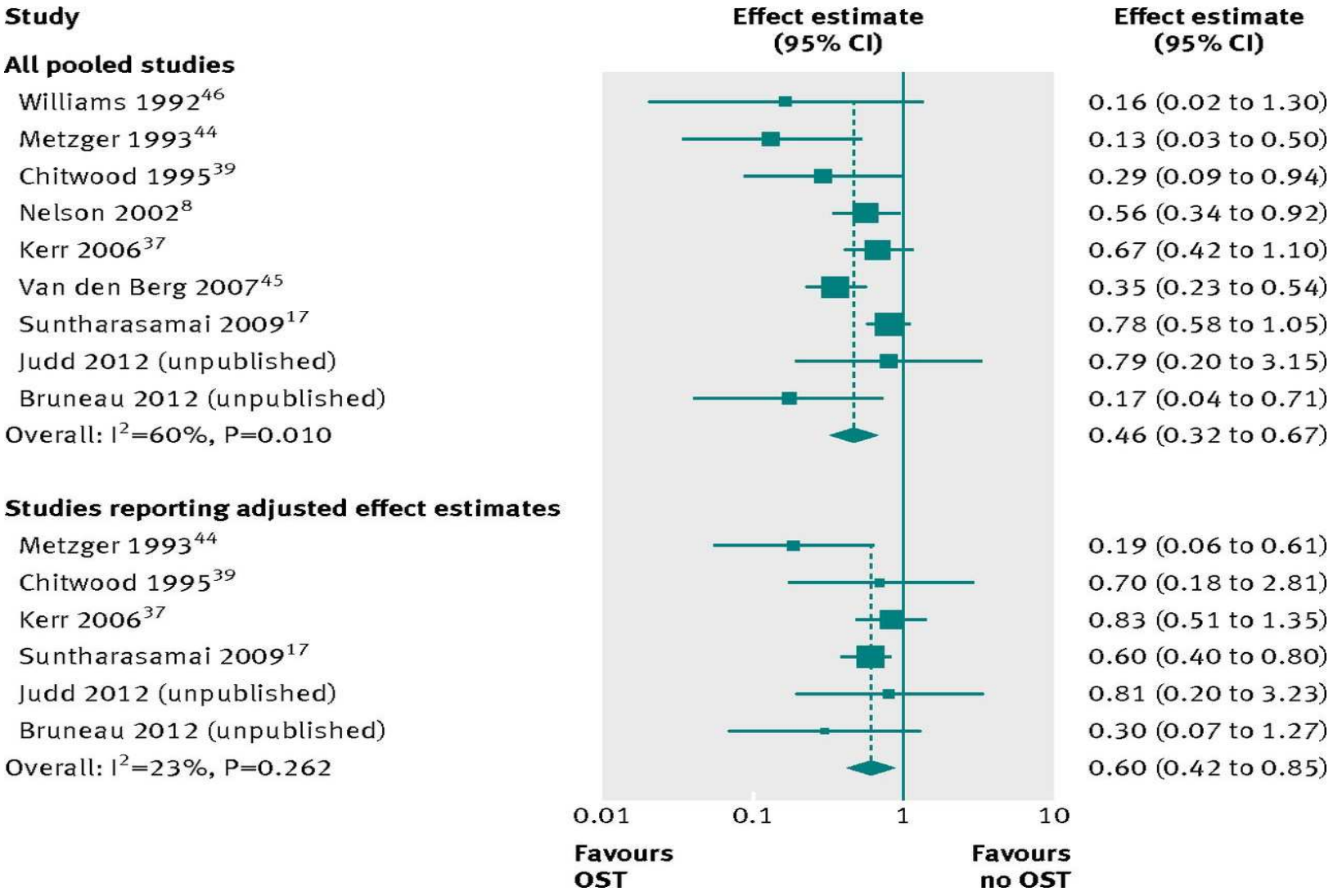
Source: Schwartz, R.P., Gryczynski, J., O'Grady, K.E., Sharfstein, J.M., Warren, G., Olsen, Y., Mitchell, S.G. and Jaffe, J.H., 2013. Opioid agonist treatments and heroin overdose deaths in Baltimore, Maryland, 1995–2009. American journal of public health, 103(5), pp.917-922.

How effective is MAT? Scale-up reduced overdose deaths, France



Source: Addiction Volume 100, Issue 11, November 2005 , Pages 1690–1700

How effective is MAT? MAT reduces HIV transmission



Source: MacArthur, G.J., Minozzi, S., Martin, N., Vickerman, P., Deren, S., Bruneau, J., Degenhardt, L. and Hickman, M., 2012. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis.

Is MAT more effective than detox and counseling? Swedish methadone study

- Swedish treatment community opposed to MAT with methadone
- Provided detox followed by comprehensive outpatient treatment
- Graph shows pre-treatment characteristics of patients

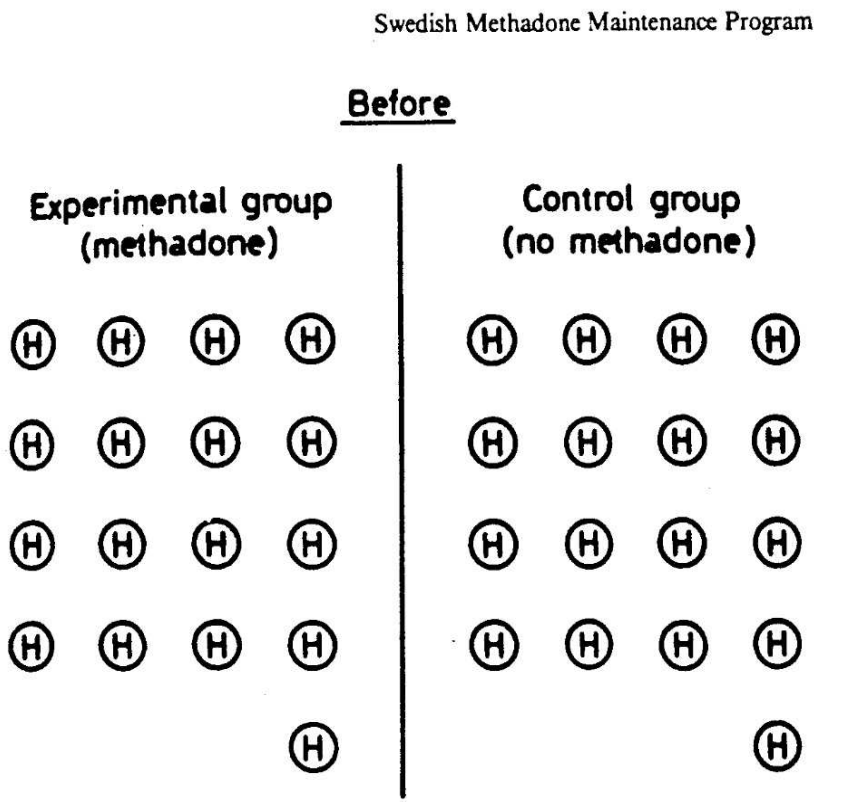


Fig. 2. Situation before the randomization study: each circle represents an individual 20–24 yrs old. H in the circles stands for regular I.V. heroin abuse. Left half: experimental group which will be accepted for MMT; Right half: controls, which will not be given MMT

Source: Gunne LM, Grönbladh L. The Swedish methadone maintenance program: a controlled study. Drug & Alcohol Dependence. 1981 Jun 1;7(3):249-56.

Swedish Methadone Study Results after 2 years

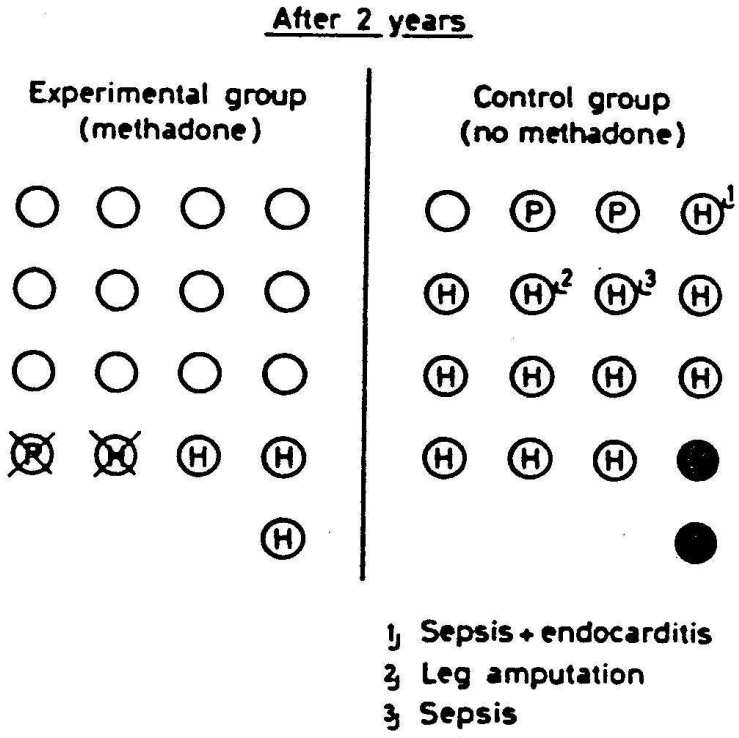


Fig. 3. Situation 2 yrs after acceptance or decline. White circle: no drug abuse. H in circle: abuse of heroin or (in the experimental group) hypnotics. P in circle: subject in prison. Black circle: deceased. Crossed circle means that the patient has been expelled from treatment

Swedish Methadone Study: Five Years Later

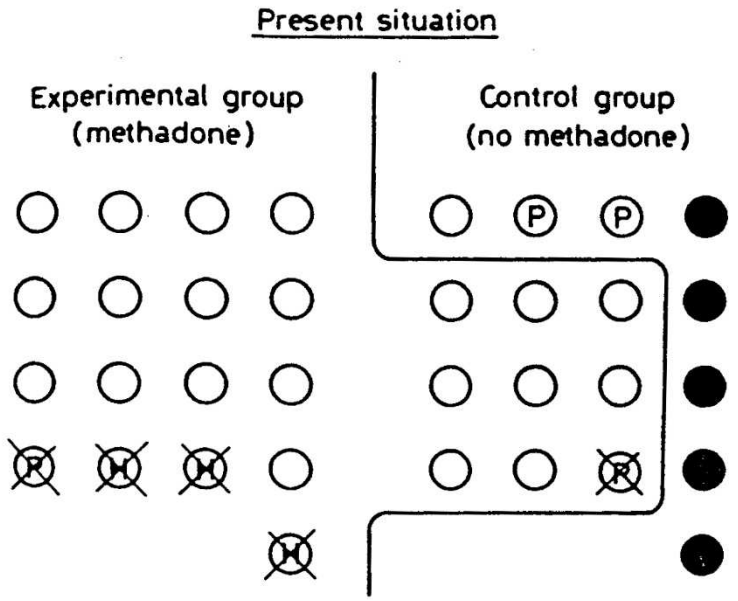


Fig. 4. Present situation: nine within the original control group have been accepted in the MMT program. For an explanation of symbols, see Fig. 3

MAT reduces mortality risk

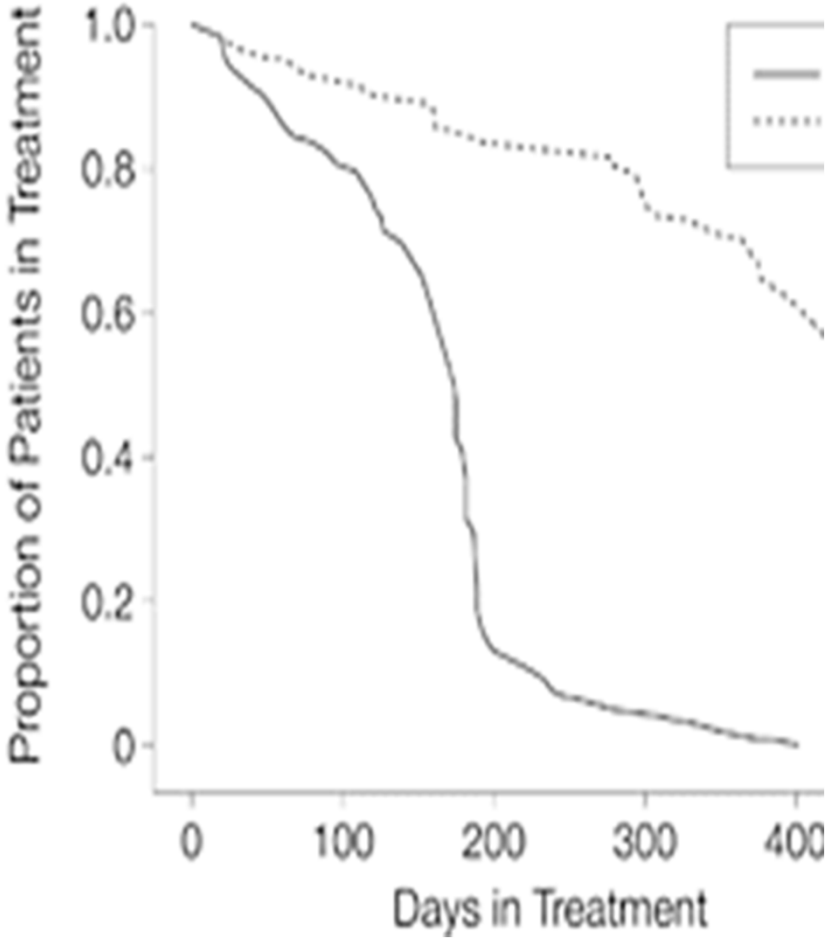
- Mortality risk with opioid addiction: 1-2% per year
- MAT with methadone or buprenorphine substantially reduces mortality risk (four to eightfold reduction)
- Mortality risk highest before **or after treatment or incarceration**
  - 1st month after treatment/jail: 4% per year
  - Loss of tolerance puts patients at greater risk
- Conclusion: “high rates of overdose prior to and after treatment [or incarceration] emphasize the need to provide rapid access to OMT, to retain patients in treatment and to re-enroll patients.” Cousins G . Risk of mortality on and off methadone substitution treatment in primary care: a national cohort study. Addiction 2015, 111, 73–82

How long should maintenance treatment last?

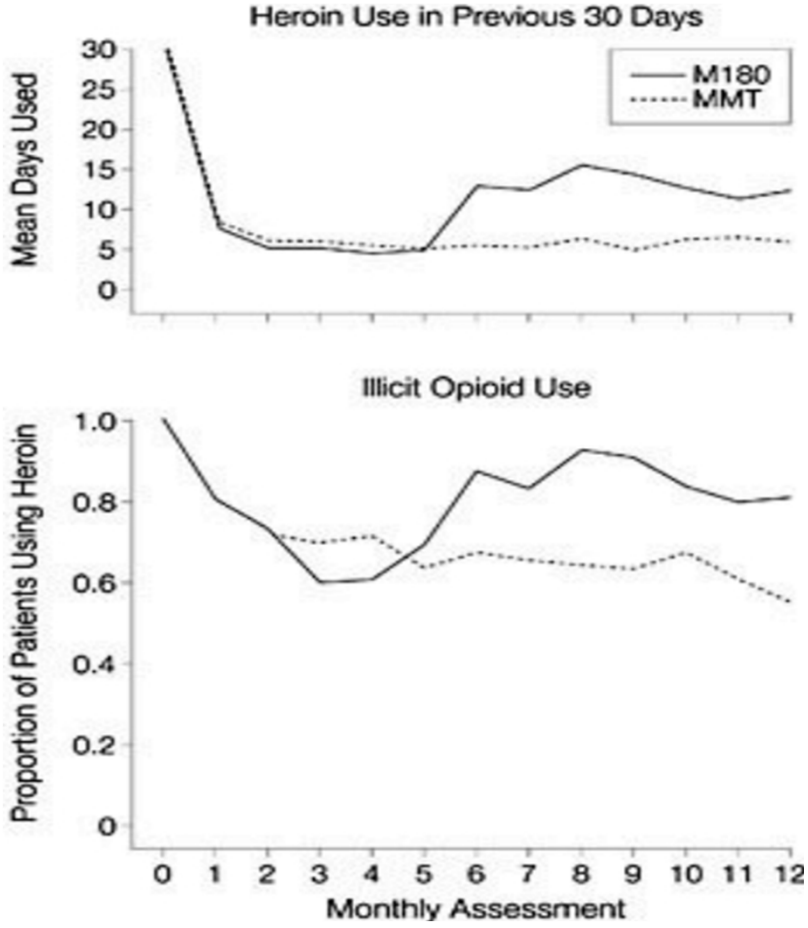
Taper/stop after 6 months vs. continue treatment

- High drop-out during taper

  Sees et. al., JAMA 283(10): 1303-1310, 2000

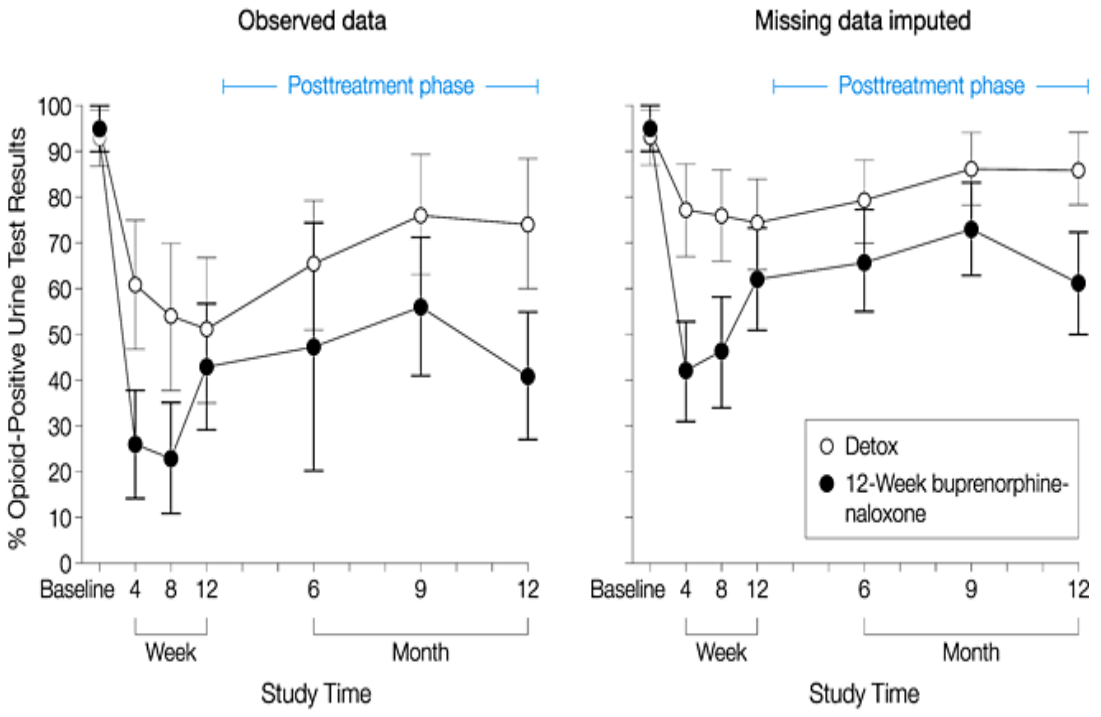


- More heroin use during taper and discontinuation



How long should maintenance treatment last for adolescents?

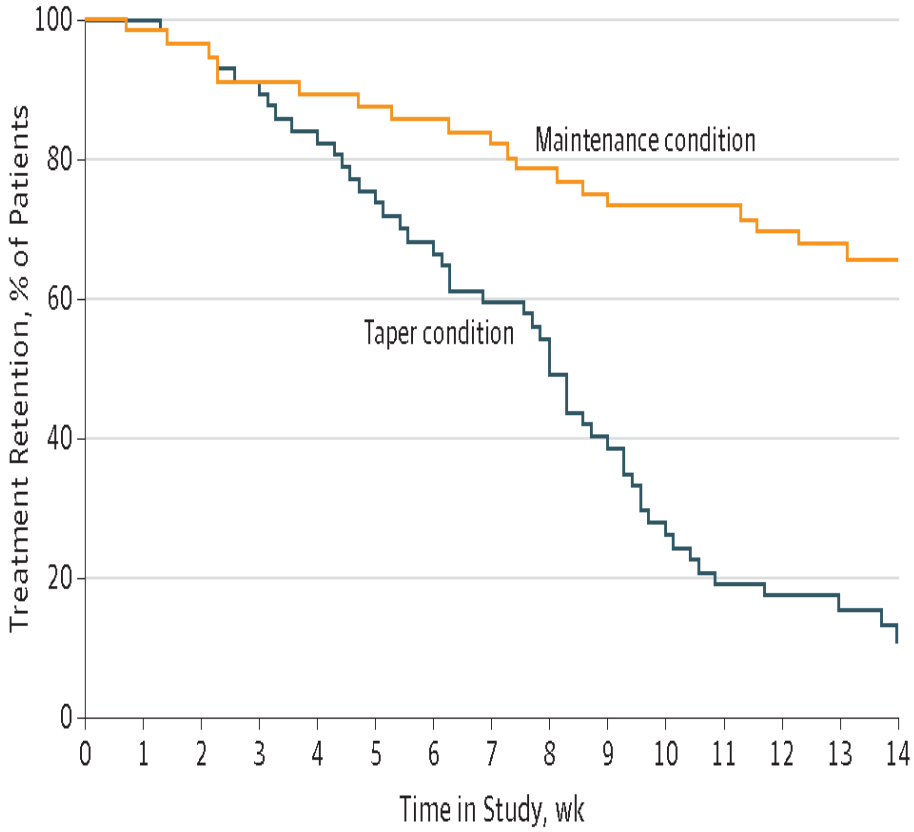
- Study compared 9 weeks buprenorphine followed by taper/discontinuation vs. buprenorphine detox
- Higher rates of opioid use with detox vs. short-term buprenorphine
- Higher rates of relapse and opioid use in both groups following discontinuation of buprenorphine: **4 patients became infected with HCV during first 12 weeks**



- Woody, G. E. et al. JAMA 2008;300:2003-2011

How long should maintenance treatment last for patients addicted to prescription opioids?

- Study compared buprenorphine taper/discontinuation vs. buprenorphine MAT for patients addicted to prescription opioids.
- Higher retention in treatment and abstinence with continued MAT
- Source: Fiellin D et al. JAMA Intern Med 2014



Mean buprenorphine dosage, mg/d															
Maintenance condition	14.9	15.1	15.2	15.3	15.3	16.0	15.9	16.2	16.2	16.6	16.8	16.2	16.1	15.8	14.6
Taper condition	15.6	15.6	15.4	15.3	14.2	9.7	5.7	3.1	0.6	0.2	0	0	0	0	0

Questions to consider

- If detoxification, residential treatment, short or long incarceration, abstinence-based outpatient treatment, or discontinuing MAT too soon or when someone uses increase the risk of dying or serious illness and don't usually lead to recovery,
- And if Medication Assisted Treatment promotes recovery and reduces the risk of dying, other complications,
- Then what are appropriate/best criminal justice system responses to people who are addicted to heroin or other opioids?