

# Opioid Use Disorders in Criminal Justice Populations



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# Disclosures

- In-kind research support (Alkermes)
- Honorarium for Advisory Board (Indivior)
- Travel and training (Braeburn)

# Roadmap

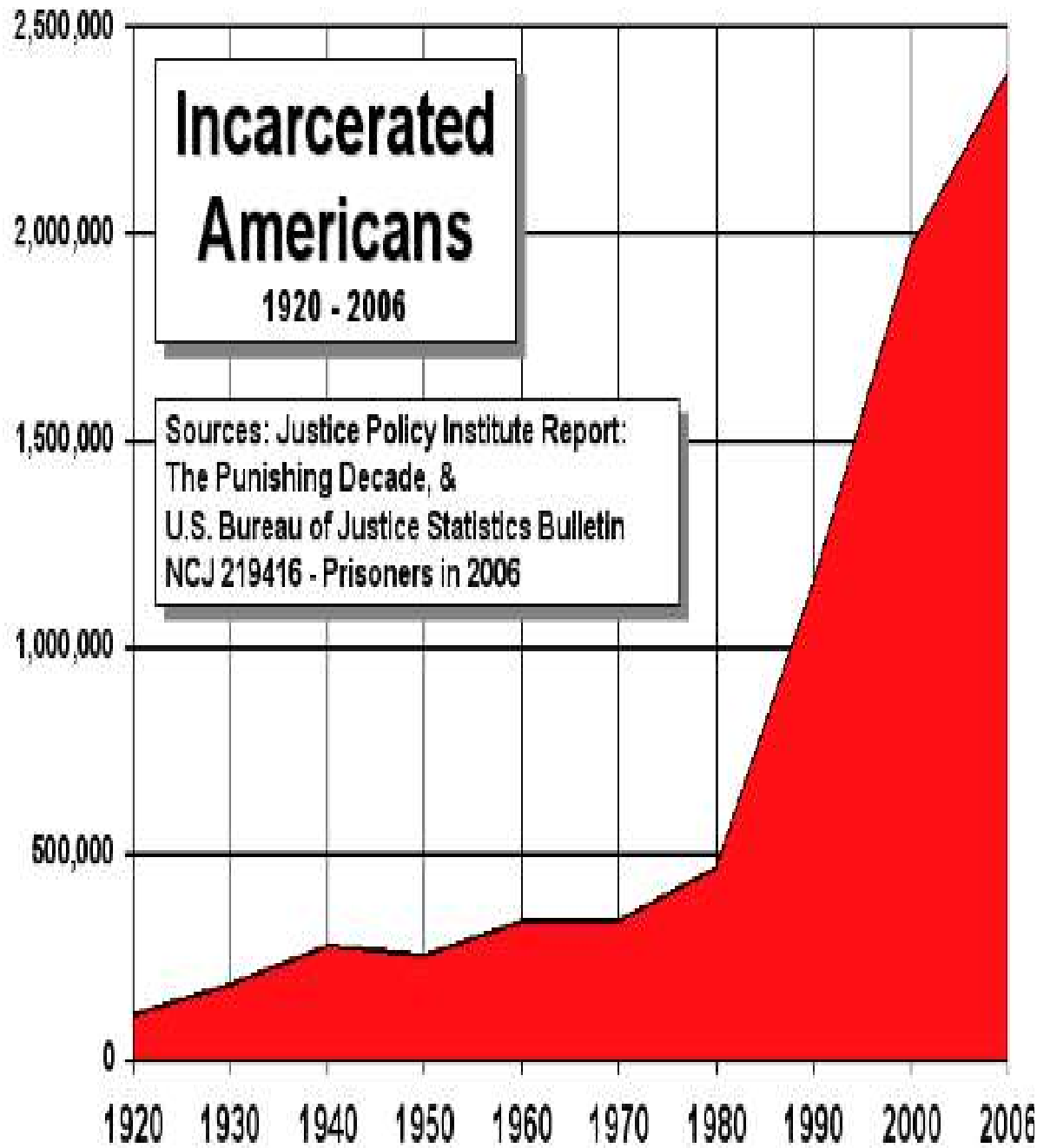
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# Casualties of the War on Drugs

- From 1980 to 2014, U.S. inmate population ↑'d 220%
  - In 2013, 2.24 million in prison
- ~ 7.1 million adults in US CJ-involved system



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# Endemic in CJ Populations

- Drugs implicated in 60-83% of offenses
  - 39% of men, 80% of women w/ nonviolent or drug offense
  - 44% of men, 52% of women have SUD
- ~ 80% who could benefit from treatment do not receive it

West, Sabol, & Cooper, 2009; Petersilia, When Prisoners Come Home, 2003; HRW, Ill-Equipped, 2003; The Providence Plan Analysis on RIDOC. Sentenced Population as of 9/30/2013. NIJ, 1999. Belenko & Peugh 1998. Karberg & James 2005; Chandler et al. 2009; Nunn et al. 2009.

# Endemic in CJ Populations

- 20-23% of U.S. inmates h/o opioid use
- ~5-15% of U.S. arrestees utox+ for opioids
- Jail inmates 12% regular use of opioids

BJS, NCJ 213530, October 2006; NCJ 209588, July 2005. ONDCP, May 2013.

Dolan , Hall & Wodak. The Provision of Methadone Within Prison Settings. In: *Methadone Maintenance treatment and Other Opioid Replacement Therapies*. Ward J, Mattick RP, Hall W, eds. Australia: Harwood Academic Publishers; 1998. pp. 379-396



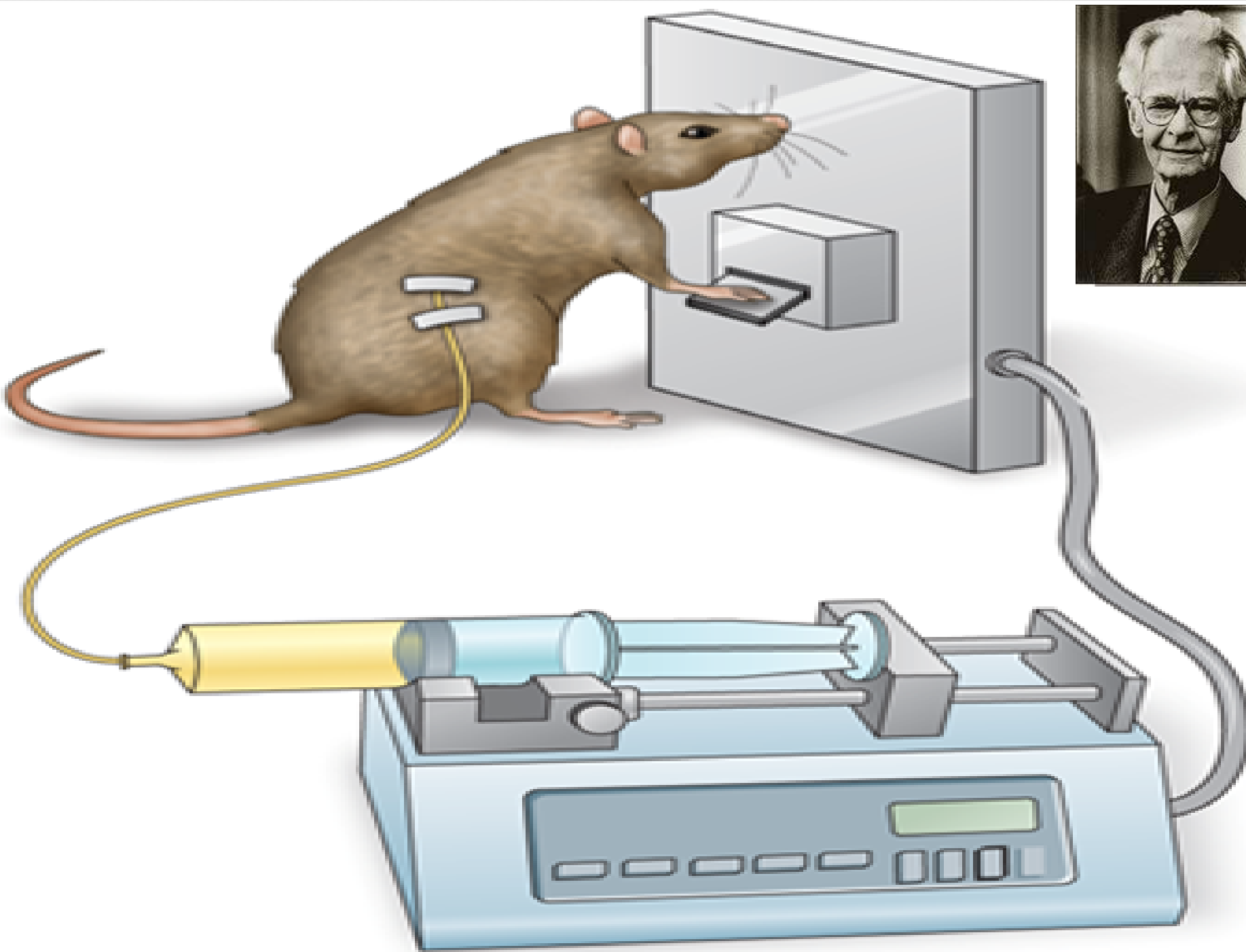
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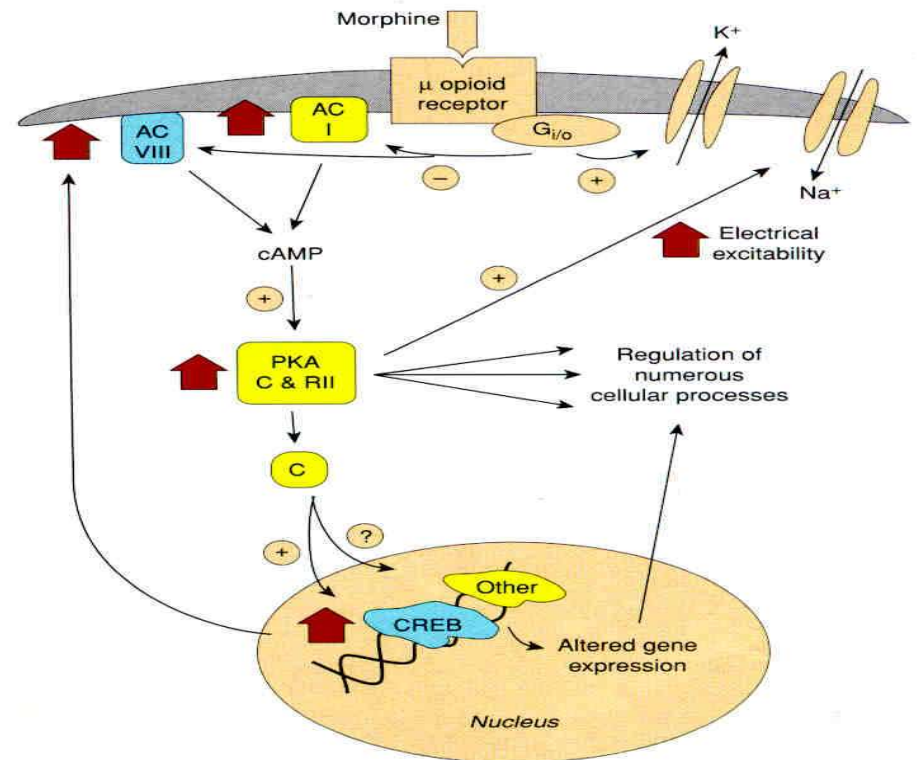
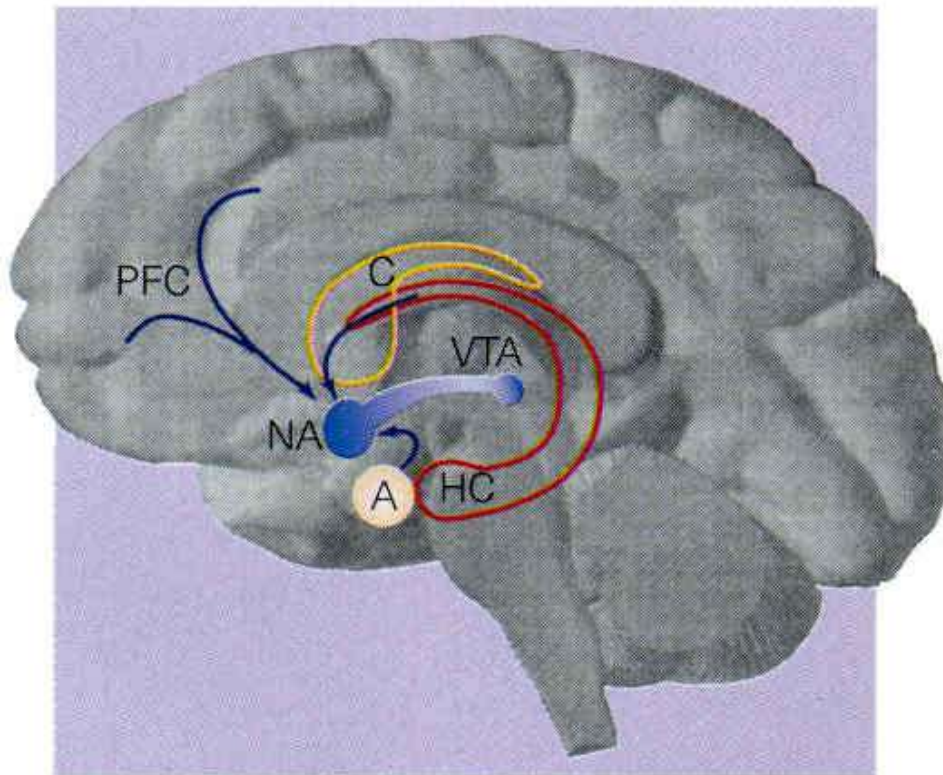
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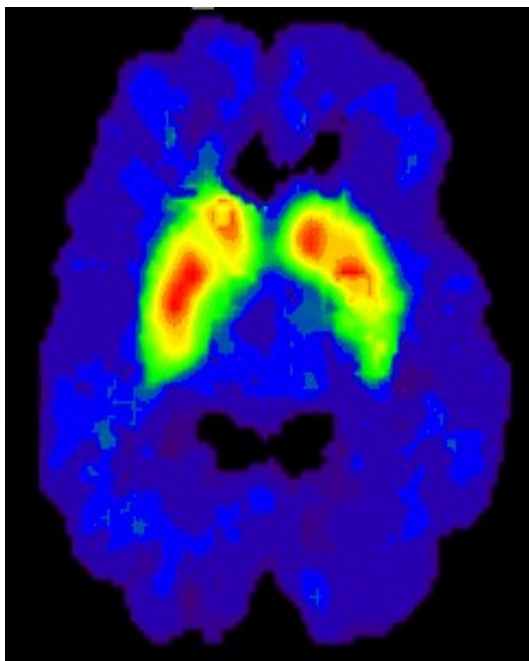


# Semi-Permanent Brain Changes

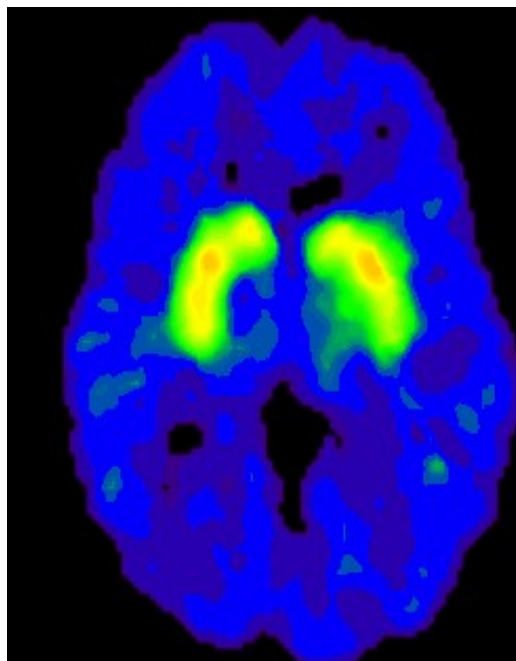


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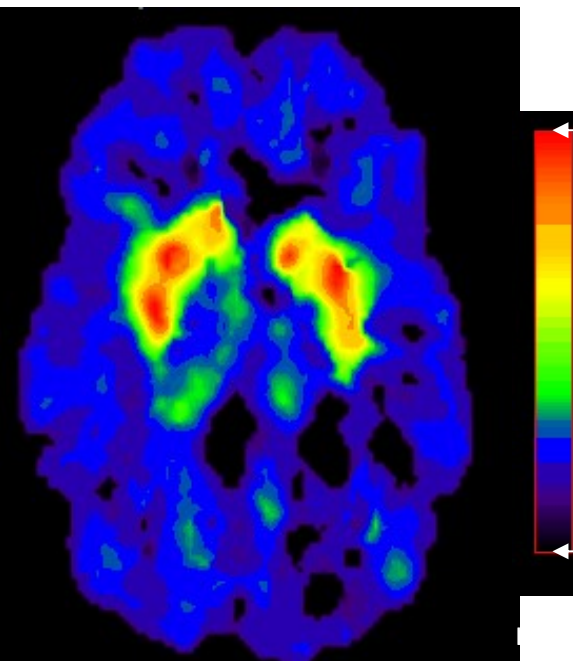
# Long-Lasting Abnormalities In Brain Dopamine Transporters



Normal Control



Methamphetamine d/o  
(1 month detox)



Methamphetamine d/o  
(24 months detox)



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Source: Volkow, ND et al., Journal of Neuroscience 21, 9414-9418, 2001.

# “Dope Sickness” = Withdrawal

## Powerful Negative Reinforcer in OUD



# Addiction ≠ Dependence

- Addiction – 4 C's :
  - compulsive use, impaired control,  
continued use despite consequences,  
craving
- Physiological dependence = Biologic adaptation to chronic use
  - Tolerance
    - Decreased effect of substance after repeated use
    - Need for increased dose to achieve same effect
  - Withdrawal syndrome

# Substance Use Disorder (DSM-V)

(2-3: mild; 4-5: moderate; six or more: severe)

## **Impaired Control**

1. Larger amounts/longer than intended
2. Inability to cut down or control
3. Much time spent
4. Craving and urges

## **Social Impairment**

5. Not able to function
6. Continued use despite interpersonal problems
7. Reduced activities

## **Risky Use**

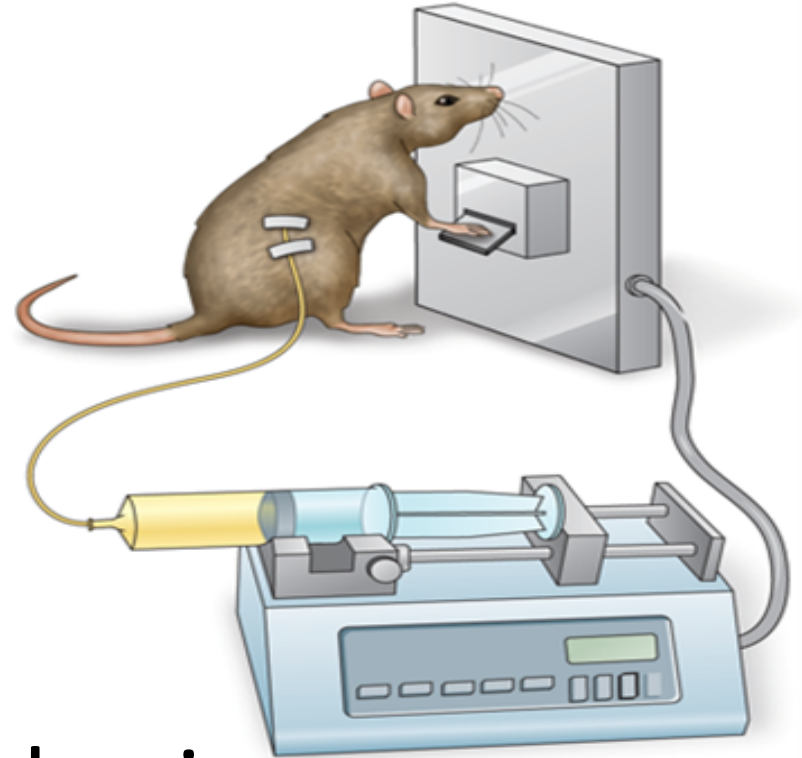
8. Use in dangerous circumstances
9. Continued use despite physical or psych. problems

## **Physiological Manifestations**

10. Tolerance
11. Withdrawal

# Strong Reinforcers/Aversives

- Salient
- Immediate
  - Swift
- Reliable
  - Certain
- Properties lost → behavior extinguished



# Reinforcement of Drug Use/Crime

Positive Consequences	Negative Consequences
<i>Immediate</i> euphoria; \$\$\$	<i>Delayed</i> arrest; prison; HIV; OD
<i>Reliable</i> everytime	<i>Unreliable</i> Vagaries of CJ system



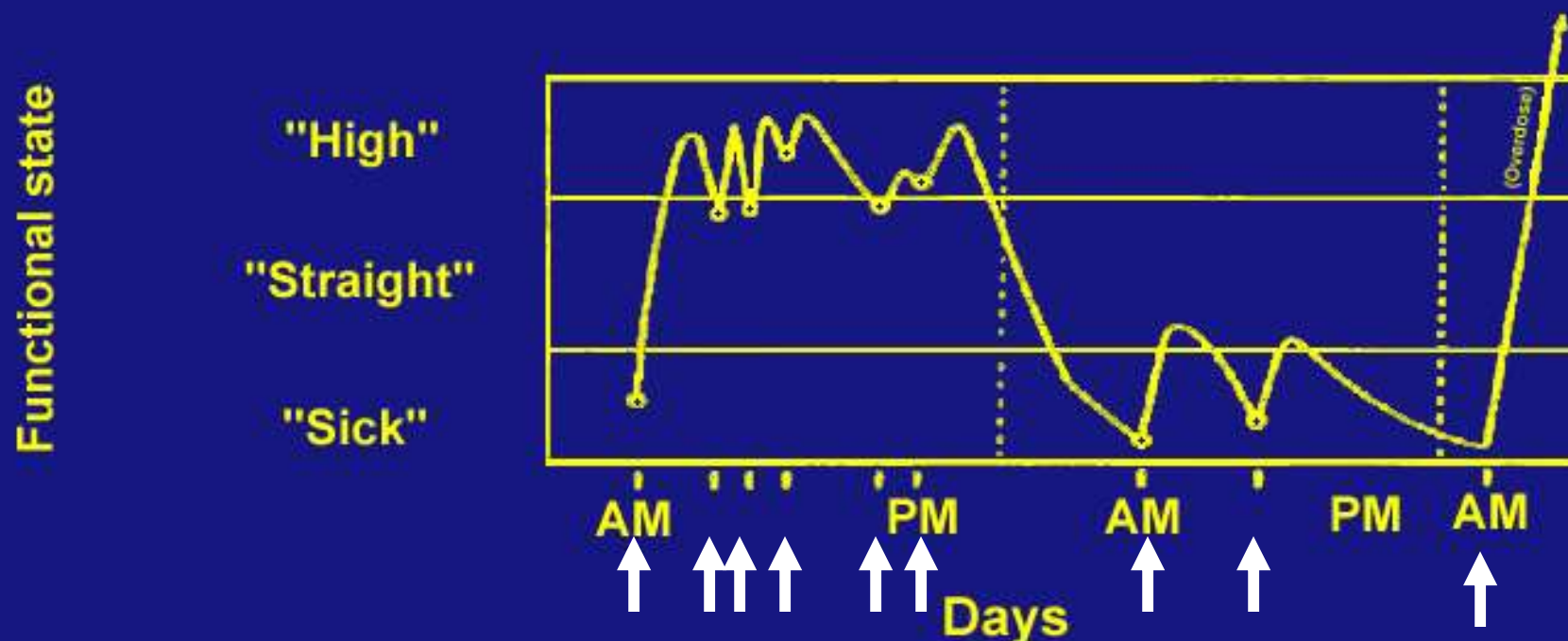
# Reinforcement of Recovery/Rehabilitation

Positive Consequences	Negative Consequences
<b>Delayed</b> Job; housing; relationships; health	<b>Immediate</b> Withdrawal/craving; stress; dysphoria; no friends.
<b>Unreliable</b> No guarantee	<b>Reliable</b> ?manageable

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6. Medication treatment is the most effective way to reduce overdose deaths

# What Does It Feel Like to have Opioid Use Disorder?

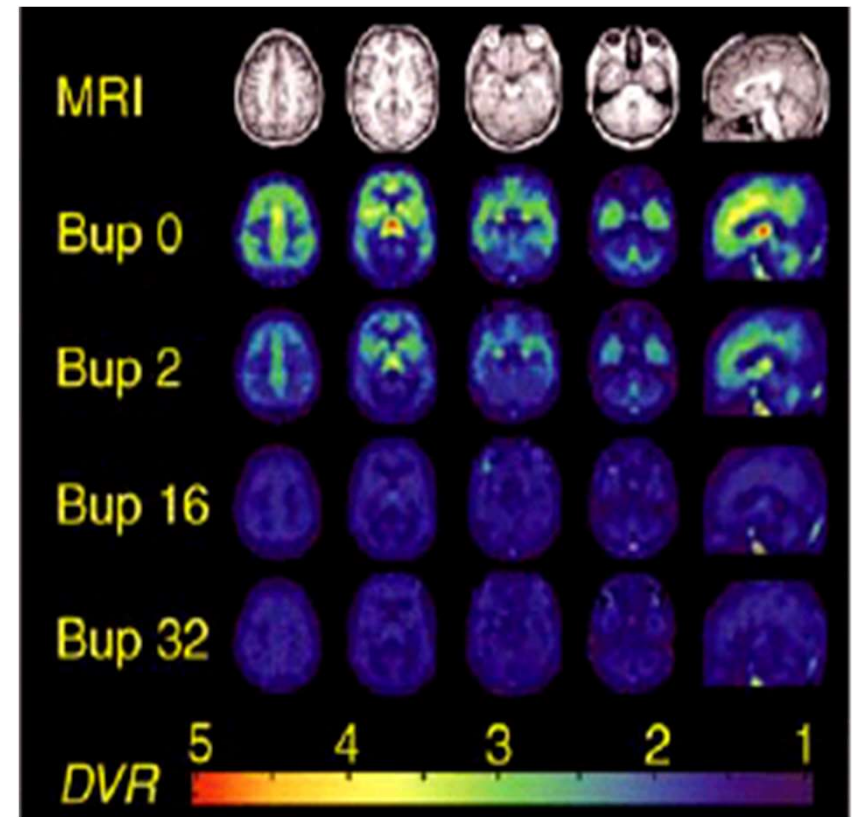


Diagrammatic summary of functional state of typical "mailine" heroin user. Arrows show the repetitive injection of heroin in uncertain dose, usually 10 to 30 mg but sometimes much more. Note that addict is hardly ever in a state of normal function ("straight").

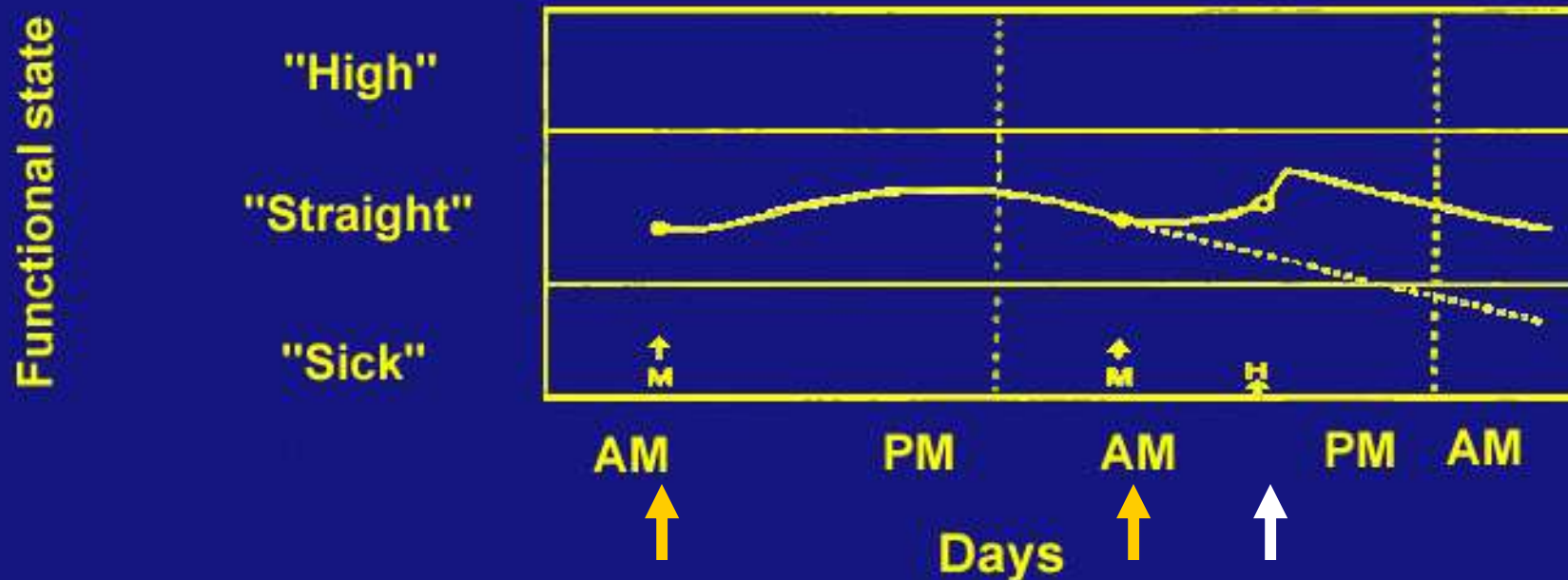
From "Narcotic Blockade," by V. P. Dole, M. E. Nyswander, and M. J. Kreek, 1966, Archives of Internal Medicine, 118, p. 305.

# How Does Medication Treatment Work?

- **Attenuates reinforcement**
  - Reward: ↓ immediate, reliable
  - Stops negative reinforcement
- **Extinguishes expectancies and conditioned responses**



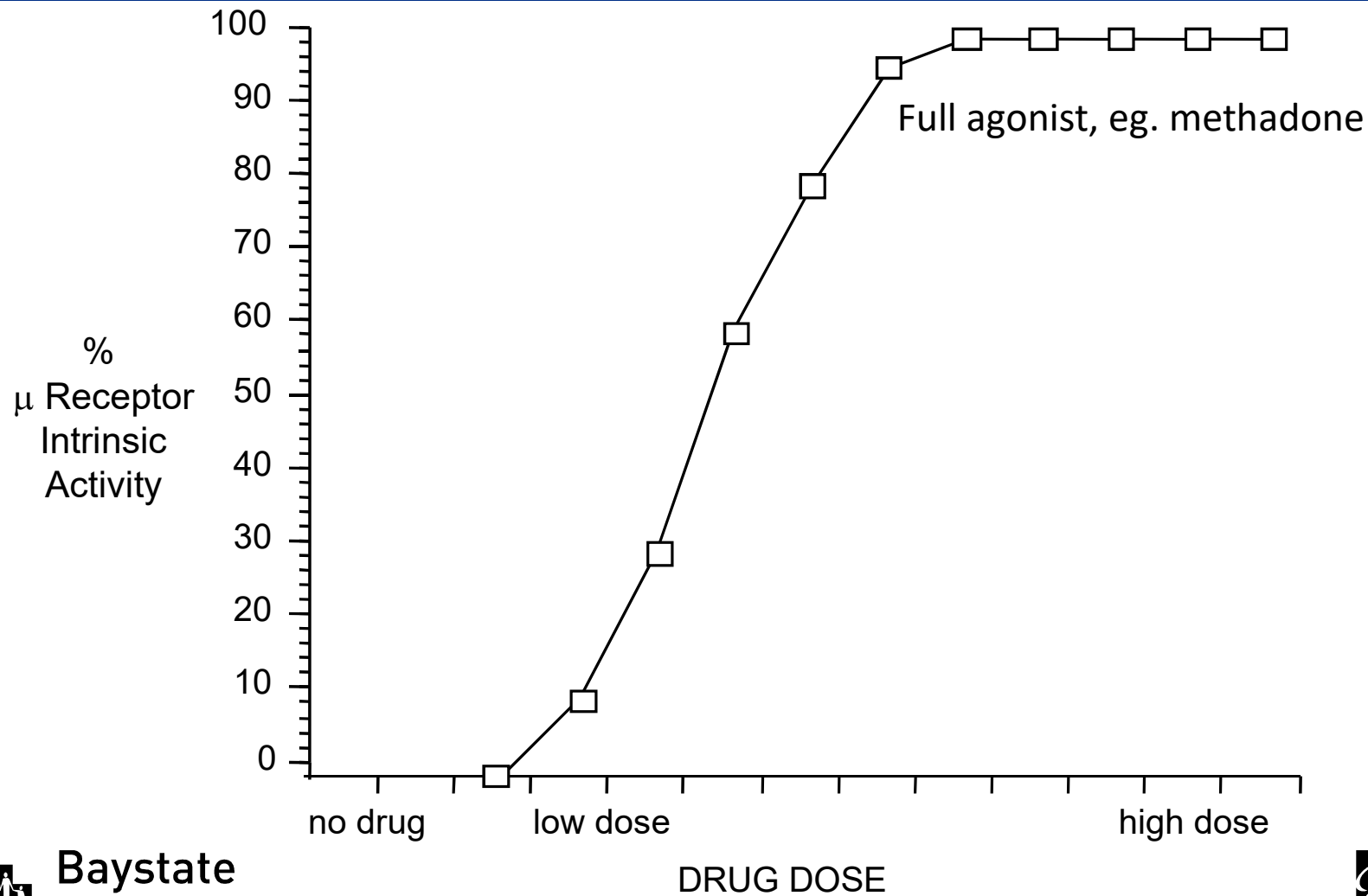
# What Does It Feel Like to Be on Medication for Addiction Treatment (MAT)?



Stabilization of patient in state of normal function by blockade treatment. A single daily oral dose of methadone prevents him from feeling symptoms of abstinence ("sick") or euphoria ("high"), even if he takes a shot of heroin. Dotted line indicates course if methadone is omitted.

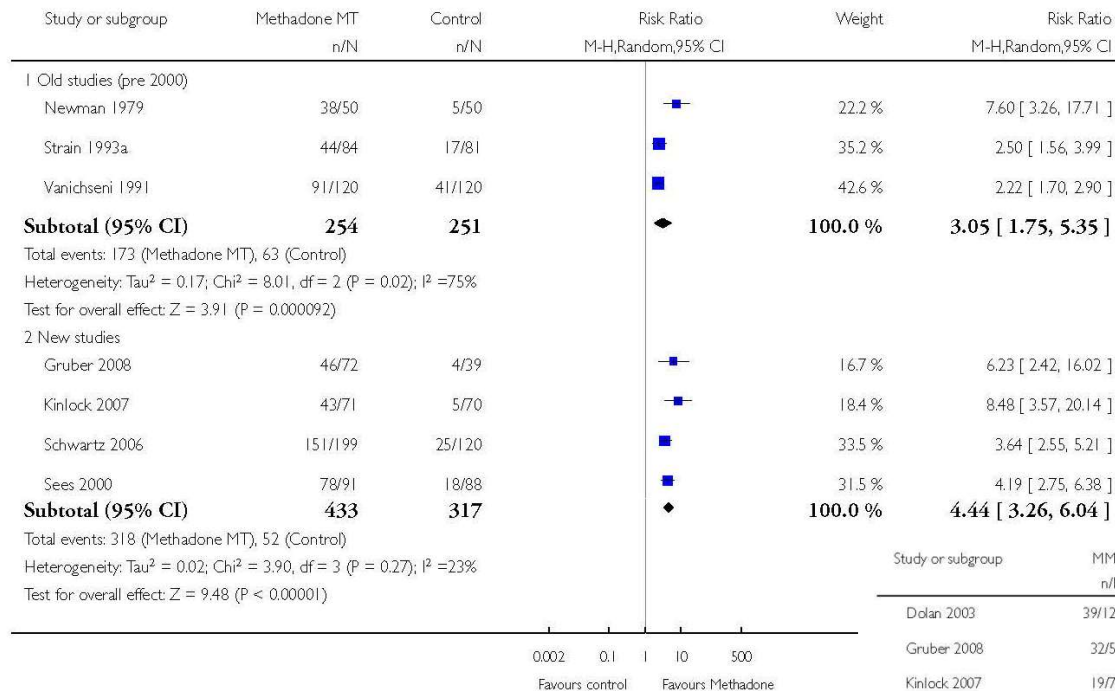
# Opioid Pharmacotherapy

## Agonists



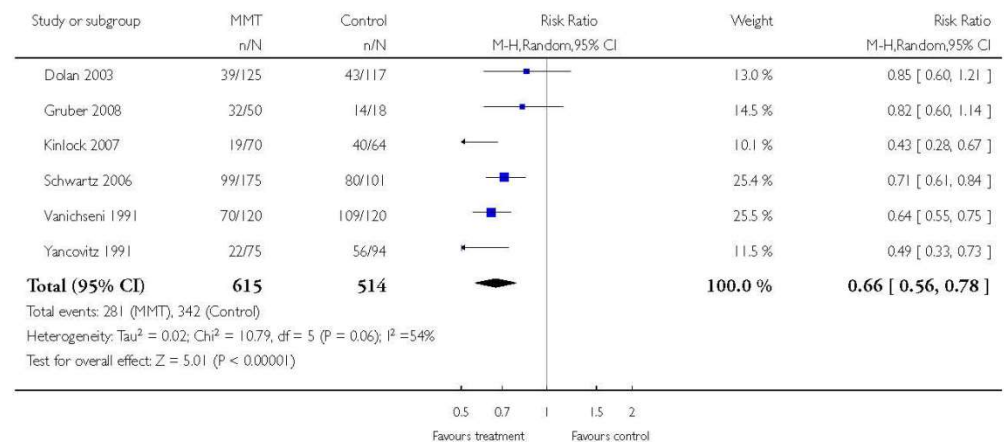


# Decades of Randomized Controlled Trials of Methadone Maintenance (MMT)



**4x ↑ retention**

**1/3<sup>rd</sup> ↓  
opioid use**



# Decades of Randomized Controlled Trials of Methadone Maintenance (MMT)

- ↓ mortality (Gronbladh, '90)
- ↓ IDU (Ball & Ross, '91; others)
- ↓ crime days (Ball & Ross, others)
- ↓ HIV seroconversion
- ↑ employment, health, social function



# Methadone Effectiveness

Gunne & Gronbladh, 1984

Baseline



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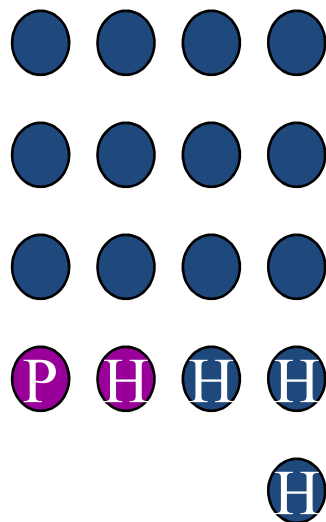
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Adapted from Dean Gerstein

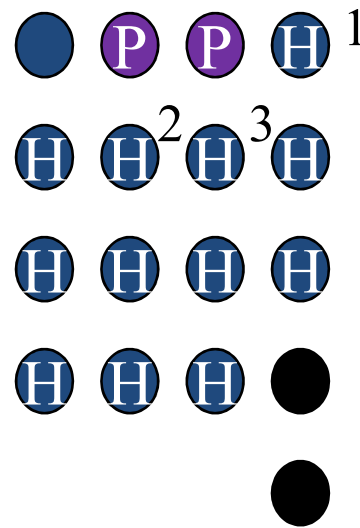
# Methadone Effectiveness

Gunne & Gronbladh, 1984

After 2 Years



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- 1- Sepsis & endocarditis
- 2- Leg amputation
- 3- Sepsis



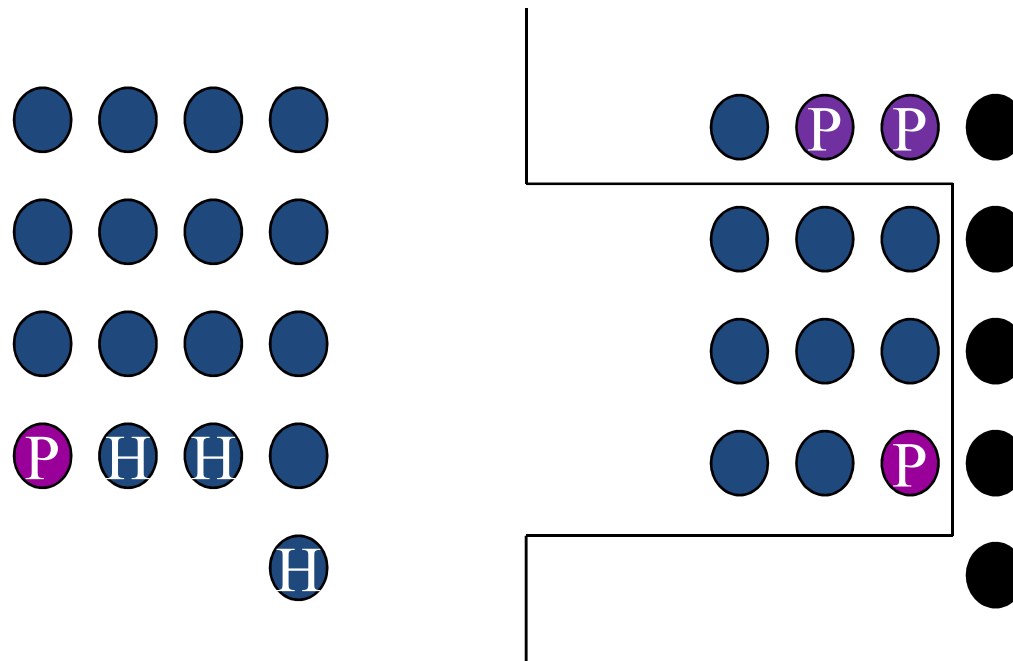
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# Methadone Effectiveness

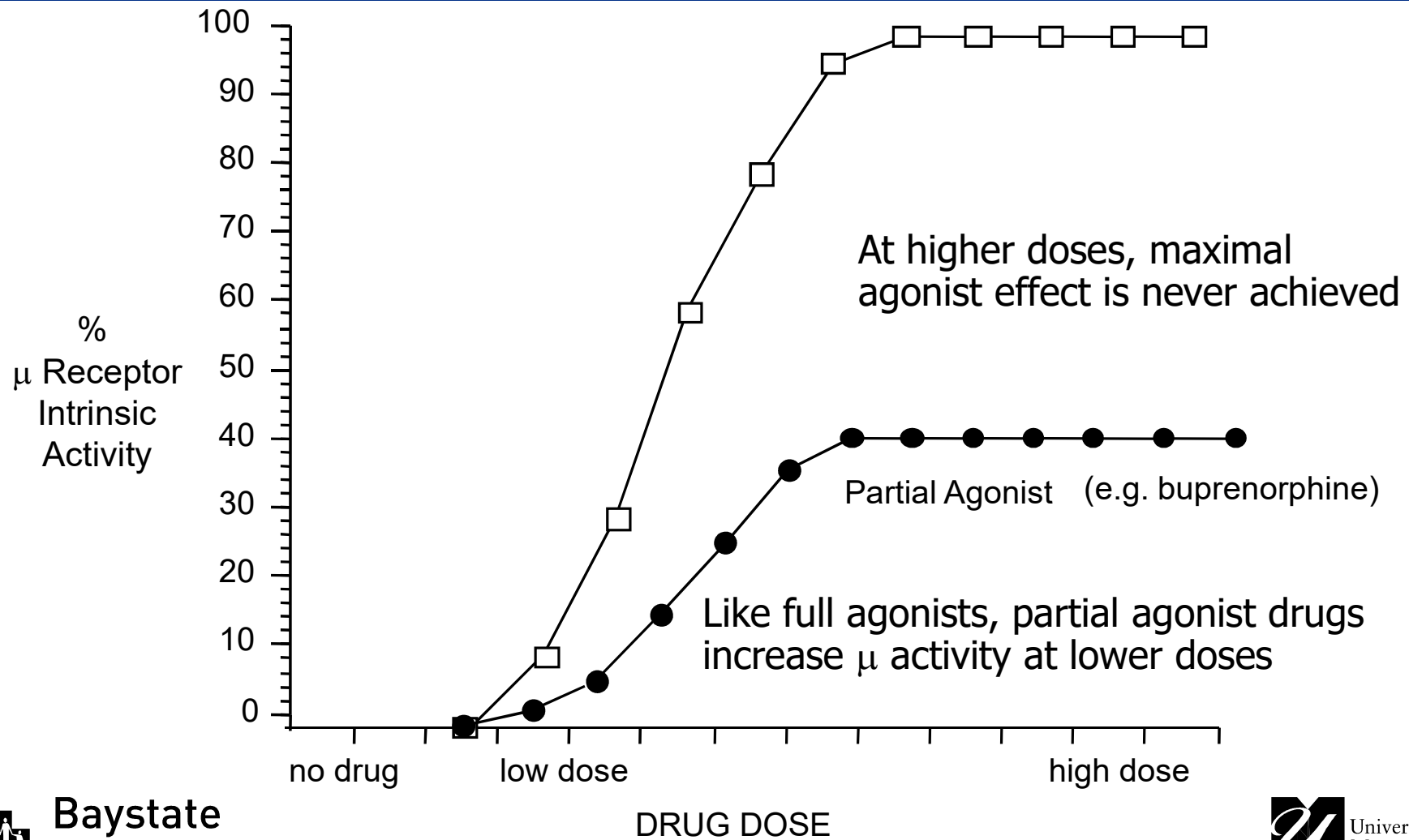
Gunne & Gronbladh, 1984

After 5 Years



# Opioid Pharmacotherapy

## Partial Agonists

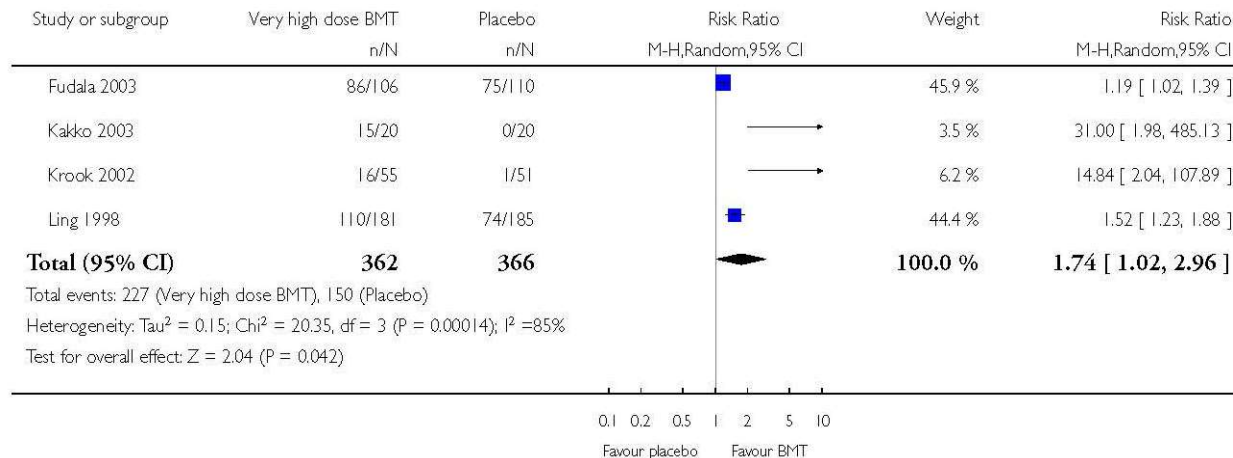


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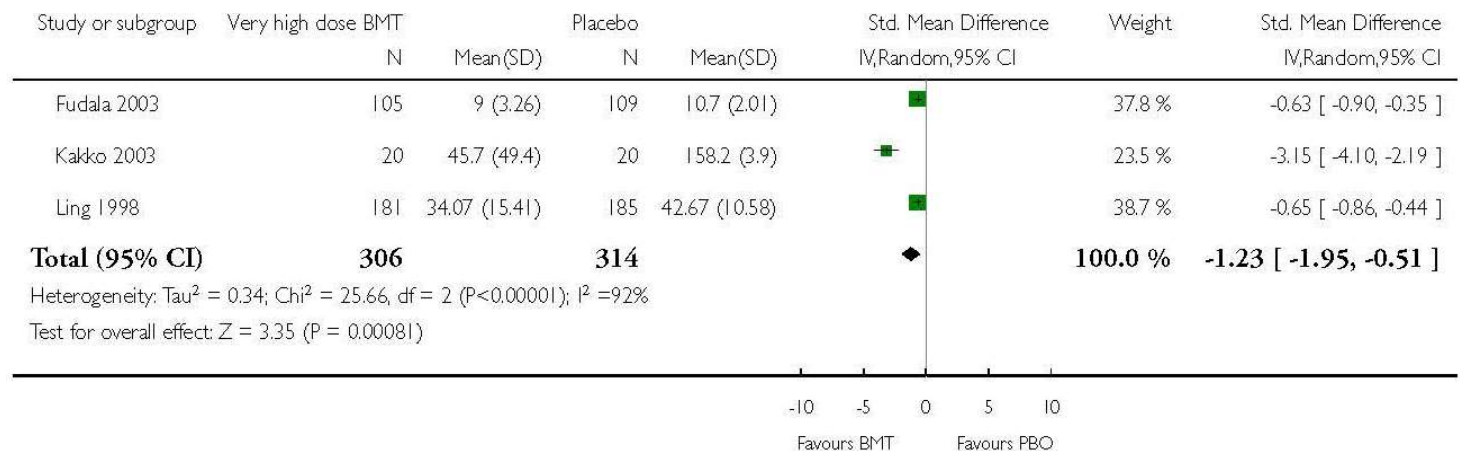
$\mu$  activity reinforces adherence

# RCTs of Buprenorphine



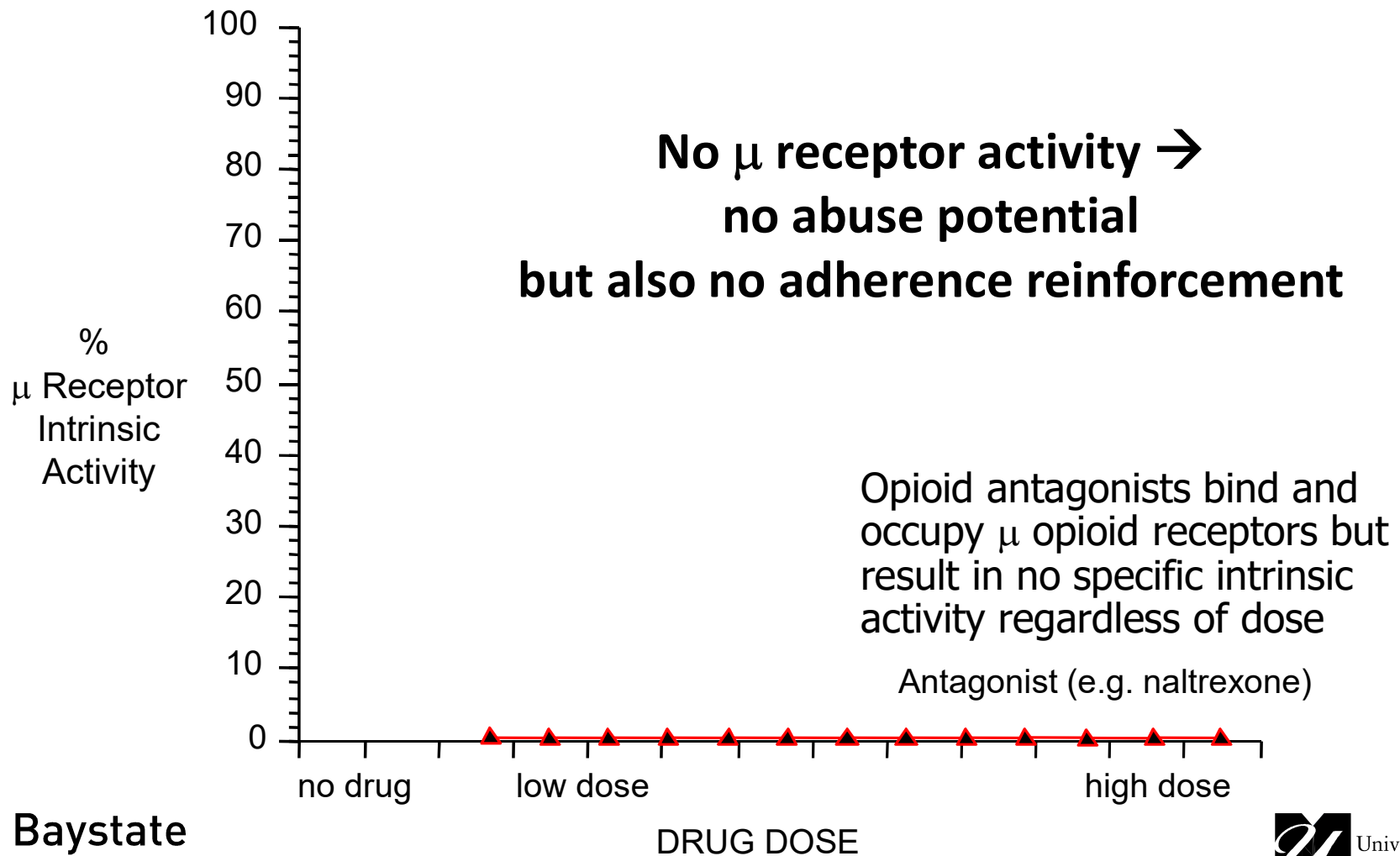
↑ retention

↓ opioid  
use



# Opioid Pharmacotherapy

## Antagonists

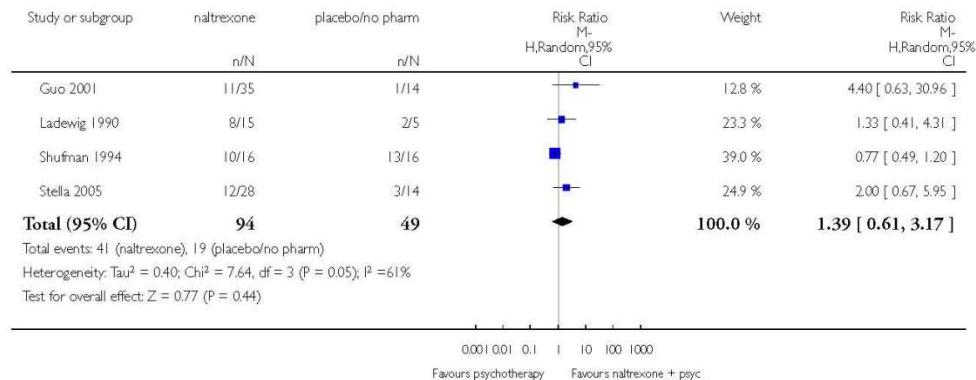
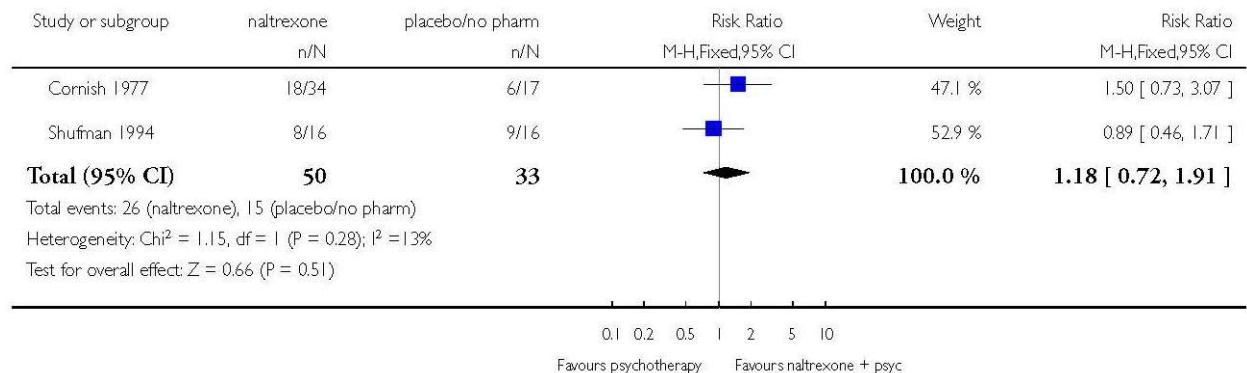


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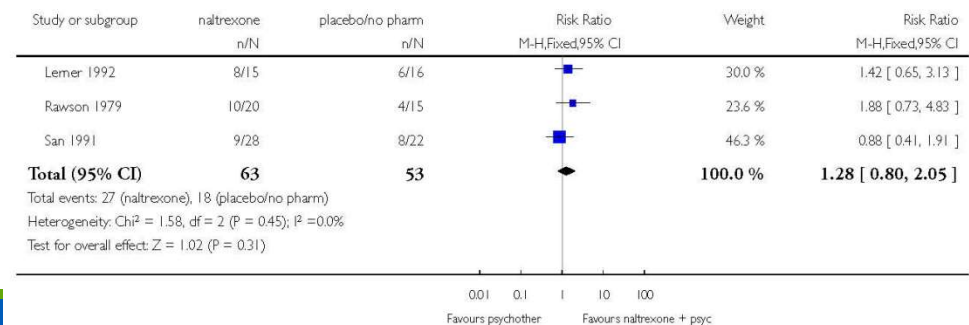
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# RCTs of Oral Naltrexone (NTX)

Ø effect on retention

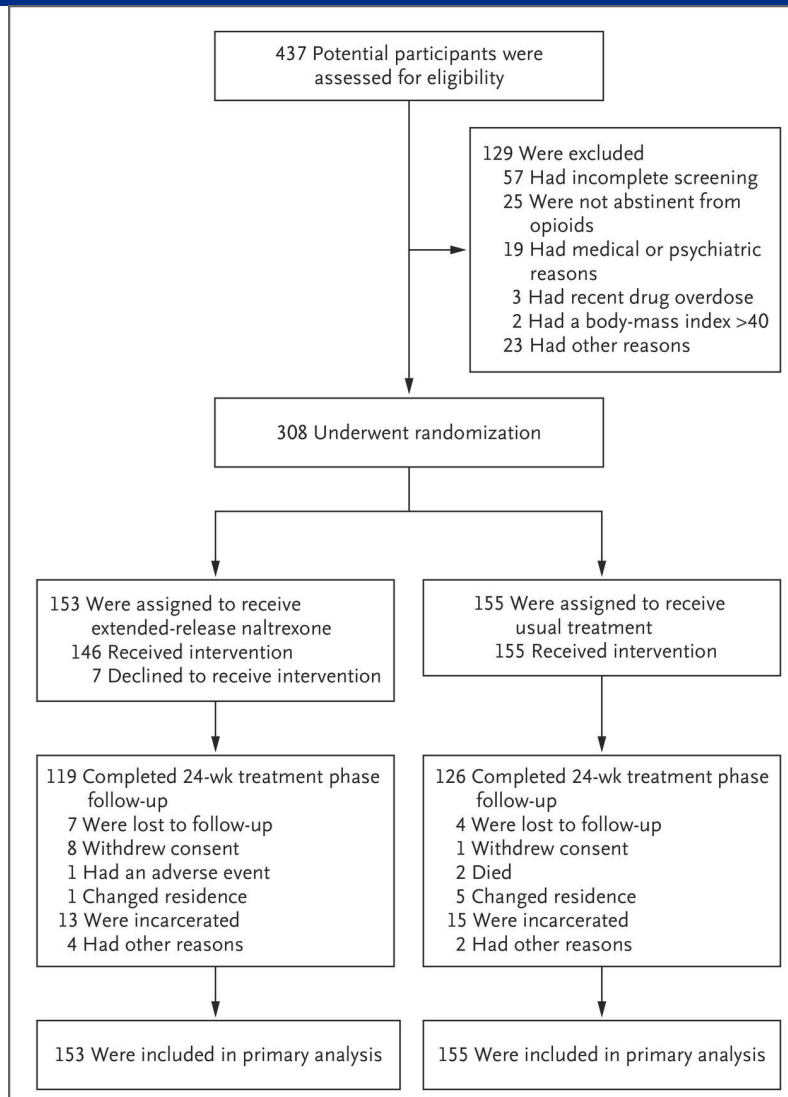


...or  
opioid use



# Extended-Release Naltrexone (XR-NTX) to Prevent Opioid Relapse in Criminal Justice

- Monthly gluteal IM injection
- Must be completely opioid-free



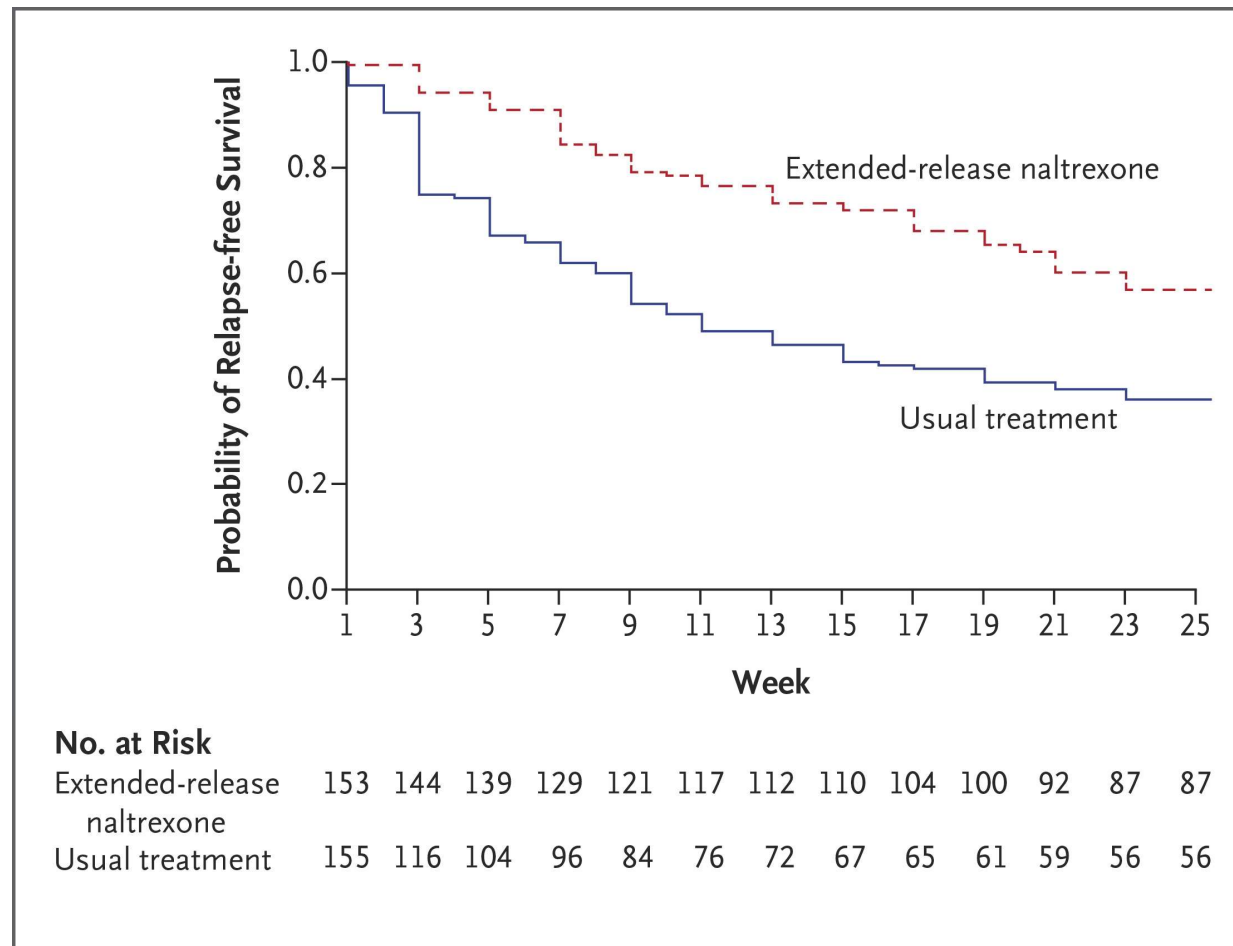


# Baseline Characteristics

Characteristic	Extended-Release Naltrexone (N=153)	Usual Treatment (N=155)
Age — yr	44.4±9.2	43.2±9.4
Male sex — no. (%)	129 (84.3)	132 (85.2)
Race or ethnic group — no./total no. (%)†		
White	31/152 (20.4)	30/155 (19.4)
Black	81/152 (53.3)	74/155 (47.7)
Hispanic	37/152 (24.3)	45/155 (29.0)
Years of education	11.5±2.2	11.5±1.8
Current employment — no. (%)	26 (17.0)	29 (18.7)
Status with respect to supervision by criminal justice system — no. (%)		
Current supervision‡	121 (79.1)	124 (80.0)
Probation	55 (35.9)	62 (40.0)
Parole	57 (37.3)	54 (34.8)
Other	9 (5.9)	8 (5.2)
No supervision§	32 (20.9)	31 (20.0)
Health insurance		
Any	109 (71.2)	111 (71.6)
Medicaid	70 (45.8)	65 (41.9)
Opioid use during lifetime — no./total no. (%)		
Opioid dependence¶	153/153 (100)	155/155 (100)
Heroin use	135/152 (88.8)	137/155 (88.4)
Other, non-heroin, opioid use	77/152 (50.7)	74/155 (47.7)
Injection-drug use	64/152 (42.1)	62/155 (40.0)
Opioid use in past 30 days — no./total no. (%)		
Heroin use	32/152 (21.1)	43/155 (27.7)
Other, non-heroin, opioid use	31/152 (20.4)	26/155 (16.8)
Any opioid use	47/152 (30.9)	59/155 (38.1)
Needed opioid detoxification to enter trial — no. (%)	13 (8.5)	14 (9.0)
Cocaine use in past 30 days — no./total no. (%)	30/152 (19.7)	29/155 (18.7)
Heavy alcohol use in past 30 days — no. (%)	18 (11.8)	19 (12.3)

# XR-NTX to Prevent Opioid Relapse in Criminal Justice

Opioid relapse:  $\geq 10$  days use



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Lee JD, Friedmann PD, Kinlock T, et al. N Engl J Med 2016;374:1232-1242

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# Incarceration does not extinguish addiction

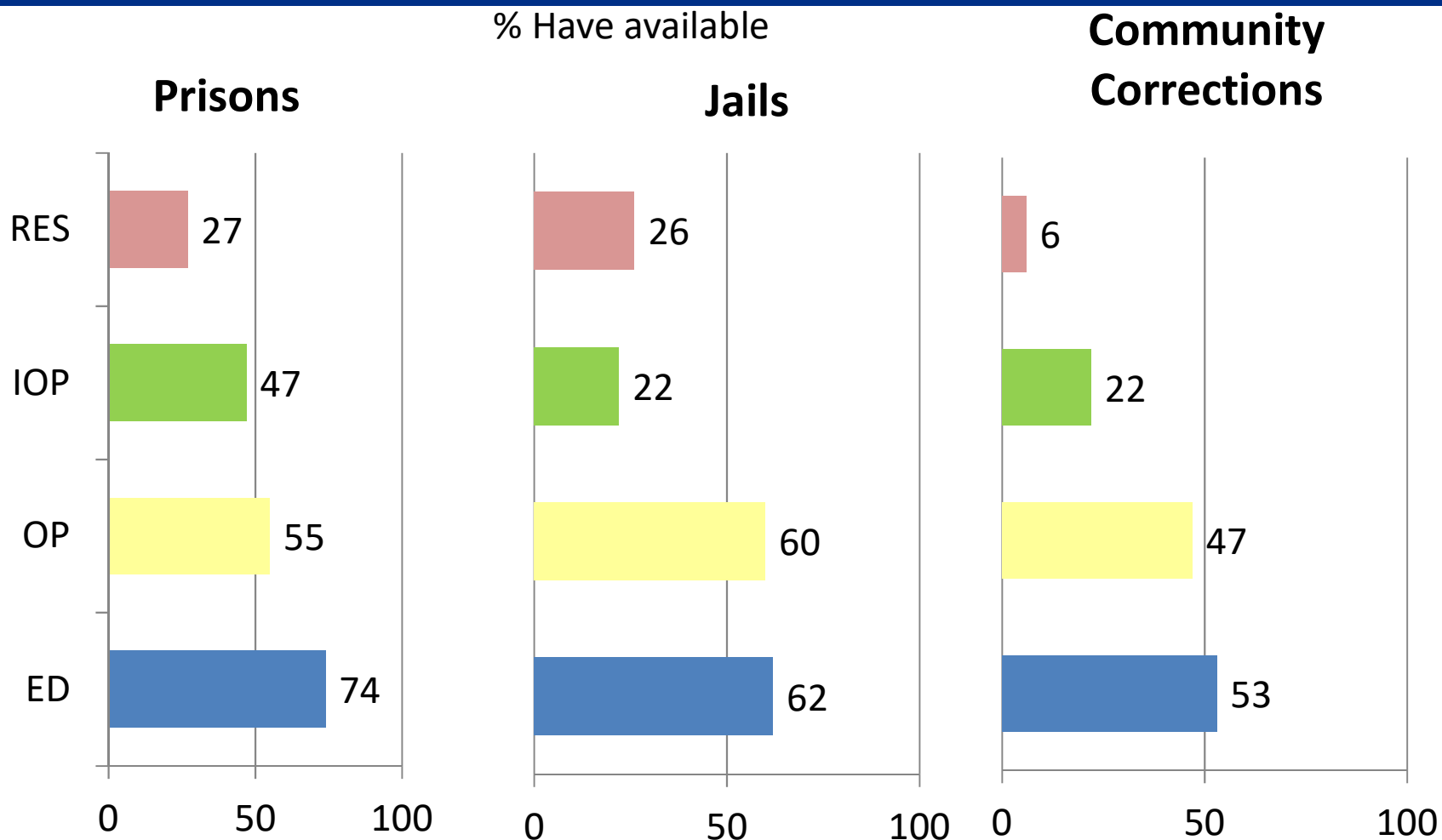
- Forced abstinence does not address substance use disorder
  - Decreases tolerance but not conditioned responses, memory
  - Still vulnerable to triggers, craving on release

# The Revolving Door...

- >12 million jail releases per year
- >700,000 prison releases per year
  - >200,000 opioid-addicted adults cycle thru CJ system annually (Nunn et al. 2009)



# Corrections-Based Treatment



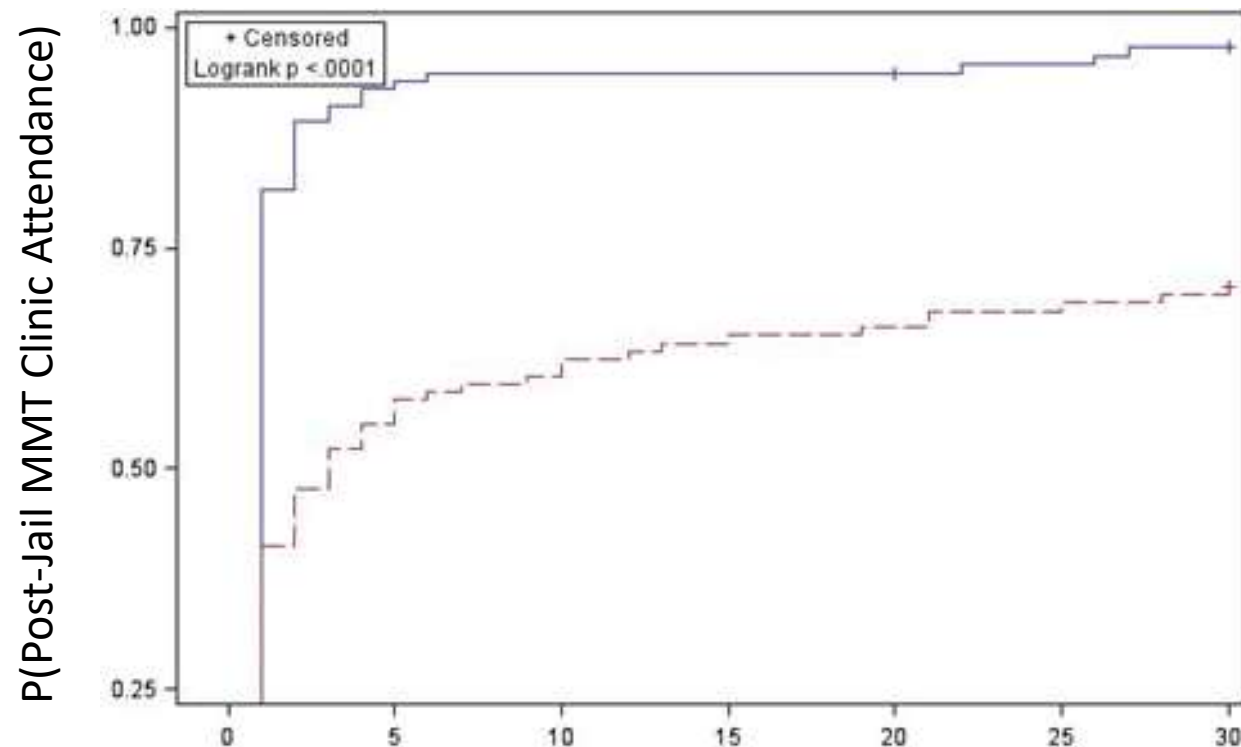
# Agonist medications underutilized in CJ Settings

- ‘Drug-free’ treatment predominates (Nunn 2009; Friedmann 2012)
- Illicit opiate use in detention
  - Corruption and violence
  - HIV and hepatitis outbreaks
- Untreated opiate withdrawal in detention
  - Forced detox: cruel and morbid
  - Reduces desire to resume medication post-release (Mitchell et al., 2009; Rich, 2015)

# RCT of Forced Withdrawal

## Jail Sentence $\leq 6$ mos

—Continued MMT (N=114) ----Forced withdrawal (N=109)







- $>1/2$  relapse within 1 year (Martin et al. 1999)
- $2/3^{\text{rd}}$  return to custody within 3 years  
(Langan & Levin, 2002)



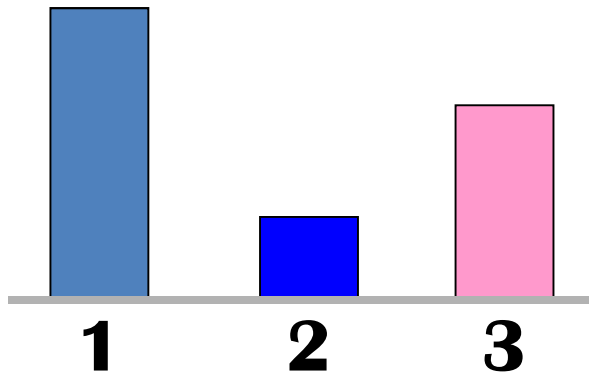
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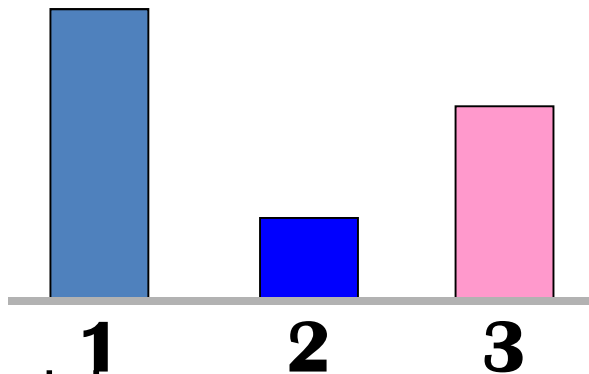
# Treatment of Chronic Disorders

## Hypertension



- 1 Untreated disorder manifests itself at high level
- 2 Treatment reduces symptoms
- 3 Symptoms return when treatment stopped – proof of its effectiveness

## Substance use disorder



- 1 Untreated disorder manifests itself at high level
- 2 Treatment reduces symptoms
- 3 Symptoms return when treatment is stopped – does treatment work?



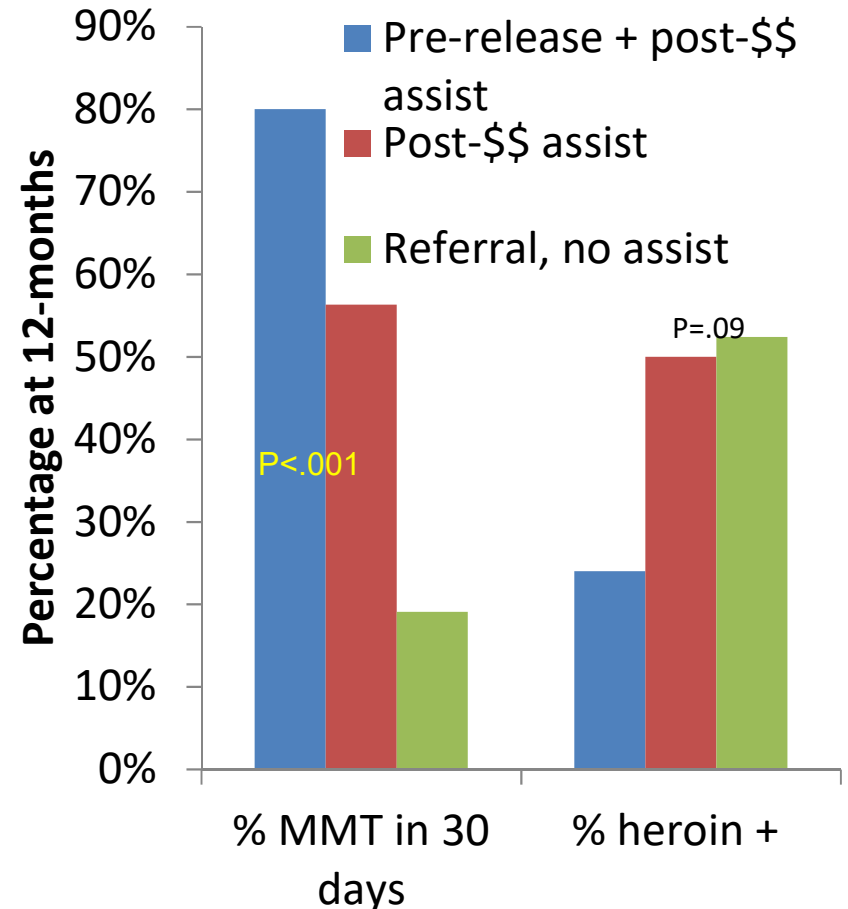
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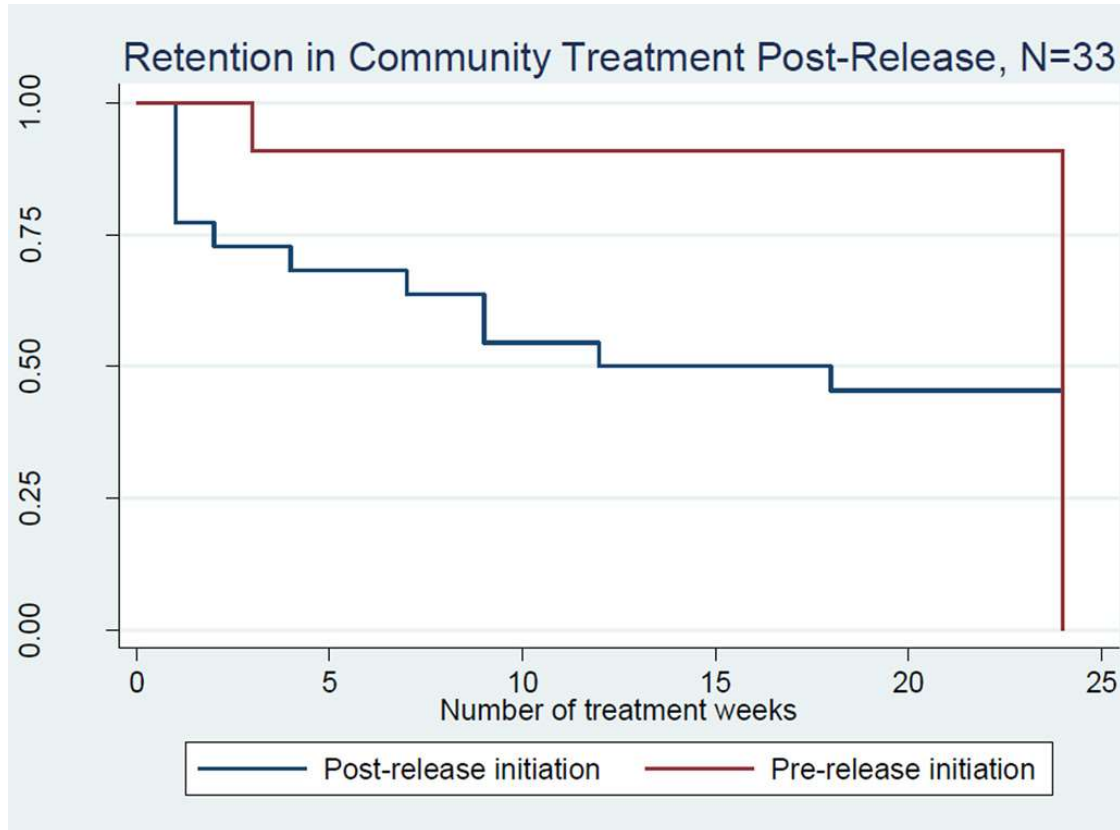
Adapted from McLellan, Lewis, O'Brien & Kleber, JAMA 2000.

# Methadone Treatment at Community Reentry

- Arm 1 (N=29) (Blue)
  - MMT 30 days before release
  - MMT linkage in community (financial assistance)
  - 4 not treated before release
- Arm 2 (N=29) (Red)
  - MMT linkage in community (financial assistance)
- Arm 3 (N=30) (Green)
  - MMT referral
  - No financial assistance for MMT
  - 15 given ATR on release → as-treated crossed to Arm 2

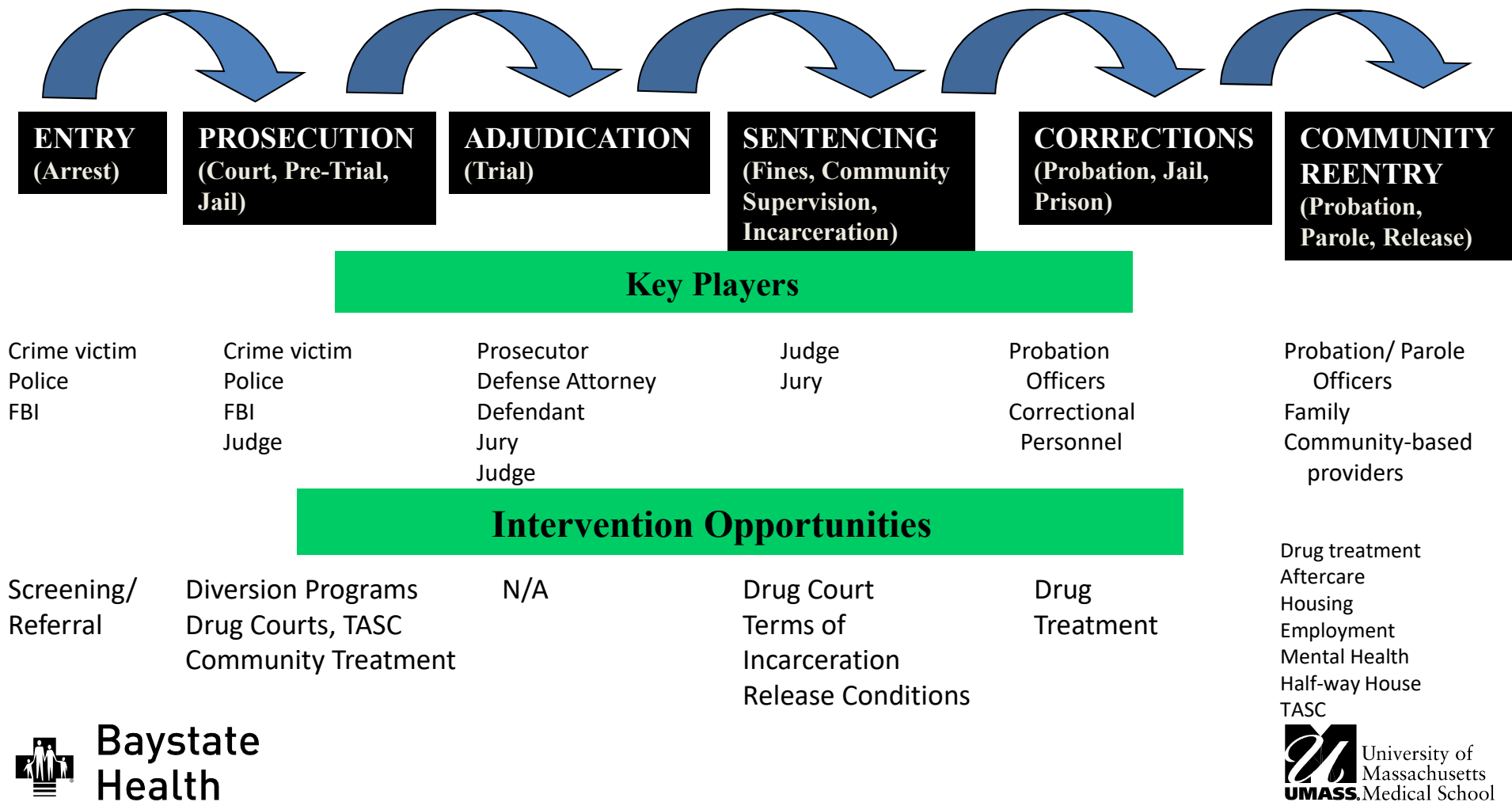


# Bup Treatment at Community Reentry



- N= 44
  - 27% pre-release
  - 73% postrelease bup
- 82% 6 month f/u
  - Median rx 9 vs 24 wks (p=.007)
  - IDU 26% vs. 0% (p=.05)
  - Arrest 17% vs. 0 (p=.14)

# Opportunities for Intervention in the CJ Setting

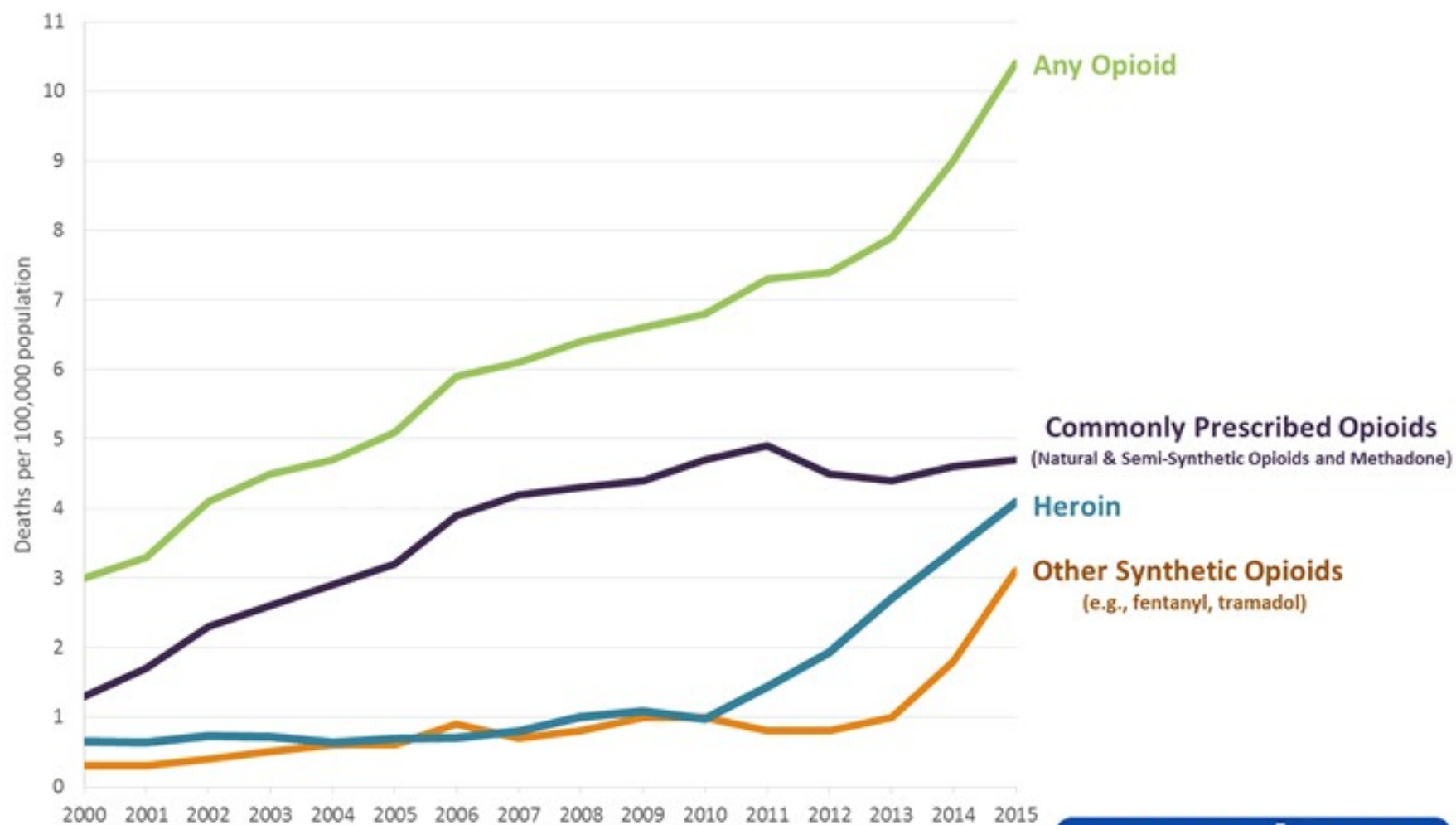


Slide adapted from Redonna Chandler

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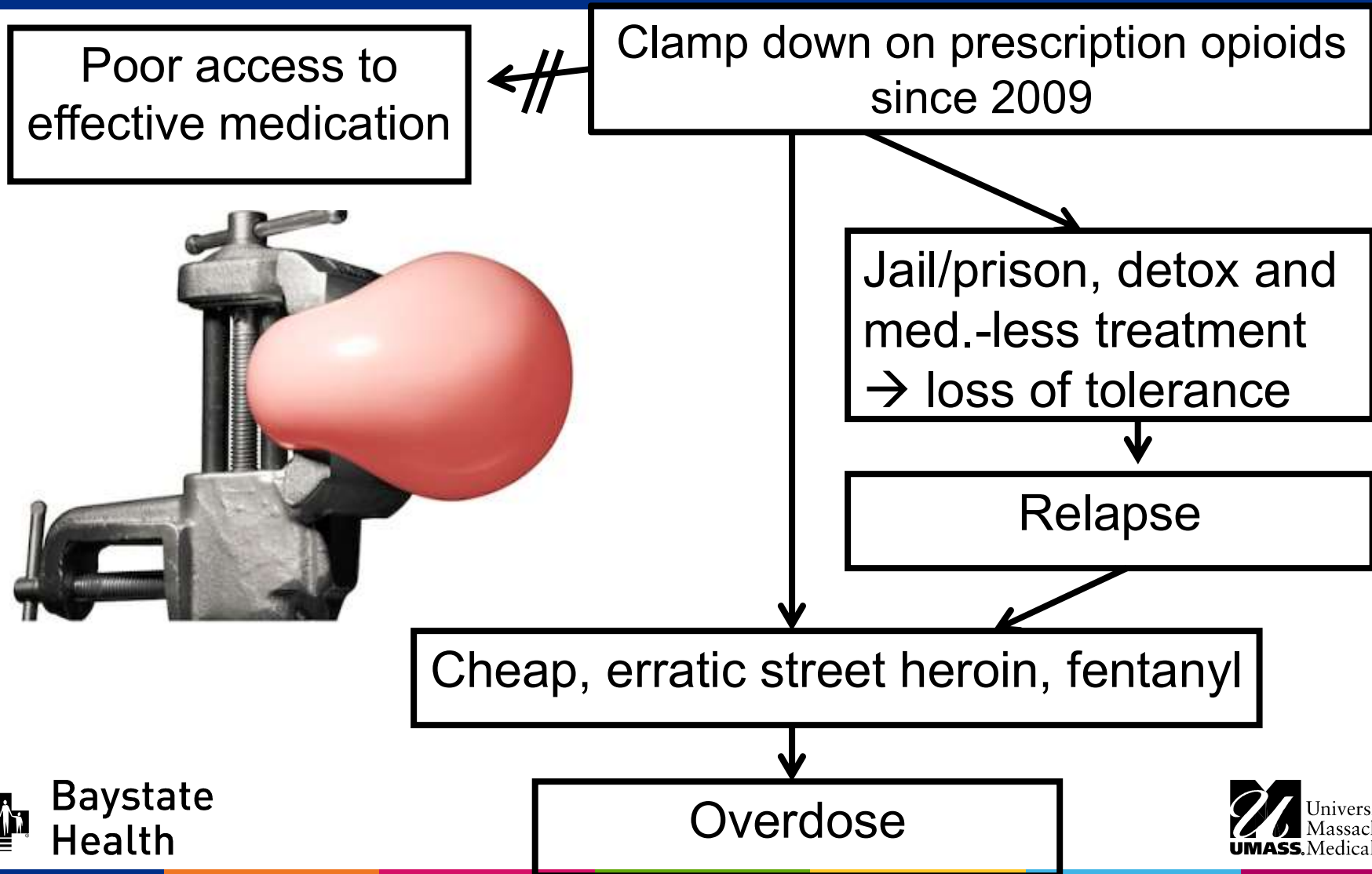
## Overdose Deaths Involving Opioids, United States, 2000-2015



SOURCE: CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2016. <https://wonder.cdc.gov/>.

**www.cdc.gov**  
Your Source for Credible Health Information

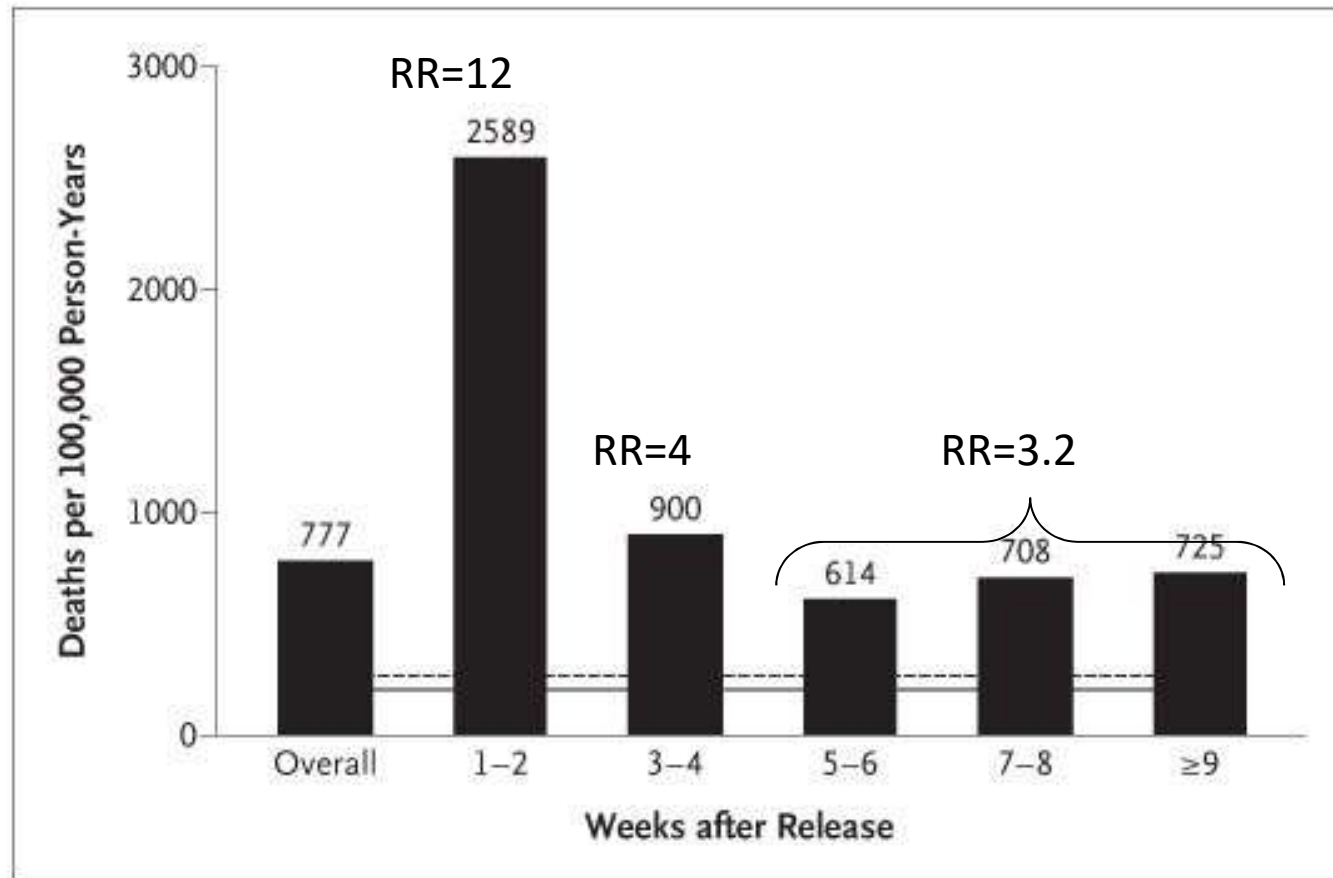
# Why a Surge in Overdoses?





# Release from Prison

## High Risk of Death

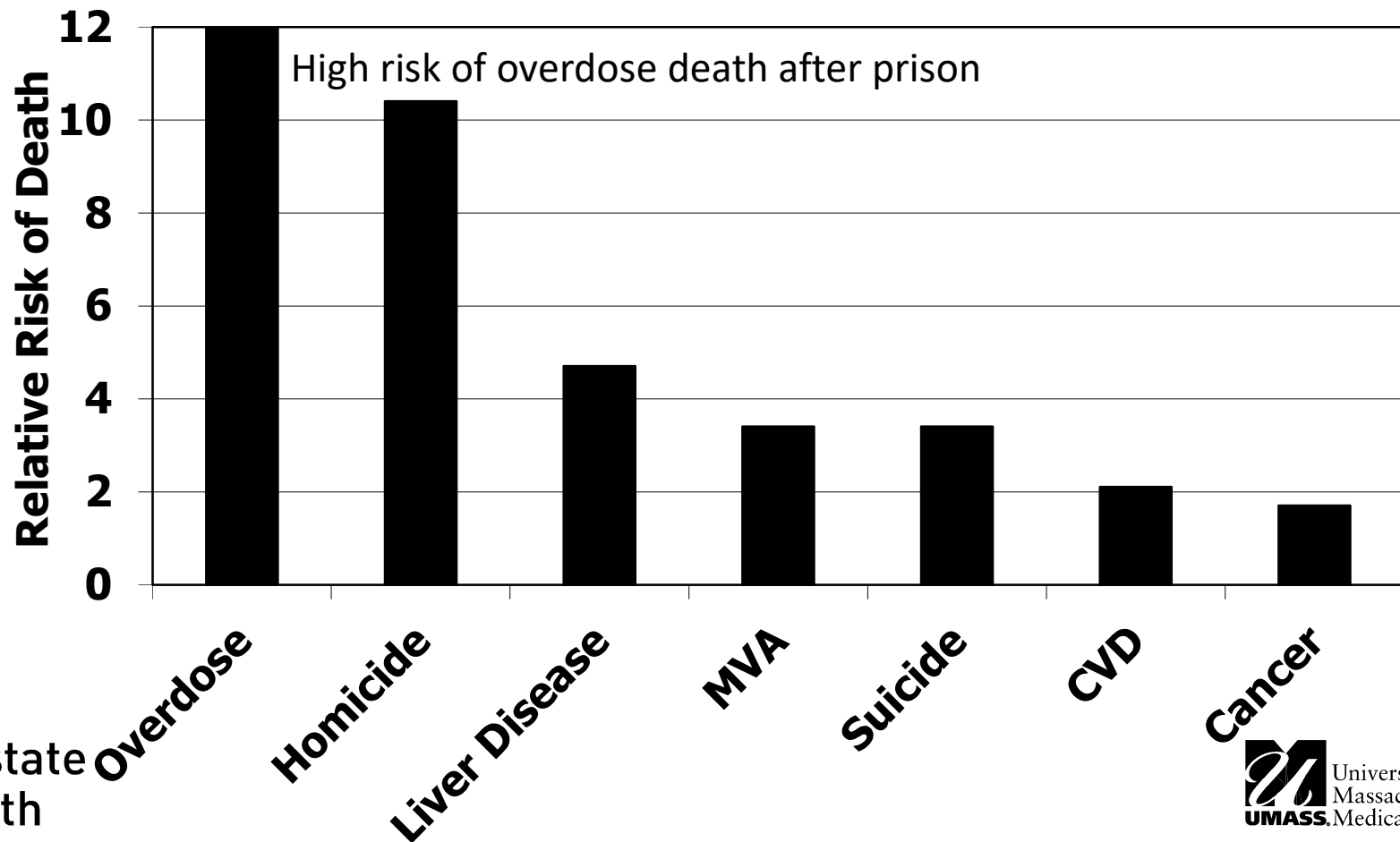


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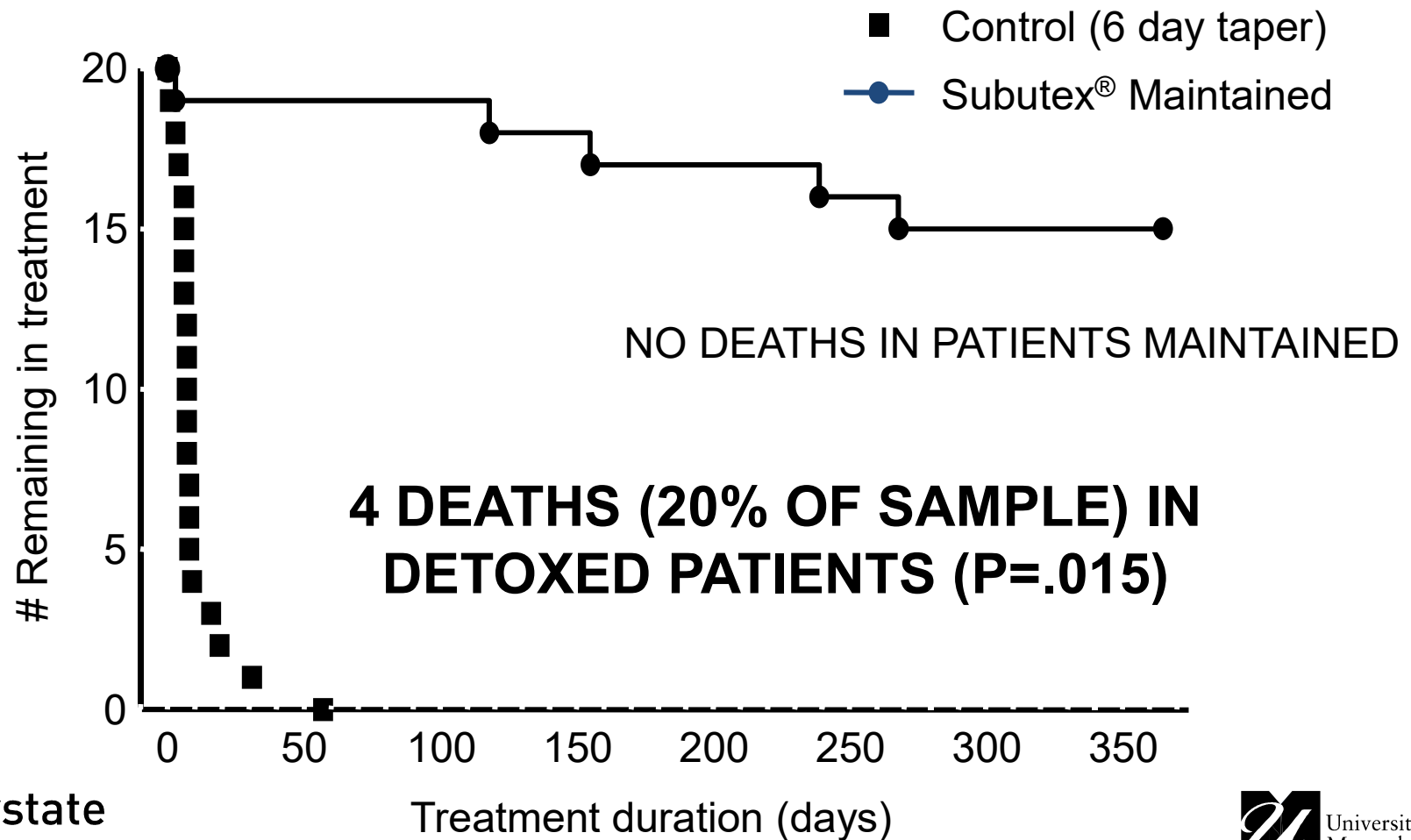
# Loss of Opioid Tolerance ↑'s Risk for Overdose, Esp. after Incarceration



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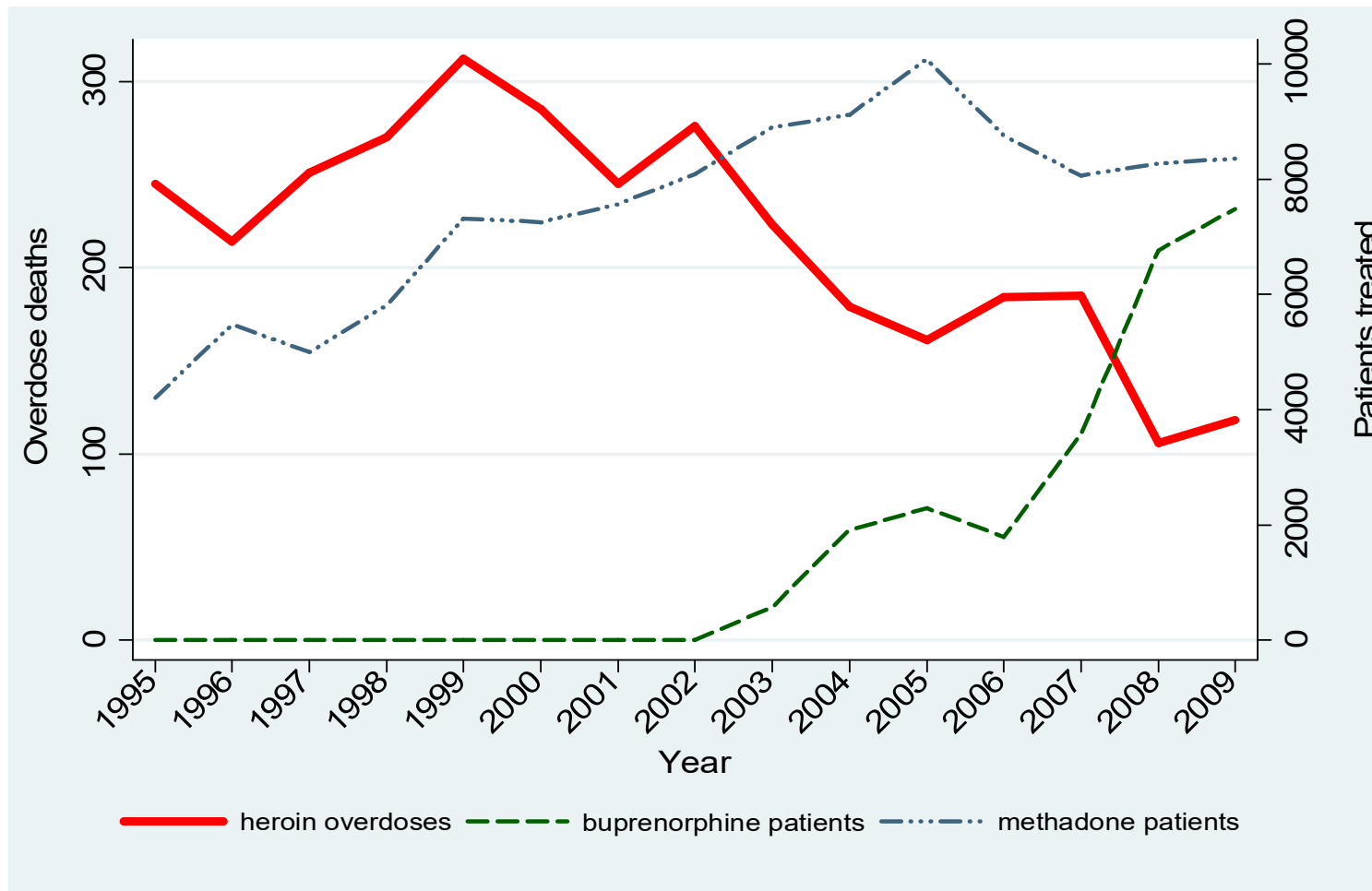
# Bup Withdrawal vs. Maintenance



# Agonist Treatment Reduces Overdose Mortality

- Methadone treatment engagement
  - ↓ annual overdose mortality to 2.6 versus 12.7 per 1000
  - ↓ annual all cause mortality to 11.3 versus 36.1 per 1000
- Bup associated with similar mortality benefits
  - smaller research cohorts limited robustness of the findings, so need additional data.

# ↑'d Community Access to Agonist Treatment → ↓'d Overdose Death



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Schwartz et al, American Journal of Public Health, 2013

# Summary

- OUD is a chronic, neurobehavioral disorder
- Policies favoring medication-less intervention increase mortality in persons with OUD
  - Loss of tolerance → overdose, e.g. after prison
- Medication underutilized in criminal justice
  - XR-NTX increasingly used in corrections
    - Likely effective short-term on opioid use outcomes
    - Concern about risk of overdose when stopped
    - Uncertain long-term outcomes
- To reduce overdose deaths, policies need to increase access to agonist medication



# THANK YOU!

## ***Colleagues and Collaborators***

- Josh Lee
- Robert Schwartz
- Redonna Chandler
- Harold Pollack
- Keith Humphreys
- Christina Andrews
- Josiah Rich
- David Farabee
- Faye Taxman
- Colleen Grogan
- Richard Saitz
- Jeffrey Samet
- Qixuan Chen
- Donna Wilson
- Randy Hoskinson, Jr
- Alex Walley
- Traci Green
- Susan Ramsey

## ***Mentors***

- Tom D'Aunno
- Dean Gerstein
- Ed Senay (deceased)
- Michael Stein

***NIDA esp. DESPR, Services Research Branch***



## **Questions?? Comments??**



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# Opioid pharmacotherapy believed less effective than research suggests

- “The clinician’s illusion”
  - Illusion from seeing prevalence sample
    - Probability that a case will appear is proportional to duration
    - Probability of detection is related to severity
    - Biased to see long duration, unremitting cases
  - Clinical and correctional settings
    - Patients who don’t return are forgotten
    - Severe cases that return (“relapsers” or “frequent flyers”) are remembered (availability bias)