Methamphetamine

Part 1

Prevalence, drug effects

Michael McCann, M.A.

June 14, 2017

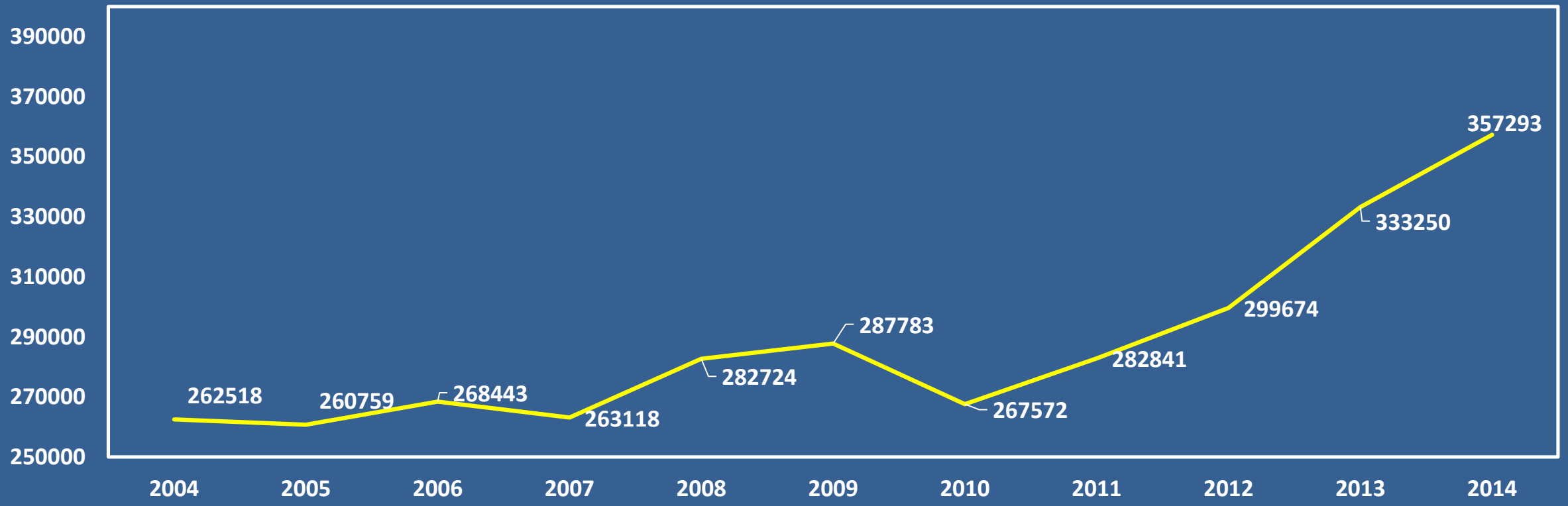
Overview

- Methamphetamine prevalence
- Effects on the brain
- Physical and psychological effects
- Treatments for methamphetamine dependence

Methamphetamine Use Prevalence

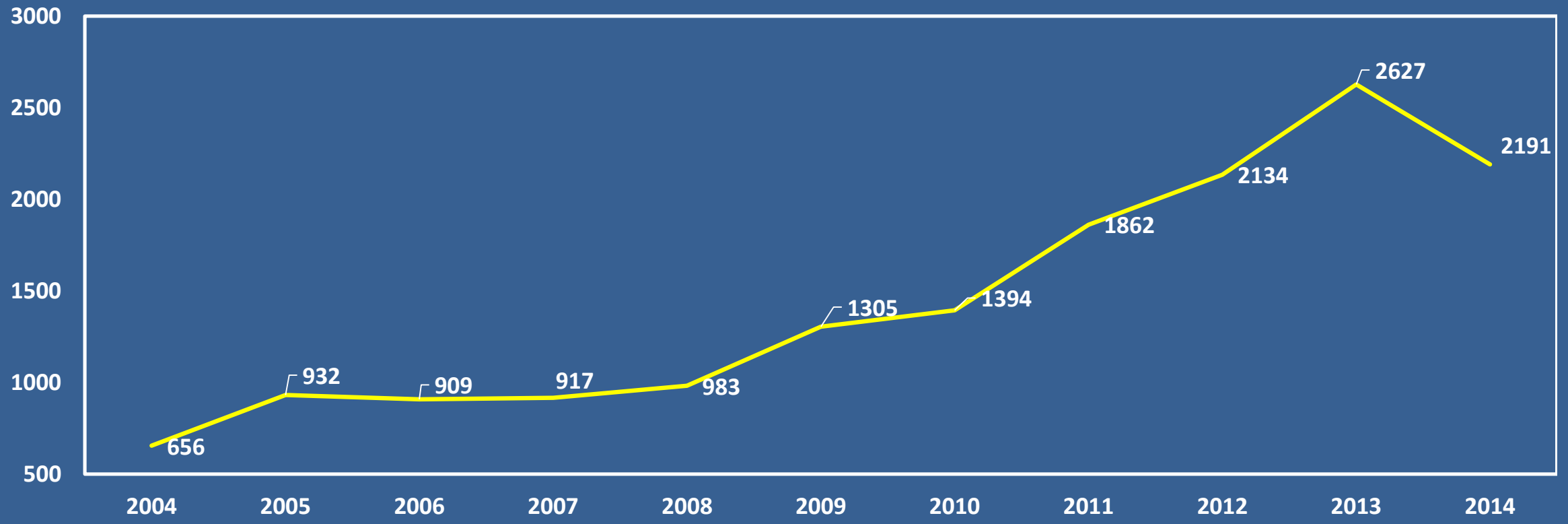
Creeping up under the cover of the opioid epidemic

National Heroin Treatment Admissions for 12 and Over



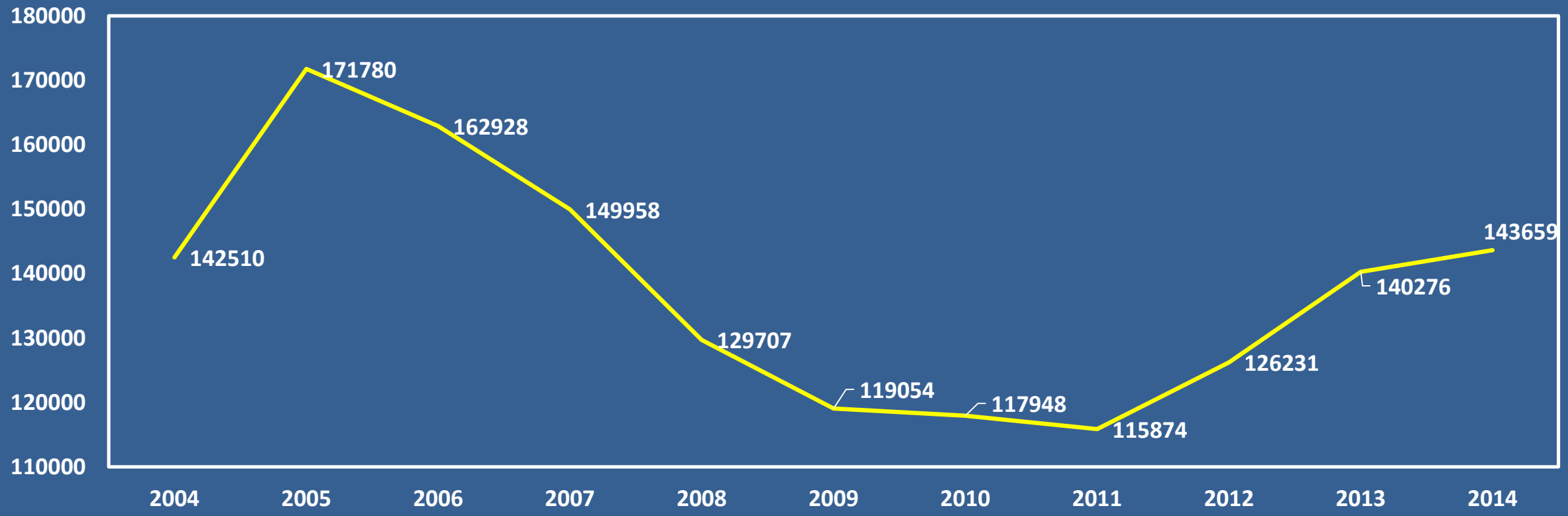
TEDS Data

Wisconsin Heroin Treatment Admissions for 12 and Over



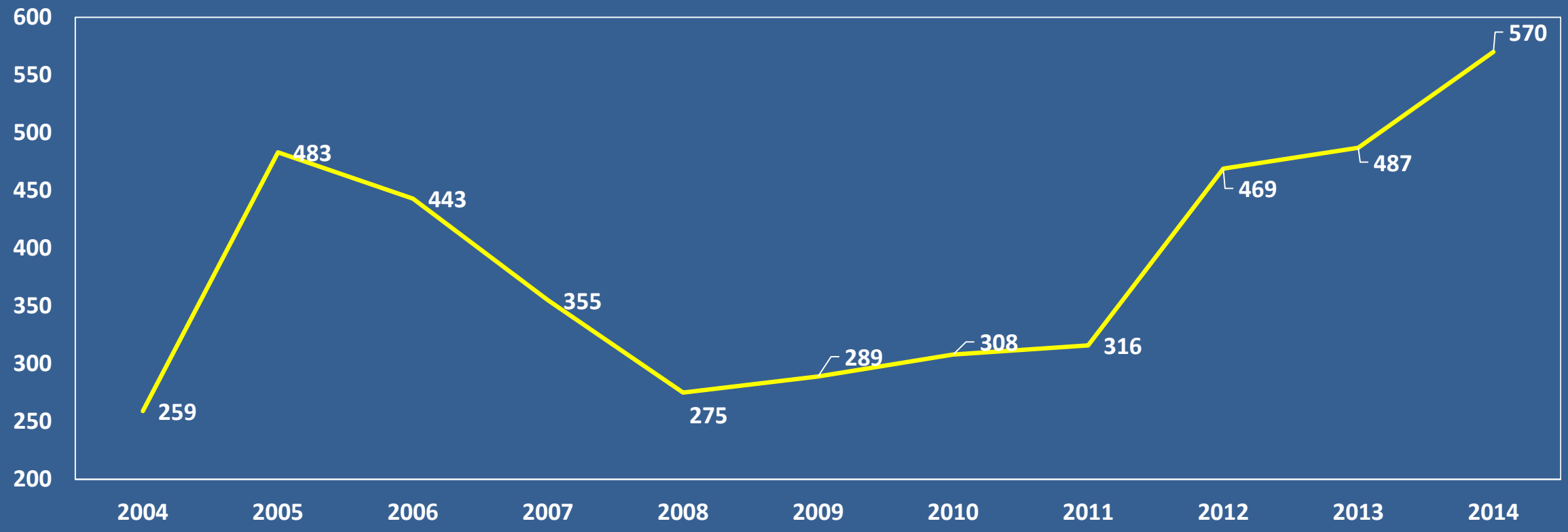
TEDS Data

National Methamphetamine Treatment Admissions for 12 and Over



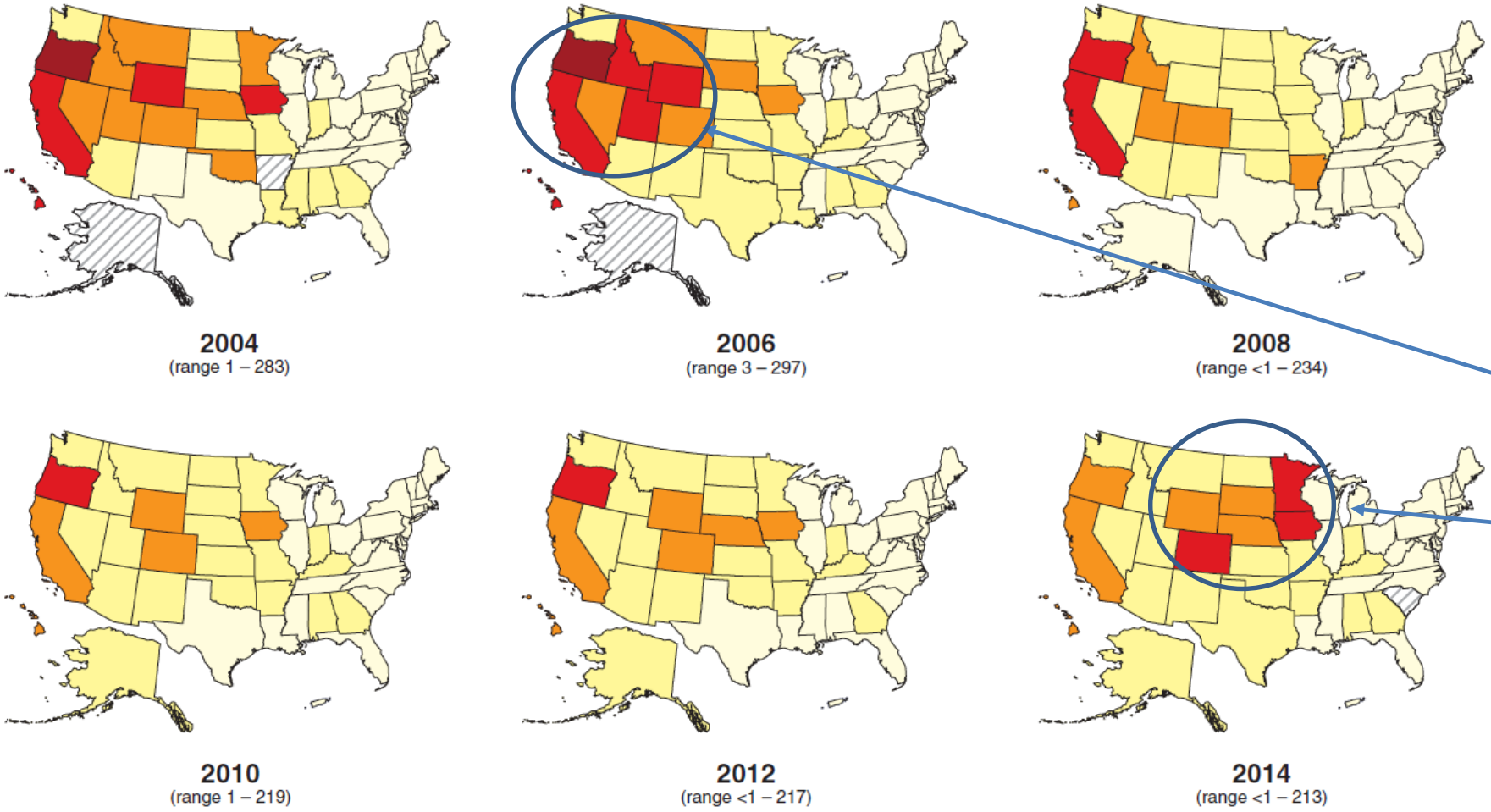
TEDS Data

Wisconsin Methamphetamine Treatment Admissions for 12 and Over



TEDS Data

Figure 6. Primary methamphetamine/amphetamine admission rates, by state or jurisdiction: 2004-2014
(per 100,000 population aged 12 and older)

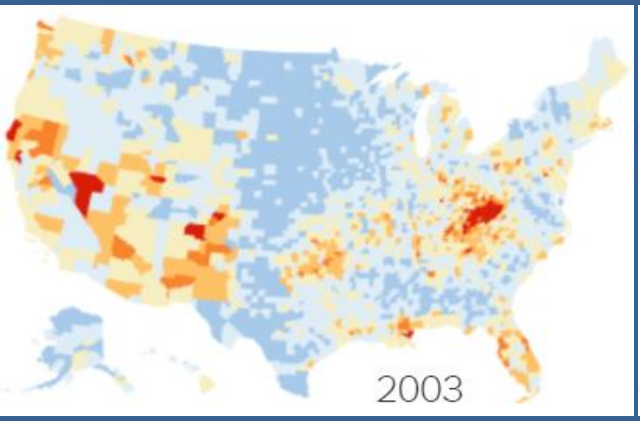


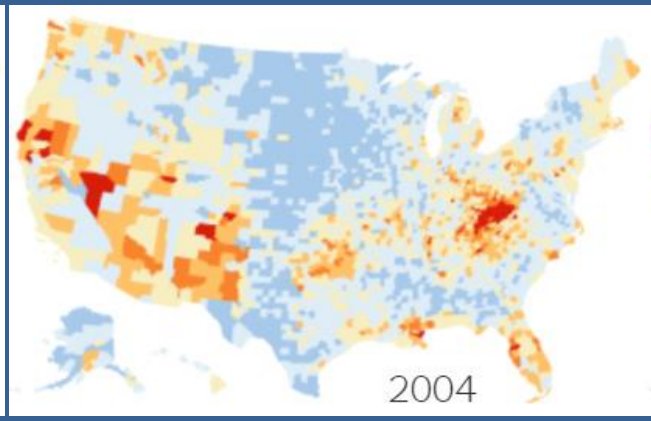
NOTES: See Chapter 1.

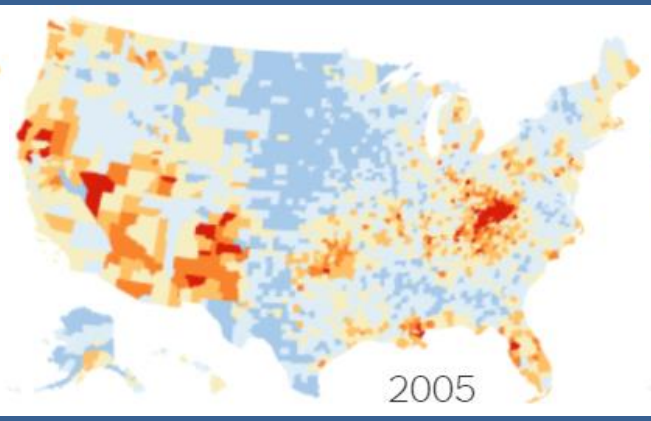
SOURCE: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Treatment Episode Data Set (TEDS). Data received through 2.01.16.

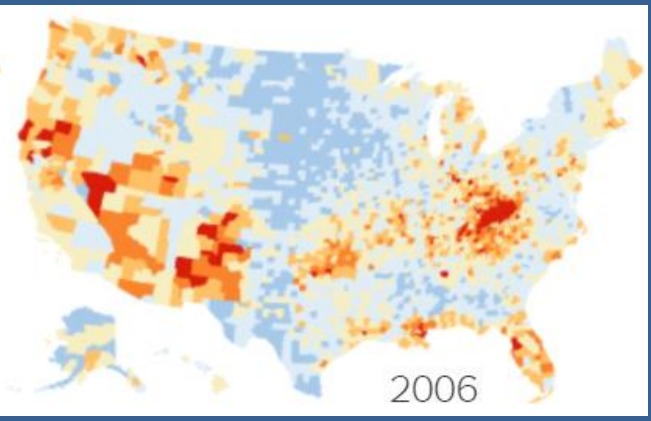
Notice where the red states were and where they shifted to.

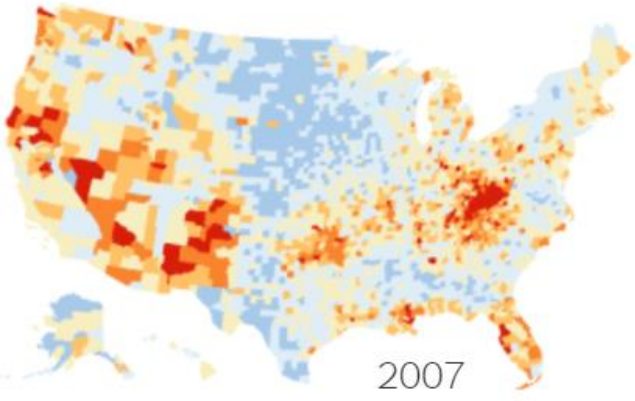
Opioid Overdose Numbers

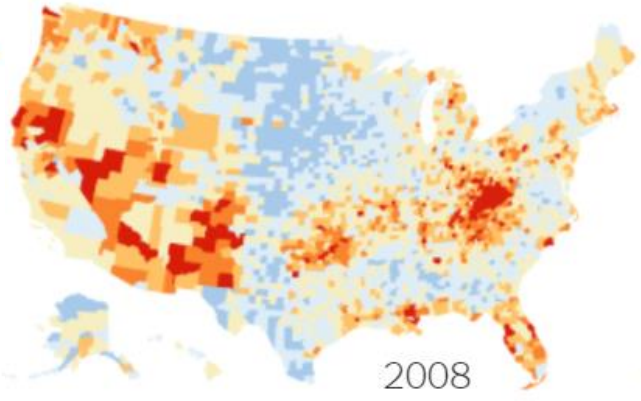


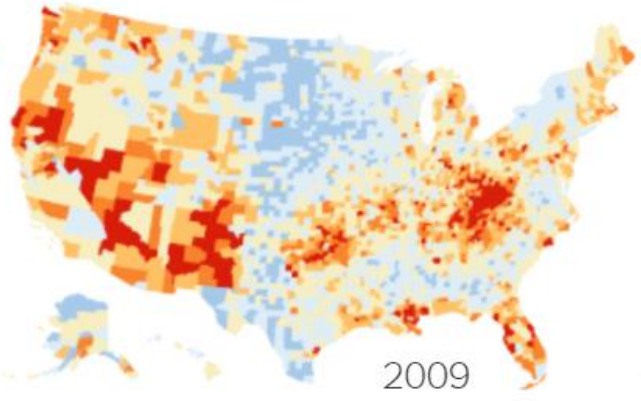


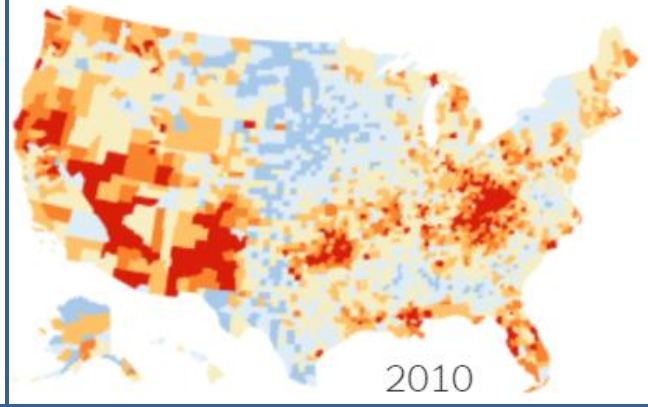


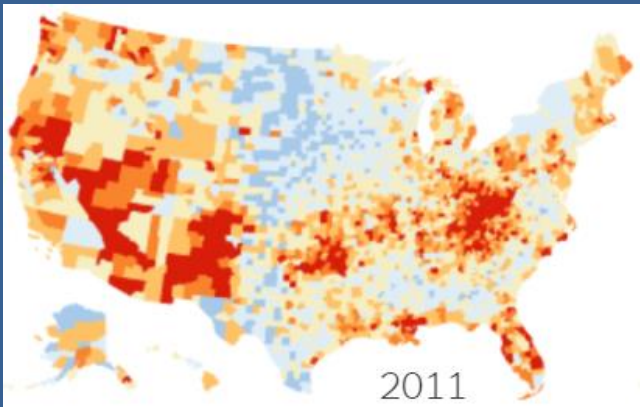


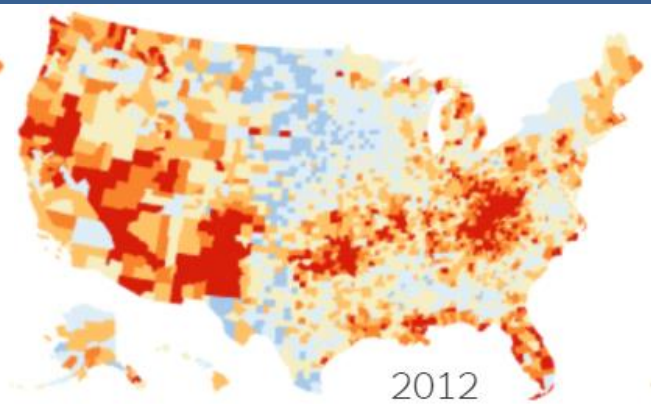


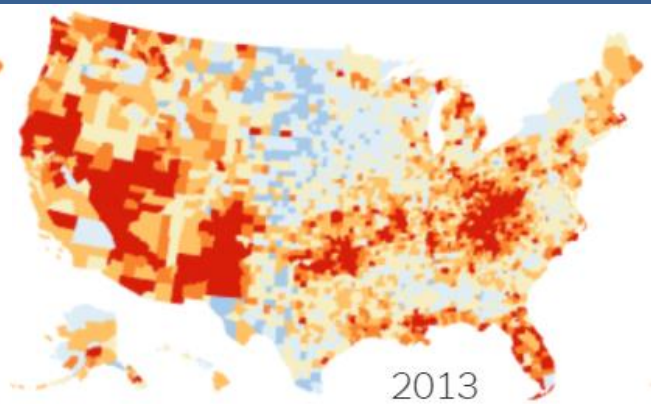


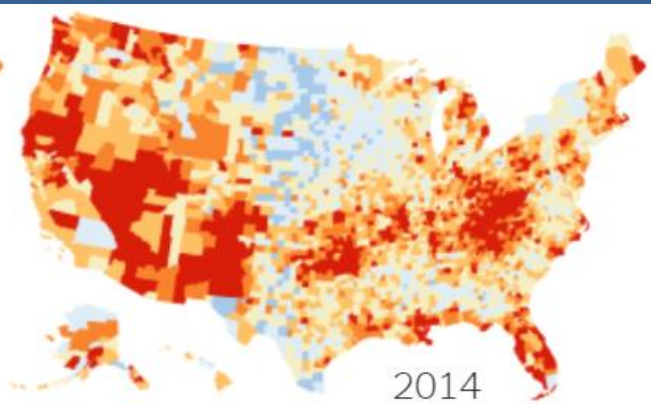






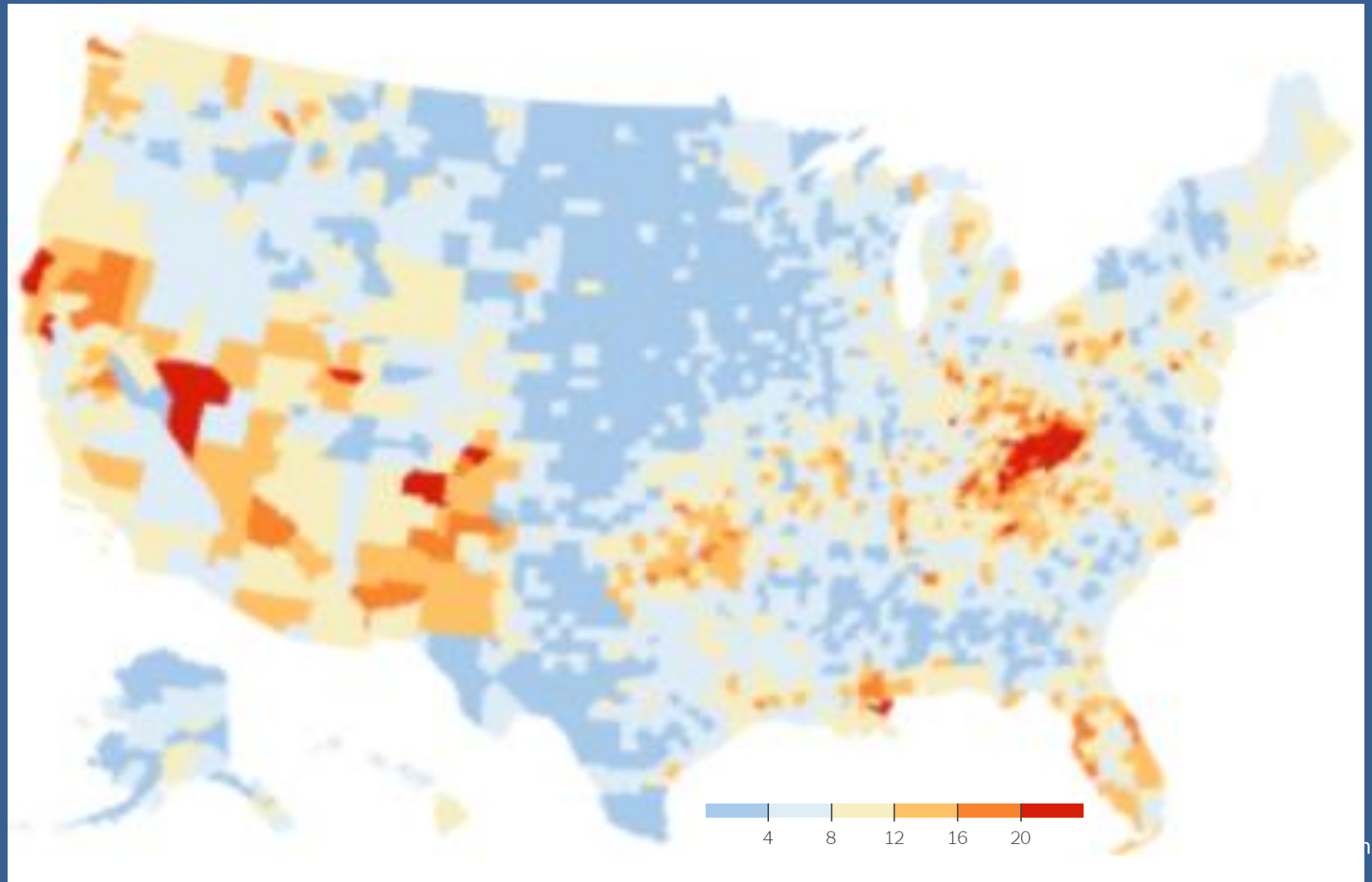






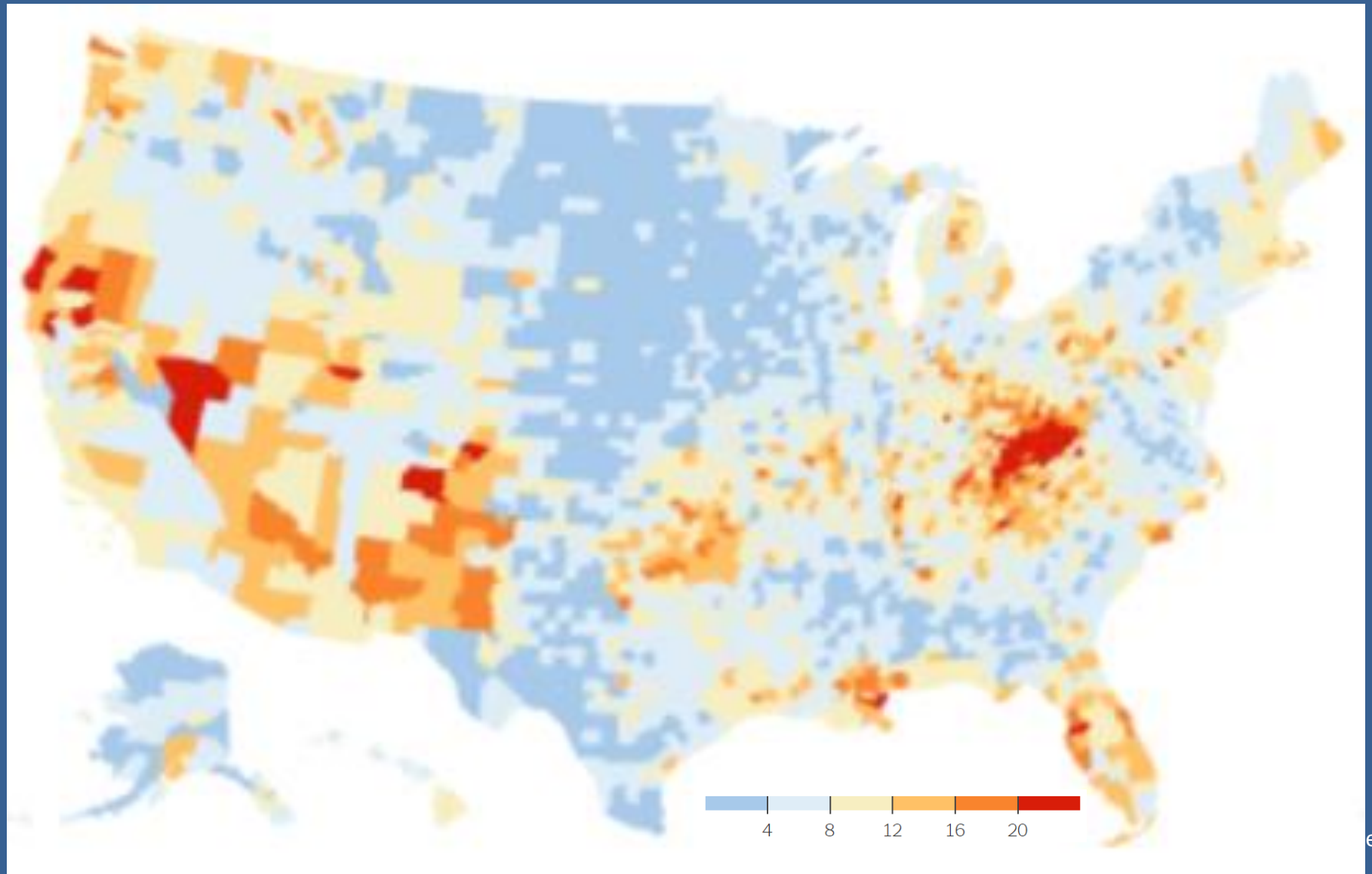
New York Times: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2003



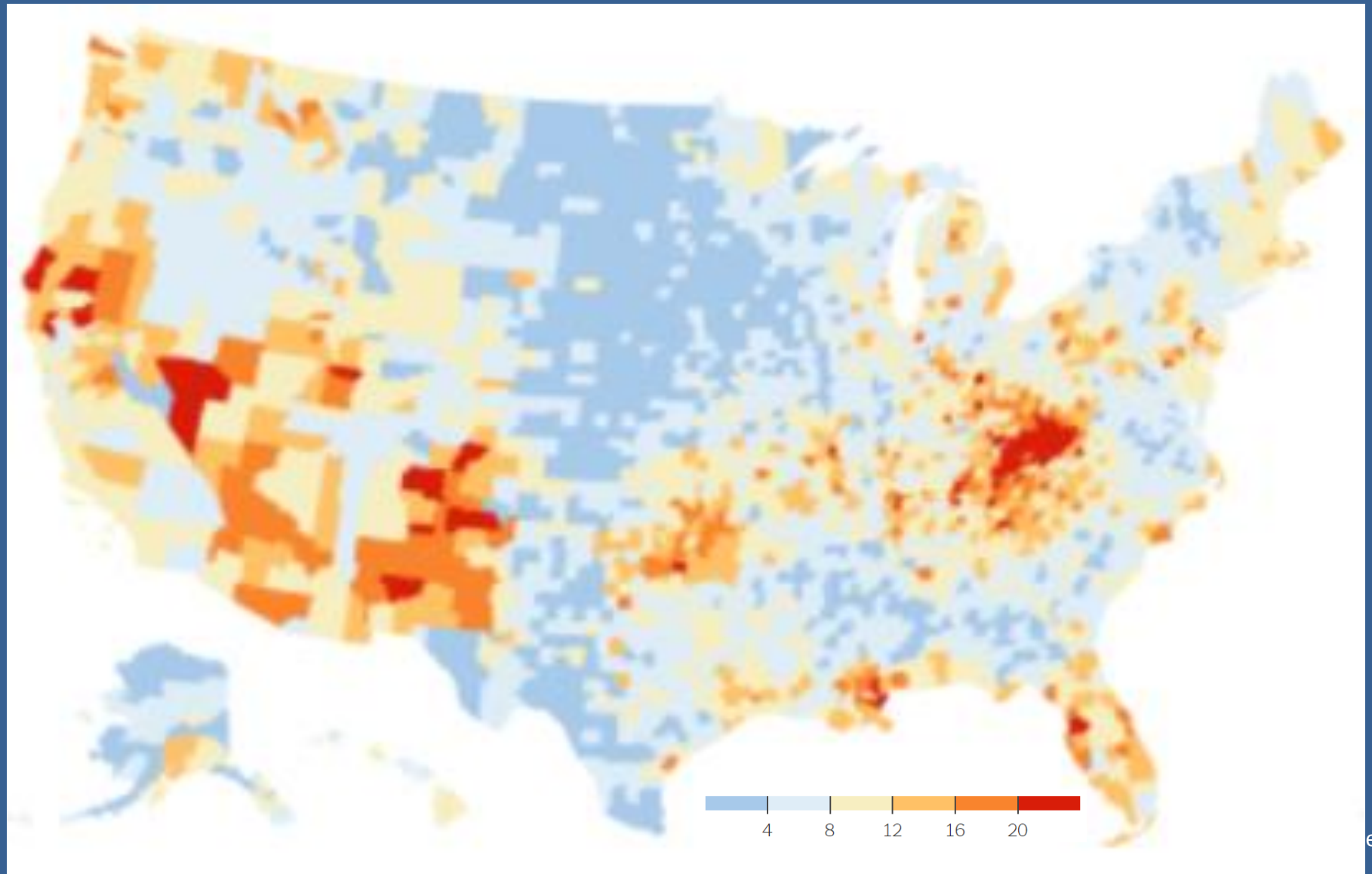
nes: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2004



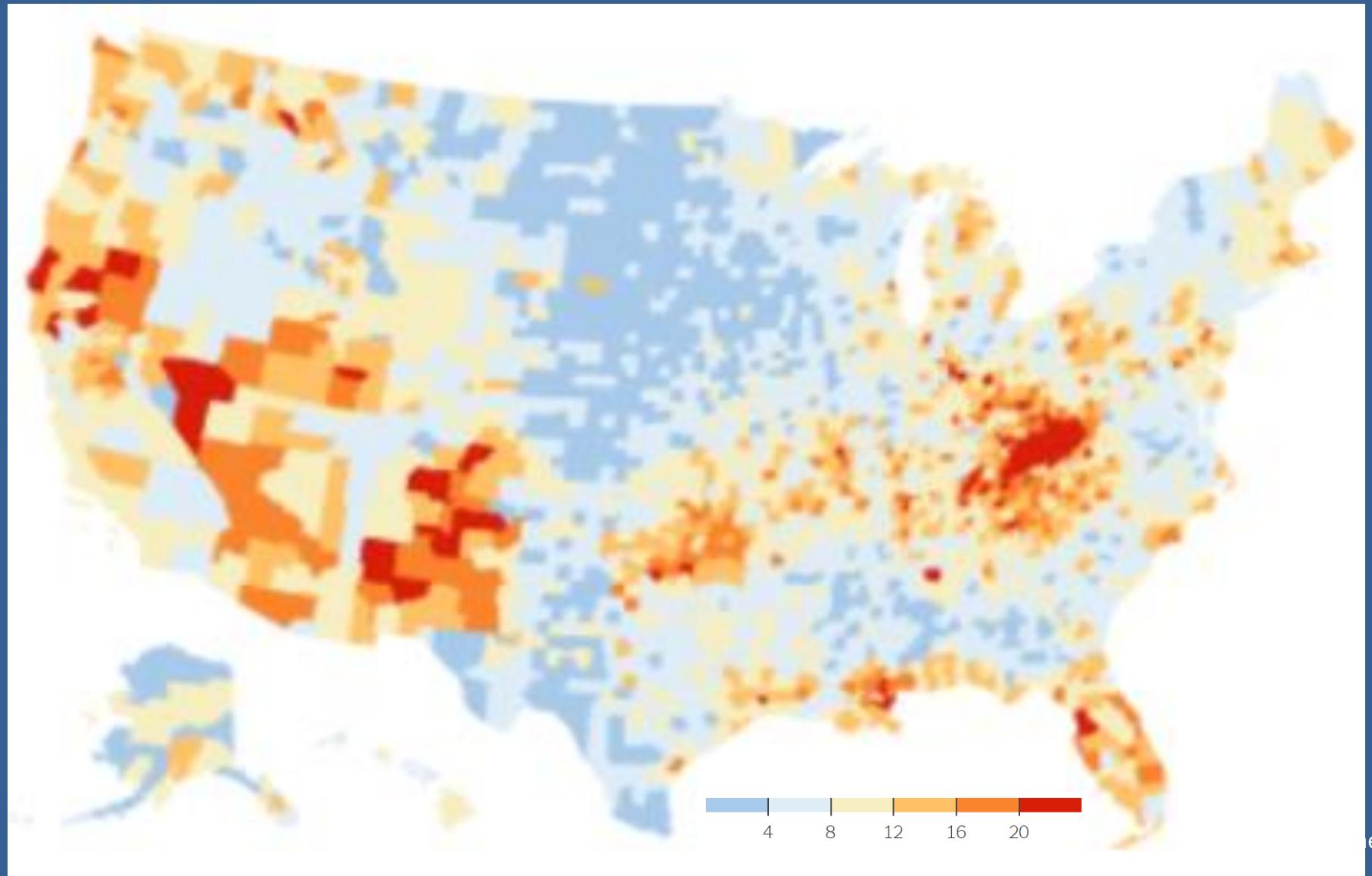
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2005



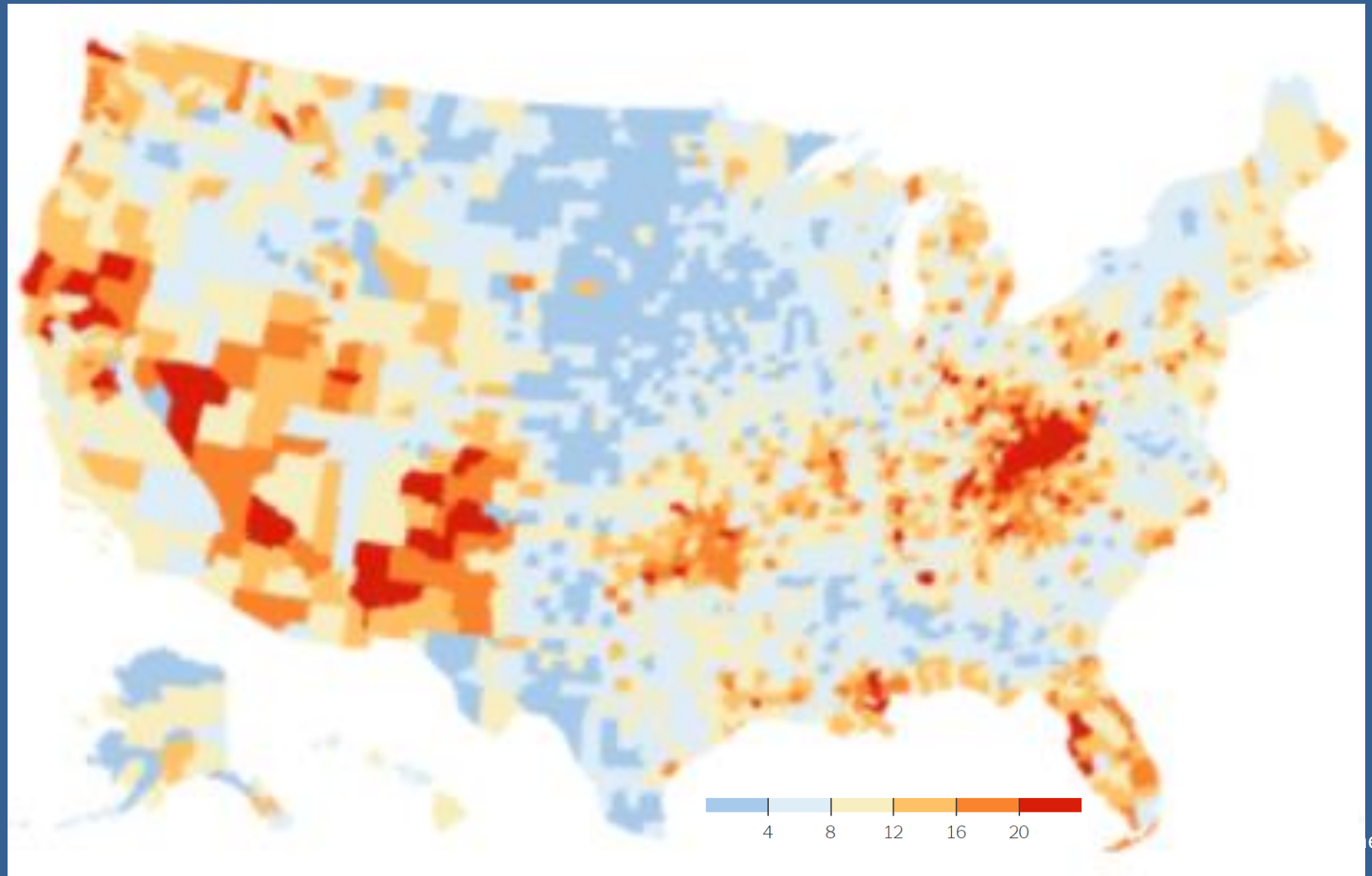
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2006



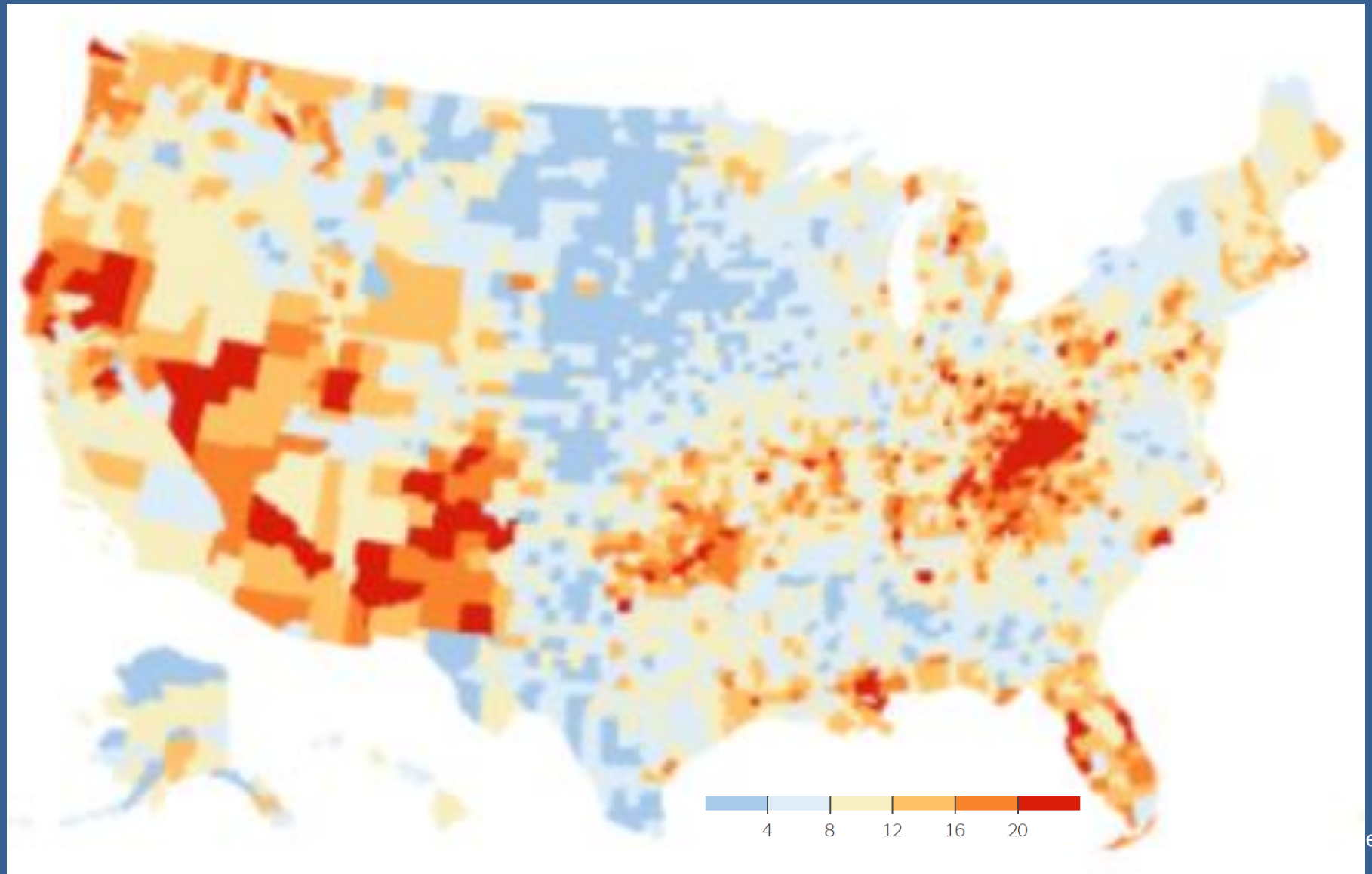
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2007



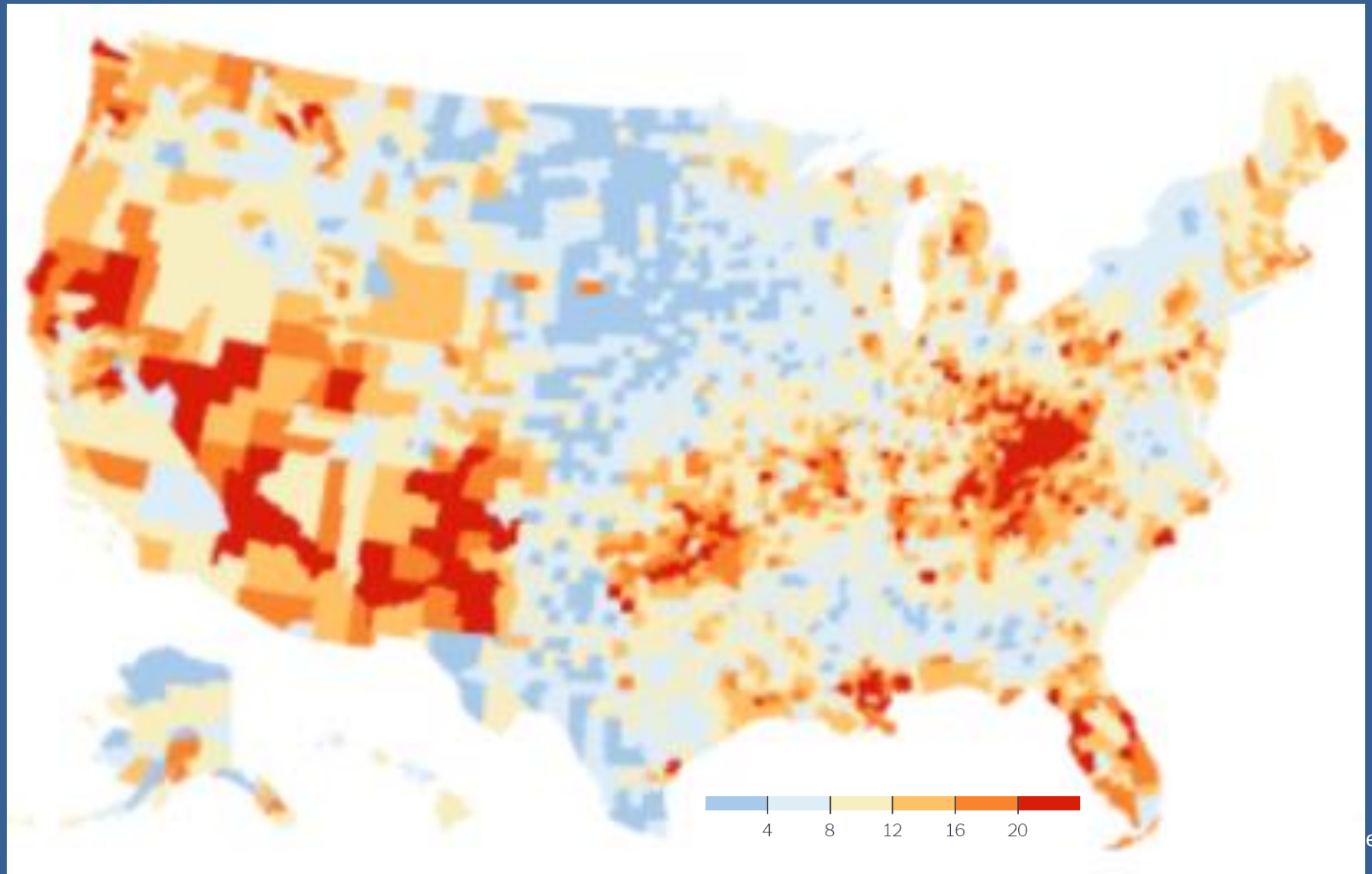
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2008



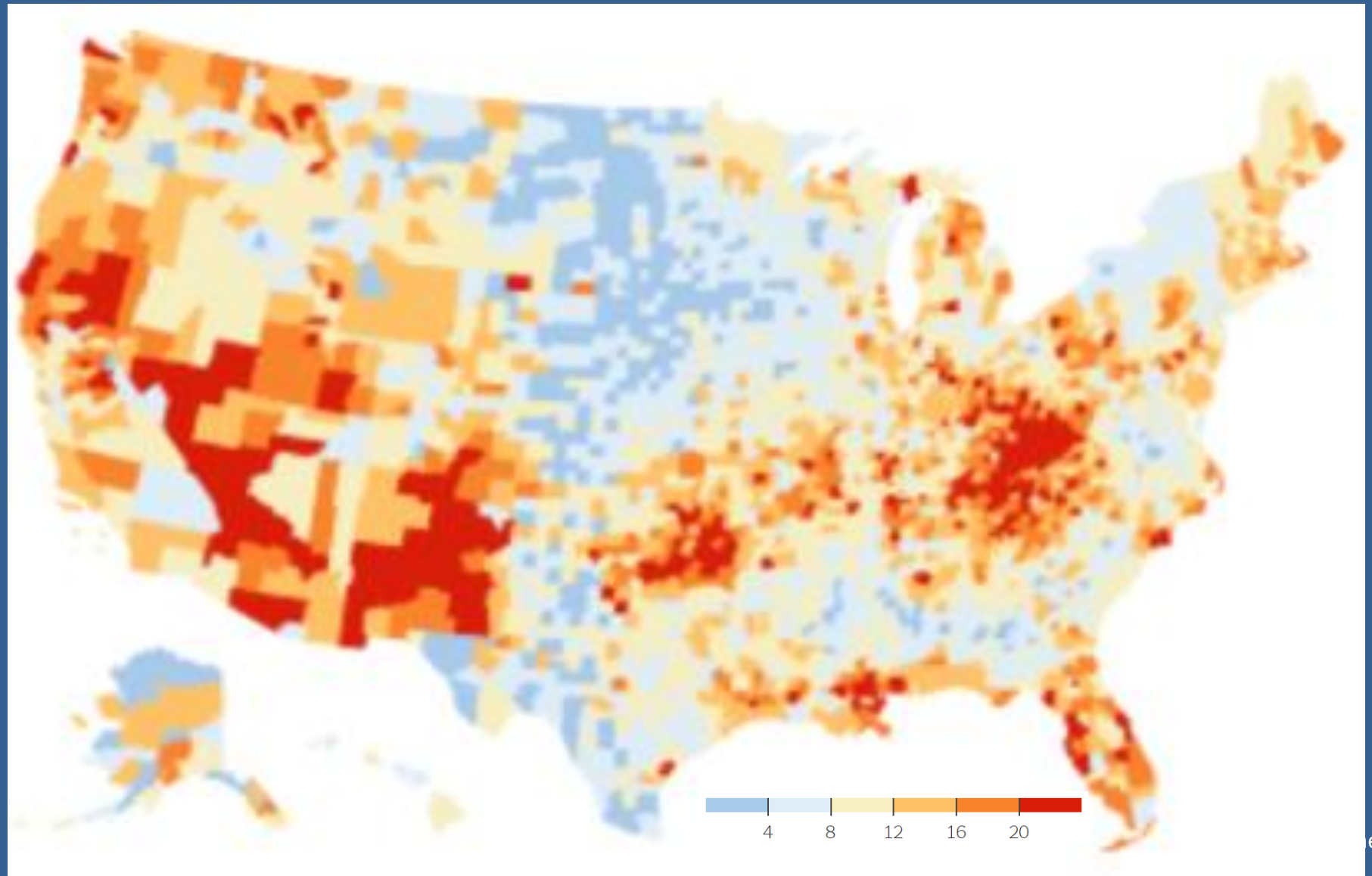
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2009



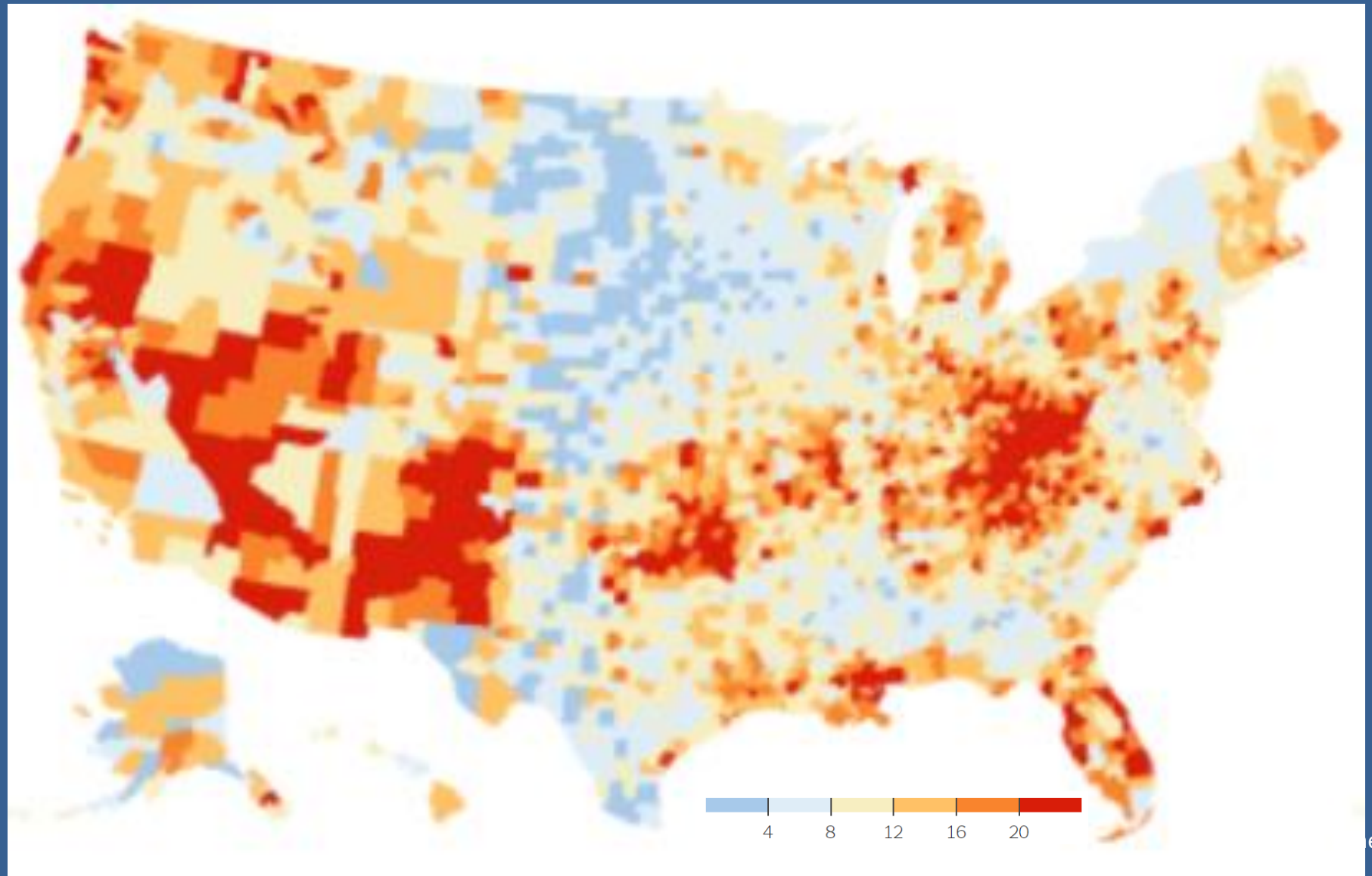
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2010



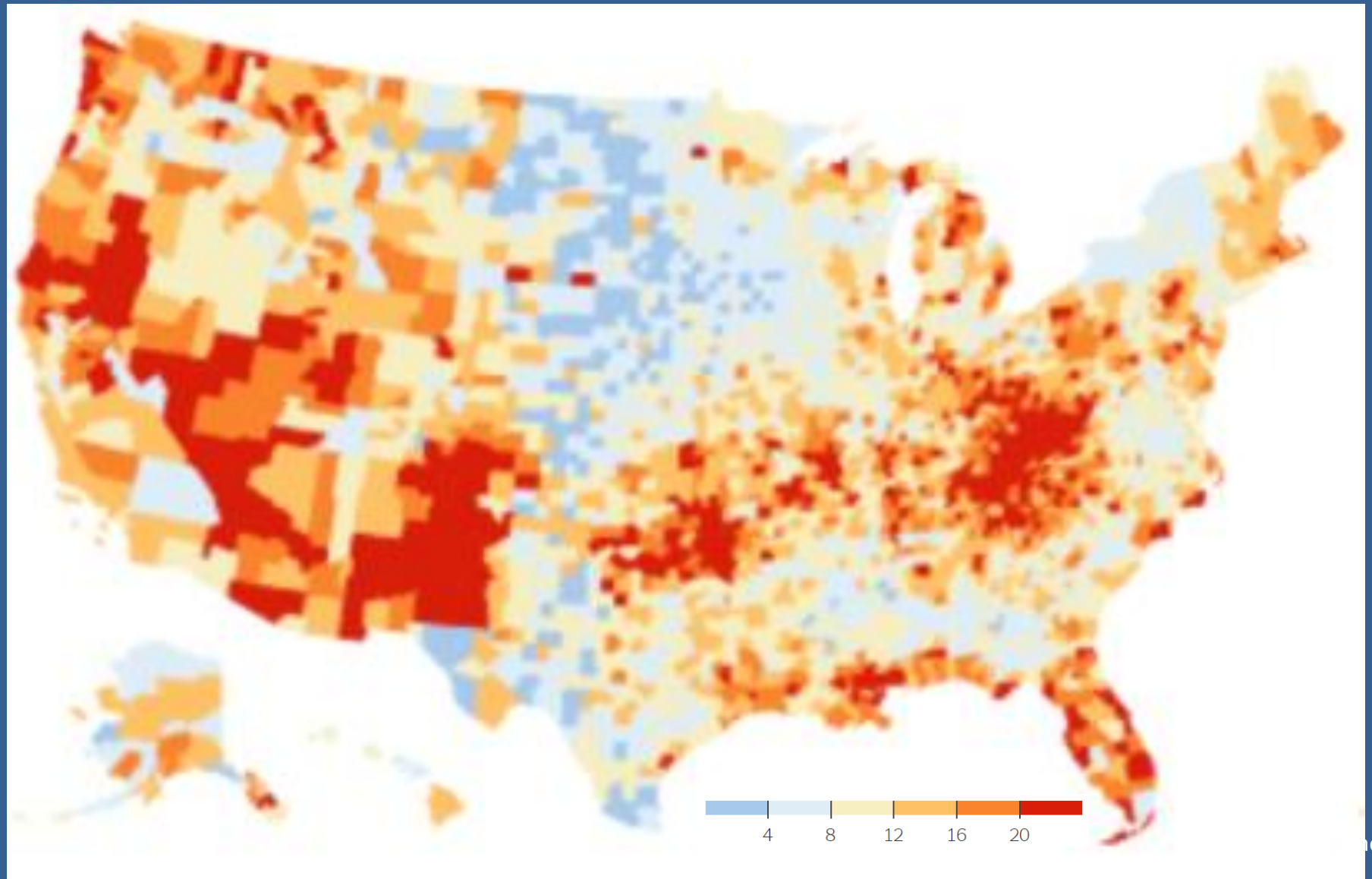
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2011



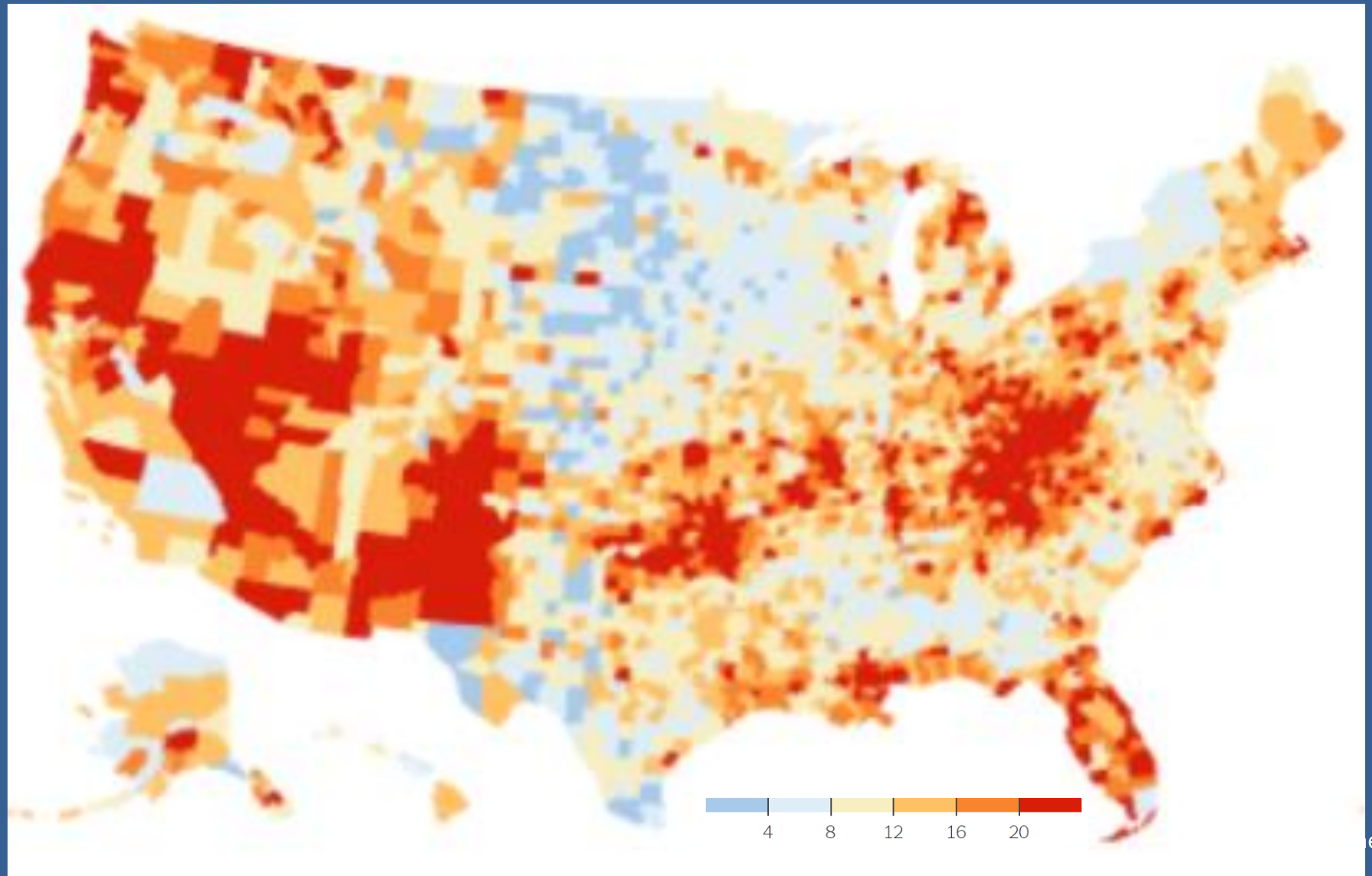
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2012



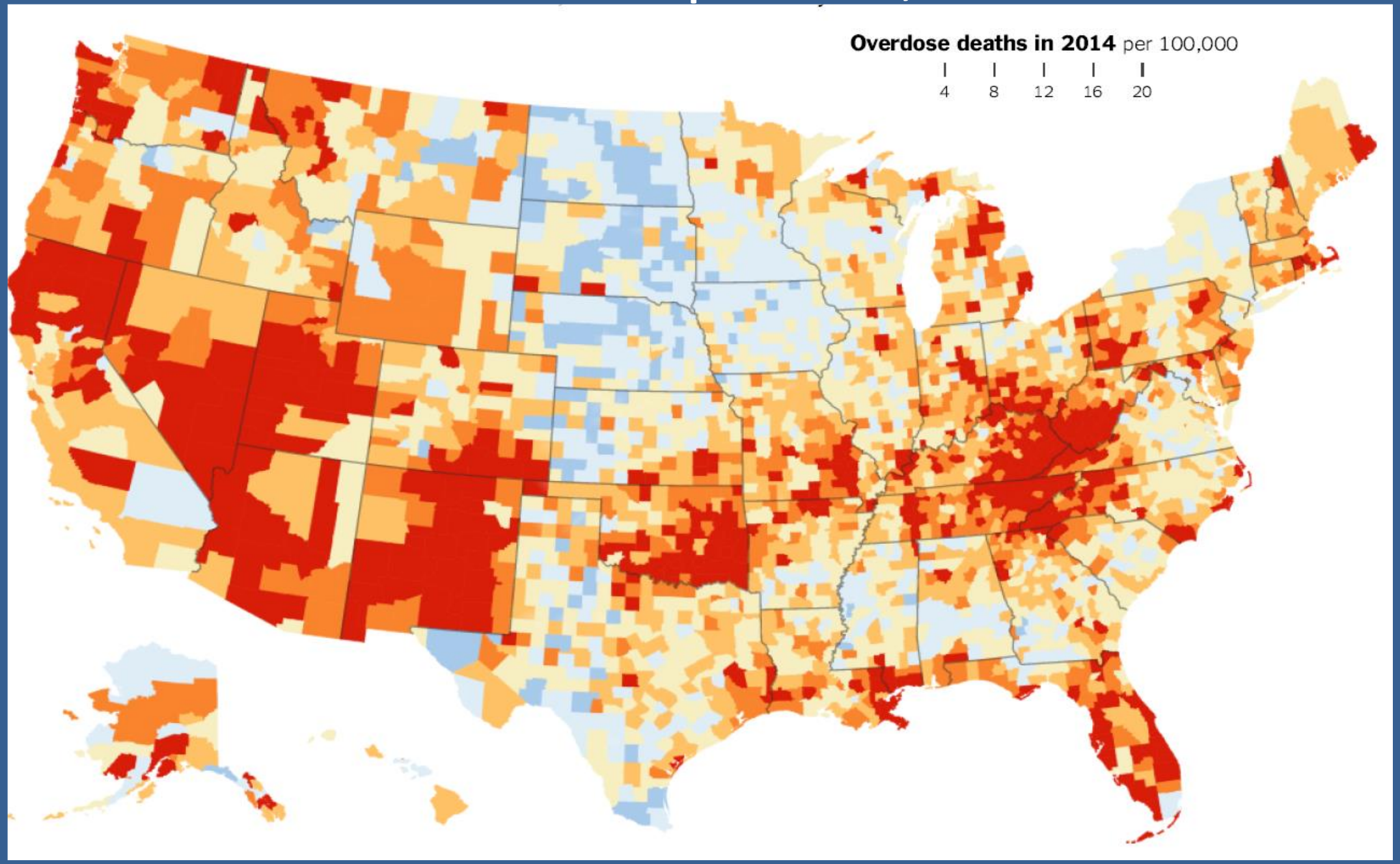
es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000
2013

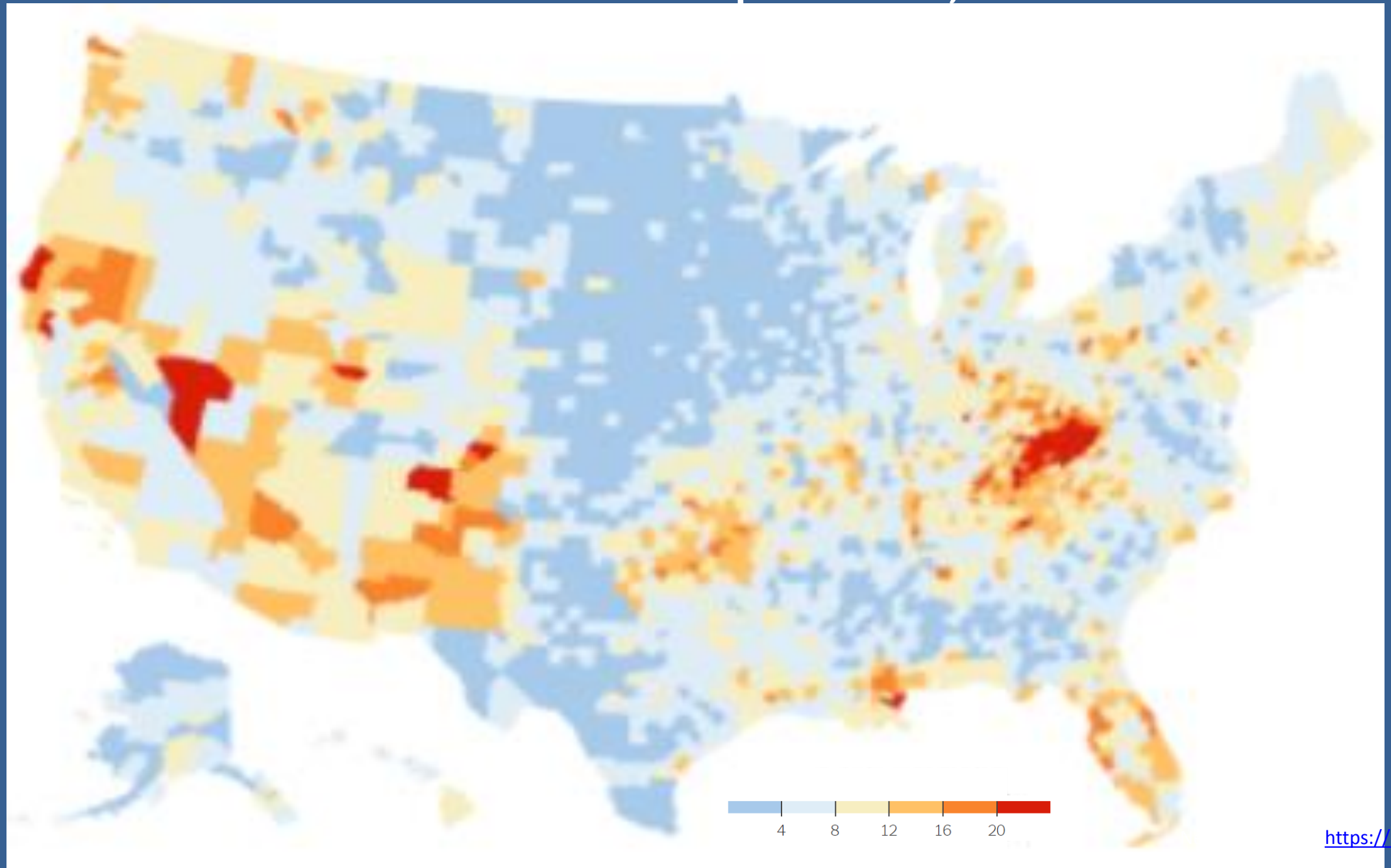


es: https://nyti.ms/2jVUlKb

Overdose Deaths per 100,000: 2014



Overdose Deaths per 100,000: 2003

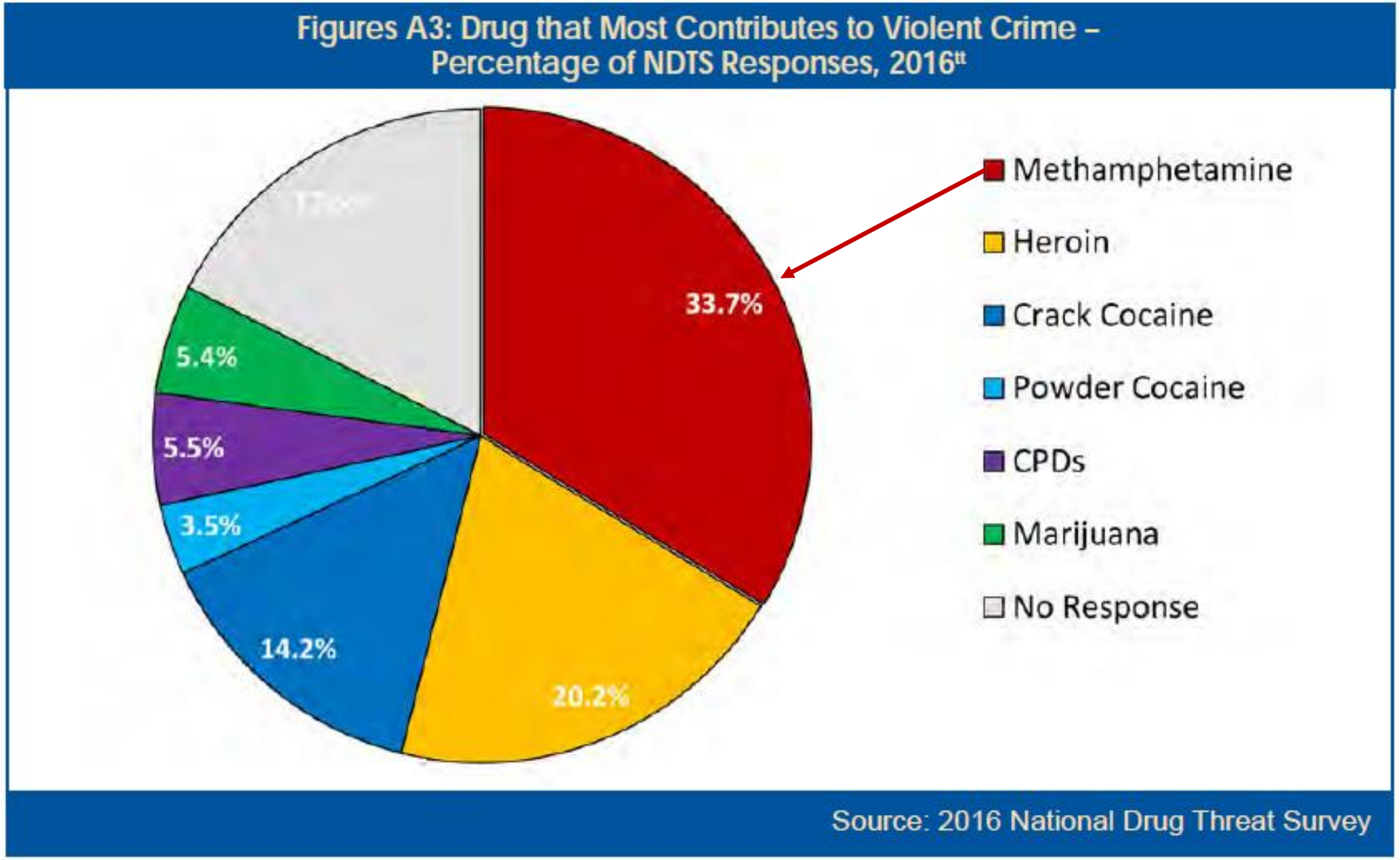


https://nyti.ms/2jVUlKb

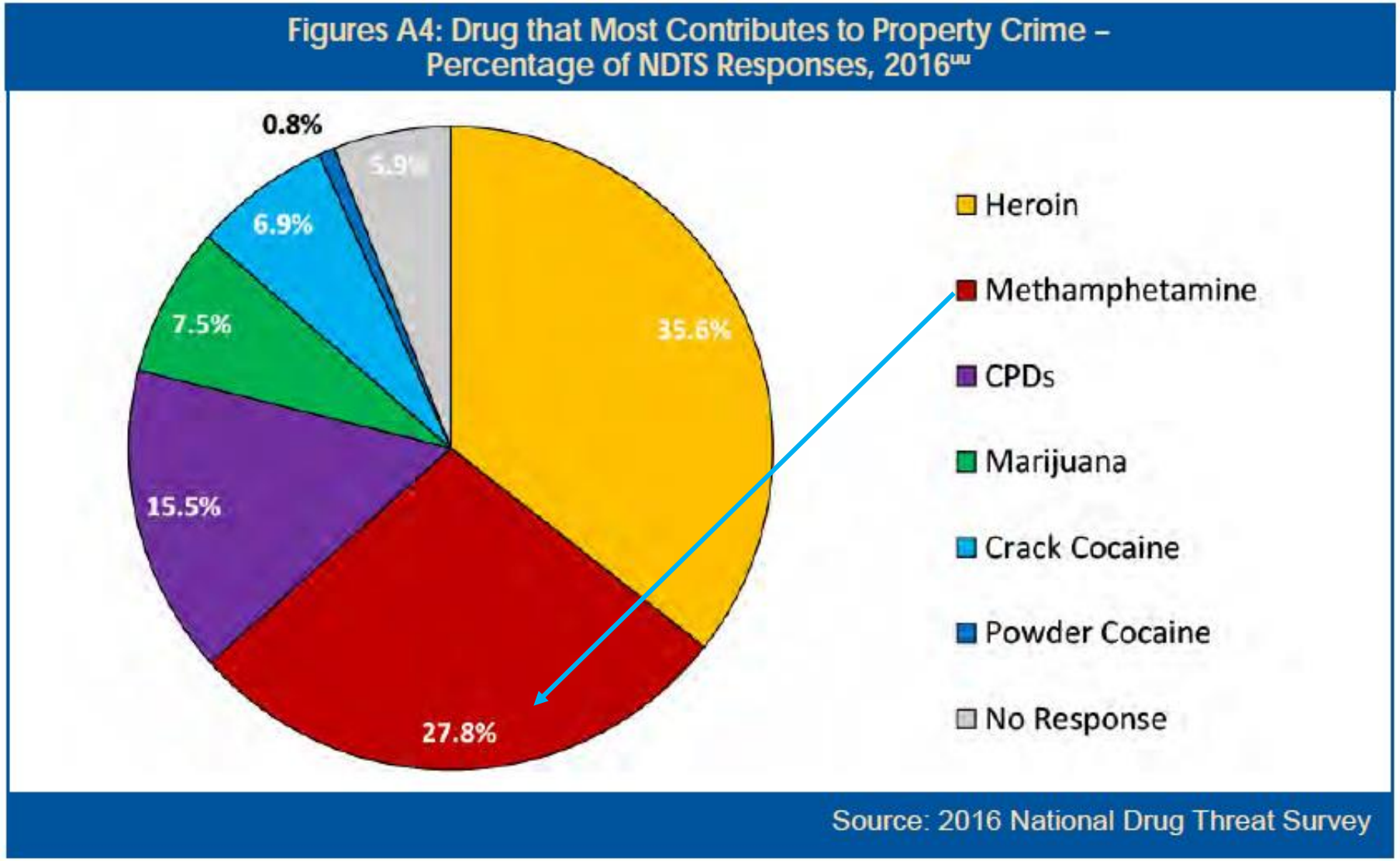
The Opioid Epidemic

- Be ready
  - Quick access to treatment
  - Support medication-assisted treatment
  - Sufficient number of methadone and buprenorphine providers

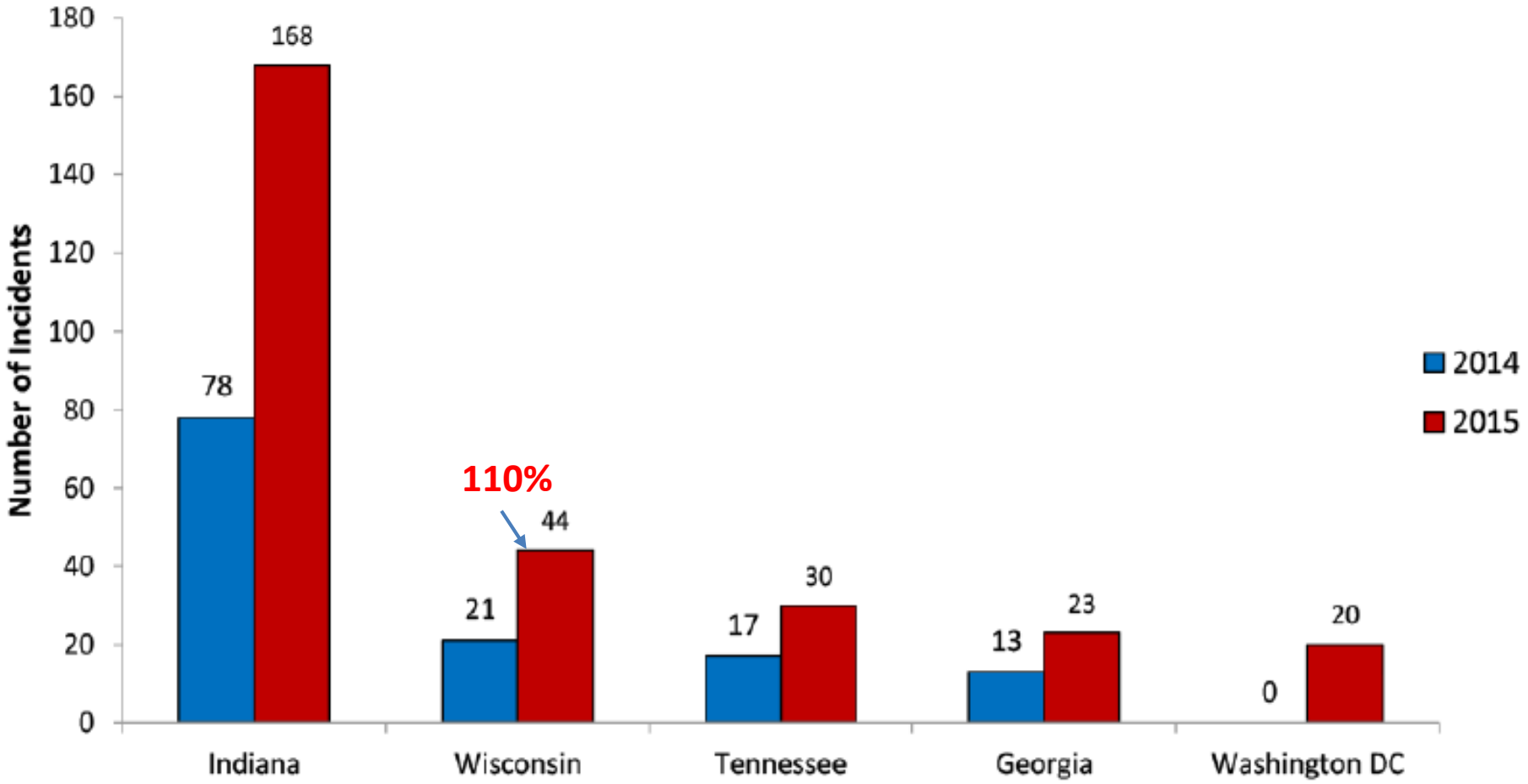
Drugs and Violent Crime



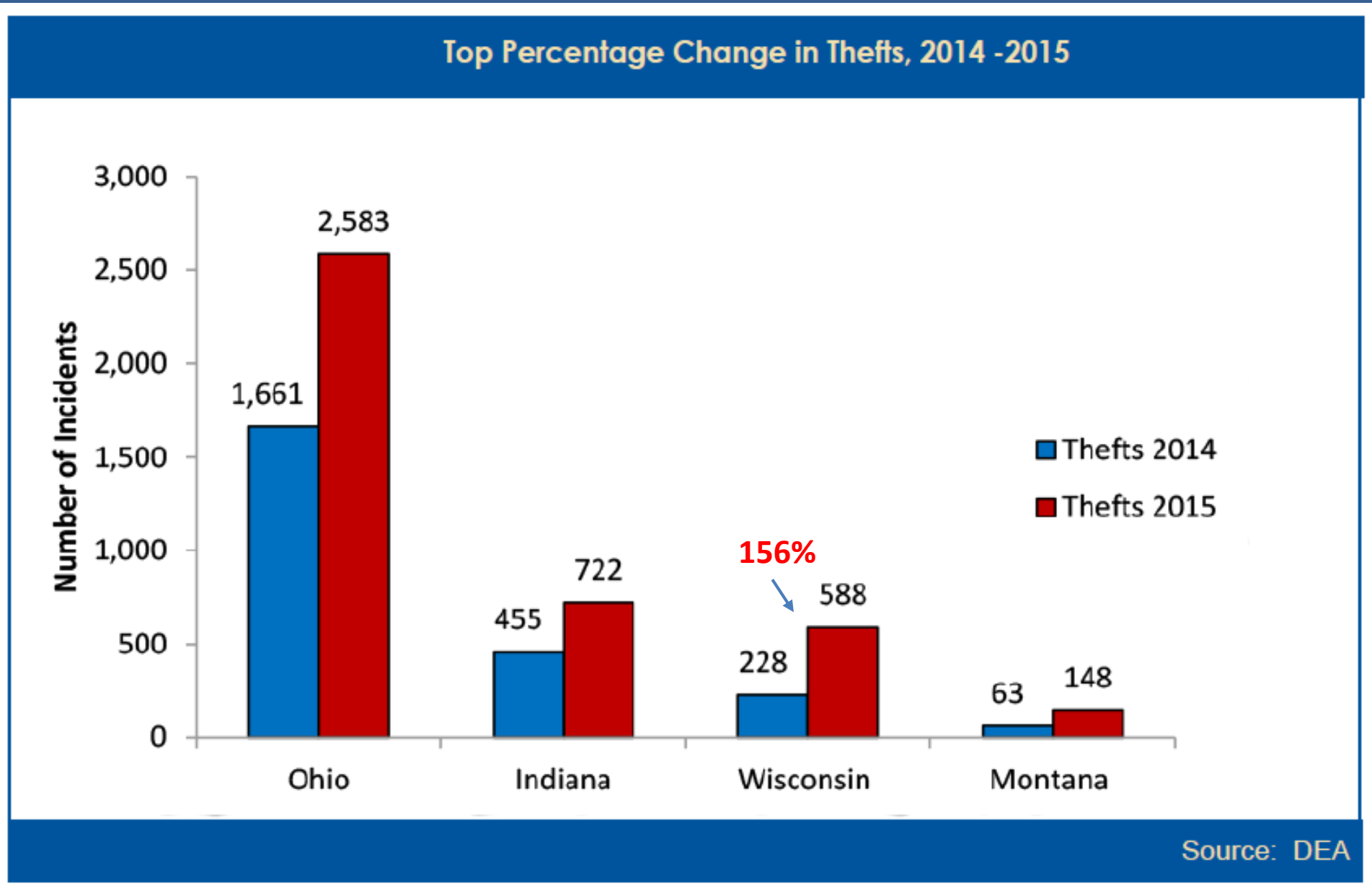
Drugs and Property Crime



Top Percentage Change in Armed Robberies, 2014 -2015



Source: DEA


Top Percentage Change in Thefts, 2014 -2015
Number of Incidents
3,000
2,500
2,000
1,500
1,000
500
0
1,661
2,583
455
722
228
588
63
148
156%
Thefts 2014
Thefts 2015
Ohio
Indiana
Wisconsin
Montana
Source: DEA

2016 Wisconsin Methamphetamine Study

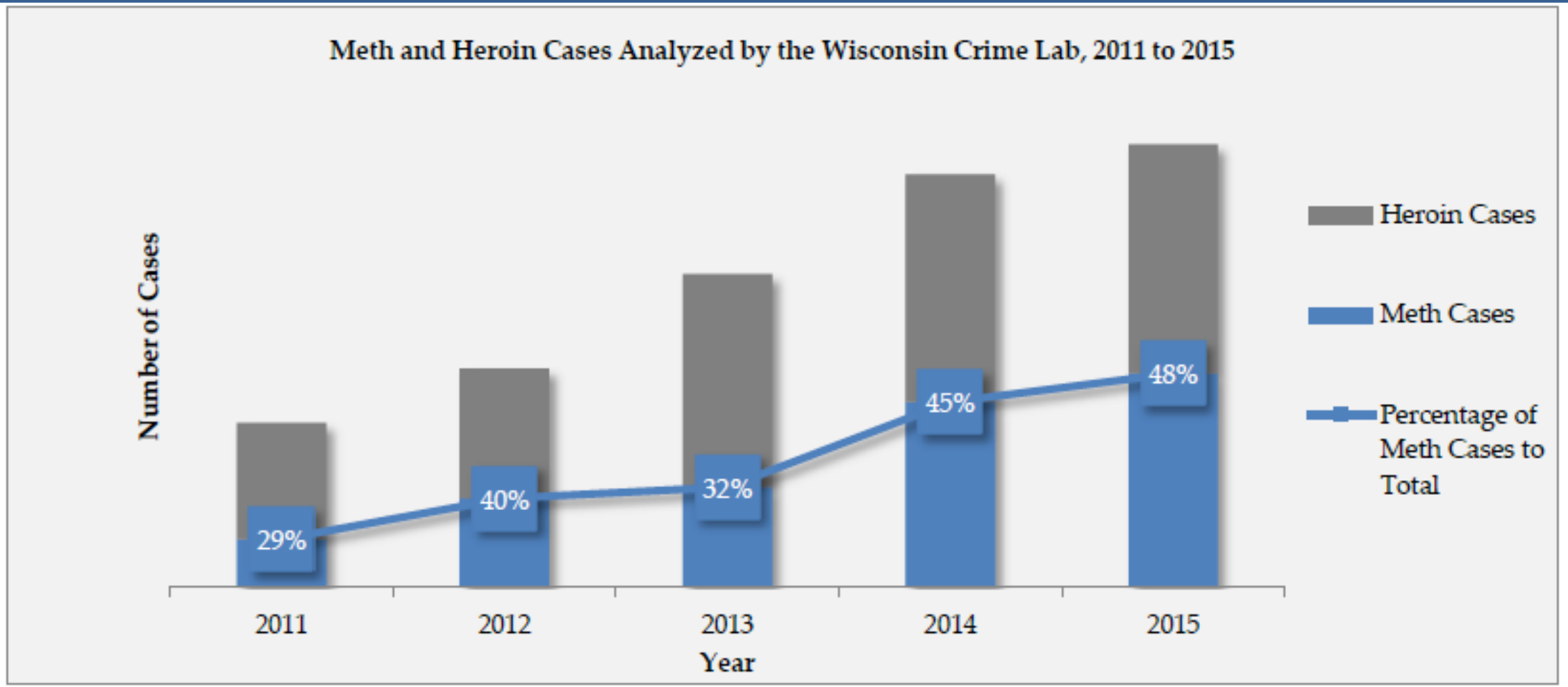
Published: November 21, 2016
Information Cutoff Date: July 11, 2016
Produced for Wisconsin Law Enforcement
Prepared by:

Wisconsin Statewide Intelligence Center

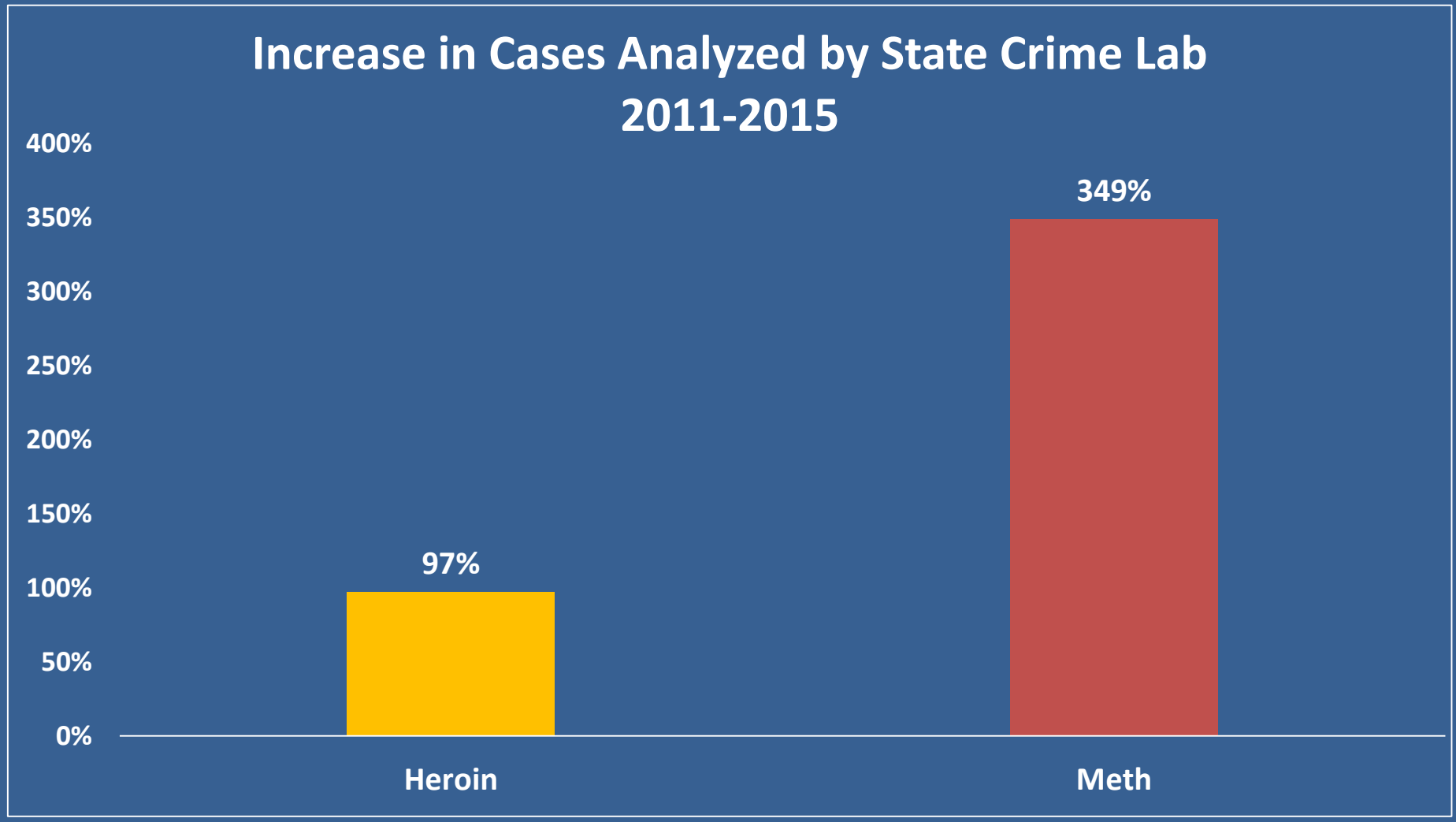
Southeast Wisconsin Threat Analysis Center

Federal Bureau of Investigation
Milwaukee Field Division – Field Intelligence Group

This publication is the first statewide study of methamphetamine in Wisconsin.

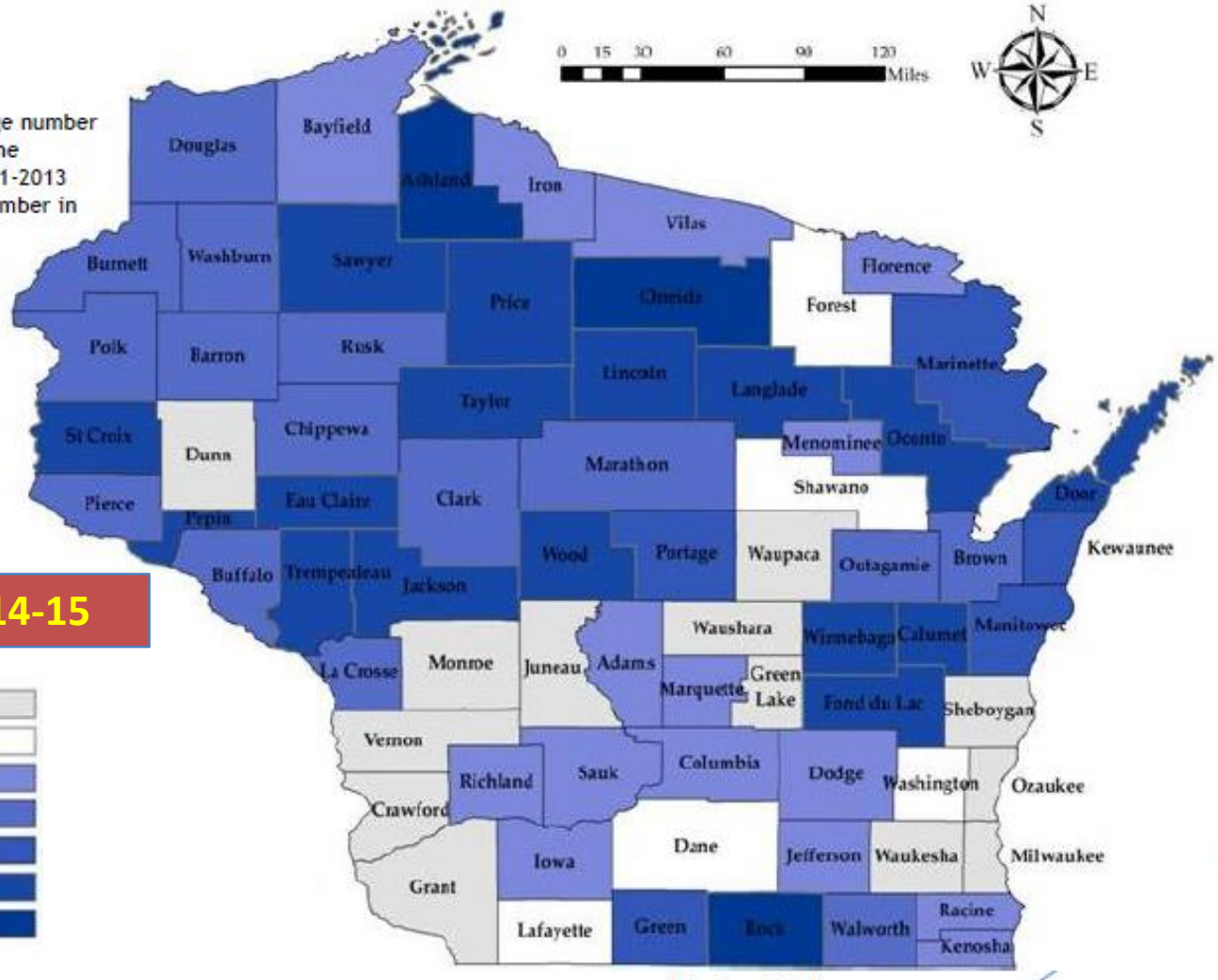


Source: WSIC; Email; April 22, 2016.


Increase in Cases Analyzed by State Crime Lab
2011-2015
400%
350%
300%
250%
200%
150%
100%
50%
0%
97%
349%
Heroin
Meth

Meth in Wisconsin

(U) Data Description: Average number of meth cases analyzed by the Wisconsin Crime Lab for 2011-2013 compared to the average number in 2014-2015.

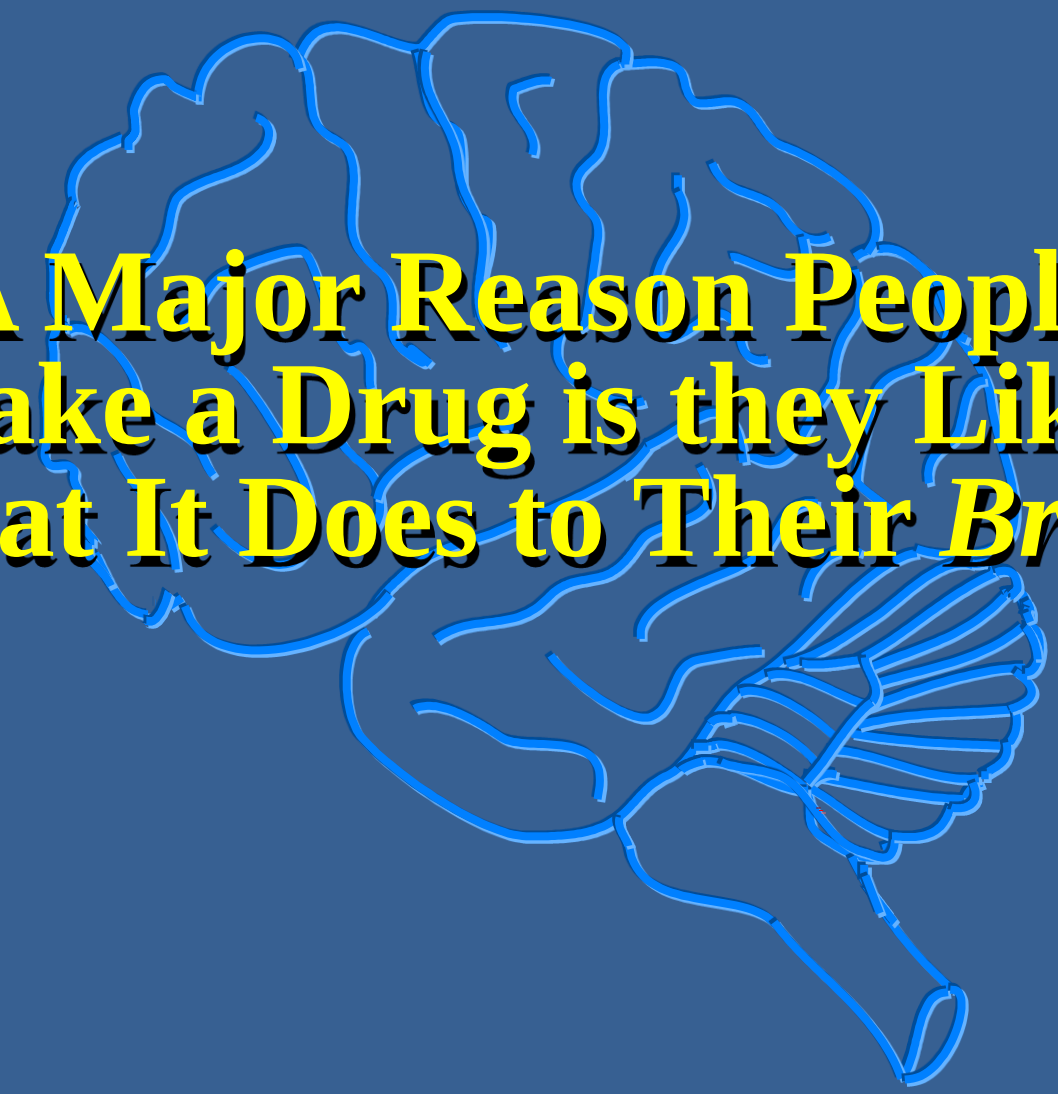


Meth lab cases 2011-13 vs 2014-15

Negative……
No Increase……
Positive……
Slight Increase….
Doubled……
Considerable…….
Dramatic……

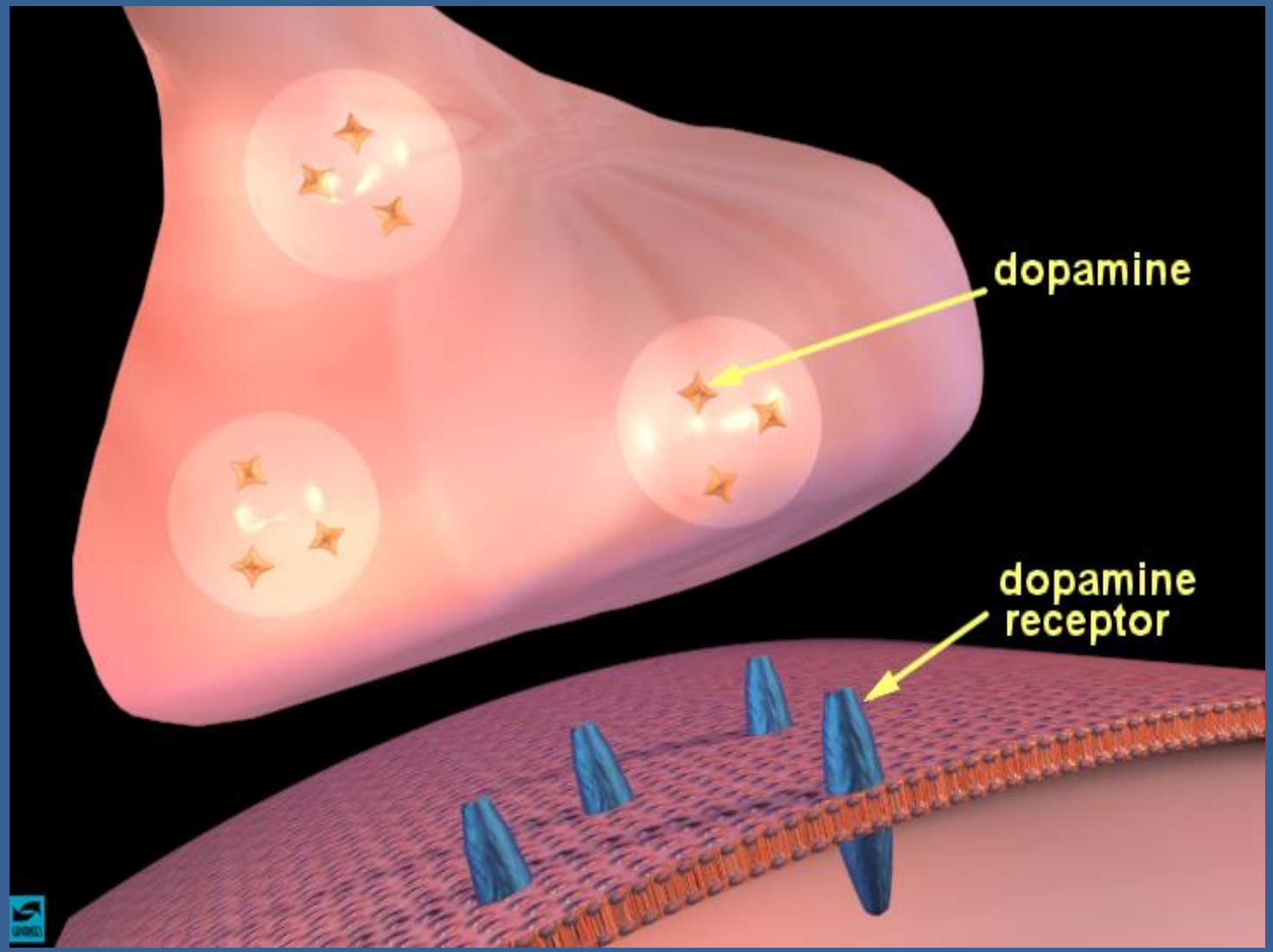
Wisconsin Methamphetamine Study Outlook

- Continued upward trend in meth use spreading across Wisconsin
- Highly likely violence, property crime, and other crimes will increase
- Number of meth users will continue to increase as opioid/heroin users develop fear of overdose
- Lack of treatment facilities will prevent individuals from getting needed treatment
- Tackling Wisconsin's drug abuse is a broad issue that requires the support of everyone in the community

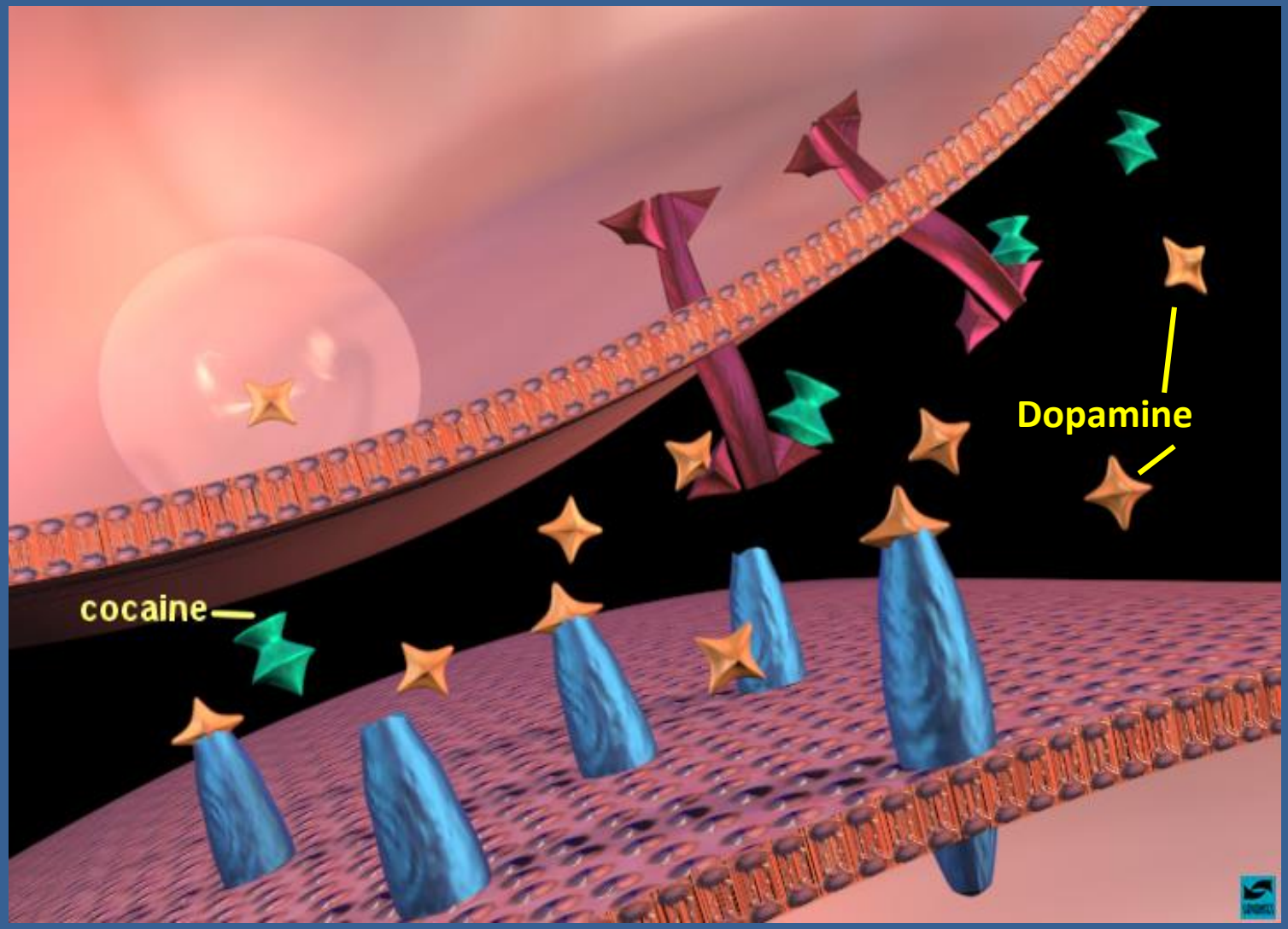


A Major Reason People Take a Drug is they Like What It Does to Their *Brains*

Dopamine Release Causes Pleasure

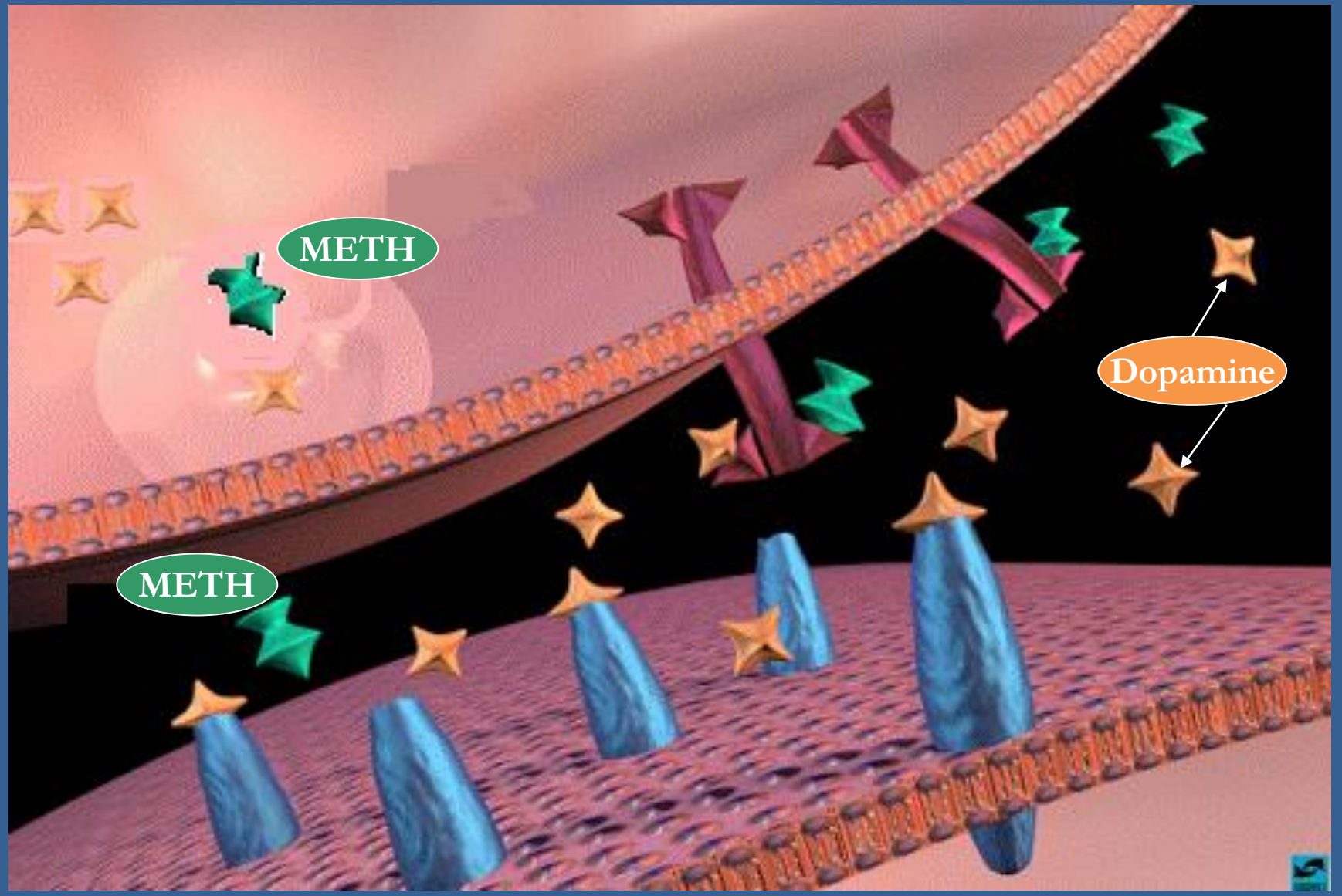


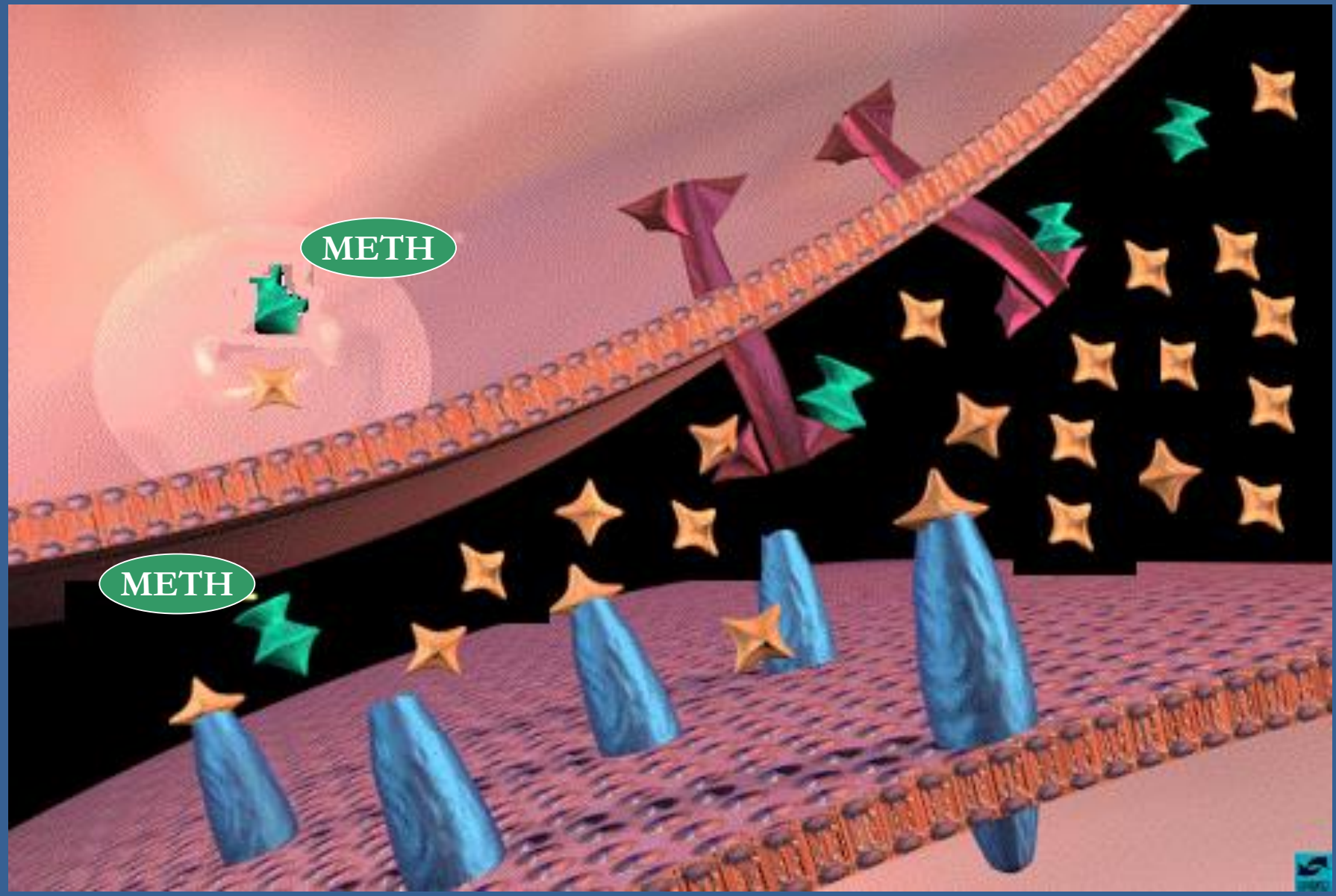
Cocaine Blocks the Uptake of Dopamine



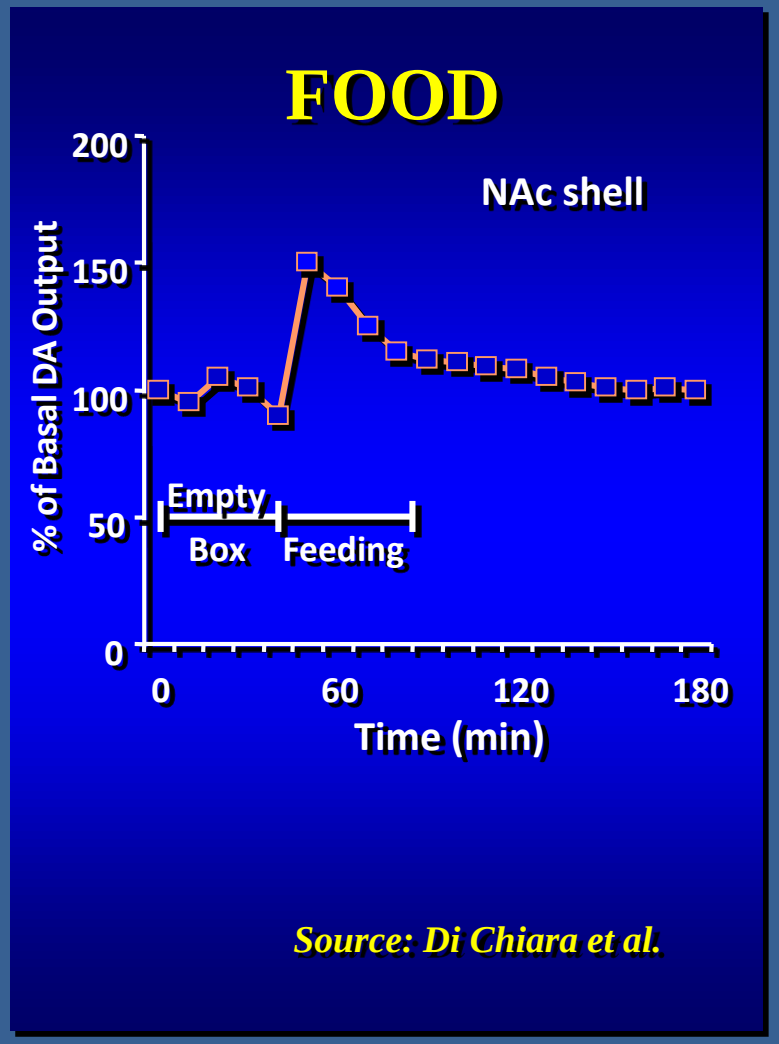
Methamphetamine: Neurochemical Mechanisms

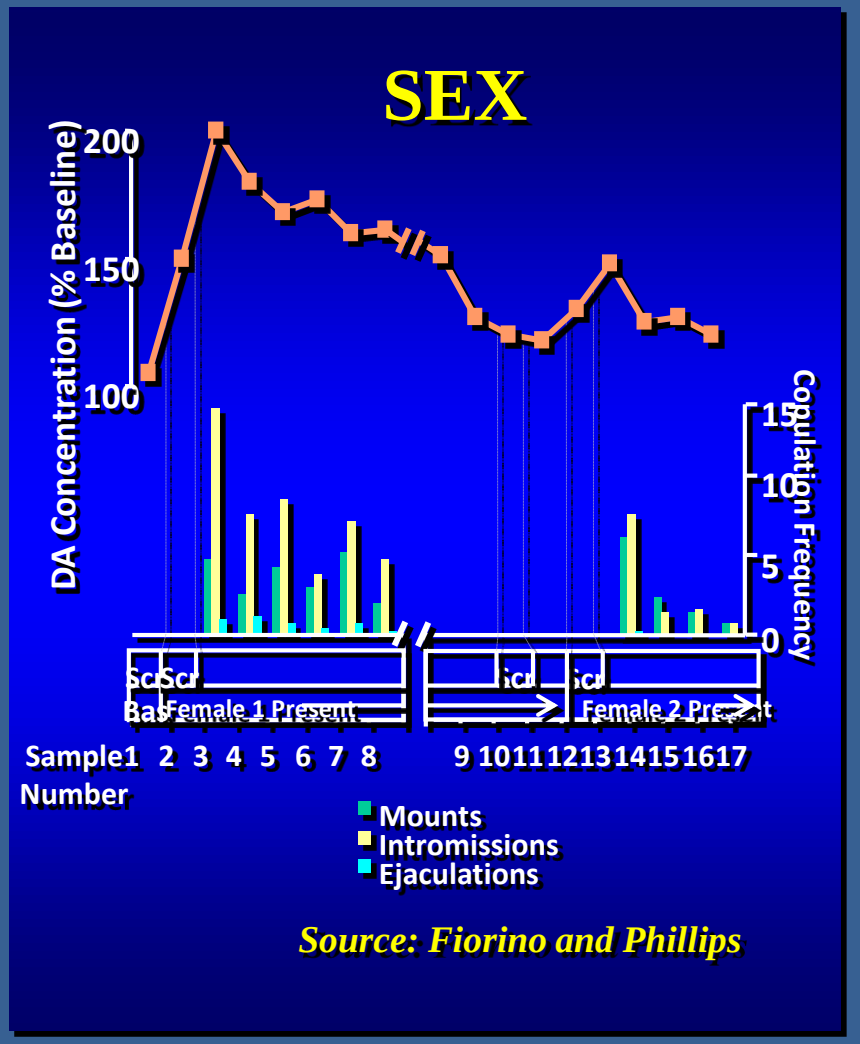
- Enters dopamine vesicles
- Vesicles deplete themselves of dopamine


METH
METH
Dopamine

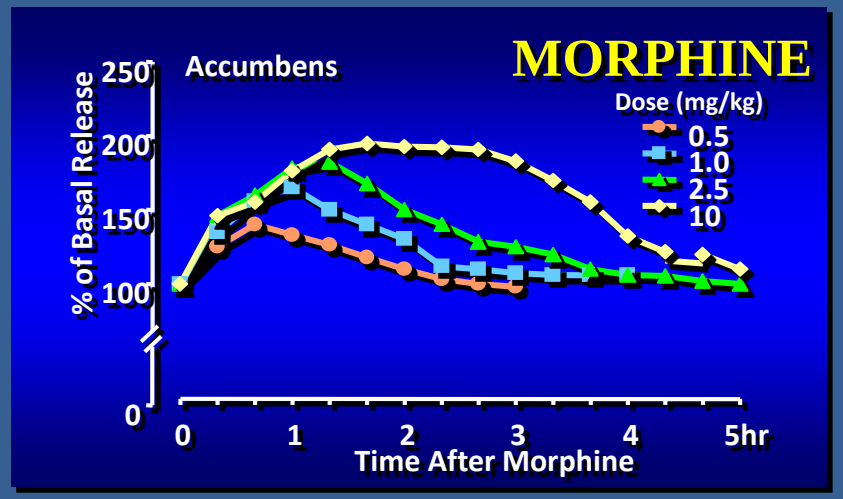

METH
METH

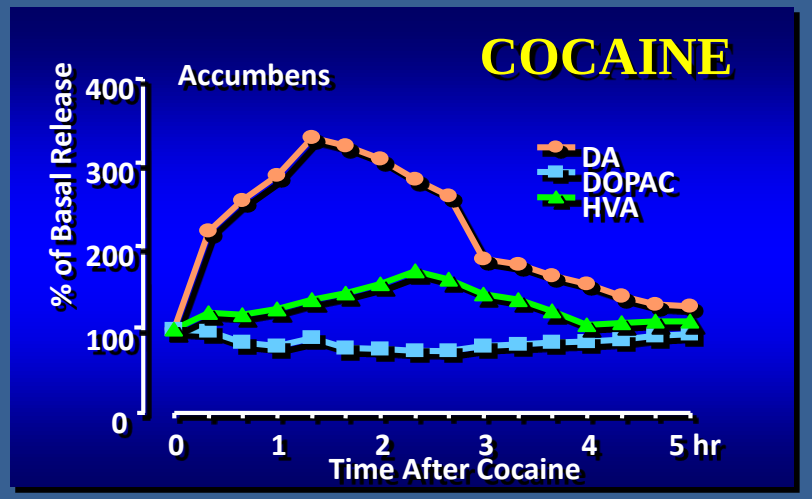
Natural Rewards Elevate Dopamine Levels

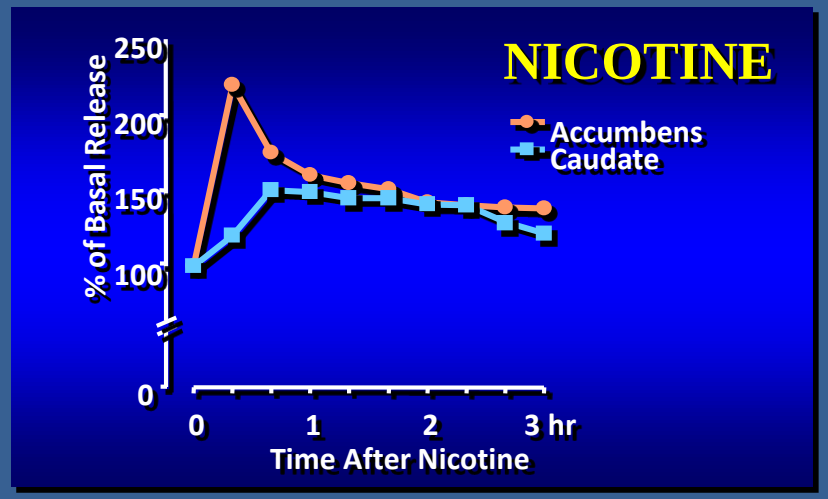


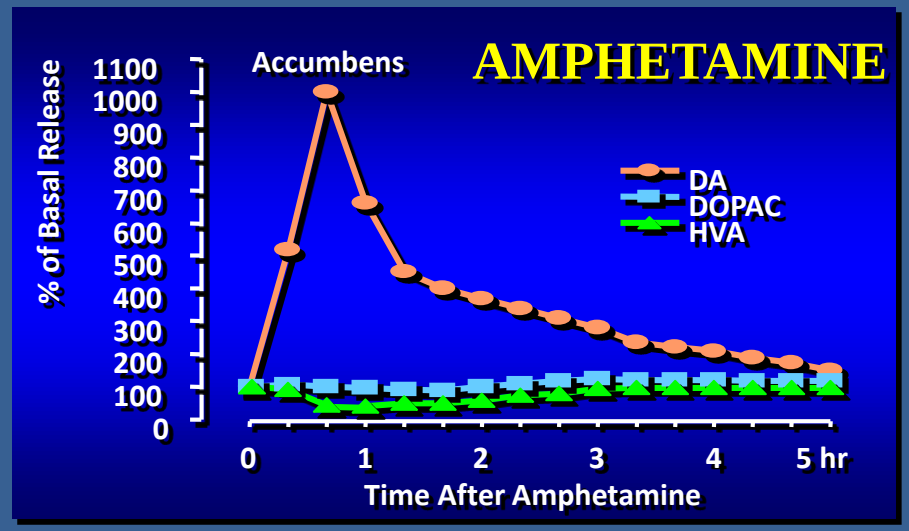


Effects of Drugs on Dopamine Levels





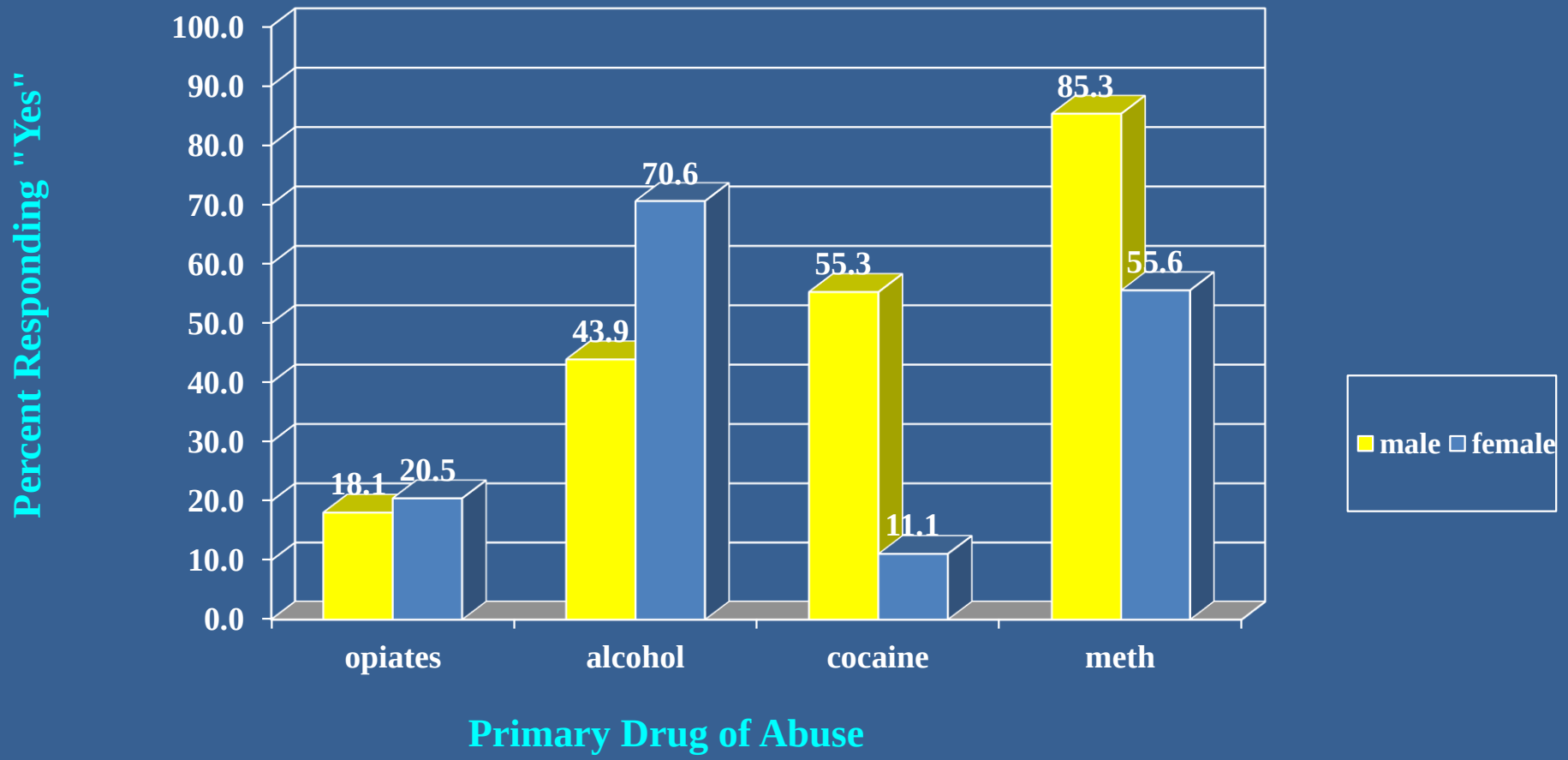




Source: Di Chiara and Imperato

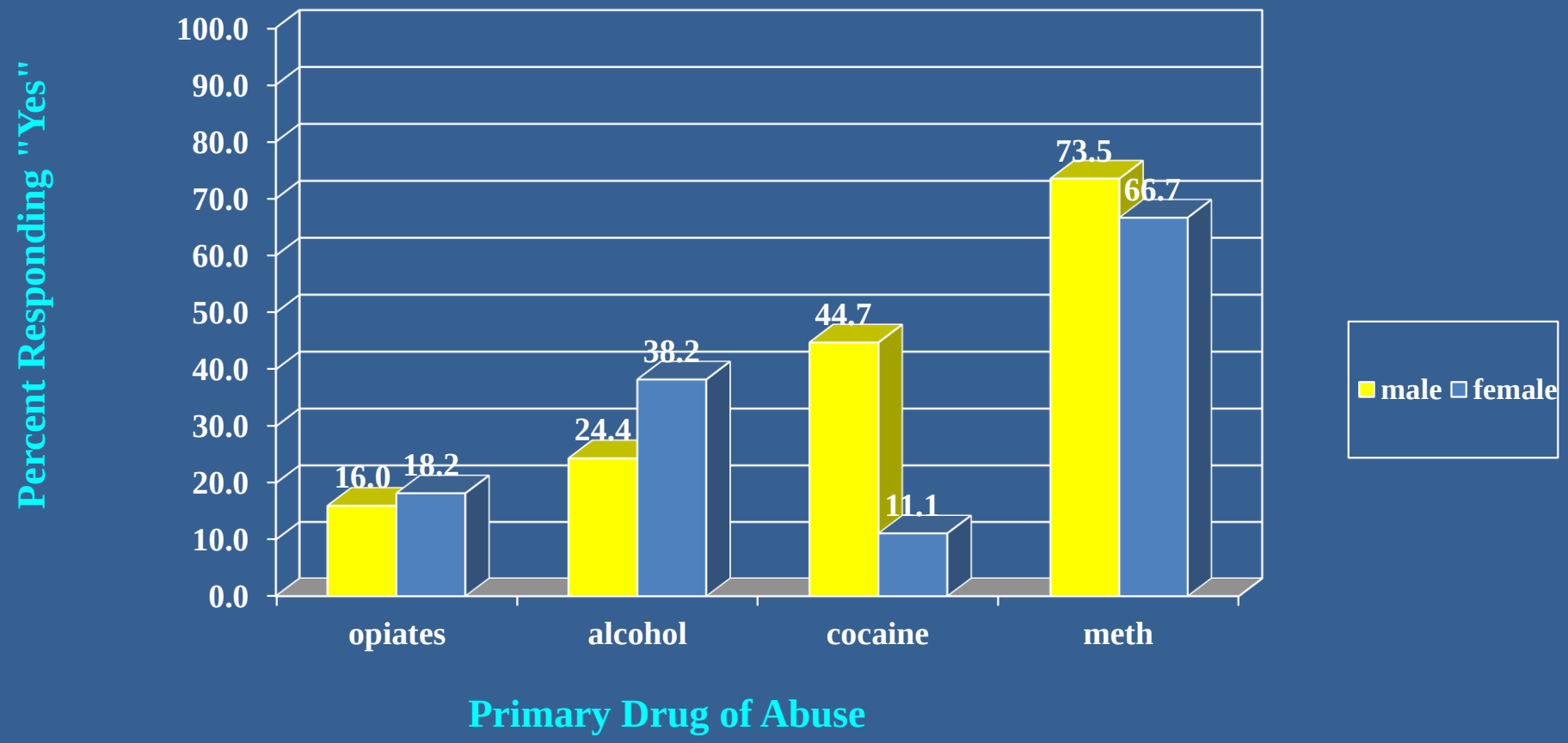
Methamphetamine Use and Sex

My sexual *drive* is increased by the use of …



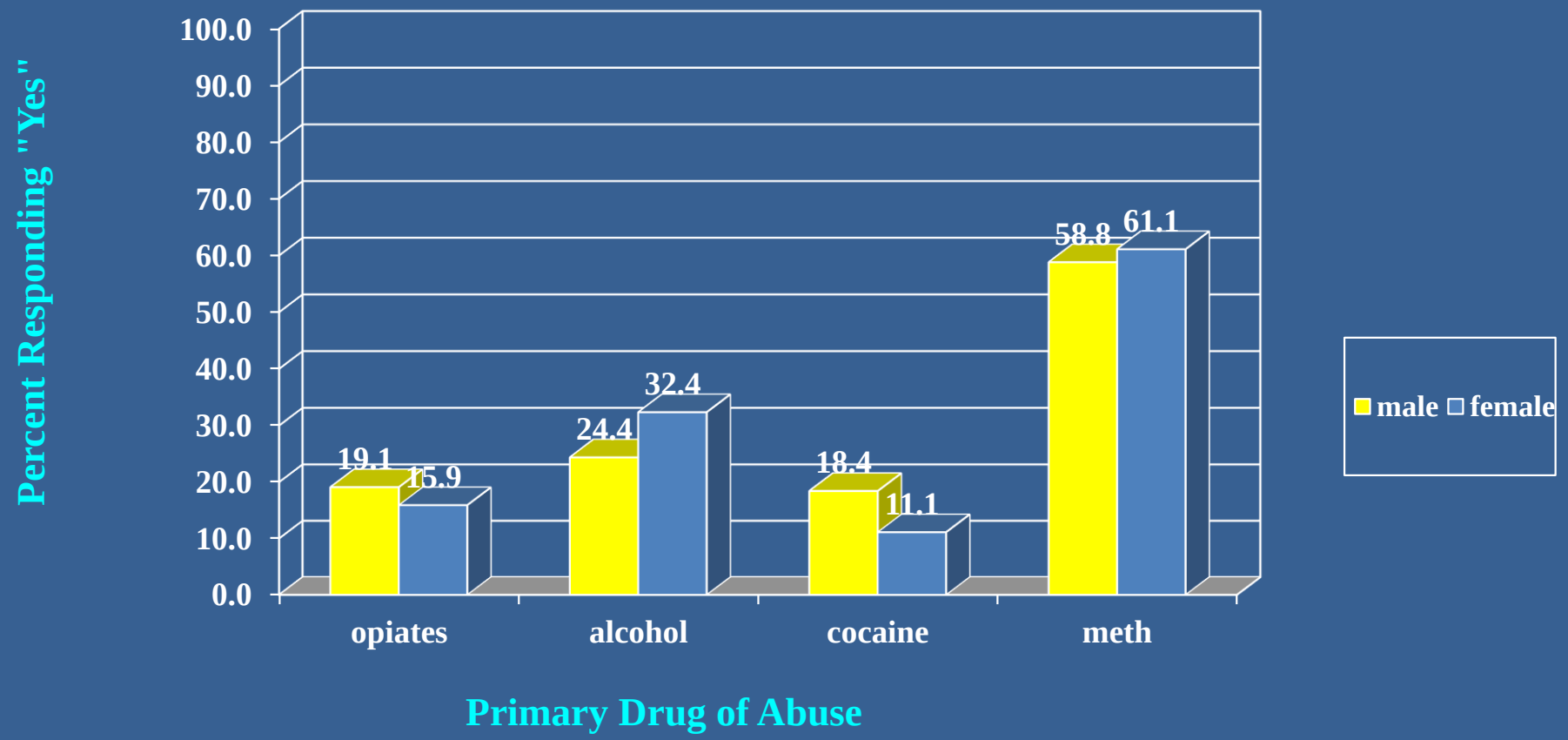
(Rawson et al., 2002)

My sexual *pleasure* is enhanced by the use of …



(Rawson et al., 2002)

My sexual *performance* is improved by the use of …



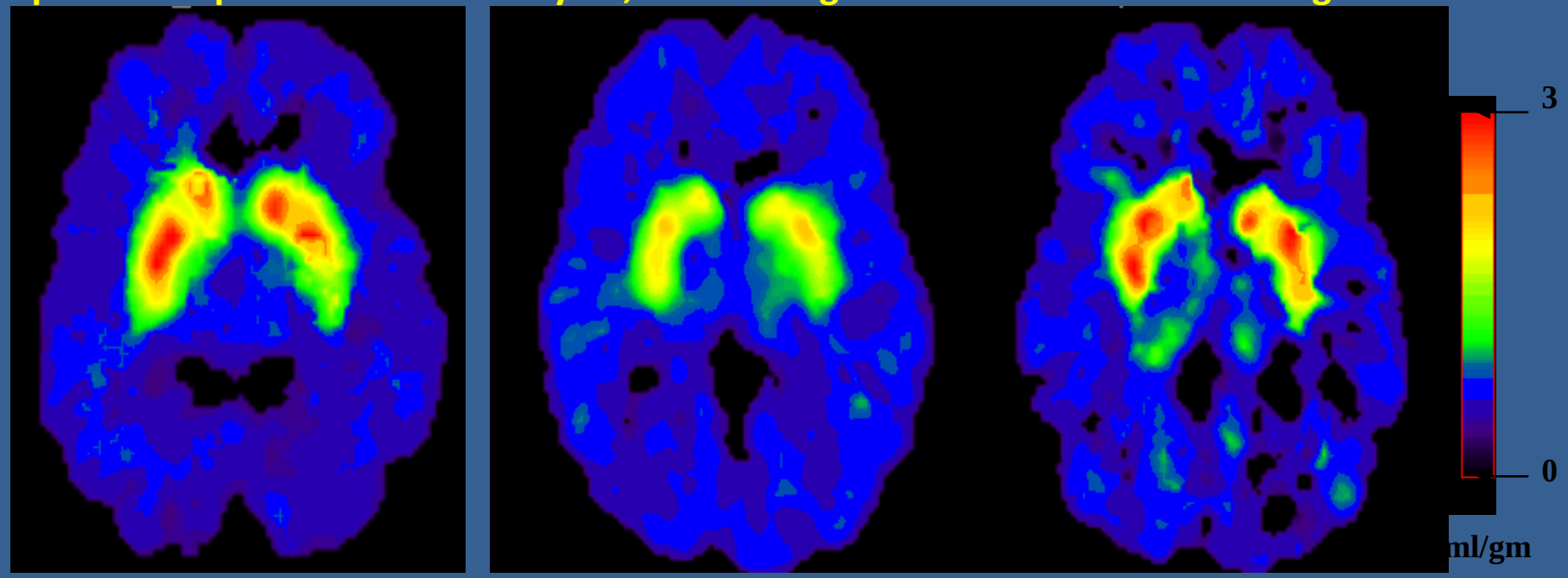
(Rawson et al., 2002)

But…

Prolonged Drug Use Changes the Brain In Fundamental and Long-Lasting Ways

Partial Recovery of Brain from Methamphetamine After Abstinence

Dopamine improvements after 1 year, but not cognitive and motor functioning



Normal Control

METH Abuser
(1 month abstinent)

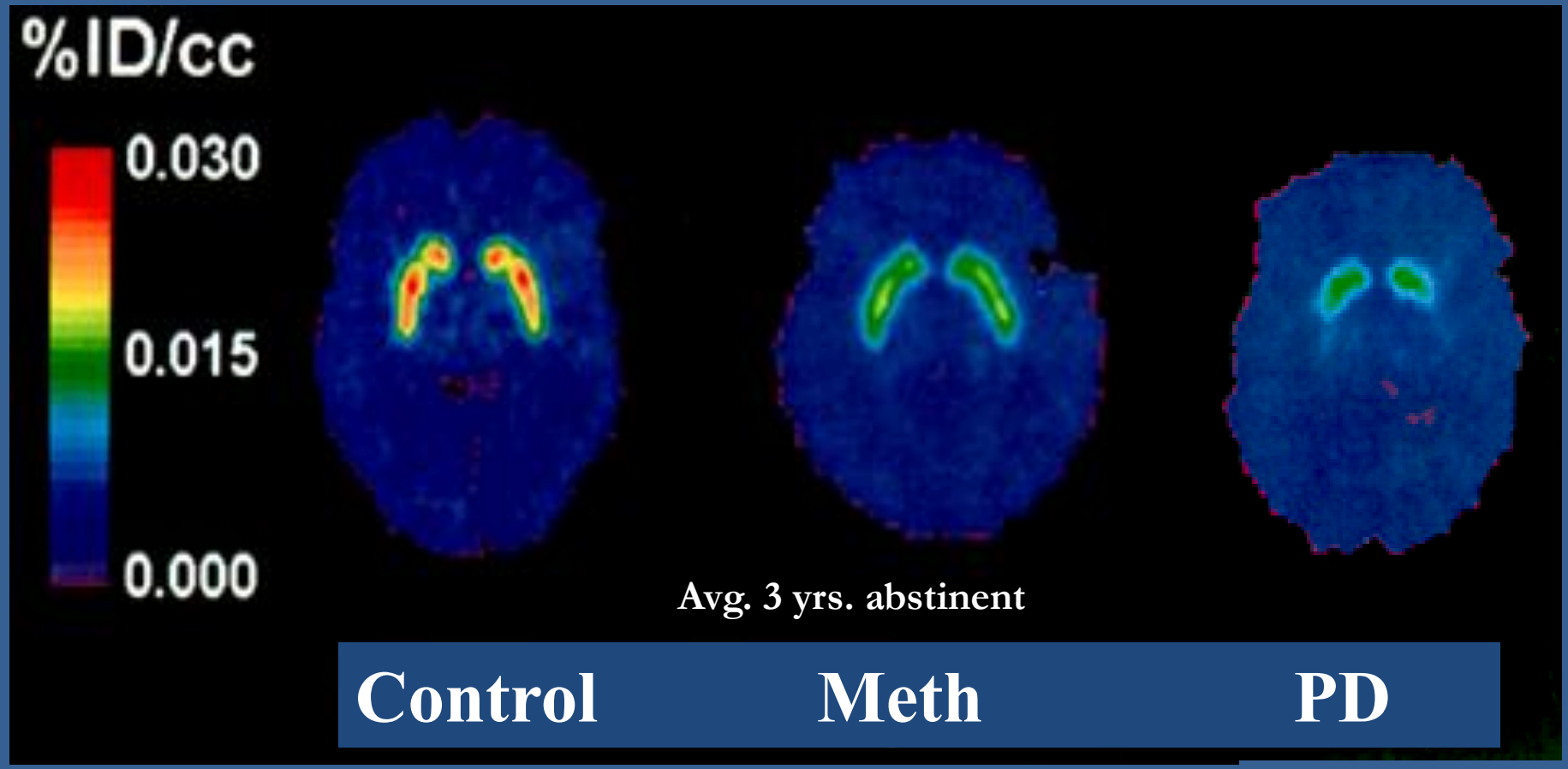
METH Abuser
(14 months abstinent)

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

Dopamine improvements after 1 year, but not cognitive and motor functioning

UCLA

Decreased dopamine transporter binding in METH users resembles that in Parkinson's Disease patients



Source: McCann U.D.. et al.,Journal of Neuroscience, 18, pp. 8417-8422, October 15, 1998.

Methamphetamine Effects

Short-term Effects

Physical

- High energy/Decreased fatigue
- Rapid/irregular heartbeat
- Increased blood pressure
- Increased pupil size
- Decrease sleep
- Decreased appetite

Psychological

- Euphoria
- Confidence
- Sex drive
- Talkativeness
- Decreased inhibitions
- Decreased Boredom

Dilated Pupil

Note: opioid withdrawal; also, stimulant acute effect.

Constricted Pupil

Long-term Effects

Physical

- Weight loss
- Irregular heart beat
- Aggressive or violent behavior
- Seizures
- Dental problems

Psychological

- Psychosis (paranoia, hallucinations)
- Cognitive deficits
- Memory loss
- Depression
- Irritability
- Anhedonia

Treating Methamphetamine Dependence

The “5%” Myth

- Myth: Only 5% of meth users are successful in treatment
- Wide dissemination may be self-fulfilling
  - Communities won’t support treatment
  - Funders won’t fund treatment
  - Meth users won’t enter treatment
  - Practitioners won’t expect treatment to work

The “5%” Myth

- Fact: Some treatments work
- Evidence-based treatments (more on these next week)

Is Meth Dependence Treatable?

- Southern California Matrix Institute clinic in San Bernardino County est. in mid-1980s
  - >50% of clinic census meth users
  - Provided an opportunity to look at meth treatment outcomes

Comparison of Meth and Cocaine Users

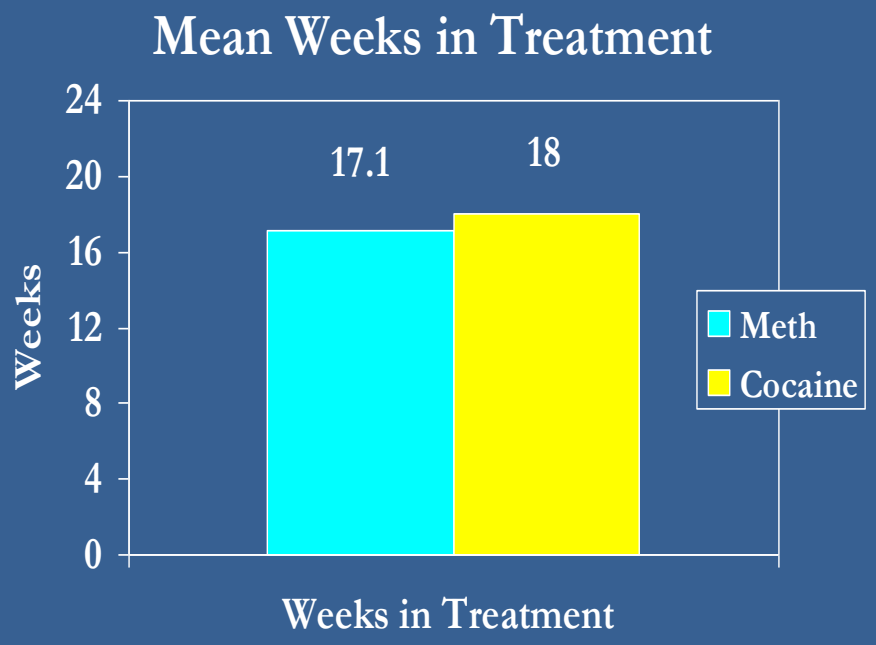
Rawson et al., 2000, Journal of Psychoactive Drugs

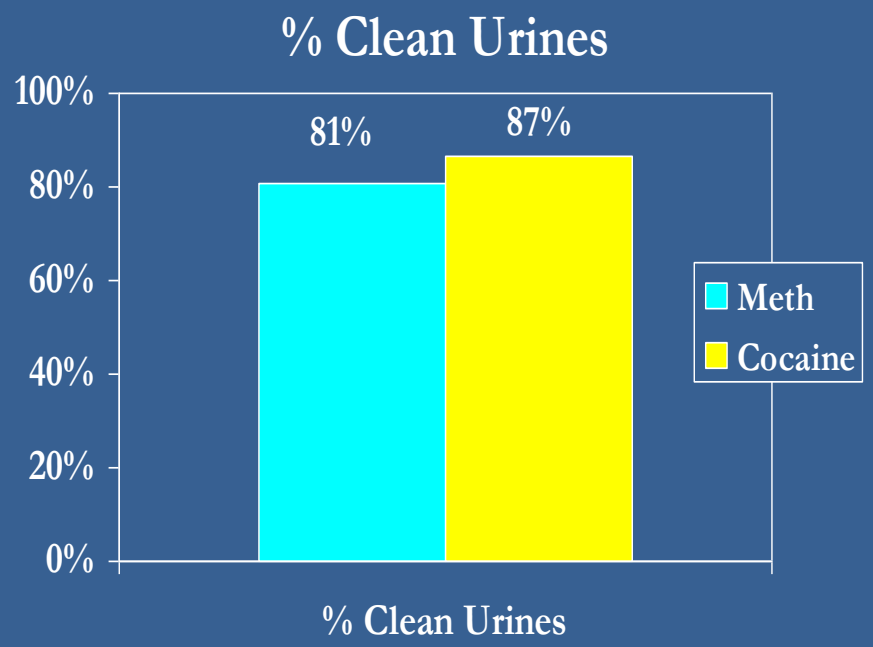
- 500 methamphetamine users
- 224 cocaine users
- Identical program and staff

Comparison of Meth and Cocaine Users

Rawson et al., 2000, Journal of Psychoactive Drugs

- **Identical treatment outcomes**





Meth Treatment is Challenging

- Powerful cravings result from chronic use
- Good intentions and commitment to change can be overwhelmed by cravings

Conditioned Cravings

- People, places, and circumstances trigger reflexive, powerful cravings.
- Pavlov's dog drooled when the bell rang.
- Methamphetamine users' brains "drool" in response to triggers.
- Conditioned reflexes are not under voluntary control

Meth Treatment is Challenging

- Prolonged meth use changes the brain
- Cognitive and emotional consequence of use can last months or years

Meth Treatment is Challenging

- Prolonged effects require appropriate treatment approaches
  - Simplicity
  - Redundancy
  - Reminders

- Impairment may not be obvious
- People adapt to cognitive impairment

What works?

- CBT including the Matrix Model
- Contingency Management
- Motivational Interviewing
- Mindfulness
- Exercise

- Programs or counselors using elements of the above

What Works

- In general behavior change is essential
- Insight-oriented approaches are not effective
- Understanding the origins of the addiction is not effective (may be important eventually in preventing relapse)
- Inpatient treatments should focus on early recovery skills prior to discharge

Medication

- Many clinical trials
- No medication has been FDA-approved for stimulants
- Most promising is bupropion (Wellbutryn)
- Challenges of medication compliance and recruiting participants

Next Week

- Effective treatments for methamphetamine dependence


Thank you,
Mickey McCann