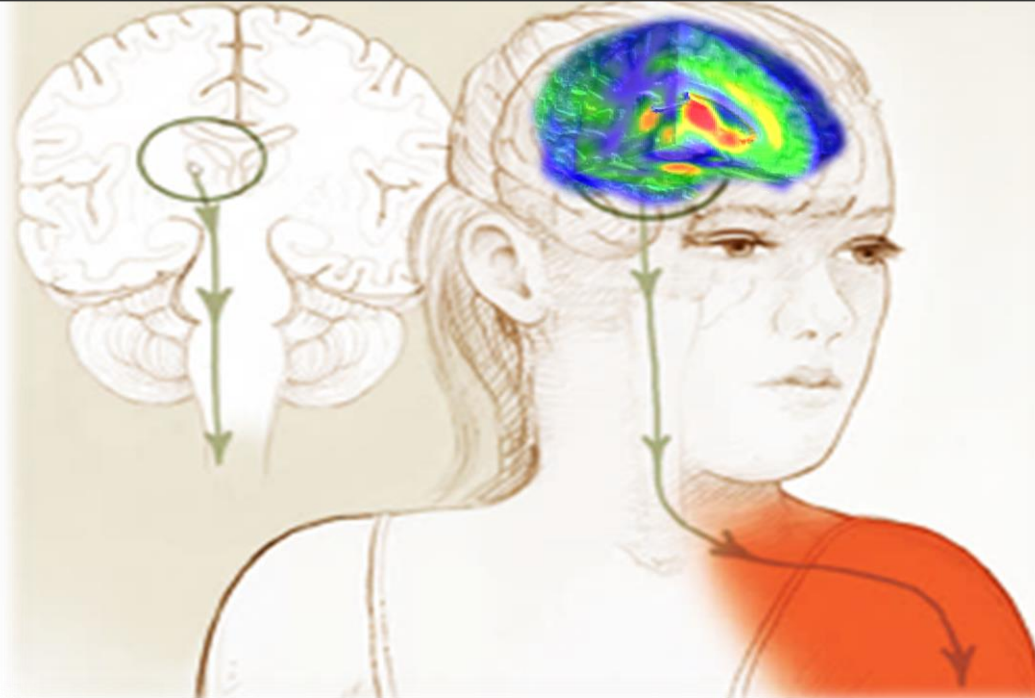


Chronic Pain in Women and its Relationship to Opioid Addiction



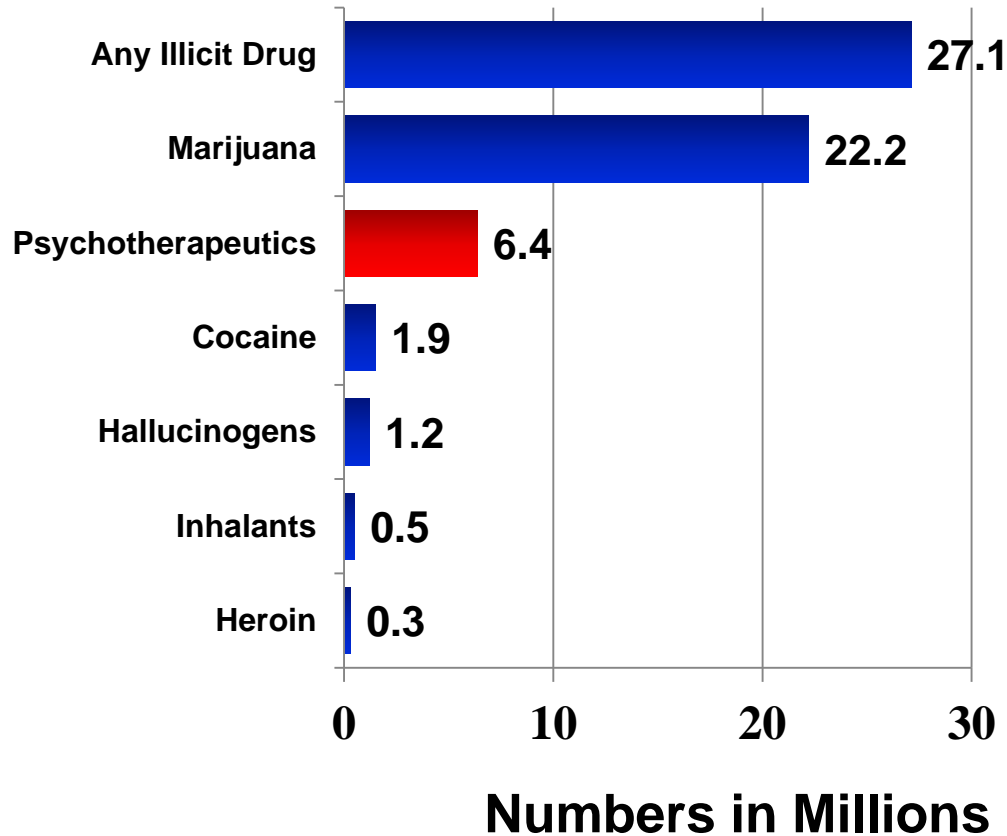
Nora D. Volkow, M.D.
Director
National Institute
on Drug Abuse



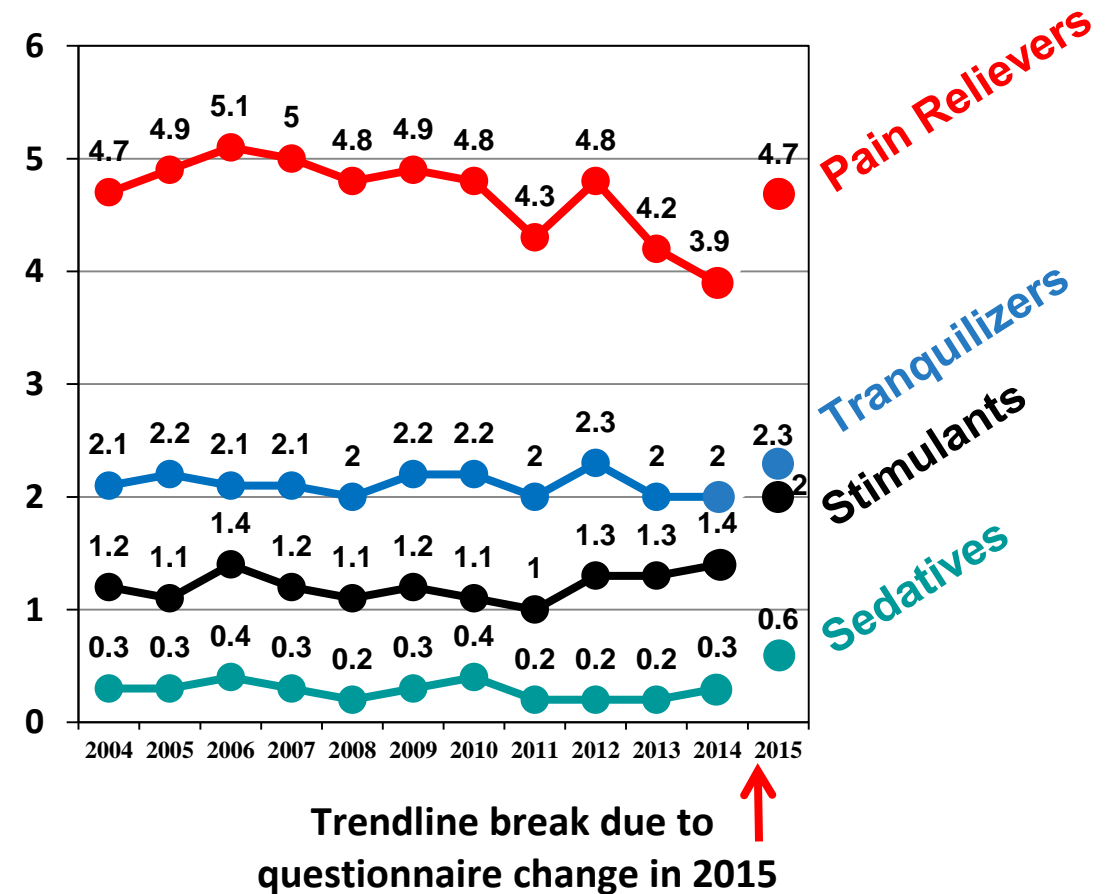
@NIDAnews

Prescription Drug Misuse/Abuse is a Major Problem in the US

Current Drug Use Rates in Person Age 12+

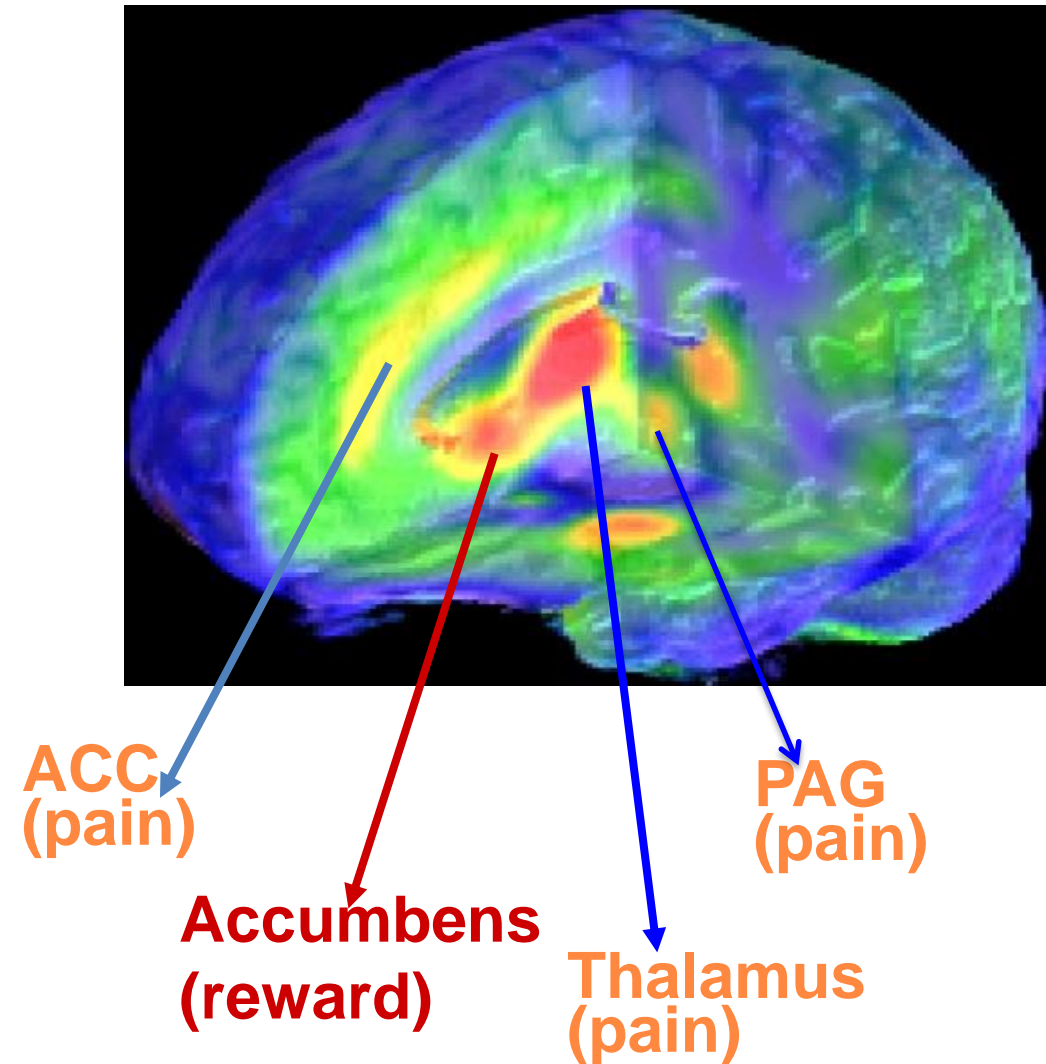


Past Year Nonmedical Use of Psychotherapeutic Drugs Persons Ages 12+



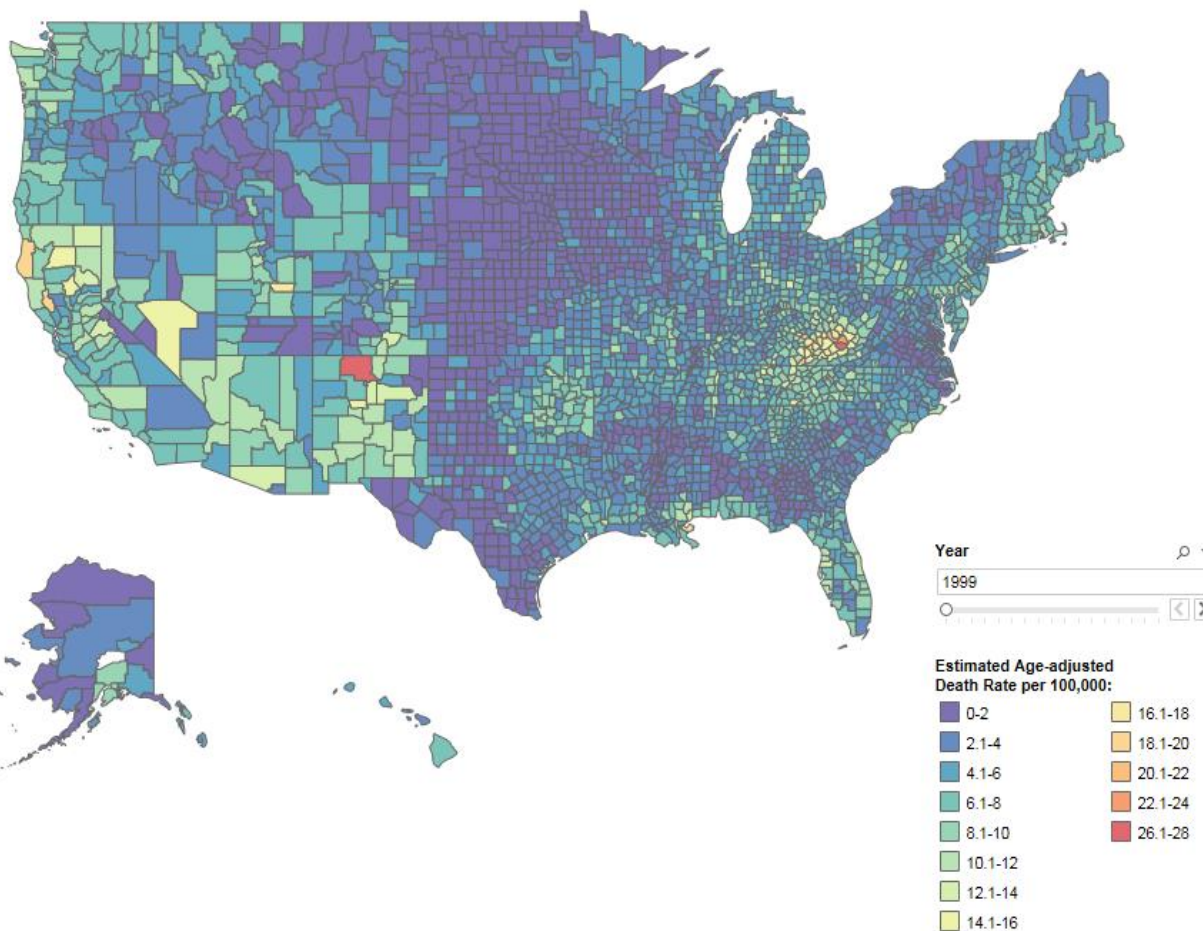
Source: SAMHSA, 2015 National Survey on Drug Use and Health, 2016.

Analgesic Mechanisms of Mu Opiate Drugs (Heroin, Vicodin, Morphine)

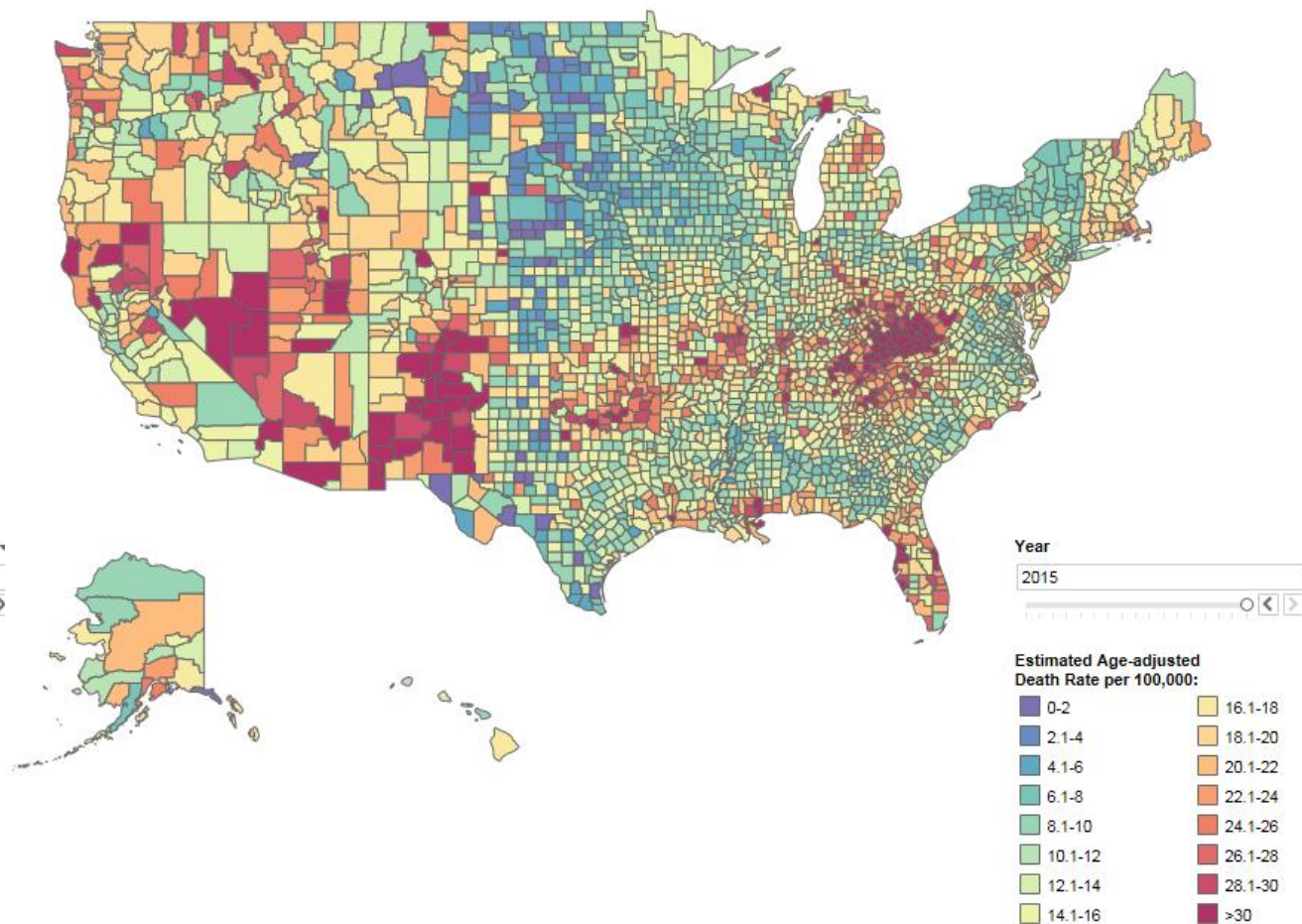


Overdose Death Rates

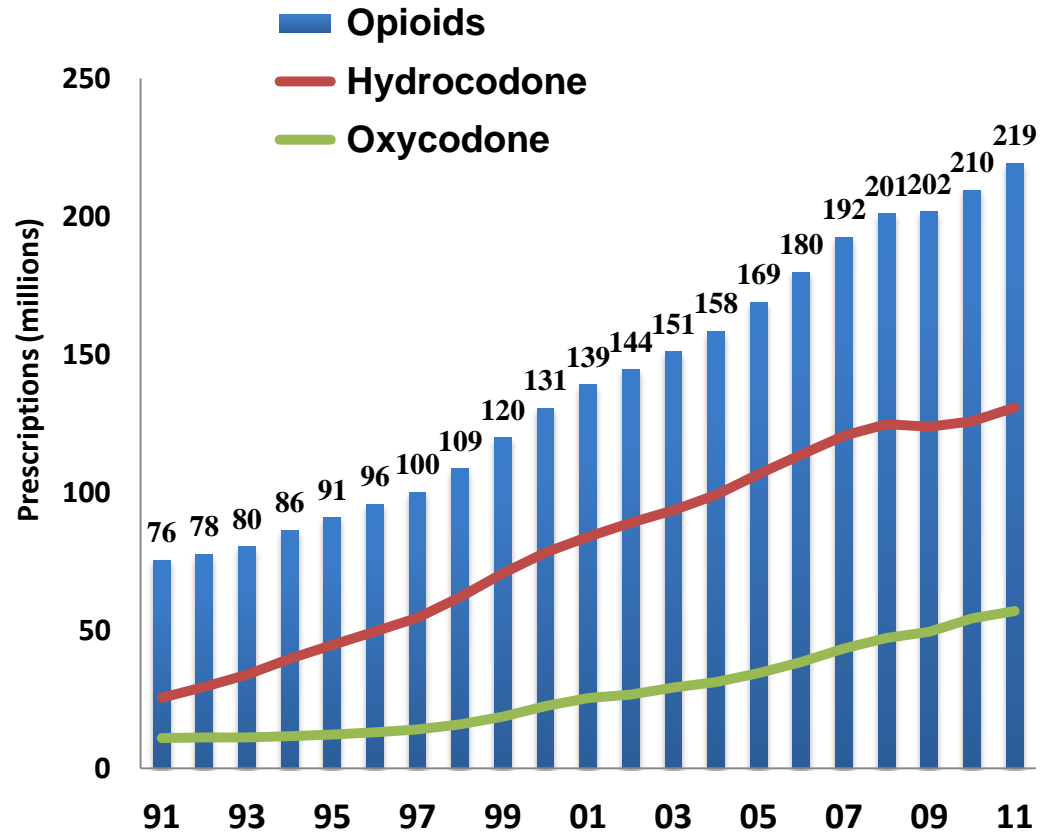
1999



2015

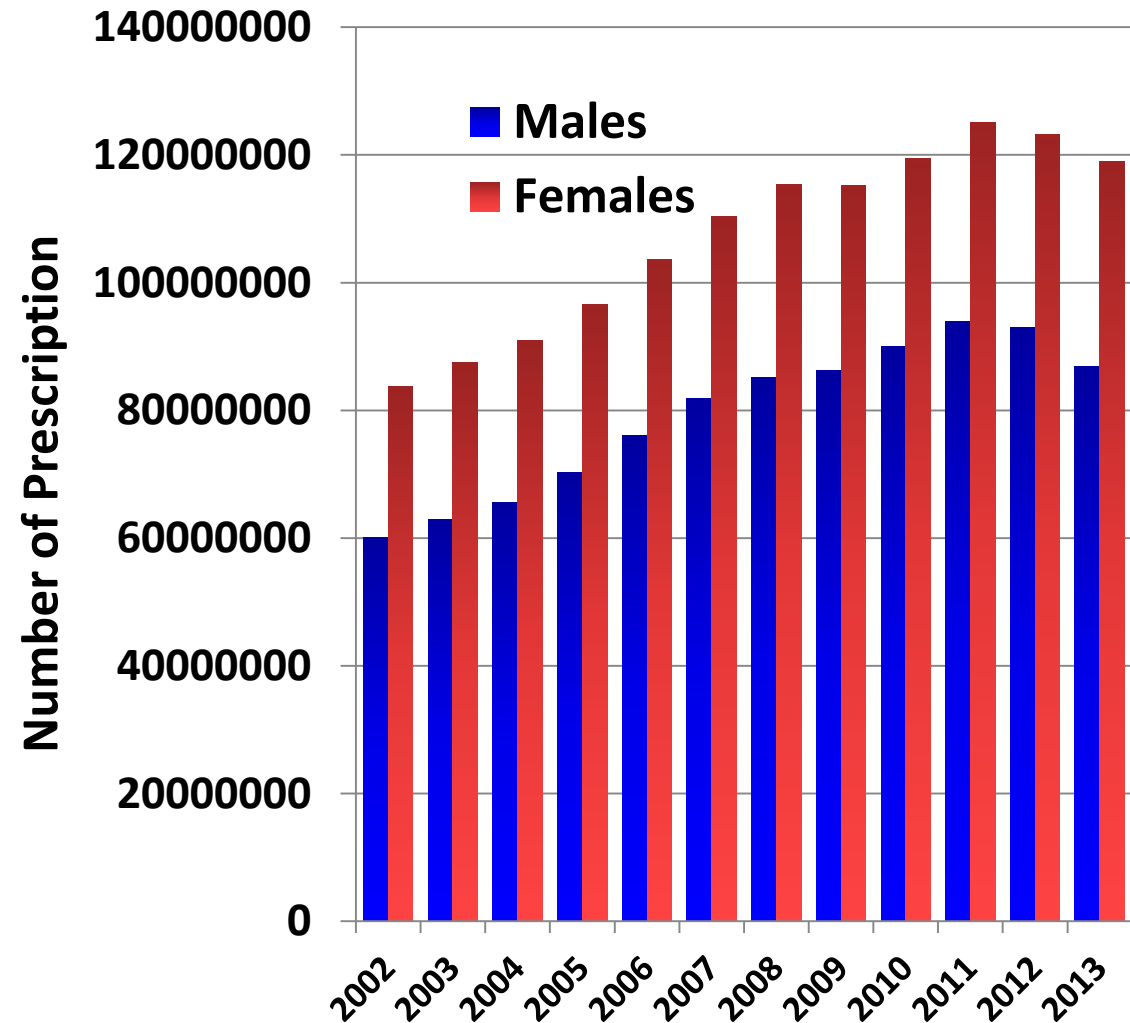


Opioid Prescriptions 1991-2011



IMS's Source Prescription Audit (SPA) &
Vector One®: National (VONA)

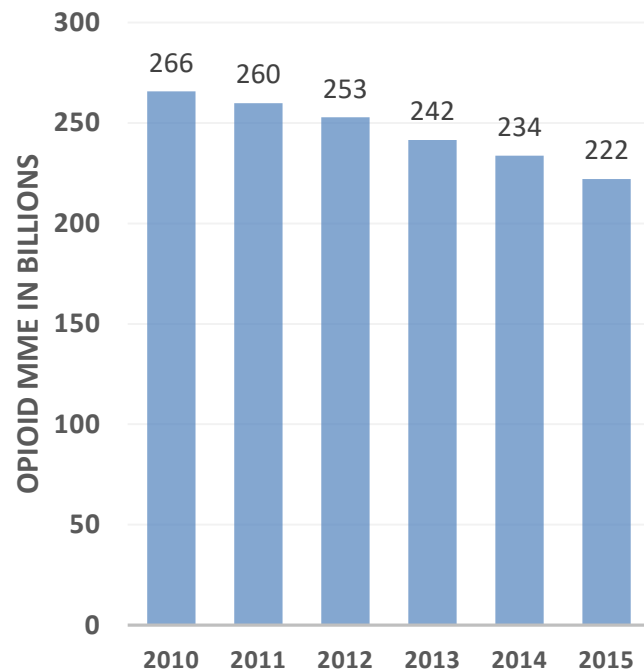
Number of Opioid Prescriptions U.S. Retail Pharmacies, 2002-2013



Source: IMS Health, National Prescription Audit

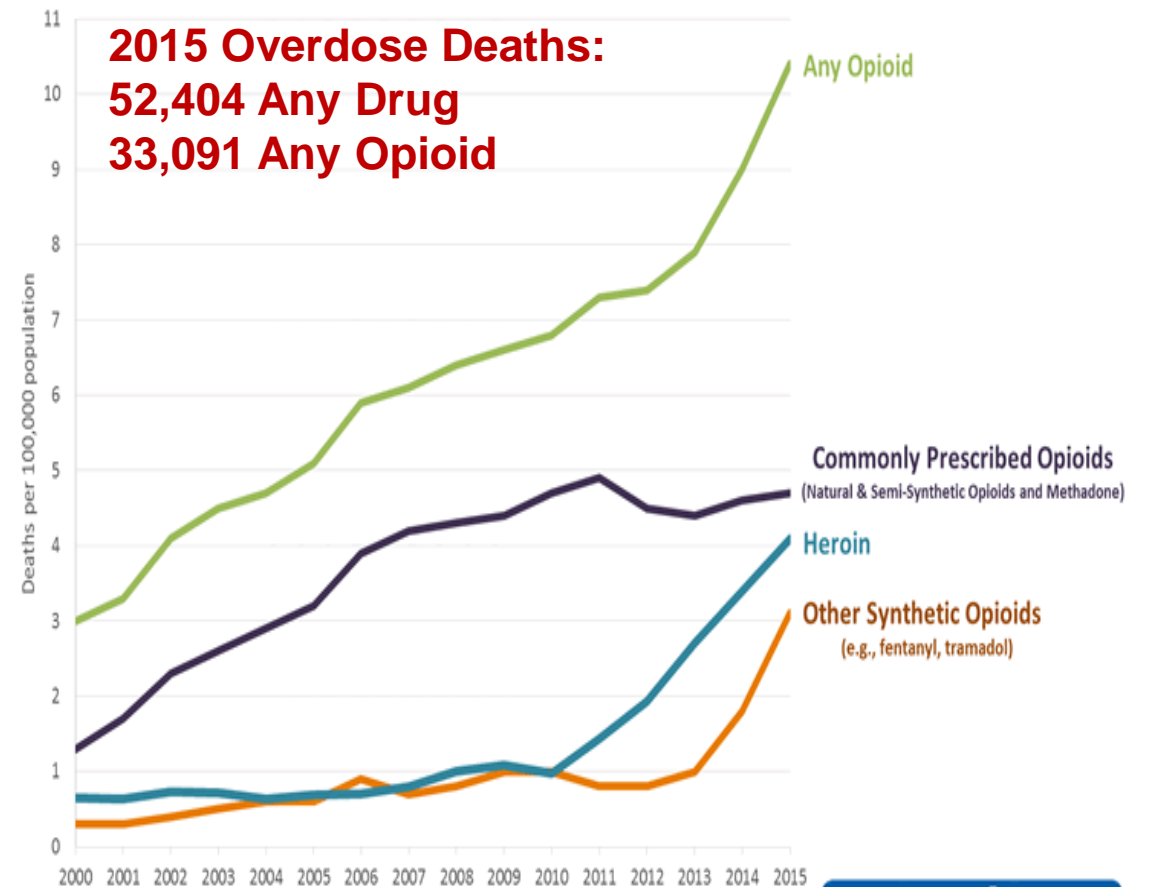
Opioid Prescriptions have started to Decrease but Opioids Fatalities are still Increasing

Opioid morphine milligram equivalents (MME) dispensed fell by over 15% from 2010-2015



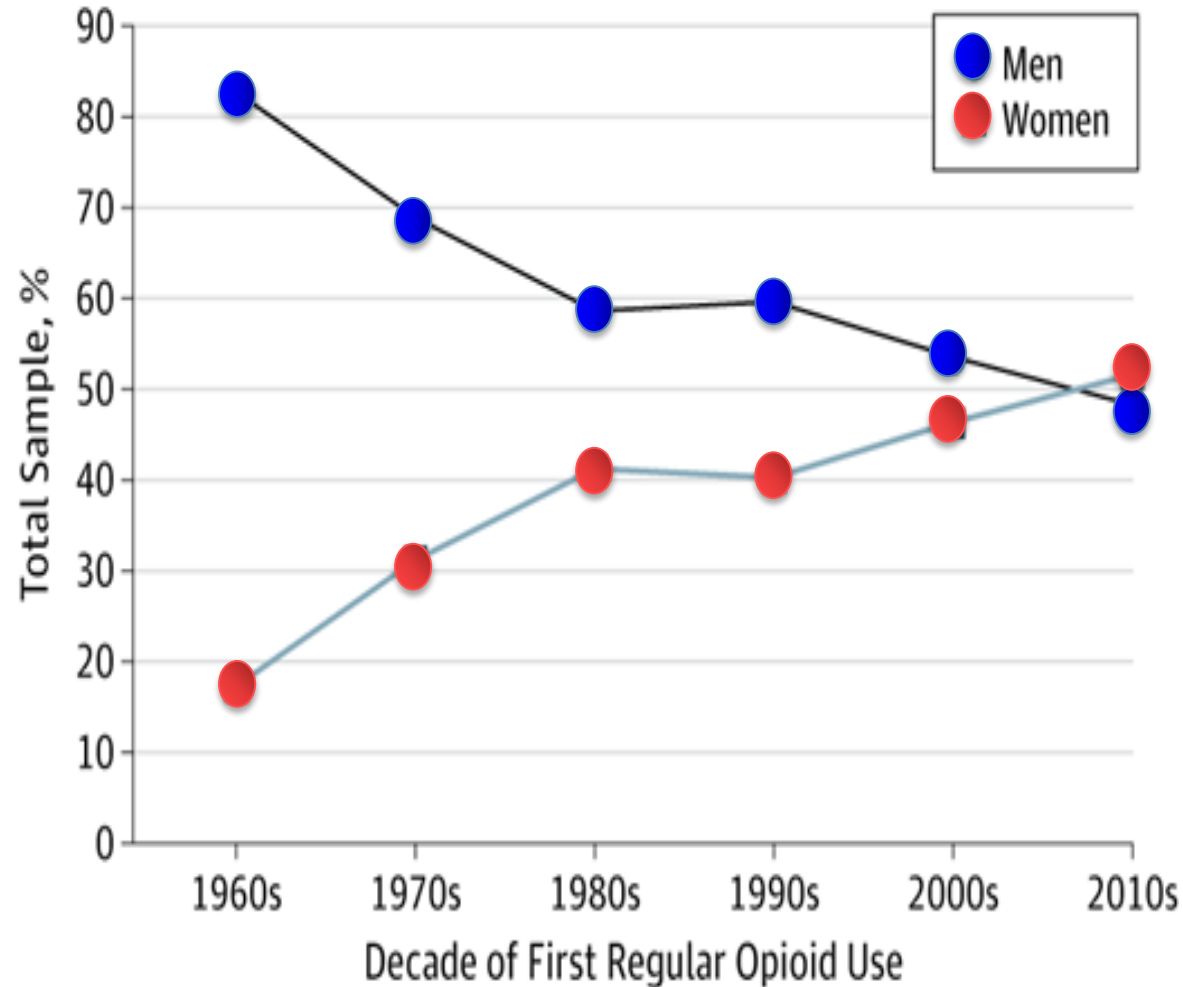
Source: IMS Health, U.S. Outpatient Retail Setting

Opioid OD Deaths US, 2000-2015



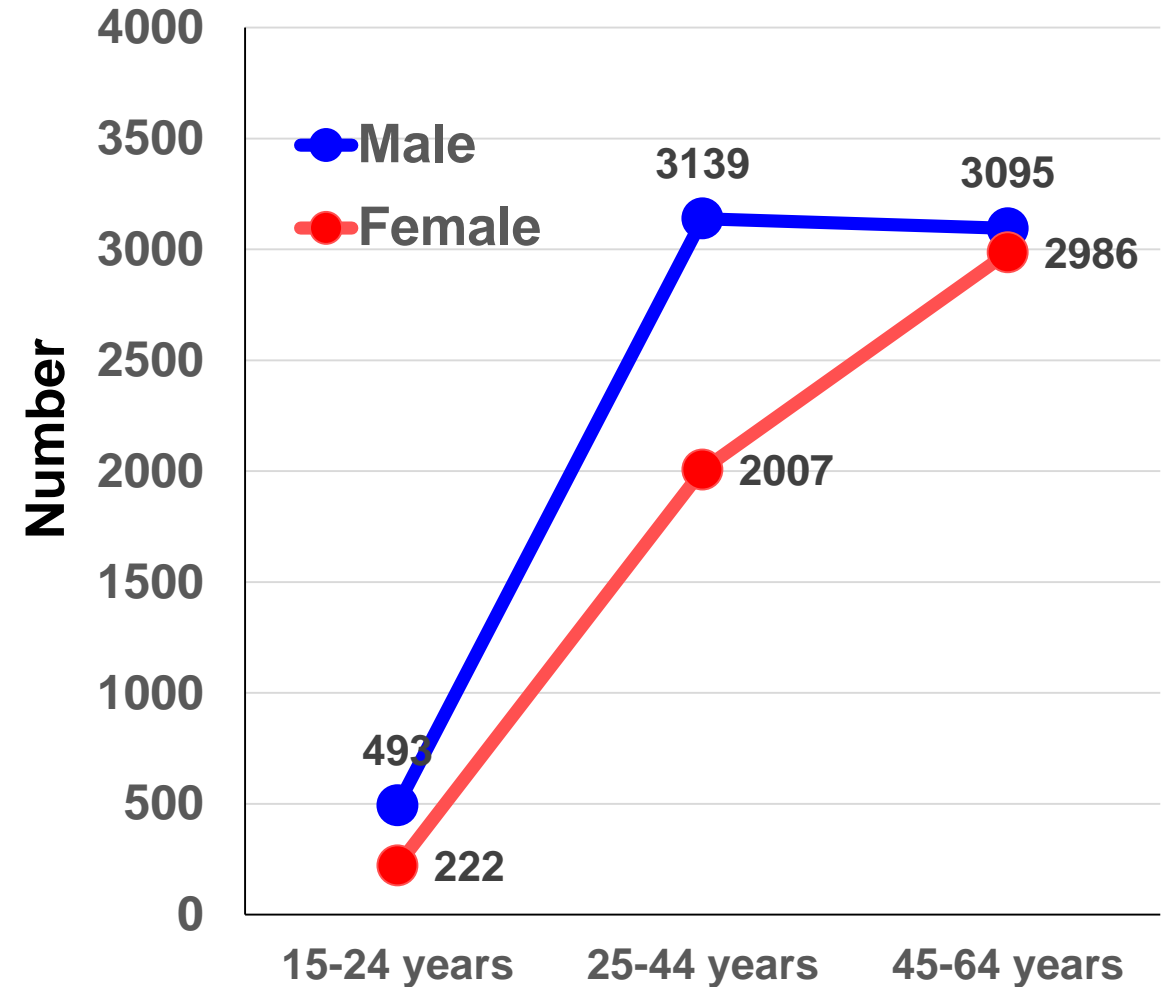
SOURCE: CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2016. <https://wonder.cdc.gov/>.

The Changing Face of Heroin Use in the US



Cicero TJ et al., JAMA Psychiatry 2014.

Deaths Involving Natural and Semi-Synthetic Opioids



Rudd RA et al., MMWR Morb Mortal Wkly Rep 2016

NIH OPIOID RESEARCH INITIATIVE

Using Research to End the Opioid Crisis

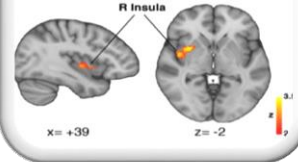
PAIN MANAGEMENT

Safe, more effective strategies

Non-Pharmacological
Treatments (e.g. TMS)



Biomarkers for Pain



Vaccines or Antibodies
Against Opioids or
Pain Producing
Chemicals

Non-Opioid
Analgesics



Respiratory
Stimulation
Devices

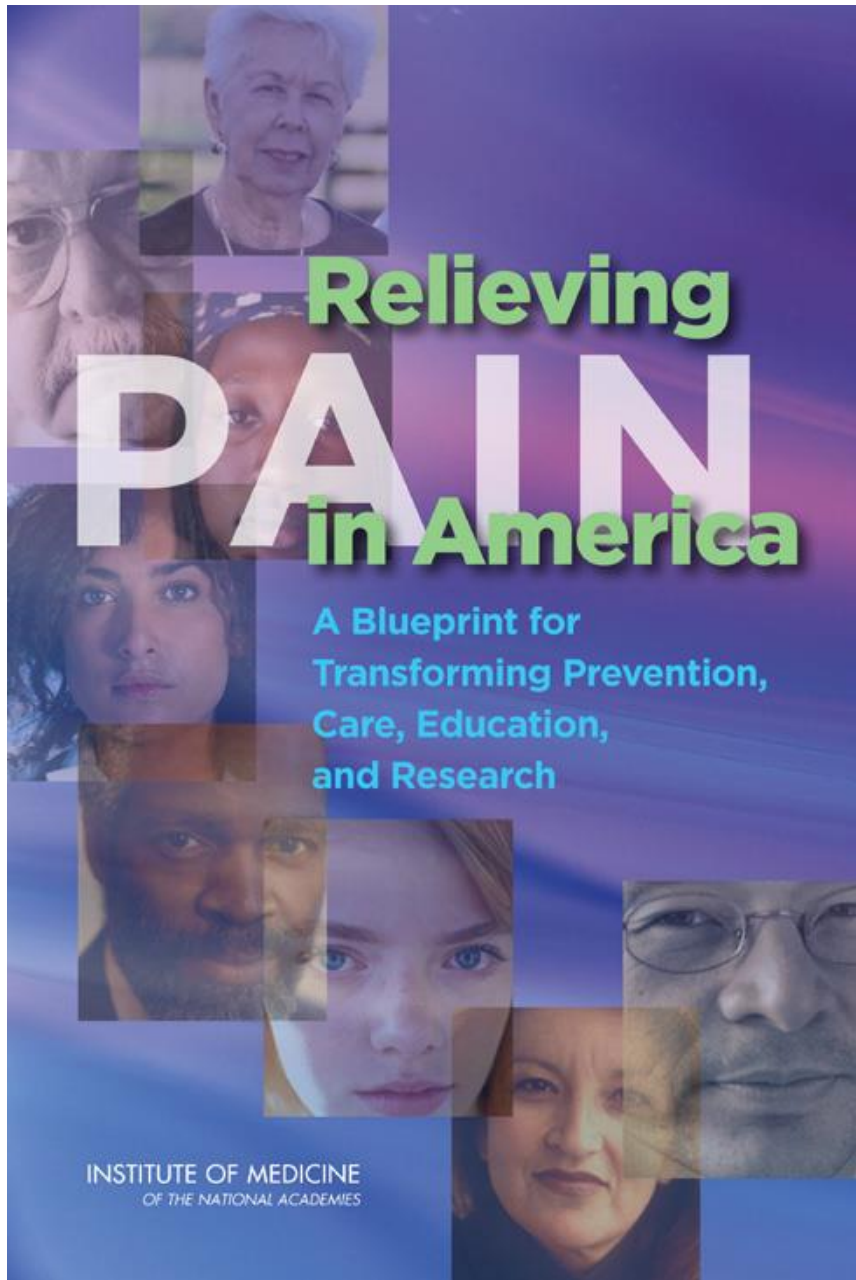
OPIOID ADDICTION TREATMENT

New and innovative
medications and
technologies

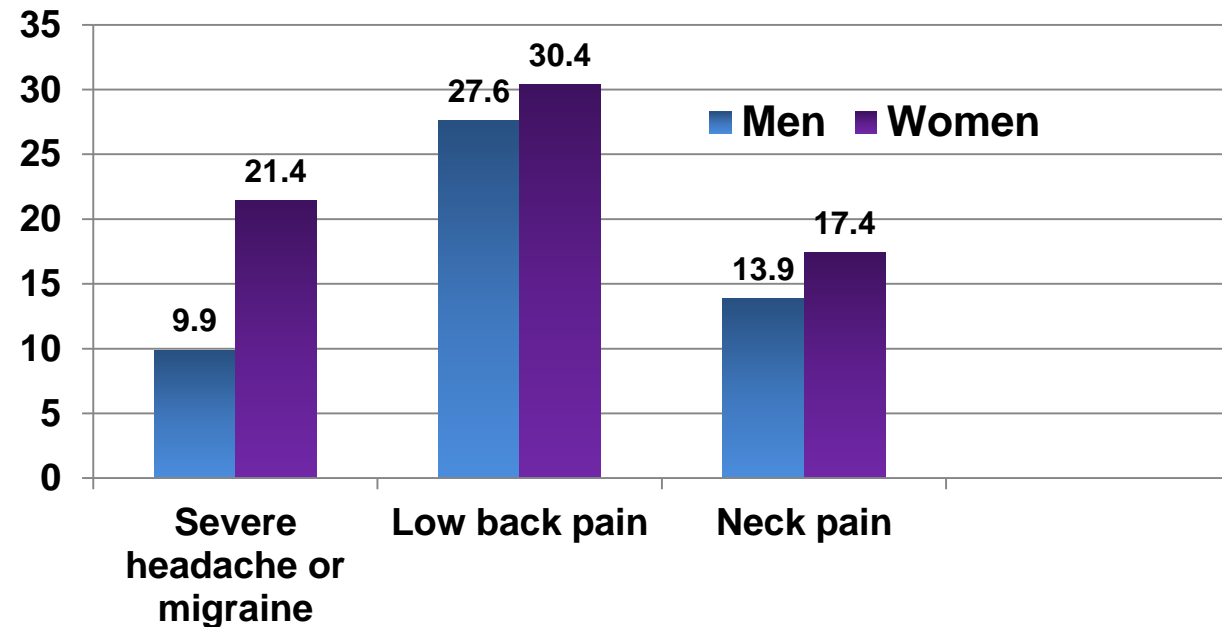
OVERDOSE REVERSAL

Interventions to reduce
mortality and link to
treatment

- **Women suffer more pain in many categories**



Rates of U.S. Adults > 18 and Older Reporting Pain, 2015

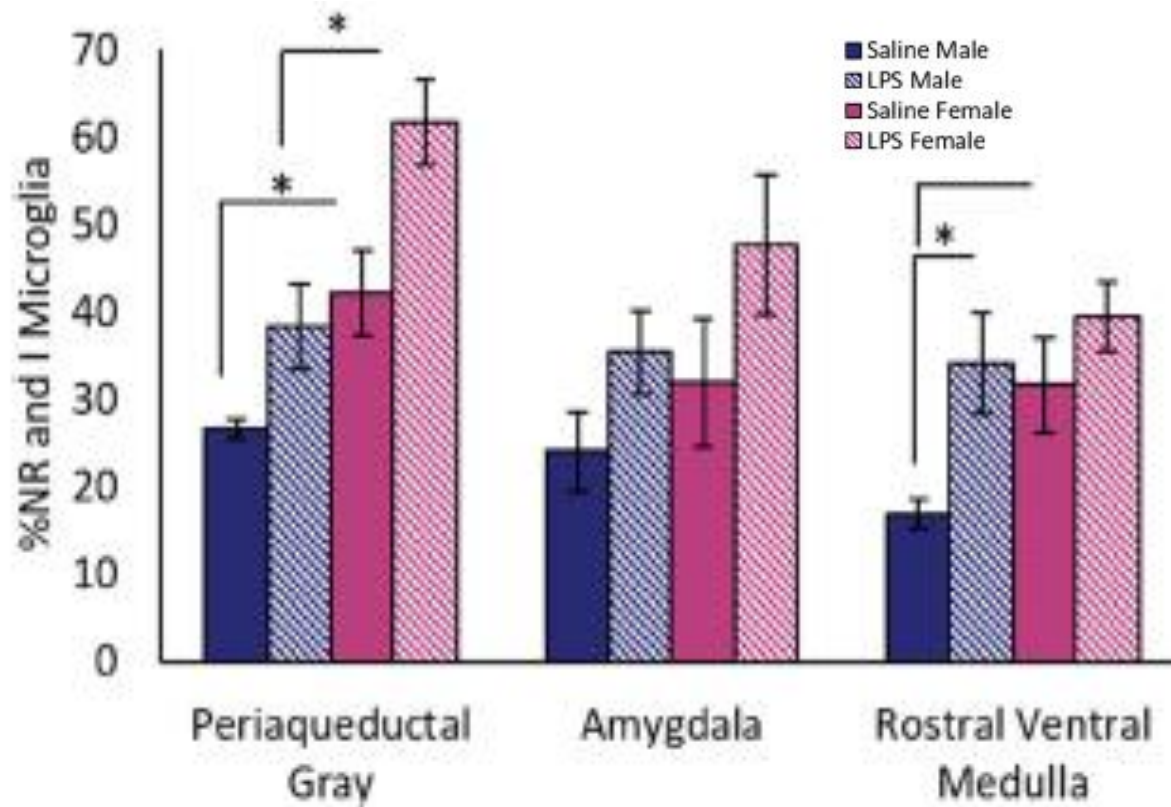


Source: CDC and NCHS, 2015

- **Women's reports of pain more likely to be dismissed**

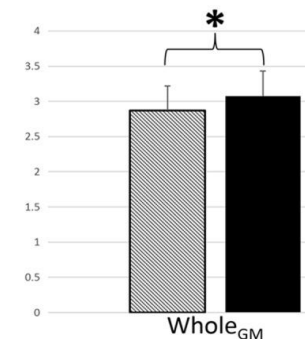
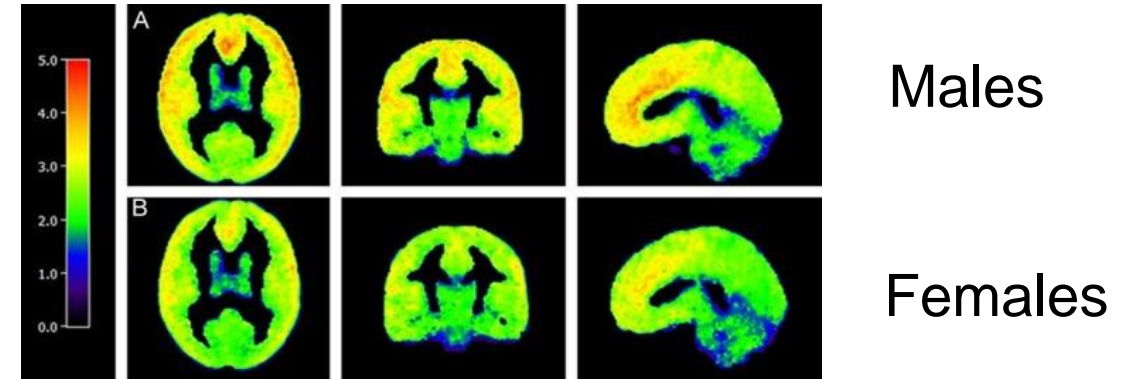
Sex Differences in Microglia Activity in Periaqueductal Gray in Response to Inflammatory Pain

Treatment with TLR4 Agonist LPS
Increased Microglial Activation in Females



Doyle HH et al., J Neuroscience, 2017.

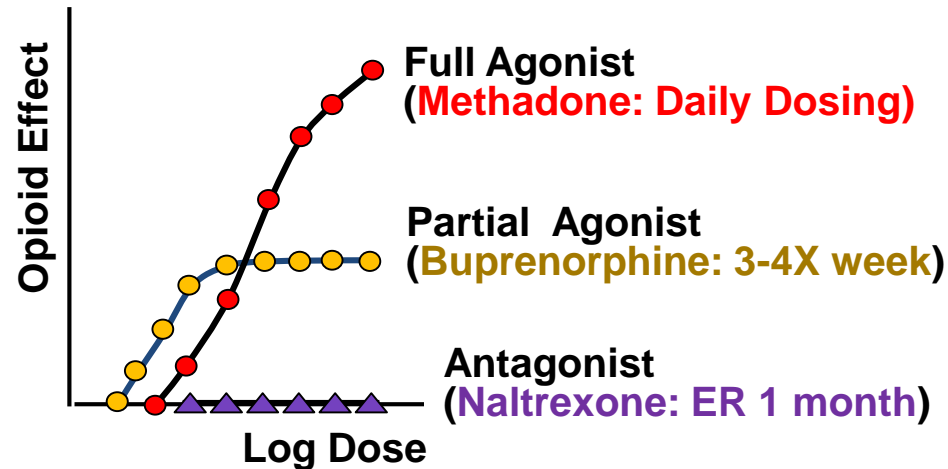
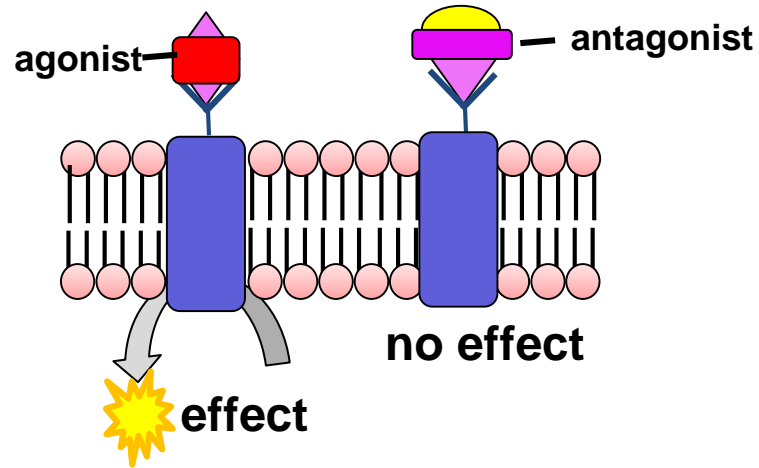
Gender Differences in Kappa Opioid Receptor Availability



- Males had higher K receptor availability than females presumably from increased dynorphin, which is aversive.
- This might help explain gender differences in pain catastrophizing

[Vijay et al., Am J Nucl Med Mol Imaging. 2016.](#)

Medications Assisted Therapies for OUD



DECREASES:

- Opioid use
- Opioid-related OD deaths
- Criminal activity
- Infectious disease transmission

And INCREASES

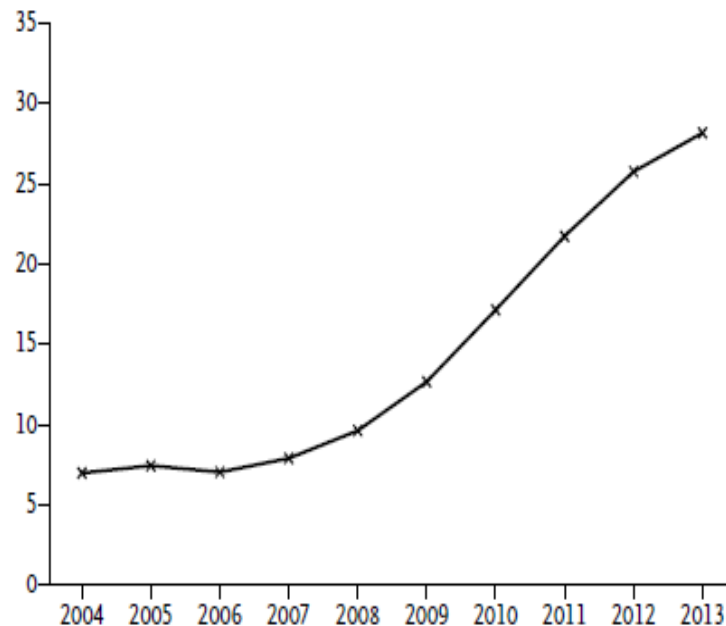
- Social functioning
- Retention in treatment
- Outcomes in NAS

MAT is highly underutilized

Opioid Use and Misuse During Pregnancy

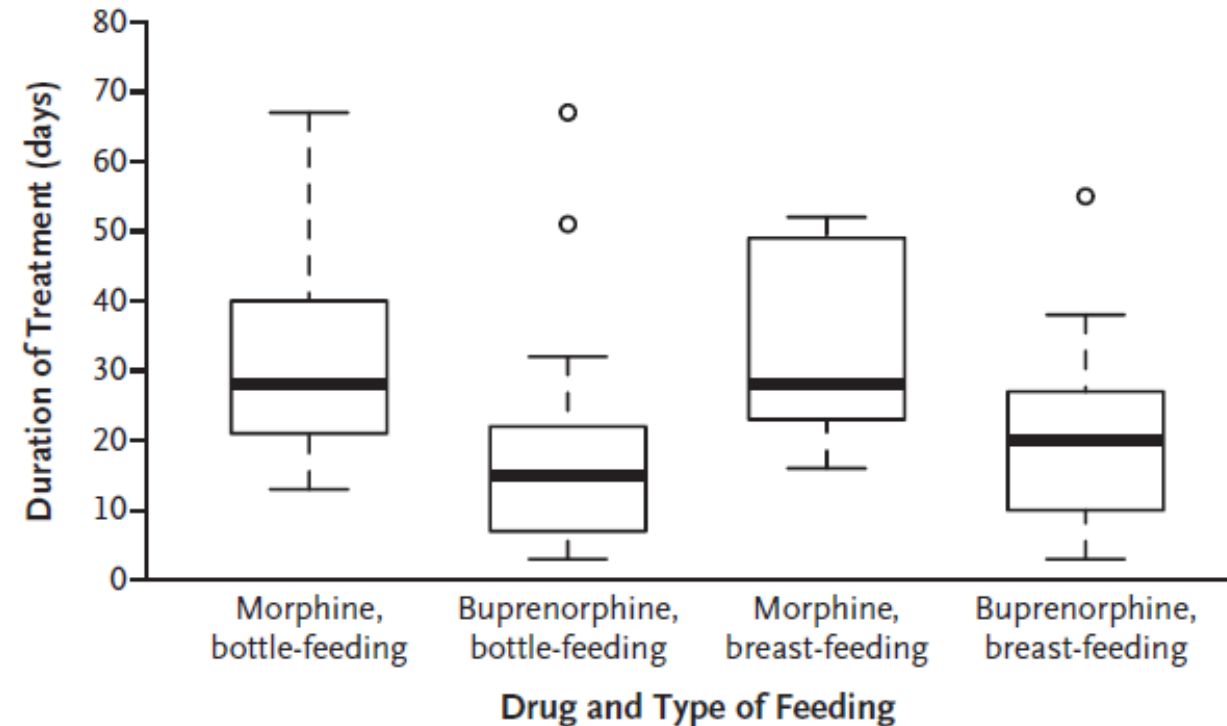
17% of pregnant women are prescribed an opioid during pregnancy

NICU Admissions for Neonatal Abstinence Syndrome NAS (Number per 1000 Admissions)



Source: Tolia VN, Patrick SW, et al. NEJM 2015;372:2118-2126.

Buprenorphine for NAS Treatment



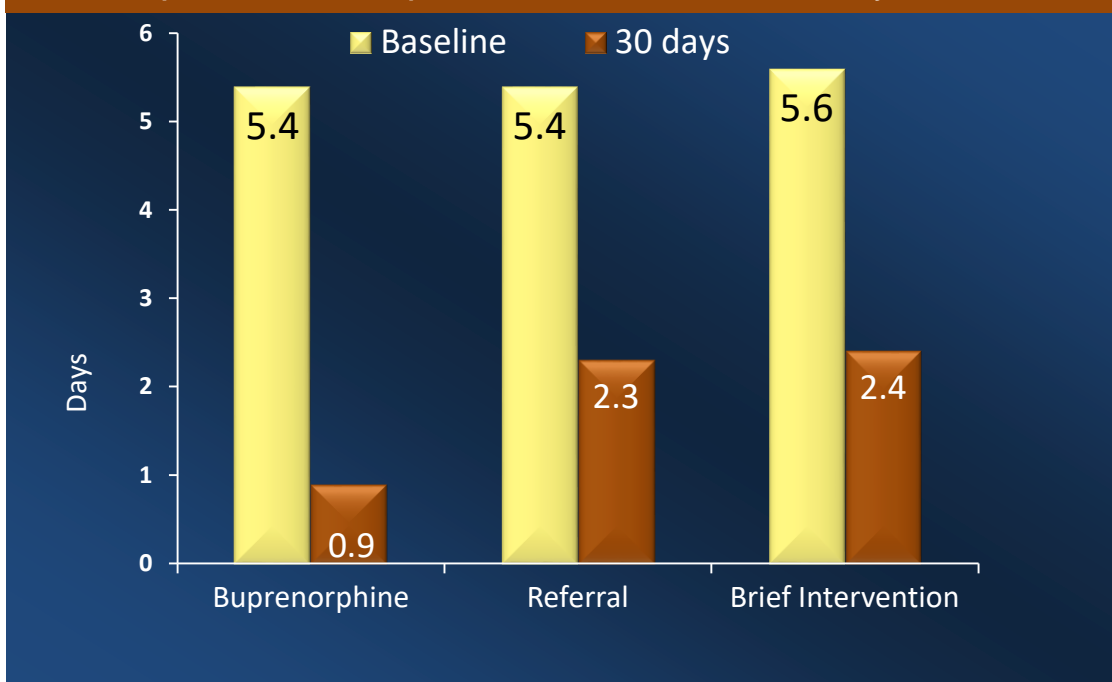
Buprenorphine resulted in a *shorter duration of NAS treatment* and *length of hospital stay* than treatment with morphine

Kraft WK et al., N Engl J Med 2017;376:2341-2348.

Emergency Department-Initiated Buprenorphine

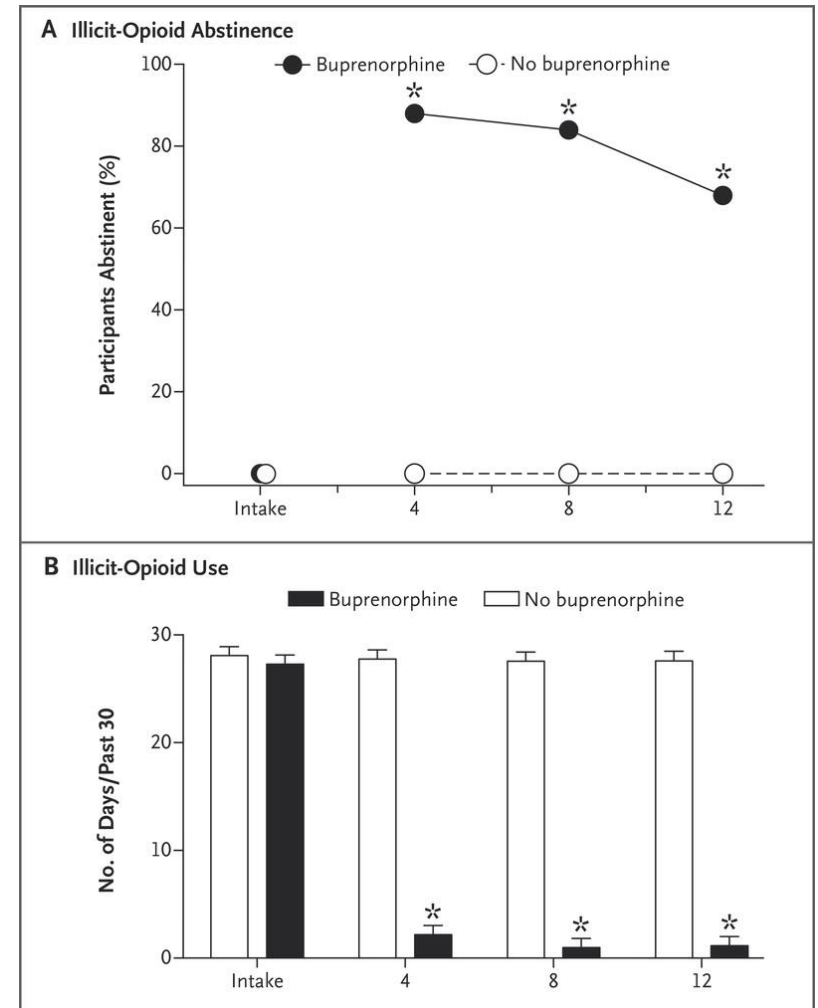
- Reduced self-reported, illicit opioid use
- Increased engagement in addiction treatment
- Decreased use of inpatient addiction treatment services

Self-Reported Illicit Opioid Use in the Past 7 Days



D'Onofrio G et al., JAMA April 28, 2015.

Abstinence from Illicit Opioids over 12 Weeks with Interim Buprenorphine



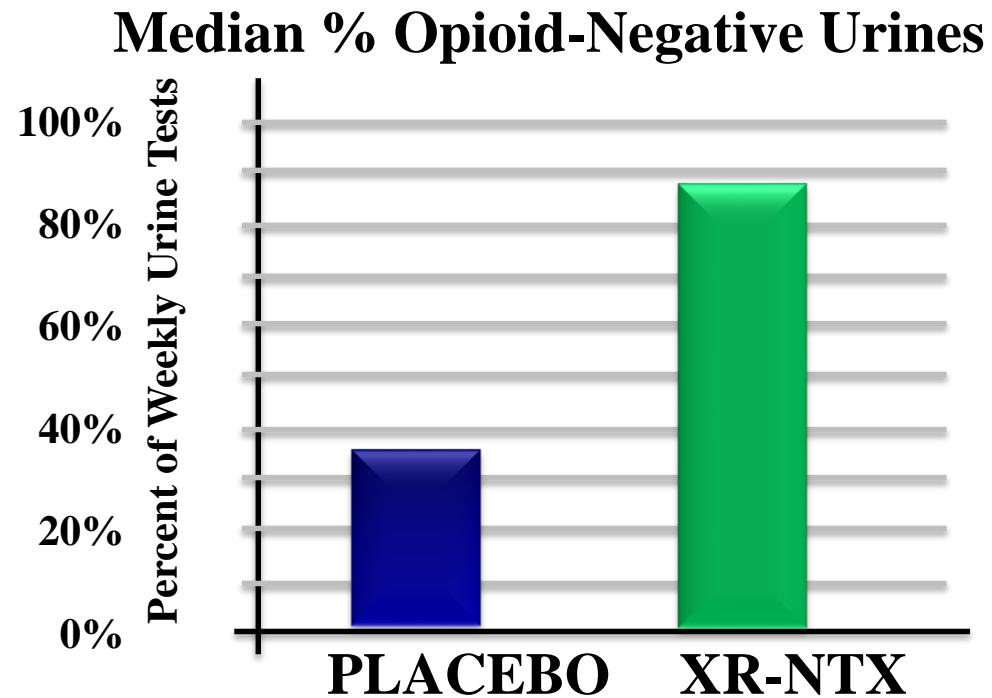
Sigmon SC et al. N Engl J Med 2016.

Extended Release Formulations

Vivitrol®



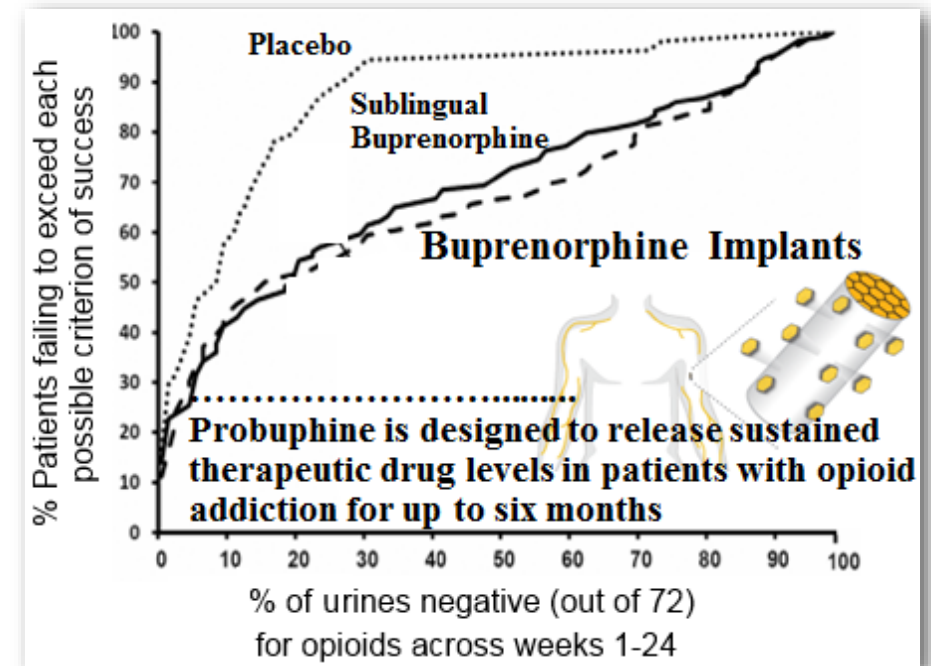
IM Injection q 4 weeks for 24 weeks



■ Placebo: N=124
■ XR-NTX: N=126

Krupitzky et al., Lancet 2011

PROBUPHINE®



Rosenthal et al., Addiction 2013;105.

FDA approval – May 26, 2016

Education

PAIN

NIH Pain Consortium Centers of Excellence in Pain Education

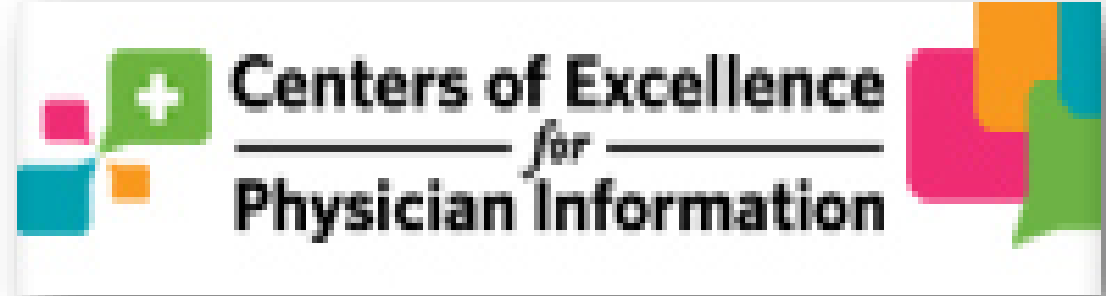
ORWH NIA
OBSSR NINR
NIDA NICHD
NIDCR NIAMS
NINDS NCCIH



CoEPes
CENTERS OF EXCELLENCE

Goal:
Improve pain treatment through education

SUD



Goal:
Prevent SUD and improve outcomes in addiction through education of health care providers

