



# Opioid Addiction and Medication Assisted Therapy

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J. MITCHELL SIMSON MD, MPH, FASAM

LUNCH DISCUSSION

*DECEMBER 18, 2024*

# **There will be 2 sessions on opioids:**



- ❖ **Definition of Addiction**
- ❖ **History and Epidemiology**
- ❖ **Opiate use in USA**
- ❖ **Pharmacology**
- ❖ **Review of Opioid Neurochemistry**
- ❖ **Newer semi-synthetic opioids**
- ❖ **Medication Assisted Therapy**

# Addiction

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**Addiction to many substances has long been recognized.**

In 1622, Sir Francis Bacon succinctly observed that:

“the use of tobacco...conquers men with a certain secret pleasure so that those who have once become accustomed thereto can hardly be restrained therefrom.”



*Quod ali cibus est aliis fuit acre venenum*

-Lucretius, 95-55 BCE

**What is sustenance to some  
may be fierce poison to others**



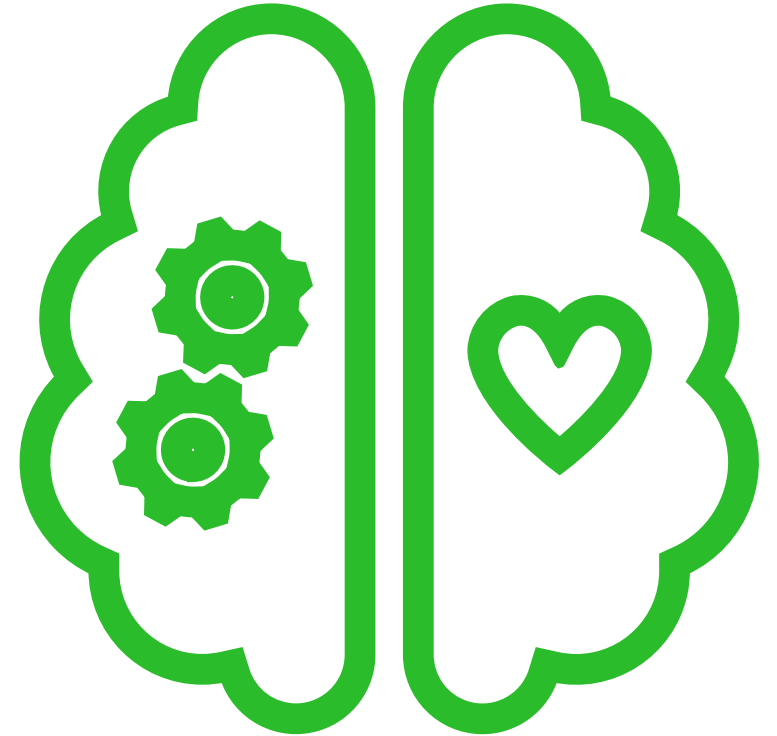
# ADDICTION DEFINITION

**Addiction is a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences.**

People with addiction use substances or engage in behaviors that become compulsive *and* often continue despite harmful consequences.

Prevention efforts and treatment approaches for addiction are generally as successful as those for other chronic diseases.

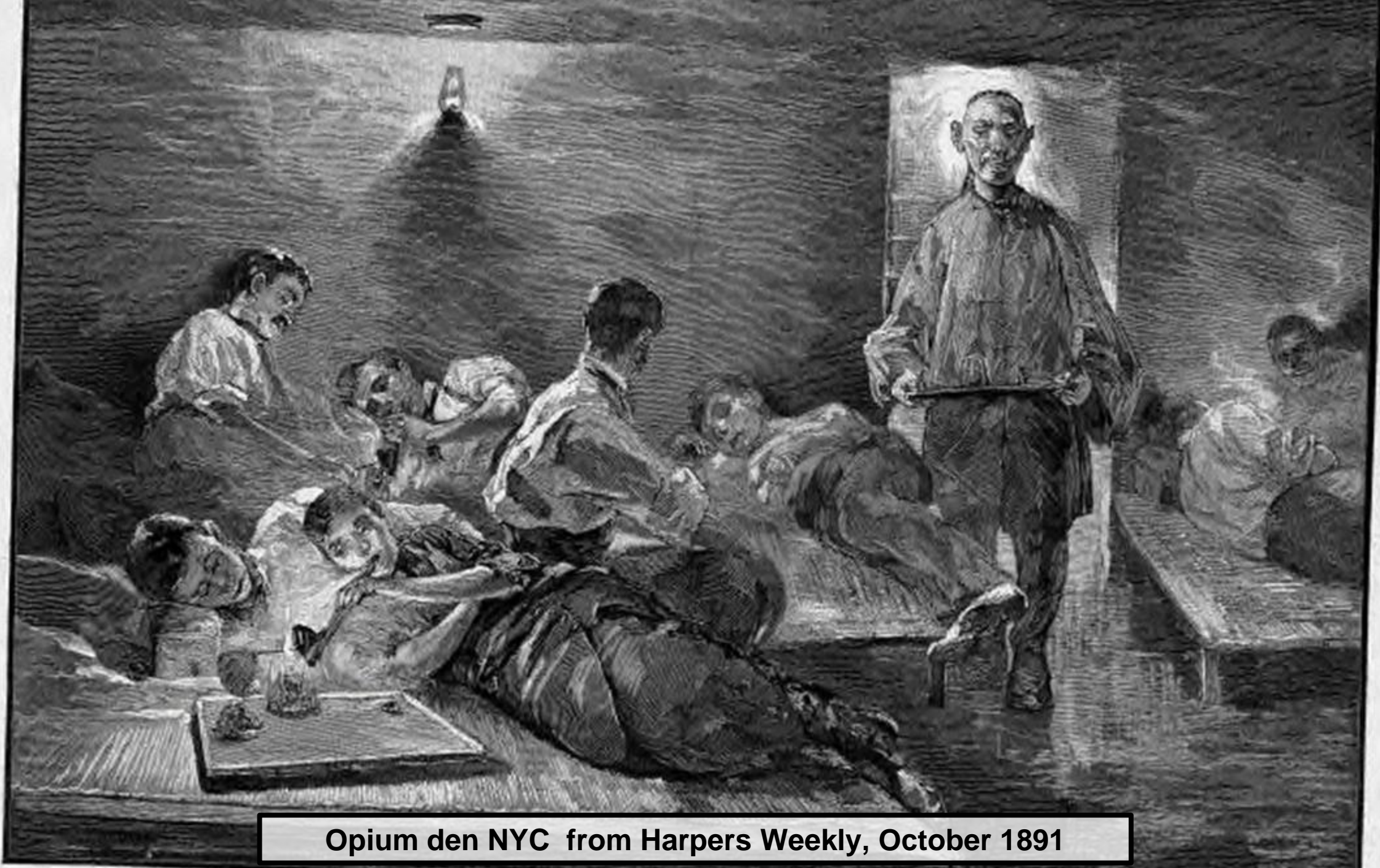
*Adopted by the ASAM Board of Directors September 15, 2019*





Manila Opium Den





Opium den NYC from Harpers Weekly, October 1891

# Opium den with “Westerners”





# *The Opium Pipe*

Leon Herbo  
(1850-1907)

Volume 25, Number 3 2006

PRINT ISSN: 1055-0887  
ELECTRONIC ISSN: 1545-0848

## Journal of **Addictive Diseases**<sup>TM</sup>



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Indexed in  
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Red & White Poppy



Poppy Bud





17<sup>th</sup> CENTURY ENGRAVING OF OPIUM HARVEST

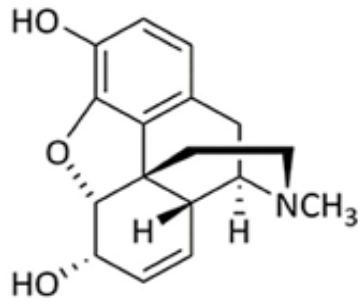


20<sup>th</sup> CENTURY PHOTO OF OPIUM HARVEST



Opium  
by the Publisher Group

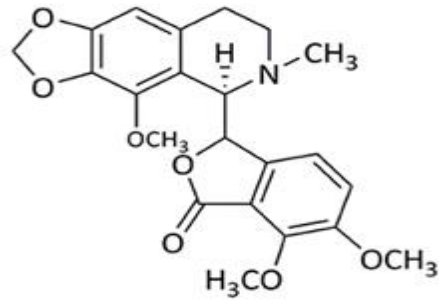
# OPIUM ALKALOIDS



Morphine

## MORPHINE

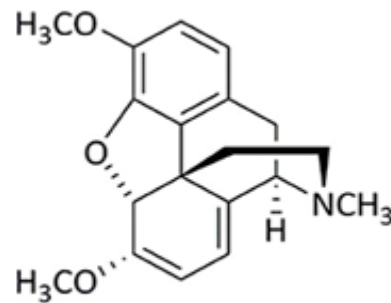
9-14%  
Narcotic Analgesic



Noscapine

## NOSCAPINE (NARCOTINE)

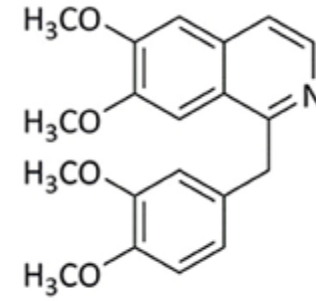
6-11%  
Antitussive



Thebaine

## THEBAINE

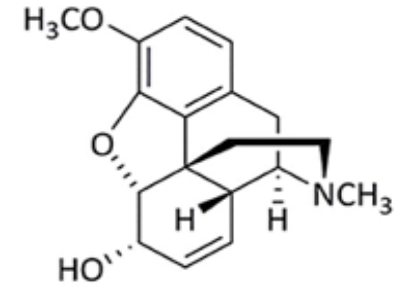
1.5-0.3%  
Convulsant drug  
Produces no  
analgesia.  
  
Important intermediate  
for the synthesis of  
semisynthetic opioids.



Papaverine

## PAPAVERINE

1%  
Smooth muscle  
relaxant



Codeine

## CODEINE

0.5%  
Narcotic Analgesic





# History

- In 1803, a German pharmacist, F.W. Serturner isolated the main alkaloid of opium and named it morphine after Morpheus, the Greek god of dreams.
- Morphine was soon widely used for medical purposes in Europe and the U.S. But by the end of the century, addiction to the drug had become a problem.
- In 1898, while searching for a non-addictive substitute for morphine, Heinrick Dresser, working at the Bayer Laboratory in Germany, developed diacetylmorphine.
- Bayer marketed it under the brand name Heroin. The new drug, however, turned out to be up to ten times more potent than morphine.

**BAYER**  
**PHARMACEUTICAL PRODUCTS.**  
We are now sending to Physicians throughout the United States literature and samples of

**ASPIRIN**  
The substitute for the Salicylates, agreeable of taste, free from unpleasant after-effects.

**HEROIN**  
The Sedative for Coughs,  
**HEROIN HYDROCHLORIDE**  
Its water-soluble salt.  
You will have call for them. Order a supply from your jobber.

Write for literature to  
**FARBENFABRIKEN OF ELBERFELD CO.**  
40 Stone Street, New York,  
SELLING AGENTS



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40 STONE STREET,  
NEW YORK.

AKG, London

Produced in 1898

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## PHARMACEUTICAL PRODUCTS.

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## FARBENFABRIKEN OF ELBERFELD CO.

40 Stone Street, New York,

SOLE AGENTS





Dr. A. BUSCHEE'S  
**GERMAN SYRUP**

OF  
Tar, Wild Cherry, &c.

CONTAINS 0.24 GRAIN SULP.  
MORPHINE PER OUNCE,  
AND  $1\frac{3}{4}$  PER CENT. ALCOHOL.

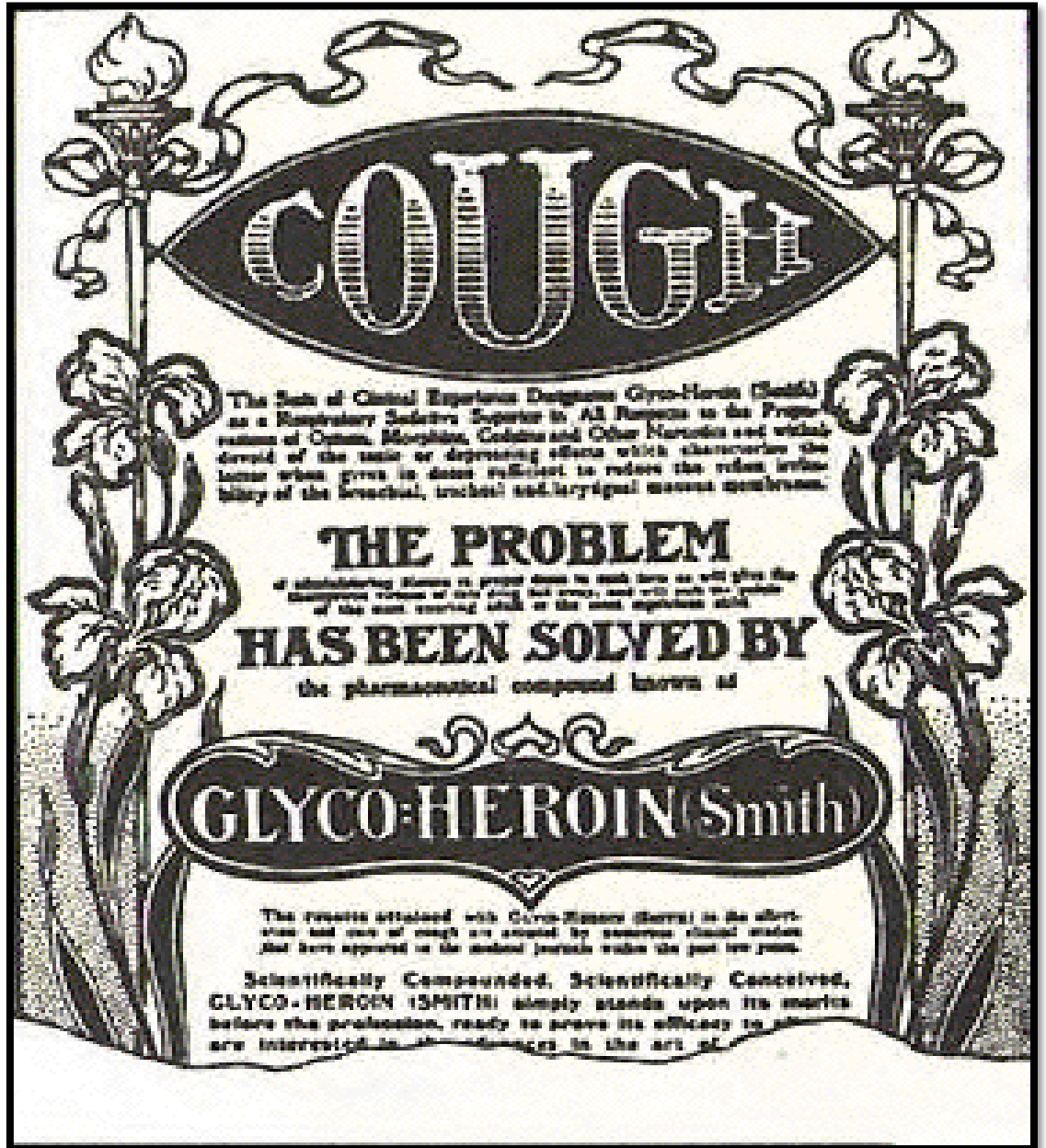
For Coughs, Colds,  
Bronchitis,  
Hoarseness, Croup,  
Pains in the Chest,  
Whooping Cough,  
Asthma.

GUARANTEED BY  
**G. G. GREEN,**  
Sole Manufacturer,  
Woodbury, N. J., U. S. A.

Under the Food and Drugs  
Act, June 30, 1906. No. 22

# Medicine with Opium

- There were countless patent medicines on the market containing opium or morphine. They were sold under such names as:
  - Ayer's Cherry Pectoral,
  - Mrs. Winslow's Soothing Syrup, Darby's Carminative,
  - Godfrey's Cordial,
  - McMunn's Elixir of Opium,
  - Dover's Powder, and so on.
- Some were teething syrups for young children
- Some were "soothing syrups"
- Some were recommended for diarrhea and dysentery or for "women's troubles"







# Godfrey's Cordial

## Godfrey's Cordial

- A mixture of opium, molasses for sweetening, and sassafras for flavoring--- was especially popular in England.
- Dr. C. Fraser Brockington reports that in mid-nineteenth century Coventry, ten gallons of Godfrey's Cordial- enough for 12,000 doses- was sold weekly and was administered to 3,000 infants under two years of age.



# Distribution

The nineteenth-century distribution system reached into towns, villages, and hamlets as well as the large cities. A New England physician-druggist wrote about 1870:

*“In this town I began business twenty years since. The population then at 10,000 has increased only inconsiderably, but my sales have advanced from 50 pounds of opium the first year to 300 pounds now; and of laudanum [opium in alcohol] four times upon what was formerly required. About 50 regular purchasers come to my shop, and as many more, perhaps, are divided among the other three apothecaries in the place.”*







## Opium

By: Yves Saint Laurent

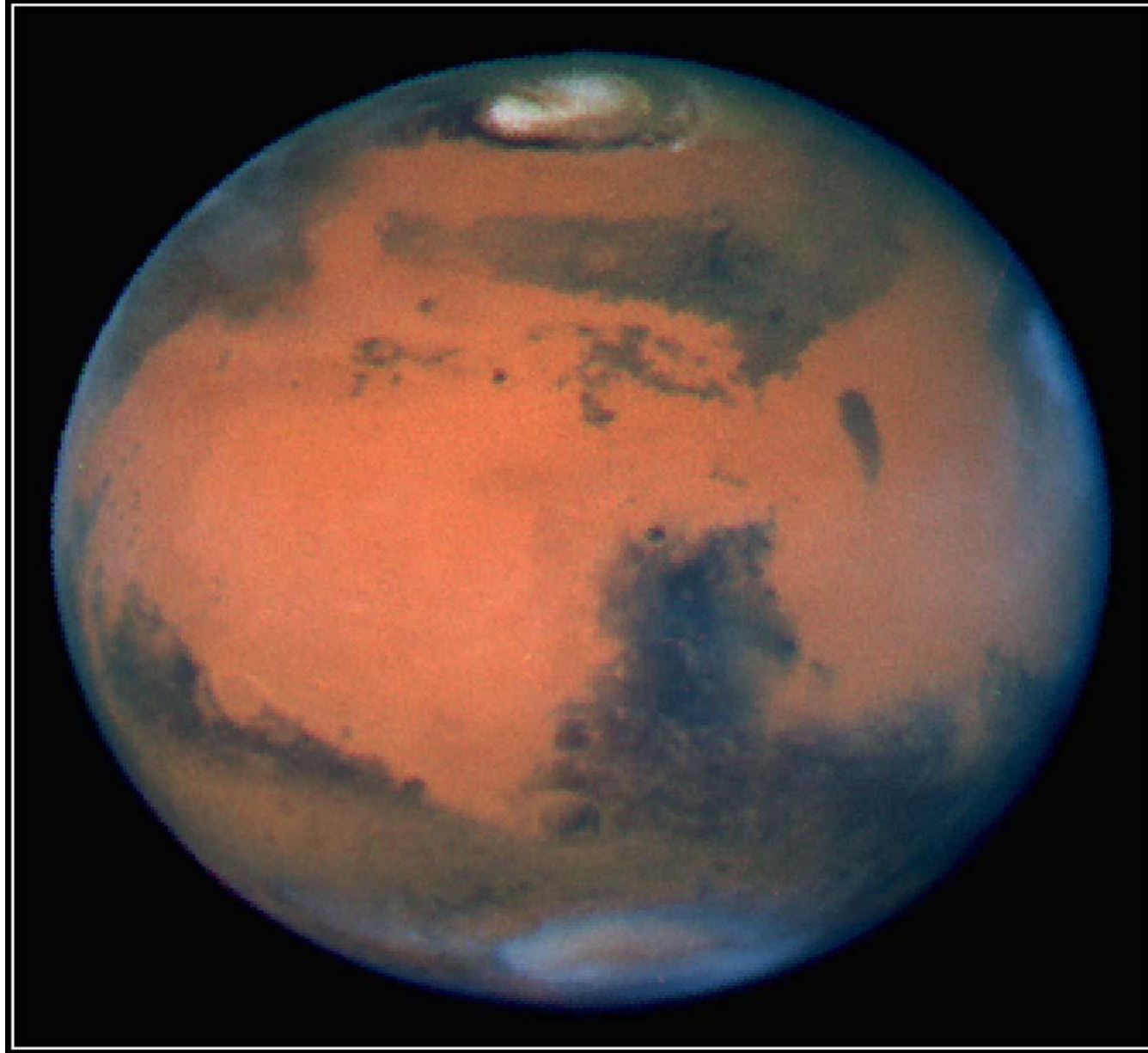


## Dior Addict

By: Christian Dior

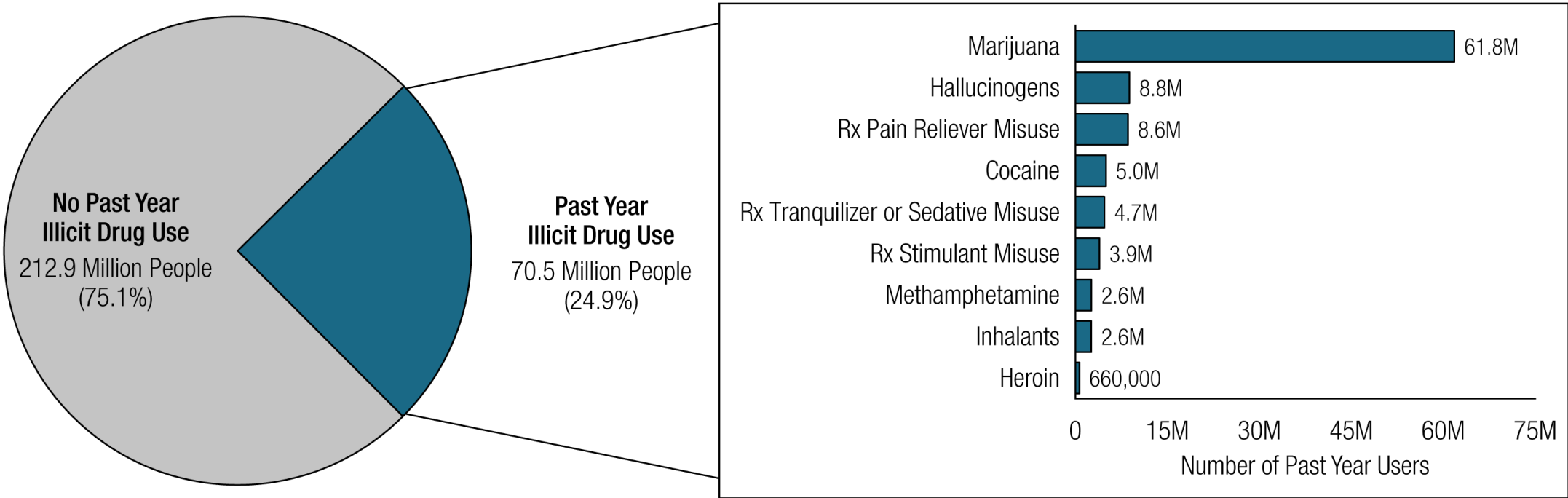


# So, what's the problem?

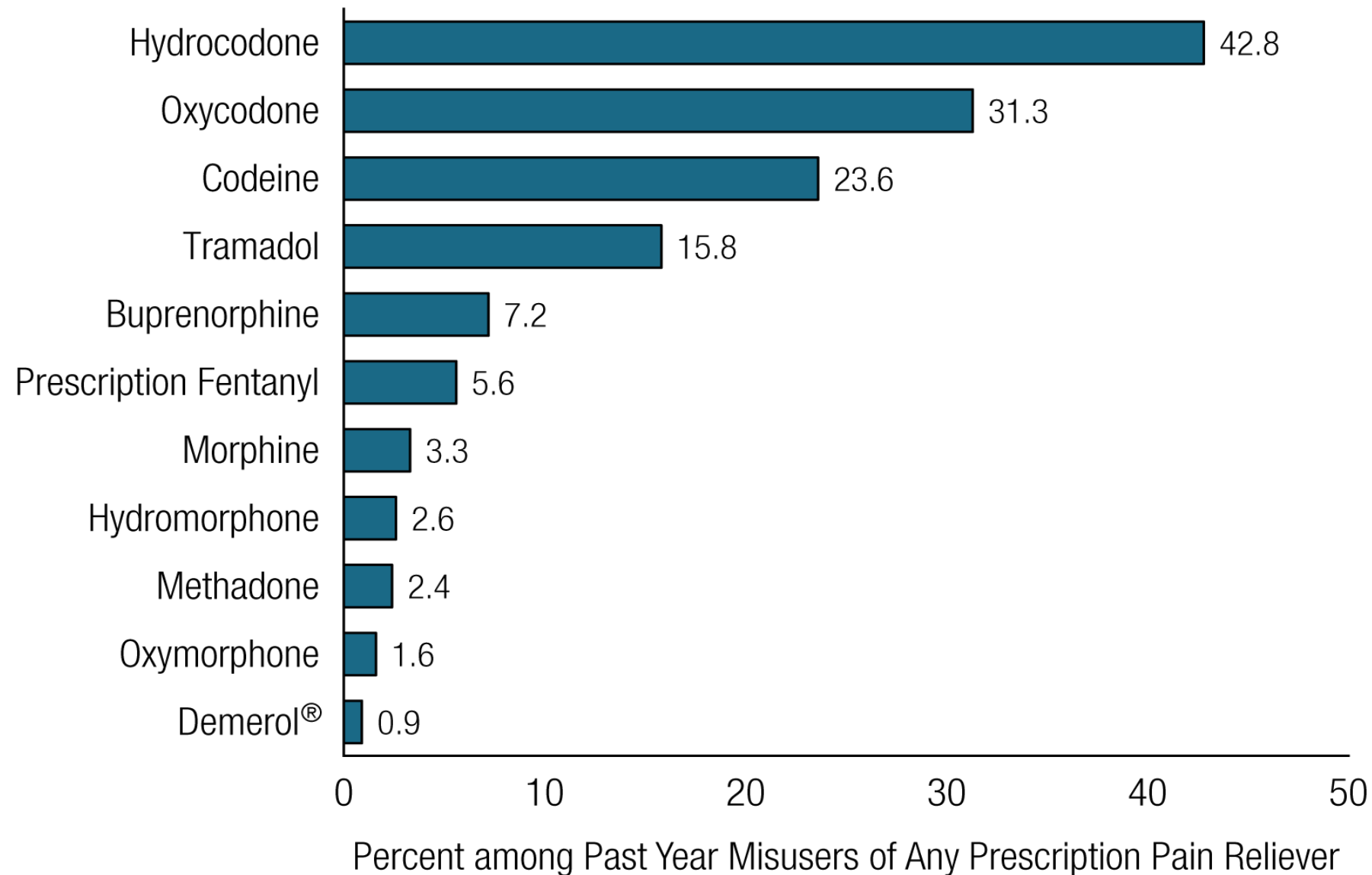


# Past Year Illicit Drug Use: Among People Aged 12 or Older

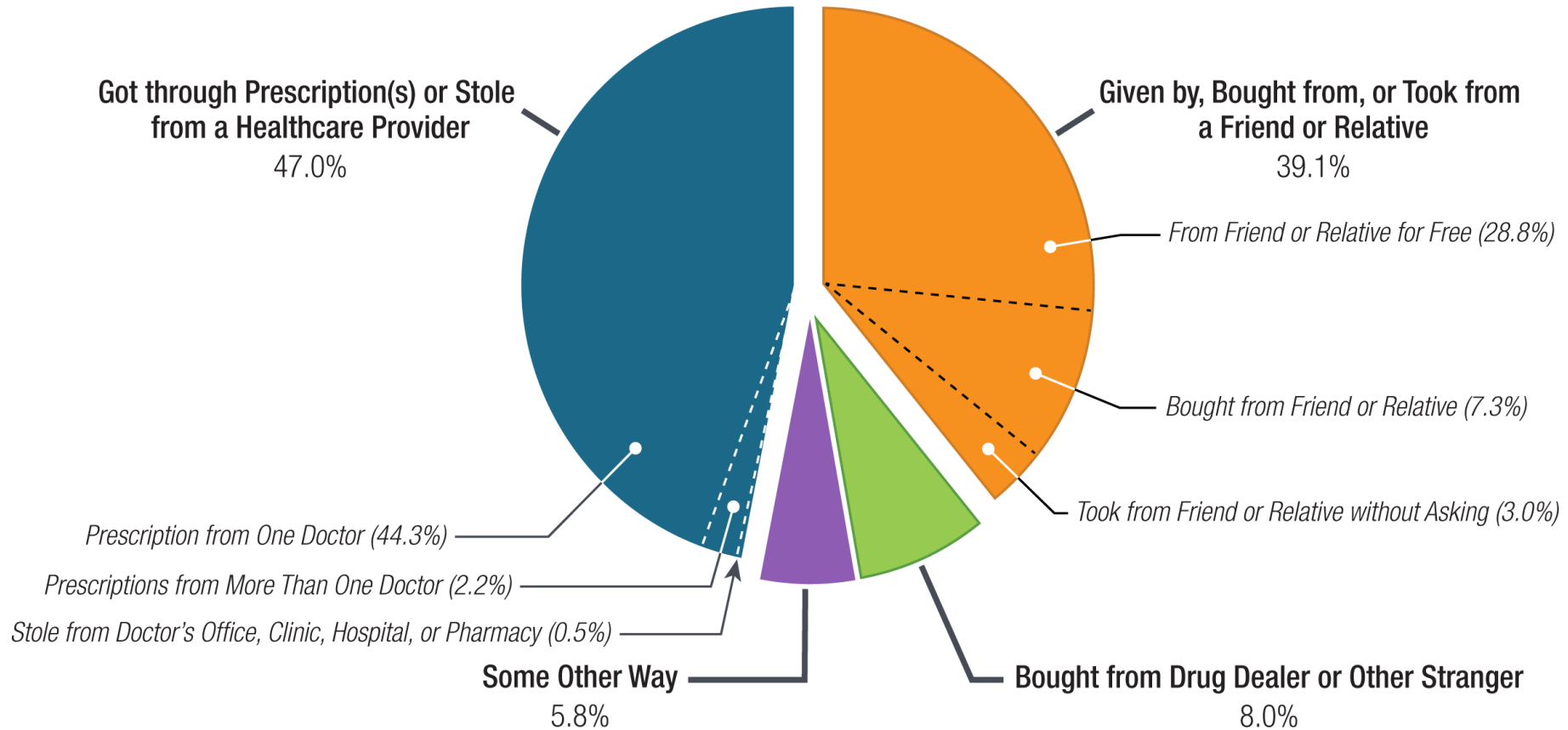
## 2023



## Past Year Prescription Pain Reliever Subtype Misuse: Among People Aged 12 or Older Who Misused Any Prescription Pain Reliever in the Past Year; 2023



# Prescription Sources, 2023



**8.6 Million People Aged 12 or Older Who Misused Prescription Pain Relievers in the Past Year**

Note: Respondents with unknown data for the Source for Most Recent Misuse or who reported Some Other Way but did not specify a valid way were excluded.

Note: The percentages may not add to 100 percent due to rounding.



# Internet Access

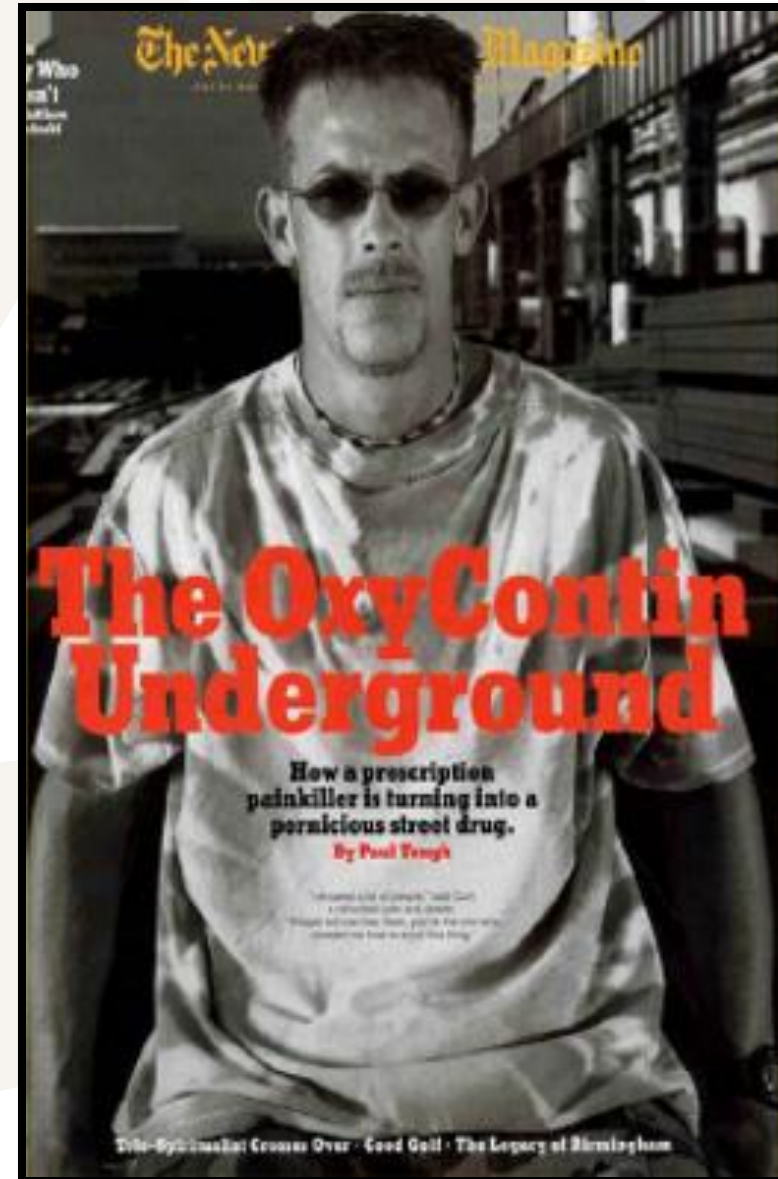
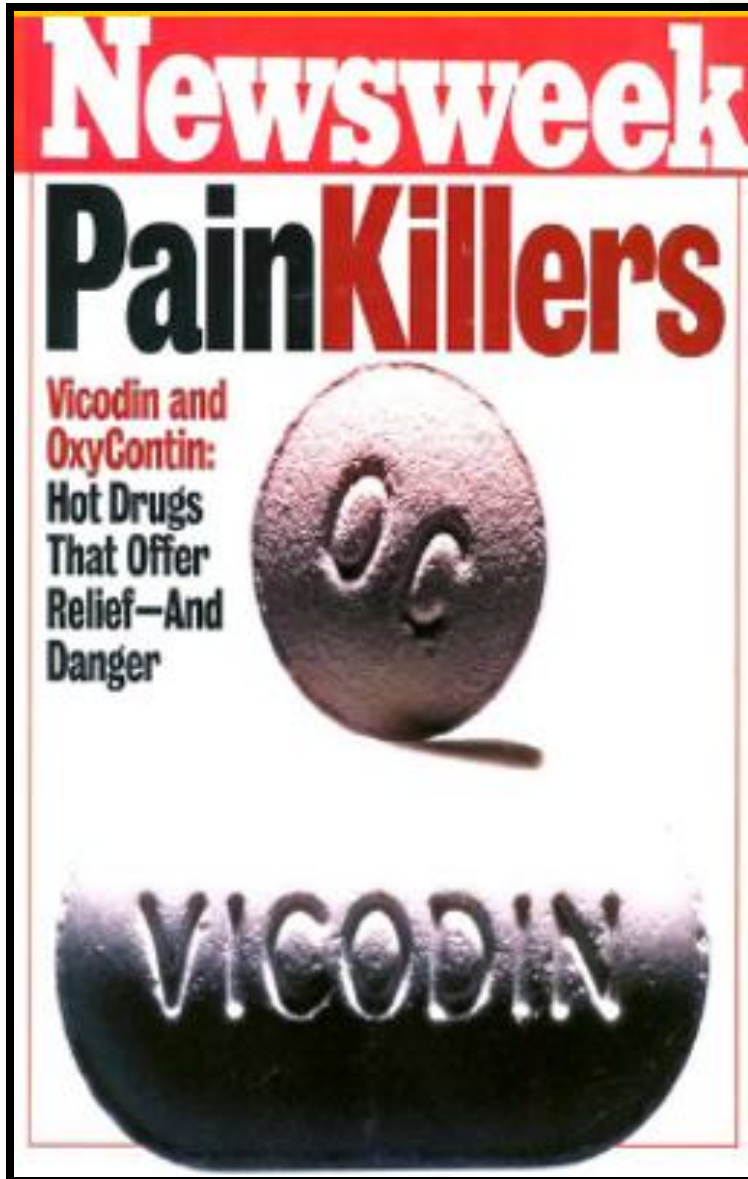


“Some reasons why you should consider using this pharmacy”

No prescription required!

Delivered in the privacy of your home!

# Prescription Drug Abuse





# Prescription Opioid Misuse

## Pathologist: Meds Killed Daniel Smith

The death of Anna Nicole Smith's 20-year-old son Daniel was caused by a lethal combination of *methadone*, Zoloft and Lexapro, pathologist Dr. Cyril Wecht has revealed to people.



## Terrel Owens Says He Didn't Attempt Suicide

Owens, who was hospitalized Tuesday night, said he'd had a bad reaction after mixing supplements with pain medication that he'd been taking for an injured hand. "I took some extra pills with my supplement," he said. He said he'd been taking the pain medication *hydrocodone*; as for the supplements: "The list is too long to tell you everything I take." Sept 06





# Opioid Manufacturer Purdue Pharma Pleads Guilty to Fraud and Kickback Conspiracies

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*Tuesday, November 24, 2020*

US Dept. of Justice



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25.

A Teen-Age Narcotic Tells Her Story

1945



# H IS FOR HEROIN

David Hulburd

Complete and unabridged

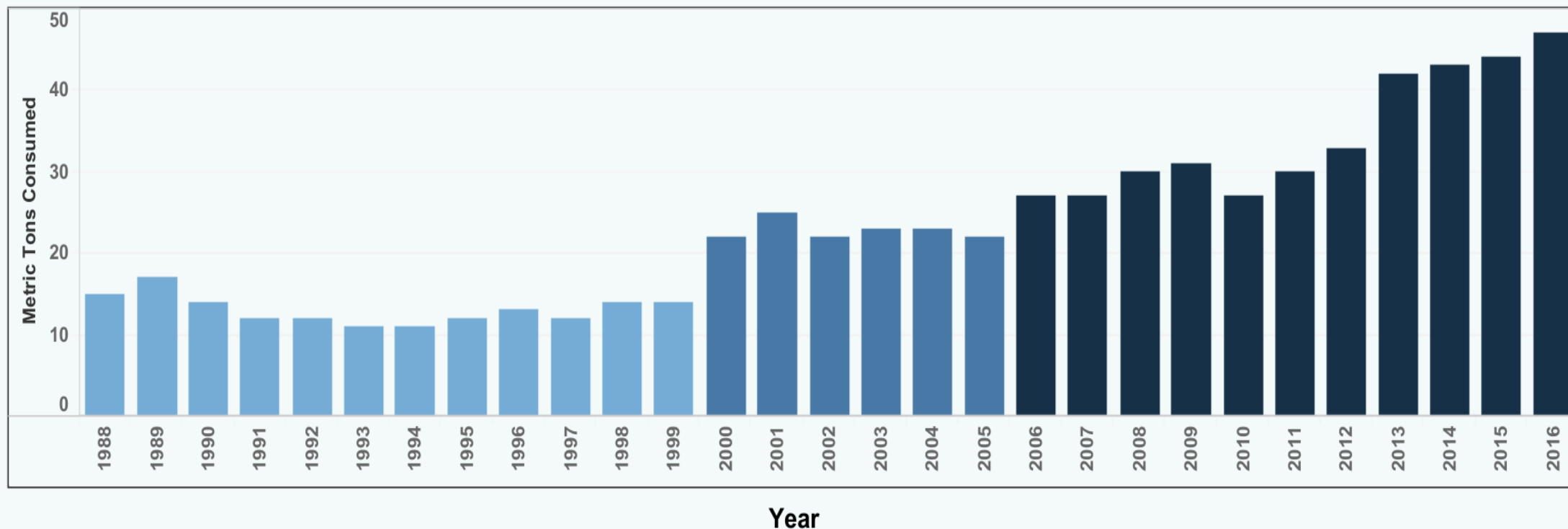
# Estimated Quantity of Drugs Consumed in the United States by Drug, 1988-2016

Heroin



Select Drug

Office of National Drug Policy Control (ONDPC)



2016	48
2015	44
2014	43
2013	42
2012	33
2011	30
2010	27
2009	31
2008	30
2007	27
2006	27
2005	22
2004	23
2003	15

Metric Tons Consumed

2002	25
2001	25
2000	22
1999	23
1998	23
1997	22
1996	22
1995	22
1994	11
1993	11
1992	12
1991	17
1990	14
1989	17
1988	15

Source: Office of National Drug Control Policy (ONDCP). What America's Users Spend On Illegal Drugs (WA



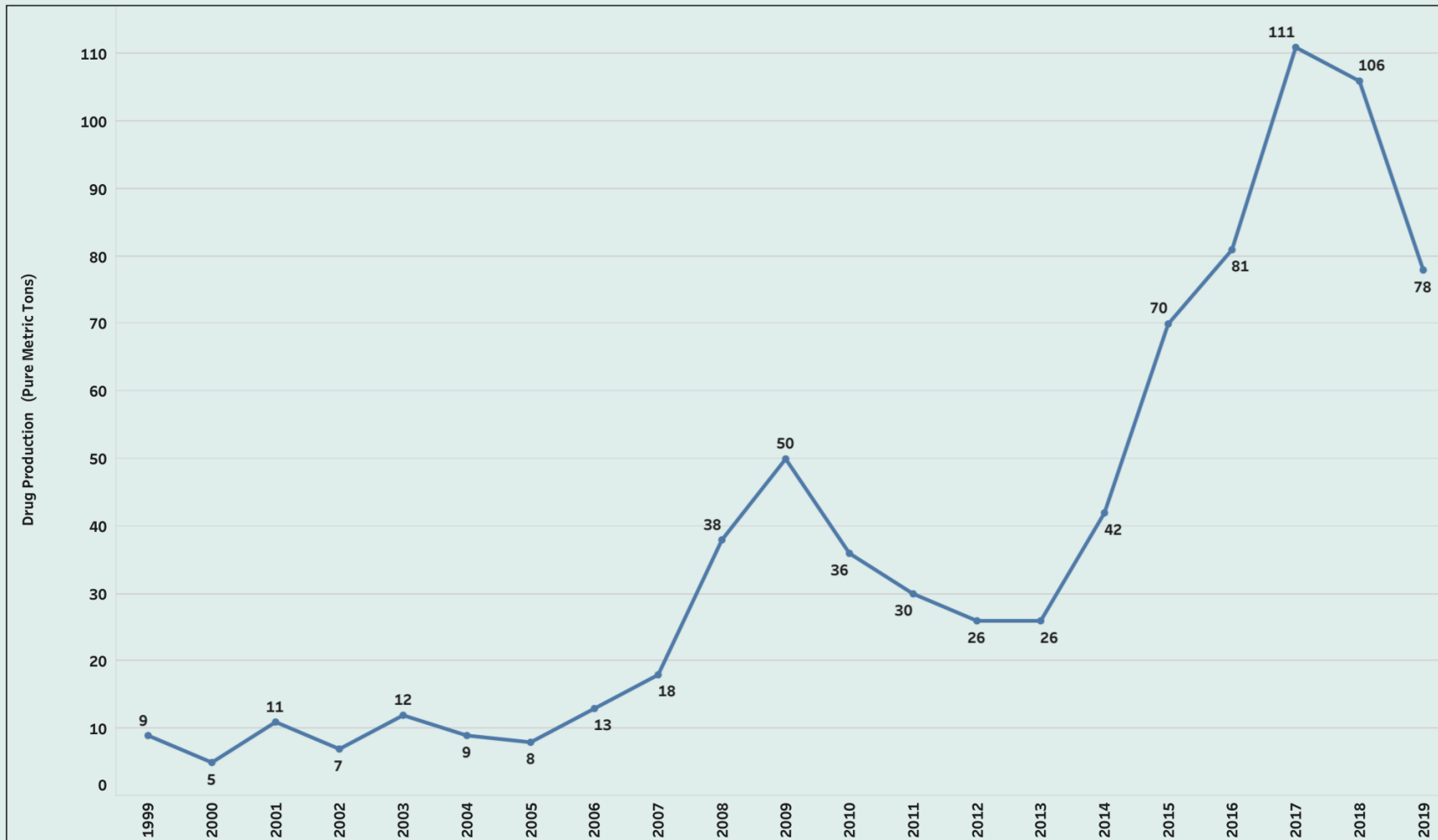




## Annual Production of Heroin in Mexico



Country	Drug
Mexico	Heroin



Heroin

Cocaine

Methamphetamine

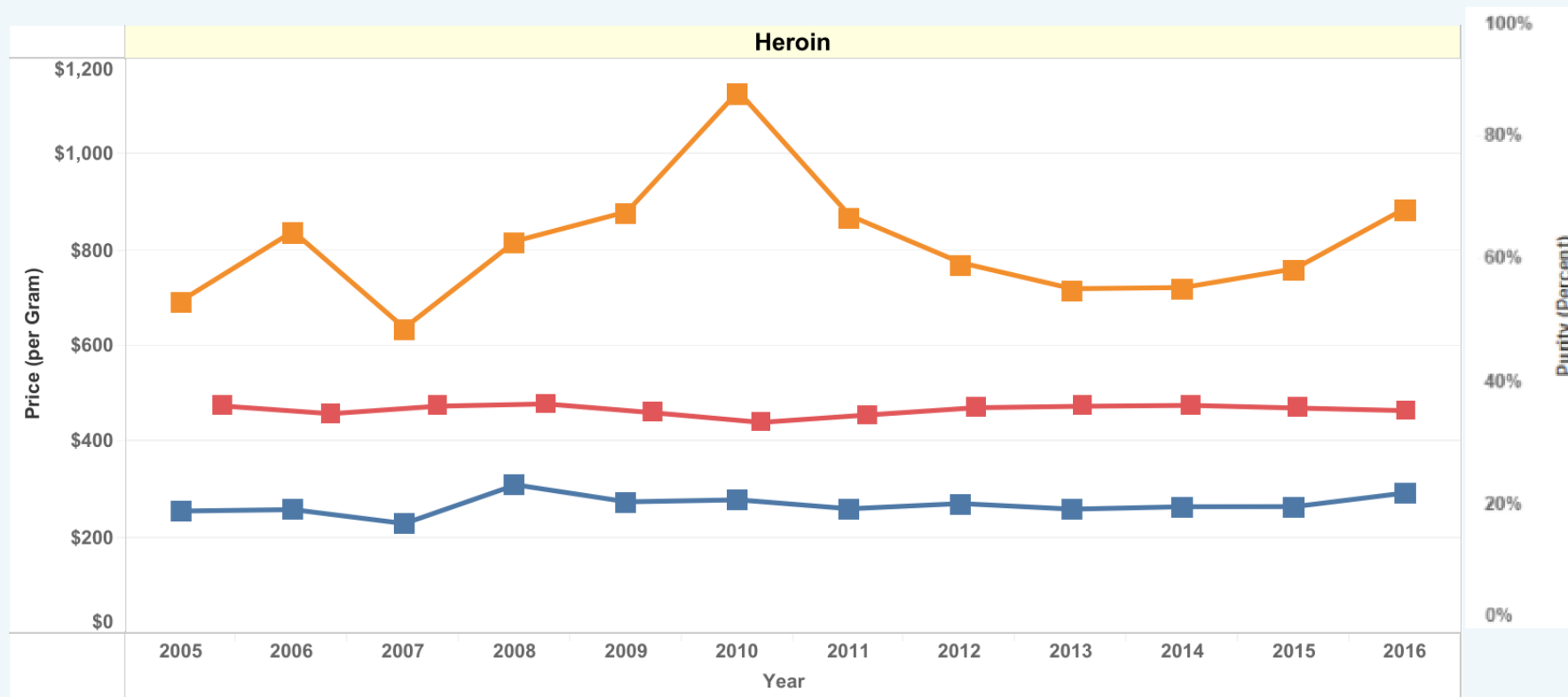


## Price and Purity of Heroin in the United States, 2005-2016



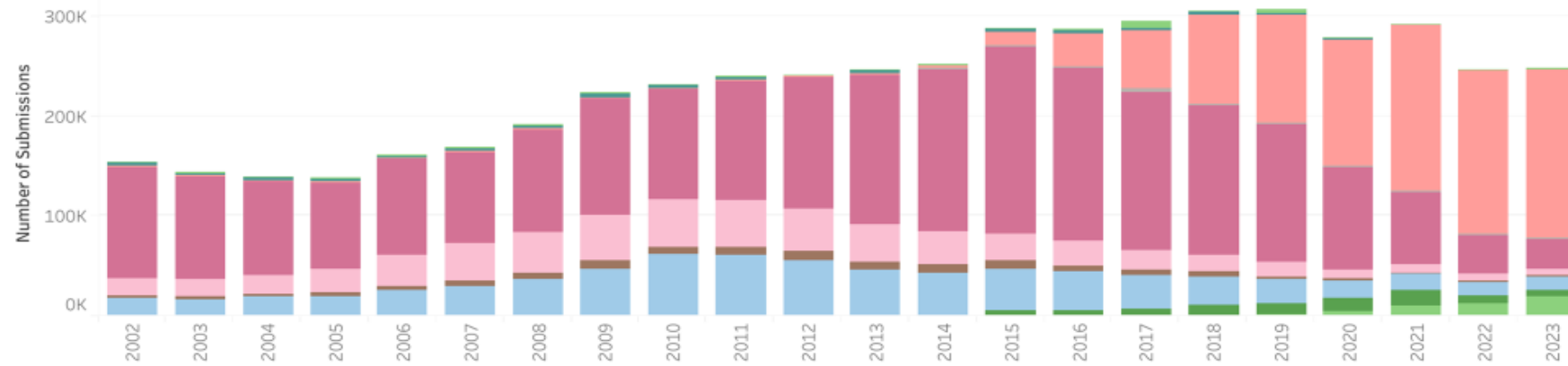
## Legend

Bulk Price Per Gram (\$) ■  
Price Per Pure Gram (\$ / Pure Gram) ■  
Purity of Drug (Percent) ■



Source: Drug Enforcement Administration (DEA).

# Number of Drug Seizure Submissions to the National Forensic Laboratory Information System by Drug, 2002-2023



Multiple values Drug

- Drug
- Carfentanil
- Codeine
- Fentanyl
- Furanyl Fentanyl
- Heroin
- Hydrocodone
- Morphine
- Oxycodone
- Tramadol
- Xylazine





# Rate of Opioid-Related Hospital Visits (per 100,000 population) in the United States by Age, 2005-2020

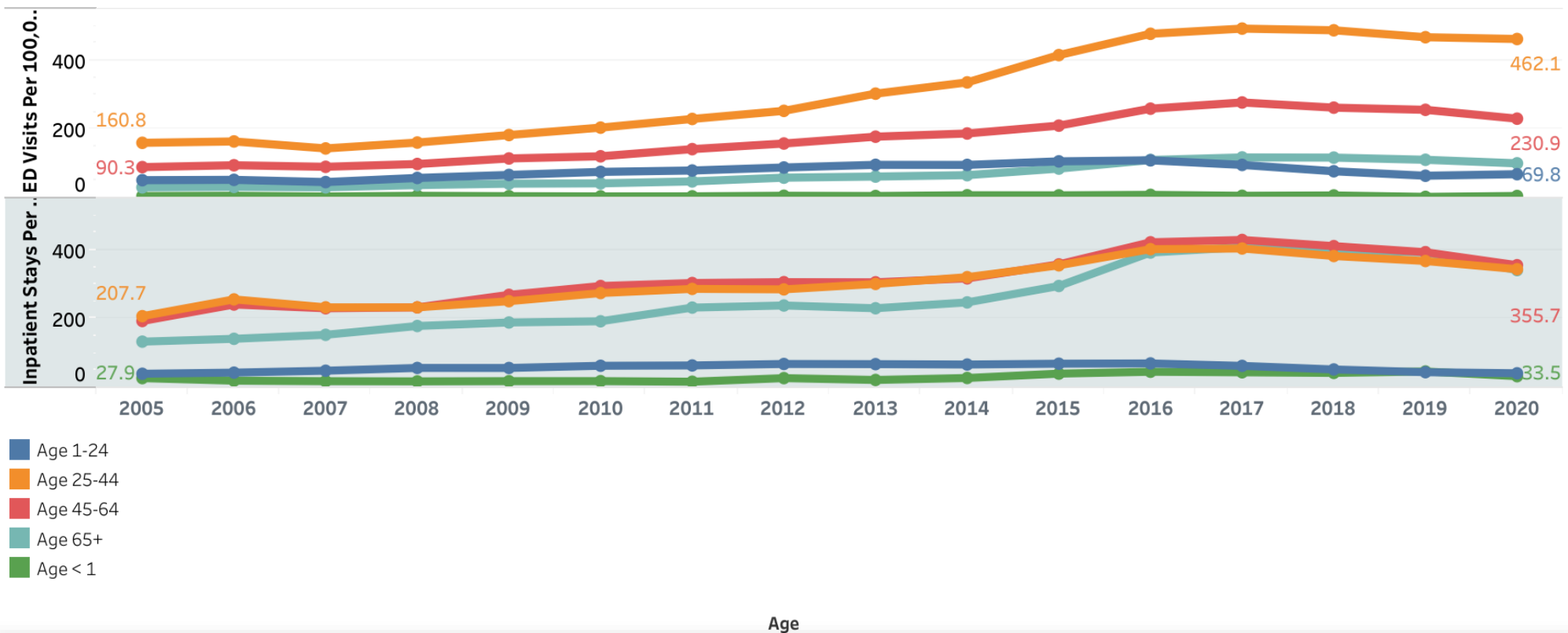


Age

Income Quartile

Rural-Urban Location

Sex



## Inpatient Stays

Source: Agency for Healthcare Research and Quality (AHRQ). Healthcare Cost and Utilization Project (HCUP), Nationwide Emergency Department Sample (NEDS).





## Number of Drug Induced Deaths in the United States by Sex, 1979-2022



Females



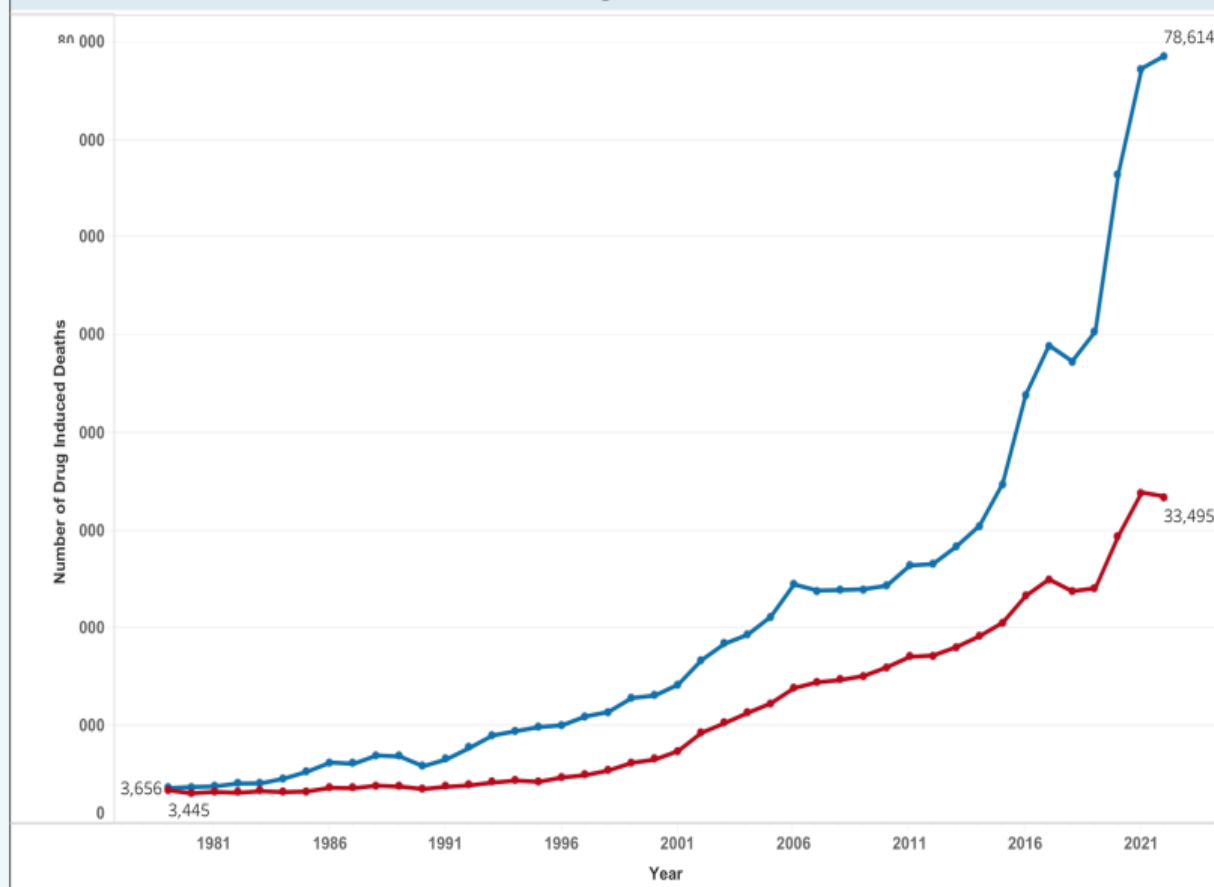
Males



Metric

- ☐ Age Adjusted Drug-Induced Death Rate (per 100,000 population)  
☒ Number of Drug Induced Deaths

### Number of Drug Induced Deaths



	Number of Drug Induced Deaths	
	Drug induced female deaths	Drug induced male deaths
2022	33,495	78,614
2021	33,910	77,309
2020	29,489	66,607
2019	24,118	50,393
2018	23,809	47,338
2017	25,023	48,967
2016	23,334	43,931
2015	20,588	34,815
2014	19,204	30,510
2013	18,090	28,381
2012	17,225	26,594
2011	17,100	26,444
2010	16,017	24,376
2009	15,132	24,015
2008	14,721	23,928
2007	14,488	23,883
2006	13,889	24,507
2005	12,333	21,208
2004	11,349	19,362
2003	10,297	18,426
2002	9,306	16,734
2001	7,452	14,253
2000	6,583	13,137
1999	6,243	12,885
1998	5,464	11,462
1997	4,982	10,991
1996	4,750	10,093
1995	4,309	9,909
1994	4,432	9,491

Source: Centers for Disease Control and Prevention (CDC). Wide-Ranging Online Data for Epidemiologic Research (WONDER).



## Age Adjusted Drug-Induced Death Rate (per 100,000 population) in the United States by Race, 1979-2022



Blacks

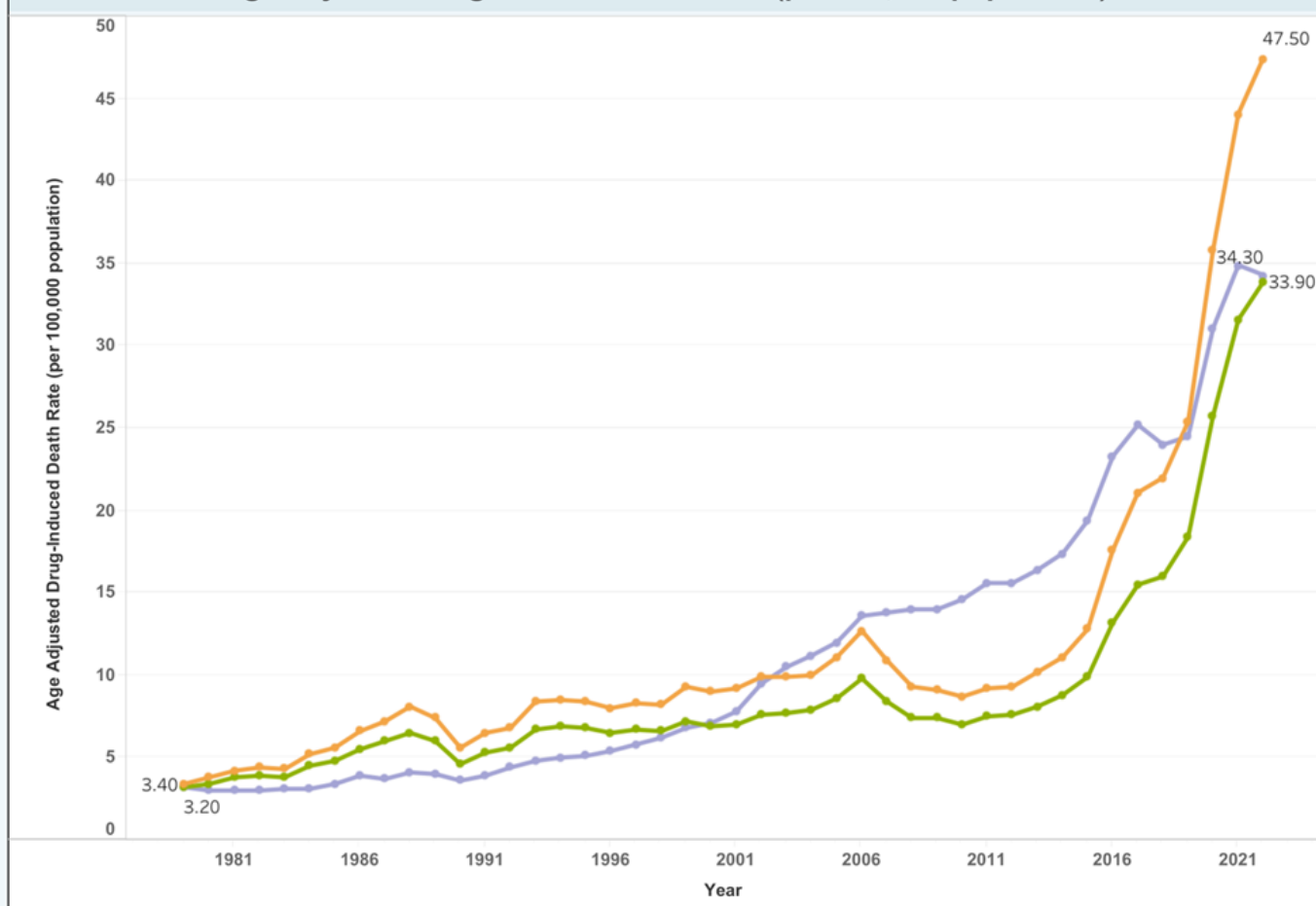
Non-whites

Whites

### Metric

- ☒ Age Adjusted Drug-Induced Death Rate (per 100,000 population)
- ☐ Number of Drug Induced Deaths

### Age Adjusted Drug-Induced Death Rate (per 100,000 population)

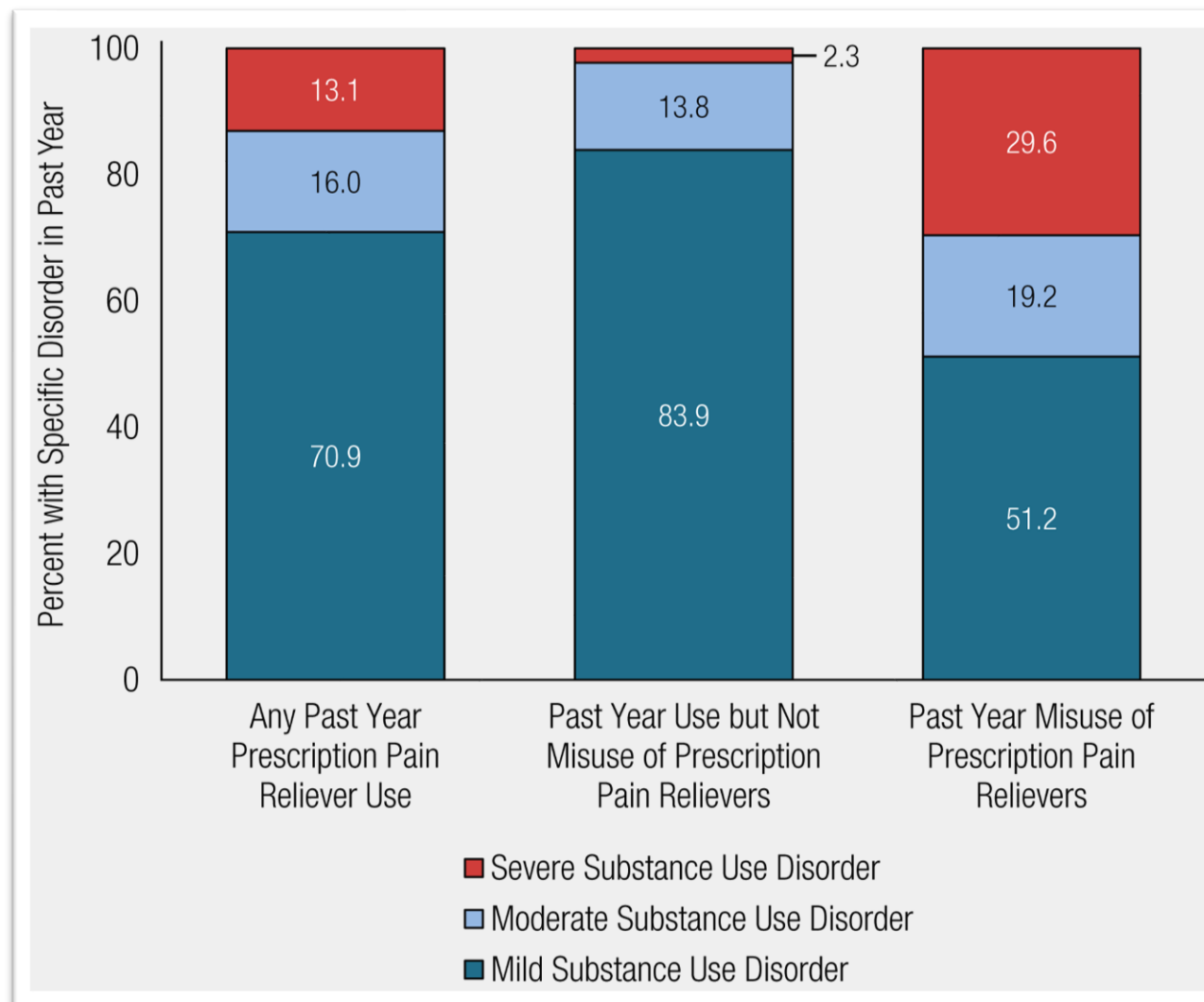


	Age Adjusted Drug-Induced Death Rate (per 100,000 population)		
	Drug induced Black deaths	Drug induced Non-white deaths	Drug induced White deaths
2022	47.50	33.90	34.30
2021	44.10	31.60	34.90
2020	35.90	25.80	31.10
2019	25.40	18.40	24.50
2018	22.00	16.00	24.00
2017	21.10	15.50	25.20
2016	17.60	13.20	23.30
2015	12.80	9.90	19.40
2014	11.10	8.80	17.40
2013	10.20	8.10	16.40
2012	9.30	7.60	15.60
2011	9.20	7.50	15.60
2010	8.70	7.00	14.60
2009	9.10	7.40	14.00
2008	9.30	7.40	14.00
2007	10.90	8.40	13.80
2006	12.70	9.80	13.60
2005	11.10	8.60	12.00
2004	10.00	7.90	11.20
2003	9.90	7.70	10.50
2002	9.90	7.60	9.50
2001	9.20	7.00	7.80
2000	9.00	6.90	7.10
1999	9.30	7.20	6.80
1998	8.20	6.60	6.20
1997	8.30	6.70	5.80
1996	8.00	6.50	5.40
1995	8.40	6.80	5.10
1994	8.50	6.00	5.00



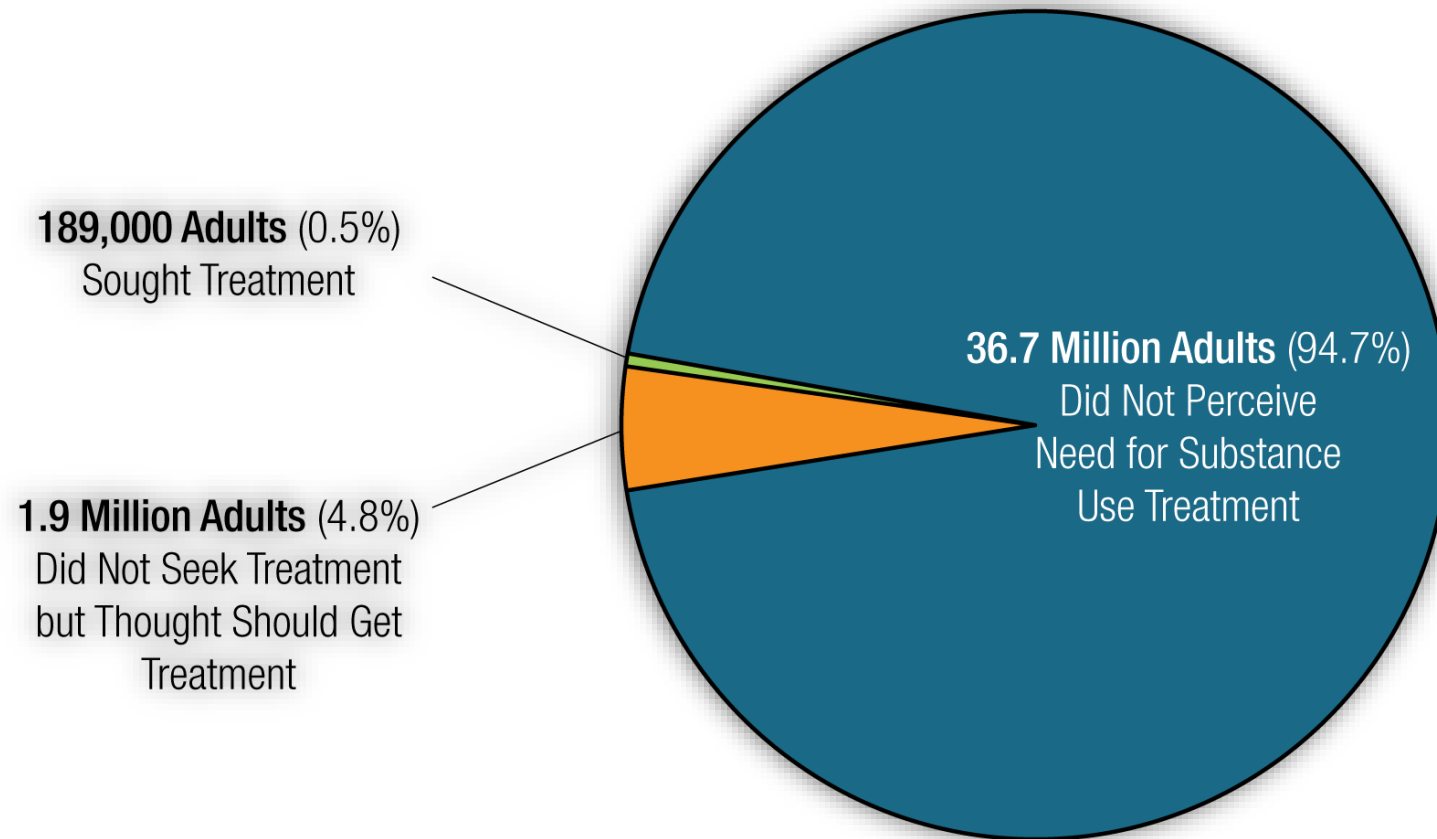


# Severity of OUDs, 2023



Note: As shown in Table 1, the number of criteria for prescription pain reliever use disorder differed for people who misused prescription pain relievers in the past year or who used but did not misuse them. Regardless of the total number of criteria used for classifying people as having a prescription pain reliever use disorder, people who meet two or three criteria are considered to have a "mild" disorder, those who meet four or five criteria are considered to have a "moderate" disorder, and those who meet six or more criteria are considered to have a "severe" disorder.

# Treatment for SUD



**39.6 Million Adults with a Substance Use Disorder Who Did Not Receive Substance Use Treatment**

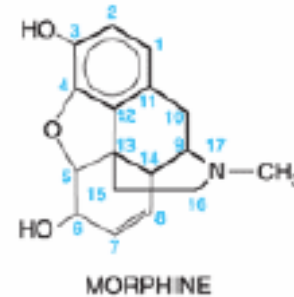
Note: Adults with unknown information for perceptions of need for substance use treatment were excluded.

**So, what is an opioid?**

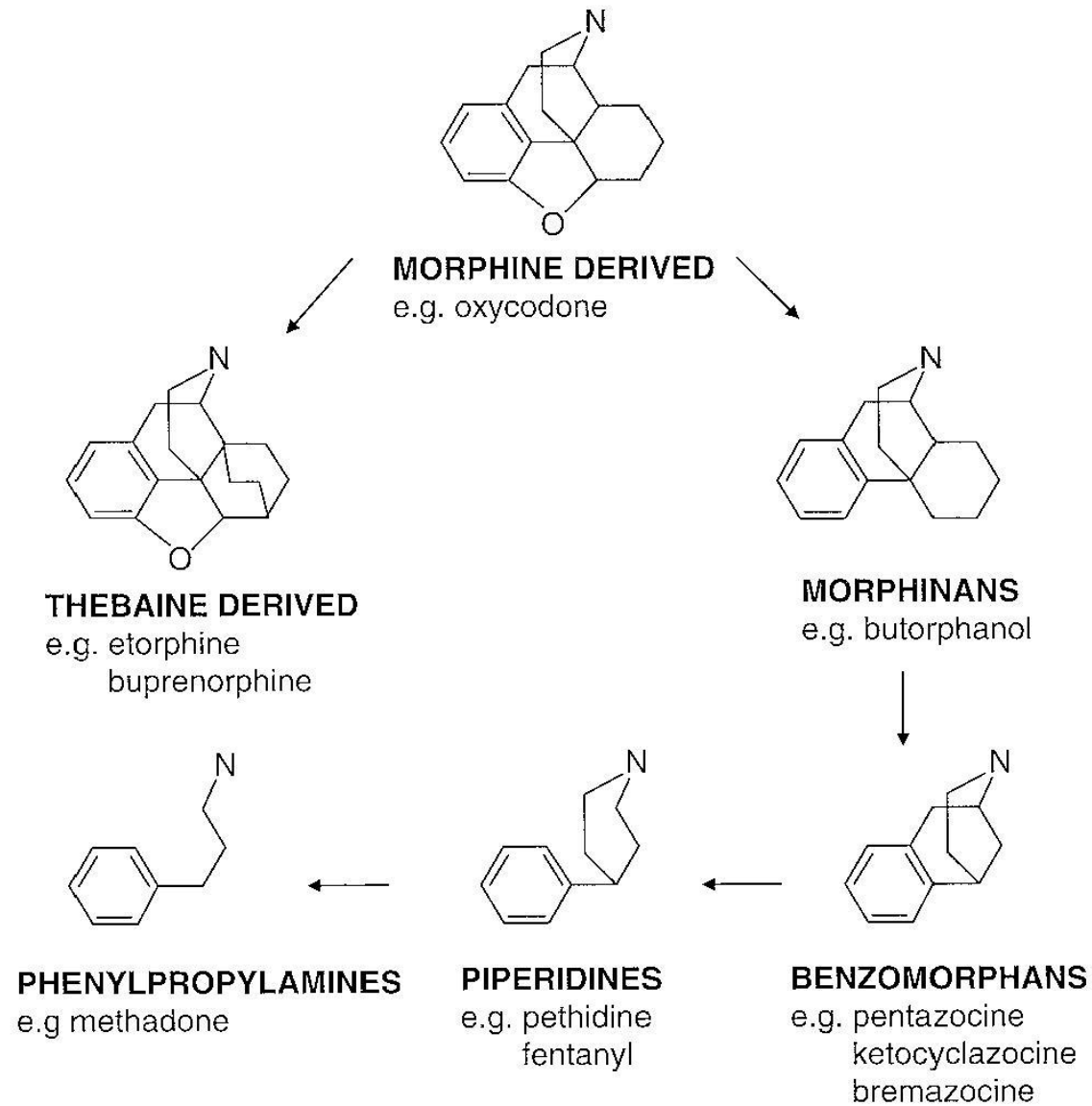




# Structures of Opioids and Opioid Antagonists Chemically Related to Morphine



NONPROPRIETARY NAME	CHEMICAL RADICALS AND POSITION*			OTHER CHANGES†
	3	6	17	
Morphine	—OH	—OH	—CH <sub>3</sub>	—
Heroin	—OCOCH <sub>3</sub>	—OCOCH <sub>3</sub>	—CH <sub>3</sub>	—
Hydromorphone	—OH	=O	—CH <sub>3</sub>	(1)
Oxymorphone	—OH	=O	—CH <sub>3</sub>	(1), (2)
Levorphanol	—OH	—H	—CH <sub>3</sub>	(1), (3)
Levallorphan	—OH	—H	—CH <sub>2</sub> CH=CH <sub>2</sub>	(1), (3)
Codeine	—OCH <sub>3</sub>	—OH	—CH <sub>3</sub>	—
Hydrocodone	—OCH <sub>3</sub>	=O	—CH <sub>3</sub>	(1)
Oxycodone	—OCH <sub>3</sub>	=O	—CH <sub>3</sub>	(1), (2)
Nalmefene	—OH	=CH <sub>2</sub>	—CH <sub>2</sub> —	(1), (2)
Nalorphine	—OH	—OH	—CH <sub>2</sub> CH=CH <sub>2</sub>	—
Naloxone	—OH	=O	—CH <sub>2</sub> CH=CH <sub>2</sub>	(1), (2)
Naltrexone	—OH	=O	—CH <sub>2</sub> —	(1), (2)
Buprenorphine	—OH	—OCH <sub>3</sub>	—CH <sub>2</sub> —	(1), (4)
Butorphanol	—OH	—H	—CH <sub>2</sub> —	(1), (2), (3)
Nalbuphine	—OH	—OH	—CH <sub>2</sub> —	(1), (2)



Chemical template of morphine-related drugs illustrating the progressive simplification of the structure.

# Opioid Receptors

➤ Mu<sub>1,2,3</sub> ( $\mu$ )

➤ Zeta ( $\zeta$ )

➤ Kappa ( $\kappa_{1,2,3}$ )

➤ Delta ( $\delta_{1,2}$ )

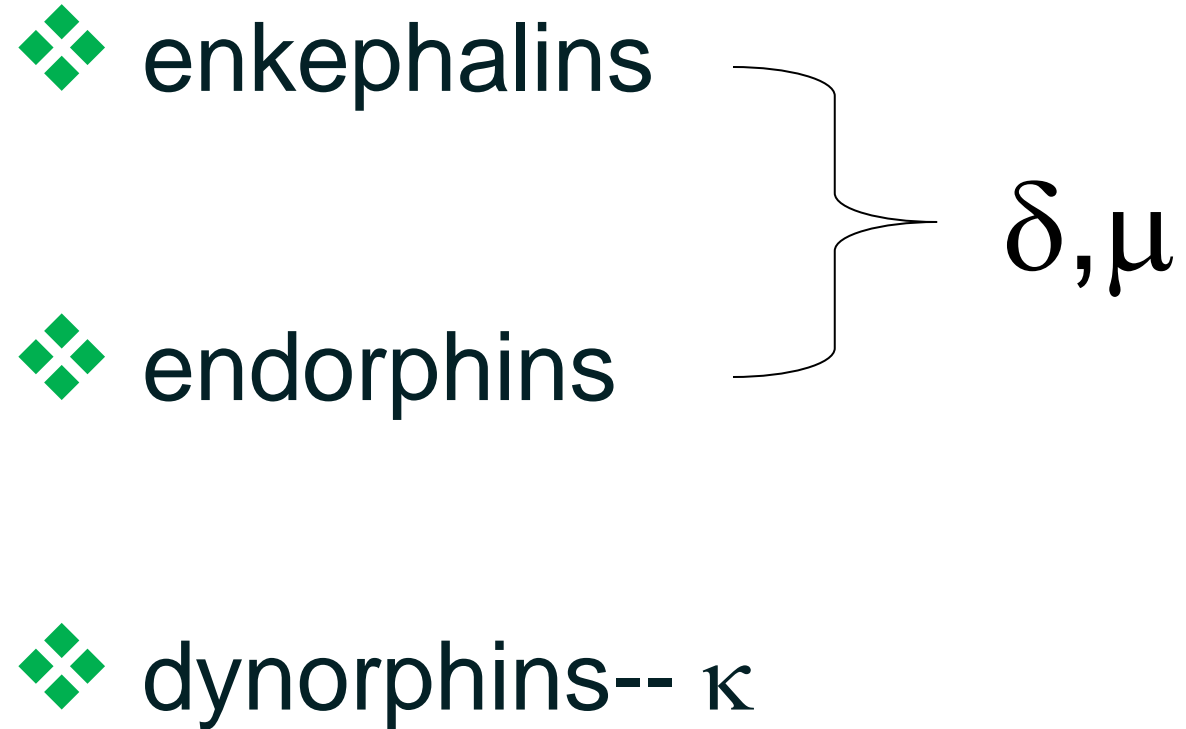


# Opioid Receptors

- Mu<sub>1</sub> ( $\mu_1$ )      analgesia, euphoria
- Mu<sub>2</sub> ( $\mu_2$ )      constipation, respiratory depression
- Kappa ( $\kappa_{1,2,3}$ )      spinal analgesia, dysphoria
- Delta ( $\delta$ )      euphoria



# Opioid Receptors



# Opioids/Receptor Classes

Drug	$\mu$	$\delta$	$\kappa$
Morphine	+++		+
Methadone	+++		
Fentanyl	+++		
Buprenorphine	P		--
Butorphanol	P		+++
Pentazocine	P		++
Nalorphine	---		+
B-Endorphin	+++	+++	
Dynorphin A	++		+++
Enkephalin	++	+++	
Naltrexone/Naloxone	---	-	---

**P=partial**

**Goodman & Gilman's Pharmacology**

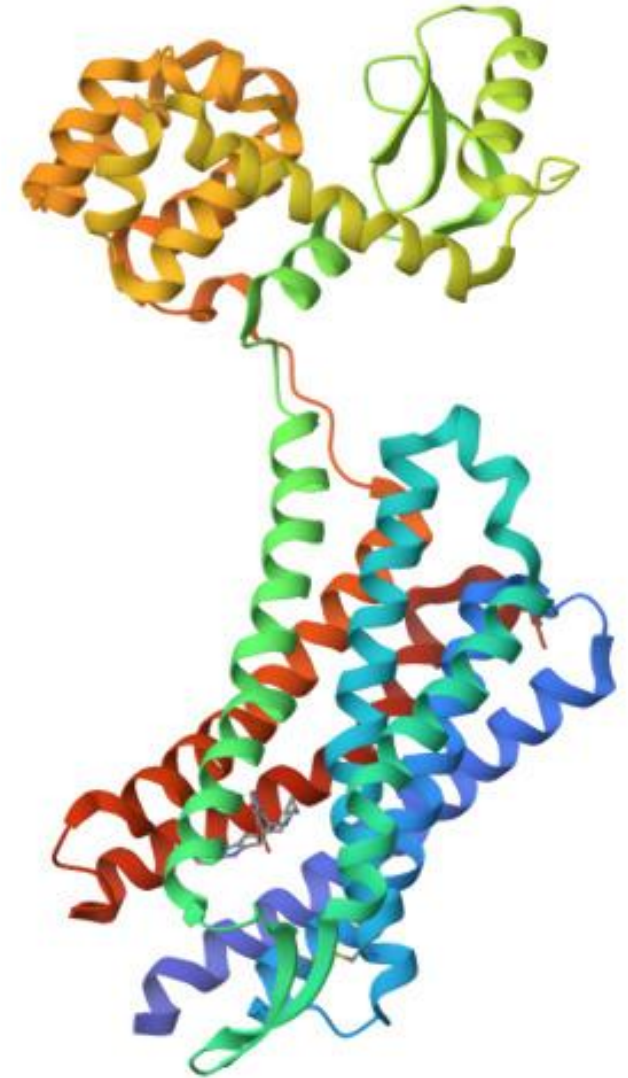




# Functions of Drugs at *mu* Receptor

## Full agonists:

- Occupy the receptor and activate that receptor
- Increasing doses of the drug produce increasing receptor-specific effects until a maximum or toxic effect is achieved
- Most abused opioids are full agonists



# Drugs and medications that activate *mu* receptors as full agonists.

---

codeine

heroin

meperidine

loperamide

hydromorphone

methadone

fentanyl

hydrocodone

oxycodone

propoxyphene

LAAM

tapentadol

sufentanyl

morphine

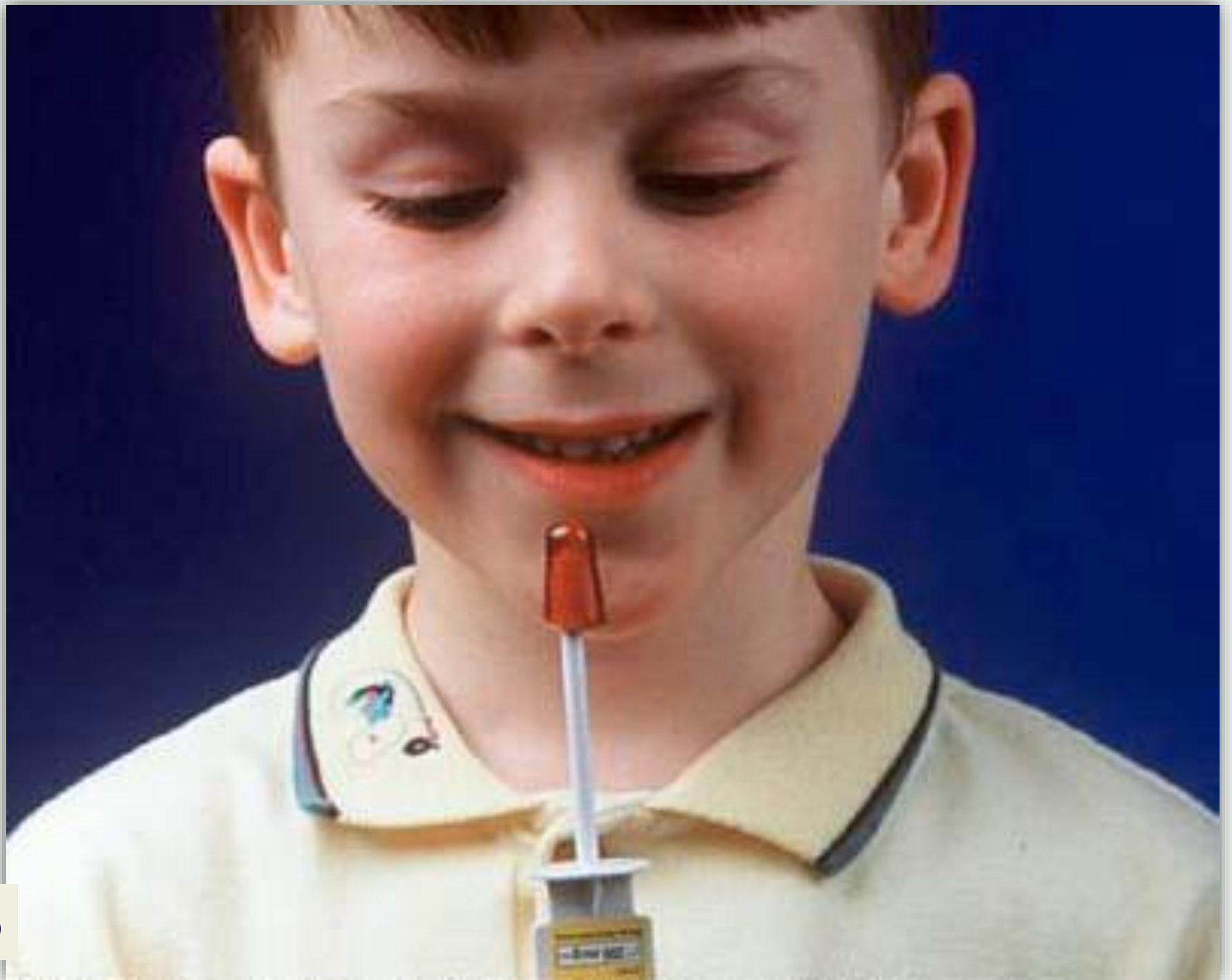
oxymorphone

Paragoric

diphenoxylate

levorphanol





**Fentanyl Lollipop**



Now  
available

New *FENTORA*—relief for  
breakthrough pain in opioid  
tolerant patients with cancer

- Onset of pain relief within 15 minutes in some patients (first time point measured)\*<sup>1</sup>
- Duration of pain relief up to 60 minutes (last time point measured)<sup>1</sup>
- OraVescent® drug delivery technology may optimize delivery of fentanyl across the buccal mucosa<sup>1</sup>
- Fentanyl is readily absorbed, achieving an absolute bioavailability of 65%<sup>1</sup>
- Convenient, discreet, sugar-free tablet

New  
**FENTORA**<sup>™</sup>  
fentanyl buccal tablet @

\*For patients with unrelieved pain, redosing may occur 30 minutes after the start of administration with *FENTORA* and the same dosage strength should be used.

Serious adverse events associated with all opioids are respiratory depression (potentially leading to apnea or respiratory arrest), circulatory depression, hypotension, and shock. All patients should be followed for symptoms of respiratory depression.

The most commonly observed events seen with *FENTORA* are typical of opioid side effects. Opioid side effects should be expected and managed accordingly. In clinical trials of *FENTORA* the most common (≥10%) adverse events observed were nausea, vomiting, application site abnormalities, fatigue, anemia, dizziness, constipation, edema, asthenia, dehydration, and headache. Most side effects were mild to moderate in severity. No attempt was made to correct for concomitant use of around-the-clock opioids or cancer-related symptoms.

PHYSICIANS AND OTHER HEALTHCARE PROVIDERS MUST BECOME FAMILIAR WITH THE IMPORTANT WARNINGS IN THIS LABEL.

*FENTORA* contains fentanyl, an opioid agonist and a Schedule II controlled substance, with an abuse liability similar to other opioid analgesics. *FENTORA* can be abused in a manner similar to other opioid agonists, legal or illicit. This should be considered when prescribing or dispensing *FENTORA* in situations where the physician or pharmacist is concerned about an increased risk of misuse, abuse or diversion. Schedule II opioid substances which include morphine, oxycodone, hydromorphone, oxymorphone, and methadone have the highest potential for abuse and risk of fatal overdose due to respiratory depression.

*FENTORA* is indicated for the management of breakthrough pain in patients with cancer who are already receiving and who are tolerant to opioid therapy for their underlying persistent cancer pain. Patients considered opioid tolerant are those who are taking at least 60 mg of oral morphine/day, at least 25 mcg of transdermal fentanyl/hour, at least 30 mg of oxycodone daily, at least 8 mg of oral hydromorphone daily or an equianalgesic dose of another opioid for a week or longer.

Because life-threatening respiratory depression could occur at any dose in opioid non-tolerant patients, *FENTORA* is contraindicated in the management of acute or postoperative pain. This product is not indicated for use in opioid non-tolerant patients.

Patients and their caregivers must be instructed that *FENTORA* contains a medicine in an amount which can be fatal to a child. Patients and their caregivers must be instructed to keep all tablets out of the reach of children. (See Information for Patients and Their Caregivers for disposal instructions.)

Due to the higher bioavailability of fentanyl in *FENTORA*, when converting patients from other oral fentanyl products, including oral transmucosal fentanyl citrate (OTFC and Actiq®), to *FENTORA*, do not substitute *FENTORA* on a mcg per mcg basis. Adjust doses as appropriate. (See DOSAGE AND ADMINISTRATION.)

*FENTORA* is intended to be used only in the care of opioid tolerant cancer patients and only by healthcare professionals who are knowledgeable of and skilled in the use of Schedule II opioids to treat cancer pain.

For more information about *FENTORA*, please call Cephalon Professional Services and Medical Information at 1-800-896-5855 or visit [www.FENTORA.com](http://www.FENTORA.com)

Please see boxed warning and brief summary of prescribing information on adjacent page.

Reference: 1. *FENTORA* [package insert]. Frazer, Pa: Cephalon, Inc.; 2006.



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Introducing the first new molecule in analgesia in over 25 years for the relief  
of moderate to severe acute pain in patients 18 years of age or older



NUCYNTA™  
tapentadol

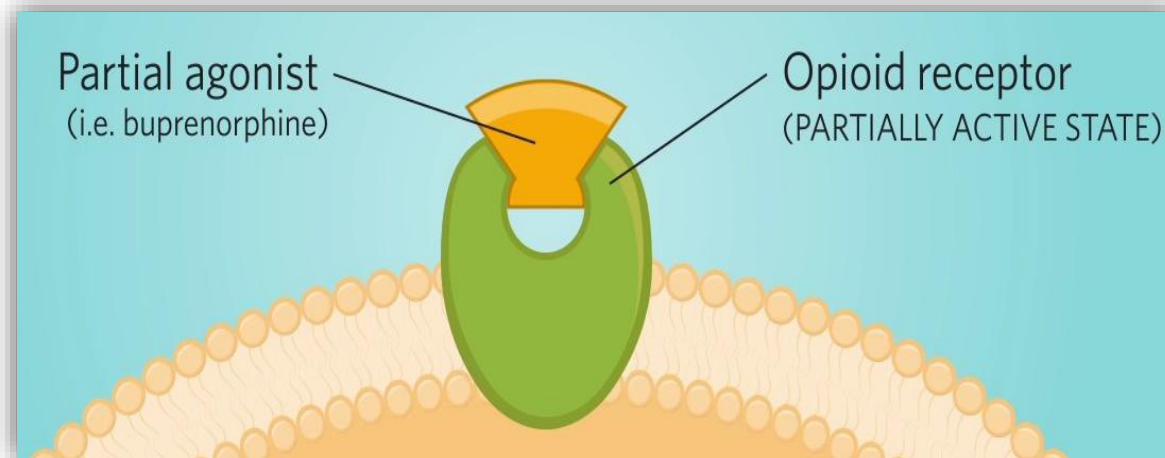
# Functions of Drugs at mu Receptor

## Partial agonists:

- Bind to and activate receptor
- Increasing dose does not produce as great an effect as does increasing the dose of a full agonist (less of a maximal effect is possible)

## Examples:

- Examples of partial agonists are:
  - buprenorphine (Buprenex, Suboxone, Subutex),
  - butorphanol (Stadol)
  - pentazocine (Talwin)
  - nalbuphine (Nubain)



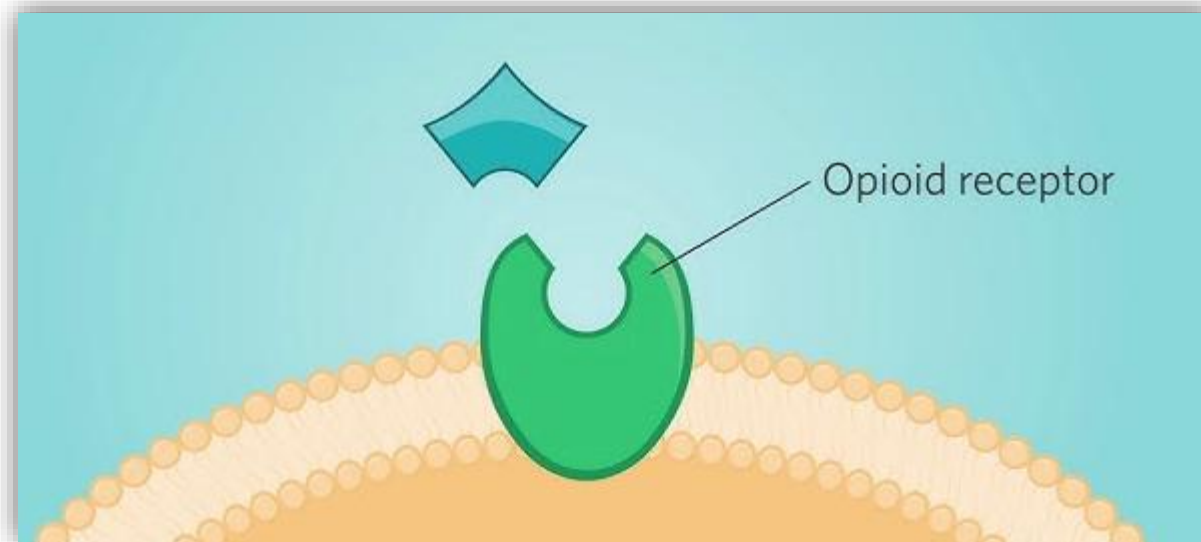
# Functions of Drugs at mu Receptor

## Antagonists:

- Bind to receptors but do **not** activate the receptor
- Block the receptor from activation by full and partial agonists

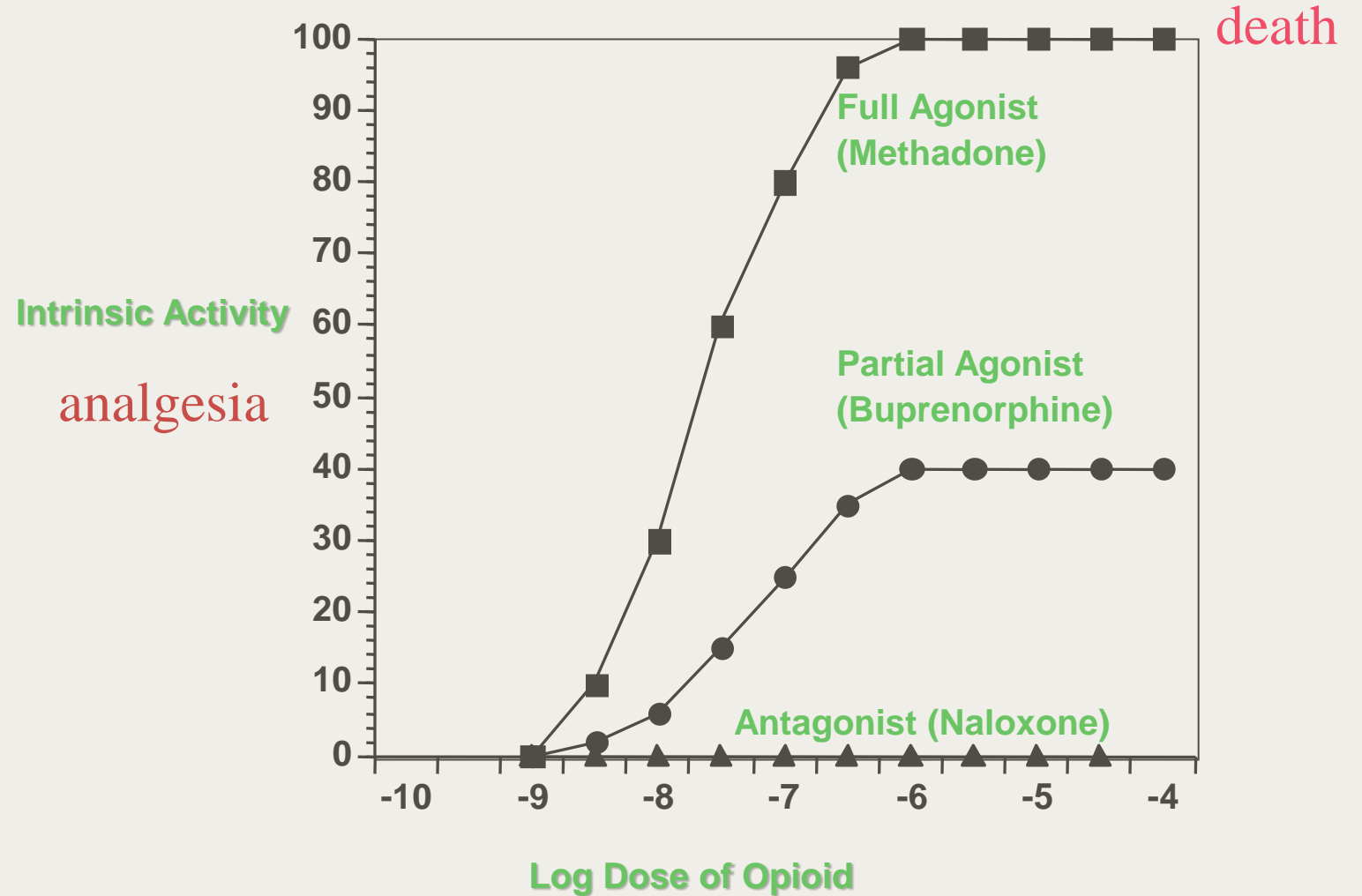
## Examples:

- Examples of opioid antagonists are:
  - Naloxone (Narcan),
  - Nalmefene (Revex),
  - Naltrexone ( ReVia, Trexan)



# Intrinsic Activity

- Full Agonist (Methadone)
- Partial Agonist (Buprenorphine)
- Antagonist (Naloxone)





**So, how do these  
opioids work?**



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



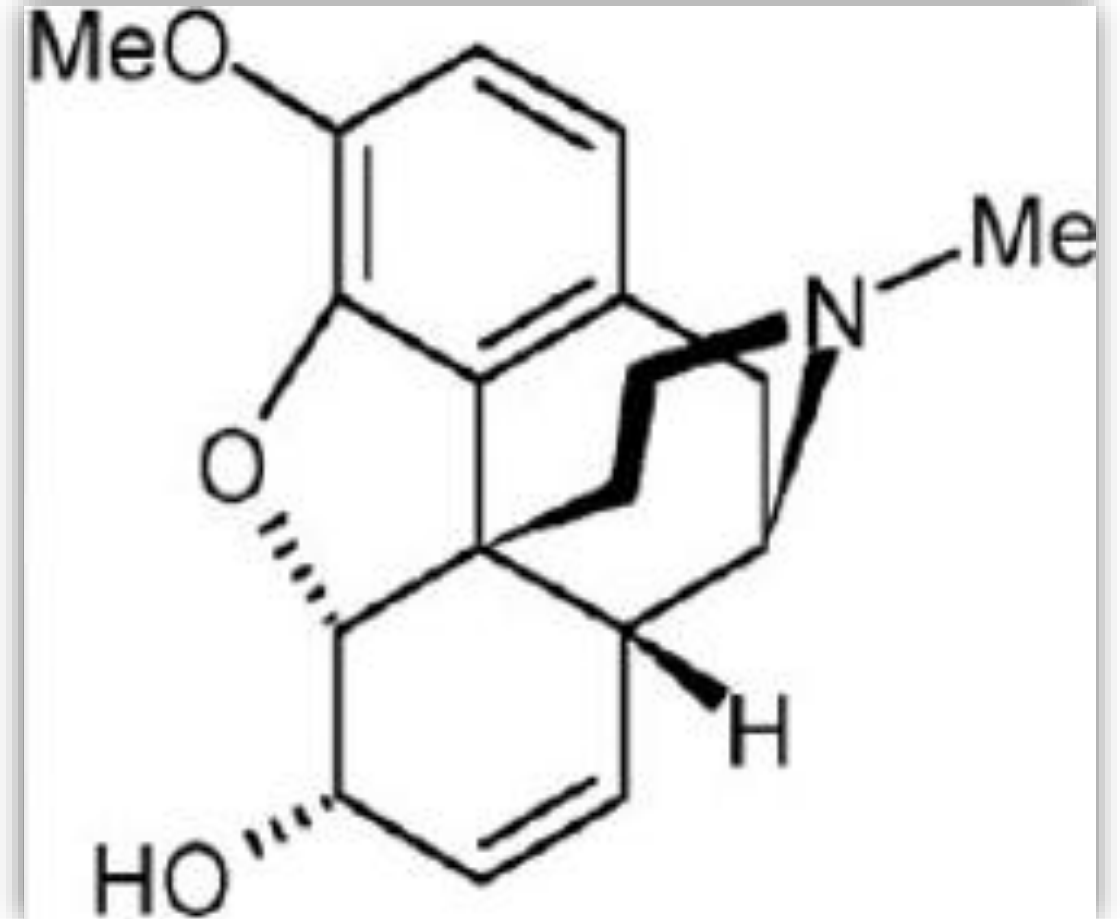
# Addict Quote

*“The first opiate I ever took was codeine... It made me feel right for the first time in my life... I never felt right from as far back as I can remember, and I was always trying different ways to change how I felt. I used lots of drugs, but none of them really did it for me. Codeine was a revelation, and I’ve been an opiate addict ever since... Opiates have caused me lots of trouble, but what they do for my head is worth it...”*

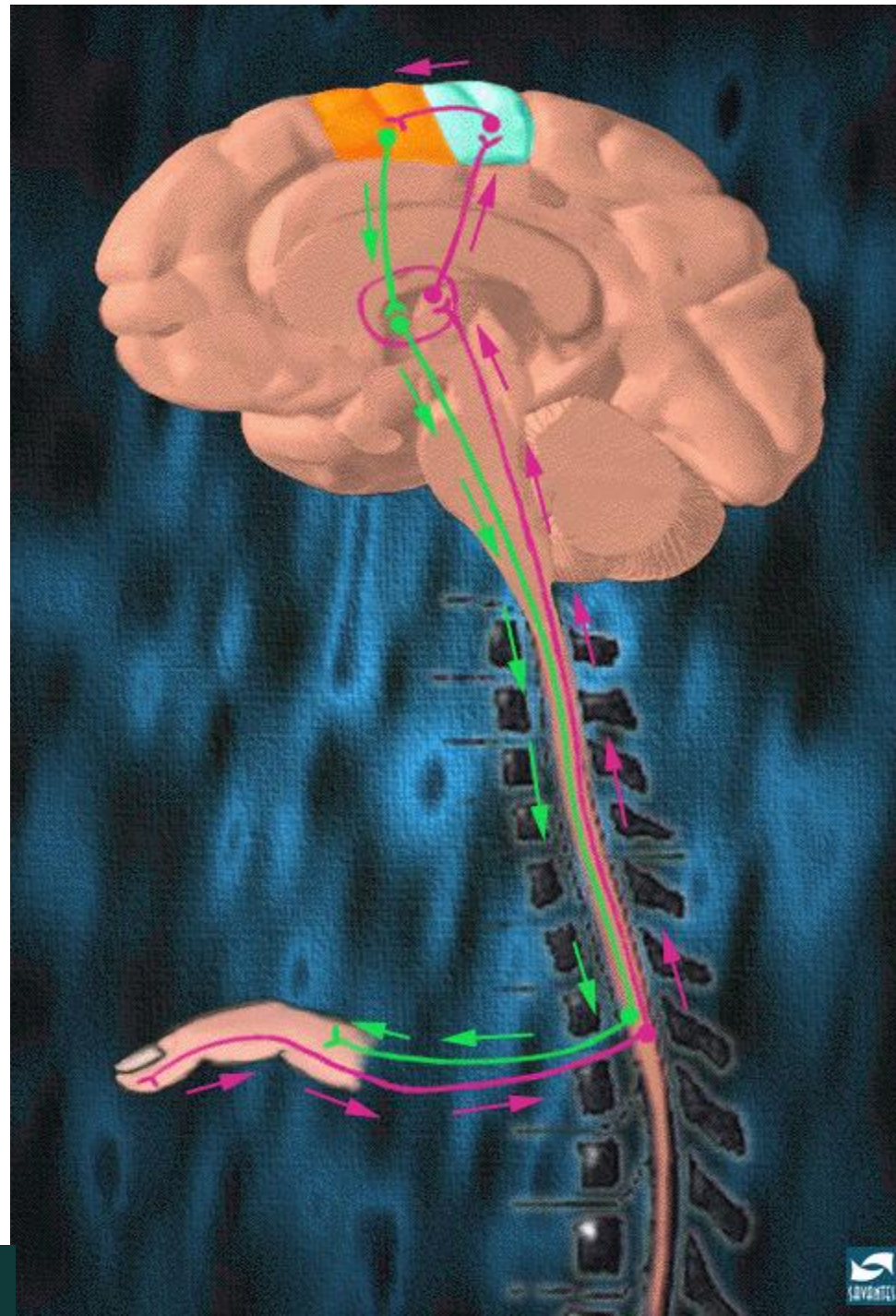
Thirty-four-year-old woman quoted in:

*From Chocolate to Morphine* (1993)

By: Andrew Weil and Winifred Rosen

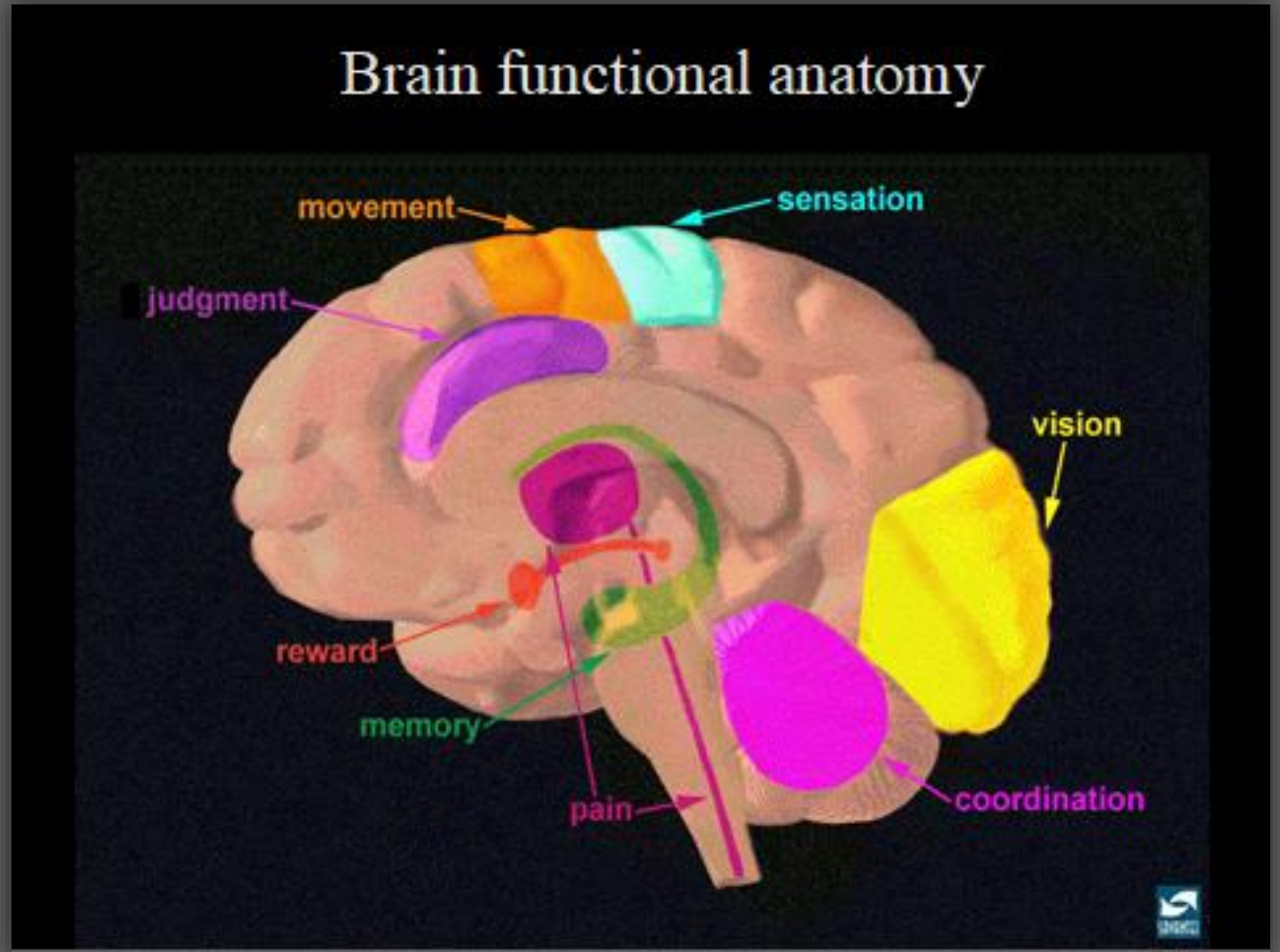


## Peripheral pain sensation via the spino-thalamic tracts

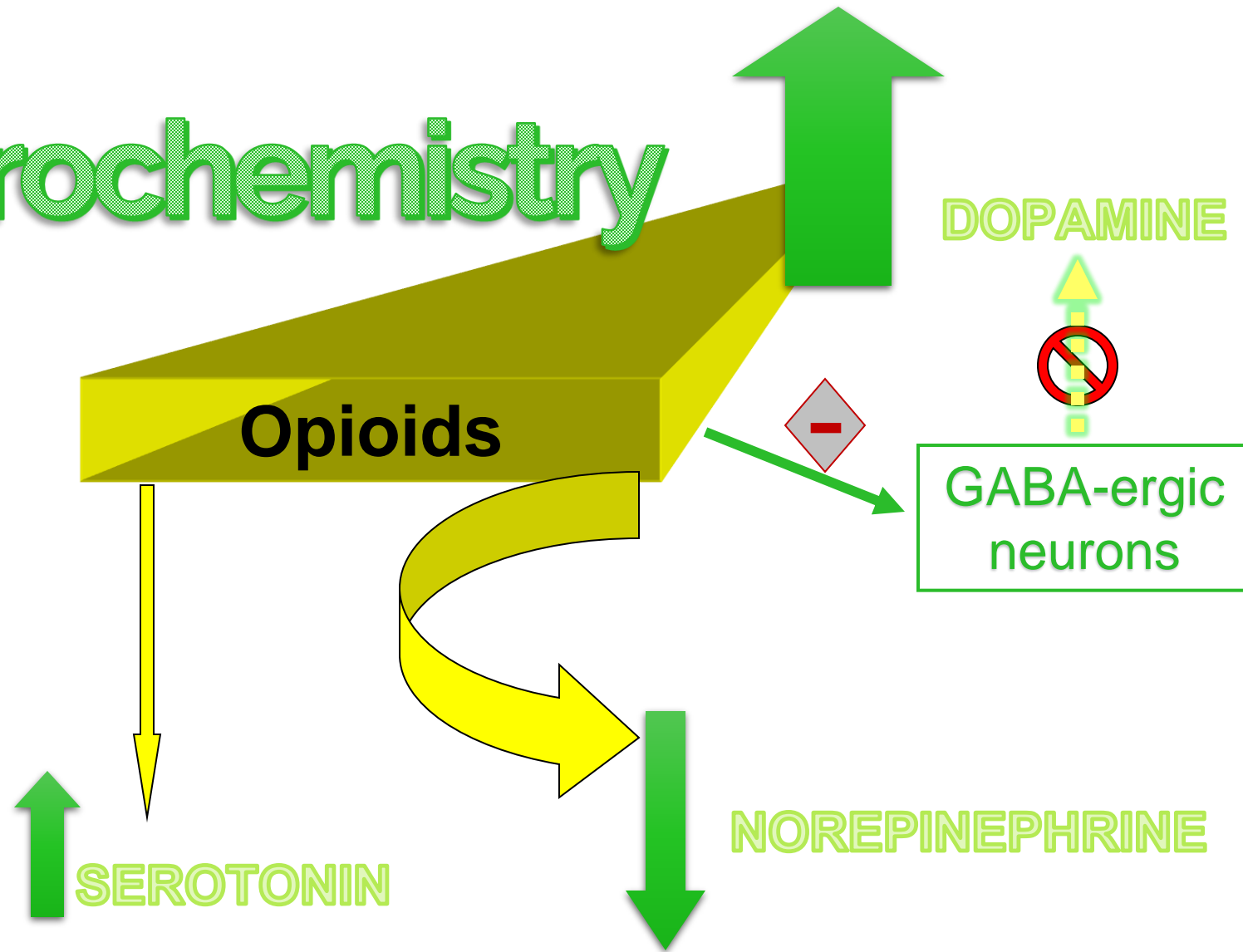




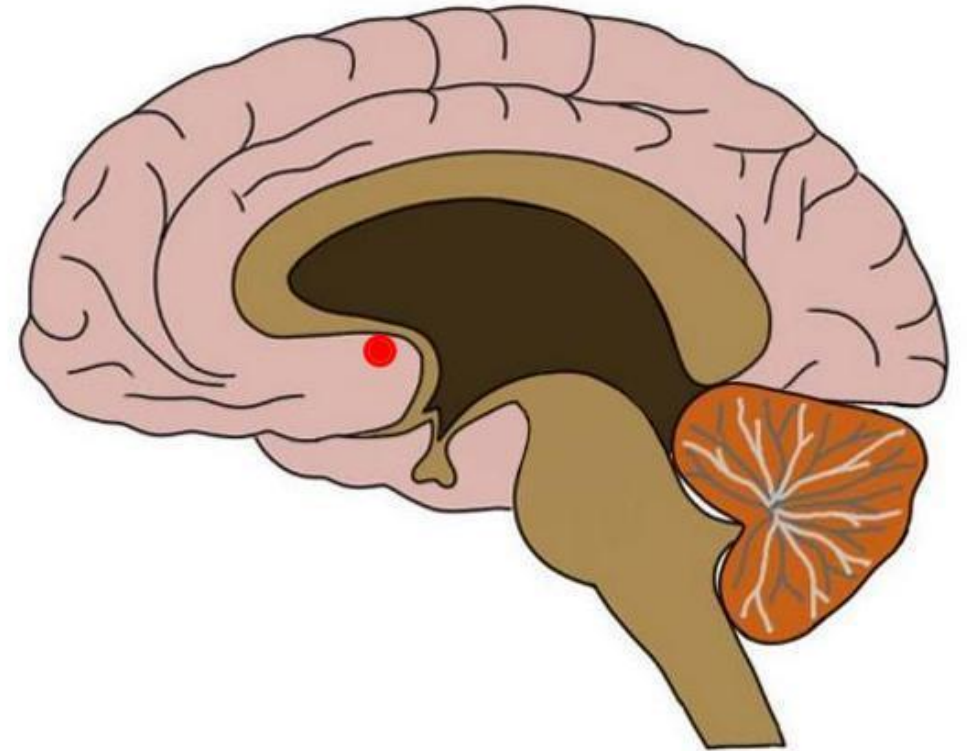
# Opiate Binding Sites – Medial Brain

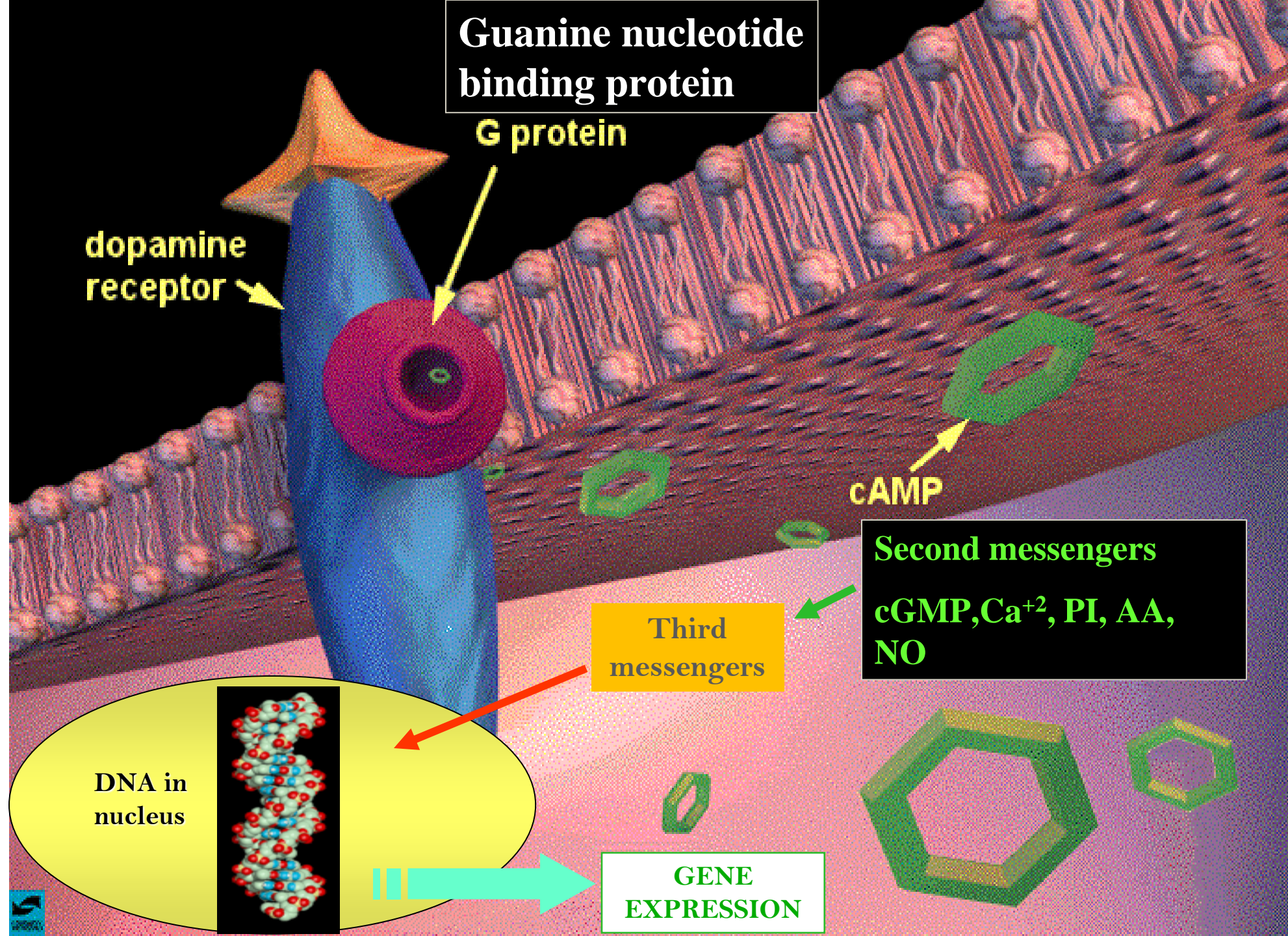


# Neurochemistry

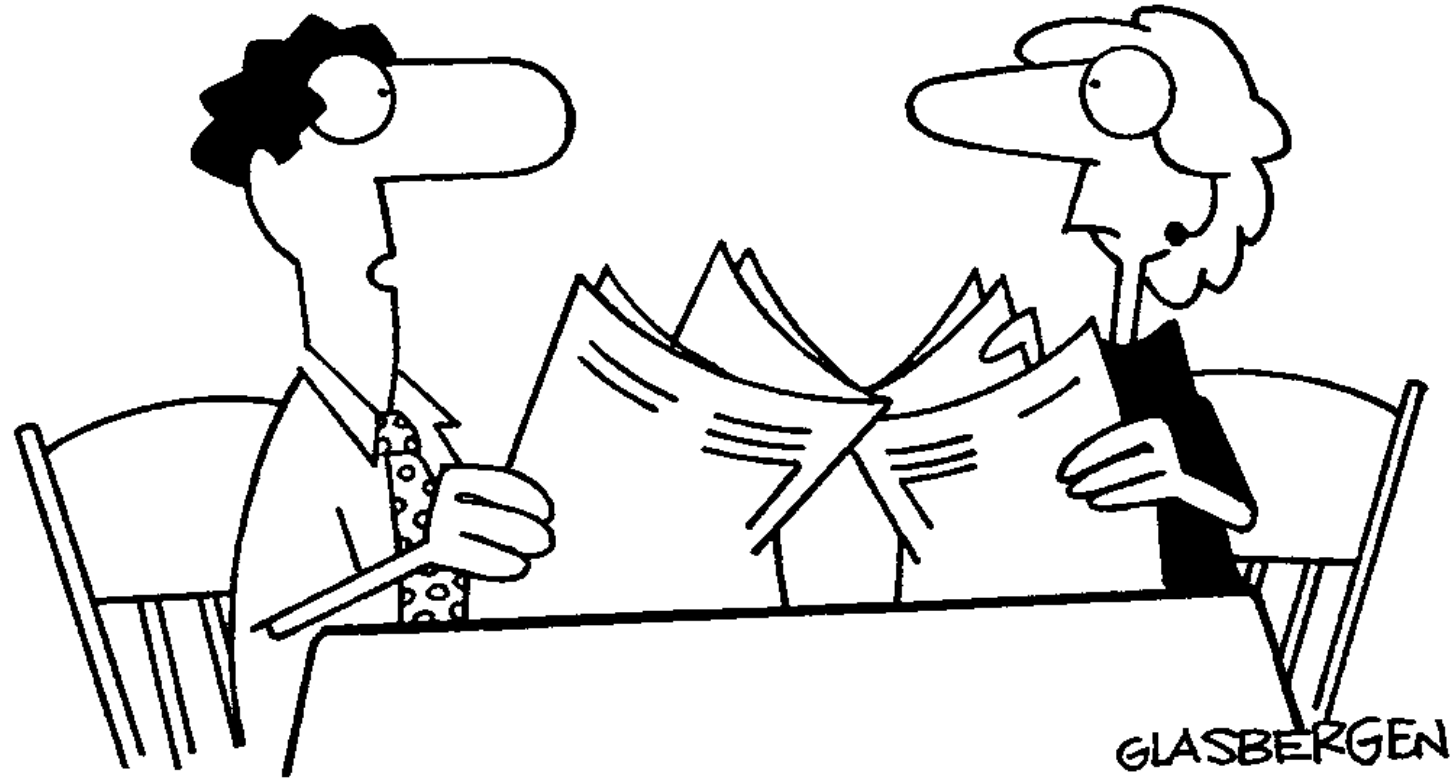


**It is the amount and speed of the release of Dopamine in the *nucleus accumbens* that is most likely related to the addiction potential of a behavior, substance or drug.**



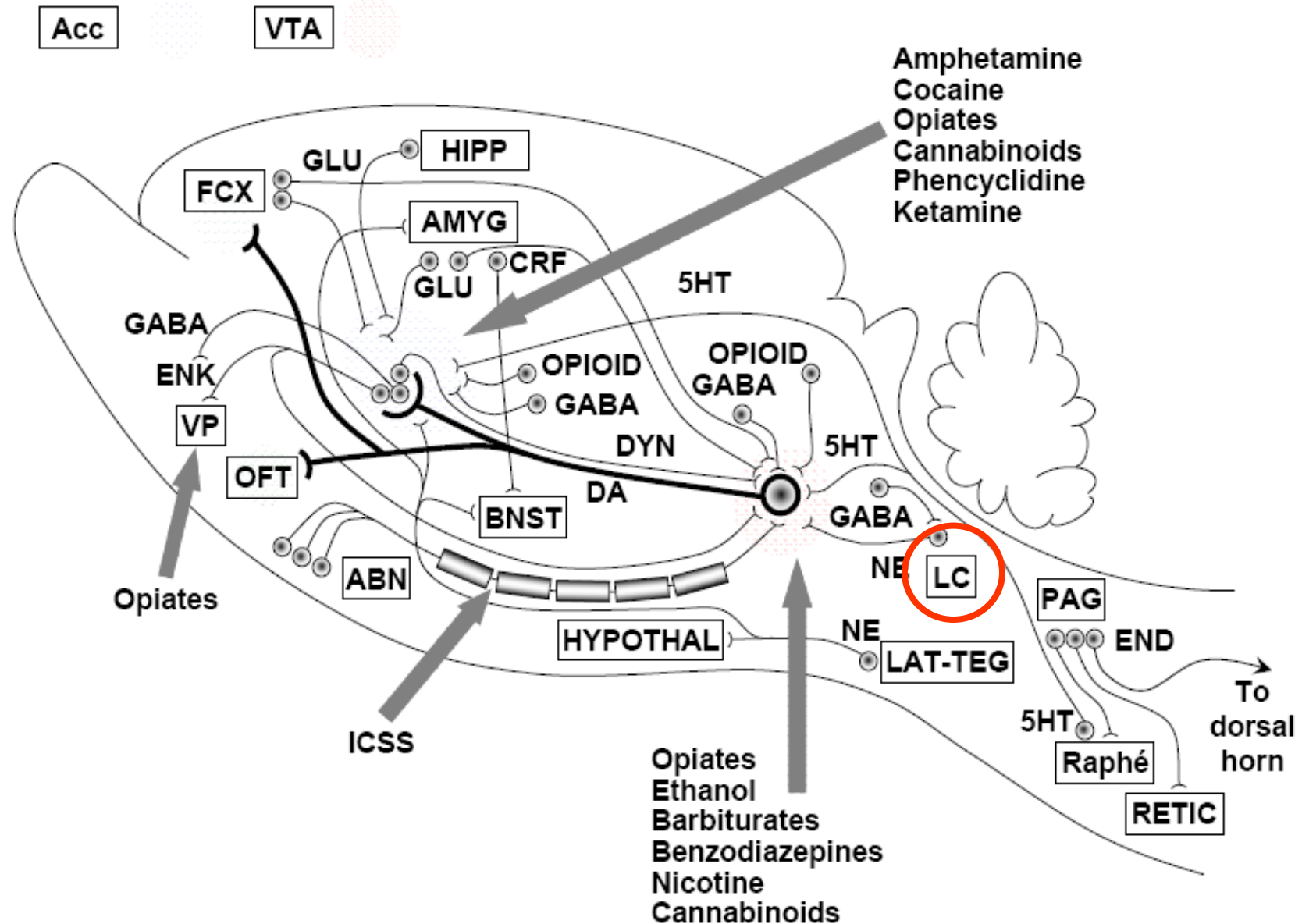






*“Scientists have isolated the gene that makes  
scientists want to isolate genes.”*

# REWARD CIRCUITRY



# Neuroadaptation Model

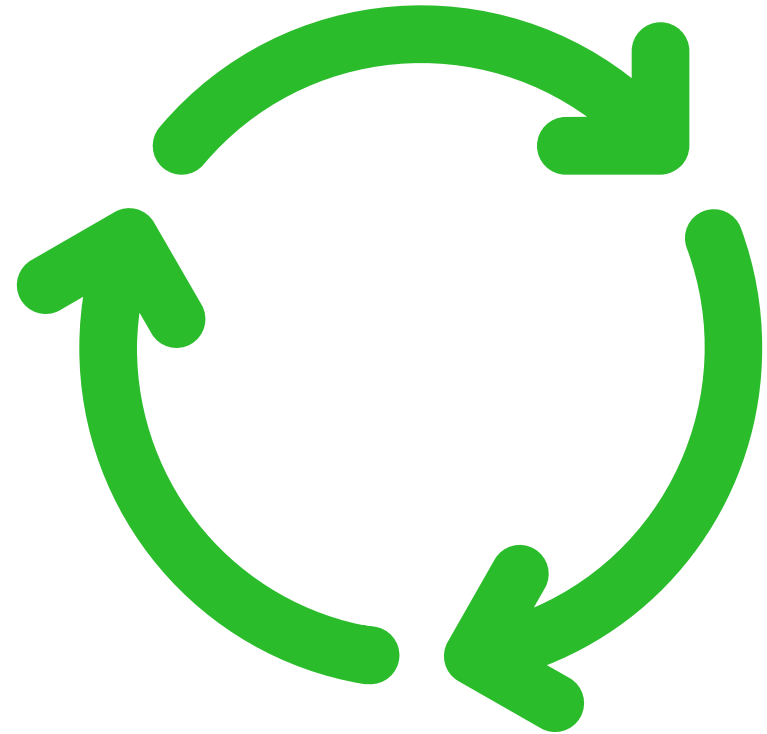
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- Upregulation of cAMP pathway
  - in locus ceruleus leads to typical constellation opiate withdrawal symptoms
  - in nucleus accumbens may contribute to reinforcing behavior of most drugs of abuse



# Repeated Administration and Withdrawal

- Repeated administration of opioids that activate the *mu* receptor results in dose-dependent physical dependence and tolerance
- Physical dependence and tolerance manifest as characteristic withdrawal signs and symptoms upon reduction or cessation of opioid use or administration (the opioid withdrawal syndrome)





# Opioid Withdrawal Signs and Symptoms

yawning

mild fever

insomnia

dysphoric  
mood

craving

irritability

hypertension

tachycardia

sweating,  
piloerection

nausea or  
vomiting

muscles  
aches,  
cramps

lacrimation

rhinorrhea

nasal  
stiffness

pupillary  
dilation

anxiety



# COWS

These withdrawal signs and symptoms are what are typically measured with the COWS.

## COWS

### CLINICAL OPIATE WITHDRAWAL SCALE

For each item, circle the number that best describes the patient's signs or symptom. Rate on just the apparent relationship to opiate withdrawal. For example, if heart rate is increased because the patient was jogging just prior to assessment, the increase pulse rate would not add to the score.

#### Resting Pulse Rate:

beats / minute

Measured after patient is sitting or lying for one minute

- 0 pulse rate 80 or below
- 1 pulse 81 to 100
- 2 pulse 101 to 120
- 4 pulse rate greater than 120

#### GI Upset:

over last 1/2 hour

- 0 no GI symptoms
- 1 stomach cramps
- 2 nausea or loose stool
- 3 vomiting or diarrhea
- 5 multiple episodes of diarrhea or vomiting

#### Sweating:

over past 1/2 hour not accounted for by room temperature or patient activity.

- 0 no report of chills or flushing
- 1 subjective report of chills or flushing
- 2 flushed or observable moistness on face
- 3 beads of sweat on brow or face
- 4 sweat streaming off face

#### Tremor:

Observation of outstretched hands

- 0 no tremor
- 1 tremor can be felt, but not observed
- 2 slight tremor observable
- 4 gross tremor or muscle twitching

#### Restlessness:

Observation during assessment

- 0 able to sit still
- 1 reports difficulty sitting still, but is able to do so
- 3 frequent shifting or extraneous movements of legs/arms
- 5 unable to sit still for more than a few seconds

#### Yawning:

Observation during assessment

- 0 no yawning
- 1 yawning once or twice during assessment
- 2 yawning three or more times during assessment
- 4 yawning several times/minute

#### Pupil size:

- 0 pupils pinned or normal size for room light
- 1 pupils possibly larger than normal for room light
- 2 pupils moderately dilated
- 5 pupils so dilated that only the rim of the iris is visible

#### Anxiety or Irritability:

Measured after patient is sitting or lying for one minute

- 0 none
- 1 patient reports increasing irritability or anxiousness
- 2 patient obviously irritable or anxious
- 4 patient so irritable or anxious that participation in the assessment is difficult

#### Bone or Joint aches:

If the patient was having pain previously, only the additional component attributed to opiates withdrawal is scored

- 0 not present
- 1 mild diffuse discomfort
- 2 patient reports severe diffuse aching of joints/muscles
- 4 patient is rubbing joints or muscles and is unable to sit still because of discomfort

#### Gooseflesh skin:

- 0 skin is smooth
- 3 piloerection of skin can be felt or hairs standing up on arms
- 5 prominent piloerection

#### Runny nose or tearing:

Not accounted for by cold symptoms or allergies

- 0 not present
- 1 nasal stuffiness or unusually moist eyes
- 2 nose running or tearing
- 4 nose constantly running or tears streaming down cheeks

#### Total Score:

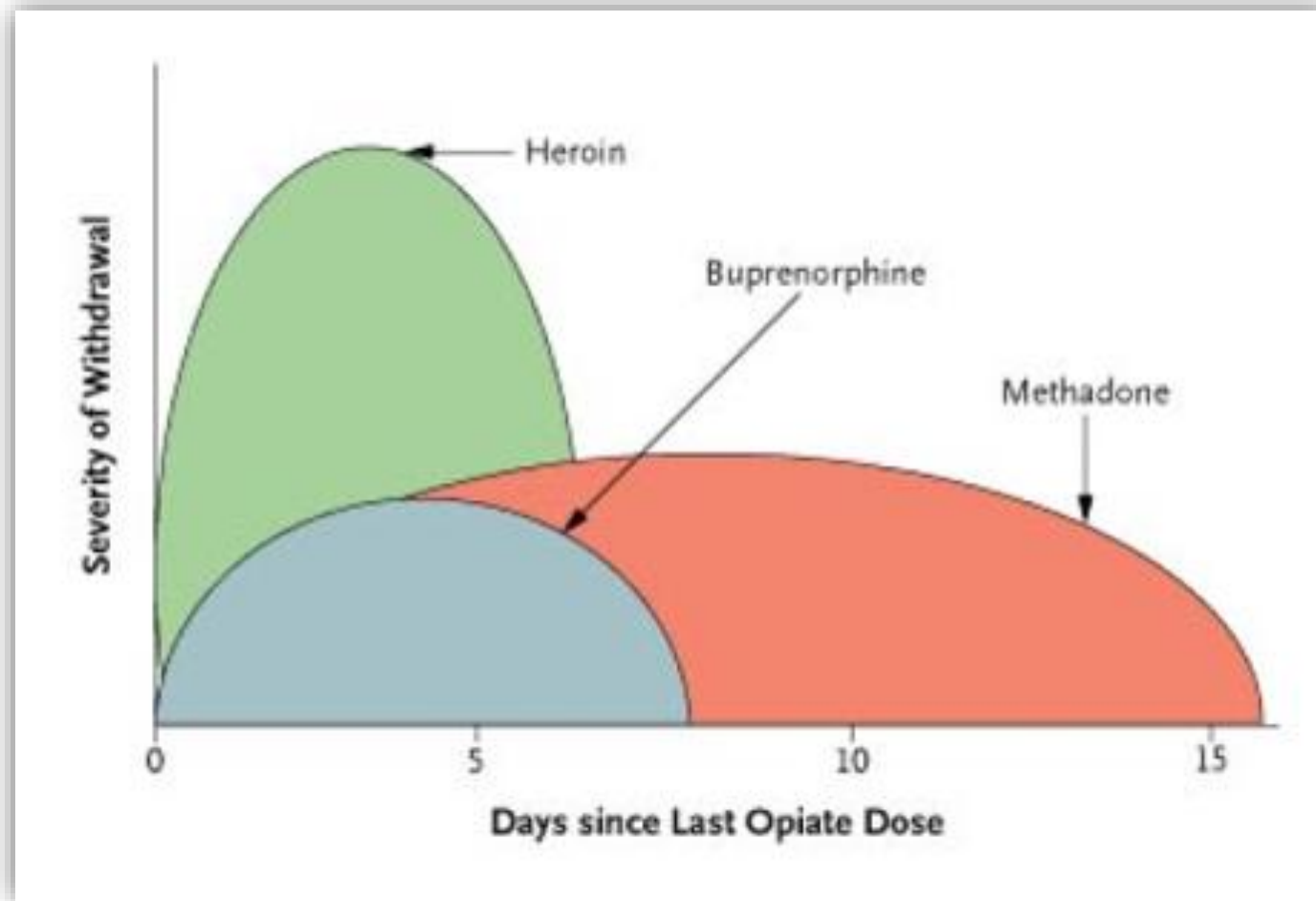
The total score is the sum of all 11 items

Initials of person completing assessment:

Score: 5-12 = **mild**; 13-24 = **moderate**;  
25-36 = **moderately severe**;  
more than 36 = **severe withdrawal**



# Severity of Opioid-Withdrawal Symptoms after Abrupt Discontinuation of Equivalent Doses of Heroin, Buprenorphine, and Methadone

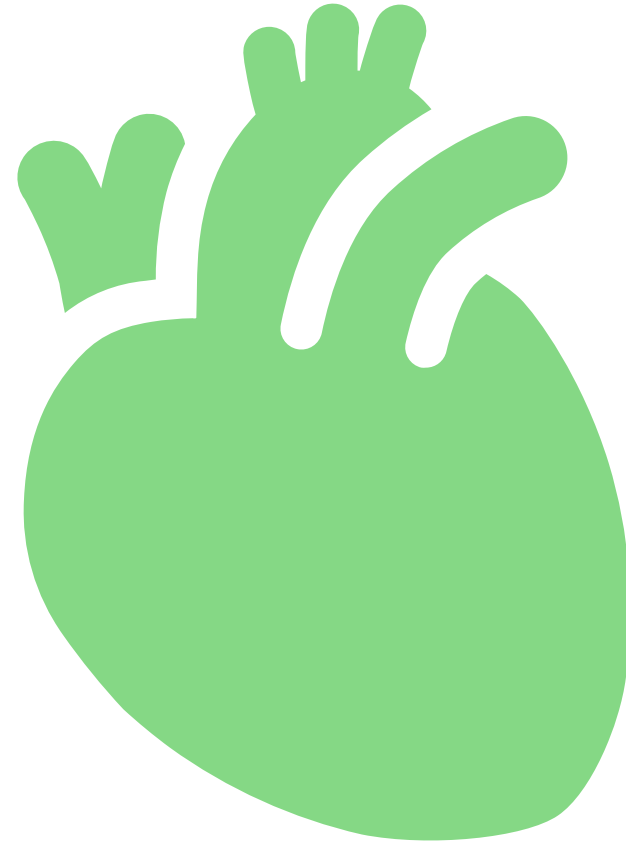


# ADVERSE EFFECTS

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## Acute Intoxication and Overdose

- Intense “high” or “rush, almost “orgasmic” sense of well-being.
- Respiratory depression/death; acute pulmonary edema; nausea; vomiting





# Chronic Intoxication

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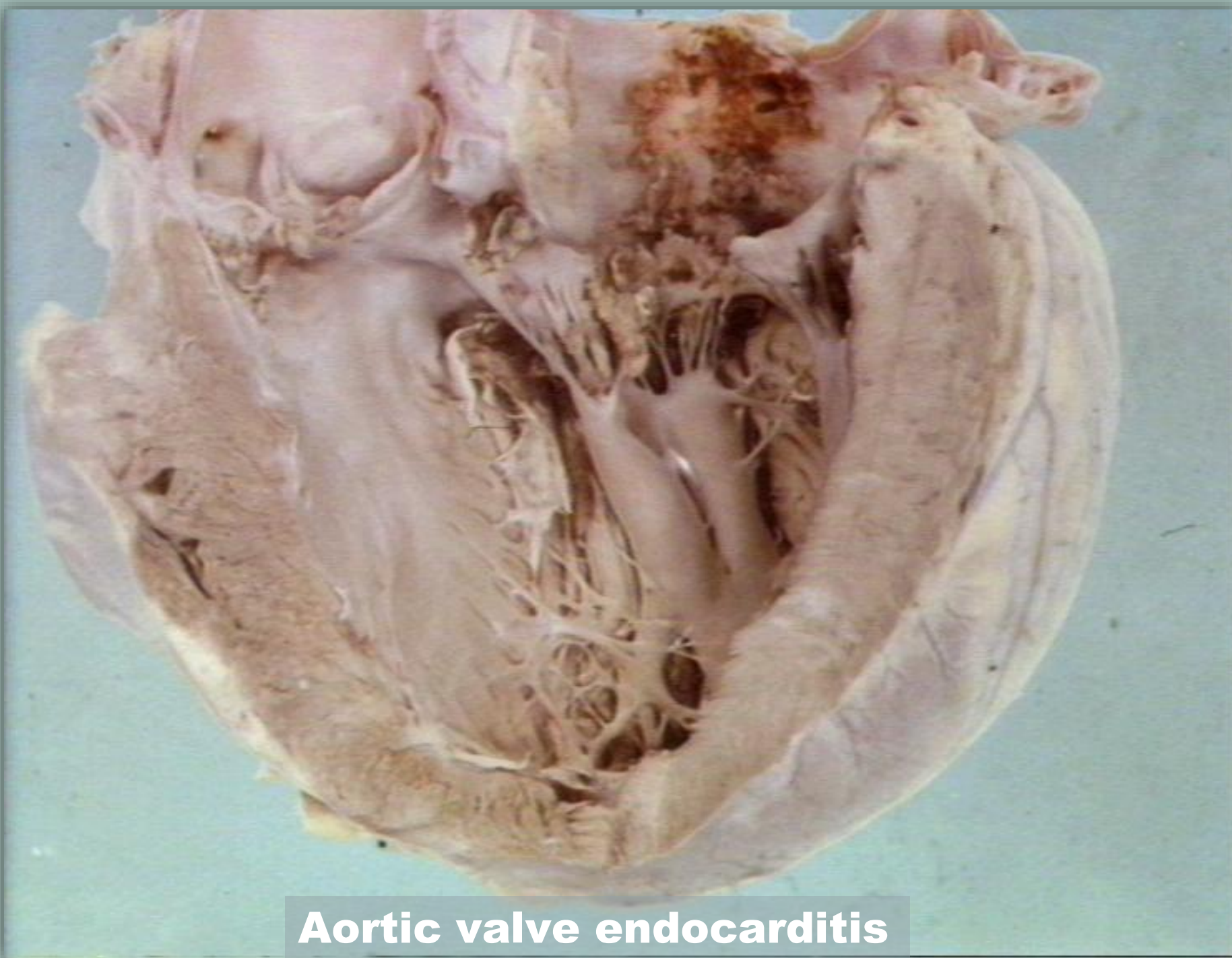
Cellulitis, wound abscesses (superficial and deep),  
venous and arterial thrombosis

Renal infarction, cerebritis, bacterial and viral  
endocarditis, STD's, TB, HIV/AIDS

Hepatitis B and C, asthma, depression, constipation

Accidents, head injuries, memory loss, paresthesias

Suicide, homicide, prison (>25% of heroin addicts die  
within 10-20 years after beginning active use)



**Aortic valve endocarditis**

# Chronic Intoxication

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Polysubstance use/abuse

“cut substance” toxicity—scopolamine, dextromethorphan, lidocaine, milk, sugar

Down-regulation of the opiate receptor sites

Designer heroin MPTP caused acute Parkinson's disease by destroying dopaminergic neurons in the basal ganglia



# *The Heart Asks Pleasure-First*

---

The Heart asks Pleasure—first—  
And then—Excuse from Pain —  
And then — those little Anodynes  
That deaden suffering —

And then —to go to sleep-  
And then — if it should be  
The will of its Inquisition  
The privilege to die—

*Emily Dickenson, 1862*







# Thank you for attending!

Please reach out with any questions you may have.



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<https://mhcp.acentra.com/>