



# Module 1: Introduction to Opioids and the Opioid Epidemic



# Learning Objectives

1. Define opioid and identify examples of natural, semisynthetic, and synthetic opioids
2. Describe the precipitating factors and scope of the opioid epidemic on society



# Opioid Definition



# What is an opioid?

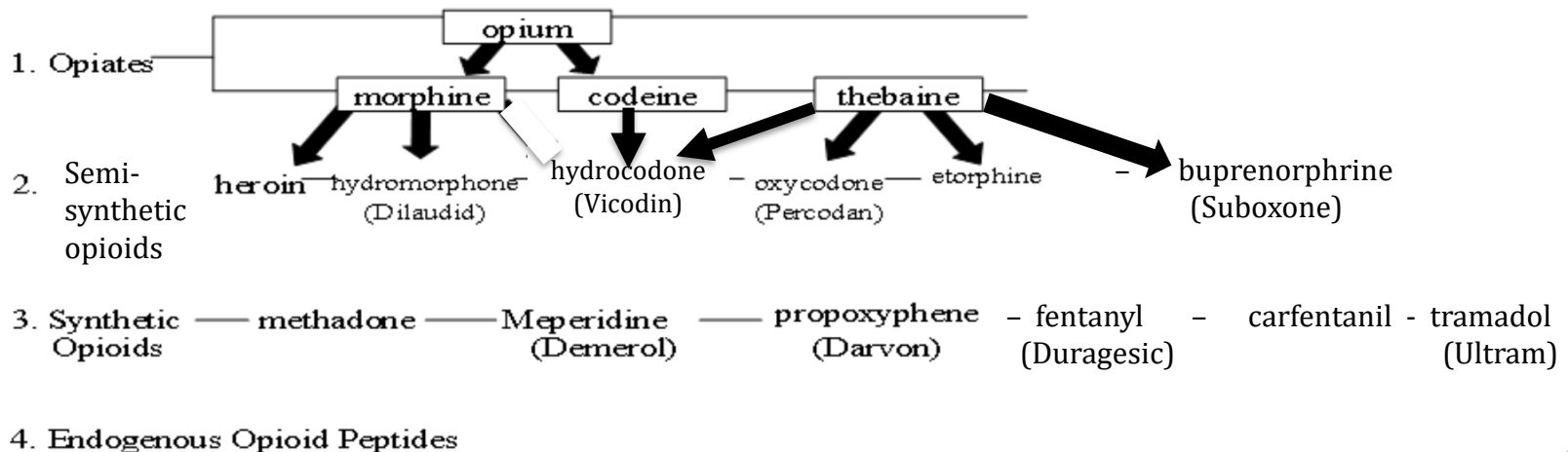


## ***Papaver somniferum*: the opium poppy**

Opium is made by drying latex from the seed pods of the opium poppy, *Papaver somniferum*

- An opioid is any compound that acts at one of the three opioid receptors:  $\mu$  (mu),  $\kappa$  (kappa), and  $\delta$  (delta)
- Opioids can be natural or synthetic; prescription medications or illegal drugs
- Opiates are the natural compounds found in opium poppies
- The three main alkaloids in opium (morphine, codeine, and thebaine) can be used as is or modified to synthesize new compounds

## Examples of opioids



# What is an opioid?

## Opioid:

- Any compound that acts at one of the three opioid receptors:  $\mu$  (mu),  $\kappa$  (kappa), and  $\delta$  (delta)
- When opioids bind to the various opioid receptors, they can cause various effects

Effects of opioids	
Analgesia	Euphoria
Sedation	Decreased GI motility
Miosis	Hallucinations/dysphoria
Respiratory depression	Antidepressant effect
Cough suppression	

- Opioid overdose occurs when an opioid overwhelms a person's system and impairs his/her ability to breathe
- Have the potential for tolerance, dependence, and addiction



# Examples of prescription opioids

- Prescription medications indicated for pain management, cough suppression, and treatment of opioid use disorders

	Opioid	Brand Name
Opiates	Morphine	MS Contin ® Kadian ®
	Codeine	Tylenol 3 ® Tylenol 4 ®
Semisynthetic	Buprenorphine	Suboxone ® Subutex ®
	Oxycodone	OxyContin®
	Hydrocodone	Vicodin®
Synthetic	Methadone	Dolophine ®
	Fentanyl	Actiq ® Duragesic ®
	Tramadol	Ultram ®



# Illicit Opioids

## Heroin

- Made from morphine (semisynthetic)
- Can be a black sticky substance, or a white or brown powder
- Can be injected, sniffed, snorted, or smoked; sometimes mixed with crack cocaine, called speed balling
- Slang terms: Big H, Horse, Hell Dust



Black Tar Heroin



Heroin Powder



Asian Heroin



Heroin Closeup

## Non-pharmaceutical Fentanyl

- Illicitly produced, synthetic drug
- Pill form package to look like prescription medications
- Powder form looks similar to heroin
- Fentanyl is often mixed with heroin or cocaine
- Unclear what substances are truly in the illicitly manufactured drugs



Packets of fentanyl laced heroin



# Question 1

A 55-year old female with severe cancer pain comes to the pharmacy to fill fentanyl. The patient is concerned about taking fentanyl because she heard it is the same type of medication as heroin. What is a true statement about opioids?

- A. Fentanyl is an opiate because it is a naturally occurring compound in the opium poppy
- B. Both fentanyl and heroin are opioids. Because both substances act on the opioid receptor and any compound that acts on opioid receptors is an opioid
- C. People only overdose from illicit fentanyl not prescription fentanyl
- D. Fentanyl is not an opioid because it is a prescription medication





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# Key Points

- An opioid is any compound that acts on one of the three opioid receptors
- Opioids can be categorized as (1) *opiates* - compounds that occur naturally in opium (morphine, codeine), (2) semisynthetics - chemical modified natural compounds (buprenorphine, oxycodone, hydrocodone), and (3) synthetics – completely artificial compounds (methadone, fentanyl, tramadol)
- Opioids can be prescription medications or illicit substances
- All opioids can lead to deadly overdoses
- Fentanyl is 50 to 100x more potent than morphine and is not detectable by opiate toxicology screens. This increases the risk for overdose when produced on the street and mixed with heroin or other drugs.



# Opioid Epidemic



# CDC Injury Center: Opioid Overdose Data Analysis

- CDC identifies and classifies which types of drugs are involved in an overdose and how that changes overtime



## Rx OPIOIDS

Include natural, semi-synthetic, and methadone and can be prescribed by doctors

Around  
**46**  
PEOPLE

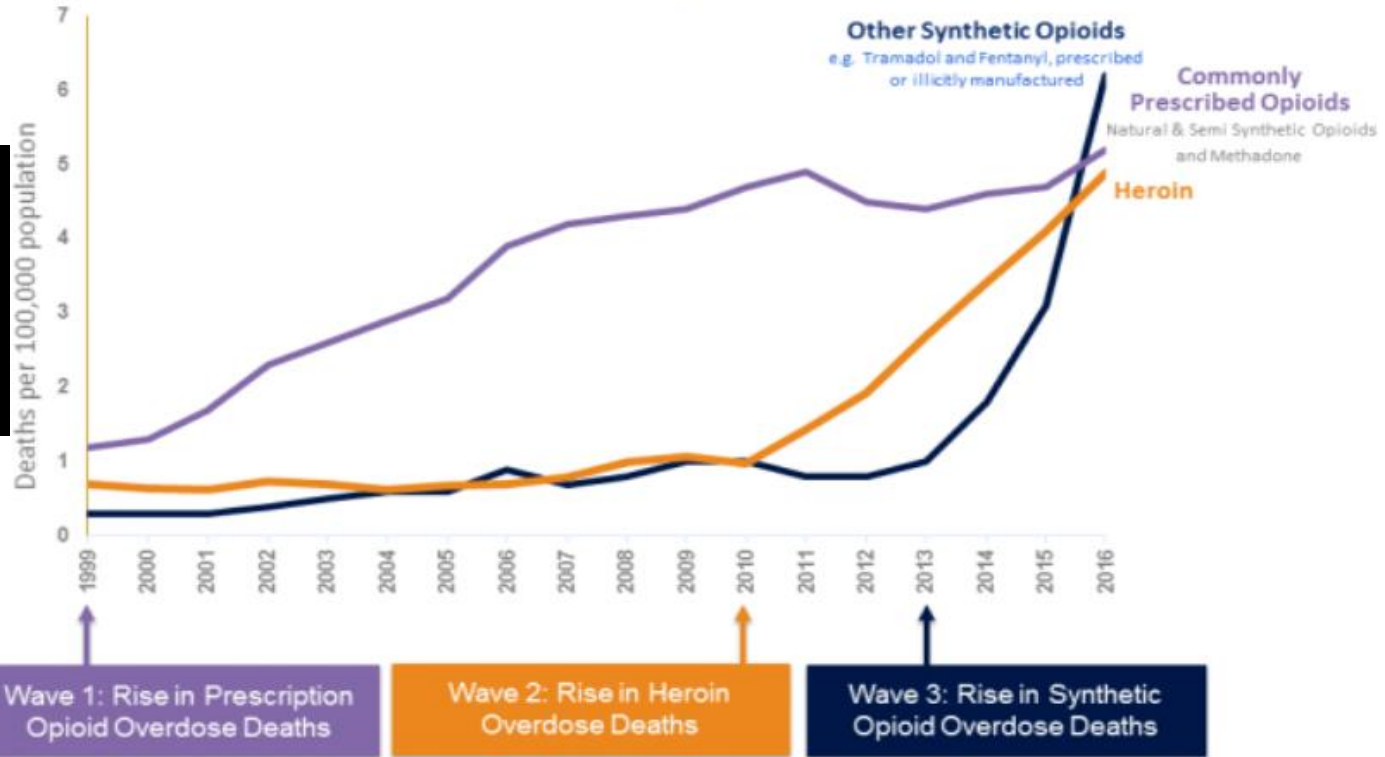


die every day from overdoses involving **prescription opioids.**



# Three Waves in the Rise of Opioid Overdose Deaths

## 3 Waves of the Rise in Opioid Overdose Deaths



From 1999 to 2017, more than 399,000 people have died from a opioid overdose

SOURCE: National Vital Statistics System Mortality File.

**Wave 1:** Began in the 1990s with an increase in the opioid overdose deaths from prescription opioids.

**Wave 2:** Began in 2010 with increase in the number of overdose deaths involving heroin

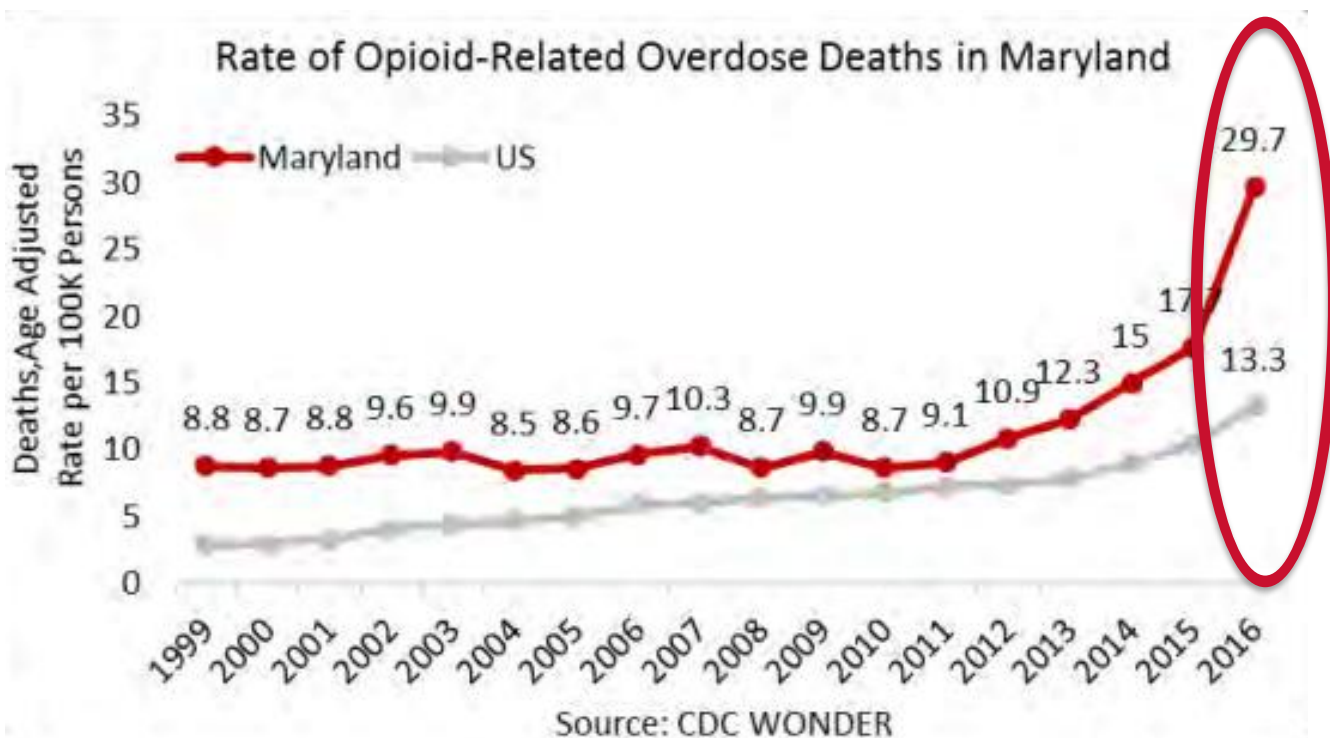
**Wave 3:** Began in 2013 with increases in overdose deaths involving synthetic opioids, particularly illegally manufactured fentanyl

- Centers for Disease Control and Prevention. Opioid Overdose. <https://www.cdc.gov/drugoverdose/data/analysis.html>. Accessed 1.6.2019
- Wide-ranging online data for epidemiologic research (WONDER). Atlanta, GA: CDC, National Center for Health Statistics; 2017. Available at <http://wonder.cdc.gov>.
- Seth P, Scholl L, Rudd RA, Bacon S. Increases and Geographic Variations in Overdose Deaths Involving Opioids, Cocaine, and Psychostimulants with Abuse Potential – United States, 2015-2016. MMWR Morb Mortal Wkly Rep. ePub: 29 March 2018.
- Kolodny et al. 2015. The prescription opioid and heroin crisis: A public health approach to an epidemic of addiction. Annual Review of Public Health, 36, 559-74
- Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in Drug and Opioid Overdose Deaths – United States, 2000-2014. MMWR 2016, 64(50); 1378-82.

# Opioid-Related Overdose Deaths in Maryland

Maryland one of the top 5 states with the highest-rates of opioid overdose

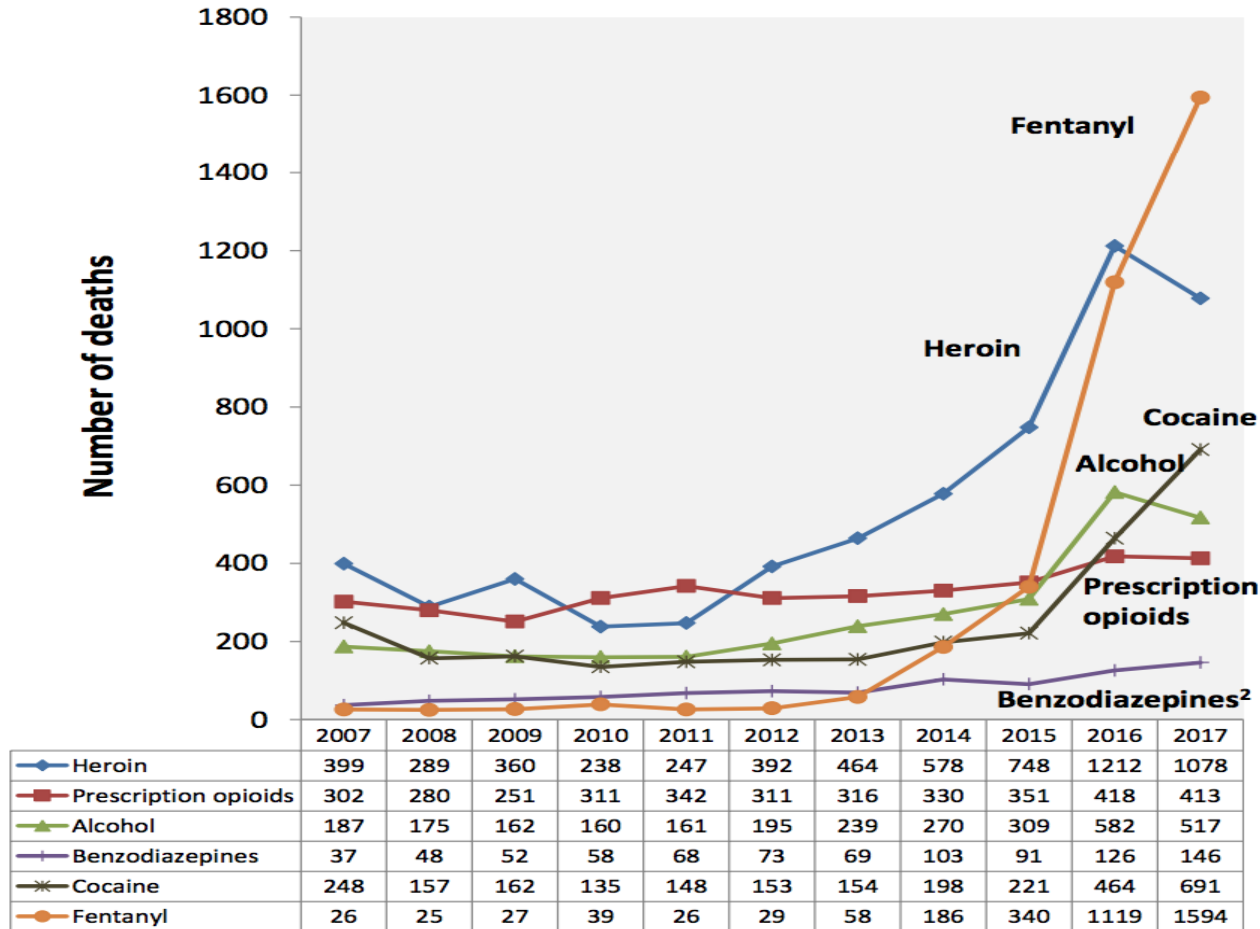
Since 1999, the death-rate has consistently been above the average, ranging from roughly 1.5 to 3 times the rate



In 2016, nearly **30 deaths per 100,000 persons** were related to opioids in Maryland compared to a national average of **13.3 deaths per 100,000 persons**



# Total Number of Drug- and Alcohol-Related Intoxication Deaths in Maryland, 2007 - 2017



# Question 2

Which of the following is a true statement about the opioid epidemic.

- A. Maryland is a state with one of the lowest rates of opioid overdose in the country
- B. The opioid epidemic is starting to cause less deaths than it has in previous years
- C. A majority of deaths from the opioid epidemic in the US and Maryland are driven by overdoses from synthetic opioids, including illicitly manufactured fentanyl
- D. Illicitly manufactured fentanyl is expensive and difficult to make; therefore, it is not contributing to the opioid epidemic





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# Key Points

- The opioid epidemic is a serious problem
- Maryland is one of the top-five states with the highest rate of opioid overdose
- Since 2013, there has been a rise in the increase of opioid overdoses due to fentanyl, often which is illicitly manufactured





You have completed Module 1:  
Opioids and the Opioid Epidemic



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