



# CDC's Overdose Data to Action Program: Drug Overdose Surveillance and Epidemiology (DOSE) System

**Shannon Casillas, MPH**

Epidemiologist, Overdose Morbidity Team

Division of Overdose Prevention

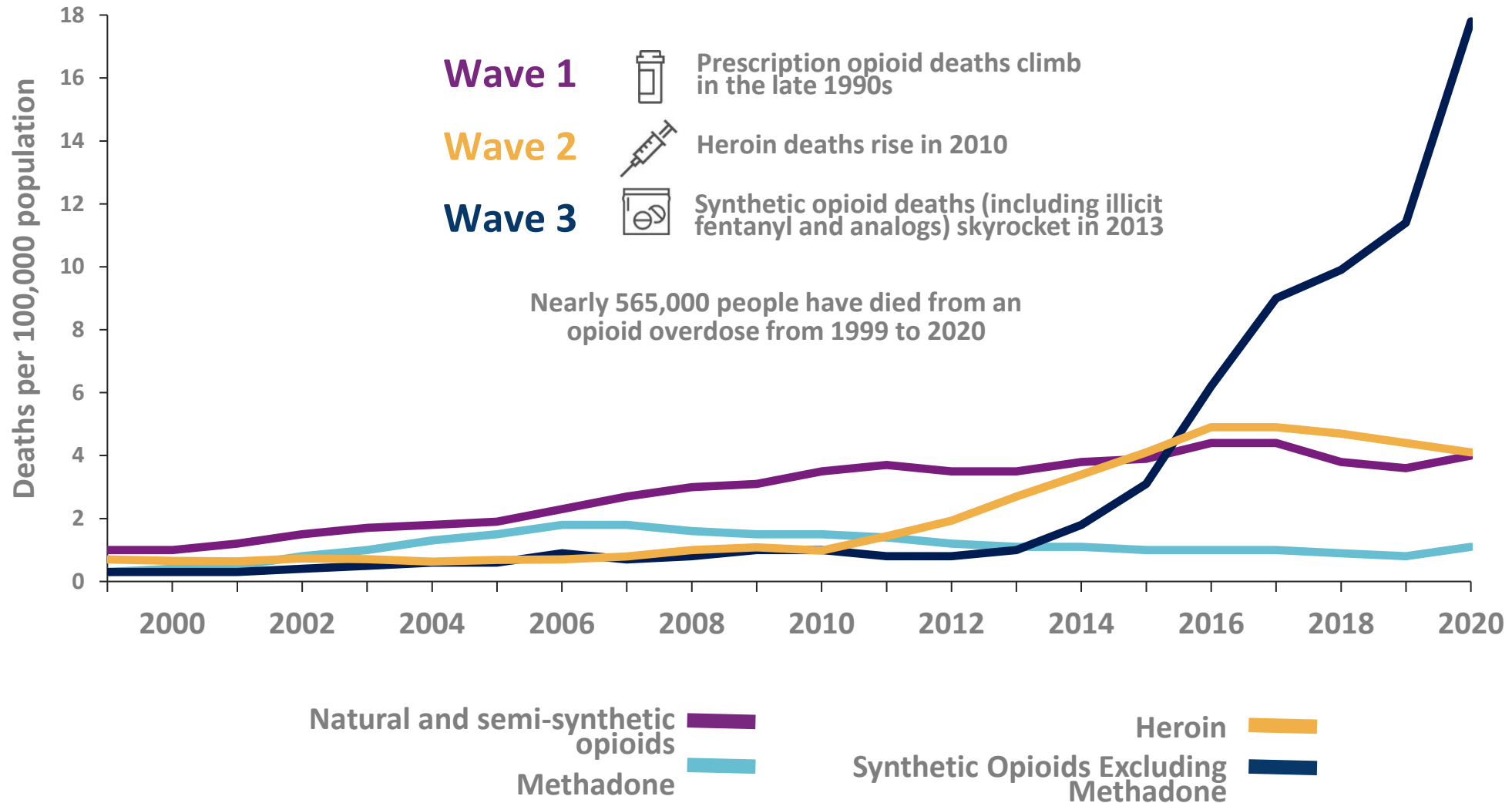
**2022 Harold Rogers Prescription Drug Monitoring Program (PDMP) National Meeting**

**December 6, 2022**

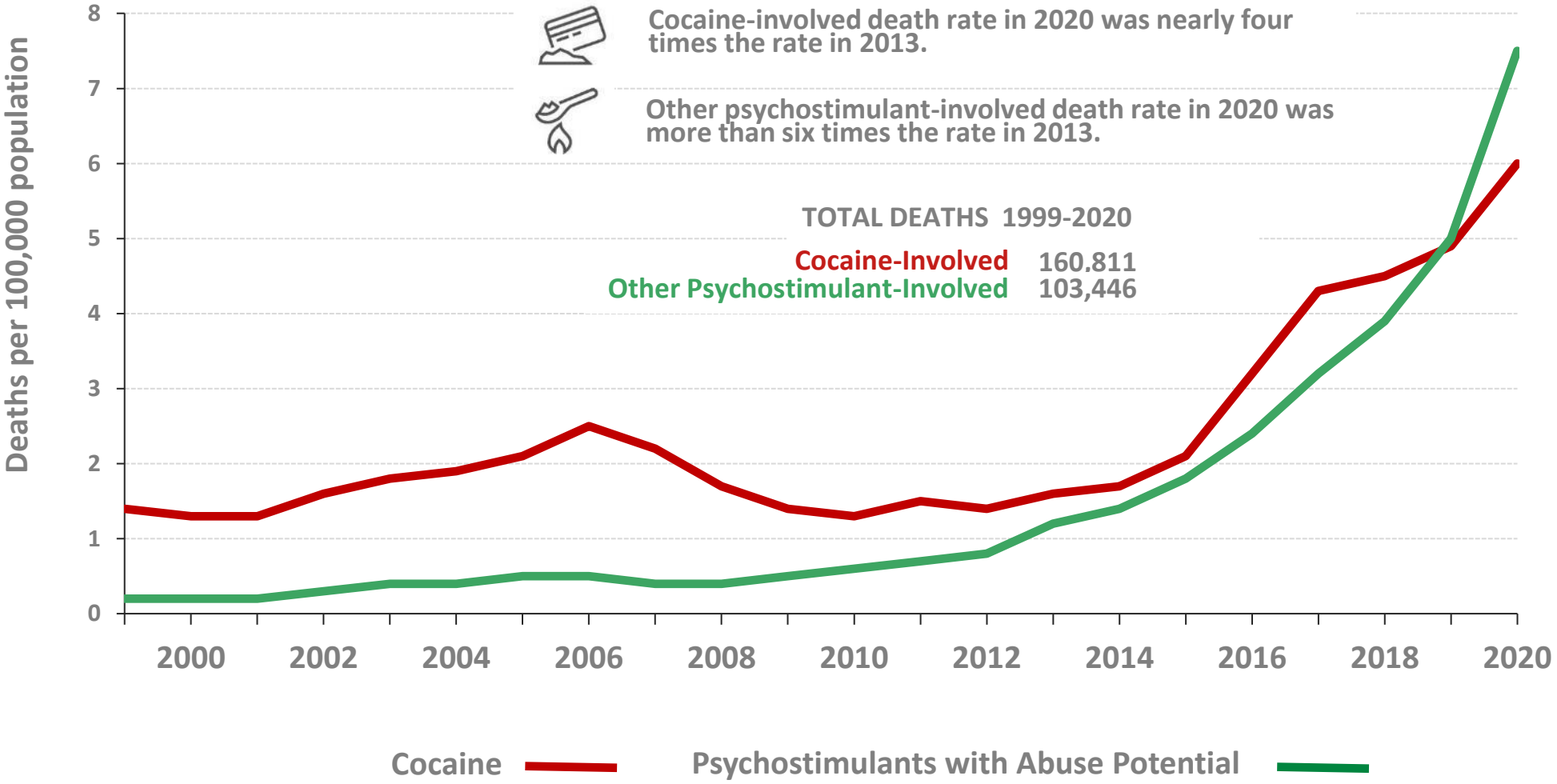
# Outline

- Background
- CDC Division of Overdose Prevention
- Overdose Data to Action (OD2A) program
- Drug Overdose Surveillance and Epidemiology (DOSE) system
  - Syndromic surveillance data
  - Discharge data
  - Dashboard

# Waves of the U.S. Opioid Overdose Epidemic

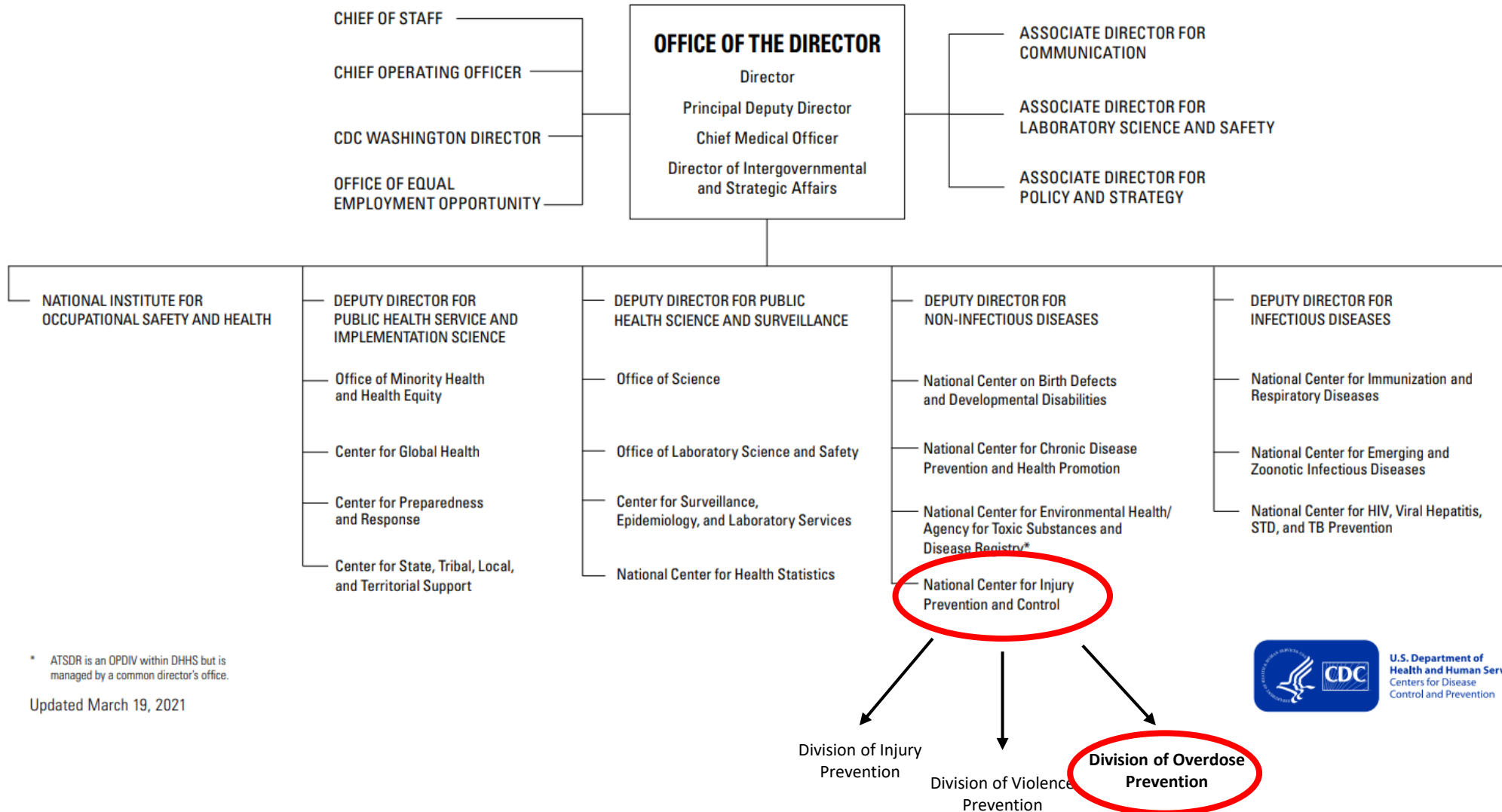


# Drug Overdose Deaths Involving Cocaine and Psychostimulants with Abuse Potential in the US are Increasing



SOURCES: National Vital Statistics System Mortality File & Hedegaard, Miniño, Spencer & Warner (2022) NCHS Data Brief 428

# DEPARTMENT OF HEALTH AND HUMAN SERVICES CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)



\* ATSDR is an OPDIV within DHHS but is managed by a common director's office.

Updated March 19, 2021



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

# Division of Overdose Prevention

**Mission:** Prevent overdose and substance use-related harms



Drug Overdose Surveillance and Epidemiology (DOSE) activities



CDC's largest fiscal investment is state-level monitoring of the epidemic and implementing evidence-based prevention and response activities

# Evolution of CDC State Support In Drug Overdose Prevention

**2014**

**PREVENTION BOOST** - Small investments in 5 high burden states - KY, TN, OK, UT, and WV – to address Rx opioid overdose prevention

**2015**

**PREVENTION FOR STATES (Pfs)** – Larger investments in 16 high burden states focused on preventing Rx opioid overdoses

**2016**

**Pfs and DATA DRIVEN PREVENTION INITIATIVE (DDPI)** - Expanded Pfs to 29 states and funded 14 additional states plus DC with DDPI

**ENHANCED STATE OPIOID OVERDOSE SURVEILLANCE (ESOOS)** – Established ESOOS for more timely and comprehensive data on fatal and nonfatal opioid overdoses and risk factors associated with fatal overdoses – 12 states in 2016 and 20 new states and DC in 2017

**2018**

**OVERDOSE PREVENTION IN STATES – SURGE SUPPORT (OPIS S2)** – Funded 50 states and 4 territories to enhance the prevention and response activities to address the evolving drug crisis – including illicit opioids

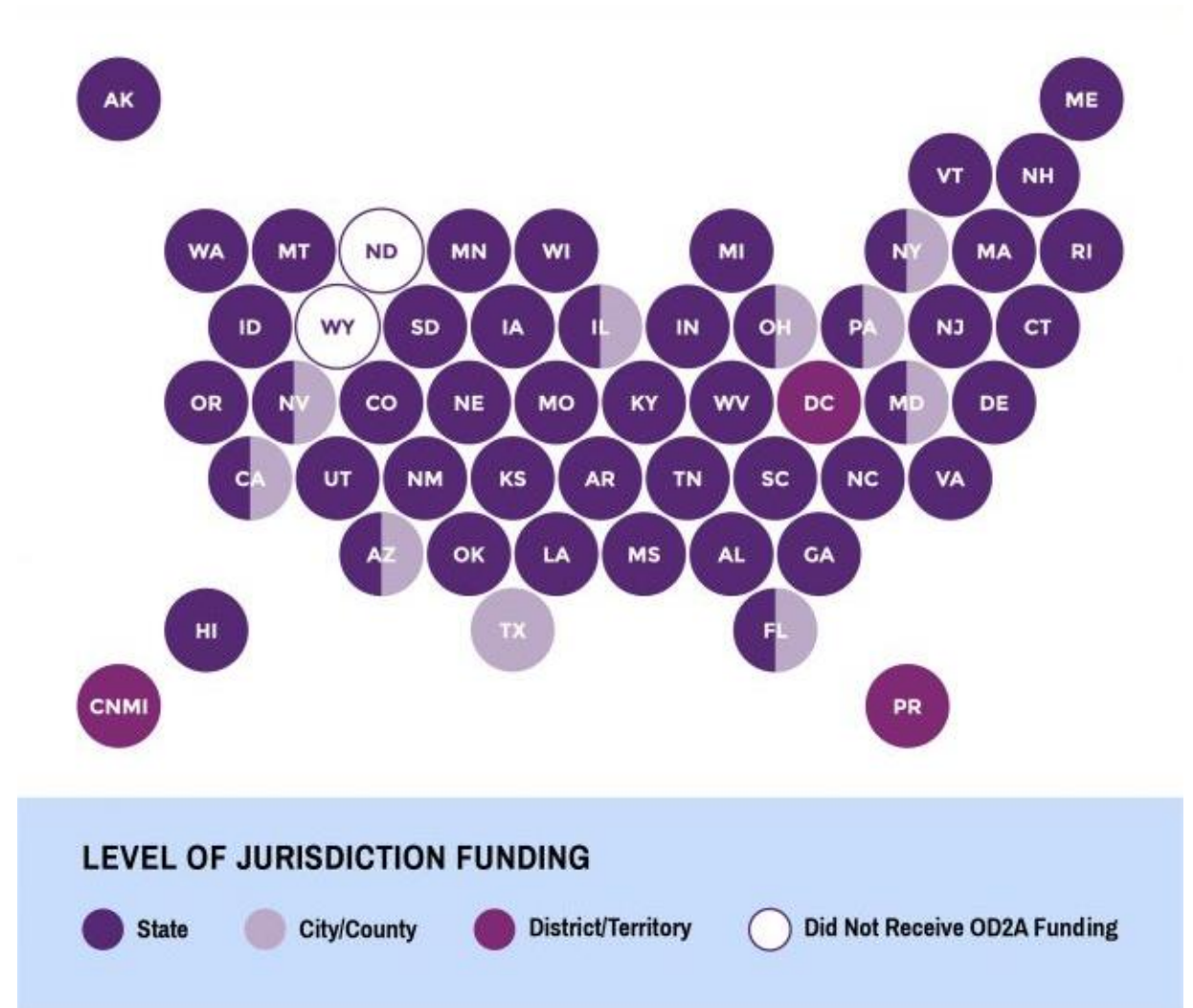
**2019**

**OVERDOSE DATA TO ACTION (OD2A)** – Consolidated all state-based monies into one program. Funding 66 jurisdictions, including 47 states, DC, and 16 hard hit large cities and counties



# Overdose Data to Action (OD2A) Program

- Integrates previous funding into one announcement
- \$300M per year for 4 years (FY2019-2023)
  - Majority of funding going to state and local health departments
- Seamless integration of surveillance and prevention programs
- 66 jurisdictions funded, including 47 states, DC, and 16 cities or counties with high overdose burden







## OD2A Prevention Strategies

- PDMPs
- State and local integration
- Linkage to care
- Provider and health systems support
- Partnerships with public safety and first responders
- Empowering individuals to make safer choices
- Innovative prevention
- Peer-to-peer learning



# OD2A Surveillance Strategies

1

## ■ **Morbidity: Drug Overdose Surveillance and Epidemiology (DOSE) system**

- Collects information on nonfatal drug overdoses treated in emergency departments and hospitals
- Utilizes syndromic surveillance and discharge data
- ED visit/hospital admission visit coverage exceeds 90% in participating jurisdictions
- Available in near real-time (syndromic data)

2

## ■ **Mortality: State Unintentional Drug Overdose Reporting System (SUDORS)**

- Collects comprehensive data on unintentional and undetermined intent drug overdose deaths
- Data collected from death certificates, medical examiner/coroner reports, and postmortem toxicology
- Includes information on characteristics and circumstances surrounding drug overdose deaths
- Information on substances causing or contributing to the death
- Delayed a year or more

3

## ■ **Innovative Projects**

- Under OD2A, innovative surveillance projects were funded for the first time
- Examples of priority projects include
  - Surveillance of linkage to care
  - Tracking the illicit drug supply
  - Data linkage (e.g., link PDMP data from different sources within the same jurisdiction)
  - Spike alert detection



# Syndromic vs. Discharge Data: Strengths and Purpose



## Syndromic surveillance data





- Rapid assessment of trends and identification of overdose spikes
- Identify areas within particular states that are experiencing spikes
- Situational awareness
- Data collected disaggregated by age group, sex, and county of patient residence



## Discharge data

- Estimating long-term trends and burden
- Compare drug overdose rates across local jurisdictions, such as counties
- Compare rates with other types of injuries (e.g., car crashes) or diseases within a state/jurisdiction
- Data collected disaggregated by age group, sex, intentionality, and county of patient residence

# Syndromic vs. Discharge Data

	Syndromic Surveillance data	Discharge data
 Timeliness	Faster (one-month delay)	Slower (delayed several months to a year)
 Data quality	Varies	Higher
 Validity	Varies	Varies
 Representativeness	Varies	Higher

# Syndromic Surveillance Definitions



*If the visit record meets at least one of the two following criteria it is captured as a suspected overdose*

---

## Discharge Diagnosis field

- 1** Search all diagnosis codes for ICD-10-CM or SNOMED codes that indicate acute, unintentional or undetermined intent drug poisoning (poisoning specific T codes)
- 

## Chief Complaint field

- 2** At least one drug term (e.g., opioid)  At least one overdose term (e.g., poisoning)  No terms indicating withdrawal, detox, denying drug use, seeking treatment

# Discharge Data Case Definition

*If the visit record meets the following criteria it is considered to be for an overdose*

## **Discharge Diagnosis field**

ICD-10-CM codes that indicate acute drug poisoning (poisoning specific T codes)

- Search all diagnosis codes not just first/primary
- Stratification by intent (i.e., unintentional/undetermined and intentional self-harm)



# Data Submission, Review, and Dissemination

- Submission process
  - CDC staff access syndromic data directly through NSSP or
  - CDC staff receive an aggregate Excel template with counts from jurisdictions
- Review process
  - Data quality checks
  - Look for substantial changes in ED visits and/or hospital admissions
- Dissemination
  - DOSE Dashboard
  - Publications (in depth-analyses)

# Publications

JAMA Psychiatry | [Original Investigation](#)

## Trends in US Emergency Department Visits for Mental Health, Overdose, and Violence Outcomes Before and During the COVID-19 Pandemic

Kristin M. Holland, PhD, MPH; Christopher Jones, PharmD, DrPH, MPH; Alana M. Vivolo-Kantor, PhD, MPH; Nimi Idaikkadar, MPH; Marissa Zwald, PhD; Brooke Hoots, PhD; Ellen Yard, PhD; Ashley D'Inverno, PhD; Elizabeth Swedo, MD; May S. Chen, PhD; Emiko Petrosky, MD; Amy Board, PhD; Pedro Martinez, MPH; Deborah M. Stone, ScD; Royal Law, PhD; Michael A. Coletta, BS; Jennifer Adjemian, PhD; Craig Thomas, PhD; Richard W. Puddy, PhD; Georgina Peacock, MD; Nicole F. Dowling, PhD; Debra Houry, MD



ELSEVIER

Contents lists available at [ScienceDirect](#)

Annals of Epidemiology

journal homepage: [www.annalsofepidemiology.org](http://www.annalsofepidemiology.org)

Original article

Differences and similarities between emergency department syndromic surveillance and hospital discharge data for nonfatal drug overdose

Alana M. Vivolo-Kantor, PhD, MPH<sup>a,\*</sup>, Herschel Smith IV, MPH<sup>a,b</sup>, Lawrence Scholl, PhD, MPH<sup>a</sup>

## Morbidity and Mortality Weekly Report (MMWR)

CDC

## Trends in Nonfatal and Fatal Overdoses Involving Benzodiazepines — 38 States and the District of Columbia, 2019–2020

Weekly / August 27, 2021 / 70(34);1136–1141

Stephen Liu, PhD<sup>1</sup>; Julie O'Donnell, PhD<sup>1</sup>; R. Matt Gladden, PhD<sup>1</sup>; Londell McGlone, MPH<sup>1</sup>; Farnaz Chowdhury<sup>2</sup> ([VIEW AUTHOR AFFILIATIONS](#))

Research Full Report

SDC

## Development and Validation of a Syndrome Definition to Identify Suspected Nonfatal Heroin-Involved Overdoses Treated in Emergency Departments

Lawrence Scholl, PhD, MPH; Stephen Liu, PhD, MPH; Alana Vivolo-Kantor, PhD, MPH; Amy Board, DrPH, MSW, MPH; Zachary Stein, MPH; Douglas R. Roehler, PhD, MPH; Londell McGlone, MPH; Brooke E. Hoots, PhD, MSPH; Desiree Mustaquim, MPH; Herschel Smith, MPH

## Morbidity and Mortality Weekly Report (MMWR)

CDC

## Nonfatal Drug and Polydrug Overdoses Treated in Emergency Departments — 29 States, 2018–2019

Weekly / August 28, 2020 / 69(34);1149–1155

Stephen Liu, PhD<sup>1</sup>; Lawrence Scholl, PhD<sup>1</sup>; Brooke Hoots, PhD<sup>1</sup>; Puja Seth, PhD<sup>1</sup> ([VIEW AUTHOR AFFILIATIONS](#))

# DOSE Dashboard

- Syndromic surveillance data
  - Launched in April 2022
  - Updated monthly and include data from 2018–present
  - Include percentage change in overdose rate per 10,000 total ED encounters
  - National data disaggregated by age and sex
  - State-level data
- Discharge data
  - *In development, expected to launch by spring 2023*

<https://www.cdc.gov/drugoverdose/nonfatal/dashboard/index.html>

# DOSE Dashboard: Syndromic Surveillance Data

🏠 Drug Overdose

Drug Basics

Understanding Drug Overdoses and Deaths

Overdose Prevention

Data Briefs +

Data Dashboards & Alerts -

**DOSE Dashboard: Nonfatal Overdose Data** -

About DOSE

How to Use Dashboard

SUDORS Dashboard: Fatal Overdose Data +

Data Alerts from CDC

Drug Overdose Deaths +

US Opioid Dispensing Rate Map

Overdose Data to Action +

## DOSE Dashboard: Nonfatal Overdose Data

[Print](#)

Updated October 26, 2022

[About this Dashboard](#) ←

[Quick Start for Using this Dashboard](#) ←

Select a Drug:

All Drug

Select a State:

United States

Compare August 2022 with the previous: ?

Month



Trends in Emergency Department Visits

### Suspected All Drug Overdoses

-2%

Monthly Percent Change<sup>†</sup> in US Suspected All Drug Overdoses

0

States Number with a Significant Increase

40

States Participating Funded states with reported data

# Suspected All Opioids Overdoses

**+2%** Annual Percent Change<sup>†</sup> in US Suspected All Opioids Overdose

**31%** Annual Percent Change<sup>†</sup> in New Jersey Suspected All Opioids Overdose

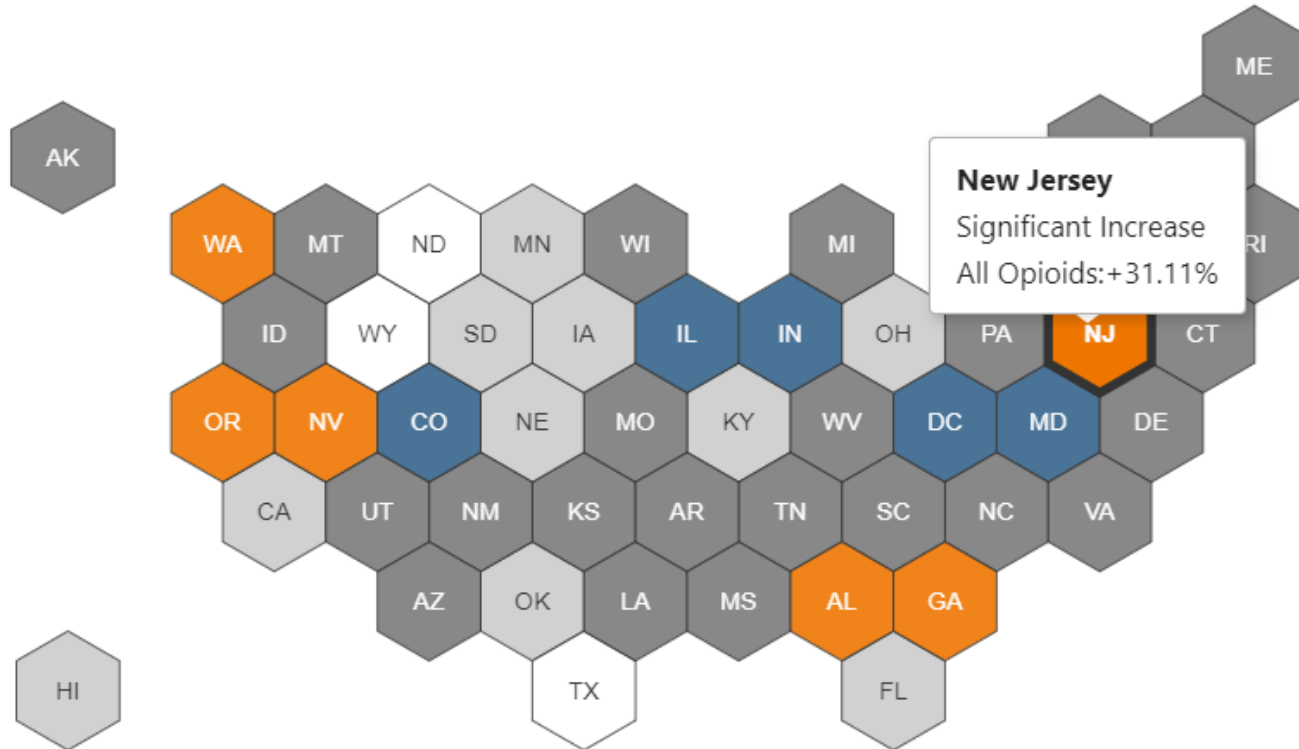
**38** States Participating  
Funded states with reported data

Now viewing New Jersey Reset

### Color Legend

- Significant Increase
- Significant Decrease
- No Significant Change
- Data Not Available/Not Reported
- Unfunded State
- \* [Suppressed Data](#)

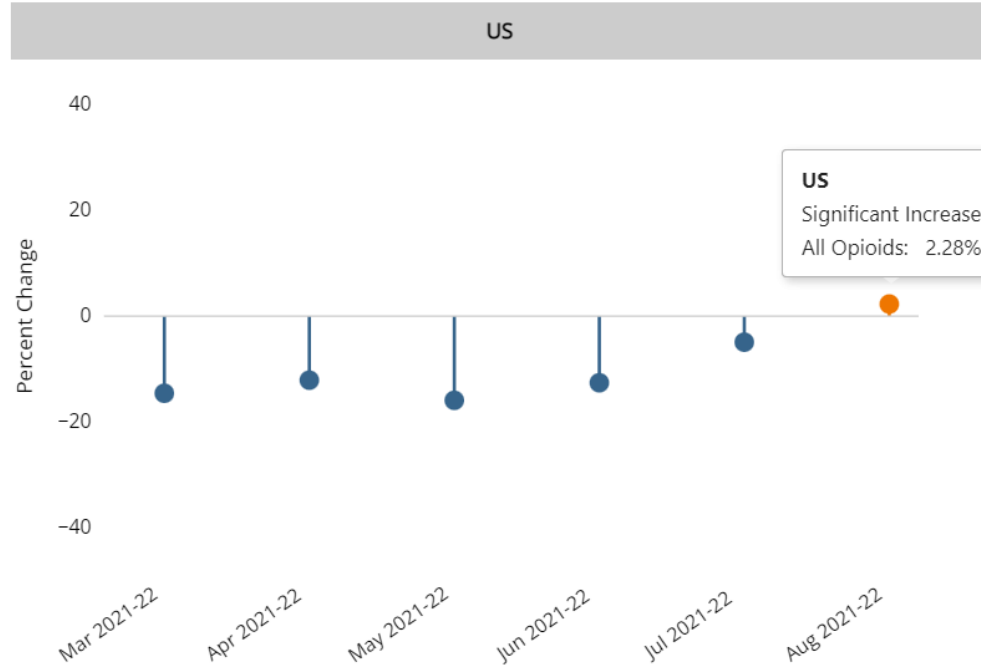
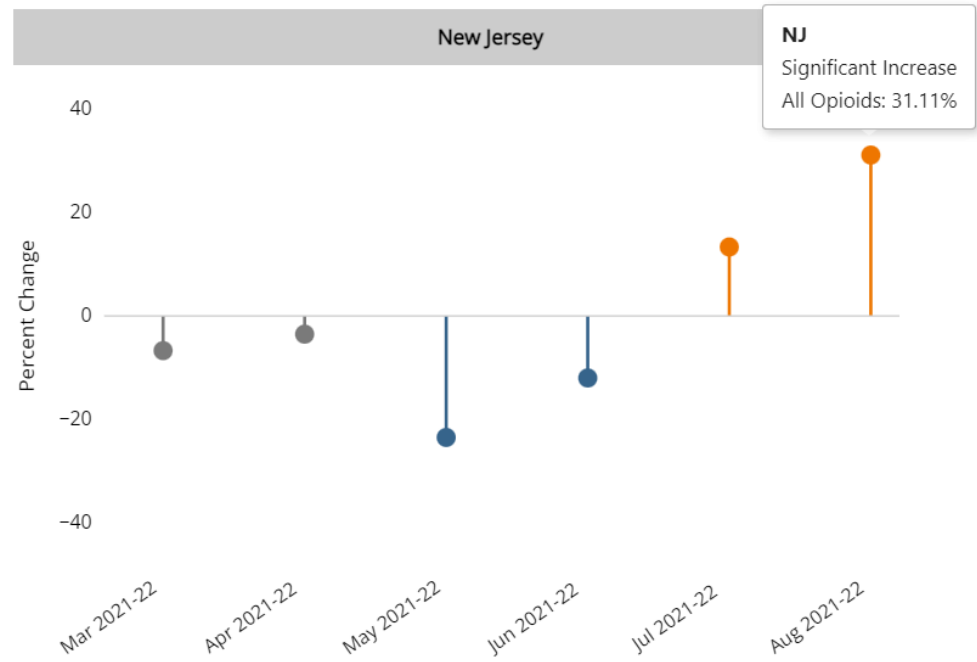
*CDC's Drug Overdose Surveillance and Epidemiology (DOSE) System*  
[Data Considerations and Data Download](#)



Annual percent change in suspected all opioid overdoses

### Annual percent change in ED visit rates<sup>†</sup> of suspected All Opioids overdoses

Compare United States against:



#### Color Legend

- Significant Increase
- Significant Decrease
- No Significant Change
- Data Not Available/Not Reported
- Unfunded State
- Suppressed Data

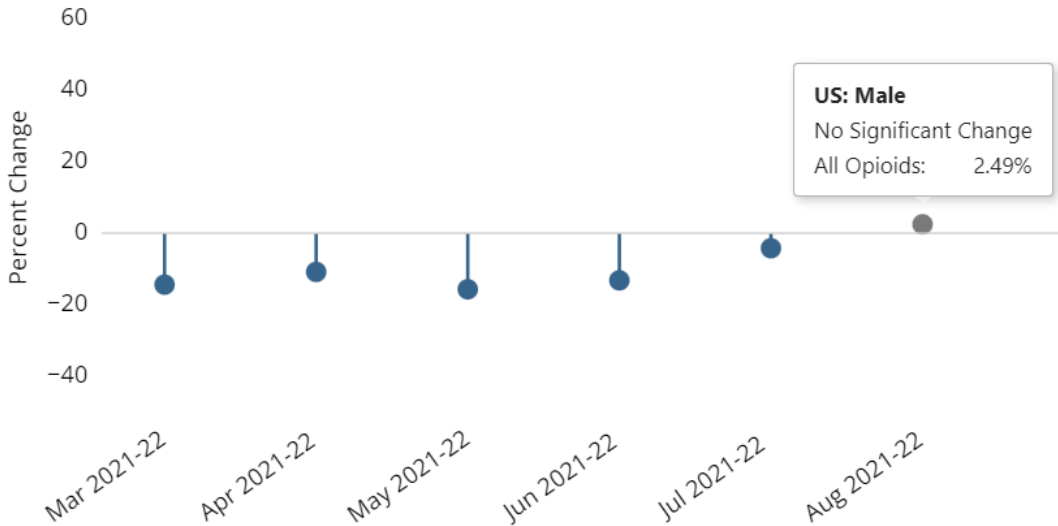
CDC's Drug Overdose Surveillance and Epidemiology (DOSE) System

[Data Considerations and Data Download](#)

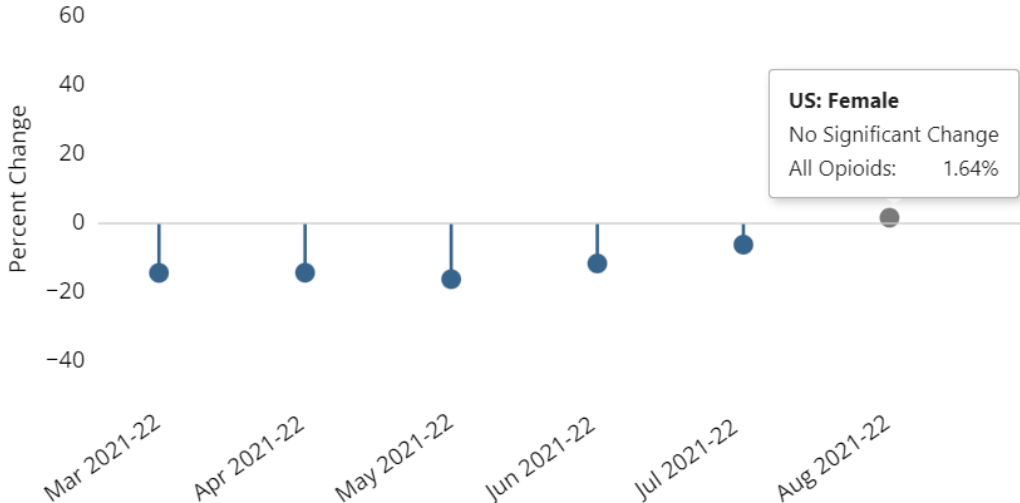
# Annual percent change in US Emergency Department visit rates<sup>†</sup> of suspected All Opioids overdoses

Sex Comparison  Age Comparison

## Male



## Female



### Color Legend

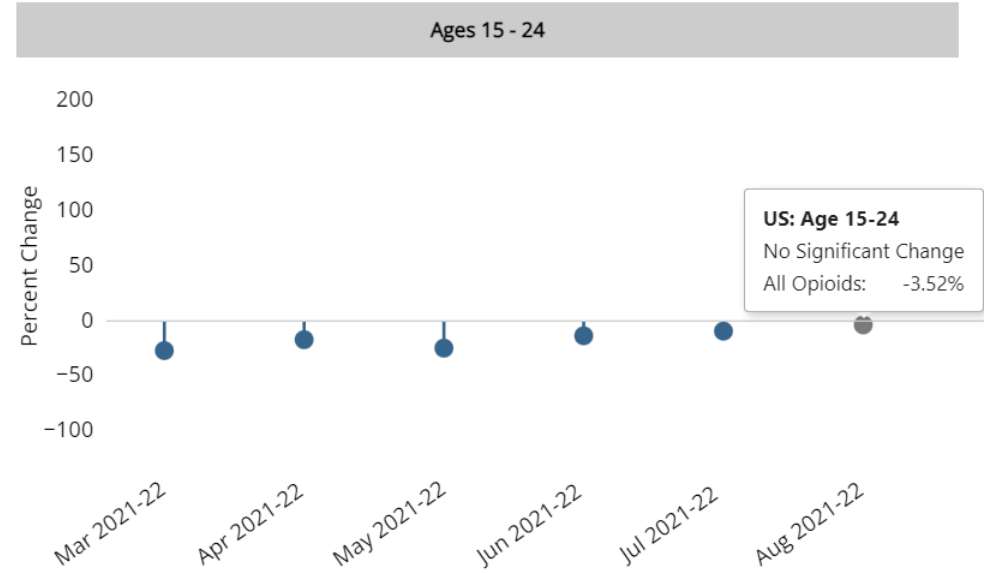
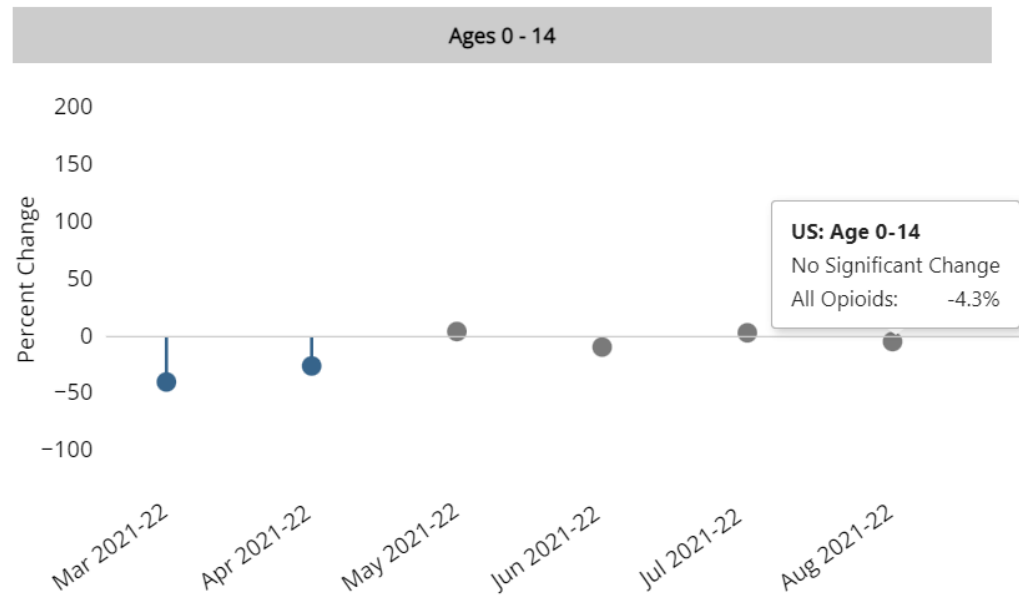
- Significant Increase
- Significant Decrease
- No Significant Change
- Data Not Available/Not Reported
- Unfunded State
- ✱ Suppressed Data

CDC's Drug Overdose Surveillance and Epidemiology (DOSE) System  
[Data Considerations and Data Download](#)



Annual percent change in US Emergency Department visit rates<sup>†</sup> of suspected All Opioids overdoses

Sex Comparison  Age Comparison



Color Legend

- Significant Increase
- Significant Decrease
- No Significant Change
- Data Not Available/Not Reported
- Unfunded State
- ✱ [Suppressed Data](#)

CDC's Drug Overdose Surveillance and Epidemiology (DOSE) System  
[Data Considerations and Data Download](#)

# DOSE Dashboard: Discharge Data

## Planned capabilities

- Ability to select time period (2018–current)
- Counts and rates per 100,000 population
- By data type (ED visit and hospital admissions)
- By drug type, including all drug, all opioid, heroin, and all stimulant (overall and by state)
- By age and sex (overall)
- County-level heat maps (annual rates for all drug ED visits)
- Updated annually

# Questions?

General: [DOSE@cdc.gov](mailto:DOSE@cdc.gov)

Shannon: [YQJ1@cdc.gov](mailto:YQJ1@cdc.gov)

*The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.*

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

