Enhanced State Opioid Overdose Surveillance (ESOOS) Program Overview

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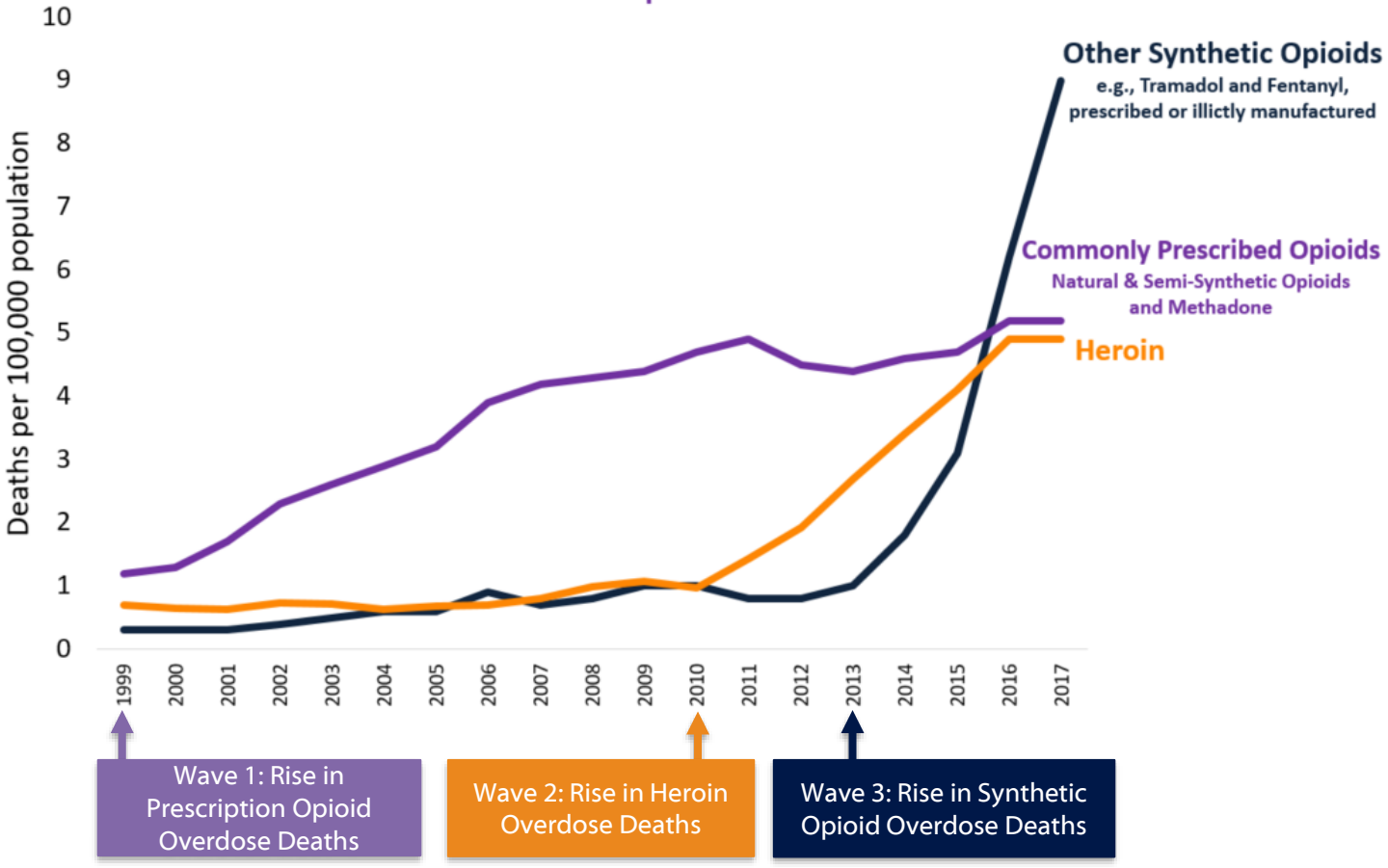
Division of Unintentional Injury Prevention

February 27, 2019

3 Waves of the Rise in Opioid Overdose Deaths



SOURCE: National Vital Statistics System Mortality File.

Pillars of CDC Activity

- **Improve data** quality and track trends
- **Strengthen state efforts** by scaling up effective public health interventions
- **Supply healthcare providers with resources** to improve patient safety
- **Collaborate with public safety** to respond quicker and more effectively
- **Empower consumers** to make safe choices




Enhanced State Opioid Overdose Surveillance (ESOOS)

- CDC funding for 12 states in September 2016; 20 additional states and the District of Columbia funded in September 2017 (through September 2019)
- Strategy One: Increase timeliness of non-fatal opioid overdose reporting
- Strategy Two: Increase timeliness of fatal opioid overdose reporting
- Strategy Three: Widespread dissemination to key stakeholders

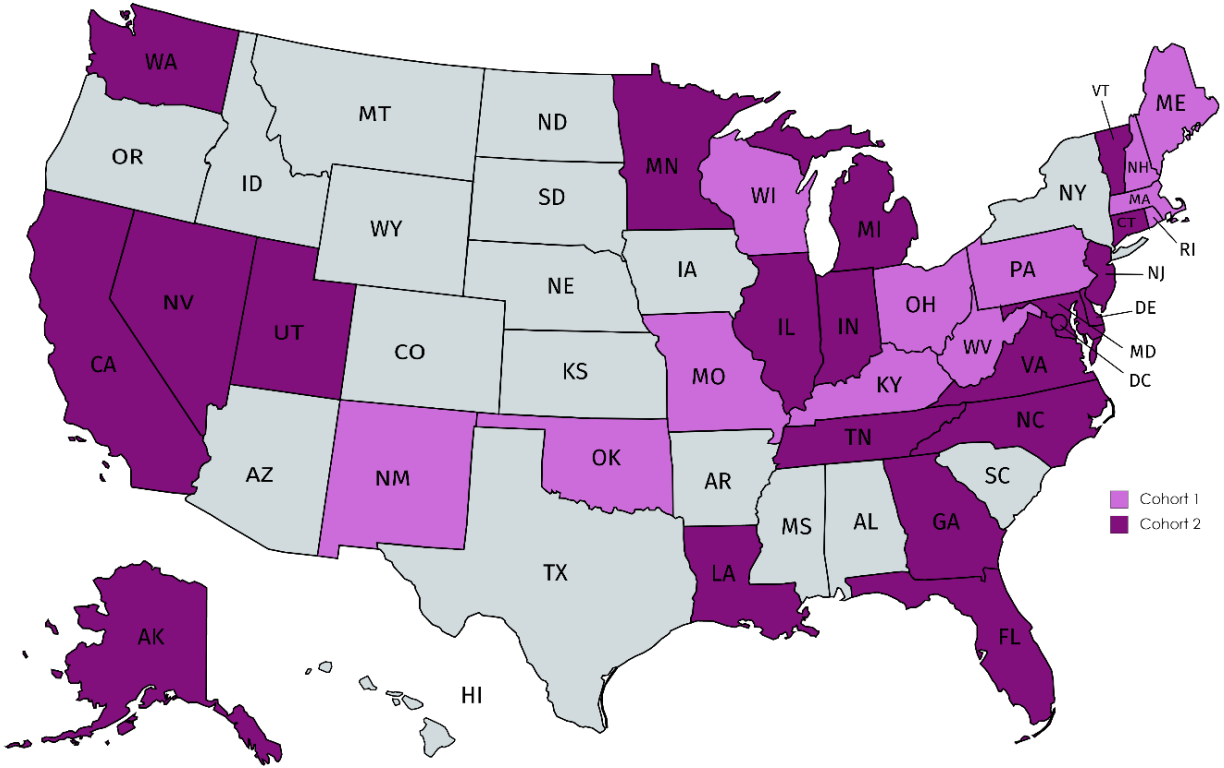
- ESOOS program expansion in September 2017
  - At least 60% for comprehensive toxicology testing for opioid-involved deaths

Funding for Enhanced Toxicology Testing

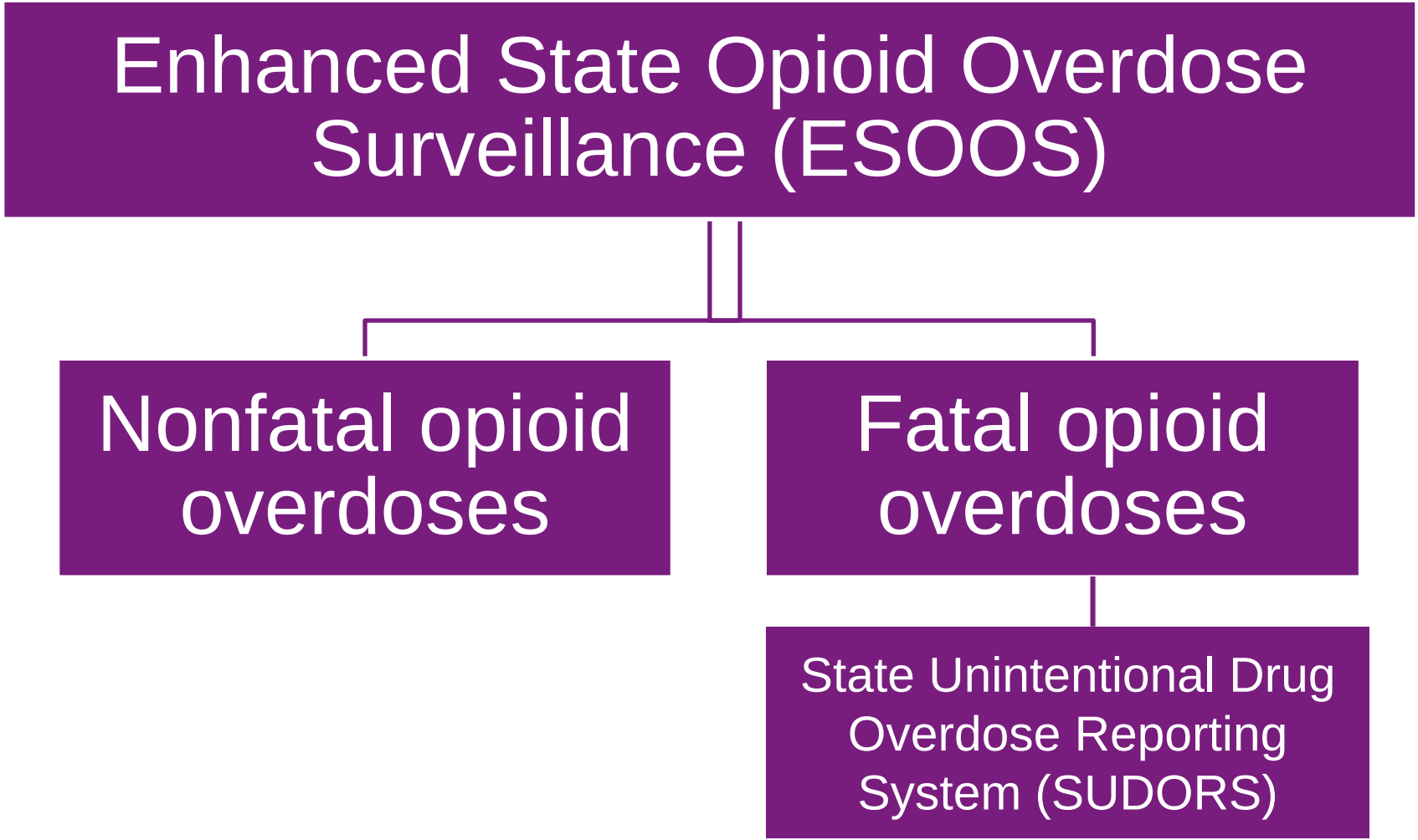
- Supplemental funding for all ESOOS-funded jurisdictions

- 40% of base funding
  - 60% of supplemental funds must go directly to medical examiners/ coroners (ME/Cs) to support comprehensive toxicology testing
  - If ME/Cs already fully funded for testing, can use funds for other innovative projects to improve timeliness/comprehensiveness of data

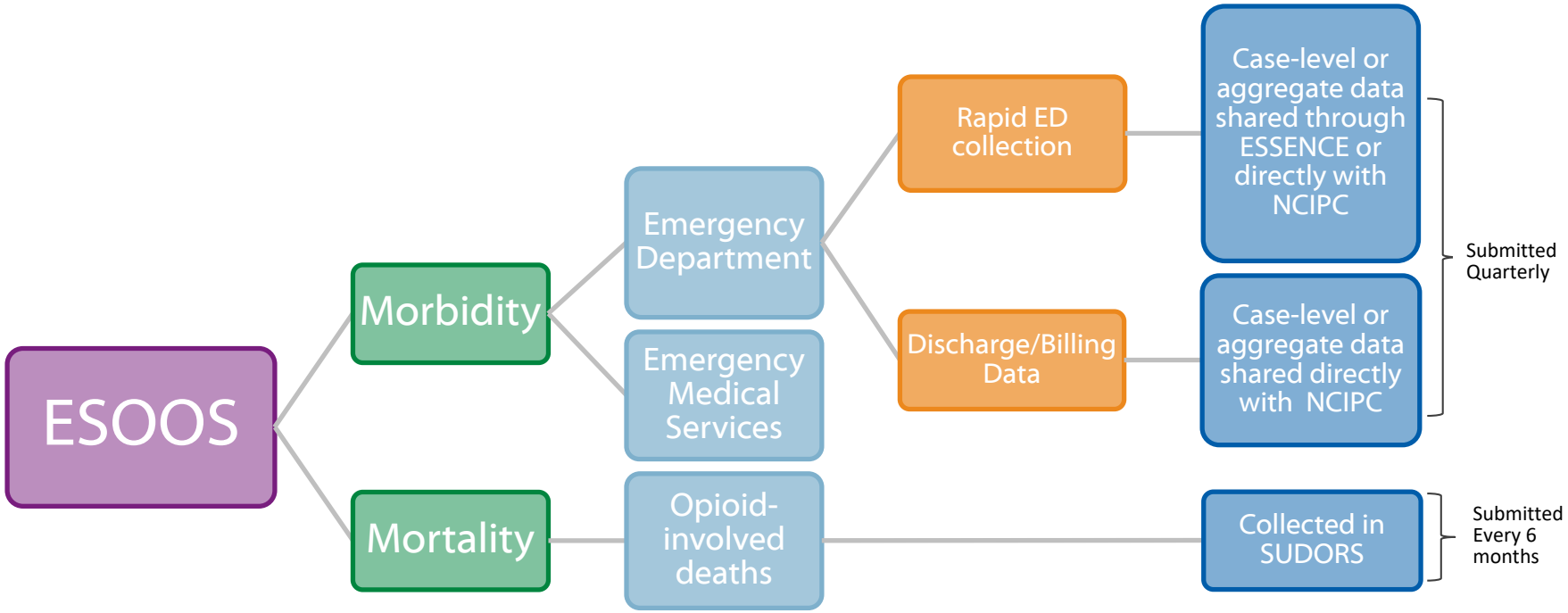
Funded ESOOS jurisdictions



Created with mapchart.net ©


Enhanced State Opioid Overdose Surveillance (ESOOS)
Nonfatal opioid overdoses
Fatal opioid overdoses
State Unintentional Drug Overdose Reporting System (SUDORS)

Data Streams



Strategy 1: Increase timeliness of non-fatal opioid overdose reporting

ESOOS Morbidity

Enhanced State Opioid Overdose Surveillance (ESOOS)

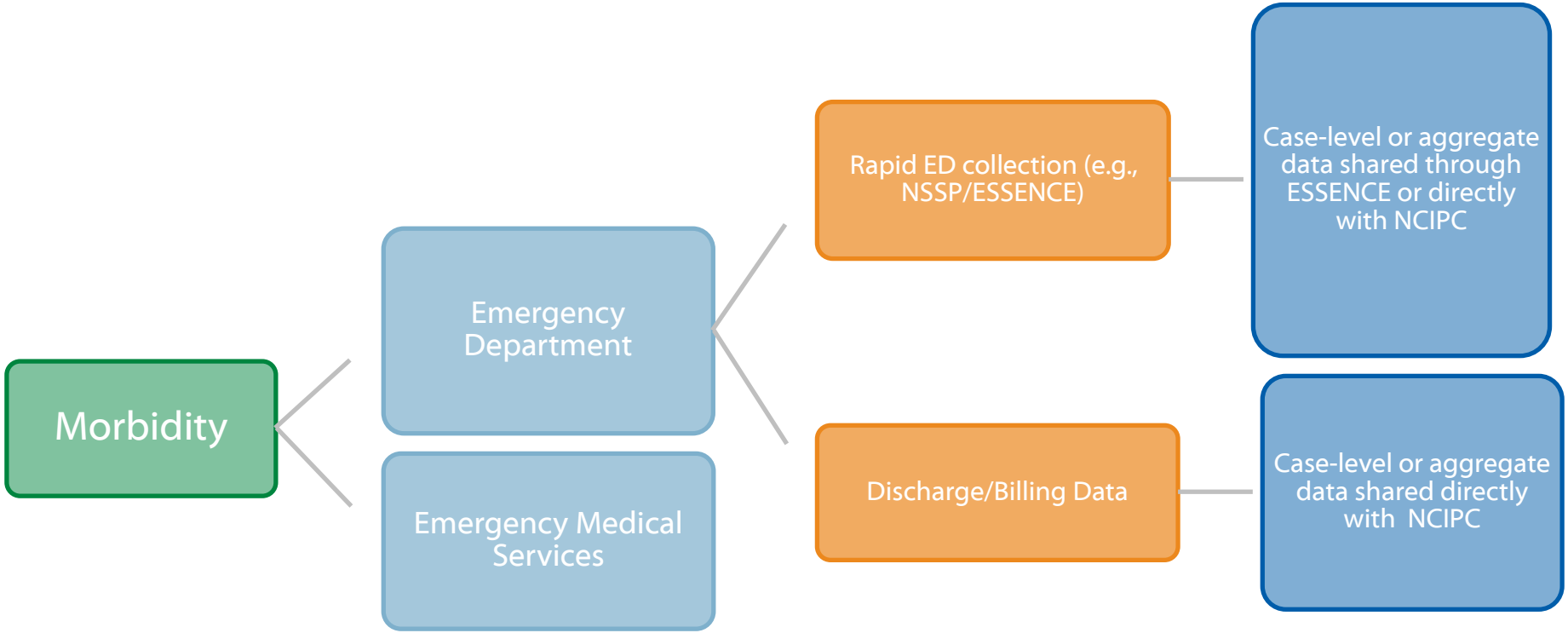
- Strategy One: Increase timeliness of non-fatal opioid overdose reporting
  - Use syndromic surveillance to establish an early warning system to detect sharp increases or decreases in non-fatal opioid overdoses.

Why Emergency Department and Emergency Medical Service Data for Surveillance?

- Need
  - Identify areas experiencing rapid increases in opioid overdoses to inform responses
  - More quickly identify promising practices to reduce opioid overdoses
- Proven utility to public health and scalable
  - Local jurisdictions already using it to track and respond to drug overdoses
  - Findings from Epi-Aid investigations and collaborative work with states
  - Leverage existing state and national resources (BioSense/ESSENCE)
- Action at local and national level
  - Improve more rapid local and state public health response
  - Track quarterly trends across the nation to inform national policy

Our Philosophy

- Focus on detecting change
  - Pushing system by looking at trend data over quarters
  - Some jurisdictions may be able to get and report preliminary burden estimates
- Jurisdiction-driven definitions will outperform national definitions
  - Local flexibility enhances quality and utility by accounting for large variance in text entries and coding
- National guidance
  - National definition will provide a good starting place
  - Guidance to encourage common conceptual definition (e.g., no withdrawal/detox) and learn from previous work


Morbidity
Emergency Department
Emergency Medical Services
Rapid ED collection (e.g., NSSP/ESSENCE)
Discharge/Billing Data
Case-level or aggregate data shared through ESSENCE or directly with NCIPC
Case-level or aggregate data shared directly with NCIPC

Data sources

- Two sources:
  - Near real-time syndromic data (visit information within 24-48 hours)
  - Lagged hospital billing or claims data (usually within 3-4 weeks)
- Different variables used:
  - Discharge diagnosis codes (e.g., ICD-10-CM) – available in billing data and sometimes syndromic
  - Free text fields (e.g., chief complaint provided by doctor) – available in syndromic
- Different platforms:
  - Leveraging CDC's National Syndromic Surveillance Program (NSSP)
  - State/local health department syndromic systems and billing data files

Case Definitions for Suspected Overdose

- If syndromic...
  - Uses both discharge codes (i.e., ICD-9-CM, ICD-10-CM, and SNOMED) and free text fields such as chief complaint or triage notes
  - Free text searches use common terms, slang, and misspellings (e.g., herion instead of heroin)
- If hospital billing or claims…
  - Uses only discharge codes (i.e., ICD-9-CM, ICD-10-CM, and SNOMED)
- Discharge codes use are for acute unintentional or undetermined drug poisoning (e.g., T40.1X1A in ICD-10-CM) and may also include some substance use/abuse codes (i.e., F11 in ICD-10-CM)

Opioid overdose query for syndromic surveillance in NSSP/ESSENCE

Variable	Automatic inclusion?	Specific terms
Discharge Diagnosis – ICD-9-CM poisoning	Yes	965.00, 965.01, 965.02, 965.09,E850.0, E850.1, E850.2 (also included terms with no period, e.g., “96500”)
Discharge Diagnosis – ICD-10-CM poisoning	Yes	T40.1X1A, T40.1X4A, T40.0X1A, T40.0X4A, T40.2X1A, T40.2X4A, T40.3X1A, T40.3X4A, T40.4X1A, T40.4X4A, T40.601, T40.604, T40.691, T40.694 (also included terms with no period, e.g., “T401X1A”)
Discharge Diagnosis – ICD-10-CM opioid abuse/dependence/use with intoxication	Yes	F11.12, F11.120, F11.121, F11.122, F11.129, F11.22, F11.220, F11.221, F11.222, F11.229, F11.92, F11.920, F11.921, F11.922, F11.929 (also included terms with no period, e.g., “F1112”)
Discharge Diagnosis – SNOMED	Yes	295174006, 295175007, 295176008, 295165009, 242253008, 297199006, 295213004
Chief complaint – narcan or naloxone	Yes	Naloxone (narcan, evzio)
Chief complaint – overdose term	No, must use in combination with opioid term	Poisoning (poison); Overdose (overdose, overdoes, averdose, averdoes, over does, overose); Nodding off; Snort; Ingestion (ingest, injest); Intoxication (intoxic); Unresponsive (unresponsiv); Loss of consciousness (syncopy, syncope); Shortness of breath (SOB), short of breath; Altered mental status (AMS)
Chief complaint – opioid term	No, must use in combination with overdose term	opioid, opiod, opoid, opiate, opate, opium, opium, opum, heroin, herion, heroine, HOD, speed ball, speedball, dope, methadone, suboxone, oxyco, oxy, oxyi, percoc, vicod, fent, hydrocod, morphin, codeine, codiene, codene, oxymor, dilaud, hydromor, tramad, suboxin, buprenorphine, and other common opioid brand and generic names
Discharge Diagnosis – ICD-10-CM opioid abuse/dependence/use	No, must use in combination with overdose term	F11.10, F11.90, F11.20

Emergency medical services (EMS) data

- Capture potential EMS transports to EDs
  - Excludes instances where individual is pronounced deceased on the scene, inter-facility transports, and when EMTs provide no “treatment” (e.g., patient refused or required no treatment or transport)
- Different variables used:
  - Chief Complaint; Secondary complaint
  - Narrative
  - Provider Impression
  - ICD-10-CM codes
  - Medication administered (i.e., Naloxone)
  - Response to medication administered (i.e., awake following Naloxone administration)

Quarterly data submission

Nonfatal Opioid Overdose Surveillance Strategy 1: Increase the timeliness of aggregate nonfatal opioid overdose reporting	
Quarterly Surveillance Data Reports (Data Submission)	**Dates of Overdoses Included in Quarterly Report to Meet Minimum Reporting Requirements**
April 15, 2017	October 2016 to December 2016
July 15, 2017	January 2017 to March 2017
October 15, 2017	April 2017 to June 2017
January 15, 2018	July 2017 to September 2017
April 15, 2018	October 2017 to December 2017
July 15, 2018	January 2018 to March 2018
October 15, 2018	April 2018 to June 2018
January 15, 2019	July 2018 to September 2018
April 15, 2019	October 2018 to December 2018
July 15, 2019	January 2019 to March 2019

What do we capture from ED & EMS data?

- Count data for at least two of the three drug overdose indicators per quarter from 31 states for ED and 19 states for EMS
  - Some as far back as Q1 2016
  - All data through Q3 2018 (*as of January 15, 2019*)
- Total number of ED visits per quarter
- Stratified by state, sex, age group, county of patient residence (or county of incident for EMS), and race/ethnicity (optional)
- Metadata to assess data quality and completeness changes (e.g., facility onboarding)

Strategy 2: Increase timeliness of fatal opioid overdose reporting

ESOOS Mortality – State Unintentional Drug Overdose Reporting System (SUDORS)

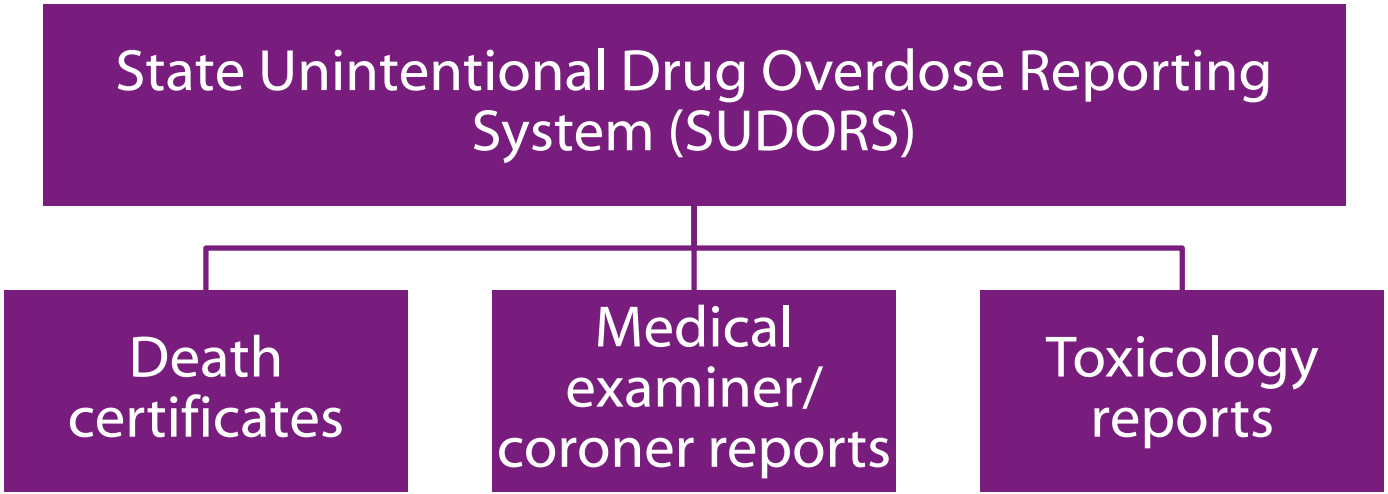
Enhanced State Opioid Overdose Surveillance (ESOOS)

- Strategy Two: Increase timeliness and comprehensiveness of fatal opioid overdose reporting
  - Capture detailed information on toxicology, death scene investigations, and other risk factors that may be associated with a fatal overdose

- ESOOS program expansion in September 2017
  - At least 60% for comprehensive toxicology testing for opioid-involved deaths

Role of Fatal Opioid Overdose Surveillance

- Track specific substances contributing to overdose deaths
- Detect newly-emerging substances involved in overdose
- Determine risk factors and circumstances associated with fatal overdose
- Assess common drug combinations
- Provide more timely data on overdose deaths


State Unintentional Drug Overdose Reporting System (SUDORS)
Death certificates
Medical examiner/ coroner reports
Toxicology reports

State Unintentional Drug Overdose Reporting System (SUDORS)

Death certificates

Medical examiner/ coroner reports

Toxicology reports

Prevention

Intervention

Response

Death certificates

Medical examiner/ coroner reports

Toxicology reports

SUDORS: Data for Action

Prevention

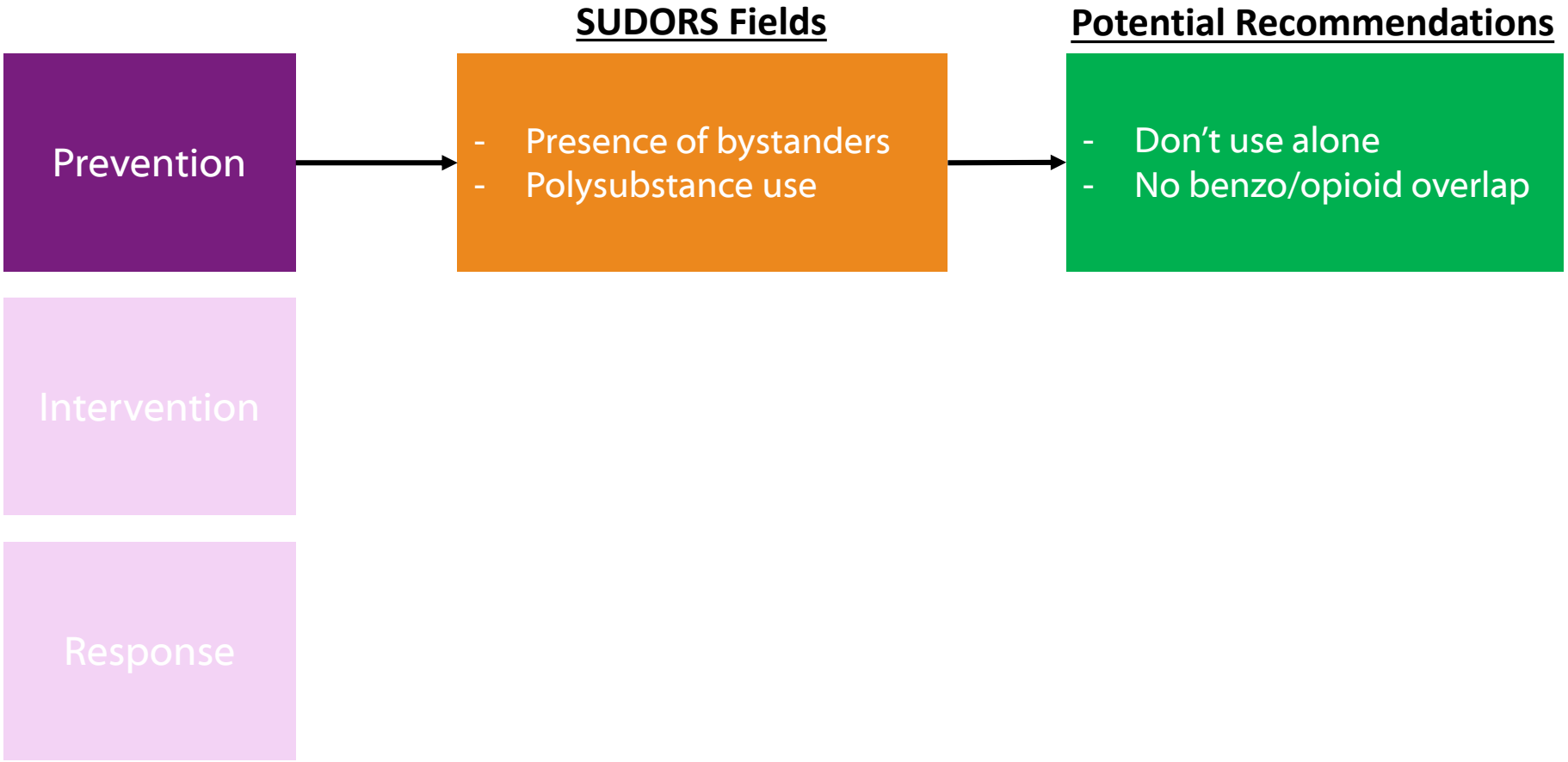
Intervention

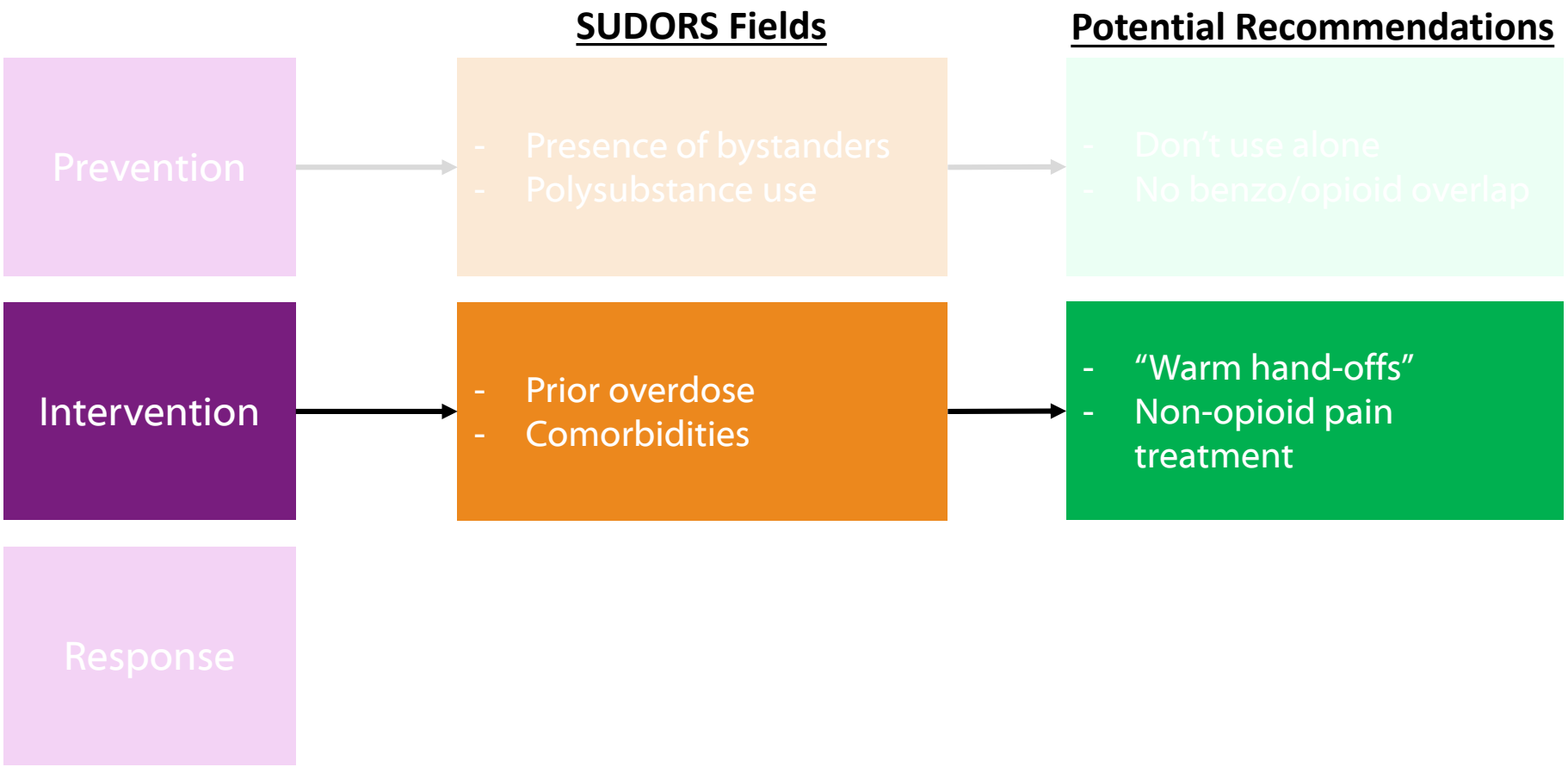
Response

Prevention

Intervention

Response


SUDORS Fields
Potential Recommendations
Prevention
- Presence of bystanders
- Polysubstance use
- Don’t use alone
- No benzo/opioid overlap
Intervention
Response


SUDORS Fields
Potential Recommendations
Prevention
- Presence of bystanders
- Polysubstance use
- Don't use alone
- No benzo/opioid overlap
Intervention
- Prior overdose
- Comorbidities
- "Warm hand-offs"
- Non-opioid pain treatment
Response

	SUDORS Fields	Potential Recommendations
Prevention	- Presence of bystanders - Polysubstance use	- Don't use alone - No benzo/opioid overlap
Intervention	- Prior overdose - Comorbidities	- "Warm hand-offs" - Non-opioid pain treatments
Response	- Naloxone administered - Bystander response - Substance potency	- Naloxone access/ education - Family/friend awareness

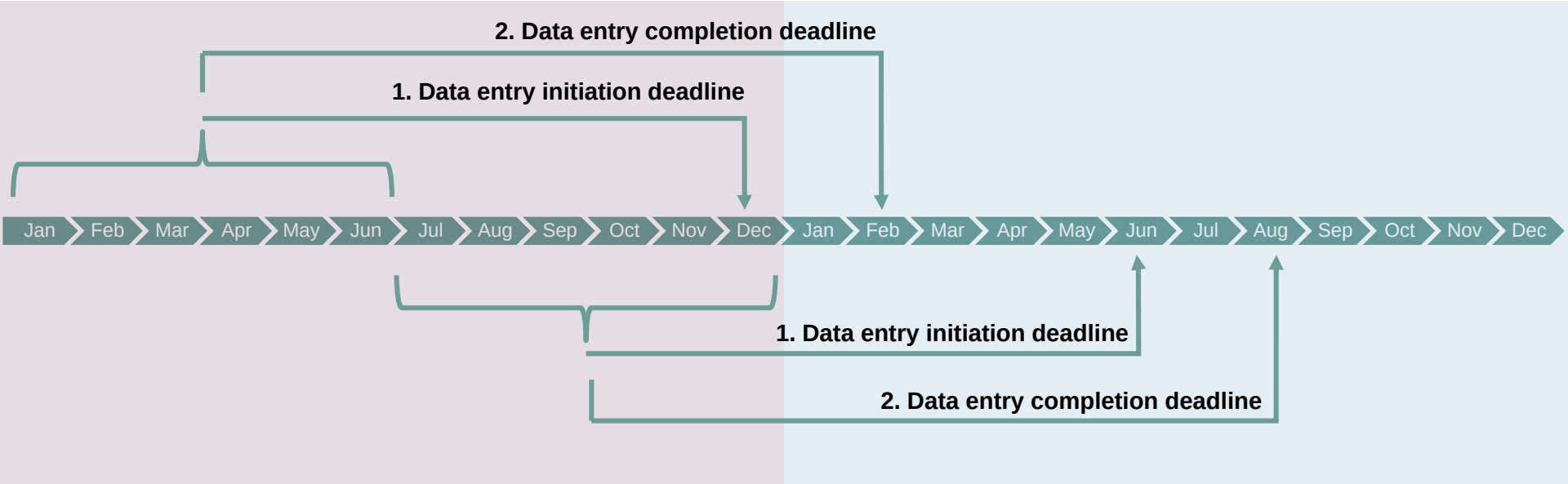
SUDORS case definitions for opioid overdose deaths

- Cases identified using death certificate cause of death information
  - Literal cause of death text fields
  - Underlying cause-of-death codes X40–44 (unintentional poisoning) and Y10 –14 (poisoning of undetermined intent)
  - Multiple cause-of-death codes
    - T40.0 (poisoning by opium)
    - T40.1 (poisoning by heroin)
    - T40.2 (poisoning by natural and semi-synthetic opioids)
    - T40.3 (poisoning by methadone)
    - T40.4 (poisoning by synthetic opioids other than methadone)
    - T40.6 (poisoning by other unspecified narcotics)

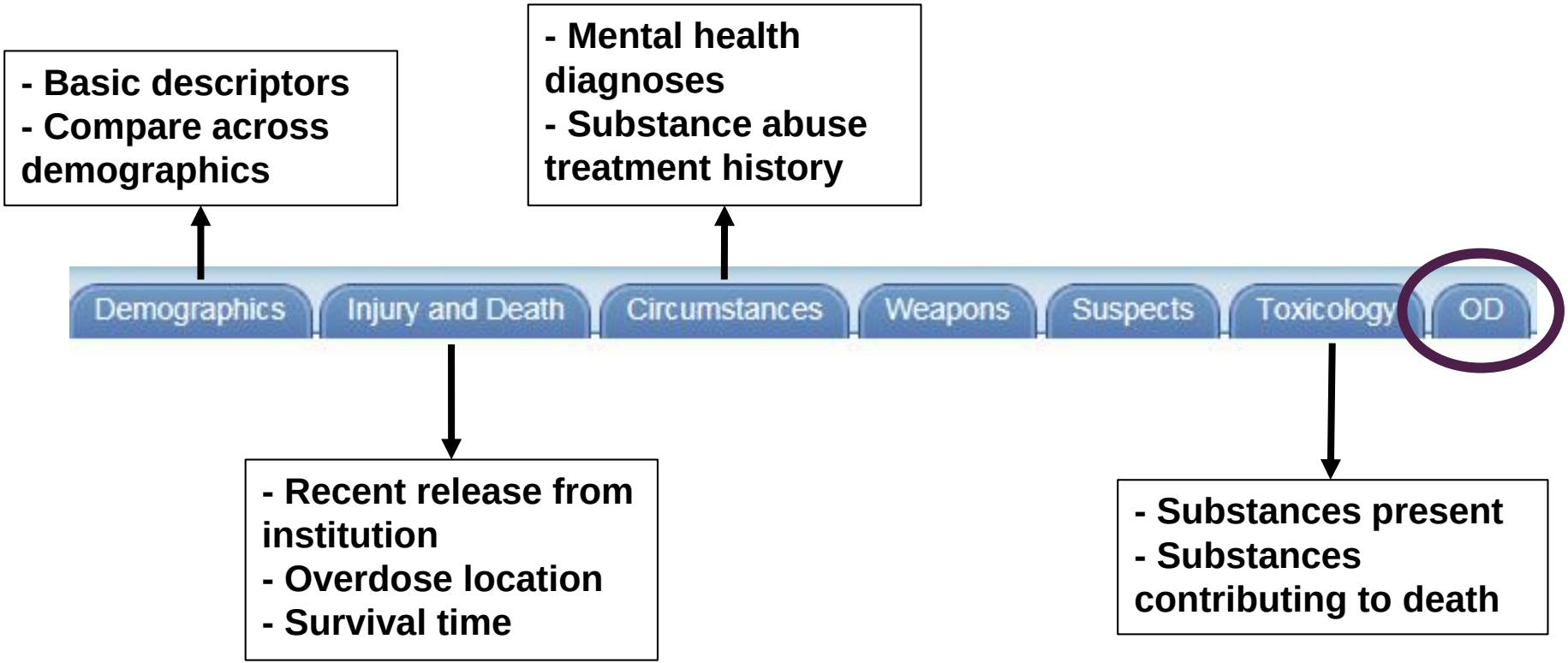
SUDORS case definitions for opioid overdose deaths

- Cases identified using medical examiner/coroner (ME/C) reports to supplement cause-of-death codes
  - E.g., death certificate says “drug toxicity” but does not specify any substance(s), but ME/C report mentions lethal amount of fentanyl
  - E.g., death certificate has pending cause of death but ME/C report indicates a drug overdose with a contributing opioid

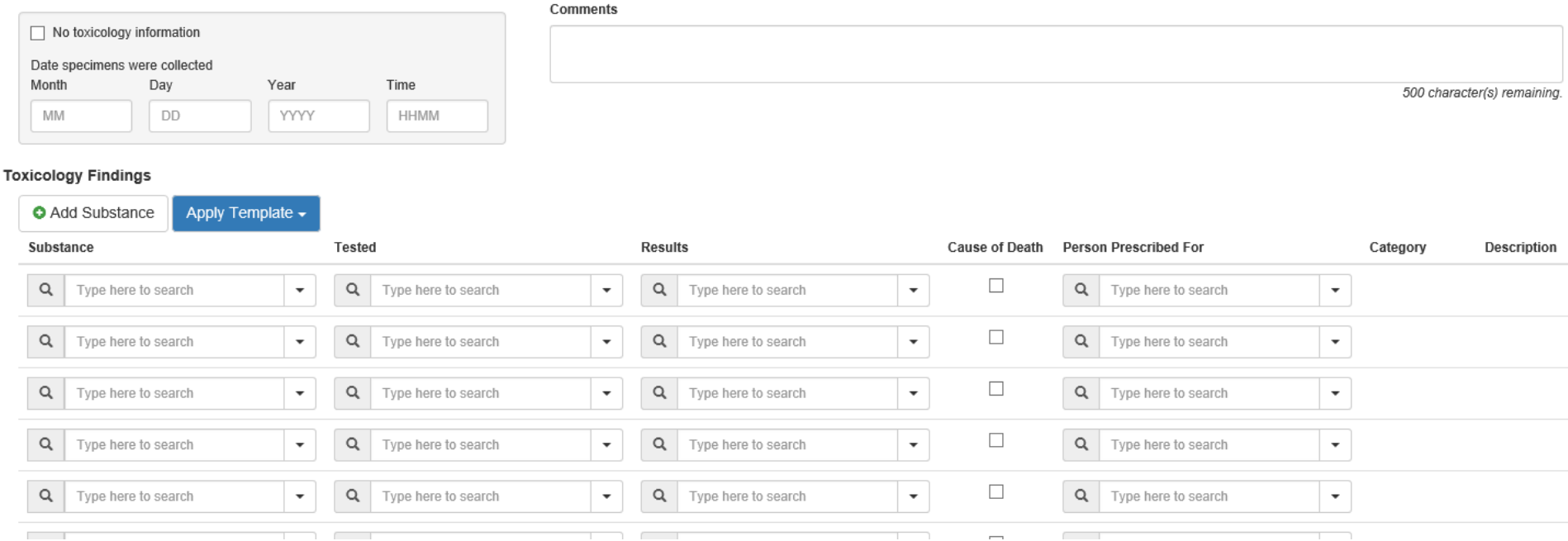
SUDORS Data Submitted Bi-annually



SUDORS leverages the web-based platform of the National Violent Death Reporting System (NVDRS)



Toxicology Information



Strategy 3 – Data Dissemination

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Early Release / Vol. 67 March 6, 2018

Vital Signs: Trends in Emergency Department Visits for Suspected Opioid Overdoses — United States, July 2016–September 2017

Alana M. Vivolo-Kantor, PhD[1]; Puja Seth, PhD[1]; R. Matthew Gladden, PhD[1]; Christine L. Mattson, PhD[1]; Grant T. Baldwin, PhD[1]; Aaron Kite-Powell, MS[2]; Michael A. Coletta, MPH[2]

Abstract

Introduction: From 2015 to 2016, opioid overdose deaths increased 27.7%, indicating a wors
epidemic and highlighting the importance of rapid data collection, analysis, and disseminat

Methods: Emergency department (ED) syndromic and hospital billing data on opioid
July 2016–September 2017 were examined. Temporal trends in opioid overdoses from 52 ju
analyzed at the regional level and by demographic characteristics. To assess trends based o
from 16 states were analyzed by state and urbanization level.

Results: From July 2016 through September 2017, a total of 142,557 ED visits (15.7
jurisdictions in 45 states were suspected opioid-involved overdoses. This rate increased on a
Rates increased across demographic groups and all five U.S. regions, with largest increases in t
West (approximately 7%–11% per quarter). In 16 states, 119,198 ED visits (26.7 per 10,000 v
involved overdoses. Ten states (Delaware, Illinois, Indiana, Maine, Missouri, Nevada, North C
and Wisconsin) experienced significant quarterly rate increases from third quarter 2016 to
one state (Kentucky), rates decreased significantly. The highest rate increases occurred in larg

Conclusions and Implications for Public Health Practice: With continued increases in o
of timely data is important to inform actions taken by EDs and public health practitioners. I
varied by region and urbanization level, indicating a need for localized responses. Educati
members about appropriate services for immediate care and treatment and implementing a
includes naloxone provision and linking persons into treatment could assist EDs with preve

Introduction

The opioid overdose epidemic continues to worsen in the United States. In 2016, a total of 63,632 drug overdose deaths occurred, a 21.4% increase from 2015 (*1,2*). Nearly two thirds (66.4%) of drug overdose deaths in 2016 involved prescription opioids, illicit opioids, or both, an increase of 27.7% from 2015 (*2*). Heroin and synthetic opioids (e.g., fentanyl) are driving increases in opioid-involved deaths (*2–4*). Tracking opioid overdoses is important to informing targeted interventions; however, timely national data on opioid overdoses evaluated in emergency departments (EDs
billing data from 2014 indicat
visits occurred for unintention
but the time lag poses challen
ED syndromic data are impo
outbreaks (*6*) and can poten
overdoses quickly. Compare
data are collected in near real
24–48 hours of an ED visit
as an early warning system t

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

CDC Vitalsigns™ #vitalsigns MAR 2018

↑30% Opioid overdoses went up 30% from July 2016 through September 2017 in 52 areas in 45 states.

↑70% The Midwestern region saw opioid overdoses increase 70% from July 2016 through September 2017.

↑54% Opioid overdoses in large cities increased by 54% in 16 states.

Want to learn more? Visit: www.cdc.gov/vitalsigns

Opioid Overdoses Treated in Emergency Departments

Identify opportunities for action

Emergency department (ED) visits for opioid* overdoses rose 30% in all parts of the US from July 2016 through September 2017. People who have had an overdose are more likely to have another, so being seen in the ED is an opportunity for action. Repeat overdoses may be prevented with medication-assisted treatment (MAT) for opioid use disorder (OUD), which is defined as a problematic pattern of opioid use. EDs can provide naloxone, link patients to treatment and referral services, and provide health departments with critical data on overdoses. ED data provide an early warning system for health departments to identify increases in opioid overdoses more quickly and coordinate response efforts. This fast-moving epidemic does not stay within state and county lines. Coordinated action between EDs, health departments, mental health and treatment providers, community-based organizations, and law enforcement can prevent opioid overdose and death.

Health departments can

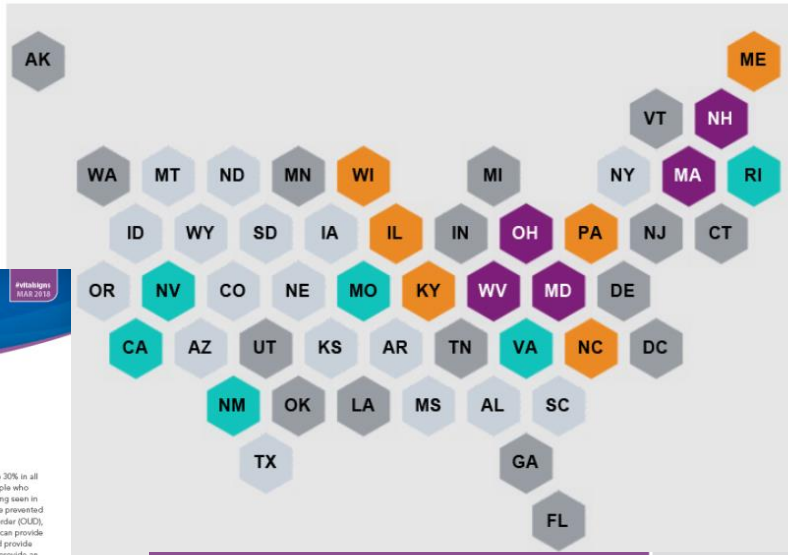
- Alert communities to rapid increases in overdoses seen in EDs for an informed and timely response.
- Increase naloxone distribution (an overdose-reversing drug) to first responders, family and friends, and other community members in affected areas, as policies permit.
- Increase availability of and access to treatment services, including mental health services and MAT for OUD.
- Support programs which reduce harms from injecting opioids, including those offering screening for HIV and hepatitis B and C, in combination with referral to treatment.
- Support the use of the *CDC Guideline for Prescribing Opioids for Chronic Pain*, which encourages using prescription drug monitoring programs (PDMPs) to inform clinical practice. https://go.usa.gov/xn6uQ

*Opioids include prescription pain medications, heroin, and illicitly manufactured fentanyl.

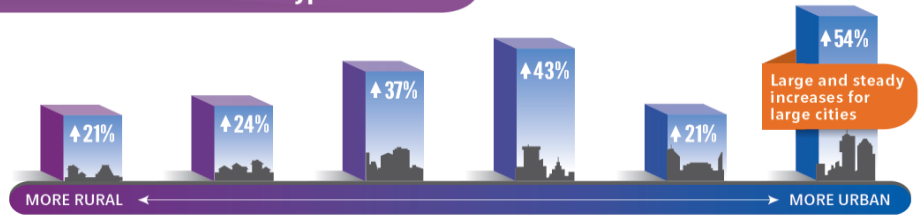
Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

Trends in Emergency Department Visits for Suspected Opioid Overdose, Q4 2016 to Q4 2017

CDC's Enhanced State Opioid Overdose Surveillance Program



Opioid overdoses continued to increase in cities and towns of all types.*

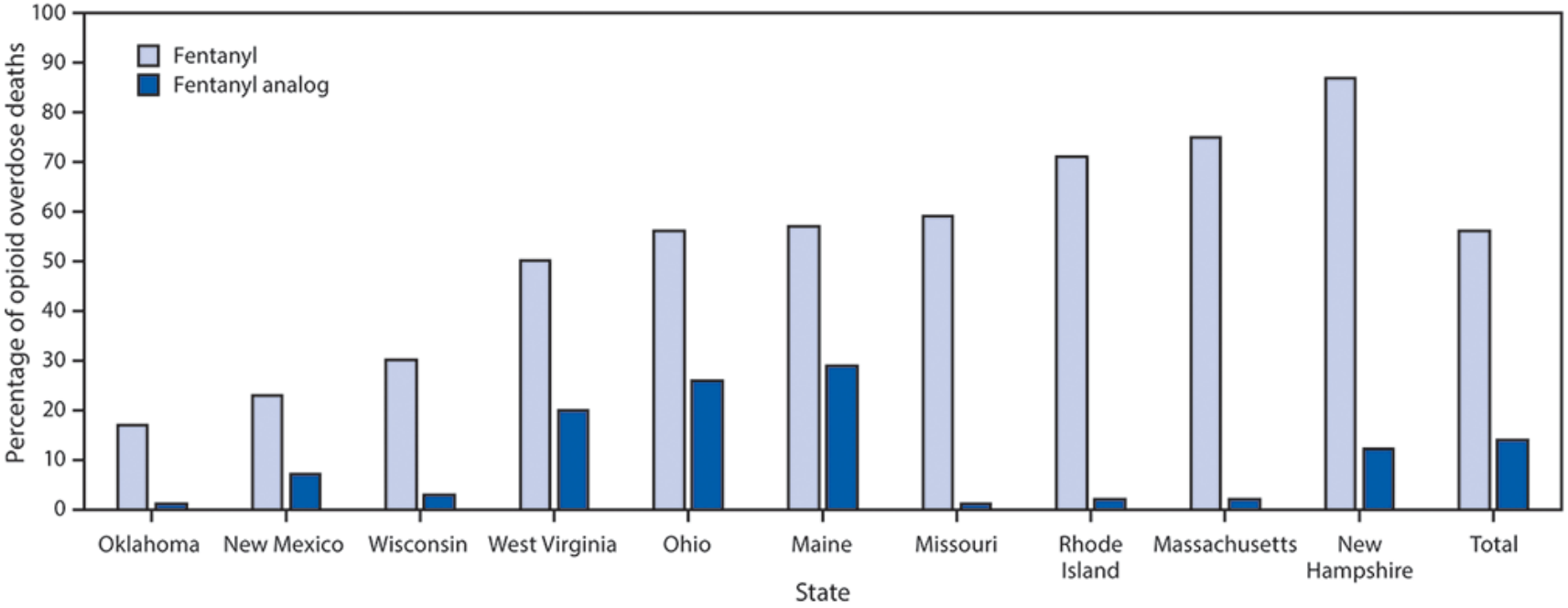


SOURCE: CDC's Enhanced State Opioid Overdose Surveillance (ESOOS) Program, 16 states reporting percent changes from July 2016 through September 2017.

* From left to right, the categories are:
1) non-core (non-metro), 2) micropolitan (non-metro), 3) small metro, 4) medium metro, 5) large fringe metro, 6) large central metro.

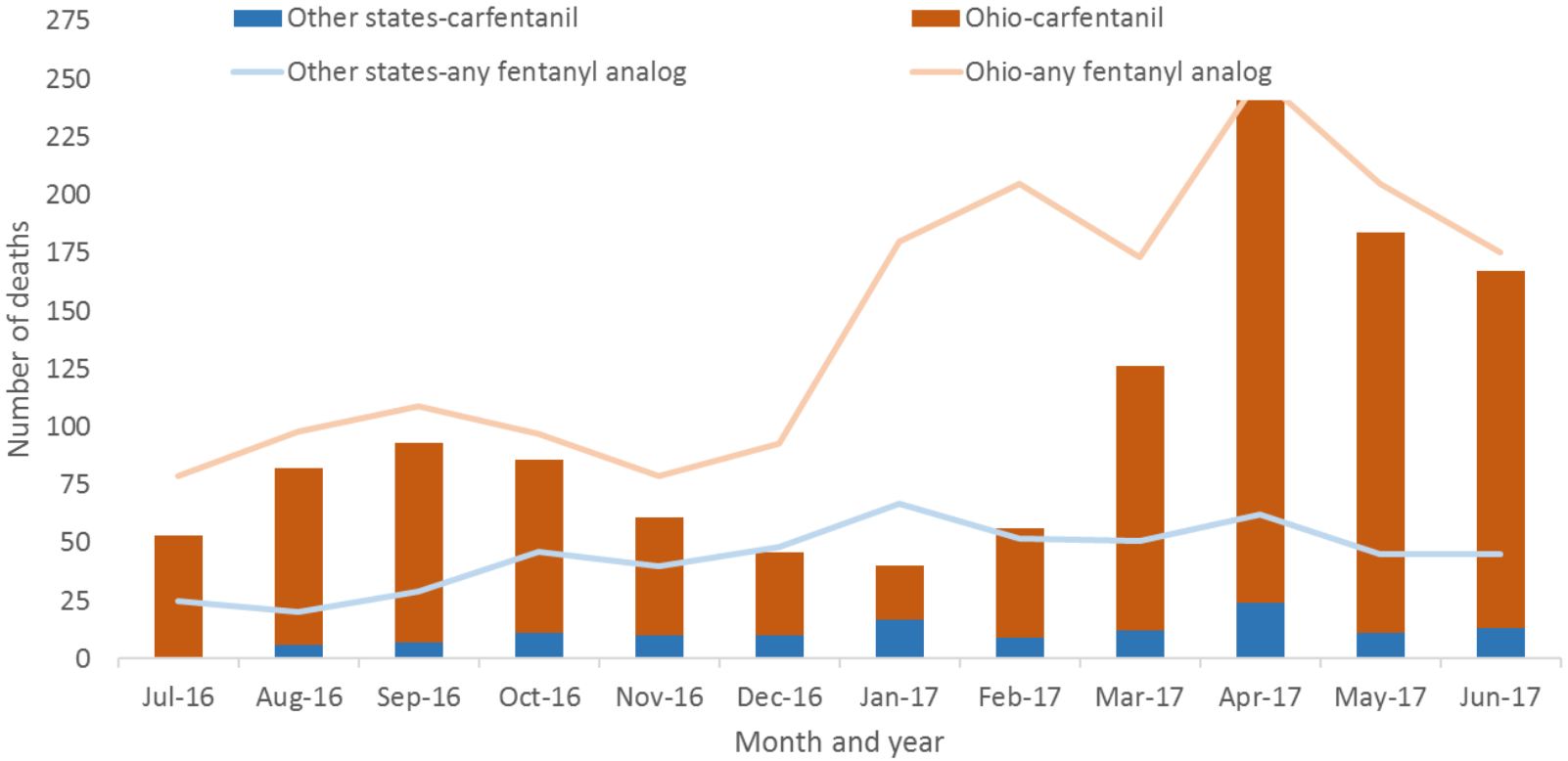
MMWR – SUDORS data, November 2017

FIGURE. Percentage of opioid overdose deaths testing positive for fentanyl and fentanyl analogs, by state — 10 states, July–December 2016



O'Donnell JK, Halpin J, Mattson CL, Goldberger BA, Gladden RM. Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 — 10 States, July–December 2016. MMWR Morb Mortal Wkly Rep 2017;66:1197–1202. DOI: http://dx.doi.org/10.15585/mmwr.mm6643e1

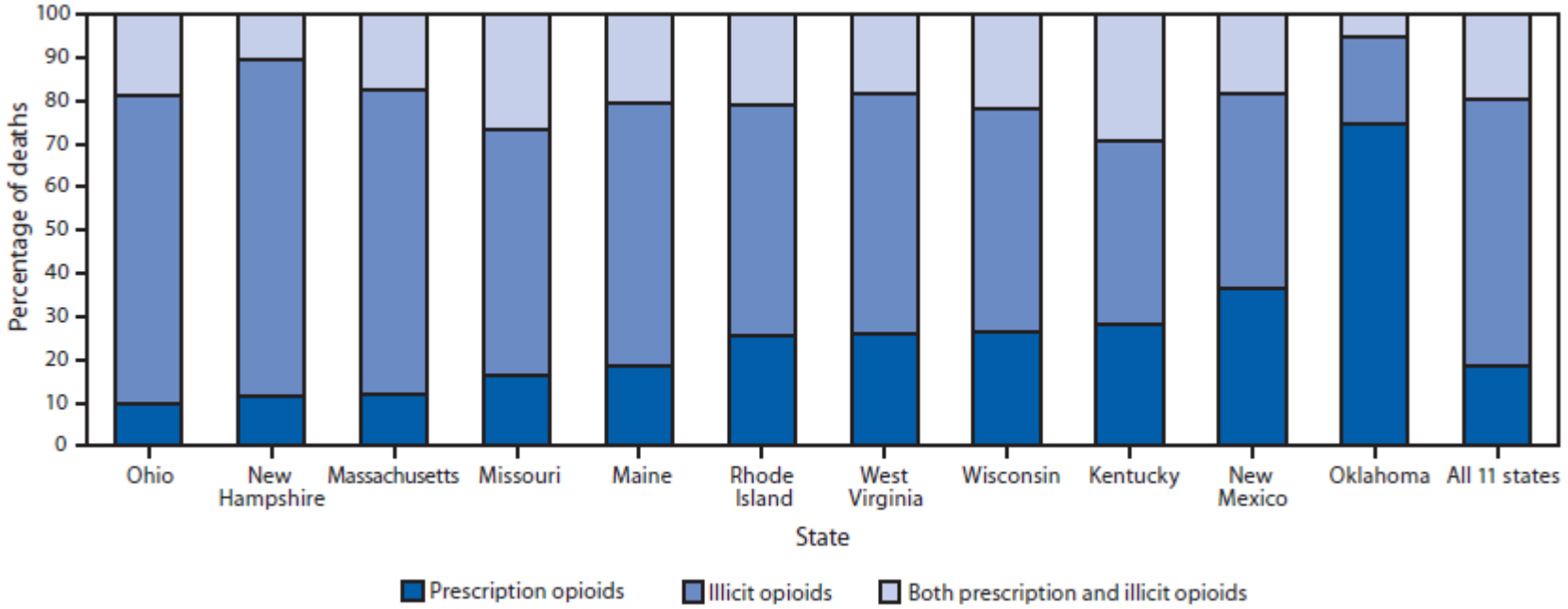
MMWR – SUDORS data, July 2018



Adapted from: O'Donnell J, Gladden RM, Mattson CL, Kariisa M. Notes from the Field: Overdose Deaths with Carfentanil and Other Fentanyl Analogs Detected — 10 States, July 2016–June 2017. MMWR Morb Mortal Wkly Rep 2018;67:767–768. DOI: http://dx.doi.org/10.15585/mmwr.mm6727a4

MMWR – SUDORS data, August 2018

FIGURE. Percentage of opioid overdose deaths in which prescription opioids only,* illicit opioids only,† or both prescription and illicit opioids§ were detected, by state — 11 states, July 1, 2016–June 30, 2017



Mattson CL, O'Donnell J, Kariisa M, Seth P, Scholl L, Gladden RM. Opportunities to Prevent Overdose Deaths Involving Prescription and Illicit Opioids, 11 States, July 2016–June 2017. MMWR Morb Mortal Wkly Rep 2018;67:945–951. DOI: http://dx.doi.org/10.15585/mmwr.mm6734a2

Overdose Data to Action

Components and Strategies: At-a-glance

- **Surveillance Component**
  - *Morbidity*
  - *Mortality*
  - *Innovative Projects*
- **Prevention Component**
  - *Prescription Drug Monitoring Programs (PDMPs)*
  - *State-local integration*
  - *Linkage to Care*
  - *Providers and Health Systems Support*
  - Public Safety Partnerships
  - Empowering Individuals
  - Innovation Projects

Italicized strategies are required

What Are the Major Changes from ESOOS?

- Even faster data
- **Only** ED data are required - more coverage (>75%) & more comprehensive
  - Suspected all drug, opioid, heroin, stimulant overdoses - required
- SUDORS will be collecting data on all drug overdoses, not just opioid-involved
  - More funding to medical examiners/coroners
  - Preliminary counts of opioid-involved deaths based on clinical and scene evidence (optional)
- Innovative projects
- Funding to territories and cities

Surveillance Component

- **Strategy 1:** Collect and disseminate timely emergency department (ED) data on suspected all drug, all opioid, heroin, and all stimulant overdoses

- **Strategy 2:** Collect and disseminate descriptions of drug overdose death circumstances using death certificates and medical examiner/coroner data

- **Strategy 3:** Implement innovative surveillance to support OD2A interventions

Surveillance Strategy 3: Innovative Projects

- Linkage to care
- Local health surveillance of people misusing drugs
- Track public health risk of illicit opioid drug supply
- Link overdose data from different sources
- Link PDMP data to other data systems
- Innovative drug overdose morbidity/mortality data
- Other critical surveillance interventions

Acknowledgements

- **Participating Jurisdictions**
  - State health departments
  - Medical examiner and coroner offices
  - Vital registrar offices

- **CDC ESOOS Team**
  - Puja Seth, Catherine Sanders, Christine Mattson, Julie O'Donnell, Matthew Gladden, Alana Vivolo-Kantor, Rose Rudd, Lawrence Scholl, Nana Wilson, Brooke Hoots, Stephen Liu, Emily Olsen, Desiree Mustaquim, Doug Roehler, Mbabazi Kariisa, Felicita David, Londell McGlone, Naomi David, Anita Pullani, Terry Davis, Shelby Alexander, Jocelyn Wheaton, Angela Hickman, Henrietta Kuoh, Lindsay Culp, Megan Early, Sabeen Bhimani, Danielle Arellano, Andrea Harris, Pierre Olivier Cote, Wilma Jackson, Calli Taylor