19-CC-01

Committee: Cross Cutting

Title: Nonfatal Opioid Overdose Standardized Surveillance Case Definition

☐Check this box if this position statement is an update to an existing standardized surveillance case definition and include the most recent position statement number here: _____.

Synopsis:
This position statement creates a standardized case definition for nonfatal opioid overdose. This position statement is intended to support the rapid identification of nonfatal opioid overdoses and clusters to implement prevention and control measures.

I. Statement of the Problem

The opioid overdose crisis continues unabated in the US; in 2015, nonfatal opioid overdoses accounted for 140,077 emergency department (ED) visits (1). Public health overdose surveillance has historically used secondary administrative data sets, and surveillance efforts to quantify drug use have focused on national surveys (2). To provide timely and comprehensive data on opioid overdoses, including associated risk factors, in 2016, CDC initiated the Enhanced State Opioid Overdose Surveillance (ESOOS) program (https://www.cdc.gov/drugoverdose/foa/state-opioid-mm.html) with data currently collected quarterly from 33 states and expansion planned to all states.

While ESOOS and other surveillance approaches have helped to close gaps and have many uses and strengths, (e.g., ability to assess long-term trends and longitudinal prevention efforts), there has not been widespread implementation of near real-time case identification and corresponding response. Additionally, current surveillance approaches are not able to support certain types of cross jurisdictional comparisons useful for resource allocation and response management. Jurisdictions would benefit from an agreed-upon public health approach to ascertaining, quantifying, and releasing data on nonfatal opioid overdoses across data sources and jurisdictional boundaries to accurately assess and respond to the epidemic. This approach will supplement established surveillance practices as well as enhance timely and coordinated community responses to opioid overdoses (3).

This position statement is designed to support case reporting based on public health legal authorities and traditional public health surveillance practice of case identification, follow-up investigation when possible, identifying and combining case data across data sources and includes:

- Reporting from individual healthcare providers, hospitals (especially EDs), emergency medical services (EMS), poison control centers (PCC), laboratories, harm reduction or comprehensive syringe service programs, and law enforcement.
- Case ascertainment or identification of potential cases by public health from administrative data (e.g., identification based on discharge diagnosis codes in hospital discharge) or from syndromic surveillance using data from EDs, urgent care centers, EMS, or PCC, where individual records are used to conduct additional case investigation in order to have data to complete and finalize case classification.

II. Background and Justification

Opioids include prescription pain relievers (e.g., oxycodone, hydrocodone) and illicit drugs (e.g., heroin, illicitly manufactured fentanyl and fentanyl analogs). In the United States, over 700,000 people died from a drug overdose from 1999 to 2017 (4). The current drug overdose epidemic can be characterized by three waves: (wave-1) beginning in the 1990s, emergence of opioid overdose deaths catalyzed by increases in prescribing of opioids for chronic pain; (wave-2) in 2010, increases in deaths driven by heroin usage; (wave-3) the third and current wave (2013), is driven by synthetic opioids, particularly those involving illicitly manufactured fentanyl. These waves have occurred in part concurrently, and specifics of the epidemic vary both between and within

states due to the emergence of new drug products (e.g., introduction of new fentanyl analogs) or changes in the access and availability of drugs in a specific geographic area.

Nonfatal opioid overdoses are responsible for increasing EMS use, ED visits, and hospital admissions (1). Individuals who have survived an overdose are at an increased risk of another or fatal overdose (5, 6). Rapid and targeted interventions for overdose survivors and their family members, like those identified through Post Overdose Response Teams (PORTs), include assistance in accessing evidence-based practices such as medication-assisted treatment (MAT). Public health surveillance data are critical and support providing individual linkage to care, as well as developing and evaluating community-level interventions and policies to prevent and control opioid overdoses.

In 2017, the Department of the Health and Human Services (HHS), declared the opioid crisis a nationwide public health emergency (7) and unveiled a new five-point Opioid Strategy (8) that included “strengthening public health data reporting and collection” as one of the priority strategies.

Public health surveillance for the opioid overdose epidemic is challenging. While national surveillance indicators exist for substance abuse and mental health, including fatal overdoses (2), relying on fatality data often result in an incomplete and out-of-date view into this rapidly evolving epidemic. Moreover, while the addition of the ESOOS data has led to improvements, timely, nationally representative data on the burden of nonfatal opioid overdoses currently do not exist. To effectively implement optimal policies, prevention strategies, and interventions, health departments and their partners need accurate, timely and actionable information on nonfatal opioid overdoses. This surveillance information should be used by public health for public health purposes and should not be used for law enforcement.

This position statement addresses the evolving need to transform and supplement current surveillance processes to more robustly assess and intervene in the epidemic. Laws have been introduced in several states that would permit or require overdoses to be reported. Yet, no standardized surveillance approach or case definition currently exists that integrates the multiple potential data sources that might be used for opioid overdose surveillance, thereby making cross-jurisdiction comparisons of the epidemic and evaluation of prevention efforts very challenging. Since all states, territories, or other jurisdictions have a system by which certain diseases and conditions are required to be reported to the state health department, typically within a relatively short period of time, adding nonfatal opioid overdoses to this surveillance approach may effectively improve surveillance and access to this important data. Additionally, improvements in health information technology (HIT), implementation of electronic health records (EHR), electronic laboratory reporting (ELR), syndromic surveillance, and electronic case reporting (eCR) (9) can facilitate advance in surveillance of nonfatal opioid overdoses nationwide.

III. Statement of the desired action(s) to be taken

CSTE recommends the following actions:

Implement a standardized surveillance case definition for nonfatal opioid overdoses.

A. Utilize standard sources (e.g. reporting*) for case ascertainment for nonfatal opioid overdoses. Surveillance for nonfatal opioid overdoses should use the recommended sources of data to the extent of coverage presented in Section V.

B. Utilize standardized criteria for case ascertainment for nonfatal opioid overdoses presented in Section VI and Table VI in Technical Supplement.

C. Utilize standardized criteria for case classification for nonfatal opioid overdoses presented in Sections VII and Table VII in Technical Supplement.

*Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance TO local, state, or territorial public health. Note: notification is addressed in a Nationally Notifiable Conditions Recommendation Statement and is the process of a local, state, or territorial public health authority submitting a report (case information) of a condition on the *Nationally Notifiable Conditions List* TO CDC.

IV. Goals of Surveillance

Nonfatal opioid overdose surveillance goals include:

- Enhance efforts to prevent opioid overdoses, which are completely preventable;
- Rapidly identify nonfatal opioid overdoses and clusters for the purposes of conducting immediate response to implement prevention and control measures and provide treatment referrals in order to prevent additional overdoses;
- Provide enhanced information to improve allocation of resources for prevention and treatment services (e.g., naloxone provision);
- Help estimate the magnitude of the problem and track longitudinal trends including changes in the epidemic between and within states;
- Identify high-risk areas and sub-groups of the population;
    - Pregnant women who have had a nonfatal opioid overdose and other sub-groups with service needs that differ from the general population;
- Investigate novel exposure pathways, previously unknown overdose scenarios, and emergence of new opioid analogs; and
- Evaluate the impact, effectiveness and scale of interventions, including widespread availability of naloxone, mental health promotion and services, prescription drug monitoring programs (PDMPs), medication- assisted treatment (MAT), efforts to reduce stigma and improve care seeking behaviors and harm reduction programs such as needle exchange/syringe service programs and safe injection facilities.

V. Methods for Surveillance: Surveillance for nonfatal opioid overdose should use the recommended sources of data and the extent of coverage listed in Table V.

Table V. Recommended sources of data and extent of coverage for ascertainment of cases of nonfatal opioid overdoses.

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
Clinician reporting	X	
Laboratory reporting	X	
Reporting by: Hospitals (emergency departments [ED] and inpatient)	X	
Hospital discharge or outpatient data sets	X	
Extracts from electronic health records (EHR), specifically consider electronic case reporting (eCR), and utilization of established syndromic surveillance systems	X	
Other, specify: Reporting to support case ascertainment should be coordinated as time and effort allow as these data sources are important but likely to identify fewer *new* previously unrecognized cases: • Emergency medical services (EMS), • Urgent care centers (UCC) • Poison control centers (PCC), • Harm reduction or comprehensive syringe service programs • Law enforcement (especially in the event of possible cluster identification)	X	
Other, specify: Other data sources that may be used to determine nonfatal status, not used for case ascertainment: • Medical examiners or coroners • Death certificates	X	
2019 Template		

No single data source exists to completely capture all opioid overdoses. While case ascertainment or identification will likely occur via individual reporters or data source access by public health, case classification should be performed utilizing available data from multiple data sources and include deduplication and combining across data sources. It is likely jurisdictions will implement surveillance in a tiered approach on available resources with utilization of ED data as the initial data source.

Data sources (see "Appendix 1: Data Sources for Case Ascertainment" for further discussion of each data source):

- **ED:** Includes multiple diagnosis codes (currently coded in ICD-10-CM, which is the tenth version of the U.S. modification of the World Health Organization's International Classification of Diseases [ICD], and ICD-9-CM [should historical comparisons be made]), chief complaint and triage notes. Reporting mechanism may include syndromic surveillance, administrative/discharge records, or case reports including eCR. A patient's ED discharge disposition (where the patient goes after discharge from the ED – home, admitted, etc.) is useful to determine nonfatal status. Highest priority dataset.
- **Clinician:** Case reporting including eCR.
- **Laboratory:** Includes clinical specimen and environmental sample testing performed at hospital, commercial, state, federal and criminal justice laboratories.
- **Other healthcare records:** May include inpatient, urgent care centers, and other outpatient records.
    - **EMS:** May include coded information, reason for dispatch and access to field notes, transport, and pre-hospital treatment or those refusing transport based on a reversal in the field following naloxone administration.
    - **Poison Control Center:** Coded information identifies potential exposures. Possible access to call notes which can be useful for information value and case investigations. Ability to provide call or case notes varies by state.
- **Harm reduction or comprehensive syringe service programs:** Useful for capturing community-based overdose reversals, many of which may not include EMS or other agency involvement. Note: These programs may not be available in every state or jurisdiction.
- **Law enforcement:** Useful for identification of clusters and to support case classification.

VI. Criteria for case ascertainment

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

The criteria below are intended to assist entities in determining which records should be reported or provided to public health. Following a report or identification, public health will use all available data sources to determine final case classification or to determine that it is not a case.

***Report any person* to public health authorities that meets the following criteria:**

A1. Clinical criteria:

- A person with clinical effects of an opioid overdose including:
    - Falling asleep, loss of consciousness or unresponsiveness to stimuli, altered mental status
    - Slow, shallow breathing (hypopnea), decreased respiratory rate (bradypnea), choking or gurgling sounds, or shortness of breath
    - Small, constricted "pinpoint pupils" (miosis)
    - Bluish nails or lips (cyanosis); skin that is pale, blue, or cold
- A person where there is clinical suspicion of a suspected overdose.
- A person whose health care record contains information about a suspect opioid overdose:

- **Healthcare records including hospital ED, inpatient, urgent care centers and hospital discharge datasets:** (see Appendix 2: Medical Record Opioid Overdose Codes and Chief Complaints)
  - A person whose health care record includes mention of opioid overdose in either a diagnosis, active problem, or chief complaint.
  - A person whose health care record includes naloxone administration with a successful response or no information about the response.
- **Poison Control Center:**
  - A person whose poison control record indicates an exposure to an opioid, an opioid overdose, or suspected opioid overdose.
  - A person whose poison control record includes naloxone administration with a successful response or no information about the response.
- **EMS:**
  - A person whose EMS record indicates an opioid overdose or suspected opioid overdose (e.g., primary/secondary impression, narrative, or complaint fields).
  - A person whose EMS record includes naloxone administration with a successful response/reversal (e.g., typically noted as medication response = "improved") or no information about the response.

A2. Laboratory criteria:

- Laboratories testing human specimens collected in the ED: Any detected or positive results for opioids or their metabolites in a clinical specimen by any laboratory test.
- Laboratories testing substance specimens: Detection of opioids on any seized drugs (e.g., pills, powders, drug paraphernalia) associated with a person suspected of an opioid overdose including crime laboratory test results or results from rapid tests, such as fentanyl test strips.

A3. Epidemiologic linkage criteria:

- Any persons suspected to be part of a cluster or an outbreak of unknown or suspected opioid overdoses.

A4. Harm reduction or comprehensive syringe service programs criteria:

- Any persons where naloxone was administered to reverse a suspected overdose.

A5. Law enforcement criteria:

- Any person or cluster of people with a suspected opioid overdose. Include information from any chemical test results on environmental samples seized at the scene. Reporting by law enforcement should follow state and jurisdiction data sharing agreements.

B. Disease-specific data elements to be included in the initial report

Disease specific data elements to be included in the initial report:

- Pregnancy, postpartum status or pregnancy loss
- Date, time, and location of overdose
- Type of suspected opioids involved (e.g., oxycodone, heroin, suspected polysubstance) and how this information was obtained
- Route of administration of opioid (e.g., injection, oral, inhalation, etc.)
- Suspicion of cluster or part of an outbreak
- Provider's primary impression
- Dispatch complaint (or reason for dispatch)
- Naloxone administration including who administered, number of doses, and strength
- Response to naloxone administration

- Linkage to care (e.g., medical assisted treatment [MAT], primary care provider, other care or support)
- Intentionality

VII. Case Definition for Case Classification

A. Narrative: Description of criteria to determine how a case should be classified.

A1. Clinical Criteria

Confirmatory and presumptive clinical evidence

- A diagnosis of an opioid overdose, OR
- A chief complaint mentions opioid overdose, OR
- Naloxone administration, OR

Clinically Compatible Presentation:
Clinical effects of an opioid overdose manifest as central nervous system and respiratory system depression. A clinically compatible presentation of opioid overdose MUST include **TWO** or more of the following signs and symptoms:

- Falling asleep or loss of consciousness
- Slow, shallow breathing (hypopnea), decreased respiratory rate (bradypnea)
- Choking or gurgling sounds
- Small, constricted “pinpoint pupils” (miosis)
- Bluish nails or lips (cyanosis); skin that is pale, blue, or cold

AND
does not result in an immediate or delayed fatal outcome from the overdose event.

Supportive clinical evidence

A notation in an EMS record suggestive of an opioid overdose
AND
no immediate or delayed fatal outcome from the overdose event.

A2. Laboratory Criteria[1]

Confirmatory laboratory evidence:

- **Human:**
  Detection of opioids (any level) including natural (e.g., morphine, codeine), semi-synthetic (e.g., heroin), and synthetic (e.g. fentanyl, or fentanyl analogs), or opioid metabolites (e.g., 6-monoacetylmorphine) in a clinical specimen from a screening or other laboratory test.

Presumptive laboratory evidence:

- **Presumptive Human:**
  Inconclusive or negative[2] human toxicologic test results in a clinical specimen from a test capable of detecting opioids as a class or for specific opioids.

- **Presumptive Environmental:**
  Detection of opioids in substance samples (e.g., products or paraphernalia) found or seized on the individual, scene[3] or other use/storage location (e.g., home, car, etc.) linked

with the individual known to have experienced an overdose. Include both crime laboratory results and rapid test results such as those from fentanyl test strips.

Supportive laboratory evidence:

- None. No laboratory findings are part of the suspect case classification.

A3. Epidemiologic Linkage Criteria

- *Presumptive epidemiologic linkage evidence:*
  - An individual who *shared substances* with a confirmed opioid overdose case at the time of a known opioid overdose and experiences similar symptoms and clinical presentation. OR
  - An individual who *used substances obtained from the same source* as a confirmed opioid overdose case and experiences similar symptoms and clinical presentation. OR
  - An individual who shared substances with or who used substances obtained from the same source and experiences similar symptoms and clinical presentation as an individual whose death certificate indicates an opioid overdose.
  - An individual who knew or was with a confirmed opioid overdose case in the days around the opioid overdose event who experiences similar symptoms and clinical presentation without further information or cause.

Epidemiologic Investigation Criteria:

An epidemiologic investigation is any follow-up on a report of a suspected opioid overdose by a state or local public health authority. This can include, but is not limited to, interviewing cases or their contacts, reviewing medical records or additional data sources (e.g., law enforcement, PDMP), contacting clinicians or laboratories, forwarding specimens for additional testing, collecting new specimens for laboratory testing, or monitoring case outcomes (e.g., fatality, disability, etc.).

Epidemiologic investigations can identify: history of a prior overdose or an individual who was observed using opioids.

Notes:
All opioid overdoses unintentional, intentional, or of unknown intent are included. When possible, characterize cases by intent.

[1] Forensic toxicology tests utilized by medical examiners and corners for the cause of death determination are confirmed by mass spectrometry. This is not always the situation in the hospital ED, for a variety of reasons. While adequate laboratory capacity might not exist at this time for mass spectrometry testing of all nonfatal opioid overdoses, a long-term goal should be the utilization of mass spectrometry or other specialized laboratory testing to appropriately confirm screening or other results.

These laboratory criteria are not intended to include non-traditional “opioid-like” compounds that stimulate the opioid receptor such as kratom. Kratom is a naturally occurring phytochemical that reacts with the biological opioid receptor. There are several biologically active alkaloids (mitragynines) that produce opioid-like effects. These substances are not structurally close enough to the opioid class to be considered a “naturally occurring opioid” and immunoassays for opioids shouldn’t detect it, nor would gas chromatography-mass spectrometry (GC-MS) for opioids. Separate tests can be performed to identify kratom.

[2] Screening tests or hospital-based laboratory tests may not adequately identify fentanyl, fentanyl analogs, or other opioids (especially some of the most recent illicit opioids), leading to inconclusive or negative opioid results. These negative or inconclusive test results alone should not rule out a case. As resources are available, forwarding samples or subset of samples to a public health laboratory or appropriate commercial laboratory for further characterization is encouraged. For patients who meet the criteria for the opioid

toxidrome, a negative preliminary test result might be a trigger for further testing to detect fentanyl or emerging congeners. Similarly, patients who show a reversal with naloxone but are negative on initial screen ideally would have samples submitted for specialized testing in a public health laboratory or appropriate commercial laboratory.

[3] Location where the overdose is suspected to have occurred.

A4. Case Classifications

Confirmed:

Report or identification *in the absence of* another known cause/diagnosis and no immediate or delayed fatal outcome from the overdose event is identified:

- A diagnosis of an opioid overdose with confirmatory laboratory evidence. OR
- A clinically compatible presentation or chief complaint indicating opioid overdose with confirmatory laboratory evidence. OR
- Naloxone administration (by, a first responder, a healthcare professional, or a person who is neither a first responder nor a healthcare professional) and indication of reversal[4] with confirmatory laboratory evidence.

Probable:

Report or identification *in the absence of* another known cause/diagnosis and no immediate or delayed fatal outcome from the overdose event is identified:

- A medical record with a diagnosis of an opioid overdose. OR
- Naloxone administration by an individual (e.g., citizen, non-healthcare or first responder), a first responder or healthcare professional and indication of reversal[4]. OR
- A clinically compatible presentation with presumptive epidemiologic linkage to a confirmed case. OR
- A clinically compatible presentation with presumptive environmental laboratory evidence. OR
- A clinically compatible presentation and the epidemiologic investigation found evidence to be consistent with an opioid overdose. OR
- A chief complaint from a medical record indicating an overdose and the epidemiologic investigation found evidence indicating an opioid overdose. OR
- A clinically compatible presentation with presumptive human laboratory evidence and the epidemiologic investigation found evidence indicating an opioid overdose. OR
- A clinically compatible presentation AND chief complaint indicating an opioid overdose. OR
- A clinically compatible presentation with epidemiologic investigation evidence indicating the individual was observed using opioids or had a previous history of an opioid overdose.

Suspect:

Report or identification *in the absence of* another known cause/diagnosis and no immediate or delayed fatal outcome from the overdose event is identified:

- A clinically compatible presentation of opioid overdose. OR
- Naloxone administration by an individual (e.g., citizen, non-healthcare or first responder), a first responder or healthcare professional with either no information on the response or no information indicating a failure/lack of response. OR
- Chief complaint in a medical record indicating an opioid overdose. OR
- A notation in an EMS record suggestive of an opioid overdose.

[4]*Note: Indication of a reversal or successful naloxone use is based on overall clinical improvement and may include specific parameters such as increased level of consciousness and improvement in respiratory depression. Signs and symptoms of reversal will be consistent in large part with the type of opioid ingested, amount/concentration ingested, and type/amount of opioid antagonist*

administered. Absolute numerical parameters used for clinical purposes (e.g., respiratory rate > 16, etc.) are not available as indication of a successful reversal, because these clinical parameters depend on the factors mentioned above. Several opioids are known to be resistant to low-normal naloxone dosing and may not respond until higher dosages are used; therefore, if a standard 0.4-0.8 mg dose is all that is tried, a negative naloxone response may occur and if available, additional information may be necessary to adequately classify the exposure. Additionally, a successful response may not occur if the patient had taken other substances in addition to an opioid or had suffered an additional insult such as a stroke or anoxia as a result of opioid overdose.

B. Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance

A new case should be created when a person experiences a subsequent overdose that is at least 24 hours after a previous overdose event AND the person experienced clinical improvement or recovery between the events.

In situations when the time frame is *less than 24 hours* between identified overdose events (e.g., presents to and ED for care within 24 hours), a new case should be created only when there is information to suggest that the individual used an opioid product again after the previous opioid overdose (e.g., in some instances, individuals may be managed in the ED and then almost immediately after discharge “re-dose” themselves. Discovery of such information is considered “intent” and a subsequent overdose would be classified as a new case even if within 24 hours).

VIII. Period of Surveillance

Ongoing.

IX. Data sharing/release and print criteria

This position statement is intended to create a standardized surveillance case definition and does not recommend national notification as one of the desired actions to be taken; therefore, no CDC print criteria are defined.

Counting cases:

1. While there are no CDC print criteria (as the condition is not nationally notifiable), the recommendation is for jurisdictions to release case counts based only on ***confirmed*** and ***probable*** cases and adherence to individual jurisdiction data release polices and considerations for privacy and confidentiality when there are small numbers in limited geographic areas or regions.

   Cases will be counted by jurisdiction based on the case’s place of residence or ‘usual residence’, regardless of where exposure occurred as defined in CSTE position statement “Revised Guidelines for Determining Residency for Disease Reporting” 11-SI-04 (10). The guidelines are modeled after provisions developed for the U.S. Census. Since case data are often combined with population data, case notification guidelines based on census residence rules will contribute toward greater consistency in the numerator and denominator data used in rates. The overarching aim is that all cases should be counted, but no case should be counted by multiple jurisdictions. It is important to note that following these guidelines may result in cases being counted by a jurisdiction other than where the exposure or overdose occurred, received or sought care.

2. Jurisdictions (e.g., States and Territories) conducting surveillance under this case definition can voluntarily submit de-identified case information to CDC, if requested and in a mutually agreed upon format.

Production of national data summaries and national data re-release for non-NNCs:

- Prior to release of national data summaries CDC should follow the CDC/ATSDR Policy on Releasing & Sharing Data, issued on April 16, 2003 and referenced in 11-SI-01 <https://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/11-SI-01.pdf> and custodians of such data should consult the CDC-CSTE Intergovernmental Data Release Guidelines Working Group Report < http://www.cste2.org/webpdfs/drgwgreport.pdf> which contains data release guidelines and procedures for CDC programs re-releasing state, local, or territorial-provided data.
- CDC programs have a responsibility, in collaboration with states, localities, and territories, to ensure that CDC program-specific data re-release procedures meet the needs of those responsible for protecting data in the states and territories.

X. Revision History

Position Statement ID	Section of Document	Revision Description
19-CC-01	XII. Coordination	1) National Office confirmed and clarified the following Agencies for Information contacts: AAPCC, ABFT, HIDTA, NASEMSO, NPHL, ONC, and RWJF.
Interim-CC-19	Section II - Background and Justification	2) Added sentence to end of 4th paragraph "This surveillance information should be used by public health for public health purposes and should not be used for law enforcement." 3) Revised sentence in fifth paragraph to include various types of jurisdictions "Since all states, territories and many other jurisdictions have a system …"
Interim-CC-19	Section III – Statement of the desired action(s) to be taken	1) Table moved to Section V in the new template; removed duplicative "Death certificates" and "see below" from the 5th row of the table
Interim-CC-19	Section VI – Criteria for case ascertainment	1) Added "Intentionality" to the list of disease specific elements to be included in initial report
Interim-CC-19	Section VII - Case Definition for Case Classification	1) Revised "‡*Note:"* substituted "overall clinical improvement and may include specific" for "improved, clinical" 2) Deletion – Under "Case classifications, Probable" removed "without a diagnosis code of an opioid overdose or opioid use disorder" 3) Deletion – "Case Classifications, Suspect" removed "indication of partial-reversal or"

XI. References

(1) 2018 Annual Surveillance Report of Drug-Related Risks and Outcomes, United States, CDC National Center for Injury Prevention and Control https://www.cdc.gov/drugoverdose/pdf/pubs/2018-cdc-drug-surveillance-report.pdf

(2) Position Statement, Surveillance Indicators for Substance Abuse and Mental Health 16-SI-01 https://cdn.ymaws.com/www.cste.org/resource/resmgr/2016PS/16_SI_01.pdf

(3) Dowell D, Noonan RK, Houry D. Underlying actors in drug overdose deaths. JAMA. 2017;318(23):2295-2296.

(4) Hedegaard H, Miniño AM, Warner M. Drug overdose deaths in the United States, 1999–2017. NCHS Data Brief, no 329. Hyattsville, MD: National Center for Health Statistics. 2018.
(5) Caudarella, Dong, Milloy, Kerr, Wood, Hayash. Non-fatal overdose as a risk factor for subsequent fatal overdose among people who inject drugs. Drug and Alcohol Dependence. Volume 162, 1 May 2016, Pages 51-55. https://doi.org/10.1016/j.drugalcdep.2016.02.024
(6) Martins, Sampson, Cerdá, Galea. Worldwide Prevalence and Trends in Unintentional Drug Overdose: A Systematic Review of the Literature. American Journal of Public Health. November 2015, Vol 105, No. 11 https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2015.302843
(7) Determination that a Public Health Emergency Exists. October 26, 2017. https://www.hhs.gov/sites/default/files/opioid%20PHE%20Declaration-no-sig.pdf
(8) HHS five point opioid strategy https://www.hhs.gov/opioids/
(9) Position statement Electronic Case Reporting 16-SI-02 (eCR)https://cdn.ymaws.com/www.cste.org/resource/resmgr/2016PS/16_SI_02.pdf
(10) Position statement Revised Guidelines for Determining Residency for Disease Reporting 11-SI-04 https://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/11-SI-04.pdf

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Table VI. Table of criteria to determine whether an individual or potential case should be reported to public health authorities.

Criterion	Opioid Overdose	
Clinical Evidence		
A person whose health care record includes mention of opioid overdose in either a diagnosis, active problem, or chief complaint.	S	
A person whose health care record includes naloxone administration with a successful response or no information about the response.	S	
A person whose poison control record indicates an exposure to an opioid, an opioid overdose, or suspected opioid overdose.	S	
A person whose poison control record includes naloxone administration with a successful response or no information about the response.	S	
A person whose EMS record indicates an opioid overdose or suspected opioid overdose.	S	
A person whose EMS record includes naloxone administration with a successful response/reversal or no information about the response.	S	
A person where there is clinical suspicion of a suspected opioid overdose.	S	
A person with clinical effects of an opioid overdose including: (1) Falling asleep, loss of consciousness or unresponsiveness to stimuli, altered mental status; (2) Slow, shallow breathing (hypopnea), decreased respiratory rate (bradypnea), choking or gurgling sounds, or shortness of breath, (3) Small, constricted “pinpoint pupils” (miosis), or (4) Bluish nails or lips (cyanosis); skin that is pale, blue, or cold	S	
Laboratory Evidence		
Any detected or positive results for opioids or their metabolites in a clinical specimen by any laboratory test from a specimen collected in the emergency department.	S	
Detection of opioids on any seized drugs (e.g., pills, powders, drug paraphernalia) associated with a person suspected of an opioid overdose including crime laboratory test results or results from rapid tests, such as fentanyl test strips.	S	
Epidemiological Evidence		
Any persons suspected to be part of a cluster or an outbreak of unknown or suspected opioid overdoses.	S	
Harm Reduction or Comprehensive Syringe Service Programs Evidence		
Any persons where naloxone was administered to reverse a suspected overdose.	S	
Law Enforcement Evidence		
Any person or cluster of people with a suspected opioid overdose. Include information from any chemical test results on environmental samples seized at the scene. Reporting by law enforcement should follow state and jurisdiction data sharing agreements.	S	

Notes:
S = This criterion alone is SUFFICIENT to report a potential case.

Table VII. Classification Table: Criteria for defining a case of a nonfatal opioid overdose

Criterion	Suspect				Probable									Confirmed			
Clinical Evidence																	
Absence of another known cause/diagnosis	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
No immediate or delayed fatal outcome	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Diagnosis of an opioid overdose					N									N			
Chief complaint indicating an opioid overdose			N							N					N		
Naloxone administration		N				N						N					N
Indication of reversal (following naloxone administration)						N											N
Clinically compatible presentation: Any TWO or more symptoms/symptom combinations (combinations presented below): - Falling asleep or loss of consciousness - Slow, shallow breathing (hypopnea), decreased respiratory rate (bradypnea) - Choking or gurgling sounds - Small, constricted "pinpoint pupils" (miosis) - Bluish nails or lips (cyanosis); skin that is pale, blue or cold	N						N	N	N		N	N	N			N	
Notation in an EMS record suggestive of an opioid overdose				N													
Laboratory Evidence[1]																	
Confirmatory																	
Human:																	
Detection of opioids (any level) including natural (e.g. morphine, codeine), semi-synthetic (e.g. heroin), and synthetic (e.g. fentanyl, or fentanyl analogs), or opioid metabolites (e.g., 6-monoacetylmorphine) in a clinical specimen from a screening or other laboratory test														N	N	N	N
Presumptive																	
Human:																	
Inconclusive or negative[2] human toxicologic test results in a clinical specimen from a test capable of detecting opioids as a class or for specific opioids											N						
Environmental:																	
Detection of opioids in substance samples (e.g. products or paraphernalia) found or seized on the individual, scene[3] or other use/storage location (e.g. home, car, etc.) linked with the individual known to have experienced an overdose. Include both crime laboratory results and rapid test results such as those from fentanyl test strips									N								

Epidemiologic linkage																		
An individual who *shared substances* with a confirmed opioid overdose case at the time of a known opioid overdose and experiences similar symptoms and clinical presentation							O											
An individual who *used substances obtained from the same source* as a confirmed opioid overdose case and experiences similar symptoms and clinical presentation							O											
An individual who shared substances with or who used substances obtained from the same source and experiences similar symptoms and clinical presentation as a decedent from an individual whose death certificate indicates an opioid overdose							O											
An individual who knew or was with a confirmed opioid overdose case in the days around the opioid overdose event who experiences similar symptoms and clinical presentation without further information or cause							O											
Epidemiologic Investigation																		
Any follow up on a report of a suspected opioid overdose by a state or local public health authority. This can include, but is not limited to, interviewing cases or their contacts, reviewing medical records or additional data sources (e.g. law enforcement, PDMP), contacting clinicians or laboratories, forwarding specimens for additional testing, collecting new specimens for laboratory testing, or monitoring case outcomes (e.g. fatality, pregnancy outcome, etc.)								N		N	N		N					
History of a prior opioid overdose													O					
Individual who was observed using opioids													O					
Criteria to Distinguish a New Case	***Suspect***				***Probable***										***Confirmed***			
>24 hours between overdose events:																		
A person experiences a subsequent overdose that is at least 24 hours after a previous overdose event	N				N										N			
The person experienced clinical improvement or recovery after the overdose event	N				N										N			
<24 hours between overdose events:																		
A person experiences a subsequent overdose within 24 hours after a previous overdose event			N							N							N	
Information to suggest use of an opioid product after the prior overdose or "intent"			N							N							N	

Notes:

N = All "N" criteria in the same column are NECESSARY to classify a case. A number following an "N" indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the absence of criterion as a necessary component.

O = At least one of these “O” (ONE OR MORE) criteria in **each category** (categories=clinical evidence, laboratory evidence, and epidemiologic evidence) **in the same column**—in conjunction with all “N” criteria in the same column—is required to classify a case. A number following an “O” indicates that this criterion is only required for a specific disease/condition subtype.

[1] Forensic toxicology tests utilized by medical examiners and corners for the cause of death determination are confirmed by mass spectrometry. This is not always the situation in the hospital ED, for a variety of reasons. While adequate laboratory capacity might not exist at this time for mass spectrometry testing of all nonfatal opioid overdoses, a long-term goal should be the utilization of mass spectrometry or other specialized laboratory testing to appropriately confirm screening or other results.

These laboratory criteria are not intended to include non-traditional “opioid-like” compounds that stimulate the opioid receptor such as kratom. Kratom is a naturally occurring phytochemical that reacts with the biological opioid receptor. There are several biologically active alkaloids (mitragynines) that produce opioid-like effects. These substances are not structurally close enough to the opioid class to be considered a “naturally occurring opioid” and immunoassays for opioids shouldn’t detect it, nor would gas chromatography-mass spectrometry (GC-MS) for opioids. Separate tests can be performed to identify kratom.

[2] Screening tests or hospital-based laboratory tests may not adequately identify fentanyl, fentanyl analogs, or other opioids (especially some of the most recent illicit opioids), leading to inconclusive or negative opioid results. These negative or inconclusive test results alone should not rule out a case. As resources are available, forwarding samples or subset of samples to a public health laboratory or appropriate commercial laboratory for further characterization is encouraged. For patients who meet the criteria for the opioid toxidrome, a negative preliminary test result might be a trigger for further testing to detect fentanyl or emerging congeners. Similarly, patients who show a reversal with naloxone but are negative on initial screen ideally would have samples submitted for specialized testing in a public health laboratory or appropriate commercial laboratory.

[3] Location where the overdose is suspected to have occurred.

Appendix 1: Data Sources for Case Ascertainment

Robust, population-based case ascertainment or case identification for nonfatal opioid overdoses is best ensured through utilization of multiple data sources as no single data source exists to completely capture all opioid overdoses. Data sources necessary for robust, complete case ascertainment are discussed here. Additionally, to apply the case classification schema (i.e. determination of confirmed, probable, or suspect case) in this position statement, health departments will need access to a minimum of the following data: hospital ED visits, laboratory and outcome or death (or ED discharge status as a proxy).

These data sources, as well as passive and active surveillance efforts, have different strengths and limitations. While patient care-seeking tendencies, poly-substance use and the emergence of different opioids and opioid analogs could result in varying degrees of the classic opioid overdose clinical presentation, surveillance efforts described here will focus on those opioid overdoses severe enough to result in the provision of care (transport, treatment, reversal of opioid effects). Surveillance for opioid *use*, or nonfatal opioid overdoses where medical care is *not* sought should be assessed via other surveillance strategies (e.g., self-report surveys, etc. CSTE Position Statement 16-SI-01) and are not addressed here. Additionally, Safe States Injury Surveillance Workgroup (ISW7) compiled and summarized a list of twenty-eight poisoning-related surveillance data systems/sources in the U.S. that may be useful for public health surveillance. The document can be found here https://c.ymcdn.com/sites/www.cste.org/resource/resmgr/Injury/ISW7.pdf. Appendix A: Detailed Description of Data Sources (page 32).

Definitions:

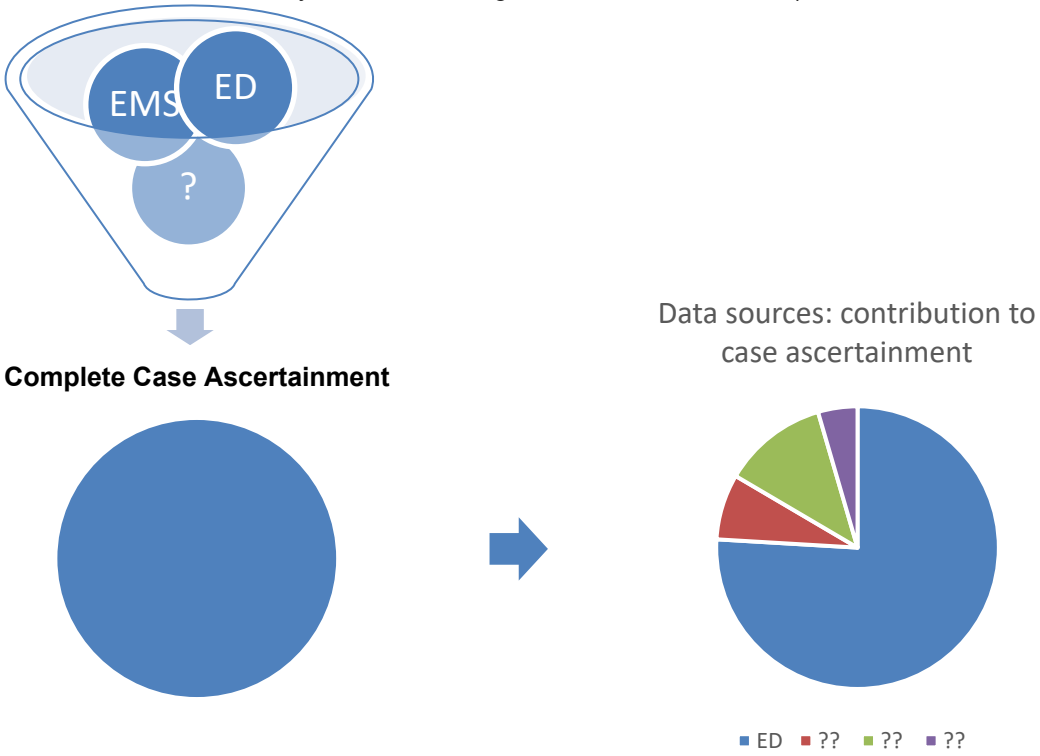
- **Case ascertainment:** Identification of new previously unrecognized cases.
    - Consider:
        - How does public health identify persons/events of potential interest?
        - Who should report and what data sources could support identification of potential cases?
        - What information should be used to 'trigger' an external provider to alert public health to a potential case?
        - Does the data source capture individuals not captured anywhere else?
        - See Figure 1
- **Case classification:** Determination if an individual meets the surveillance case definition criteria (i.e., confirmed, probable, suspect or not a case)
    - What data sources are necessary to help public health determine if the individual meets the case definition and at what level of 'certainty' (i.e., confirmed, probable or suspect)?

Data Considerations:

- Robust, population-based case ascertainment or identification for nonfatal opioid overdoses is best ensured through utilization of different data sources.
    - Population-based surveillance efforts regardless of the condition under surveillance typically consider multiple data sources to fully ascertain all cases as *no one individual data* source captures the full extent of the problem.
    - For nonfatal opioid overdose surveillance efforts described here data linkage is necessary to identify individuals found in multiple datasets to ensure each case is reported once.
- Data sources as well as passive and active surveillance efforts have different strengths and limitations. In addition to the type of data captured, other factors play a role in the utility of the data source for surveillance purposes.
    - Less timely but more complete data, such as fully coded data may be useful information to fully classify a case as confirmed, probable or suspect.
    - More timely data may be the most useful for initial identification of potential cases but may not provide the full range of details necessary to accurately classify a case according to the surveillance case definition.

- Instances of overdose where no medical care is sought present a challenge for public health, and surveillance is likely to be performed most often only in the context of the receipt of reports associated with clusters or unusual events. It is useful for public health to also determine if there are additional data sources or evidence to assess the proportion of non-reported opioid overdoses.
- Variation in identified nonfatal opioid overdose incidence at the local level will reflect, to varying degrees, both differences in the true incidence of disease and differences in the vigor with which surveillance is able to be performed. It is anticipated that surveillance for nonfatal opioid overdoses will likely be implemented in a tier approach with access to ED data as the initial data source.

Figure 1: Case ascertainment diagram
Depiction of data sources necessary to identify all potential cases and the contribution or "yield" (the number of new cases likely identified through that data source alone).



Data Sources for case ascertainment:
Descriptions, strengths, and limitations of various data sources described below represent commonly occurring characteristics of data sources across states. However, they may not accurately represent all the individual characteristics of any one jurisdiction's data.

Data source 1: Emergency department (ED) records

Summary for ED data:

- High priority: The primary data source for acute or timely quantification of opioid overdoses. Supports both case ascertainment and case classification.
- Considered the most complete *single* data source for acute identification of new opioid overdoses as the majority of medically attended opioid overdoses receive some type of emergency department care or visit record.

- Ability to capture likely true cases and support follow-up, referrals to care and targeted interventions.
- Two primary mechanisms for public health to access ED data are: (1) near real-time syndromic surveillance systems (SyS) [**Data source 1A**] and (2) less-timely hospital discharge databases [**Data source 1B**].

Data source 1A: ED data accessed *via syndromic surveillance systems* (SyS)

- **Description:** Coverage and participation in SyS varies by state.
  - CDC's NSSP-ESSENCE application or other state-based platforms, provide an environment for the analysis of near-real time overdose data for case ascertainment, cluster identification and assessment of trends.
  - SyS algorithms for case ascertainment often vary from state-to-state, but in general rely on identification of key terms in the chief complaint field and the discharge diagnosis of the ED electronic record. Staff from CDC's Enhanced State Opioid Overdose Surveillance (ESOOS) program have developed a standardized nonfatal opioid overdose query in consultation with CDC's NSSP-ESSENCE staff. The query includes both the chief complaint and discharge diagnosis fields that can be used to support case ascertainment or monitoring trends.
  - Opportunities exist to expand electronic case reporting (eCR).
- **Strengths:**
  - For many jurisdictions, data may be extremely timely (i.e., visit information available within the first 24-48 hours of visit). This allows health departments to monitor trends in near real-time and detect potential clusters of opioid overdoses.
  - Some jurisdictions have also developed access to personal identifiers via SyS, (often through a subsequent data submission process) providing additional opportunities for immediate response, including linkages to care and naloxone provision.
  - Availability of NSSP supports access for all states to an electronic syndromic surveillance system. CDC's National Center for Injury Prevention and Control (NCIPC) and Center for Surveillance, Epidemiology, and Laboratory Science (CSELS) staff continue to work in partnership with state and local health department colleagues to improve syndrome definitions available in NSSP-ESSENCE. API functionality within NSSP-ESSENCE supports automated data exports to other applications to support individual case investigations, management, and follow-up.
  - A patient's ED discharge disposition is useful for assessing nonfatal status.
- **Limitations:**
  - Data are not finalized based on toxicological results, thus timely information for case ascertainment may not necessarily represent individuals meeting the confirmed case definition or fully distinguish between an opioid vs non-opioid overdose.
  - SyS may not accurately represent the patient's final discharge disposition.
  - Different hospitals collect and report free text chief complaint data in different ways. Even within a hospital, different staff may enter these data using different terms or abbreviations, even codes, with varying amounts of information provided. Although discouraged by public health, some facilities have chief complaint 'pick-lists' or 'dropdowns' which can lead to a lack of detail in identifying appropriate chief complaints associated with opioid overdoses.
  - Discharge diagnosis coding practices and quality may not be consistent across hospitals and hospital staff. Coding decisions may at times be influenced by billing.
  - The transition from ICD-9-CM to ICD-10-CM coding marked a dramatic change in the coding structure that precludes easy comparisons of pre and post-transition trends. For example, the number of overdose-related codes available for use increased significantly in ICD-10-CM with intent and other contextual information now embedded in the code.

- In general, information from most visits arrive within 24-48 hours – and most often this includes the chief complaint of the visit. However, the trade-off for timely data are data with imperfections and variable-level incompleteness.
    - Over time, facilities send updated information about visits that are merged with previous information on a visit using a unique identifier. However, updates to records will continue to arrive weeks later and may carry heroin or opioid overdose relevant ICD-10-CM discharge diagnosis codes or revised chief complaint text (e.g., original chief complaint text is “shortness of breath” which is updated to “shortness of breath due to heroin overdose”). Therefore, additional visits may be identified but at a later time and after the visit records are completed and additional data transmitted to public health.
    - Case ascertainment for relevant visits may not occur if a chief complaint misrepresents the patient’s true diagnosis (e.g. patient arrives with chief complaint “non-responsive” but is actually a heroin overdose).
- As with all real-time automated reporting, data feeds should be continuously monitored as on any given day, data feeds from facilities may be interrupted, thus impacting the ability to view data from a particular facility. In some circumstances, facilities are unable to fill-in that data once data transmission errors are resolved over time.
- In many jurisdictions, not all potential facilities initially begin submitting data into the SyS at the same time. With the onboarding of new facilities, historical data may not necessarily be provided back to the same starting date by all jurisdictions and facilities. Also, as new facilities join the system large fluctuations in the number of cases identified may occur. For these reasons, SyS is a useful case ascertainment tool by may not be useful to estimate overdose incidence or burden.
- Laboratory results are not commonly included in ED SyS data.

Data source 1B: Hospital (ED and inpatient) discharge database

- **Description:**
    - Population based.
    - Utilization of hospital discharge databases, which can contain data from inpatient and/or ED visits, are widely considered the most complete single source of drug overdose data making them suitable to support final case classification as well as outcome (fatal or nonfatal).
    - Not timely. Static final data set initially designed to support hospital billing data and typically serves as a secondary or administrative dataset for public health surveillance and typically data is delayed (sometimes many months).
    - Acute care hospitals in almost all states compile electronic data on all hospital discharges using the standard uniform billing form (UB-04), including patient, clinical, and billing information, and make a combined state-wide data set available to public health agencies.
    - Most jurisdictions capture ED and inpatient data. Hospital inpatient discharge databases include those persons first seen in the ED or directly admitted (often bypassing the ED) for opioid overdoses. Conversely, hospital ED discharge databases often exclude patients seen in the ED and then admitted to the hospital for an inpatient stay.
    - The discharge diagnoses were coded using ICD-9-CM until October 2015, when the change to ICD-10-CM was mandated by the Federal Centers for Medicare and Medicaid Services.
- **Strengths:**
    - Population-based coverage allows for case ascertainment and incidence estimates of drug poisoning emergency department visits and hospitalizations.

- Useful to evaluate overall prevention programs long-term and to identify cases that may have been initially missed when reviewing other more timely data sources.
- Data are generally considered more complete and reliable than SyS data, allowing for more accurate final case classification and incidence estimates of drug poisoning emergency department visits and hospitalizations.
- Uses a standardized coding schema.
- Often includes ED and inpatient data sources allowing for a more complete picture of burden.
- Useful for conducting validation studies (either completeness or overall trend) on other real-time data sources.
- A patient's ED discharge disposition is useful for assessing nonfatal status.

- **Limitations/caveats:**
  - Public health authorities often only receive access to hospital discharge databases after a considerable delay and thus utilization of these data do not support implementation of acute or individual interventions.
  - Data may not include personal identifiers, or a separate data use agreement may be necessary to access personal identifiers, and thus do not support implementation of individual interventions.
  - Many jurisdictions' ED discharge datasets do not include visits where the patient was admitted to the hospital for an inpatient stay. These jurisdictions will need to access ED and inpatient discharge datasets to compile a complete set of ED visits to support case ascertainment.
  - Discharge diagnosis coding practices and quality may not be consistent across hospitals and hospital staff. Coding decisions may at times be influenced by billing.
  - The transition from ICD-9-CM to ICD-10-CM coding marked a dramatic change in the coding structure that precludes easy comparisons of pre and post-transition trends. For example, the number of overdose-related codes available for use increased significantly in ICD-10-CM with intent and other contextual information now embedded in the code.
  - Diagnoses are often not based on toxicological test results, which may result in misdiagnosis or misclassification.
  - Federal hospitals (e.g., Veterans Affairs, Department of Defense, and Indian Health Services) may not submit records for inclusion in the hospital discharge dataset.
  - Resident hospitalizations in out-of-state hospitals may not be included, due to the lack of non-resident data exchange between states.

Data source 2: Clinician reporting

- **Summary:**
  - Population-based coverage. Individual clinician reports outside of those associated with an ED visit are likely to be of lower case-ascertainment yield as most medically attended overdoses are treated in and ED.
  - Inclusion of clinical impression leads to high PPV.
  - Useful for case ascertainment and case classification
  - Supports individual case management and follow up and coordination with other prevention groups including identifying individuals and linkage to care.

- **Description:**
  - Population-based coverage as this represents clinicians in any practice setting. Reporting from clinicians would typically take the form of case reports including electronic case reporting (eCR). Individual clinician reports outside of those associated with an ED visit

are likely to be of lower case-ascertainment yield as most medically attended overdoses are treated in and ED.
    - Case reports are based on information contained within the patient record which includes personal identifiers, pregnancy status; coded information for demographics, substance identification or clinical impression, reason for exposure, exposure site (e.g. home, etc.), clinical effects, therapies used, laboratory test results and orders, and medical outcomes; medications administered; history of present illness; and a full case narrative often called case notes is available as well as underlying health conditions.
    - Case reports typically occur rapidly. This would allow for identification of an individual at the time they are in care providing an opportunity for intervention including linkage to further services. It is anticipated that the majority of these reports will come from EDs and evidence indicates if care linkage does not occur at the time of ED care a proportion of individuals are never linked to care.
    - EMS or self-transport information is often available.
- **Strengths:**
    - Data has been critical in supporting the identification of some clusters and data can be very timely.
    - Inclusion of clinical impressions leads to high PPV.
    - Includes clinical impression of suspected drug as well as severity.
- **Limitations/caveats:**
    - Reporting may be inconsistent unless supported through automated processes such as electronic case reporting (eCR) or other processes.

Data source 3: Laboratory data

- **Summary:**
    - Useful for case classification and results are necessary for the confirmed case classification; patterns of polysubstance use such as benzodiazepines, and identifying newly emerging opioids associated with overdoses.
    - Medical examiner toxicology results can be useful to assist in the classification of fatal drug overdoses.
    - Laboratory findings from law enforcement associated with drugs or drug paraphernalia collected or seized at the scene or on the individual at the time of the event can also be useful in assessing non-fatal drug and opioid overdose case classification. Evidence indicates that assessment of the drugs found at the scene have a high degree of correlation to the toxicological test results completed on the individual; in the absence of laboratory testing on clinical specimens, environmental specimens (drugs collected at the scene) should be utilized for case assessment (both ascertainment and case classification).
    - Triage and treatment in EDs for overdoses often occurs without drug testing. In many other situations, the testing is performed on site by a supporting laboratory, but using an immunoassay that only detects opioids as a class. These tests provide results for drug classes (including opioids). They give fast results, but are not sensitive to all opioids, including fentanyl and its congeners.
    - Most testing that is available for use in case ascertainment is completed at the hospital-level and commercially available testing is also available (LabCorp, Quest Diagnostics, etc.); variability exists among testing capacity at the hospital level; state laboratories may provide complimentary/expanded testing; in particular, fentanyl is not well represented in some of the toxicology screens; tests often look at opioids as a class.
- **Description:**

- Laboratory toxicological data. Testing (identification and quantitation of specific opioids) can be performed on human as well as environmental specimens (e.g. drugs collected at the scene). The lab's ability to detect opioids in human specimens is dependent on how close in time blood or other specimens were drawn after exposure. Many state public health laboratories may not be set up to receive specimens for further testing or characterization. Environmental specimens are reported to have a high correlation with human toxicological findings (which can sometimes be delayed or challenging to test based on development of adequate tests to identify the toxic substance in the body). Additionally, it can be difficult to identify substances in clinical specimens that are more rapidly metabolized and some substances share metabolites.

- **Strengths:**
  - Provides high information value to identify if an opioid (instead of another drug) and which specific opioid was the cause of the overdose.
  - High PPV if clinical specimens are available and tests are positive, good for making final case classification.
- **Limitations/caveats:**
  - Often not conducted or done by EDs where the highest proportion of individuals experiencing overdoses receive care, not completed by EMS
  - Toxicological (tox) test results are most commonly available on fatalities. Medical examiner (ME) tox testing can be prolonged and not available for many months, but is most rigorous.
  - Often provides little to no information about the exposure or overdose event.
  - ME tox testing may not be able to identify some of the new synthetic opioids or new fentanyl analogs based on lack of good testing methodology to identify the newer drugs in clinical specimens.
  - Based on the rapidly evolving presence of fentanyl analogs and the lack of adequate testing methodologies to identify new drugs in clinical specimens, negative results should be interpreted with caution.
  - Tests performed in labs that support EDs are antibody-based and the monoclonal antibodies included in typical panels do not bind to fentanyl (unless specifically included) and its analogs, and this is likely to be true for new synthetic opioids. Thus, existing assays used by labs that support EDs will continue to fail to detect these opioids.

Data source 4: Poison control centers (PCCs)

- **Summary:**
  - Data from PCCs have been critical in supporting the identification of clusters, novel drugs, and data can be very timely. Calls are coded using universal (to PCCs) fields and definitions and access to 'progress notes' fields for information about potential exposure source may be available for direct review or discussion with PCC administration in some jurisdictions and can support active surveillance and case investigation efforts. Twenty-five percent of calls to PCC are placed by ED physicians seeking consultation during treatment and thus may provide more information about the overdose event but not necessarily support new potential case identification as the individual may already have been reported to the health department by the ED.
  - May be useful to support case classification and case ascertainment. Additionally, useful to identify clusters as calls can be placed by different EDs where individual presentations may not be recognized as part of a larger cluster.
- **Description:**
  - Every jurisdiction in the US is covered by a PCC staffed by health care practitioner specialists who assess, triage, manage and monitor patients regarding a known exposure to toxic substances or illnesses where a toxic substance is suspected of being the cause,

and dispense diagnostic, treatment and monitoring advice under the authority and control of a Medical Director.
    - The electronic medical record system used to document the patient calls and the consultative process has nationally standardized definitions that are used by all PCCs. The patient record includes personal identifiers; coded information for demographics, substance identification, reason for exposure, exposure site (e.g. home), clinical effects, therapies used, labs, and medical outcomes; and a full case narrative often called “case notes.” In states where laws/rules require reporting by clinicians, PCCs may or may not be considered clinicians and therefore requirements for PCCs to report vary from jurisdiction to jurisdiction.
    - Every 3-5 minutes, PCCs automatically upload a standardized subset of electronic case data collect on every patient to the American Association of Poison Control Centers’ (AAPCC) National Poison Data System (NPDS). Anomaly alert analysis, once programmed, is conducted autonomously by NPDS every hour. Toxicosurveillance staff (AAPCC and CDC) confirm clusters found via alert notification with the originating PCC. Following confirmation of relevant cluster recognition, alerts can be issued to appropriate agencies. Surveillance staff in the CDC National Center for Environmental Health and several divisions of the Food and Drug Administration (FDA) have full access to NPDS data and can unilaterally utilize the data during instances of a recognized public health threat. Staff in state and territorial health agencies can be similarly enabled for NPDS and/or local PCC data access for their region via dialogue and requests made to their regional PCC. Personal identifiers and the “case notes” section of the PCC case report are not available in NPDS as the case is de-identified prior to upload. This information can be made available to state health department partners per dialogue with and requests to the local PCC.
- **Strengths:**
    - Data are available in near-real time.
    - May be able to capture less severe presentations as calls can be made by the public for consultation or advice. Informational and “pill ID” calls may also provide insight into street drug availability and patterns of abuse. PCC are one of few data sources to explore for less severe presentations.
    - Public-provided naloxone and its use is being tracked with non-universal methodology providing varying degrees of efficiency and accuracy depending upon the jurisdiction. In some jurisdictions, if resuscitation of the patient by a family member or by-stander is successful, the individual may not get reported to public health. Some states have enacted hotlines (both inside and outside the PCCs) to track this and some have required reporting in order to gain a refill of the naloxone. Individual PCCs may be a resource that should be queried and possibly considered as a mechanism to complete the spectrum for counting nonfatal opioid overdoses.
    - May capture more unusual presentations.
    - More likely to aid in cluster identification or emergence of a new product with unusual presentations.
- **Limitations/caveats:**
    - Patient’s found dead at the scene will not be reported to PCCs. As there is no requirement to report individuals to the PCCs, some individuals experiencing and overdose presenting to EDs may be missed, if no contact to the PCC was made.
    - State and ZIP code of the health care facility caller is often used as a surrogate measure for the patient’s exposure site, which may not accurately represent the patient’s actual residence.

Data source 5: Urgent care centers

- **Summary:**
  - Associated with lower acuity overdoses. Likely to result in the initial identification of a smaller number of nonfatal overdoses. More severe presentations will likely also be seen in an ED and be identified through ED surveillance efforts.
  - Supports both case ascertainment and case classification.
  - The majority of new opioid overdoses may not present at urgent care centers, but rather receive some type of emergency department care.
  - Ability to capture likely true cases and support follow-up, referrals to care and targeted interventions.
  - Use of a patient's urgent care center discharge disposition (or where the patient goes after they leave the urgent care center – home, transported to ED, admitted to hospital, etc.) is useful for assessing nonfatal status.
  - Access to urgent care center data can be supported through syndromic surveillance or case reporting.
- **Description:**
  - Population-based.
  - Syndromic surveillance and case reports from urgent care center visits for nonfatal overdoses includes chief complaints and discharge diagnoses. Laboratory data could potentially include urine screen test at the point of care in the urgent care center. However, lab testing is often lacking in this setting.
  - Encounter data are collected for billing and utilization purposes. These administrative data are made available to some public health agencies often through data use agreements. Access to patient identifiers is not always available to public health.
  - Opportunities exist to expand electronic case reporting (eCR)
- **Strengths:**
  - Timely.
  - Facilities participate in an electronic syndromic surveillance system operated by a public health agency.
  - Case reports from the patient record at urgent care facilities can include personal identifiers, pregnancy status; coded information for demographics, substance identification (ICD-10 or SNOMED-CT opioid overdose codes) or clinical impression, reason for exposure, exposure site (e.g. home, etc.), reason for visit, medications administered and response laboratory test results and orders, and medical outcomes; and a full case narrative often called case notes is available as well as underlying health conditions. Opportunities exist to expand electronic case reporting (eCR) will increase timeliness.
- **Limitations/caveats:**
  - The proportion of non-fatal overdose cases seen in an urgent care center and not seen in an emergency department is likely very small. Thus, the efficiency of case-finding via urgent care centers is relatively low.
  - Data are not finalized data sets based on toxicological results, thus timely information for case ascertainment may not necessarily represent individuals meeting the confirmed case definition. See discussion of ED data access by SyS above for discussions on limitations access the data via a SyS.

Data source 6: Emergency Medical Services (EMS)

- **Summary:**
  - The proportion of non-fatal overdose cases seen by EMS and not seen in an emergency department is likely small. Thus, the efficiency of case-finding via EMS is relatively low.

- EMS data systems can provide data on cases that would be missed by other systems. EMS agencies are often responsible for naloxone administration in the field, at the scene or in transport. Anecdotal evidence indicates some individuals suffering an opioid overdose refuse EMS transport to and ED following a successful administration of naloxone in the field. The proportion of individuals only identified via EMS services (refusal of transport or other care seeking) may be substantial and represent an important high-risk population for a subsequent use or fatality.

- **Description:**
  - EMS data is a prehospital incident reporting system. It contains information for those who seek care by calling 911; and is collected during 911 dispatch, EMT first response, paramedic care, ambulance transport, and ED encounter.
  - Many state, local, and territorial health departments have EMS program that license and regulate EMS providers and coordinate EMS data collection.
  - The National Emergency Medical Services Information System (NEMSIS) is a national effort to standardize the data collected by EMS agencies. It provides the framework for collecting, storing, and sharing standardized EMS data.
- **Strengths:**
  - Likely to provide information about overdose reversals in the field post naloxone administration where transport is refused.
  - EMS is an essential part of the health care delivery system. EMS data are frequently used to complement information obtained from other sources. In some circumstances, EMS data may be the only data available to identify an opioid overdose event.
  - There are a variety of commercial EMS data software packages available, such as ImageTrend and FirstWatch. These software packages are usually in compliance with NEMSIS formatting standards.
- **Limitations/caveats:**
  - Because of the highly time sensitive nature of first responses, EMS data entered at the scene often encounter data quality issues (i.e. lack of completeness and accuracy).
  - EMS data collection tools have a wide range of formats, such as paper forms, stationary computer workstations, laptop computers, and other mobile terminals. Timeliness of data submission vary greatly depending on which tool(s) each specific EMS provider chooses.
  - Administration of naloxone is a crude indicator of an opioid overdose. Cases can be more accurately identified if patient response (i.e., recovery) following naloxone administration is documented. However, this method of case ascertainment relies on EMS personnel routinely providing this documentation. The degree to which this is done may vary by EMS agency, thus impacting analysts' ability to examine geographical difference in opioid overdoses.

Data source 7: Law enforcement

- **Summary:**
  - This data source likely is most useful to support identification of outbreaks or to supplement investigation of a previously identified potential case with limited value for new initial case ascertainment.
  - Cases may be ascertained if the data indicate that naloxone was administered.
  - Collection of arrest data may provide useful information to help support case classification.
- **Description:**
  - Data collected by law enforcement when responding. May include information about the overdose scene, time of the event or drugs seized at the scene.
- **Strengths:**
  - Main strength likely is its use to assist in case classification or cluster identification as opposed to case ascertainment.

- **Limitations/caveats:**
  - Can be challenging for public health to access and often requires establishment of memorandums of understanding (MOUs).

Data source 8: Harm reduction or comprehensive syringe service programs

- **Summary:**
  - These programs may not be available in every state.
  - May be useful support identification of clusters or new high potency products or to supplement investigation of a previously identified potential case with more limited value for new initial case ascertainment.
  - May be helpful to assess prior history of drug overdose or use.
- **Description:**
  - Harm reduction is a pragmatic approach that aims to reduce the adverse consequences of drug abuse.
- **Strengths:**
  - Useful for capturing community-based overdose reversals, many of which may not include EMS or other agency involvement.
- **Limitations/caveats:**
  - May be challenging for public health to access and require establishment of MOUs or new reporting polices.

Appendix 2: Medical Record Opioid Overdose Codes and Chief Complaints

Introduction

This appendix contains guidance for jurisdictions conducting case ascertainment and case classification of opioid overdoses utilizing healthcare records. For information discussing strengths and limitations about different data sources including syndromic surveillance approaches see Appendix 1. The queries and codes provided below have been adapted to support the criteria specified in this CSTE Position Statement for Nonfatal Opioid Overdoses from definitions originally developed as part of activities funded through the Centers for Disease Control and Prevention's (CDC) Overdose Prevention in States (OPIS) cooperative agreements with state and local partners to combat the opioid overdose crisis. The three programs under the OPIS umbrella include Prescription Drug Overdose: Prevention for States (PfS), Data-Driven Prevention Initiative (DDPI), and Enhanced State Opioid Overdose Surveillance (ESOOS).

Case ascertainment and case classification codes and queries

Table 1 and Table 2: *Case ascertainment*. These criteria and supporting query are designed to support case ascertainment by health departments utilizing syndromic surveillance. The criteria for inclusion and query were designed for syndromic surveillance purposes utilizing emergency department (ED) data, but the terms and codes provided may be used for conducting syndromic surveillance for case ascertainment with other data sources as well (urgent care centers, poison control centers, emergency medical services, [EMS], etc. and will function more or less optimally depending on the similarity of the data to ED data). Jurisdictions conducting case ascertainment may have other terms or codes that prove useful to case ascertainment based on variations in their jurisdictional data, especially to support active case ascertainment/finding during outbreaks. However, the criteria and query below are robust and recommended for use. As additional information is learned, these criteria and query are expected to be updated to more fully support optimal case ascertainment.

> **Note:** The criteria in Table 1 and the query code in Table 2 were developed by CDC staff and funded state health departments involved in ESOOS and have been modified to support the case ascertainment criteria for the CSTE Nonfatal Opioid Overdose Position Statement case definition. To note, the definition currently used by ESOOS varies from the CSTE position statement in two key ways. First, the ESOOS definition only includes overdoses of unintentional and undetermined intent, while all intents (unintentional, intentional, assault, and undetermined) are considered in the position statement. Second, the ESOOS guidance excludes patients under the age of 11, whereas patients of all ages are included here. Table 2 includes specific query code for use in CDC's National Syndromic Surveillance Program (NSSP) BioSense/ESSENCE platform. Additional information on NSSP can be found here: https://www.cdc.gov/nssp/index.html.

Table 3. Opioid overdose ICD-10-CM diagnosis codes for case classification. The codes specified here would meet the probable case definition: "A medical record with a diagnosis of an opioid overdose" or could be combined with appropriate laboratory evidence to meet the confirmed case definition: "A diagnosis of an opioid overdose with confirmatory laboratory evidence."

> **Note:** The identified codes are based on an indicator definition developed by CDC staff working on PfS/DDPI in close partnership with CSTE's ICD-10-CM Drug Poisoning Indicators Workgroup. The original CDC indicator, "emergency department visits involving non-fatal opioid overdose excluding heroin" was designed for program monitoring and evaluation with hospital emergency department administrative datasets (i.e., discharge datasets). CDC's indicator definition varies slightly from that listed here which includes heroin, whereas the original PfS/DDPI definition explicitly excludes heroin from the opioid overdose indicator and counts them in a separate, mutually exclusive indicator.

Case Ascertainment (Chief Complaint and diagnosis codes)

Table 1: Opioid overdose chief complaint and diagnosis codes for case ascertainment

Variable	Automatic inclusion?	Specific terms
Discharge Diagnosis (included terms with no period, e.g., "96500")	Yes	*ICD-9-CM* 965.00, 965.01, 965.02, 965.09, E850.0, E850.1, E850.2 *ICD-10-CM* T40.0X1A-T40.0X4A, T40.1X1A-T40.1X4A, T40.2X1A-T40.2X4A, T40.3X1A-T40.3X4A, T40.4X1A-T40.4X4A, T40.411A-T40.414A, T40.421A-T40.424A, T40.491A-T40.494A, T40.601A-T40.604A, T40.691A-T40.694A, 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 *SNOMED* 295174006, 295175007, 295176008, 295165009, 242253008, 297199006, 295213004
Chief complaint – naloxone	Yes	Naloxone (narcan, evzio)
Chief complaint – overdose term (includes all possible misspellings)	No, must use in combination with opioid term	Poisoning, Overdose, Nodding off, Snort, Ingestion, Intoxication, Unresponsive, Loss of consciousness (syncope), Shortness/short of breath, Altered mental status
Chief complaint – opioid term (includes all possible misspellings)	No, must use in combination with overdose term	Heroin, speed ball, dope, opioid, opiate, opium, methadone, suboxone, percocet, vicodin, fentanyl, hydrocodone, morphine, codeine, "oxy" (for all types of oxycodone, oxymorphone, etc.), dilaudid, hydromorphone, tramadol, buprenorphine, Abstral, Actiq, Avinza, Butrans, Demeral, Dolophine, Duragesic, Fentora, Hysingla, Methadose, Morphabond, Nucynta, Onsolis, Oramorph, Oxaydo, Roxanol, Sublimaze, Xtampza, Zohydro, Anexsia, Co-Gesic, Embeda, Exalgo, Hycet, Hycodan, Hydromet, Ibudone, Kadian, Liquicet, Lorcet, Lortab, Maxidone, MS Contin, Norco, Opana, Oxycet, Palladone, Percodan, Reprexain, Rezira, Roxicet, Targiniq, TussiCaps, Tussione, Tuzistra, Vicoprofen, Vituz, Xartemis, Xodol, Zolvit, Zutripro, Zydone, Ultram
Discharge Diagnosis – ICD-10-CM opioid abuse/dependence/use	No, must use in combination with overdose term	F11.10, F11.90, F11.20
Exclusions		
Chief complaint	Exclude	Statements in chief complaint text indicating the following: • no loss of consciousness or no shortness/short of breath • patient denying opioid use • patient seeking detox or in withdrawal • Terms that may accidentally be captured by "oxy": oxy saturation, oxy state, oxy high/low, oxy mask, oxy given, placed on oxy, pulse oxy, not enough oxy • Terms that may accidentally be captured with fentanyl that is used to treat pain: received/administered/given fentanyl, doses of fentanyl given, levels of fentanyl given (e.g., 50/75/100/150mg fentanyl)

Table 2. ESSENCE query for suspected opioid overdose (updated 2021 to account for the new T40.4 codes)

(,^narcan^,or,^naloxo^,or,^[;/]T40.[012346][X0129][14]A^,or,^[;/]T40[012346][X0129][14]A^,or,^[;/]F11.12^,or,^[;/]F11.22^,or,^[;/]F11.92^,or,^[;/]F1112^,or,^[;/]F1122^,or,^[;/]F1192^,or,^[;/]965.0[0129][;/]^,or,^[;/]9650[0129][;/]^,or,^[;/]E850.[012]^,or,^[;/]E850[012]^,or,^295174006^,or,^295175007^,or,^295176008^,or,^295165009^,or,^242253008^,or,^297199006^,or,^295213004^,),or,(,(,(,^poison^,or,^verdo[se][se]^,or,^over dose^,or,^overose^,or,^nodding^,or,^ nod ^,or,^snort^,or,^in[gj]est^,or,^intoxic^,or,^unresponsiv^,or,^loss of consciousness^,or,^syncop^,or,^shortness of breath^,or,^short of breath^,or,^altered mental status^,) ,and, (,^her[io][oi]n^,or,^ hod ^,or,^speedball^,or,^speed ball^,or,^dope^,or,^opioid^,or,^op[io][oi]d^,or,^opiate^,or,^opate^,or,^op[iu][ui]m^,or,^opum^,or,^methadone^,or,^ suboxone^,or,^oxyco^,or,^oxyi^,or,^ oxy ^,or,^percoc^,or,^vicod^,or,^fent^,or,^hydrocod^,or,^morphin^,or,^cod[ei][ie]n^,or,^codene^,or,^oxymor^,or,^dilaud^,or,^hydromor^,or,^tramad^,or,^suboxin^,or,^buprenorphine^,or,^Abstral^,or,^Actiq^,or,^Avinza^,or,^Butrans^,or,^Demer[oa]l^,or,^Dolophine^,or,^Duragesic^,or,^Fentora ^,or,^Hysingla^,or,^Methadose^,or,^Morphabond^,or,^Nucynta^,or,^Onsolis^,or,^Oramorph^,or,^Oxaydo^,or,^Roxanol^,or,^Sublimaze^,or,^Xtampza^,or,^Zohydro^,or,^Anexsia ^,or,^Co-Gesic^,or,^Embeda ^,or,^Exalgo^,or,^Hycet^,or,^Hycodan^,or,^Hydromet^,or,^Ibudone^,or,^Kadian^,or,^Liquicet^,or,^Lorcet^,or,^Lortab^,or,^Maxidone^,or,^ MS Contin ^,or,^Norco ^,or,^ Opana ^,or,^Oxycet^,or,^Palladone^,or,^Percodan^,or,^Reprexain^,or,^Rezira^,or,^Roxicet^,or,^Targiniq^,or,^TussiCaps^,or,^ Tussione ^,or,^Tuzistra^,or,^Vicoprofen^,or,^Vituz^,or,^Xartemis^,or,^Xodol^,or,^Zolvit^,or,^Zutripro^,or,^Zydone^,or,^Ultram^,or,^[;/]F11.[129]0^,or,^[; /]F11[129]0^,),),andnot,(,^no loss of consciousness^,or,^denie[sd] loss of consciousness^,or,^negative loss of consciousness^,or,^denies any loss of consciousness^,or,^denies her[io][oi]n^,or,^deny her[io][oi]n^,or,^denied her[io][oi]n^,or,^denying her[io][oi]n^,or,^denies drug^,or,^deny drug^,or,^denied drug^,or,^denying drug^,or,^denies any drug^,or,^with dra^,or,^withdra^,or,^detoxification^,or,^detos^,or,^detoz^,or,^dtox^,or,^ oxy sat ^,or,^ oxy state ^,or,^oxy high^,or,^oxy low^,or,^oxy mask ^,or,^oxy given^,or,^given oxy ^,or,^oxy clean^,or,^low oxy ^,or,^high oxy ^,or,^placed on oxy ^,or,^pulse oxy ^,or,^oxy deep cleaner^,or,^not enough oxy ^,or,^oxy level^,or,^sedat ^,or,^received fentanyl^,or,^administered fentanyl^,or,^given fentanyl^,or,^fentanyl en route^,or,^fentanyl enrt^,or,^fent en route^,or,^fentanyl given^,or,^fentynl given^,or,^gave fent^,or,^gave fentanyl^,or,^given fentanly^,or,^mcg fentanyl^,or,^mcg fent^,or,^mcg of fent^,or,^fentanyl 75^,or,^fentanyl 50^,or,^50 fentanyl^,or,^fentanyl 100^,or,^100 fentanyl^,or,^fentanyl 150^,or,^intranasal fent^,or,^milligram fent^,or,^milligram of fentanyl^,or,^ fenton ^,or,^fent pta^,or,^fentanyl pta^,or,^fentynl 100 ^,or,^fentynyl 100^,or,^fentynal 50^,or,^fentynl 50^,or,^fent 50^,or,^fent 100^,or,^fent 150^,or,^diffently^,or,^received fent ^,or,^recieved fent ^,or,^ given 50 ^,or,^ given 100 ^,or,^ given 150 ^,or,^ gave 50 ^,or,^ gave 100 ^,or,^ gave 150 ^,or, ^ doses of fent ^,),)

Notes

Table 1 includes chief complaint text and diagnosis codes (e.g., ICD-9/10-CM, SNOMED) for identifying potential nonfatal opioid overdose cases. As of October 1, 2020 select T40.4X codes were retired and additional codes were introduced () to include more specificity regarding injuries due to poisoning by fentanyl, tramadol, and other synthetic narcotics. See Appendix 3, Supplemental Material 3 for list of Opioid Overdose Related ICD-10-CM T Codes.

In situations where diagnosis codes are not present, the free text field called chief complaint which represents the purpose of an ED visit (e.g., “patient was found unresponsive, EMS provided narcan and patient said took heroin.”) is used to identify potential overdoses). ED visits with chief complaints containing text indicating an overdose or poisoning (e.g., “overdose” or “loss of consciousness”, etc.) *and* text indicating the involvement of a drug (i.e., “opioid”, “cocaine”, etc.) were identified as potential all drug or opioid overdoses. Common misspellings of key search terms (e.g., “herion” instead of “heroin”, etc.) were also included. The table includes the overdose and drug terms included by the CDC ESOOS program. Several text exclusions are also included to decrease the likelihood of false positives.

Tools and resources

(1) Additional information on syndromic surveillance including CDC's National Syndromic Surveillance Programs (NSSP): https://www.cdc.gov/nssp/index.html
(2) New to syndromic surveillance?: https://www.cdc.gov/nssp/new-users.html
(3) Details on how to operationalize the case definition in NSSP's ESSENCE program: https://www.healthsurveillance.org/
(4) Additional information on ESOOS: https://www.cdc.gov/drugoverdose/foa/state-opioid-mm.html and data stemming from ESOOS's nonfatal data efforts: https://www.cdc.gov/drugoverdose/data/nonfatal.html

Case Classification Overdose Diagnosis Codes

Table 3: Opioid overdose ICD-10-CM discharge diagnosis codes for case classification

ED visits with any of the following ICD-9-CM codes:		
First-Listed Diagnosis	**OR Any Mention of External Cause-of-Injury**	
965.00: Poisoning by opium **965.01:** Poisoning by heroin **965.02:** Poisoning by methadone **965.09:** Poisoning by other opiates and related narcotics	**E850.0:** Accidental poisoning by heroin **E850.1:** Accidental poisoning by methadone **E850.2:** Accidental poisoning by other opiates and related narcotics	
ED visits with any of the following ICD-10-CM codes (Provisional Definitions):		
Any Mention of Diagnosis	**AND a 6th character of 1,2,3, or 4:**	**AND a 7th character of A or missing**
T40.0X: Poisoning by opium **T40.1X:** Poisoning by heroin **T40.2X:** Poisoning by other opioids **T40.3X:** Poisoning by methadone **T40.4X:** Poisoning by synthetic narcotics **T40.60:** Poisoning by unspecified narcotics **T40.69:** Poisoning by other narcotics	**1:** Accidental (unintentional) **2:** Intentional self-harm **3:** Assault **4:** Undetermined intent *Do not include:* **5**: Adverse effect **6**: Underdosing	**A**: Initial encounter **Missing** *Do not include:* **D**: Subsequent encounter **S**: Sequela

Notes

Table 3 includes ICD-10-CM codes for classifying nonfatal opioid overdose cases. These codes would meet the probable case classification component: "A medical record with a diagnosis of an opioid overdose." Final discharge diagnosis codes found in any diagnosis field or external cause of injury field should be considered. Patients with a discharge status of "death" or "deceased" should be excluded from counts of probable nonfatal opioid overdose cases. In counts, include ED visits involving state residents only. Although access to data for out-of-state residents may be available, for state-to-state comparison only utilize data for in-state residents (see IX. Data Sharing/Release and Print Criteria). Depending on what data set is utilized counts of emergency department visits may also be admitted to the hospital; for most states, these admission records are not included in the emergency department discharge data set. See Appendix 1 for more information about hospital emergency department discharge datasets. See Appendix 3 for more information about classifying nonfatal opioid overdose cases specifically using Emergency Medical Services Data.

As of October 1, 2020 select T40.4X codes were retired and additional codes were introduced to include more specificity regarding injuries due to poisoning by fentanyl, tramadol, and other synthetic narcotics. See Appendix 3, Supplemental Material 3. List of Opioid Overdose Related ICD-10-CM T Codes.

Tools and resources for this definition

(1) Additional information on CSTE ICD-10-CM Drug Poisoning Indicators Workgroup: https://www.cste.org/general/custom.asp?page=InjICD10DrugPoisInd
(2) Additional information on PFS: https://www.cdc.gov/drugoverdose/states/state_prevention.html

(3) Additional information on DDPI: https://www.cdc.gov/drugoverdose/foa/ddpi.html
(4) The Transition from ICD-9-CM to ICD-10-CM: Guidance for Reporting of Injuries by Mechanism and Intent https://c.ymcdn.com/sites/www.safestates.org/resource/resmgr/isw9/ISW9_FINAL_Report.pdf
(5) Impact of ICD-10-CM/PCS on Research Using Administrative Databases. HCUP Methods Series Report # 2016-02 https://www.hcup-us.ahrq.gov/reports/methods/2016-02.pdf
(6) Healthcare Cost and Utilization Project (HCUP) Recommendations for Reporting Trends Using ICD-9-CM and ICD-10-CM/PCS Data https://www.hcup-us.ahrq.gov/datainnovations/HCUP_RecomForReportingTrends_070517.pdf
(7) Case Study: Exploring How Opioid-Related Diagnosis Codes Translate From ICD-9-CM to ICD-10-CM https://www.hcup-us.ahrq.gov/datainnovations/ICD-10CaseStudyonOpioid-RelatedIPStays042417.pdf
(8) Trends in Opioid-related Inpatient Stays Shifted After the US Transitioned to ICD-10-CM Diagnosis Coding in 2015 https://www.hcup-us.ahrq.gov/datainnovations/Opioid_trends_ICD_Med_Care.pdf

Appendix 3: Council of State and Territorial Epidemiologists Emergency Medical Services Nonfatal Opioid Overdose Standard Guidance

Using this Standard Guidance

This guidance will assist public health practitioners in state, tribal, local, and territorial (STLT) jurisdictions utilize Emergency Medical Services (EMS) data to identify suspected nonfatal opioid overdose (NFOO).

EMS Data Collection Overview

The data elements for this standardized guidance for nonfatal opioid overdose are derived from a core set of elements that most states submit to a national data repository, the National Emergency Medical Services Information System (NEMSIS). The National Highway Traffic Safety Administration (NHTSA) developed the NEMSIS to provide a national standard for the documentation of patient care reports in the prehospital setting. EMS incidents are documented as patient care reports (PCRs) using software compliant with documentation and data exchange standards. In 2019, NEMSIS received 34,203,087 EMS activations submitted by 10,062 EMS agencies in 47 states and territories.

The flow of EMS data from an EMS incident to inclusion in the national database is illustrated in Figure 1. EMS personnel generate a PCR for each patient at an EMS incident, which incorporates information from the 911 dispatch, medical devices utilized in patient care, and any information logged by EMS personnel. When the incident is complete, the PCR is submitted to the EMS agency, transferred to the state data repository, and finally transmitted to NEMSIS. The time this process takes varies by state, with NEMSIS receiving about 40% of records within 24 hours of the EMS incident.

Definitions for the elements in this standard guidance are adapted from the NEMSIS v3.5.0 Data Dictionary. Differences between NEMSIS v3.4.0 and v3.5.0 that may affect this guidance are discussed in Supplemental Material 4.

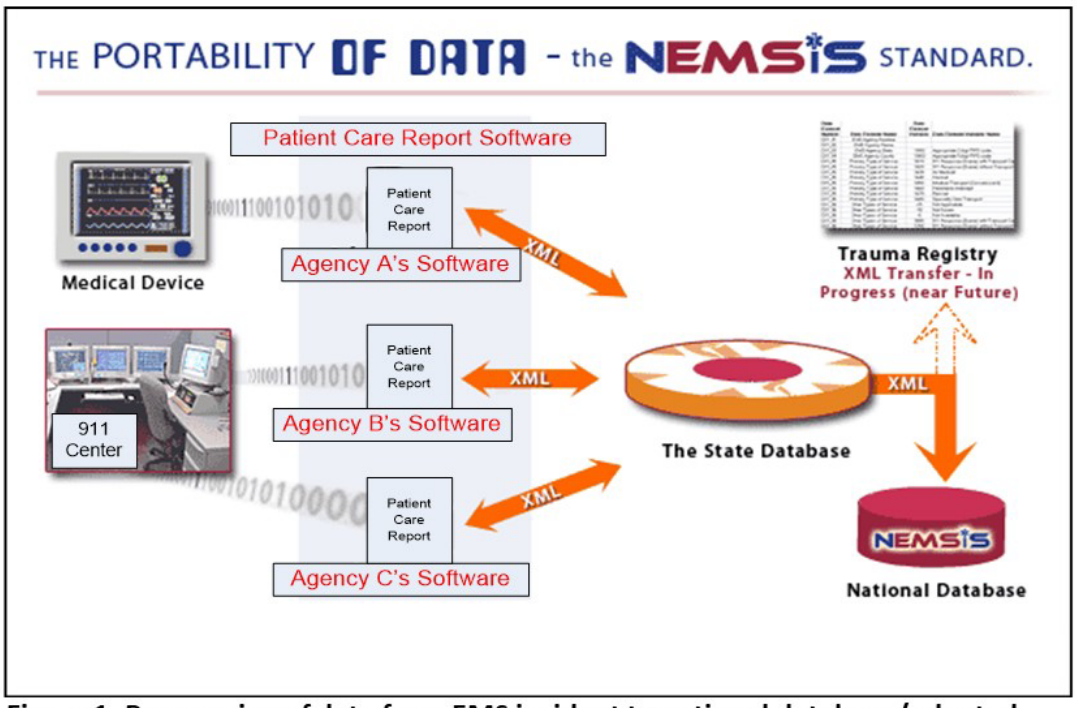


Figure 1. Progression of data from EMS incident to national database (adapted from NEMSIS TAC resources)

Understanding the Data Elements Used in This Standard Guidance

This standard guidance directs practitioners to utilize key EMS data elements to define a nonfatal opioid overdose including six coded elements and one text field, the *Patient Care Report Narrative*. Coded elements are populated when EMS personnel complete their reports of incidents. In the reports EMS personnel select set terms of medical conditions from text descriptions (in drop down menu selections).

Coded Elements. The coded elements are elements containing selections from a drop-down menu.

- *Provider's Primary Impression*
- *Provider's Secondary Impression*
- *Primary Symptom*
- *Other Associated Symptoms*
- *Medication Administered*
- *Response to Medication Administered*

The data selections made by EMS personnel in the field (the frontend) may differ from data obtained on the backend by public health professionals because text descriptions of conditions and symptoms included in drop-down menu selections are typically mapped to correspond on the backend to diagnosis or medication codes not seen by EMS personnel. Algorithms determined by EMS software vendors dictate how frontend data are mapped to the backend. Specifically, data selections for *Provider's Primary Impression* and *Provider's Secondary Impression* and selections for *Primary Symptom* and *Other Associated Symptoms* are often mapped on the backend to codes from the International Classification of Diseases, Tenth Revision Clinical Modification (ICD-10-CM). These would include "T-codes" which indicate injury, poisoning, and certain other consequences of external causes, and/or "F-codes" which indicate mental and behavioral disorders.

For example, EMS personnel may select "Narcotic use" as a *Primary Symptom* during an encounter. The EMS software vendor algorithm might map the encounter on the backend to "T40.6: poisoning by, adverse effect of, and underdosing of other and unspecified narcotics". Staff in public health departments conducting overdose surveillance typically have access only to the backend coded values, not the initial frontend drop-down menu categories selected by EMS personnel in the field. In this example, public health staff cannot reasonably be expected to determine NFOO from the presence of this ICD-10-CM code alone since numerous ICD-10-CM codes may indicate a suspected NFOO. This variation in codes indicating suspected NFOO can be attributed to the customization of data selections available to EMS personnel on the frontend, and variation in the way these customized data selections map to backend diagnosis codes. For example, an EMS agency may wish to include "opioid overdose symptoms" as a choice for *Primary Symptom* or *Other Associated Symptoms.* This selection may map on the backend as "F11: Opioid related disorders", or "F11.1: Opioid abuse", or "F11.15: Opioid abuse with opioid-induced psychotic disorder". A list of all ICD-10-CM codes which may indicate a suspected NFOO are available in Table 1a, along with a detailed description of each coded element, their definition (per NEMSIS v3.5.0), and "values of interest" which may indicate a suspected NFOO.

Text Element: Patient Care Report Narrative.
The *Patient Care Report Narrative* may be used to validate suspected NFOO identified using the coded elements, or to detect a NFOO that may have been missed by the coded elements. In contrast to the coded elements the national EMS database does not collect the *Patient Care Report Narrative,* limiting the ability to utilize this element to identify NFOO using national NEMSIS data. In addition, although most states require submission of the *Patient Care Report Narrative* to the state data repository, confidentiality and privacy laws may limit the ability of state and local jurisdictions to access this element, as the *Patient Care Report Narrative* may contain unredacted protected health information. Thus, availability of this element may vary by state.

CSTE Emergency Medical Services Nonfatal Opioid Overdose Standard Guidance

This standard guidance details how to use the EMS coded elements and text element, *Patient Care Report Narrative* to identify suspected NFOO. EMS incidents (also referred to as EMS runs or EMS transports) are considered eligible for consideration if the *Type of Service Requested (*eResponse.05) indicates an emergency response (e.g., primary response area, intercept, or mutual aid). EMS incidents should be excluded from consideration if a) the *Type of Service Requested* (eResponse.05) is a non-emergency response (e.g., hospital-to-

hospital transfer, public assistance, standby, mobile integrated health care encounter, etc.), OR b) *Initial Patient Acuity* (eSituation.13*)* is "Dead Without Resuscitation Efforts (Black)" OR c) *Final Patient Acuity* (eDisposition.19) is "Dead Without Resuscitation Efforts (Black)". The standard guidance is summarized in Box 1 and explained in further detail below.

In rare instances, death may result from rebound opioid toxicity following an opioid overdose. It is possible that an individual may die following interaction with EMS personnel. Therefore, this definition aims to identify suspected NFOO to the extent they can be identified while the individual is still alive.

Box 1: CSTE Emergency Medical Services Nonfatal Opioid Overdose Standard Guidance

Eligibility: EMS incidents are *eligible* if *Type of Service Requested* indicates an emergency response. EMS incidents should be *excluded* if *Type of Service Requested* is a non-emergency response or *Initial Patient Acuity/Final Patient Acuity* is "Dead Without Resuscitation Efforts (Black)".

A nonfatal opioid overdose is defined as any eligible EMS incident where:

1. The *Provider's Primary Impression* OR *Provider's Secondary Impression* is opioid overdose related

OR

2. The *Primary Symptom* OR *Other Associated Symptoms* is opioid overdose related

OR

3. *Medication Administered* is naloxone or Narcan AND *Response to Medication Administered* is improved

OR

4. *Patient Care Report Narrative* contains:
a) At least ONE (1) opioid- related keywords, see Table 1b
AND
b) At least TWO (2) overdose-related keywords, see Table 1b

CSTE Emergency Medical Services Nonfatal Opioid Overdose Standard Guidance

1: *Provider's Primary Impression OR Provider's Secondary Impression* are opioid overdose related.
In these fields, EMS personnel indicate their "differential diagnosis", which should identify the patient as the victim of an opioid overdose. A suspected NFOO can be identified by ICD-10-CM T and F codes to which text descriptions are mapped and which indicate an opioid overdose related incident. A suspected NFOO may also be indicated by values for *Provider's Primary Impression* or *Provider's Secondary Impression* that contain the word "opioid" or "overdose". Values for *Provider's Primary Impression* or *Provider's Secondary Impression* that may indicate a suspected NFOO can be found in Table 1a and in Supplemental Materials 2 and 3.

2: The *Primary Symptom* OR *Other Associated Symptoms* are opioid overdose related.
Similar to the *Provider's Primary Impression* and the *Provider's Secondary Impression*, the *Primary Symptom* and *Other Associated Symptoms* also identify suspected NFOO through opioid overdose related T and F codes (Table 1a). This would include any incidents which contained opioid overdose related T or F codes based on symptoms but were not identified as a suspected NFOO using either the *Provider's Primary Impression* or the *Provider's Secondary Impression.*

For example, an opioid overdose would be excluded if EMS personnel selected "R41.82: Change in mental status NOS" as the *Provider's Primary Impression* and "R40.20: Unconsciousness NOS" as the *Provider's Secondary*

Impression. However, this incident may still be identified if EMS personnel selected a *Primary Symptom* that translated on the backend to “F11: Opioid related disorders.

3: *Medication Administered* is naloxone or Narcan AND *Response to Medication Administered* is improved.
Nonfatal opioid overdoses may be identified by searching for any EMS incidents which reported the administration of Narcan or naloxone with an improved response. In contrast to the other coded elements, *Medication Administered* may allow EMS personnel to enter the medication as a free-text response, which may result in a variety of eligible responses (e.g., Naloxone Hydrochloride 1 MG/ML Injectable Solution (Narcan), Naloxone Injectable Solution [Narcan], Naloxone Prefilled Syringe, Naloxone 0.5mg, Naloxone 2 mg, Naloxone/Pentazocine, EVZIO, etc.). Thus, possible values of *Medication Administered* may need to be evaluated to capture all responses that indicate a naloxone administration.

Although naloxone administrations have often been used as a proxy variable for identifying NFOO using EMS data[2,3], counting naloxone administrations only (without documentation of response to Naloxone) might overestimate NFOO. For example, counting all naloxone administrations might include instances when naloxone was administered to rule out NFOO as a cause of respiratory depression[4]. However, counting naloxone administrations where the *Response to Medication Administered* was improved should decrease the likelihood of including any non-NFOO events.

4: *Patient Care Report Narrative* contains at least ONE(1) opioid AND at least TWO(2) overdose-related keywords.
The *Patient Care Report Narrative* is an unstructured free-text response written by EMS personnel. Rather than focusing on standardized values that indicate a NFOO, the *Patient Care Report Narrative* can be queried for opioid- and overdose-related keywords that may indicate a suspected NFOO. This may be advantageous for incidents where the coded elements were missing or left blank, such as incidents where the patient was not transported to the hospital, refused treatment, or was administered naloxone prior to EMS personnel arrival at the scene. Information provided in the *Patient Care Report Narrative* may also be used to determine which EMS incidents identified as NFOO may actually be “false positives” provided the incident does not meet the criteria for any coded elements(1-3). For example, an individual with an altered mental status due to alcohol intoxication may be administered naloxone with an “improved” response, albeit due to the reaction resulting from the discomfort of an intranasal naloxone administration. Further information in the *Patient Care Report Narrative* may be useful for identifying this as a “false positive” and excluding it from NFOO counts.

When using coded elements (1-3) to identify a suspected NFOO only one relevant selection is required. Identifying a suspected NFOO using the *Patient Care Report Narrative* requires the combination of one(1) opioid-related keyword and two(2) overdose-related keywords. The field tests conducted to examine this standard guidance demonstrated that use of only one overdose-related keyword had a higher likelihood of identifying a “false positive”. For example, identification of all cases where the word “pinpoint” is used in the *Patient Care Report Narrative* may also select incidents involving stroke or head injuries, whereas the combination of “pinpoint” with “opioid” and “agonal” may limit selection to incidents of suspected NFOO.

Specific opioid- and overdose-related keywords within the *Patient Care Report Narrative* which may indicate a suspected NFOO are listed in Table 1b. These keyword lists were developed using commonly occurring keywords in existing state definitions for NFOO, then evaluated in a field test that applied the NFOO guidance to EMS data from six state/local jurisdictions. Keywords identified as frequently occurring in the first field test were further examined in a second field test where two states utilized EMS incidents to examine the frequency of each keyword in a “true” nonfatal opioid overdose, as identified through manual review of the *Patient Care Report Narrative*. The keyword lists included in Table 1.b feature the words determined most likely to identify a “true positive” nonfatal opioid overdose. This determination was resulted from two separate field tests of this guidance by six distinct jurisdictions including state and local agencies.

Classification of Nonfatal Opioid Overdose Cases

The CSTE Standardized Surveillance Case Definition (CSTE NFOO PS or PS:19-CC-01) identifies a three-tiered hierarchy of NFOO case classifications based upon the evidence used to identify cases as confirmed, probable, or suspected in section VII- Case Definition for Case Classification.

Confirmed Cases are unlikely due to the very low proportion of EMS incidents that use confirmatory laboratory evidence, which is a required element to classify a case as confirmed as outlined in PS:19-CC-01.

Probable Cases PS:19-CC-01 outlines criteria to use when determining probable NFOO cases. However, EMS data are unlikely to meet the stated criteria demonstrating successful naloxone administration with reversal or improvement. Most EMS incidents will not contain enough information to reasonably determine successful naloxone administration with reversal or improvement. When developing this standard guidance, two field tests were conducted to understand such concerns. Field test results indicate that the coded elements *Medication Administered* and *Response to Medication Administration* with Narcan or naloxone and improved, respectively are not fields consistently made available to public health jurisdictions or the fields are frequently incomplete. Inconsistent data quality of the coded elements requires that the *Patient Care Report Narrative* must be searched manually for indication of naloxone administration and if improvement resulted. The free text field is not consistently documented. Primary and secondary impressions alone are not sufficient to determine probable cases. Similar to Emergency Department syndromic data which identify suspected overdoses, the ICD-10-CM codes assigned in EMS data for coded elements are not final diagnosis codes based on medical confirmation. Rather, the assigned ICD-10-CM codes in EMS data are typically assigned based on algorithms pre-set by EMS vendors to coincide with descriptions of the patient state and main medical ailment selected by EMS personnel during the encounter.

Suspected Cases The majority of EMS incidents will meet the suspect case classification. EMS incidents that indicate a NFOO by any opioid overdose related entries from the drop-down elements (i.e., *Provider's Primary Impression, Provider's Secondary Impression, Primary Symptom,* or *Other Associated Symptoms)* or include any cases that are identified with at least one opioid-related keyword and at least two overdose-related keywords should be classified as suspected cases.

For example, a suspected NFOO case would include any of the following:

- EMS incident where the *Provider's Primary Impression OR Provider's Secondary Impression* was opioid overdose related
- EMS incident where the *Primary Symptom* OR *Other Associated Symptoms* were opioid overdose related
- EMS incident where the *Patient Care Report Narrative* contains
    - at least ONE(1) opioid-related keyword, See Table 1b
      AND
    - at least TWO(2) overdose-related keywords, See Table 1b

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Table 1a: NEMSIS v3.5.0 Definitions and Values for Coded Elements Which May be Used to Identify a Nonfatal Opioid Overdose

Element[a]	Element Description	Values of Interest[b]

Provider's Primary Impression eSituation.11	The EMS personnel's impression of the patient's primary problem or most significant condition which led to the management given to the patient (treatments, medications, or procedures)	**T-Codes likely containing the words "overdose" or "opioid"**
		• **Poisoning by opium** (T40.0,T40.0X,T40.0X1,T40.0X1A,T40.0X2,T40.0X2A,T40.0X3,T40.0X3A,T40.0X4, T40.0X4A)
		• **Poisoning by heroin** (T40.1, T40.1X, T40.1X1, T40.1X1A, T40.1X2, T40.1X2A, T40.1X3, T40.1X3A, T40.1X4, T40.1X4A)
		• **Poisoning by other opioids** (T40.2, T40.2X, T40.2X1, T40.2X1A, T40.2X2, T40.2X2A, T40.2X3, T40.2X3A, T40.2X4, T40.2X4A)[c]
		• **Poisoning by methadone** (T40.3, T40.3X, T40.3X1, T40.3X1A, T40.3X2, T40.3X2A, T40.3X3, T40.3X3A, T40.3X4, T40.3X4A)
		• **Poisoning by other synthetic narcotics** (T40.4, T40.4X, T40.4X1, T40.4X1A, T40.4X2, T40.4X2A, T40.4X3, T40.4X3A, T40.4X4, T40.4X4A)
		  ○ **Poisoning by fentanyl** (T40.41, T40.411, T40.411A, T40.412, T40.412A, T40.413, T40.413A, T40.414, T40.414A)[c]
		  ○ **Poisoning by tramadol** (T40.42, T40.421, T40.421A, T40.422, T40.422A, T40.423, T40.423A, T40.424, T40.424A)[c]
		  ○ **Poisoning by other synthetic narcotics** (T40.49, T40.491, T40.491A, T40.492, T40.492A, T40.493, T40.493A, T40.494, T40.494A)[c]
		• **Poisoning by other and unspecified narcotics** (T40.6)
		  ○ **Poisoning by unspecified narcotics** (T40.60, T40.601, T40.601A, T40.602, T40.602A, T40.603, T40.603A, T40.604, T40.604A)
		  ○ **Poisoning by other narcotics** (T40.69, T40.691, T40.694, T40.691A, T40.692, T40.692A, T40.693, T40.693A, T40.694, T40.694A)
		F-Codes likely containing the words "overdose" or "opioid"
		• **Opioid related disorders** (F11)
		• **Opioid abuse** (F11.1, F11.10, F11.11, F11.12, F11.120, F11.121, F11.122, F11.129, F11.13, F11.14, F11.15, F11.150, F11.151, F11.159, F11.18, F11.181, F11.182, F11.188, F11.19)
		• **Opioid dependence** (F11.2, F11.20, F11.21, F11.22, F11.220, F11.221, F11.222, F11.229, F11.23, F11.24, F11.25, F11.250, F11.251, F11.259, F11.28, F11.281, F11.282, F11.288, F11.29)
		• **Opioid use, unspecified** (F11.9, F11.90, F11.92, F11.920, F11.921, F11.922, F11.929, F11.93, F11.94, F11.95, F11.950, F11.951, F11.959, F11.98, F11.981, F11.982, F11.988, F11.99)

Provider's Secondary Impression eSituation.12	The EMS personnel's impression of the patient's secondary problem or most significant condition which led to the management given to the patient (treatments, medications, or procedures)	
Primary Symptom eSituation.09	The primary sign and symptom present in the patient or observed by EMS personnel	
Other Associated Symptoms eSituation.10	Other symptoms identified by the patient or observed by EMS personnel	
Medication Administered eMedications.03	The medication administered to the patient (by EMS personnel)	aloxone[d] aloxone Hydrochloride[d] arcan[d]
Response to Medication Administered eMedications.07	The patient's response to the medication	• "Improved"

[a] Element definitions based on the NEMSIS Data Dictionary for NEMSIS v3.5.0.

[b] Values for Primary Impression, Secondary Impression, Primary Symptoms, and Other Associated Symptoms are from the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10-CM)

[c] Denotes ICD-10-CM T codes introduced on October 1, 2020 that identify injuries due to poisoning by fentanyl, tramadol, or other synthetic narcotics. These codes may start to be included by NEMSIS v3.5.0.

[d] These three entries for naloxone are the most common, however there may be additional choices that contain "naloxone" or "Narcan" that could also be included (e.g., Naloxone Hydrochloride 1 MG/ML Injectable Solution (Narcan), Naloxone Injectable Solution [Narcan], Naloxone Prefilled Syringe, Naloxone 0.5mg, Naloxone 2 mg, Naloxone/Pentazocine, EVZIO, and RXNorm RXCUI code Naloxone 0.5mg = 343216).

Table 1b: NEMSIS v3.5.0 Definitions and Values for the Patient Care Report Narrative (eNarrative.01) Which May be Used to Identify a Nonfatal Opioid Overdose

Values of Interest	
Analysis of PCRN should include at least 1 opioid-related keyword AND at least 2 overdose-related keywords in order to be identified as a suspected nonfatal opioid overdose	
Opioid-Related Keywords	**Overdose-Related Keywords**
• Buprenorphine • Carfentanyl • Codeine, codiene, codene, • Dilaudid, dilaud • Dope • Evzio • Fentanyl, fent • Heroin, herion, heroine, HOD, spheroin • Hydrocodone, hydrocod • Hydromorphone, hydromor • Methadone • Morphine, morphin • Narcan, naloxone, nalox[d] • Opiate(s), opate(s) • Opioid(s), opiod(s), opoid(s) • Opium, opium, opum • Oxymorphone, oxymor • Oxycodone (oxyco, oxy, oxyi) • Percocet, percoc • Speed ball, speedball • Suboxin • Suboxone • Tramadol, tramad • Vicodin, vicodine, vicod	• Agonal • Altered mental status (AMS) • Apnea • Constricted pupil • Decreased resp • Decreased rr • Decreasing resp • Depressed resp • Dyspnea • Ingestion (ingest, injest) • Intoxication (intoxic) • Loss of conscious (syncopy, syncope) • Miosis (Miotic) • Nodding off • Overdose (overdosed, overdosing, overdose, overdoes, averdose, averdoes, over does, over dose) • Pinpoint (pin point, pin-point) • Poisoning (poison) • Pupil*constricted[e] • Resp*decreased[e] • Resp*depression[e] • Snort, snorted • Unresponsive (unresponsiv)
AMS= altered mental status, HOD=heroin overdose, LOC=loss of consciousness, NEMSIS=National Emergency Medical Services Information System, PCR=patient care report, RR=respiratory rate	

[d] These three entries for naloxone are the most common, however there may be additional choices that contain "naloxone" or "Narcan" that could also be included (e.g., Naloxone Hydrochloride 1 MG/ML Injectable Solution (Narcan), Naloxone Injectable Solution [Narcan], Naloxone Prefilled Syringe, Naloxone 0.5mg, Naloxone 2 mg, Naloxone/Pentazocine, EVZIO).

[e] In these instances, an asterisk(*) is included as a "wildcard", which is intended to match any amount of text in the place of the asterisk. For example, "Pupil*constricted" will match "pupil constricted" as well as "pupils are severely constricted".

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ADDITIONAL CONTEXT FOR SUSPECTED NONFATAL OPIOID OVERDOSES

The estimates of suspected NFOO determined by this standard guidance prove useful for public health surveillance and examining trends over time. EMS data may also be utilized to contextualize NFOO incidents, providing knowledge that could be used to inform the initiation of community-based opioid-related drug overdose prevention interventions and harm reduction programs. For example, public health jurisdictions may wish to assess bystander/layperson naloxone administrations following community initiation of a naloxone distribution program (NDP). A subpopulation of bystander naloxone administrations may be found by evaluating incidents where *Medication Administered Prior to the Arrival of EMS* was 'yes' and assessing the *Incident ZIP Code* within that subpopulation may help jurisdictions assess the distribution of bystander naloxone within the community. Suggested variables for providing further context are summarized in Supplemental Material 1, along with their definitions (per NEMSIS v 3.5.0), values of interest, and their potential use for contextualizing an analysis of suspected NFOO.

LIMITATIONS

EMS incidents involving a suspected NFOO identified using this standard guidance are subject to several limitations.

- *Cannot confirm NFOO.* It is important to remember that NFOO identified using EMS data are "suspected" or "probable", as they are based on key signs and symptoms or naloxone administration coupled with a response, but these lack confirmation that would come from the toxicological analysis of biological specimens. This would also limit the ability to use EMS data to determine the type of opioid ingested. Although this information may be self-reported by the patient, the accuracy of any self-reported information would be difficult to determine without biological specimen analysis.

- *Underestimation or Overestimation of true NFOO.* Similar to emergency department syndromic data, NFOO identified from EMS data should not be used to estimate overall burden. However, NFOO identified from EMS data should be useful in monitoring potential overdose spikes and monitoring trends over time (e.g., examining change over time in rates of suspected or probable NFOO per number of EMS incidents) and with the understanding that a given individual might be represented in multiple incidents. Suspected and probable NFOO can be analyzed separately or combined to meet surveillance objectives (e.g., when examining trends in rates of NFOO per number of EMS incidents).

- *Polysubstance use.* This standard guidance may also underestimate NFOO in instances where opioids were combined with other substances (polysubstance use). Consider an example in which the patient mixes opioids with alcohol. The obvious intoxication and inability to determine the presence of additional substances may lead EMS personnel to document the *Provider's Primary Impression* as "T50.904: Poisoning by unspecified drugs, medicaments and biological substances, undetermined". Further, administration of naloxone to the patient may elicit no response; while naloxone may reverse the respiratory depression due to the opioid(s), it would have no effect on the persisting central nervous system depression related to the alcohol consumption. This may lead EMS personnel to document the *Medication* as "naloxone (Narcan)" and the *Response to Medication Administered* as "Unchanged" or "Worse". Thus, the potential inability to capture cases of polysubstance use using the coded elements may contribute to an underestimation of NFOO.

- *Decrease in EMS Responses to NFOO.* The increase in programs to distribute naloxone may decrease the perceived necessity of individuals to call 911 after an opioid overdose or cancel an initiated call. Several studies have shown that individuals who are trained to provide naloxone no longer feel the need to call 911 because they believe they can "handle the overdose themselves" [5–7]. Additionally, many individuals remain afraid to call 911 due to negative interactions with law enforcement[7]. There are also individuals who are transported to emergency departments without involvement of EMS personnel. Therefore, the inability to account for suspected NFOO where EMS is not summoned (or is cancelled) may contribute to an overall underestimation of suspected NFOO.

- *Accuracy in Documentation of NFOO.* Data submission rules may allow incidents to be submitted without the information necessary for identifying a NFOO. For example, the associated validation rules for *Provider's Primary Impression* and *Primary Symptom* in the NEMSIS Data Dictionary V3.5.0 show that both are required to be submitted when the *Type of Service Requested* (eResponse.05) is "Emergency Response" (Primary Response Area), AND the *Patient Evaluation/Care* (eDisposition.28) is "Patient Evaluated and Care Provided". It is therefore possible that in instances where *Patient Evaluation/Care* is not "Patient Evaluated and Care Provided" (e.g., "Patient Evaluated and Refused Care" or "Patient Evaluated, No Care Required", or "Patient Refused Evaluation/Care") that information for the coded elements may not be documented, and thus result in underreporting of NFOO. While information necessary to identify these cases as a NFOO may be found in the *Patient Care Report Narrative,* not all jurisdictions may have access to or the capacity to analyze the *Patient Care Report Narrative,* which may lead to an overall underestimation of NFOO.

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SUPPLEMENTAL MATERIALS

1. **Supplemental Material 1:** NEMSIS v3.5.0 Definitions for Data Elements that can provide context when assessing nonfatal opioid overdoses

2. **Supplemental Material 2.** List of Opioid Overdose Related ICD-10-CM F codes

3. **Supplemental Material 3.** List of Opioid Overdose Related ICD-10-CM T codes

4. **Supplemental Material 4:** Crossover from NEMSIS v3.4.0 to NEMSIS v3.5.0

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Supplemental Material 1: NEMSIS v3.5.0 Definitions for Data Elements that Can Provide Context When Assessing Nonfatal Opioid Overdoses[a]

Element[b]	Element Description	Potential Values of Interest [c,d,e]	Use/Context
Patient Evaluation/Care eDisposition.28	The patient disposition for an EMS event identifying whether a patient was evaluated, and care or services were provided	• "Patient Evaluated and Care Provided" • "Patient Evaluated and Refused Care" • "Patient Evaluated, No Care Required" • "Patient Refused Evaluation/Care"	• Describe prevalence of NFOO who were transported to the hospital, or who refused transport to the hospital
Unit Disposition eDisposition.27	The patient disposition for an EMS event identifying whether patient contact was made	• "Patient Contact Made" • "Cancelled on Scene" • "Cancelled Prior to Arrival at Scene" • "No patient contact" • "No patient found" • "Non-Patient Incident"	• Describe prevalence of NFOO that cancelled EMS or where EMS made no contact • Provide additional context/validation for NFOO involving bystander naloxone administration
Medication Administered Prior to the Arrival of EMS eMedications.02	Indicates that the medication administration which is documented was administered prior to this EMS units care.	• "Yes" • "No"	• Describe prevalence of NFOO involving bystander naloxone administration
Medication Administered Route eMedications.04	The route medication was administered to the patient	• "Intranasal" • "Intramuscular (IM)" • "Intravenous (IV)"	• Provide additional context/validation for NFOO involving bystander naloxone administration
Medication Dosage eMedications.05	The dose or amount of the medication administered to the patient	*Variety of Numbers*	• Provide additional context/validation for overall severity of NFOO • Additional context/validation for NFOO involving bystander naloxone administration
Medication Dosage Units eMedications.06	The unit of medication dosage administered to patient	• "mg"	• Provide additional context/validation for NFOO involving bystander naloxone administration
Role/Type of Person Administering Medication eMedications.10	The type (level) of EMS or Healthcare Professional Administering the Medication. For medications administered prior to the EMS arrival, this may be a non-EMS healthcare professional	• "Lay person" • "Law enforcement" • "Family member"	• Provide additional context/validation for NFOO involving bystander naloxone administration
Medical/Surgical History eHistory.08	The patient's pre-existing medical and surgery history of the patient	*Variety of Medical Codes*	• Describe pre-existing conditions common among patients sustaining NFOO
Destination/Transferred To, Name[†] eDisposition.01	The destination the patient was delivered or transferred to	*Variety of Hospital Codes*	• Describe healthcare resources utilized by NFOO
Emergency Department Diagnosis eOutcome.10	The practitioner's description of the condition or problem for which Emergency Department services were provided	• "Discharged to home of self-care" • "Left against medical advice" • "Admitted as an inpatient to this hospital"	• Provide validation for EMS differential diagnosis of NFOO
Patient's Home ZIP Code ePatient.09	The patient's ZIP code of residence	*Variety of ZIP codes*	• Enable geographic coding
Incident ZIP Code eScene.19	The ZIP code of the incident location	*Variety of ZIP codes*	• Enable geographic coding
Procedure eProcedures.03	The procedure performed on the patient	• "Oxygen therapy" • "Manual establishment of airway" • "Cardiopulmonary resuscitation"	• Provide additional context/validation for overall severity of NFOO

[a] Element definitions based on the NEMSIS Data Dictionary for NEMSIS v3.5.0 (NEMSIS, 2019).
[b] Code assigned to elements in the NEMSIS v3.5.0
[c] Suggested List for Medical/Surgical History given by ICD-10-CM Description. Available at https://stash.utahdcc.org/stash/projects/NEP/repos/nemsis_public/browse/SuggestedLists/NEMSIS_V3_Suggested_List_eHistory.08.pdf
[d] NEMSIS suggested List for Procedures. Available at https://stash.utahdcc.org/stash/projects/NEP/repos/nemsis_public/browse/SuggestedLists/eProcedures.03%2C%20dConfiguration.03%2C%20dConfiguration.07%20- %20Procedures.xlsx
[e] Example values for procedure are based on SNOMED values
[†] State required element, may not be provided to NEMSIS
NOTES: Abbreviations: EMS=Emergency Medical Services, NFOO=Nonfatal Opioid Overdose, NEMSIS=National Emergency Medical Services Information System.

Supplemental Material 2. List of Opioid Overdose Related ICD-10-CM F Codes

Code	Code Description
F11	Opioid related disorders
F11.1	Opioid abuse
F11.10	Opioid abuse, uncomplicated
F11.11	Opioid abuse, in remission
F11.12	Opioid abuse with intoxication
F11.120	Opioid abuse with intoxication, uncomplicated
F11.121	Opioid abuse with intoxication delirium
F11.122	Opioid abuse with intoxication with perceptual disturbance
F11.129	Opioid abuse with intoxication, unspecified
F11.13	Opioid abuse with withdrawal
F11.14	Opioid abuse with opioid-induced mood disorder
F11.15	Opioid abuse with opioid-induced psychotic disorder
F11.150	Opioid abuse with opioid-induced psychotic disorder with delusions
F11.151	Opioid abuse with opioid-induced psychotic disorder with hallucinations
F11.159	Opioid abuse with opioid-induced psychotic disorder, unspecified
F11.18	Opioid abuse with other opioid-induced disorder
F11.181	Opioid abuse with opioid-induced sexual dysfunction
F11.182	Opioid abuse with opioid-induced sleep disorder
F11.188	Opioid abuse with other opioid-induced disorder
F11.19	Opioid abuse with unspecified opioid-induced disorder
F11.2	Opioid dependence
F11.20	Opioid dependence, uncomplicated
F11.21	Opioid dependence, in remission
F11.22	Opioid dependence with intoxication
F11.220	Opioid dependence with intoxication, uncomplicated
F11.221	Opioid dependence with intoxication delirium
F11.222	Opioid dependence with intoxication with perceptual disturbance
F11.229	Opioid dependence with intoxication, unspecified
F11.23	Opioid dependence with withdrawal
F11.24	Opioid dependence with opioid-induced mood disorder
F11.25	Opioid dependence with opioid-induced psychotic disorder
F11.250	Opioid dependence with opioid-induced psychotic disorder with delusions
F11.251	Opioid dependence with opioid-induced psychotic disorder with hallucinations
F11.259	Opioid dependence with opioid-induced psychotic disorder, unspecified
F11.28	Opioid dependence with other opioid-induced disorder
F11.281	Opioid dependence with opioid-induced sexual dysfunction
F11.282	Opioid dependence with opioid-induced sleep disorder
F11.288	Opioid dependence with other opioid-induced disorder
F11.29	Opioid dependence with unspecified opioid-induced disorder
F11.9	Opioid use, unspecified
F11.90	Opioid use, unspecified, uncomplicated
F11.92	Opioid use, unspecified with intoxication
F11.920	Opioid use, unspecified with intoxication, uncomplicated
F11.921	Opioid use, unspecified with intoxication delirium
F11.922	Opioid use, unspecified with intoxication with perceptual disturbance
F11.929	Opioid use, unspecified with intoxication, unspecified
F11.93	Opioid use, unspecified with withdrawal
F11.94	Opioid use, unspecified with opioid-induced mood disorder
F11.95	Opioid use, unspecified with opioid-induced psychotic disorder
F11.950	Opioid use, unspecified with opioid-induced psychotic disorder with delusions
F11.951	Opioid use, unspecified with opioid-induced psychotic disorder with hallucinations
F11.959	Opioid use, unspecified with opioid-induced psychotic disorder, unspecified
F11.98	Opioid use, unspecified with other specified opioid-induced disorder
F11.981	Opioid use, unspecified with opioid-induced sexual dysfunction
F11.982	Opioid use, unspecified with opioid-induced sleep disorder
F11.988	Opioid use, unspecified with other opioid-induced disorder
F11.99	Opioid use, unspecified with unspecified opioid-induced disorder

Supplemental Material 3. List of Opioid Overdose Related ICD-10-CM T Codes

Code	Description
T40.0	Poisoning by, adverse effect of and underdosing of opium
T40.0X	Poisoning by, adverse effect of and underdosing of opium
T40.0X1	Poisoning by opium, accidental (unintentional)
T40.0X1A	Poisoning by opium, accidental (unintentional), initial encounter
T40.0X2	Poisoning by opium, intentional self-harm
T40.0X2A	Poisoning by opium, intentional self-harm, initial encounter
T40.0X3	Poisoning by opium, assault
T40.0X3A	Poisoning by opium, assault, initial encounter
T40.0X4	Poisoning by opium, undetermined
T40.0X4A	Poisoning by opium, undetermined, initial encounter
T40.1	Poisoning by and adverse effect of heroin
T40.1X	Poisoning by and adverse effect of heroin
T40.1X1	Poisoning by heroin, accidental (unintentional)
T40.1X1A	Poisoning by heroin, accidental (unintentional), initial encounter
T40.1X2	Poisoning by heroin, intentional self-harm
T40.1X2A	Poisoning by heroin, intentional self-harm, initial encounter
T40.1X3	Poisoning by heroin, assault
T40.1X3A	Poisoning by heroin, assault, initial encounter
T40.1X4	Poisoning by heroin, undetermined
T40.1X4A	Poisoning by heroin, undetermined, initial encounter
T40.2	Poisoning by, adverse effect of and underdosing of other opioids
T40.2X	Poisoning by, adverse effect of and underdosing of other opioids
T40.2X1	Poisoning by other opioids, accidental (unintentional)
T40.2X1A	Poisoning by other opioids, accidental (unintentional), initial encounter
T40.2X2	Poisoning by other opioids, intentional self-harm
T40.2X2A	Poisoning by other opioids, intentional self-harm, initial encounter
T40.2X3	Poisoning by other opioids, assault
T40.2X3A	Poisoning by other opioids, assault, initial encounter
T40.2X4	Poisoning by other opioids, undetermined
T40.2X4A	Poisoning by other opioids, undetermined, initial encounter
T40.3	Poisoning by, adverse effect of and underdosing of methadone
T40.3X	Poisoning by, adverse effect of and underdosing of methadone
T40.3X1	Poisoning by methadone, accidental (unintentional)
T40.3X1A	Poisoning by methadone, accidental (unintentional), initial encounter
T40.3X2	Poisoning by methadone, intentional self-harm
T40.3X2A	Poisoning by methadone, intentional self-harm, initial encounter
T40.3X3	Poisoning by methadone, assault
T40.3X3A	Poisoning by methadone, assault, initial encounter
T40.3X4	Poisoning by methadone, undetermined
T40.3X4A	Poisoning by methadone, undetermined, initial encounter
T40.4	Poisoning by, adverse effect of and underdosing of other synthetic narcotics
T40.41[c]	Poisoning by, adverse effect of and underdosing of fentanyl or fentanyl analogs
T40.411[c]	Poisoning by fentanyl or fentanyl analogs, accidental (unintentional)
T40.411A[c]	Poisoning by fentanyl or fentanyl analogs, accidental (unintentional), initial encounter
T40.412[c]	Poisoning by fentanyl or fentanyl analogs, intentional self-harm
T40.412A[c]	Poisoning by fentanyl or fentanyl analogs, intentional self-harm, initial encounter
T40.413[c]	Poisoning by fentanyl or fentanyl analogs, assault
T40.413A[c]	Poisoning by fentanyl or fentanyl analogs, assault, initial encounter
T40.414[c]	Poisoning by fentanyl or fentanyl analogs, undetermined
T40.414A[c]	Poisoning by fentanyl or fentanyl analogs, undetermined, initial encounter
T40.42[c]	Poisoning by, adverse effect of and underdosing of tramadol
T40.421[c]	Poisoning by tramadol, accidental (unintentional)
T40.421A[c]	Poisoning by tramadol, accidental (unintentional), initial encounter
T40.422[c]	Poisoning by tramadol, intentional self-harm
T40.422A[c]	Poisoning by tramadol, intentional self-harm, initial encounter
T40.423[c]	Poisoning by tramadol, assault
T40.423A[c]	Poisoning by tramadol, assault, initial encounter
T40.424[c]	Poisoning by tramadol, undetermined

Code	Description
T40.424A[c]	Poisoning by tramadol, undetermined, initial encounter
T40.49[c]	Poisoning by, adverse effect of and underdosing of other synthetic narcotics
T40.491[c]	Poisoning by other synthetic narcotics, accidental (unintentional)
T40.491A[c]	Poisoning by other synthetic narcotics, accidental (unintentional), initial encounter
T40.492[c]	Poisoning by other synthetic narcotics, intentional self-harm
T40.492A[c]	Poisoning by other synthetic narcotics, intentional self-harm, initial encounter
T40.493[c]	Poisoning by other synthetic narcotics, assault
T40.493A[c]	Poisoning by other synthetic narcotics, assault, initial encounter
T40.494[c]	Poisoning by other synthetic narcotics, undetermined
T40.494A[c]	Poisoning by other synthetic narcotics, undetermined, initial encounter
T40.4X[b]	Poisoning by, adverse effect of and underdosing of other synthetic narcotics
T40.4X1[b]	Poisoning by other synthetic narcotics, accidental (unintentional)
T40.4X1A[b]	Poisoning by other synthetic narcotics, accidental (unintentional), initial encounter
T40.4X2[b]	Poisoning by other synthetic narcotics, intentional self-harm
T40.4X2A[b]	Poisoning by other synthetic narcotics, intentional self-harm, initial encounter
T40.4X3[b]	Poisoning by other synthetic narcotics, assault
T40.4X3A[b]	Poisoning by other synthetic narcotics, assault, initial encounter
T40.4X4[b]	Poisoning by other synthetic narcotics, undetermined
T40.4X4A[b]	Poisoning by other synthetic narcotics, undetermined, initial encounter
T40.6	Poisoning by, adverse effect of and underdosing of other and unspecified narcotics
T40.60	Poisoning by, adverse effect of and underdosing of unspecified narcotics
T40.601	Poisoning by unspecified narcotics, accidental (unintentional)
T40.601A	Poisoning by unspecified narcotics, accidental (unintentional), initial encounter
T40.602	Poisoning by unspecified narcotics, intentional self-harm
T40.602A	Poisoning by unspecified narcotics, intentional self-harm, initial encounter
T40.603	Poisoning by unspecified narcotics, assault
T40.603A	Poisoning by unspecified narcotics, assault, initial encounter
T40.604	Poisoning by unspecified narcotics, undetermined
T40.604A	Poisoning by unspecified narcotics, undetermined, initial encounter
T40.69	Poisoning by, adverse effect of and underdosing of other narcotics
T40.691	Poisoning by other narcotics NOS
T40.691A	Poisoning by other narcotics, accidental (unintentional), initial encounter
T40.692	Poisoning by other narcotics, intentional self-harm
T40.692A	Poisoning by other narcotics, intentional self-harm, initial encounter
T40.693	Poisoning by other narcotics, assault
T40.693A	Poisoning by other narcotics, assault, initial encounter
T40.694	Poisoning by other narcotics, undetermined
T40.694A	Poisoning by other narcotics, undetermined, initial encounter

[a] All codes based on the definitions for the International Classification of Diseases version 10-CM.
[b] Denotes ICD-10-CM T code retired after October 1, 2020.
[c] Denotes ICD-10-CM T codes introduced on October 1, 2020 that identify injuries due to poisoning by fentanyl, tramadol, or other synthetic narcotics. These codes may start to be included by NEMSIS v3.5.0.

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Supplemental Material 4: Crossover from NEMSIS v3.4.0 to NEMSIS v3.5.0

Not all EMS jurisdictions may be submitting data compliant with NEMSIS v3.5.0, and may instead be working with data elements from NEMSIS v3.4.0. Although the data elements in the CSTE EMS Standard Guidance did not substantially change from v3.4.0 to v3.5.0, there are several instances where the data element name or data element number may have been updated. These changes have been highlighted and illustrated in the table below.

Individuals using data from NEMSIS v3.4.0 instead of NEMSIS v3.5.0 should note the following differences:

- Changes to enumerated list for eResponse.05 *Type of Service Requested* (intent can still be met)
- Addition to enumerated list for *Initial Patient Acuity*
- The data element name for "*Medication Administered*" is "*Medication Given*"
- *Unit Disposition* and *Patient Evaluation/Care* are combined into one data element in NEMSIS v3.4.0, the data element name is *Incident/Patient Disposition* and element number (eDisposition.12).

Table SM4.1: Potential Changes in Data Elements from NEMSIS v.3.4.0 to v3.5.0

Element Name NEMSIS v3.4.0	**Element Name** NEMSIS v3.5.0	**Element Number** NEMSIS v3.4.0	**Element Number** NEMSIS v3.5.0
Type of Service Requested	*Type of Service Requested*	eResponse.05	eResponse.05
Initial Patient Acuity	*Initial Patient Acuity*	eSituation.13	eSituation.13
Medication Given	*Medication Administered*	eMedications.03	eMedications.03
Incident/Patient Disposition	*Unit Disposition*	eDisposition.12	eDisposition.27
Incident/Patient Disposition	*Patient Evaluation/Care*	eDisposition.12	eDisposition.28
Final Patient Acuity	*Final Patient Acuity*	eDisposition.19	eDisposition.19