IMPLEMENTATION GUIDE

CSTE Nonfatal Opioid Overdose Standardized Surveillance Case De inition (PS-19-CC-01)

CSTE

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Background – How to Use This Guide

State of existing surveillance for nonfatal opioid overdoses

Public health surveillance for the opioid overdoses (OOD) epidemic proves challenging. No single data source currently exists which is able to completely capture all OOD occurrences in the United States. Instead, most jurisdictions develop a picture of the burden of OOD occurrences from compiling information from a variety of data sources, especially when conducting nonfatal opioid overdose (NFOO) surveillance. The combination of data sources used in this type of surveillance often varies by jurisdiction state. Traditionally, NFOO surveillance has relied on data from secondary administrative data sets such as the emergency department (ED) or emergency medical services (EMS); however, efforts to quantify NFOO could also draw from additional data sources, including inpatient hospital data, laboratory data, poison control centers, law enforcement, syndromic surveillance (SyS) systems, and harm reduction programs (e.g., naloxone distribution programs, syringe services, etc.).Jurisdictions throughout the United States build the picture of NFOO occurrences by using a combination of these data sources.

Many state, tribal, local, and territorial (STLT) public health agencies would likely benefit from an agreed-upon public health approach to ascertaining, quantifying, and releasing data on NFOO surveillance. The widespread adoption of a standardized process may increase the ability of STLT public health agencies to share and compare epidemiological estimates of OOD data between states and jurisdictions, thereby enhancing surveillance and informing a more coordinated, collective response to the opioid crisis.

In an effort to provide guidance on the use of many of the key data sources, the 2019 Council of State and Territorial Epidemiologists (CSTE) released the Nonfatal Opioid Overdose Standardized Surveillance Case Definition Position Statement (hereafter referred to as the CSTE NFOO PS). This position statement addressed the evolving need to transform and supplement current surveillance processes to more robustly assess and intervene in the epidemic by recommending the following actions:

1. STLT public health agency staff utilize standard sources for case ascertainment of NFOO.
2. STLT public health agency staff utilize standardized criteria for and classification for NFOO.

Following the release of the 2019 NFOO Position Statement, STLT public health agency staff noted challenges with adopting the guidance in their jurisdictions citing data access barriers and concerns for the impact inclusion of additional data sources may pose to their overall reported NFOO case counts. CSTE convened a workgroup of twenty (20) STLT health department staff representing sixteen (16) jurisdictions to discuss barriers and challenges with adopting the 2019 NFOO Position Statement guidance. This group worked with subject matter experts representing each data source and a consultant writer, Mirinda Gormley, PhD, MSPH, NRP to develop guidance for each of the data sources.

Purpose of this Implementation Guide

This guide provides applied surveillance staff in STLT health departments with additional information necessary to build or assess processes capable of conducting comprehensive NFOO surveillance. This guide demonstrates how STLT public health agencies can access and leverage available data sources (e.g., EMS, poison control, ED, etc.) to conduct NFOO surveillance using the CSTE NFOO PS. This guide describes how to ascertain and classify NFOO, comprehensively reviews the data sources capable of identifying NFOO, and highlights opportunities for data source linkage, data partnerships, and the reporting of results.

Target audience

This guide is designed to benefit to STLT public health agencies regardless of their existing level of surveillance infrastructure.

For example, stakeholders without an established NFOO surveillance case definition may use this guide to understand how the CSTE NFOO PS may be adopted in their jurisdiction. In contrast, stakeholders with an established NFOO surveillance case definition may use this guide as a tool to evaluate current practices and identify potential areas for adjustment.

Using the Nonfatal Opioid Overdose Standard Surveillance Case Definition

For the purpose of nonfatal opioid overdose surveillance, two criteria used to classify a NFOO case: confirmatory laboratory evidence and presumptive clinical evidence. These two criteria may only be applied to cases which do not result in an immediate or delayed fatal outcome from an overdose event[1].

Presumptive Clinical Evidence

Presumptive clinical evidence for a NFOO may be identified using specific elements within patient care records/official documentation or may be identified if the patient's record indicates signs and symptoms which are clinically compatible with a NFOO. Records containing one or more of the following elements indicate presumptive clinical evidence for a NFOO:

- Diagnosis of an OOD (e.g., ICD-10-CM opioid-overdose related T-codes)
- A chief complaint that mentions OOD
- Naloxone administration with improved patient response

The clinical effects of an OOD manifest as central nervous system and respiratory system depression. To identify cases with a clinically compatible presentation for a NFOO, records must contain at least two or more of the following signs and symptoms:

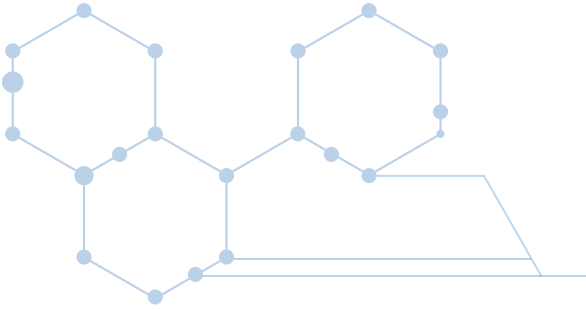
- Falling asleep or loss of consciousness
- Slow, shallow breathing (hypopnea) or decreased respiratory rate (bradypnea)
- Choking or gurgling sounds
- Small, constricted "pinpoint pupils" (miosis)
- Bluish nails or lips (cyanosis) or skin that is pale, blue, or cold

Confirmatory Laboratory Evidence

A NFOO may only be confirmed with evidence indicating an opioid or opioid-analog compound was involved in the overdose. This evidence may be produced through presumptive drug screens or laboratory analysis of biological or environmental samples. *Clinical specimens* would include any biological sample taken from the individual who experienced the overdose (e.g., blood, urine). *Environmental samples* include any drug paraphernalia assumed to be involved in the overdose found at the scene or present on the patient at the time of the overdose (e.g., needles, baggies, spoons, etc.).

Confirmatory laboratory evidence for *clinical specimens* includes an opiate positive result on any drug screen or detection of opioids in any other laboratory test. The standard opiate immunoassay is targeted to morphine and would detect any compound that is metabolized to morphine (e.g., heroin, codeine). However, these screens may miss semisynthetic or synthetic opioid-compounds which do not metabolize to morphine, such as oxycodone, methadone, fentanyl, and buprenorphine[3]. Therefore, while a positive result for an opiate immunoassay would confirm opioid involvement in the overdose, a negative result may occur due to a lack of specificity required to detect a semisynthetic or synthetic opioid compound.

Confirmatory laboratory evidence for *environmental samples* would include an opiate positive result as indicated by forensic analysis. However, the presence of opioids in *environmental samples* does not automatically indicate opioid involvement in the overdose under investigation. Thus, positive results from *environmental samples* should be interpreted within the context of this limitation.



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Using the Nonfatal Opioid Overdose Standard Surveillance Case Definition

Special Note

Exclusion from National Notifiable Disease List

The Centers for Disease Control and Prevention (CDC) in conjunction with state health departments develops the Nationally Notifiable Disease List, which outlines diseases that will be reported upon occurrence for national surveillance[1]. Individual states are empowered to set their own individual mandates for which diseases from the list will be reported in their jurisdictions. As a result, the list of diseases reported by each state varies. All cases of diseases on the list are reported for national surveillance using the National Notifiable Diseases Surveillance System (NNDSS) which is operated by CDC in collaboration with CSTE.

Neither nonfatal opioid overdose nor fatal opioid overdose conditions are included in the Nationally Notifiable Disease List. Currently, the variation in surveillance practices among jurisdictions for nonfatal opioid overdoses interferes with reliable reporting at the national level. The introduction of the CSTE NFOO PS and this Implementation Guide aims to provide an agreed-upon public health approach for ascertaining, quantifying, and releasing data on nonfatal opioid overdoses across data sources and jurisdictional boundaries to accurately assess and respond to the epidemic.

Nonfatal Opioid Overdose Case Classification

NFOO cases can be classified into three distinct categories: confirmed, probable, and suspect. Each class would be identified in the absence of another known cause/diagnosis with no immediate or delayed fatal outcome from the overdose event.

Confirmed Cases

can be identified through a clinically compatible presentation or chief complaint indicating OOD with confirmatory laboratory evidence, or through diagnosis of an OOD with confirmatory laboratory evidence.

The factor that distinguishes confirmed cases from suspect and probable cases is laboratory confirmation. Regardless of the data source used to identify the incident through use of clinical or diagnostic criteria, laboratory confirmation is a requirement to confirm an opioid-related overdose. Examples of data source combinations that may produce a confirmed case are presented in Table 1.

Confirmed cases allow for the identification of an overdose's causative agent and may also increase the accuracy of epidemiological estimates by identifying incidents involving the co-occurring use of opioids with other substances, which otherwise may not have been identified. However, there are several factors that may limit the utility of confirmed cases in OOD surveillance. Access to Clinical specimens' analysis is dependent upon on the resources available within each jurisdiction, and may not be possible for all STLT public health agencies. In addition, laboratory analysis may take time, which would negatively impact the timeliness of case identification.

Probable Cases

are identified using clinical criteria compatible with an OOD or standardized diagnosis codes specific to an OOD. Data used to identify these cases are extracted from reports submitted by medical or public safety personnel who are trained to recognize and treat an OOD. In contrast to confirmed cases, probable cases are based on the clinical expertise of a trained professional but lack the definitive confirmation of clinical specimens' analysis. Examples of data source combinations that could produce a probable case are presented in Table 1.

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While probable cases lack the clinical specimens' analysis to definitively identify an OOD, studies have found that use of diagnosis codes alone can accurately identify a NFOO. In one study, Slavova et. al. found that ICD-10-CM codes indicating opioid or heroin poisoning could accurately identify between 79.4% and 93.2% of true OODs, respectively[4]. Identification of probable cases may also be the timeliest, as some systems are able to load them to state databases in near-real time, enabling swift identification of trends. Yet probable codes may also have some limitations. Reporting of OOD may vary by location, resulting in inconsistent documentation which may prevent the identification of all opioid related incidents. For example, overuse of non-specific T-codes (e.g., T50.904: Poisoning by unspecified drugs, medicaments and biological substances, undetermined) may prevent the identification of an OOD[5]. Additionally, reliance on diagnostic codes in the absence of toxicological confirmation may limit the identification of cases where opioids were ingested with additional substances (i.e., polysubstance use).

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Nonfatal Opioid Overdose Case Classification

Suspect Cases are identified through records of incidents reported to clinicians or program staff who learned of the incident either from the overdose survivor or a third-party and were not present to assess the situation when the overdose occurred.

Suspect cases may include incidents of NFOO within the community which often go unreported. For example, if an individual returns for a refill of take-home naloxone and reports administering take-home naloxone to an overdose victim. Although nearly all programs ask that bystanders administering naloxone call 911, many witnesses to an OOD may be hesitant to do so; either fearing the involvement of law enforcement, or believing they can "reverse the overdose themselves"[6–8]. The utility of suspect cases in OOD surveillance is subject to several limitations. First, the reporting of suspect cases may not be timely. Many harm reduction programs lack the infrastructure to regularly record and report incidents, and data sharing from poison control centers may take time. Second, without the presence of a trained professional to conduct a patient assessment, it would be difficult to establish whether the patient experienced a verified OOD or instead experienced known side-effects resulting from the ingestion of a prescribed opioid. Finally, all suspect cases would be subject to reporting bias.

While poison control centers and harm reduction programs may capture fewer NFOO incidents than other data sources, other data they produce could be beneficial to overall OOD surveillance. For example, after identifying a spike in probable NFOO, public health personnel could assess poison control center exposures to investigate potential surges in specific types of opioids. Similarly, public health personnel may also reach out to harm reduction programs in the affected area to ask about increases in the demand for take-home naloxone. Thus, while poison control centers and harm reduction programs are limited in their ability to definitively identify and report OOD incidents, they may still make important contributions to a comprehensive OOD surveillance system.

Table 1. Examples of Confirmed, Suspect, and Probable Cases

Classification	Examples	Potential Data Sources
Confirmed	• Probable OOD identified by SyS with confirmation from positive opiate immunoassay or definitive laboratory testing in a clinical specimen • Narcotic overdose documented by law enforcement with confirmation from opioid-positive toxicological analysis	• Syndromic Surveillance Systems • Laboratory or Biosurveillance • Law Enforcement
Probable	• Discharge diagnosis code of "F11: Opioid related disorder" documented by emergency room physician • Opioid- and overdose-related keywords indicating clinical criteria compatible for OOD documented in a patient care report by EMS personnel • Narcotic overdose documented by law enforcement with confirmation from opioid-positive toxicological analysis of environmental specimen.	• Emergency Medical Services • Hospital Emergency Department and Inpatient Hospitalization • Law Enforcement • Syndromic Surveillance Systems
Suspect	• OOD reported to staff at a naloxone distribution program by an individual seeking a refill of take-home naloxone • Ingestion of fentanyl reported to staff at a poison control center by the mother of a 16-year-old male who accidentally took his grandmother's medication • OOD reported to staff member of a syringe exchange program by a program participant	• Harm Reduction Programs • Poison Control Centers

Case Ascertainment

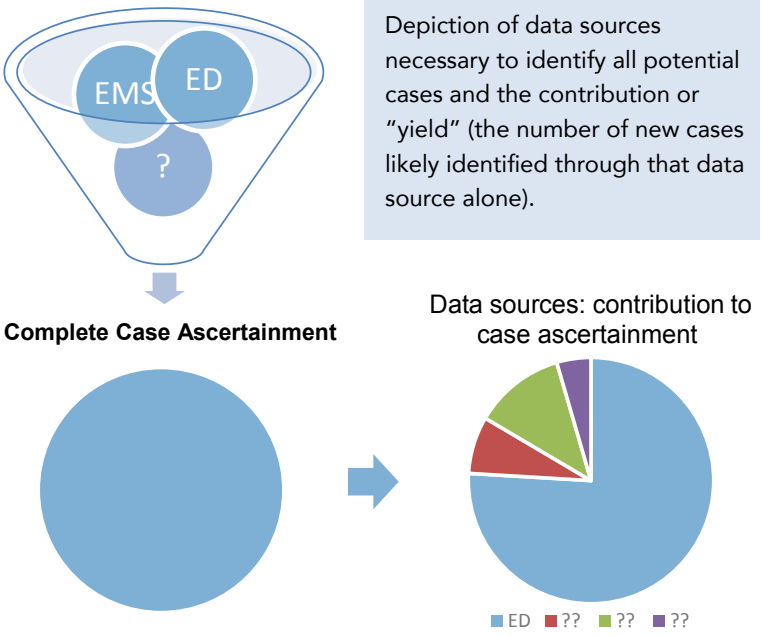
Accuracy in case ascertainment is crucial for producing accurate epidemiological estimates. There are a number of public health and public safety data sources which may be utilized for NFOO surveillance. Confirmed, probable, and suspect cases of NFOO can be identified from one data source or from a combination of data sources.

No one data source currently used for NFOO surveillance is expected to ascertain 100% of cases. The inability of any one data source to identify the true count of NFOO is a significant limiting factor for producing accurate epidemiological estimates. Thus robust, population-based case ascertainment for NFOO would likely best be achieved through the use of multiple data sources, as one data source might be expected to identify cases not captured in another. For example, the NFOO cases identified using ED data likely underestimate the true count of NFOO within the community, due to not capturing overdoses in persons who did not present in an ED. However, the combined surveillance of data from multiple data sources, such as ED, EMS, and/or law enforcement may increase the completeness of case ascertainment. Surveillance using all three data sources would include the individuals treated for a NFOO case who refused to go to the hospital, as identified through EMS and/or law enforcement data.

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).



Completeness of case ascertainment is not only dependent upon the number and types of data sources utilized, but also the consistency with which those data sources are able to identify cases. Reporting and submission guidelines for each data source likely vary state-to-state, and should be taken into consideration when linking data sources for coordinated surveillance. For example, poison control centers use standardized measures to document and record cases, resulting in timely and consistent data. In contrast, discharge diagnosis codes primarily used to identify NFOO in the ED may be recorded inconsistently from provider-to-provider, and the time lag for reporting records to the state or local database may vary by facility.

Accuracy, completeness, and timeliness of data submission are several important characteristics to take into account when choosing data sources to link for NFOO surveillance. It is also important to consider the purpose of how the data will be used when selecting data sources. The following pages list each data source identified by the CSTE NFOO PS. Each page provides a description of the data source, as well as data source-specific information on case ascertainment, accessibility, opportunities and challenges to data linkage, and the strengths and limitations of each data source's ability to accurately identify a confirmed, probable, or suspect NFOO case.

SOURCE Syndromic Surveillance Systems

Case Classification **PROBABLE CASE**

Overview

Syndromic surveillance (SyS) systems provide public health jurisdictions with timely access to OOD data for detecting, understanding, and monitoring health events[20]. In contrast to some other data sources, symptom, chief complaint, other text data, along with preliminary diagnosis information available in SyS can be used to identify suspected NFOO[21]. For example, many SyS systems identify OOD through algorithms that utilize ED data. SyS can be used as an early warning system for many public health concerns, from OOD to influenza outbreaks. In 2019, the CDC began funding states and Washington DC to enhance overdose surveillance through the Overdose Data to Action (OD2A) program[20]. One primary objective of OD2A aims to improve the timeliness of NFOO surveillance, and forty-two jurisdictions shared ED SyS for CDC's surveillance of NFOO.

Case Ascertainment

SyS algorithms for case ascertainment vary state-by-state but rely on key terms in the chief complaint and discharge diagnosis of an ED electronic record that indicates an unintentional or undetermined drug poisoning. Staff from the CDC OD2A program have also developed a standardized NFOO query in consultation with CDC's NSSP-ESSENCE staff *(See CSTE NFOO PS: Appendix 2, Table 2).*

Syndromic Surveillance Considerations

- May include cases initially missed due to inaccurately written chief complaint, or new toxicology results.
- May provide additional information for cases initially identified using ED or EMS data.

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SOURCE Syndromic Surveillance Systems

Case Classification **PROBABLE CASE**

Data Accessibility

Through OD2A funding, 42 jurisdictions currently share information with CDC regarding NFOO from analysis of syndromic ED data. SyS may also be accessible through other systems run by the state department of health.

Syndromic Surveillance Systems Data Linkage

May be linked with data from inpatient hospitalizations, EMS, and poison control centers.

Strengths

- ***Timely Identification***. Can identify visit information within an hour, allowing users to monitor trends in near real-time and detect potential spikes in cases.
- ***Record Linkage***. May be used to develop "personal identifiers" which could provide opportunities for follow-up, including linkages to care and harm reduction resources.
- ***Contextual Information***. ICD-10-CM Codes now used for ED SyS may offer more information on overdose intent.

Limitations

- ***No Laboratory Results:*** Laboratory results are not included with reported information, making it difficult to definitively determine opioid involvement.
- ***Inconsistent Coding:*** Discharge diagnosis coding may not be consistent across hospitals, which may underestimate true count of a NFOO.
- ***Delayed Reporting:*** Records may not be updated until weeks later, impacting timeliness and limiting use of SyS data to producing cross-sectional estimates of incidence and prevalence of a NFOO.
- ***Availability:*** May not be available in every state[23].
- ***Cases cannot be identified from SyS data.*** Additional steps must be taken to contact sender for identification

Resources

- Enhanced State Opioid Overdose Surveillance (ESOOS)[22]
- Drug Overdose Surveillance and Epidemiology (DOSE) System[24]

[1]ESOOS funds have been awarded to Alaska, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Utah, Vermont, Virginia, Washington, Washington D.C., West Virginia, and Wisconsin.

SOURCE Hospital Emergency Department Discharge

Case Classification **PROBABLE CASE**

Overview

Over the past two decades, the rate of suspected OOD visits to emergency departments(ED) and hospitals increased substantially throughout the United States[9]. In 2016 approximately 56.6 per 100,000 visits to the ED were suspected opioid-involved overdoses[10]. Following a suspected OOD, overdose victims may be transported to an ED by EMS or by personal vehicle. In the ED these individuals are administered naloxone (if necessary) and evaluated until the opioid wears off. Individuals seen in the ED for an opioid-related emergency may be identified using billing data that contain standardized discharge diagnosis codes (e.g International Classification of Diseases,Tenth Revision, Clinical Modificiation[ICD-10-CM] discharge diagnosis codes) [11].

ED data often lack the drug screening information needed to confirm an OOD. Understandably, these additional measures are not needed in the successful clinical treatment of drug overdoses. Additionally, inadequate access to resources may limit specimen analysis for the ED. Fortunately, studies analyzing ED records report that primary or secondary discharge diagnosis codes listing heroin or other opioid poisoning surveillance definitions are able to identify a high percentage of true-positive cases[4].

Case Ascertainment

Discharge diagnosis codes from the ED or inpatient hospitalization where the primary or secondary diagnosis indicates an unintentional or undetermined drug poisoning involving opioids. OOD related ICD-10-CM codes are available in Appendix 1.

Hospital Emergency Department Considerations

- Likely contribute the majority of cases for surveillance of probable NFOO.
- ED syndromic data may be available as soon as 24-48 hours of an ED visit.

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SOURCE Hospital Emergency Department Discharge

Case Classification **PROBABLE CASE**

Data Accessibility

Most state public health departments have systems that collect data from hospitals within the state or may receive ED data from their state hospital association. Nationally representative samples of ED data may be accessed through Federal data surveys, such as the Healthcare Cost and Utilization Project's National Inpatient Sample (NIS), Nationwide Emergency Department Sample (NEDS) survey, sponsored by the Agency for Healthcare Research and Quality.

Hospital Emergency Department Hospital Emergency Department Discharge Data Linkage

Lack of variables such as date or time in ED data may present challenges when attempting to link with hospital inpatient data. Despite challenges, ED data are commonly linked to other public health data sources to achieve full case ascertainment, (e.g.,EMS, poison control centers). Those attempting to link ED data to other data sources may have to address patient privacy and confidentiality laws.

Strengths

- ***Standardized Documentation.*** ICD codes use a standardized coding schema that may increase the efficiency of identifying overdoses.
- ***Timeliness.*** ED syndromic data may be uploaded in near real-time, expediting the identification of trends and hotspots[11].
- ***Data Linkage.*** ED incidents are often able to link with other data sources (e.g., EMS, coroner) to provide more robust surveillance of the population.
- ***Contextual Information.*** ICD-10-CM codes provide more information on the type of opioid ingested and intent of the probable NFOO, a notable change from ICD-9-CM codes.

Limitations

- ***Delayed Availability.*** Some data may not be available at the same time as others, creating a time-lag for case completeness[12].
- ***Biased Reporting.*** Codes are assigned for purposes of billing and reimbursement considerations might potentially bias ICD codes recorded for discharge diagnoses, decreasing the accuracy of NFOO estimates[9].
- ***Inconsistent Documentation.*** Inconsistent documentation of discharge diagnoses or frequent use of non-specific ICD codes may hinder the identification of polysubstance overdoses, and potentially underestimate probable NFOO.
- ***Accessibility.*** Federal hospitals (e.g. military, Veterans Affairs) may not submit records for inclusion in all hospital discharge datasets, which may bias estimates of probable NFOO.

Resources

- Performance Measures of Diagnostic Codes for Detecting Opioid Overdose in the Emergency Department[13]

SOURCE Laboratory Testing and Biosurveillance

Case Classification **CONFIRMED CASE**

Overview

Biosurveillance, the analysis of clinical specimens such as blood and urine, might provide important information not available in existing epidemiological, EMS, and seized drug data sets.[25] Analysis of clinical specimens at hospital, commercial, forensic, public health or criminal justice laboratories can provide reliable laboratory evidence that can inform OOD response efforts. In contrast to fatal overdoses, NFOO often do not include laboratory confirmation, as clinical testing is often not necessary to treat an overdose. Additionally, some facilities may not have the resources available to perform clinical testing on every overdose patient. While some hospitals may perform presumptive drug screens (e.g., immunoassays), however the lack of sensitivity among these tests may require additional definitive confirmation to confirm the presence of specific opioid compounds. Forensic, state, or public health laboratories may be equipped to conduct definitive laboratory-based drug tests which may provide additional context for surveillance by identifying the concentrations of drugs present in patients at hospital presentation[25].

Case Ascertainment

Opioids identified through screening tests such as immunoassays (e.g., CEDIA, EIA, ELISA). Or through definitive analysis using liquid or gas chromatography coupled with mass spectrometry to definitively identify opioids and opioid metabolites.

Laboratory Testing or Biosurveillance Considerations

- May definitively confirm whether an opioid was present in a biological sample.
- Can be used to identify information on drugs ingested, and presence of additional substances.

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Continued from page 13.

SOURCE Laboratory Testing and Biosurveillance

Case Classification **CONFIRMED CASE**

Data Accessibility

By confirming and supplementing overdose case ascertainment, forensic and public health laboratories may help inform interventions addressing the opioid epidemic through data partnerships that link laboratory results with existing data sources, such as existing drug use surveys and hospital discharge records.

Laboratory or Biosurveillance Data Linkage

State public health laboratories and STLT public health agencies should link programs with input from medical examiners/coroners, epidemiologists, forensic epidemiologists, state and local elected officials, and the poison control center.

Strengths

- ***Case Confirmation.*** Can definitively confirm the identification of a NFOO through clinical specimens' analysis.
- ***Additional Context.*** Able to identify the type and concentrations of substances involved in a NFOO, as well as new or novel substances circulating within a community.
- ***Specific Surveillance.*** Able to identify high-risk clusters involving new or novel substances and enhance the investigation of novel exposure pathways.
- ***Ease of Sharing Data.*** Lab data could be communicated via means already supported by labs, hospitals, and public health agencies (ELR, LRI) if there is authority to receive it. Additionally, this source can be supported by electronic case reporting in many jurisdictions.

Limitations

- ***Accessibility.*** May be limited among healthcare facilities that lack the resources to test every patient.
- ***Testing Sensitivity.*** Drug screen tests are limited by a lack of sensitivity and false positives and may be unable to accurately identify novel substances.
- ***Interpretation.*** Not all drugs or metabolites detected may be associated with illicit use (e.g., medications for the treatment of opioid use disorder). Caution should be taken when inferring the type of drug ingested as the lab may be detecting a metabolite and not the parent compound. Refer to a medical toxicologist to assist with the interpretation of results.
- ***Legality.*** May need to consult legal liaisons to clarify legal authority to request laboratory data from hospitals. May also require human subjects review or institutional review board approval.[25]

Resources

- APHL Opioids Biosurveillance Task Force Model Opioids Biosurveillance Strategy for Public Health Practice[25]

SOURCE Poison Control Centers

Case Classification **SUSPECT CASE**

Overview

The American Association of Poison Control Centers' National Poison Data System (NPDS) contains self-reported exposure case data collected from 55 regional poison centers serving the population of the United States, DC, and outlying territories[28]. Available 24 hours a day every day of the year, poison control centers respond to self-reported calls from the public or healthcare professionals reporting actual or potential exposures to a substance or requesting information[28]. Trained specialists record data reported over the telephone using an electronic health record collection system with mandatory common data elements and reporting requirements[29]. Follow-up calls may be used to monitor case progress and medical outcomes[28]. As of October 31st, 2020 poison control centers in the United States managed 46,552 cases of opioid substance exposure[30].

Case Ascertainment

Any recorded case involving opioid substance exposure, as indicated by any of the substances within the opioid subcategory of the NPDS. Appendix 2 lists all opioid derivatives included in the opioid subcategory.

Data Accessibility

Data from poison control centers may be obtained by making a request to the American Association of Poison Control Centers (AAPCC) NPDS. The data request policy may require internal approval prior to agreement excution31. Information on the data request process is available here.

Poison Control Considerations

- Report cases in near-real time, which may identify problematic trends before the availability of data from other data sources.
- May distinguish between types of opioids, although true opioid involvement cannot be confirmed.

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SOURCE Poison Control Centers

Case Classification **SUSPECT CASE**

Strengths

- ***Additional Context.*** Case reports the drug identity, allowing epidemiologists to distinguish between types of opioids, and also include information on the intent of poisoning, symptoms, treatment, use of healthcare resources, and poisoning severity[29].
- ***Geographic Coverage and Timeliness.*** Poison control centers have broad geographic coverage in the U.S., DC, and outlying territories, and are reported in near real-time, which may serve as an early warning to identify dangerous trends[32].
- ***Standardized Documentation.*** Utilize nationally standardized and consistent reporting standards, which likely decreases bias due to inconsistent documentation[32].

Poison Control Centers Data Linkage

May be accessed through the data request process, however requests for data must be purchased, and the time lag to receiving data following the request would vary by poison center[23].

Limitations

- ***No Confirmation.*** Poison control centers are not able to definitively confirm opioid involvement in the overdose.
- ***Reporting Bias.*** Opioid-related exposures in NDPS are a subset of NFOO within the U.S., due to voluntary reporting. Stigma associated with opioid poisoning may reduce the number of opioid-related calls reported to NDPS[29].
- ***Recall and Information Bias.*** Individuals may not accurately report the type of opioid involved in the exposure if they do not recall or are unaware of what they took (e.g., fentanyl-substituted heroin).
- ***Accuracy.*** Exposures reported to poison control centers do not necessarily represent a poisoning or overdose.

Resources

- American Association of Poison Control Centers: Opioid (Narcotic) Pain Medications.[30]

SOURCE Emergency Medical Services

Case Classification **SUSPECT CASE**

Overview

EMS play a critical role responding to the opioid overdose crisis. EMS personnel create patient care reports (PCR) for each incident, which incorporates information from dispatch, medical devices utilized in patient care, and interventions performed by EMS personnel (e.g., naloxone administration). EMS personnel include paramedics, emergency technicians, or emergency responders.

EMS personnel strongly encourage overdose survivors to be assessed at the ED, yet nation-wide estimates report over 90% of individuals administered naloxone by EMS are transported to the ED[14], some jurisdictions report between 18.5-35.0% of those seen by EMS for a probable NFOO refuse transport[15,16]. PCR are submitted to the EMS agency, routed to the state data repository, and ultimately transmitted to the National EMS Information System (NEMSIS), a national repository of EMS data in the United States[17]. Use of EMS data with other data sources may lead to more robust estimates of suspect NFOO in the population by identifying patients who were treated in the field by EMS personnel but who were not transported to the hospital.

Case Ascertainment[a,b]

Any PCR for an emergency response for a living patient meeting at least one of three conditions:

1. *The Provider's Primary Impression* OR *Provider's Secondary Impression* are OOD related
2. The *Primary Symptom* or *Other Associated Symptoms* are OOD related
3. *Medication Administered* is "Naloxone (Narcan)" and *Response to Medication Administered* is "Improved"
4. *Patient Care Report Narrative* contains:
   - **a.** at least ONE opioid-related keywords
   AND
   - **b.** at least TWO overdose related keywords

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Emergency Medical Services Considerations

- May include patients not seen in the ED due to refusal of transport.
- May provide valuable contextual information (e.g., overdose location, initial acuity) for cases identified using ED discharge and/or ED SyS data.

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SOURCE Emergency Medical Services

Case Classification **SUSPECT CASE**

Data Accessibility

Data may be accessible through EMS agencies, regional EMS councils, or at the state level via the state department of public health, or state office of EMS.

Emergency Medical Services Data Linkage

May be linked to ED data, hospital inpatient discharge data, or poison control center data.

Strengths

- ***Timely Identification***. May identify incident within days, allowing real-time monitoring of trends and detection of potential clusters.
- ***Geographical Locations***. Can identify OOD locations, increasing precision to detect hotspots or assess the distribution of harm reduction resources.
- ***Record Linkage***. May be linked to ED discharge or ED SyS data for use to develop "personal identifiers" which could increase opportunities to provide linkages to care or additional harm reduction resources.
- ***Contextual Information***. Elements specific to an EMS PCR may provide valuable information for assessing community harm reduction programs (e.g., bystander naloxone administrations).

Limitations

- ***Cannot Confirm NFOO***. Differential diagnoses are based on patient signs and symptoms without confirmation of clinical specimens.
- ***Difficulty Accessing Data***. Lack of data use agreements or infrastructure for data sharing may limit access to EMS data.
- ***Underestimation of True NFOO***. Inability to count NFOO when 911 is not called or in records where NFOO was not documented appropriately, which may underestimate the true count of suspect NFOO.
- ***Polysubstance Use***. May not easily identify instances where opioids were combined with additional substances, underestimating suspect NFOO.
- ***Biased Epidemiological Estimates***. Inability to account for individuals who call 911 multiple times for a NFOO would decrease the accuracy of epidemiological estimates.

Resources

- Emergency Medical Services Nonfatal Opioid Overdose Case Definition
- Emergency Medical Services and the Opioid Crisis[18]
- National Emergency Medical Services Information System (NEMSIS.org)[17]

[a]Data element names for case ascertainment come from the National Emergency Medical Services Information System (NEMSIS) Codebook v.3.5.019.
[b]Detailed description of opioid-overdose related values available in the Emergency Medical Services Nonfatal Opioid Overdose Case Definition

SOURCE Law Enforcement

Case Classification **CONFIRMED/PROBABLE CASE**

Overview

Law enforcement officers are often part of the emergency response to an OOD, as many jurisdictions will automatically include law enforcement on any drug or overdose-related incident. Upon arrival to an overdose, law enforcement will ensure that the scene is safe for EMS personnel, and then collect any evidence present at the scene. This evidence (e.g., needles, drug paraphernalia, etc.) may be sent off for forensic analysis to determine the type of substance involved in the overdose, which may enable the identification of new or novel opioid compounds, or other substances also involved in the overdose. While the majority of responses to a NFOO would likely be identified through EMS records, certain conditions may cause law enforcement to cancel EMS prior to their arrival at the scene. For example, many officers are now trained to carry and administer naloxone to reverse a NFOO. Officers who successfully reverse an overdose may cancel EMS at the request of the patient or may choose to take stable overdose survivors into custody, transporting them directly to jail.

Case Ascertainment

Field reports involving a narcotics violation or OOD, or reports attached to a forensic analysis that identifies an opioid-related compound as one of the substances contributing to a drug overdose.

Data Accessibility

Law enforcement data may be accessible through local precincts/jurisdictions or at the state level. Implementation of data use agreements may alleviate confidentiality concerns, increasing access to other data sources and opportunities to partner with other public health and public safety partners.

Law Enforcement Considerations

- May capture cases where patient was taken directly into custody, and not transported to the hospital.
- Cases linked to forensic data could confirm opioid involvement and identify additional/novel substances.

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SOURCE Law Enforcement

Case Classification **CONFIRMED/PROBABLE CASE**

Strengths

- ***Timeliness:*** The push to increase drug testing of environmental specimens in the field may enable law enforcement to report confirmed cases in near real-time, enabling the rapid identification of emerging trends.
- ***Additional Context:*** Cases utilizing forensic detection may be used to identify novel opioid-compounds, and increased specificity may increase the identification of overdoses where opioids were consumed with additional substances (i.e., polysubstance overdose).
- ***Confirmed Overdoses:*** Cases linked to forensic laboratories may enhance surveillance of hotspots and identify the presence of new substances.

Law Enforcement Data Linkage

May be linked to other public health and medical data sources, however issues related to data confidentiality may complicate the process.

Limitations

- ***Availability:*** May not respond to all OOD, as dispatches for "breathing problems" or "altered mental status" may not elicit an automatic response.
- ***Barriers to Confirming Cases.*** Good Samaritan drug laws which provide individuals seeking treatment for an overdose with limited immunity from drug-related prosecution, may limit the collection of clinical specimens for forensic analysis following a NFOO, decreasing the ability to confirm opioid involvement in the absence of other drug-related evidence.
- ***Delayed Reporting.*** Increased demand on forensic laboratories may limit their ability to respond, which may significantly delay clinical specimens' analysis.

Resources

- Building Successful Partnerships between Law Enforcement and Public Health Agencies to Address Opioid Use[26]
- Law Enforcement Efforts to Fight the Opioid Crisis[27]

SOURCE Harm Reduction Programs

Case Classification **SUSPECT CASE**

Overview

Harm reduction programs aim to prevent OOD through the implementation of community-based interventions. Popular harm reduction programs include naloxone distribution programs (NDP), which provide overdose education and naloxone administration training for individuals at high risk of experiencing or witnessing an overdose, and syringe exchange programs, which provide access to clean and sterile needles used for the preparation and consumption of drugs[33]. Staff of harm reduction programs may learn of NFOO within the community from program participants who either witnessed or experienced the overdose themselves. Some programs may have an official mechanism for capturing NFOO, such as a survey for bystander naloxone administrations, while others learn of an OOD anecdotally while working with program participants. Harm reduction programs may be useful for identifying community cases of NFOO where the patient did not call 911 or seek additional medical attention and may also be useful in determining local outbreaks and evaluating the distribution of harm reduction resources within a community. However, the self-reported nature of the incidents, and variation in the infrastructure available for programs to consistently document and report community cases of NFOO may limit data accuracy and inhibit opportunities for data linkage.

Case Ascertainment

Incidents of NFOO are self-reported by program participants to program staff. These may occur through scheduled interviews, while receiving services (e.g., naloxone refills, syringe exchange), or may be identified through surveys (e.g., bystander naloxone administrations).

Harm Reduction Program Considerations

- May capture community cases of NFOO where the emergency response system was not activated, and additional medical assistance was not received.

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SOURCE Harm Reduction Programs

Case Classification **SUSPECT CASE**

Data Accessibility

Harm reduction programs may not have the infrastructure and resources necessary for documenting NFOO. Programs may have insufficient staff to dedicate to data collection, and available staff may lack training, resulting in inconsistent documentation of NFOO.

Harm Reduction Program Data Linkage

Variation in data collection and data availability may inhibit the ability to link data from harm reduction programs into an overall surveillance program. Data linkage would likely best be achieved by establishing relationships with harm reduction programs at the county or city level.

Strengths

- ***Community Overdoses.*** Harm reduction programs may be able to identify NFOO amongst individuals who do not seek emergency assistance or additional medical attention following an overdose.
- ***Resource Evaluation***. Data from self-reported NFOO within the community may also be useful when targeting resources within a community.

Limitations

- ***Availability.*** Programs may lack processes or resources necessary for documenting NFOO, resulting in inconsistent data collection.
- ***Ability to Link.*** Lack of infrastructure for documenting NFOO may also inhibit harm reduction programs from sharing data with healthcare partners.
- ***Convenience Sample.*** Reported cases would be limited to service participants and would not be representative of all community overdoses.
- ***Reporting Bias.*** Self-reported NFOO may be subject to recall bias depending on the length of time since the incident, and hesitancy to share sensitive information.

References

- National Harm Reduction Coalition Resource Center
- Evidence-Based Strategies for Preventing Opioid Overdose: What's Working in the United States[33]

Data Partnerships

Data partnerships which allow data sources to coordinate surveillance are the best way to achieve complete case ascertainment and support the creation of a more comprehensive public health response to the opioid epidemic. The coordinated flow of information between data sources and state and local health departments could help increase the accuracy of epidemiological estimates of probable NFOO incidence and prevalence, which can inform the distribution of harm reduction resources and implementation of overdose prevention programs.

Initiating a data partnership may be difficult. However, according to Eric Bakota, Science and Research Manager at Harris County Public Health (HCPH), getting started may be as easy as picking up the phone[34]. Mr. Bakota began seeking data by "cold-calling" staff at the institutes where he was seeking access to data. He reports that calling at the staff level can help provide a feel for what is and is not possible. These initial calls were followed by meetings with department leadership, which ultimately led to a data partnership between HCPH, The University of Texas School of Public Health, and the Harris County Sheriff's Office.

Strong partnerships may also play a crucial role in addressing the challenges that may occur when linking data sources. For example, Liz Pizzicato, the Substance Use Epidemiology Manager for the Philadelphia Department of Public Health, highlighted how privacy issues hindered the process of building the CARES Integrated Data System in Philadelphia, which required many memorandums of understanding and data licensing agreements. She highlights how partnerships within the department of health were a valuable asset to complete this dataset, stating that "political will" from not only her department but the entire health and human services cluster, was helpful to get it done[35].

Developing relationships and data partnerships between health care, public health, and public safety personnel is a crucial and necessary first step towards creating a system that will enable a comprehensive and coordinated response to the opioid epidemic.

Data Linkage

Combining data from two or more data sources to study the same individual, facility, organization, event, or geographic area, makes it possible to enhance the value of the information obtained beyond what is available from any single source[36].

Methods of Data Linkage

There are a variety of different methods which may be used to link cases from separate data sources. For example, the state of Maryland links data sources in the Chesapeake Regional Information System for our Patients (CRISP) health information exchange using a probabilistic algorithm applied to patient identifiers before it de-identifies data for research.[37] In contrast, the Philadelphia Department of Public Health links cases from multiple data sources using "Deterministic matching", which connects cases based on several personal identifiers (e.g., name, gender, birthdate, SSN, phone number, street address, source party identifiers[35]".

Challenges of Data Linkage

There are several challenges faced when combining data sources through data linkages. Substantial costs and resources may be required to implement and manage such systems, and the costs of data management and analysis increase as systems receive increasing amounts of data with increasing speed and diversity[36]. Laws governing processes for data collection, like the Paperwork Reduction Act, may also create substantial lags in starting new data collection efforts for surveillance[36], and privacy and confidentiality laws could make it very difficult to connect to any healthcare (e.g, EMS, ED) or law enforcement data sources.

Overcoming barriers to linking data sources is a critical component of building a coordinated surveillance system. Further information on linking data sources is available from the CSTE, who produced a four-part webinar series on data linkages for the State Unintentional Drug Overdose Reporting System (SUDORS), EMS and Public Safety data sources[38].

Dissemination

Reporting epidemiological estimates and trends involving NFOO that can inform actionable public health activities is the most important part of surveillance. Reports and updates should be available not only to the stakeholders who contribute data, but also to the individuals who initiate and implement public health interventions, public health researchers, and the general public. Reporting of this data would largely be dependent upon the type of data requested, such as aggregate or individual de-identified data[25].

Aggregate Data

are groups of data that are used to generate summary statistics, general epidemiological estimates, and trends. Aggregate data are most often reported to the public health and healthcare partners, as well as the general public. Aggregate data may also be reported to state legislators, to inform and propel public health policies.

Public interest in the opioid crisis has led to a variety of ways to deliver information about NFOO surveillance. Some states report aggregate data through interactive data dashboards, which upload and report data in near-real time, often with maps that allow visualization of hotspots and trends. For example, the Virginia Department of Health (VDH) Office of Epidemiology provides a website that reports VDH opioid indicators within EDs[39], and the Maine Division of Disease Surveillance utilizes an interactive data dashboard to illustrate trends in ED-identified NFOO and opioid prescriptions[40].

States may also allow public access to aggregate data through an online data analysis platform that allows the user to generate reports based on desired statistics and indicators. For example, the Georgia Department of Public Health's Office of Health Indicators for Planning hosts an Online Analytical Statistical Information System which allows users to generate reports of desired opioid indicators and demographic/geographic variables[41].

Epidemiological estimates and trends from aggregate data may also be periodically circulated in reports. Data collected from NFOO surveillance in New Hampshire, using a system which combines syndromic ED data with EMS naloxone administrations and medical examiner data, is distributed routinely to involved agencies, as well as public health and law enforcement[5]. These reports may also be made publicly available on state or agency websites.

Individual De-identified Data

Sharing data is crucial for driving the process for evidence-based research. To advance public health research, STLT public health agencies may also consider making deidentified data on NFOO available to public health researchers. For example, the North Carolina Disease Event Tracking and Epidemiological Collection Tool (NC DETECT) makes data available to public health researchers in North Carolina through a secure, Web-based application, which allows researchers to gain access to record-level data for ED visits, EMS responses, and poison center exposures in near-real time[12]. Similarly, the Philadelphia CARES program allows public health researchers to access data by filling out a data request describing the purpose, cohort, time period and data elements required. CARES allow researchers to access aggregate data for summary, but also allows access to identifiable data and limited data sets, although requests for identifiable and limited data sets are subject to legal approval, and must address Federal/state approval requirements, as well as meet the requirements of the Health Information Portability and Accountability Act (HIPAA)[35].

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Appendices

Appendix 1: List of Opioid Overdose-Related ICD-10-CM T codes

Appendix 2: List of Opioid Overdose Related ICD-10-CM F codes

Appendix 3: List of Opioid Overdose Related SNOMED CT codes

Appendix 4: Opioid derivatives found within the opioid subcategory of the National Poison Data System

Appendix 1. List of Opioid Overdose-Related ICD-10-CM T Codes

Code	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

[a] All codes based on the definitions for the International Classification of Diseases version 10-CM.
[b] Denotes ICD-10-CM T code that is intended to be retired soon
[c] These ICD-10-CM T codes were introduced on October 1st 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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Appendix 1. List of Opioid Overdose-Related ICD-10-CM T Codes

Code	Code Description
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	Poisoning by, adverse effect of and underdosing of fentanyl or fentanyl analogs
T40.411	Poisoning by fentanyl or fentanyl analogs, accidental (unintentional)
T40.411Ac	Poisoning by fentanyl or fentanyl analogs, accidental (unintentional), initial encounter
T40.412	Poisoning by fentanyl or fentanyl analogs, intentional self-harm
T40.412Ac	Poisoning by fentanyl or fentanyl analogs, intentional self-harm, initial encounter
T40.413	Poisoning by fentanyl or fentanyl analogs, assault
T40.413Ac	Poisoning by fentanyl or fentanyl analogs, assault, initial encounter
T40.414	Poisoning by fentanyl or fentanyl analogs, undetermined
T40.414Ac	Poisoning by fentanyl or fentanyl analogs, undetermined, initial encounter
T40.42	Poisoning by, adverse effect of and underdosing of tramadol
T40.421	Poisoning by tramadol, accidental (unintentional)
T40.421Ac	Poisoning by tramadol, accidental (unintentional), initial encounter
T40.422	Poisoning by tramadol, intentional self-harm
T40.422Ac	Poisoning by tramadol, intentional self-harm, initial encounter
T40.423	Poisoning by tramadol, assault
T40.423Ac	Poisoning by tramadol, assault, initial encounter
T40.424	Poisoning by tramadol, undetermined
T40.424Ac	Poisoning by tramadol, undetermined, initial encounter
T40.49	Poisoning by, adverse effect of and underdosing of other synthetic narcotics
T40.491	Poisoning by other synthetic narcotics, accidental (unintentional)
T40.491Ac	Poisoning by other synthetic narcotics, accidental (unintentional), initial encounter
T40.492	Poisoning by other synthetic narcotics, intentional self-harm
T40.492Ac	Poisoning by other synthetic narcotics, intentional self-harm, 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 that is intended to be retired soon
[c] These ICD-10-CM T codes were introduced on October 1st 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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Appendix 1. List of Opioid Overdose-Related ICD-10-CM T Codes

Code	Code Description
T40.493	Poisoning by other synthetic narcotics, assault
T40.493Ac	Poisoning by other synthetic narcotics, assault, initial encounter
T40.494	Poisoning by other synthetic narcotics, undetermined
T40.494Ac	Poisoning by other synthetic narcotics, undetermined, initial encounter
T40.4X	Poisoning by, adverse effect of and underdosing of other synthetic narcotics
T40.4X1	Poisoning by other synthetic narcotics, accidental (unintentional)
T40.4X1Ab	Poisoning by other synthetic narcotics, accidental (unintentional), initial encounter
T40.4X2	Poisoning by other synthetic narcotics, intentional self-harm
T40.4X2A	Poisoning by other synthetic narcotics, intentional self-harm, initial encounter
T40.4X3	Poisoning by other synthetic narcotics, assault
T40.4X3A	Poisoning by other synthetic narcotics, assault, initial encounter
T40.4X4	Poisoning by other synthetic narcotics, undetermined
T40.4X4A	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 that is intended to be retired soon
[c] These ICD-10-CM T codes were introduced on October 1st 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.

Appendix 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

Continued on following page.

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

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

Appendix 3. List of Opioid Overdose Related SNOMED CT codes

Code	Code Description
95175007	Accidental heroin overdose (disorder)
295174006	Heroin overdose (disorder)
295176008	Heroin overdose of undetermined intent (disorder)
295165009	Morphinan opioid overdose (disorder)
242253008	Overdose of opiate (disorder)
297199006	Accidental overdose of opiate (disorder)
295213004	Overdose of opiate analgesic of undetermined intent (disorder)

Appendix 4. Opioid derivatives found within the opioid subcategory of the National Poison Data System (NPDS)

- Alfentanil
- Buprenorphine
- Butorphanol
- Codeine
- Difenoxin
- Dihydrocodeine
- Fentanyl
- Hydrocodone Alone or in Combination *(Excluding Combination Products with Acetaminophen, Acetylsalicylic Acid or Ibuprofen)*
- Hydromorphone
- Levorphanol
- Meperidine
- Methadone
- Morphine
- Nalbuphine
- Oxycodone Alone or in Combination *(Excluding Combination Products with Acetaminophen or Acetylsalicylic Acid)*
- Oxymorphone
- Pentazocine
- Propoxyphene
- Remifentanil
- Sufentanil
- Tapentadol
- Tramadol
- Other or Unknown Narcotics
- Acetaminophen with Codeine
- Acetaminophen with Hydrocodone
- Acetaminophen with Other Narcotics or Narcotic Analogs
- Acetaminophen with Oxycodone
- Acetaminophen with Propoxyphene
- Acetylsalicylic Acid with Codeine
- Acetylsalicylic Acid with Other Narcotics or Narcotic Analogs
- Acetylsalicylic Acid with Oxycodone
- Acetylsalicylic Acid with Propoxyphene
- Ibuprofen with Hydrocodone
- Acetaminophen, Acetylsalicylic Acid, and Opioid with Antihistamine Last updated on: 02/03/2017
- Acetaminophen, Acetylsalicylic Acid, and Opioid with Decongestant
- Acetaminophen, Acetylsalicylic Acid, and Opioid with Decongestant and Antihistamine
- Acetaminophen and Codeine with Antihistamine
- Acetaminophen and Codeine with Decongestant
- Acetaminophen and Codeine with Decongestant and Antihistamine
- Acetaminophen and Other Opioid with Antihistamine
- Acetaminophen and Other Opioid with Decongestant
- Acetaminophen and Other Opioid with Decongestant and Antihistamine
- Acetylsalicylic Acid and Codeine with Antihistamine
- Acetylsalicylic Acid and Codeine with Decongestant
- Acetylsalicylic Acid and Codeine with Decongestant and Antihistamine
- Acetylsalicylic Acid and Other Opioid with Antihistamine
- Acetylsalicylic Acid and Other Opioid with Decongestant
- Acetylsalicylic Acid and Other Opioid with Decongestant and Antihistamine
- Antihistamine and Decongestant with Other Opioid
- Antihistamine with Codeine
- Antihistamine with Other Opioid
- Decongestant with Codeine
- Decongestant with Other Opioid
- Acetaminophen, Acetylsalicylic Acid, Phenylpropanolamine, and Opioid Combinations with Decongestant and/or Antihistamine
- Acetaminophen, Phenylpropanolamine, and Codeine Combinations with Decongestant and/or Antihistamine
- Acetaminophen, Phenylpropanolamine, and Other Opioid Combinations with Decongestant and/or Antihistamine
- Acetylsalicylic Acid, Phenylpropanolamine, and Codeine Combinations with Decongestant and/or Antihistamine
- Acetylsalicylic Acid, Phenylpropanolamine, and Other Opioid Combinations with Decongestant and/or Antihistamine
- Antihistamine and/or Decongestant with Phenylpropanolamine and Codeine
- Antihistamine and/or Decongestant with Phenylpropanolamine and Other Opioid
- Non-Acetylsalicylic Acid Salicylates, Phenylpropanolamine, and Opioid Combinations with
- Decongestant and/or Antihistamine
- Heroin