# 2020 OPIOID-RELATED OVERDOSE SURVEILLANCE REPORT

## PALM BEACH COUNTY, FLORIDA

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# Data Source Acknowledgments

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We gratefully acknowledge all organizations in our extensive list of community partners we have worked throughout the county. Our shared goals are made stronger by our partnerships.

Finally, we would acknowledge the Centers for Disease Control and Prevention for technical support and funding through the Overdose Data to Action grant. The content expressed in this report is solely that of the authors and does not necessarily represent the views of the Centers for Disease Control and Prevention.

# Executive Summary

**Background**

The purpose of this report is to provide an overview of the opioid-related overdose surveillance in 2020 for Palm Beach County, FL (PBC) conducted by the Florida Department of Health (FDOH) in PBC under the Centers for Disease Control and Prevention (CDC) Overdose Data to Action (OD2A) grant.

**Methods**

We aimed to provide a comprehensive surveillance report incorporating multiple data sources. The information presented in this report contains data collected through agreements with local hospitals, the Palm Beach County Medical Examiner's office, and hospital discharge data provided by the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) database.

**Results**

The results of PBC overdose surveillance identified 3,475 opioid-related overdoses identified through syndromic surveillance, 892 non-fatal opioid-related overdose emergency department (ED) medical records, and 528 fatal overdoses involving opioids. Across all three data sources, most of the overdoses occurred in White, Non-Hispanic, men. Adults aged 24-35 were most likely to experience a non-fatal or fatal overdose compared to over age groups. The most frequently report opioid in both syndromic surveillance and non-fatal overdose surveillance was heroin, whereas the most frequent opioid implicated in a fatal overdose was fentanyl.

# Introduction

Throughout the span of the US drug overdose epidemic, Florida has remained at the forefront of this devastating public health crisis. Drug overdose mortality has had record breaking years recently, and 2019 was no exception. In 2019 alone, 5,268 Floridians lost their lives to a drug overdose at an age-adjusted rate of 25.5 deaths per 100,000 people, an increase of 11.8 deaths per 100,000 people from 2018[1]. The recent waves of fentanyl, fentanyl analogs, and novel psychoactive substances (NPS) starkly contrast from the 1990s prescription opioid epidemic. This is partly due to provider outreach and education for the Prescription Drug Monitoring Program (PDMP) by the Florida Department of Health (FDOH). Data from the 2019-2020 PDMP Annual Report described an increasing enrollment in both prescribers and dispensers in the system used to track controlled substance prescriptions which has correlated with a decrease in opioid prescriptions and a decreased in the strength of opioids prescribed[2].

Despite the decrease in rates of prescription opioid overdoses, Florida has continued to struggle against overdose morbidity and mortality. Converging public health crises are developing because the opioid epidemic is serving as a catalyst for a surge in infectious disease. Substance use disorder (SUD) and opioid use disorder (OUD) are a risk factors for viral infections such as human immunodeficiency disorder (HIV) and Hepatitis C infection (HCV), and are associated with high risk behaviors such as injection drug use (IVDU) practices and risky sexual behaviors[3]. In addition, contaminated drugs, drug paraphernalia as well as bacteria found at the injection site can cause infection as the site of injection[3]. In 2017, 9.7% (N=3,690) of the new HIV diagnoses were associated with injection drug use (IVDU)[4].  More specifically, 110,034 persons were living with a diagnosed HIV infection in Florida and of those, 11.4% of male cases was credited to IVDU or risky sexual behaviors. As well, among female cases in Florida, 12.4% were attributed to IDVU[5]. Pregnant women with OUD also carry a unique risk of delivering a child with neonatal abstinence syndrome (NAS) or Neonatal withdrawal (NOWS). Recent studies suggest that the rates of babies diagnosed with NAS in Florida have increased by 10-fold from 2005 to 2011[6]. State surveillance for NAS is limited, and more investigation is needed to truly comprehend the scope of NAS in Florida.

The need to address this public health crisis extends beyond the desire to prevent individual mortality. Overdose deaths can also have significant emotional and mental health implications on family members and friends of the deceased. Overdose related deaths are often abrupt and are generally associated with feelings of secrecy, shame, social stigmas and can produce feelings of helplessness, shame, and guilt[7]. By addressing the issue of overdose morbidity and mortality, we are also addressing the issue of incarceration, communicable disease, crowded state-run foster homes, and climbing healthcare cost. The prevention and treatment of SUD is extremely complex, and deeply embedded with many aspects of the social-ecological framework of thinking. The development of an effective solution or opioid prevention and treatment requires an inclusive framework where individual, community, and society factors are identified, and resources are created to successfully navigate through the crisis[8].

Locally, Palm Beach County is one of the most populous counties in Florida, with an estimated population of about 1.5 million residents[9]. Palm Beach County has seen an increase in opioid related overdose mortality along with the rest of the state and the United States. To combat the opioid crisis in Palm Beach, stakeholders in the community united and worked together to develop an innovative partnership between the Health Care District, JFK Medical Center and the Palm Beach County Commissioners Office. A product of this partnership came into fruition on February 5th, 2020, with the opening of the Addiction Stabilization Unit (ASU) within JFK Medical Center's North Campus in West Palm Beach[10]. The purpose of this unit is to receive patients from different reaches of Palm Beach County and provide overdose stabilization along with options long-term treatment[10].

In September of 2019, the Florida Department of Health for Palm Beach County (PBC) was one of three counties in the state of Florida (along with the state itself) to be awarded funding from the CDC under the Overdose Data to Action (OD2A) grant. Under the grant, PBC was awarded $11.3 million over 3 years (extended to 4 in 2021) to implement 8 strategies related to overdose surveillance and prevention; the 8 strategies are: Implement Innovative Surveillance to Support NOFO Interventions, Prescription Drug Monitoring Programs (PDMPs), Integration of State and Local Prevention and Response Efforts, Establishing Linkages to Care, Providers and Health Systems Support, Partnerships with Public Safety and First Responders, Empowering Individuals to Make Safe Choices, and Prevention Innovation Projects. The goal of housing these 8 strategies under one roof in PBC is to ensure that the results of implementing innovative surveillance translate into more robust and targeted prevention activities. Under the "Implement Innovative Surveillance to Support NOFO Interventions" strategy, PBC has focused on six activities with an eye towards the overall objective of "Innovate Surveillance of Drug Use/Misuse". These 6 activities, which range from data collation from various sources to cross-county meetings with Broward County, are all aimed at getting access to as much data as possible, as frequently as possible, for comprehensive analysis and reporting in a timely matter that allows for spikes in overdoses to be caught early and prevention activities to respond in-kind. To date, over 3,000 medical records have been collected and over 500 reports from the Medical Examiner's office reviewed. Data analysis has taken the form of both traditionally statistical analysis as well as GIS spatial analysis which has allowed PBC to map overdoses and target prevention accordingly. Department of Health Palm Beach County seeks utilize the surveillance data to drive prevention and response efforts throughout the County. The surveillance component of the project will enable Palm Beach County to have access to high quality and timely data on overdoses in the county. Specific data will be collected and analyzed to identify the drug burden in the county. This data will be shared with community partners and various stakeholders engaged in local opioid related committees, and tasks force to combat the drug crisis in the county. Palm Beach County continues to build strategic collaborative partnership, and leverage resources with key community partners.

The goal of the surveillance component of the project is to influence the prevention component and to decrease opioid use and opioid use disorder. Palm Beach County has seen this data collected being put into action through increased prevention and education efforts in the county.  ED data is shared monthly with the task force and community partners. Community partners use the data to target prevention and outreach efforts. Palm Beach County is currently working with various stakeholders and task force in ramping up prevention efforts throughout the county, which is all directed by the data that has been collected.

## Methods

In 2020, opioid-related overdose surveillance included information from three primary sources. ESSENCE database was used for the de-identified syndromic surveillance of opioid overdose ED data, including both morbidity and mortality. Patient-level morbidity data was obtained through ED medical records from participating hospitals. Patient-level mortality data was obtained from PBC MEO. Details of the data and analysis methods of the surveillance system are outlined below.

|  | ESSENCE Data | Non-Fatal ED Data | Fatal Data |
|---|---|---|---|
| **Date** | January 2020 -December 2020 | January 2020 - December 2020 | January 2020 - December 2020 |
| **Source** | Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE)- web based syndromic surveillance system | Medical Records from 10 local Hospitals. Date of collection varied by hospital. | Palm Beach County Medical Examiner's Office (PBC MEO) |
| **Data Type** | ED chief complaint and discharge diagnosis data | Hospital ED data for overdoses — hospitals faxed medical records from patients that came in for an opioid-related overdose | All drug/poison deaths as categorized by the PBC MEO |
| **Variables** | Patient demographics (age, race, ethnicity, gender), hospital, zip code, time, ED chief complaint, discharge diagnosis | Patient demographics (age, race, ethnicity, gender, employment status, housing status, insurance status), substances involved in overdose, toxicology screen, overdose incident details, medical interventions (opioid reversal medication, clinical procedures), clinical outcome (diagnosis, discharge status), criminal history, past medical history, social history | Decedent's demographics (age, race, ethnicity, gender, occupation, housing, military services, education level, PBC residency), overdose incident details (location, jurisdictions responding, who found the decedent, paraphernalia found on scene), death details (location, manner of death, cause of death, autopsy findings), toxicology screen, medical interventions, criminal history, past medical history, social history |
| **Initial assessment** | Syndrome chief complaint and discharge diagnosis categories that contain ICD codes drug terms to monitor suspected drug overdoses | Medical records are sorted based on inclusion/exclusion criteria to extract opioid-related overdose ED records | Classification of deaths involving opioids based on PBC MEO cause of death |
| **Spatial data** | N/A | N/A | Residential and incident location |
| **Temporal data** | Date of ED visit | Date of ED visit | Date of death |

# ESSENCE Syndromic Overdose Surveillance

### Data Collection

De-identified data is downloaded from the ESSENCE database for syndromic surveillance. ESSENCE has three functions that include data ingestion, alerting, and analysis and visualization. During the data ingestion process, hospital data is received electronically and placed in syndrome groups. The groups have an algorithm that is applied and creates alerts to users so that they can further investigate any patterns or outbreaks. Lastly, ESSENCE provides the data to be expressed spatially and temporally using many different formats. Data is pulled using a query portal that allows the user to input the data source, start and end dates, and add query fields. The query field that we use is the CC and DD Category called "Drug-CDC All Drug v2 OD2A". This pre-defined query pulls ED data for incidences in which the chief complaint or discharge diagnosis include specific drug-related terms – such as "opioids", "benzodiazepines", "overdose", etc. –  or incidences in which ICD-10-CM codes corresponding with drug overdose or poisoning were recorded.

### Case Definition

Data pulled from ESSENCE was manually examined for inclusion and exclusion criteria pertaining to opioid-related drug overdose surveillance.  Records where the discharge diagnosis reported ICD-10-CM codes for opioid overdose (T40.0, T40.1. T40.2. T40.3, T40.4, T40.6) were automatically included as an opioid-related overdose. ICD-10-CM codes for opioid abuse (F.11.1), opioid dependence (F11.2), and opioid use (F11.9) – excluding F11.11 and F11.21 – were included as an opioid-related overdose if the chief complaint included an overdose term such as "overdose", "poisoning", "unconscious", etc.

### Variables and Analysis

Data collected was de-identified and included date and time of emergency department visit, and the ED hospital name. Demographics for opioid-related overdose included patient age, gender, race, ethnicity, chief complaint, and discharge diagnosis. In total, out of 10,071 entries on ESSENCE pulled from the query field, we were able to select 3,475 opioid overdoses by using the inclusion/exclusion criteria described earlier. The records that were excluded were non-opioid overdoses, general drug use, or patients experiencing withdrawal symptoms. Microsoft Excel (Microsoft Corporation, Redmond, WA) was used for data management and analysis.

# Opioid-Related Overdose Morbidity

### Data Collection

In April 2020, medical record collection began for patients admitted to the ED from one of ten participating hospitals in the PBC. The overdose incident dates range from January 2020 to December 2020. A list of participating hospitals can be found in Table 1.are detailed below. Supplemental patient data were obtained through multiple databases with the purpose of record completeness and providing a whole patient surveillance. For a list a databases and information obtained from them, see Table 2 All

physical copies of ED records were securely stored in locking file cabinets behind no less than two locked doors. Electronic versions of ED records were stored securely in Merlin system.  All ED records were handled in accordance with Health Insurance Portability and Accountability Act (HIPAA) regulations.

**Case Definition**

Emergency department records received from local hospitals were manually reviewed to determine if the opioid-related overdose case definition was met. Records were included if they met one of the following criteria: chief complaint or discharge diagnosis of opioid overdose, Narcan (naloxone) given with a positive clinical response, and clinically compatible opioid overdose symptoms with either the patient reporting opioid use or a high degree of suspicion of opioid use by EMS or clinician. Records that were reported instances of patient requesting detox for opioid without meeting any of the prior opioid-related overdose criteria were excluded.

**Variables and Analysis**

Data collected on included demographic information, medical history, substance use history, criminal history, and overdose incident information. The social ecological framework was applied to the design of overdose surveillance collection.  The resulting variable list was created with the purpose of providing a comprehensive overdose surveillance report that incorporated social determinants of health. Demographic information included: age, gender, race, ethnicity, employment, insurance, housing status, and patient-reported social history. Missing or incomplete demographics in the ED records were supplemented with alternative databases. Opioid-related overdose incident information included: signs and symptoms of overdose incident, polysubstance use related to the incident, toxicology screens, treatment prior to arrival, course of treatment in ED, medications administered, and disposition at time of ED discharge. Patient medical history was obtained from ED records, Merlin, and Surveillance Tools and Reporting System (STARS) databases. Variables included: history of chronic pain, mental health and psychiatric diagnoses, viral hepatitis, HIV, and STDs. Social history was collected from ED records and including substance abuse history and IV drug use. Criminal record history was conducted through LexisNexis. It is important to note that criminal history was collected as a means of identifying areas of opportunity for substance abuse prevention and intervention. Any criminal record history ***does not*** indicate guilt or conviction and only indicates that charges were filed against the individual at one point.

In total we collected 892 opioid-related overdose ED records from 769 individuals. We used Microsoft Excel (Microsoft Corporation, Redmond, WA) for data management and SAS version 9.4 (SAS Institute, Cary, NC) was used for data analysis.

# Opioid-Related Overdose Mortality

**Data Collection**

The PBC MEO database was sorted from January 2020 to December 2020 and the analyzed cases were organized by the COD. Of the total 570 cases listed in the MEO database, 528 included a COD that involved at least one opioid or listed a complication

related to an opioid. Each case was abstracted and received a unique patient identifier to protect the patient's privacy. The unique patient identifier allowed us to link prior non-fatal overdose hospital admissions for further analysis.  Supplemental patient data was obtained through crosschecks in other databases. All physical records were securely stored in locking file cabinets behind no less than two locked doors. Electronic versions of medical records were stored securely on the Merlin System.  All records were handled in accordance with the Health Insurance Portability and Accountability Act (HIPAA) regulations.

## Case Definition

The Palm Beach County Medical Examiner's Office (PBC MEO) is used to review the fatal opioid overdoses. While non-fatal overdoses are assessed to determine if they meet specific criteria, fatal overdoses are defined through the opinions stated by the medical examiner physician in the doctor's report after an investigation, autopsy, and toxicology study are conducted. The medical examiner's findings are documented in their investigative report noting various factors that include health conditions, prior substance abuse, and if drug paraphernalia was found at the incident scene. These combined factors aid the physician in determining the cause of death (COD). The OD2A team then utilizes the COD to further review and assess whether the fatality was the result of an opioid or complications from opioid usage. This report includes fatalities where at least one opioid was deemed to cause or contribute to the COD.

## Variables and Analysis

Demographic information, overdose incident details, medical history, criminal history, and social history were collected for the fatal overdoses as well. Additional demographic information obtained in fatal overdoses included: military services, education level, Palm Beach County residency.  Variables collected from the medical examiner investigation notes of drug overdoses included: place of injury (overdose location), place of death, manner of death, cause of death, autopsy findings, medical interventions, paraphernalia found, drug use with others, reported age when substance abuse began. This information was collected to learn about health issues/complications caused by the substances ingested and better identify overdose incident details and link areas of higher incidence. Additional variables included: jurisdictions responding (EMS and Police agency) and welfare checks conducted by police. This data can help agencies better understand the relationship of those who find an overdosed individual and determine jurisdictions responding to the overdoses to drive prevention strategies. Toxicology findings were collected to learn about the substances ingested and to present findings on frequencies where these substances were marked as cause of death. The toxicology report, investigation report, and autopsy findings provide details as to what drugs were involved in the overdose that serve to help community partners to better understand the extent of overdoses in PBC.

In total we reviewed 570 cases in the PBC MEO database of which 528 met the inclusion criteria for the analysis. Microsoft Excel (Microsoft Corporation, Redmond, WA) was used for data management and SAS version 9.4 (SAS Institute, Cary, NC) was used for data analysis. Spatial analysis was performed using ArcGIS Pro 2.6.0 (ESRI, Redlands, CA).

# Results

The findings of the 2020 opioid overdose surveillance for Palm Beach County are detailed in the sections below. Due to the heterogeneity of data sources and variables we were able to collect, the syndromic surveillance findings, morbidity, and mortality data are reported in separate sections.

## ESSENCE Syndromic Overdose Surveillance

**Figure 1**

The data processed from ESSENCE resulted in 3,475 opioid overdose ED visits in 2020. There was an average of 289.6 overdoses per month and 9.5 overdoses per day. Opioid overdoses remained relatively stable through 2020. The largest decrease occurred in February which experienced a decrease of 16%. ED overdose visits peaked in September, increasing 31% from the month prior.



Emergency Department Opioid-Related Overdose Visits by Month in Palm Beach County, FL (2020)
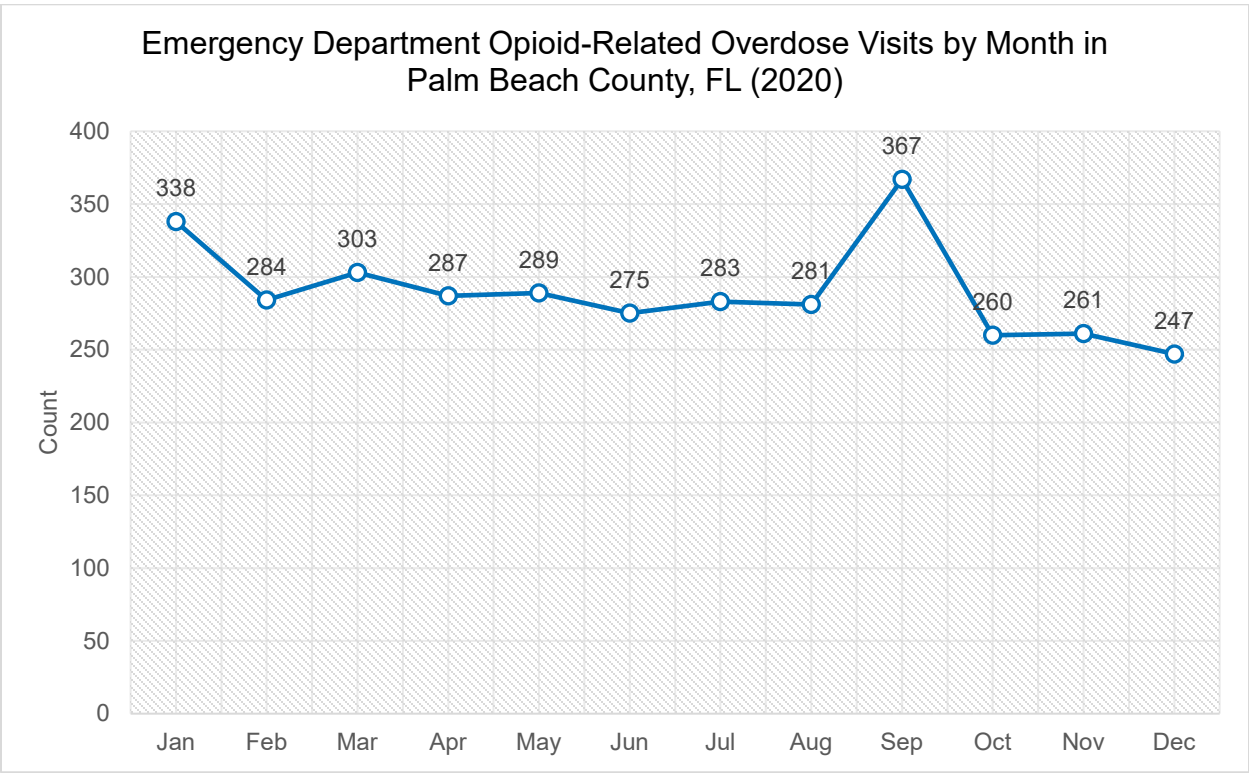
**Figure 2**

ED opioid overdoses were recorded at all 14 hospitals in the county. JFK Medical Center experienced the highest volume of ED opioid overdoses visits in 2020. With 810 opioid overdoses seen in the ED accounting for nearly a quarter (23.3%) of opioid overdoses. Hospitals located in less populated regions of PBC tended to experience lower volume of ED opioid overdose visits in 2020.

Emergency Department Opioid-Related Overdose Visits by Hospital in Palm Beach County, FL (2020)

| Hospital | Count |
|---|---|
| Bethesda Hospital East | 391 |
| Bethesda Hospital West | 28 |
| Boca Raton Regional Hospital | 227 |
| Delray Medical Center | 354 |
| Good Samaritan Medical Center | 232 |
| JFK Medical Center | 810 |
| JFK Medical Center - North | 280 |
| Jupiter Medical Center | 190 |
| Lakeside Medical Center | 11 |
| Palm Beach Gardens Medical Center | 207 |
| Palms West Hospital | 75 |
| St Marys Medical Center | 303 |
| Wellington Regional Medical Center | 221 |
| West Boca Medical Center | 146 |

**Figure 3**

In 2020, the average age of male patients seen in the ED for opioid overdose was 39.3 (SD=14.2) years of age. The average age of female patients was 44.2 (SD=18.3) years of age. The highest proportion of opioid overdoses was found in the 25-34-year age group, followed by the 35-54-year age group. Among children less than 15 years of age, the most ED visits occurred in the 0-3 years age group for both male and female children.

**Emergency Department Opioid-Related Overdoses by Age and Gender in Palm Beach County, FL (2020)**

| Age Group (Years) | Male | Female |
|---|---|---|
| 0-3 | 5 | 4 |
| 4-9 | 1 | 1 |
| 10-14 | 0 | 0 |
| 15-24 | 197 | 130 |
| 25-34 | 943 | 392 |
| 35-44 | 584 | 229 |
| 45-54 | 256 | 124 |
| 55-64 | 224 | 115 |
| 65-74 | 102 | 66 |
| 75-84 | 26 | 40 |
| 85+ | 12 | 24 |
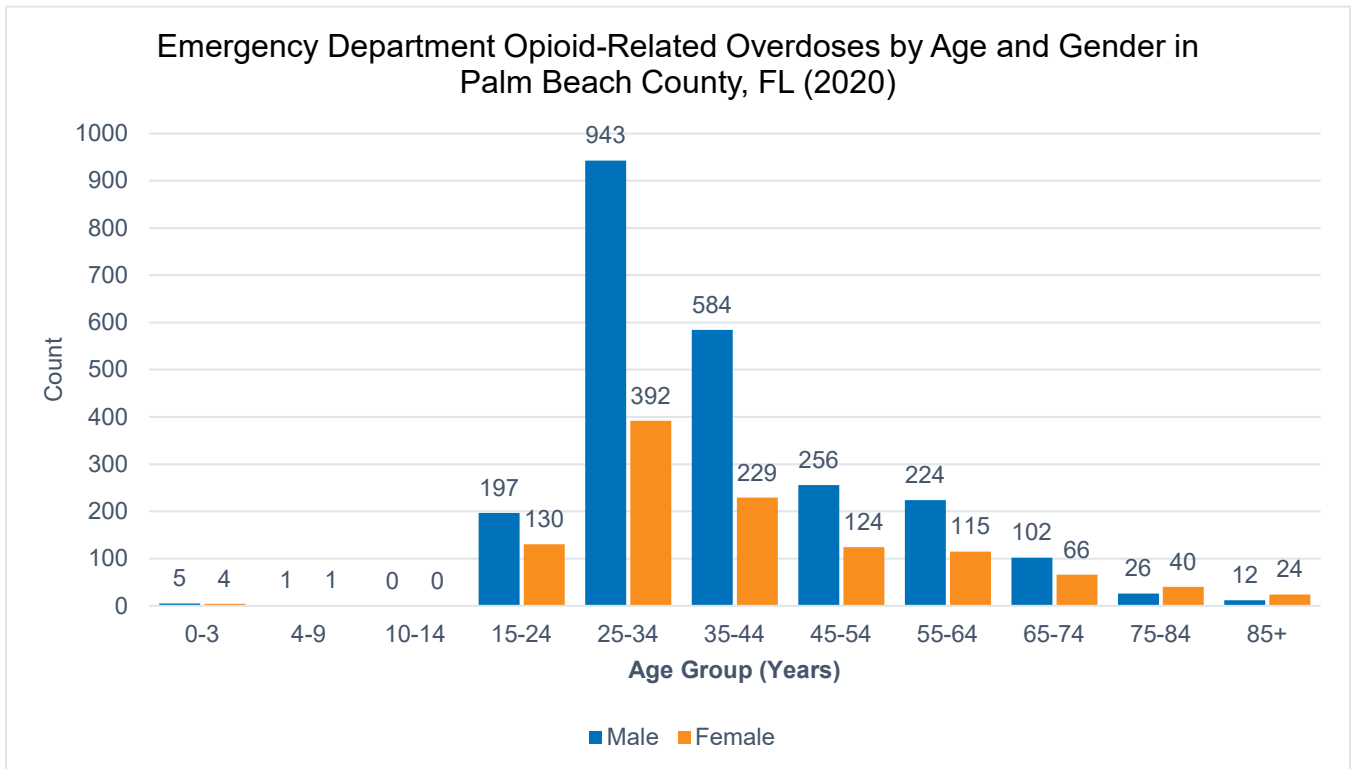
**Figure 4**

Over half (52.5%) of the ED visits for opioid overdoses in PBC occurred in white males. White females account for the second highest number of ED visits with 28.0% of opioid overdose in 2020. American Indian/Alaskan Native and Native Hawaiian/Pacific Islander accounted for the lowest number of ED visits at 0.12% and 0.14% respectively.



Emergency Department Opioid-Related Overdoses by Race and Gender in Palm Beach County, FL (2020)
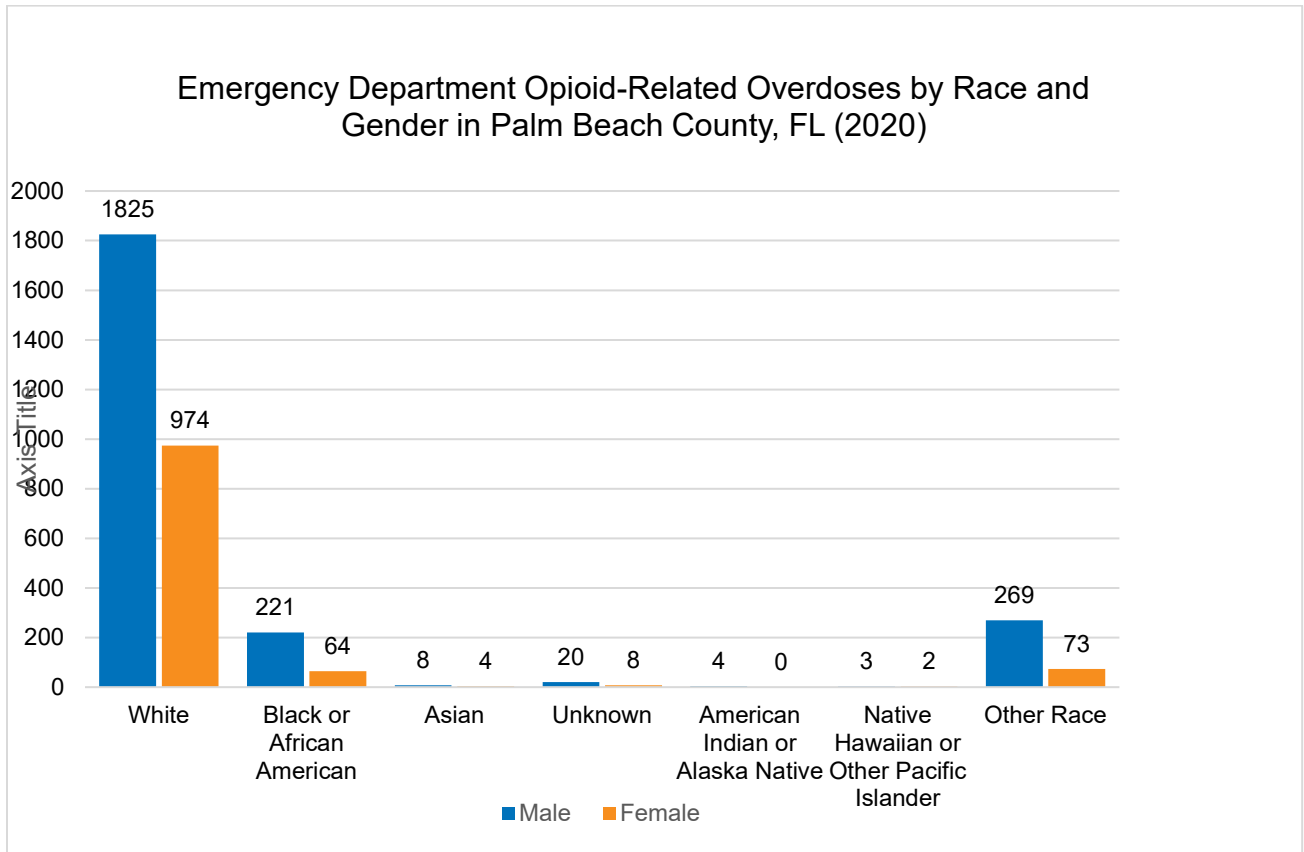
**Figure 5**

Most of the ED visits for opioid overdoses did not specify a specific drug. It was common in hospital chief complaints or discharge diagnoses to include phrases such as "opioid overdose" without detailing the specific opioid ingested, and thus 43% of ED visits were from unspecified opioids. The highest reported opioid overdose involved heroin, with 1421 heroin overdoses. Medications for opioid use disorder (MOUD) including buprenorphine and methadone accounted for a total of 0.52% of opioid overdoses.



Emergency Department Opioid-Related Overdoses by Drug in Palm Beach County, FL (2020)
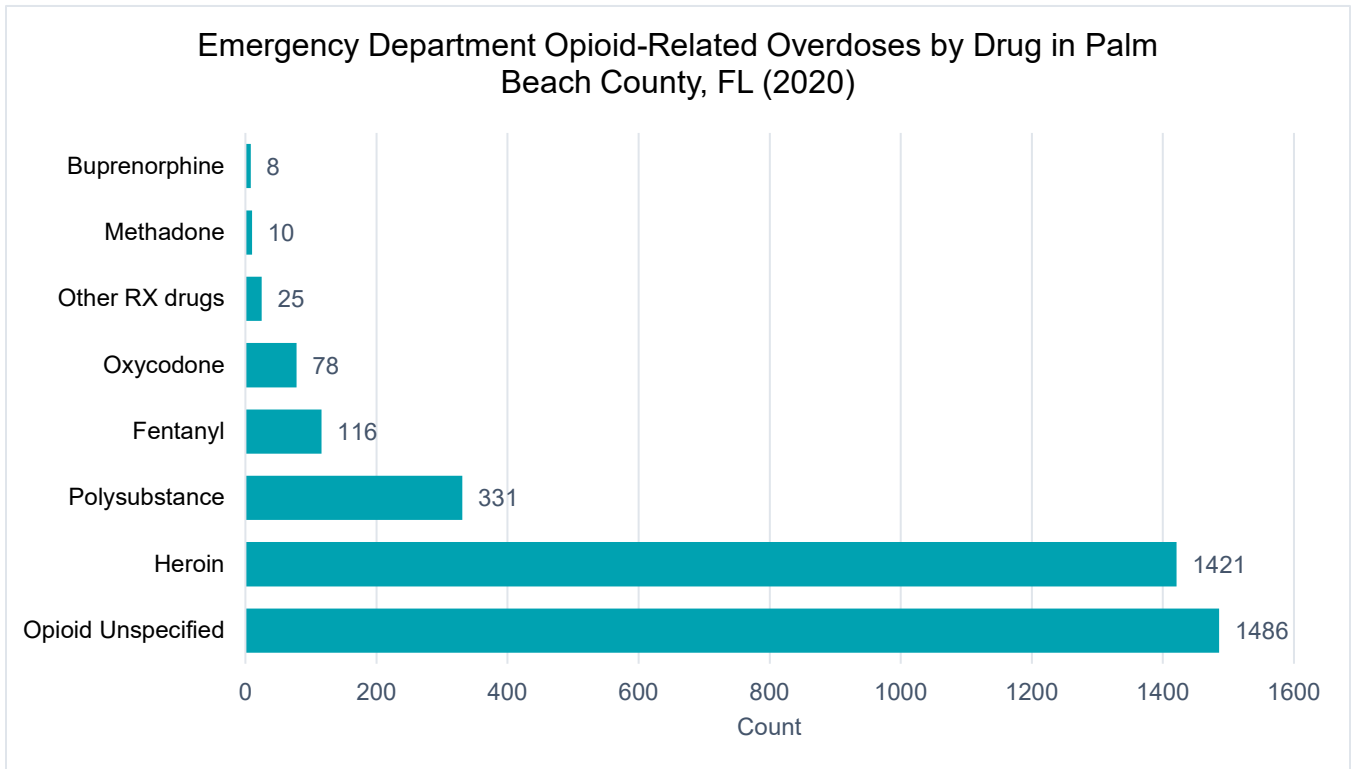
# Opioid-Related Overdose Morbidity

**Patient Demographics**

Summary data for patient demographics and characteristics of opioid-related overdose morbidity can be found in Table 3.

A total of 892 non-fatal opioid-related overdose records were collected and reviewed. The average age of non-fatal opioid-related overdoses was 38.6 years (SD=13.4 years). Non-fatal overdoses were most prevalent among White (85.7%), Non-Hispanic (76.1%), males (67.4%). Of the 291 female patients, 3.4% (N=10) were known to be pregnant at time of overdose. The age groups with the highest proportion of non-fatal overdoses occur among adults aged 25-34 (38.7%) and adults aged 35-44 (25.3%). Patients were typically unemployed (45.6% vs 20.3% employed), and more than half of the patients were uninsured at time of overdose (54.6% vs 37.4% insured).

Instability in housing and criminal history were frequent in PBC. Nine percent of patients reported being homeless, 1.5% of patients reported living in a hotel or motel, and an additional 13.0% of patients reported other types of unstable housing. Other unstable housing included such settings as living in a car, couch-surfing, and other nomadic living conditions. The majority of people with non-fatal overdoses had some form of criminal record history (78.5% vs 21.5% with no criminal record). Most crimes were drug-related (53.1%) such as drug possession and possession of drug paraphernalia. Nineteen percent of patients had a prior charge of driving under the influence (DUI) or driving while intoxicated (DWI).

Relevant patient medical history included chronic pain (17.4%), hepatitis C (37.3%), HIV (2.8%) and other STDs (13.5%). One-third of patients reported a previous mental illness. The most prevalent mental illnesses were depression (24.6%) and anxiety (19.73%). Most of the patients had a history of substance abuse (82.4%) and 30.3% had a history of IV drug use. Participation in a past or current SUD treatment program was reported in 34.4% of patients. Treatment history of buprenorphine based MOUD was reported in 12.0% of patients.

**Figure 6**

Non-fatal opioid overdose records show males in the 25-34 age group had the highest number of overdoses in 2020. This age group also is the highest proportion for females. For children under the age of 15, the 0-3 age group had the most overdoses.



Non-Fatal Opioid-Related Overdoses by Age and Gender in Palm Beach County, FL (2020)
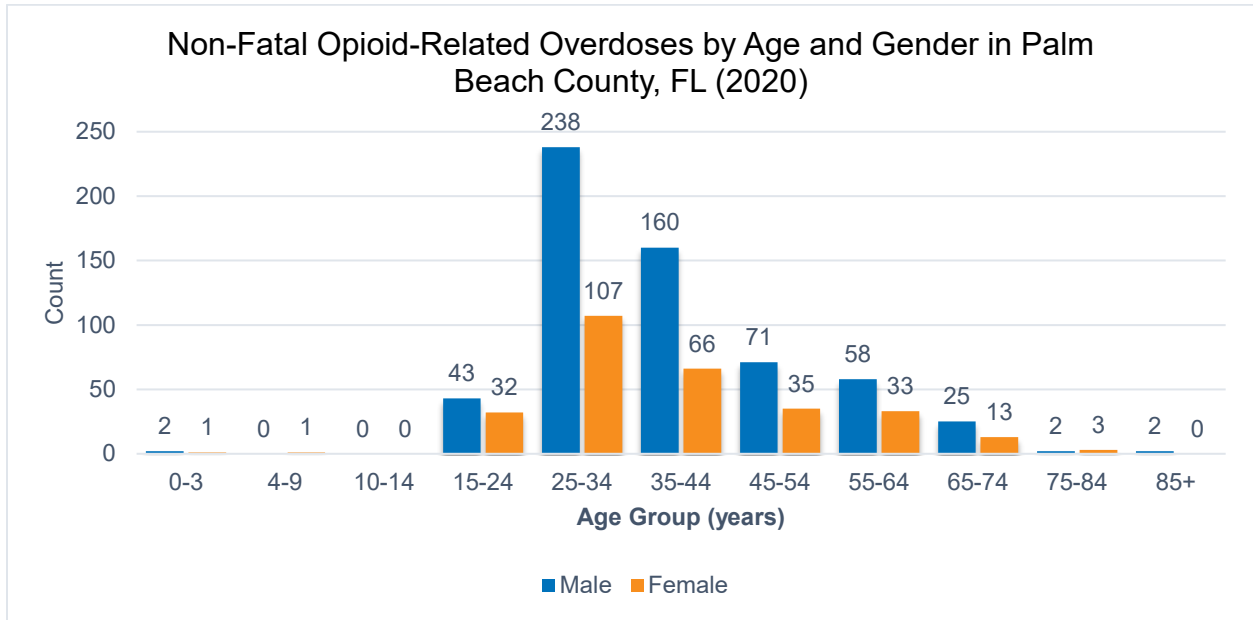
**Figure 7**

In PBC, more than half (57.8%) of opioid-related overdoses in PBC were white males followed by white females (28.3%). American Indian/Alaskan Native accounted for the lowest number of non-fatal opioid-related overdoses (0.11%).
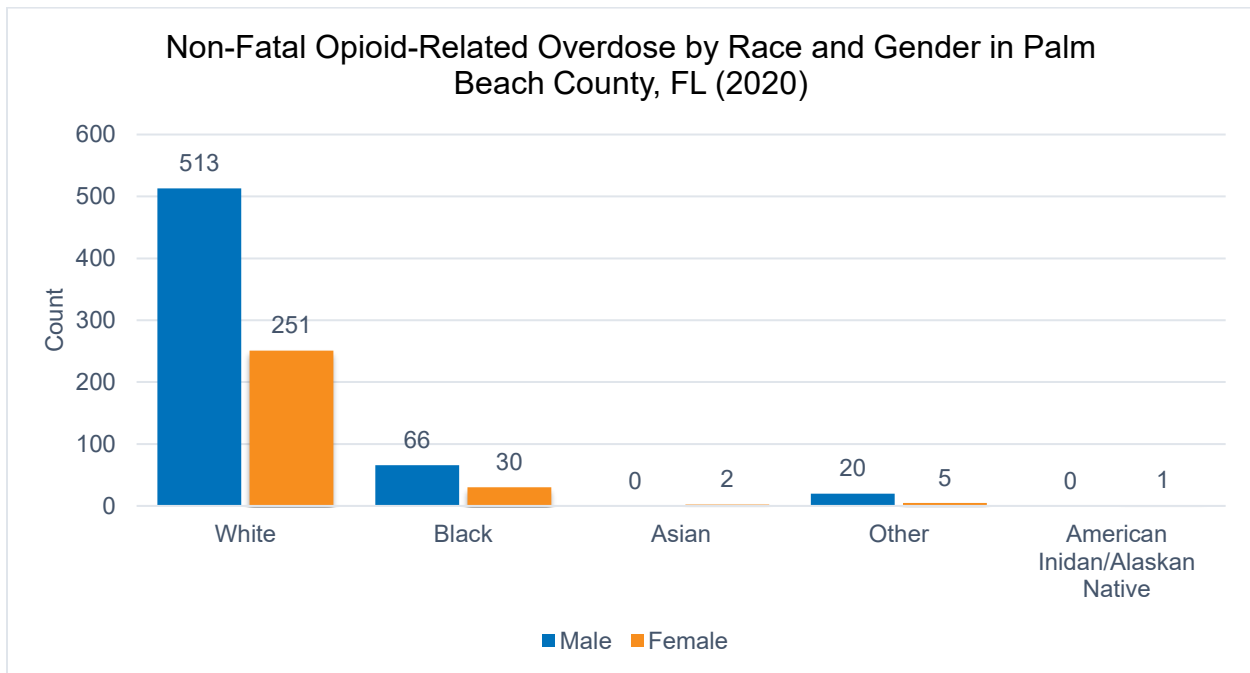
**Non-Fatal Opioid-Related Overdose by Race and Gender in Palm Beach County, FL (2020)**

| Race | Male | Female |
|------|------|--------|
| White | 513 | 251 |
| Black | 66 | 30 |
| Asian | 0 | 2 |
| Other | 20 | 5 |
| American Indian/Alaskan Native | 0 | 1 |

Legend: ■ Male ■ Female

**Overdose Incident Information**

Summary data for opioid-related overdose incident information can be found in Table 4.

In 2020, nearly half (47.7%) of non-fatal opioid-related overdoses reported heroin as the type of opioid ingested. Other opioids implicated included fentanyl (21.1%) and oxycodone (11.1%). A quarter of opioid-related overdoses were unspecified in type of substance ingested. Additionally, the opioid route of administration was unreported in 44.7% of overdose records. Alcohol (14.0%), cocaine (13.0%) and benzodiazepines (11.9%) were the most prevalent non-opioid polysubstance used in conjunction with opioids.  Most records did not report on internal or external factors that contributed to the patient's substance use and overdose. Of those who reported any contributing factors relating to substance use, patients most frequently mentioned chronic pain as a factor of overdose (5.5%) and depression (3.3%). Complications following opioid-related overdose were present in 27.4% of cases, and 30.9% of patient required inpatient hospitalization. Naloxone (Narcan) was commonly administered as an opioid overdose reversal medication. While more than half of patients received a single dose of Narcan (54.8%), 17.8% of overdoses required additional doses.

**Figure 8**

The temporal distribution for non-fatal overdose records can be seen in the figure below. The COVID-19 pandemic delayed collection from many hospitals, and few were able to provide an entire year of data. June had the highest number (N=114) of non-fatal opioid overdose records that we were able to collect.

Non-Fatal Opioid-Related Overdose Visits by Month in Palm Beach County, FL (2020)
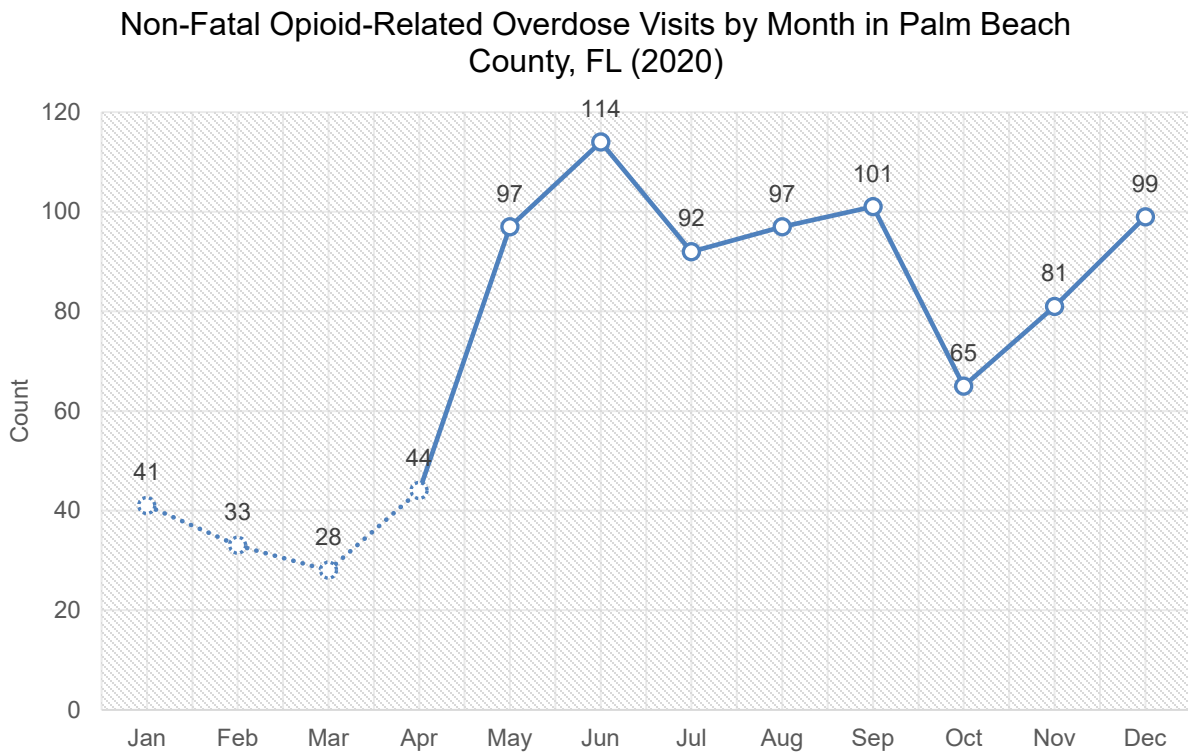
**Figure 9**

We were not able to collect from three hospitals (Bethesda East, Bethesda West, and Wellington Regional). Most of the opioid-related overdose records we collected came from JFK Medical Center North Campus (N=315). JFK Medical Center North Campus was one of the first hospitals that we started collecting from and has the ASU where patients are stabilized after an overdose and then referred to treatment.



Non-Fatal Opioid-Related Overdoses by Hospital in Palm Beach County, FL (2020)
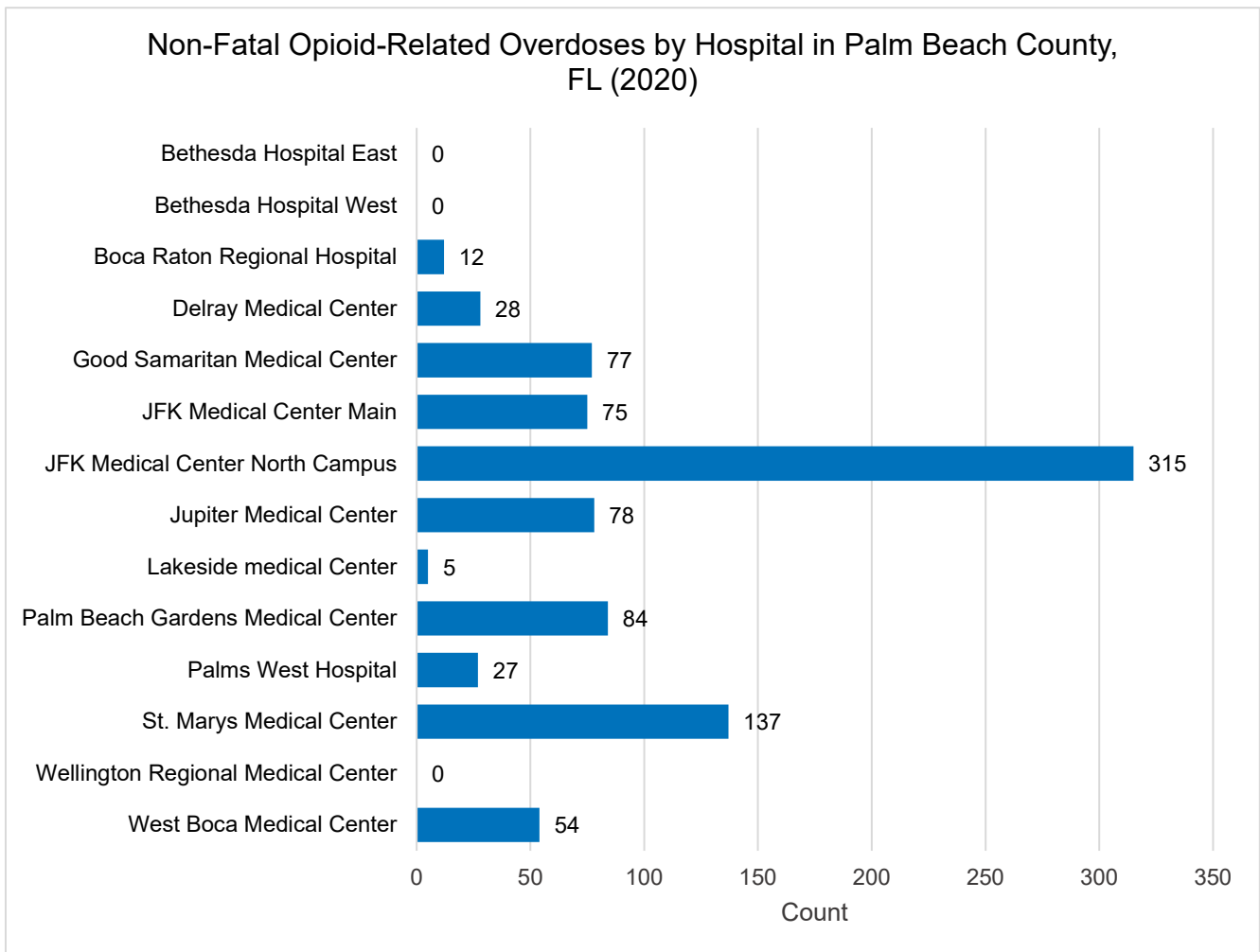
**Figure 10**

In the hospital medical records, drugs used prior to overdose were reported by the patient, clinician, or EMS. Heroin accounted for 42.6% of the reported drugs used prior to overdosing followed by opioid unspecified at 22.5%. Opioid unspecified was second highest as patients would sometimes report taking a non-opioid that they thought may have been laced with an opioid and then they would have a positive response to Narcan.

**Non-Fatal Opioid-Related Overdoses by Drug in Palm Beach County, FL (2020)**

| Drug | Count |
|------|-------|
| Methadone | 6 |
| Buprenorphine | 23 |
| Other RX Drugs | 32 |
| Oxycodone | 99 |
| Fentanyl | 188 |
| Opioid Unspecified | 225 |
| Heroin | 425 |
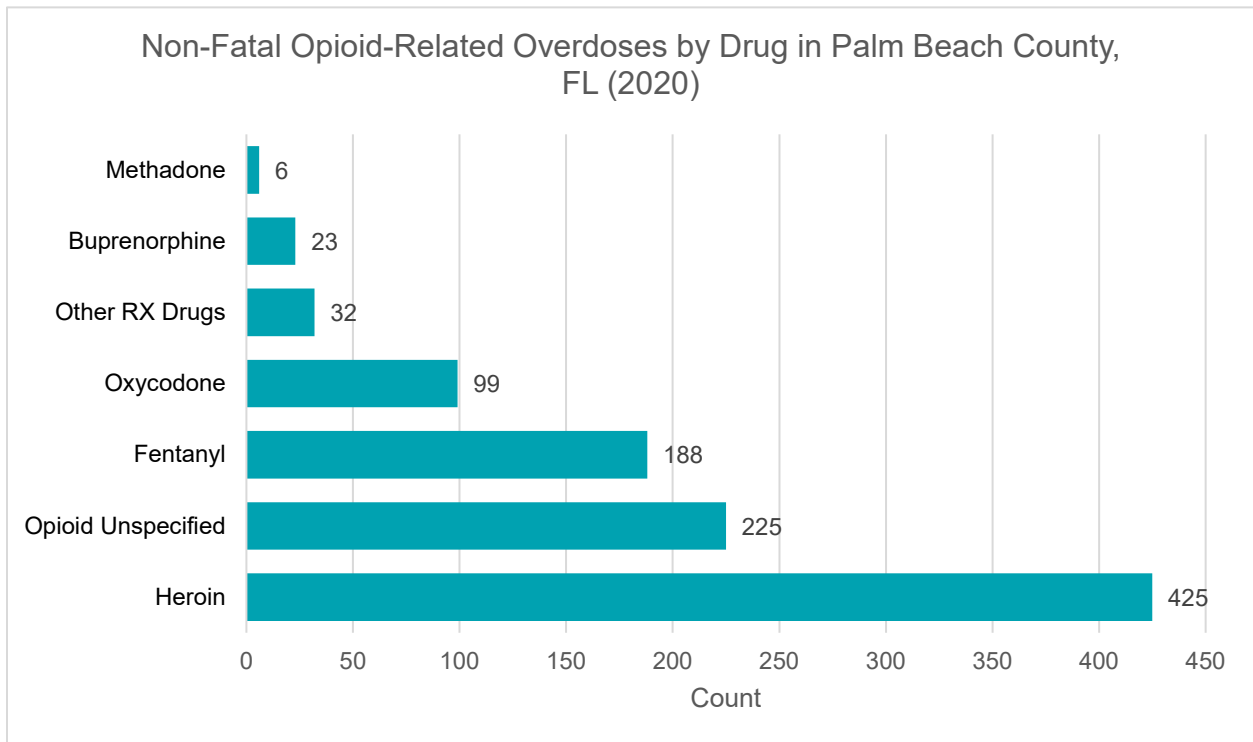
# Opioid-Related Overdose Mortality

**Decedent Demographics**

Summary data for patient demographics and characteristics of opioid-related overdose mortality can be found in Table 5.

A total of 528 fatal opioid-related overdose records in 2020 were collected and reviewed. The average age of fatal opioid-related overdoses was 38.6 years (SD=12.2 years). Fatal overdoses were most prevalent among White (90.5%), Non-Hispanic (85.4%), males (76.5%). Of the 123 female decedents, 2.4% (N=3) were pregnant at time of death and 4.1% (N=5) were pregnant within one year of death. The age groups with the highest proportion of non-fatal overdoses occur among adults aged 25-34 (33.3%) and adults aged 35-44 (28.6%). No youths aged 14 years or younger were reported.

In 2020, the majority of decedents were PBC residents (85.4%). The usual occupation of decedents was most frequently workers in the hospitality/food and beverage industry, followed by workers in the construction industry, 15.2% and 14.8% respectively. Ten percent of decedents obtained a bachelor's degree or higher, and the majority (58.7%) had a high school diploma or less.

Instability in housing and criminal history were frequently among decedents who fatally overdosed. Homelessness was reported in 6.6% of cases. Residing in a hotel or motel was reported in 3.6% of cases. Other unstable housing situations occurred in 3.2% of cases. The majority of decedents had some form of criminal record history (70.0% vs 30.0% with no criminal record). Most crimes were drug-related (47.5%) such as drug possession and possession of drug paraphernalia. Decedents with a prior charge of driving under the influence (DUI) or driving while intoxicated (DWI) occurred in 19.9% of cases.

Decedent medical history included chronic pain (9.9%), hepatitis C (19.7%), HIV (0.6%) and other STDs (9.9%). Thirty percent of decedents had a known mental illness. The most prevalent mental illnesses were depression (19.3%) and anxiety (9.9%). Most decedents had a history of substance abuse (97.4%) and 34.1% had a history of IV drug use. The average age of decedents when substance abuse began was 20.6 years (SD=7.3 years). Participation in a past or current SUD treatment program was reported in 44.7% of patients.

**Figure 11**

In PBC, the highest proportion of fatal opioid-related overdoses was seen in males in the 25-34 age group while the 35-44 age group followed closely behind. For females, the highest proportion of overdoses was also in the 25-34 age group. For adults over the age of 65, the 65-74 age group had the most overdoses, with 69.2% of them being males. For children under the age of 15, there were no fatal opioid-related overdoses reported.



Fatal Opioid-Related Overdoses by Age and Gender in Palm Beach County, FL (2020)
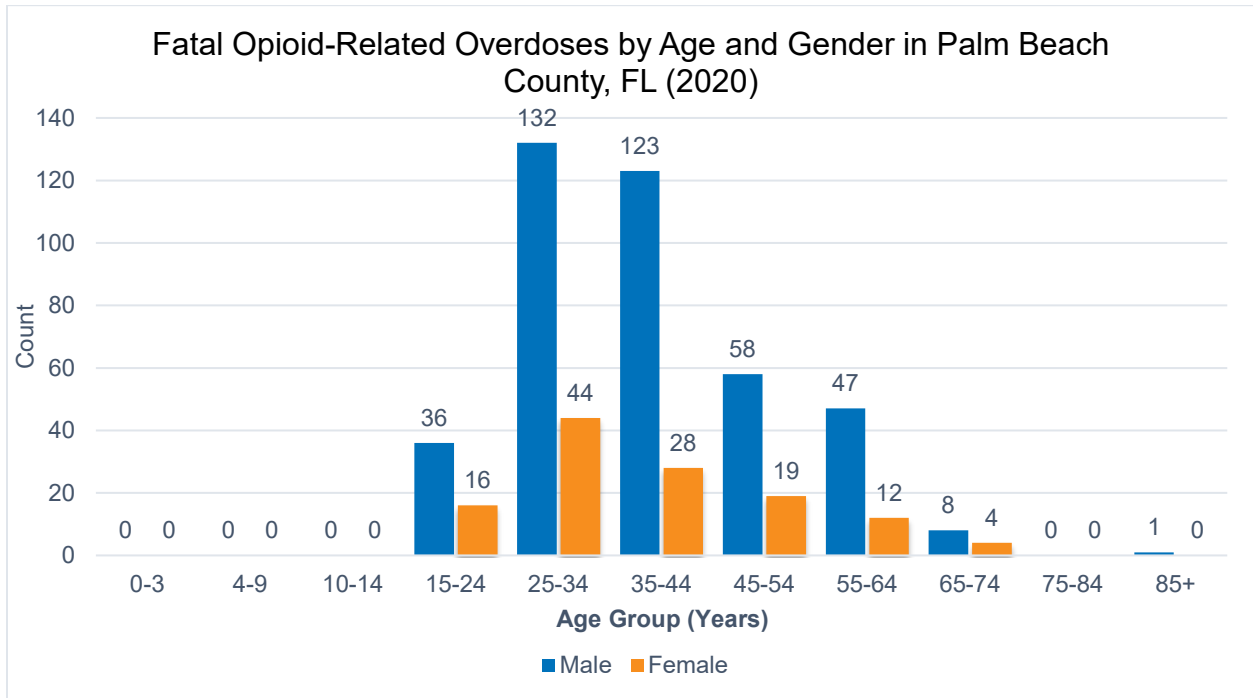
**Figure 12**

Fatal opioid-related overdose records show 68.6% were white males and 22.0% were white females. Asian and Multiracial individuals accounted for the lowest number of fatal overdoses with 1.1% and 0.9% respectively.
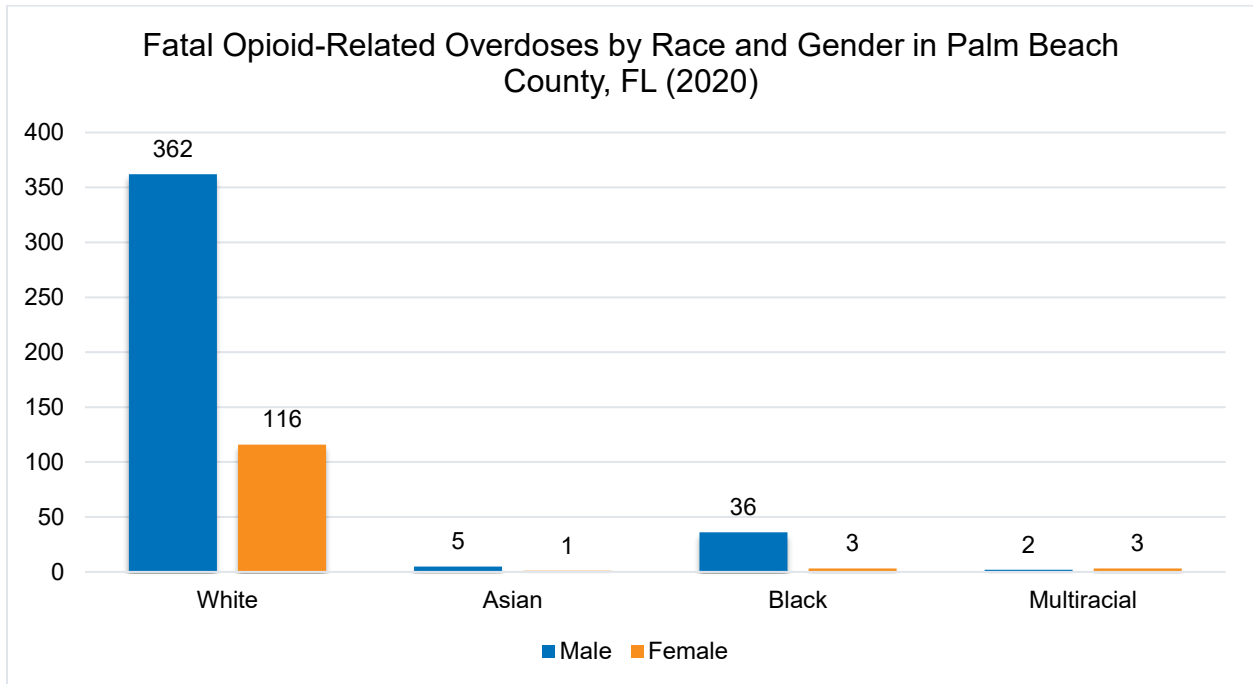
**Fatal Opioid-Related Overdoses by Race and Gender in Palm Beach County, FL (2020)**

| Race | Male | Female |
|------|------|--------|
| White | 362 | 116 |
| Asian | 5 | 1 |
| Black | 36 | 3 |
| Multiracial | 2 | 3 |

■ Male  ■ Female

**Overdose Incident Information**

Summary data for opioid-related overdose incident information can be found in Table 6.

In 2020, the majority (94.3%) of fatal opioid-related overdoses had fentanyl reported as the type of opioid involved in the fatal overdose. Other opioids implicated included fentanyl analogs (24.8%) and heroin (11.0%). Cocaine was the highest used non-opioid (28.6%) in addition to the opioids. Other non-opioids involved were alcohol (17.2%) and a Benzodiazepine (12.7%). The primary cause of death was polysubstance toxicity with 70.6% and 28.8% only had a single substance. More than half (57.4%) of the fatal overdoses occurred at the decedent's home. Other fatal overdose locations included hotel/motel (9.9%) and other private residence (11.9%) like a friend or family's home. Additionally, 25.2% of decedents were provided with Narcan as a medical intervention and 23.9% required mechanical ventilation/intubation.

**Figure 13**

In 2020, there were 528 fatal opioid-related overdoses in PBC. There was an average of 44 fatal overdoses per month and 1.4 fatal overdoses per day. The largest decrease was in December with a 29.7% decrease and the peak occurred in February with a 44.0% increase from the previous month.



Fatal Opioid-Related Overdose Visits by Month in Palm Beach County, FL (2020)
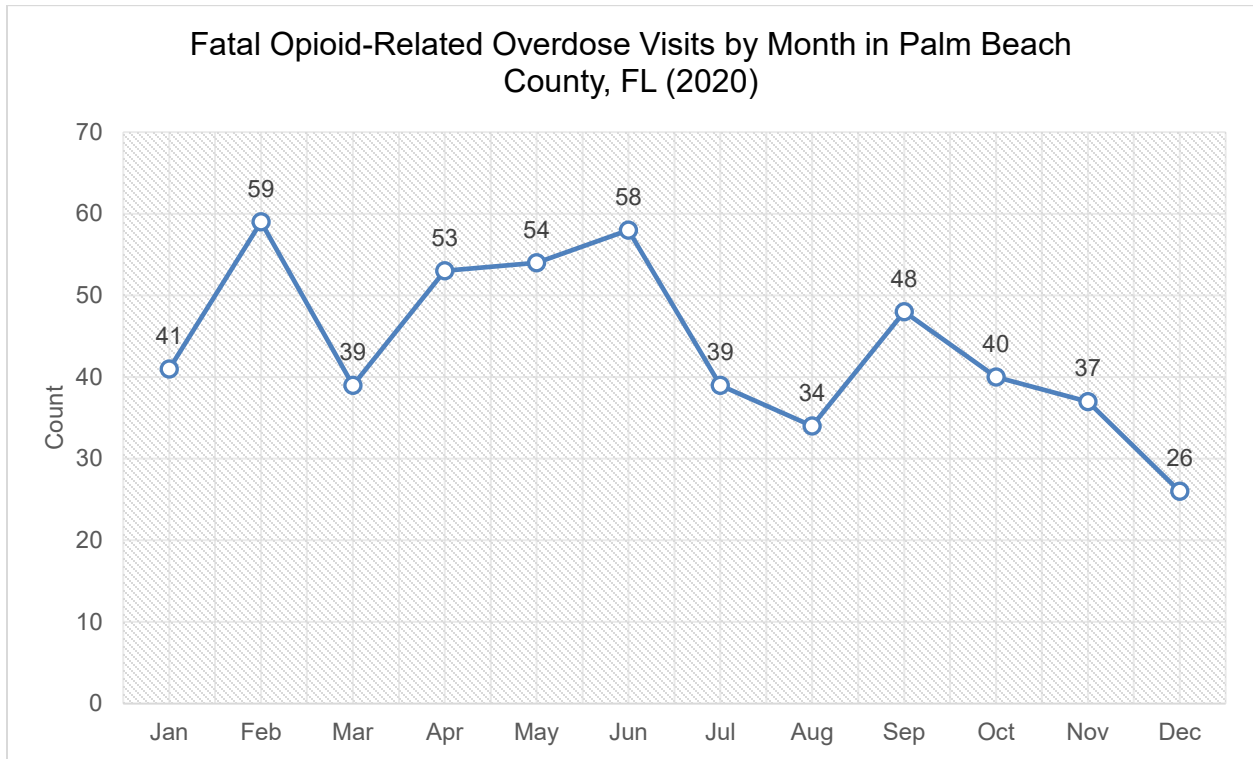
**Figure 14**

In 2020, the top three hospitals where patients were taken for their fatal opioid-related overdoses were JFK Medical Center North Campus (17.2%), Palm Beach Gardens Medical Center (14.8%), and Bethesda Hospital East (13.3%). On the other side of the county at Lakeside Medical Center, only 0.8% of fatal opioid-related overdoses were taken there. This was also the case for Bethesda Hospital West.

## Fatal Opioid-Related Overdoses by Hospital in Palm Beach County, FL (2020)

| Hospital | Count |
|---|---|
| Bethesda Hospital East | 17 |
| Bethesda Hospital West | 1 |
| Boca Raton Regional Hospital | 6 |
| Delray Medical Center | 11 |
| Good samaritan Medical Center | 8 |
| JFK Medical Center Main | 22 |
| JFK Medical Center North Campus | 4 |
| Jupiter Medical Center | 5 |
| Lakeside medical Center | 1 |
| Palm Beach Gardens Medical Center | 19 |
| Palms West Hospital | 5 |
| St. Marys Medical Center | 11 |
| Wellington Regional Medical Center | 13 |
| West Boca Medical Center | 5 |

**Figure 15**

In PBC, fentanyl accounted for 94% of the single substances found in fatal opioid overdoses.

**Fatal Single Substance Opioid Overdoses
in Palm Beach County, FL (2020)**



- Fentanyl
- Heroin
- Methadone
- Acetylfentanyl
- Morphine
- Unknown Opioid
- Oxycodone
- Tramadol
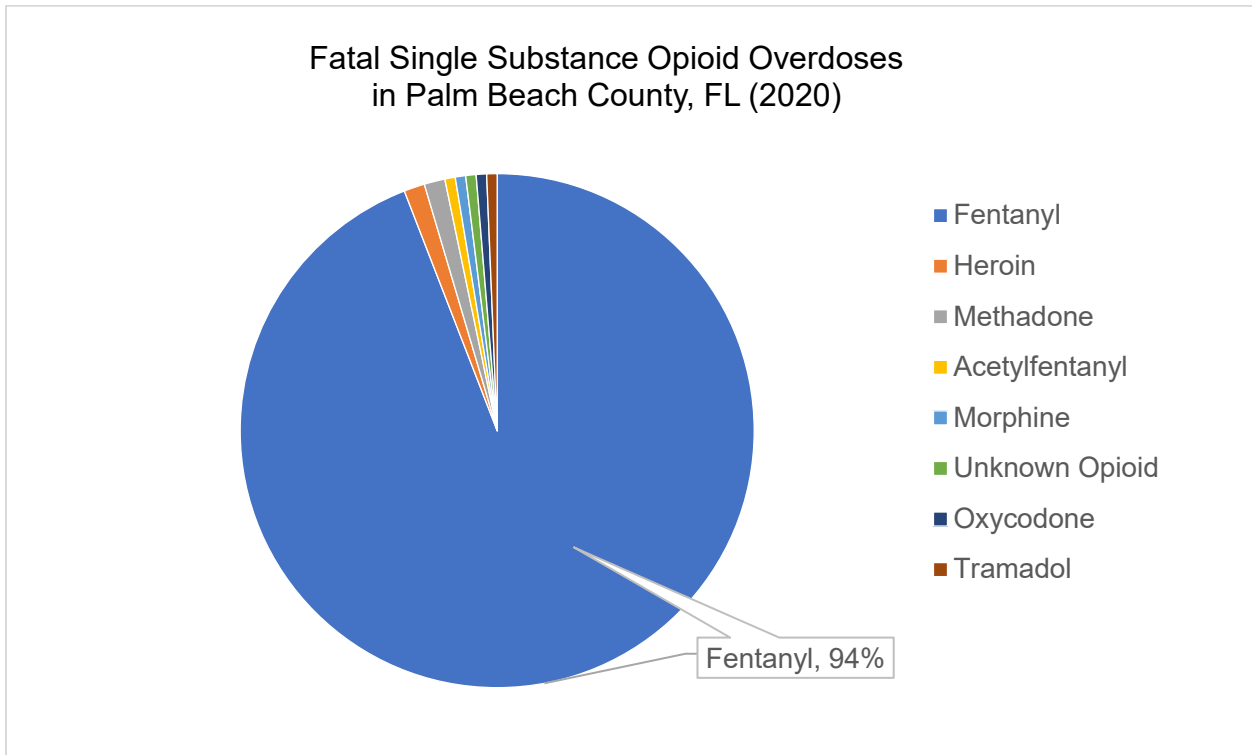
Fentanyl, 94%

**Figure 16**

In PBC, 28.6% of the drugs found in the fatal opioid-related overdoses were a combination of fentanyl and a non-opioid. Following closely after at 27.5% was fentanyl alone. The majority of overdoses have a combination of two or more opioids. The combination with the highest number of drugs included fentanyl, fentanyl analog, heroin, another opioid, and a non-opioid and accounted for 0.4% of the fatal overdoses.



Fatal Opioid-Related Overdoses by Drug in Palm Beach County, FL (2020)

**Key**
**F** - Fentanyl
**A** - Fentanyl Analog
**H** - Heroin
**O** - Other Opioid
**N** - Other Non-Opioid
**U** - Unknown
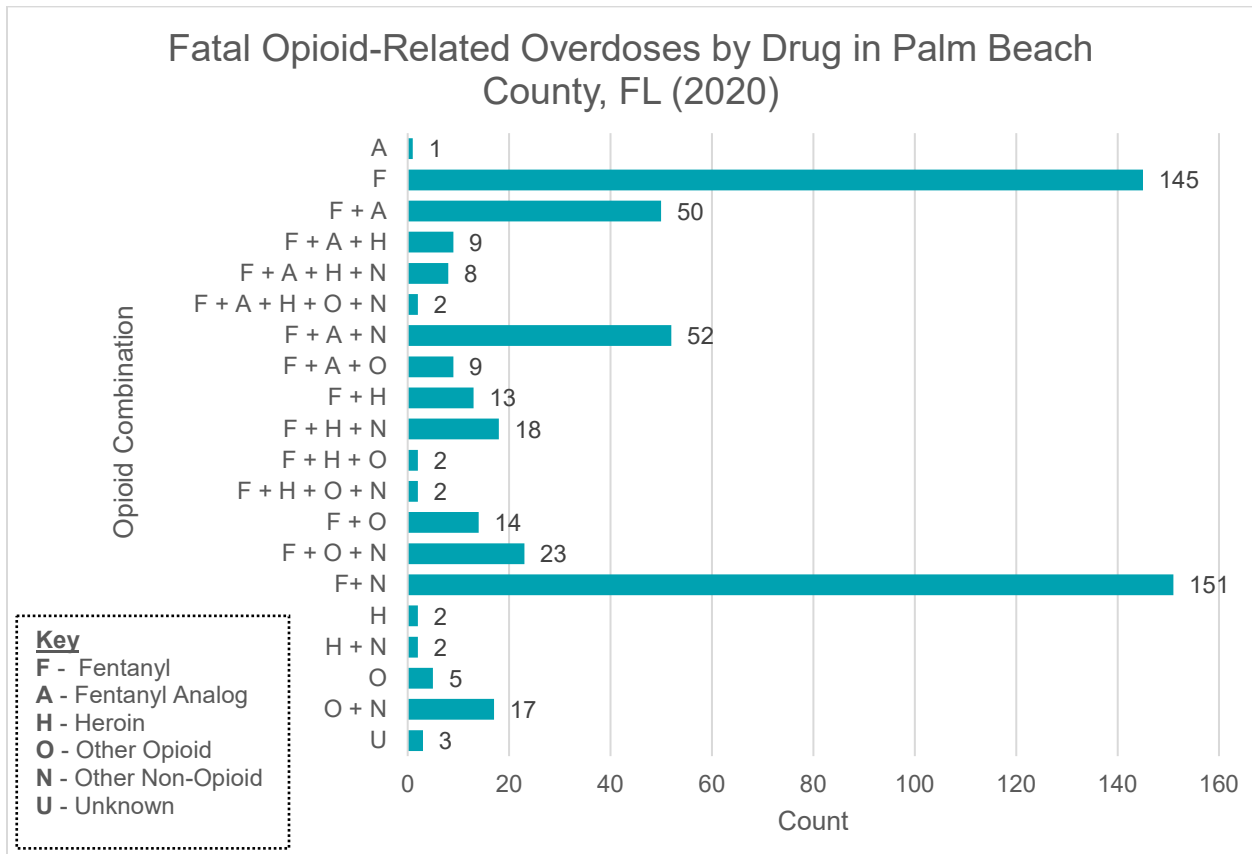
**Figure 17**

In 2020, the highest number of opioid-related deaths occurred in the months of February and June. The only month that had 26 deaths or less was in December. The remaining months varied from 27 to 54 deaths.

## Number of Opioid-Related Overdose Deaths by Month
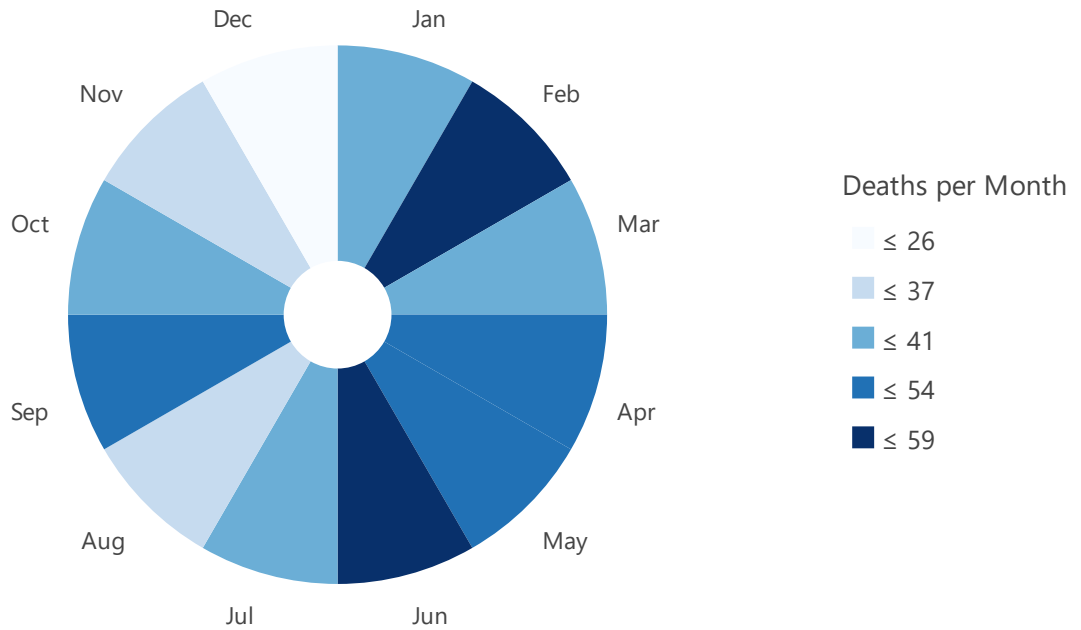
**Figure 18**

In PBC, the areas with the highest opioid-related deaths occurred in the east side of the county and included: West Palm Beach, Lake Worth, Boynton Beach, Delray Beach, and Boca Raton.
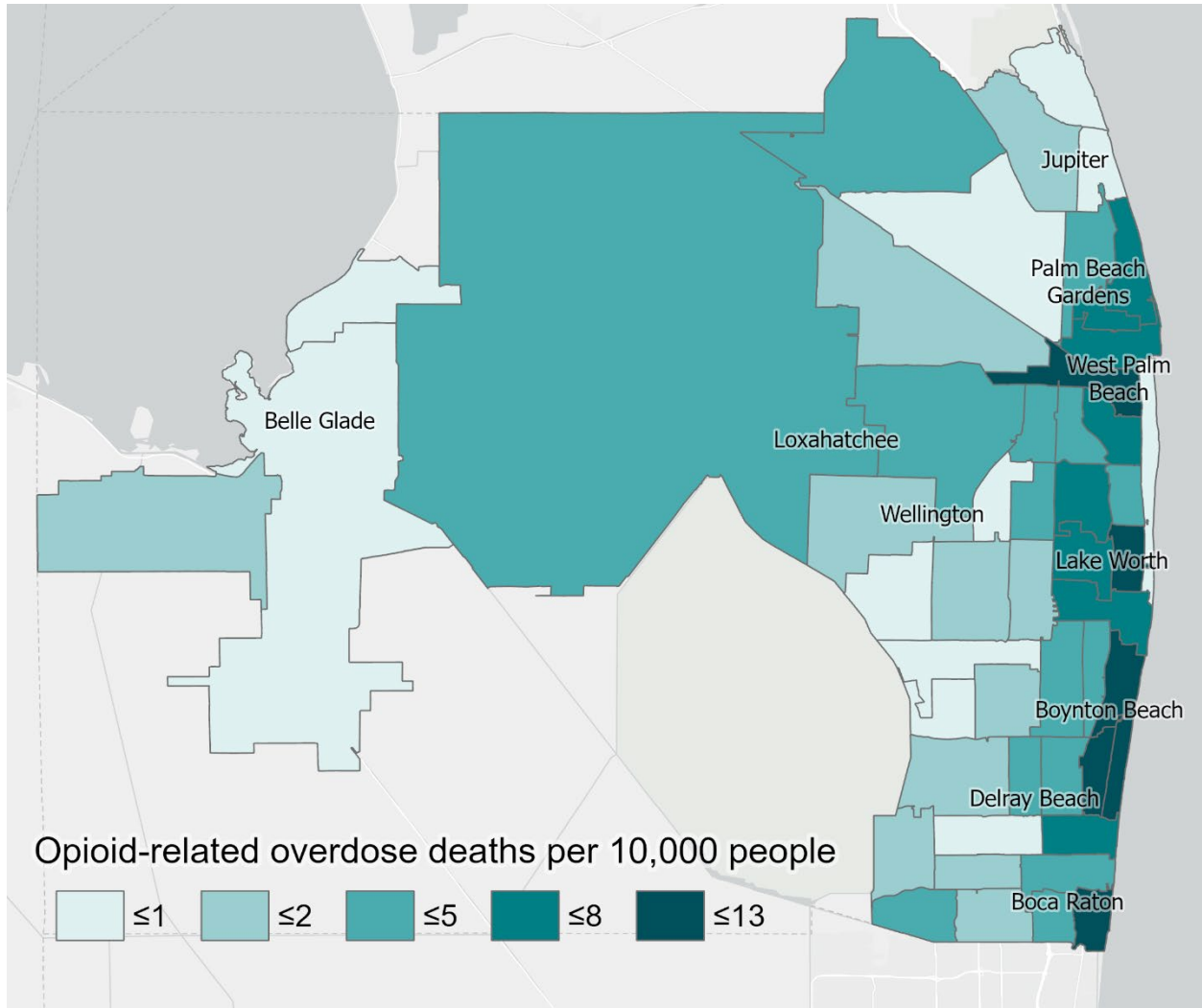
# Discussion

The data presented in this report is an aggregation of multiple data sources with the purpose of providing a comprehensive holistic approach to drug overdose surveillance in Palm Beach County, FL. Comparison of overdose data from syndromic surveillance, medical records, and medical examiner records allowed us to gain new perspectives on opioid overdose morbidity and mortality.

The findings in key demographic areas such as age, race, and ethnicity were similar across the data sources. Overall, the largest age group affected were adults ages 25-34 followed by adults ages 35-44. Opioid-related overdose cases were mostly White, Non-Hispanic, and male. Population and age-adjusted rates of overdose were not included in this report but are needed to further quantify the relationship between demographics and opioid-related overdose. Temporal trends in opioid-related overdoses varied significantly across the data. Syndromic surveillance and non-fatal overdoses peaked in during summer months from June to September 2020, while overdose mortality peaked earlier in the year.

One important inconsistency among the data is among the report type of opioid overdose.  Analysis of syndromic surveillance and non-fatal overdoses show heroin to be the most frequently reported opioid involved in overdoses, excluding unspecified opioids. Conversely, fatal overdose data shows that fentanyl was involved in the overwhelming majority of opioid-related overdose deaths with heroin playing a much smaller role overall. The discrepancies between non-fatal and fatal overdoses could be attributed to many different factors. For example, hospital staff might make assumptions or generalizations based on their expectations or experiences in treating overdoses and record the incident as such. Other sources of discrepancies could arise from the patient not fully being aware of the substance ingested. Fatal overdoses undergo extensive toxicology testing for an exceptionally large number of substances compared to standard hospital toxicology. Consequentially, the opioid reported in syndromic and non-fatal data are qualitatively assessed, while fatal overdose data was able to be quantitatively assessed and thus presumably can provide a more accurate representation of types of opioid involved in drug overdoses. Finally, the discrepancy between non-fatal overdoses and fatal overdoses could be accounted by the overall result of the overdose. Fentanyl and fentanyl analogs are significantly more lethal than other opioids like heroin and oxycodone[1]. Thus, the discrepancy could potentially be the result of survivorship bias. Further investigation into the chemical composition of drugs, particularly illicitly manufactured drugs, is needed to provide further clarification on the matter.

The Florida Department of Health in Palm Beach County looks forward to continuing to improve surveillance measures and provide innovative solutions for the new wave in this drug overdose epidemic.

# Tables

**Table 1. Participating hospitals for ED overdose medical record collection and date FDOH began record collection**

| Name of Hospital | Name of City | Hospital Start Date |
|---|---|---|
| JFK Medical Center North | West Palm Beach | April 24th, 2020 |
| Palms West Hospital | Loxahatchee | May 15th, 2020 |
| Lakeside Medical Center | Belle Glade | May 22nd, 2020 |
| Jupiter Medical Center | Jupiter | June 2nd, 2020 |
| Delray Medical Center | Delray Beach | June 19th, 2020 |
| West Boca Medical Center | Boca Raton | June 19th, 2020 |
| St. Mary's Medical Center | West Palm Beach | June 19th, 2020 |
| Good Samaritan Medical Center | West Palm Beach | June 19th, 2020 |
| Palm Beach Gardens Medical Center | Palm Beach Gardens | June 19th, 2020 |
| JFK Main | Atlantis | December 9th, 2020 |
| Boca Raton Regional Hospital | Boca Raton | January 19th, 2021 |

**Table 2. Database accessed for patient information**

| Database | Information Obtained |
|---|---|
| Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) | Hospital ED visits. This information is de-identified and categorized into syndrome groups by chief complaints and ICD-10-CM codes. |
| LexisNexis- Accurint | Criminal record history, addresses, driver license issue state |
| Merlin | All reportable diseases/conditions in Florida (e.g. viral hepatitis, COVID-19) |
| Surveillance Tools and Reporting System (STARS) | HIV and other STDs |

| Vital Statistics Search | Death certificates |
| --- | --- |

**Table 3. Patient demographics for non-fatal opioid related overdoses in 2020**

| Variable | Frequency | Percent |
|---|---|---|
| *Sex* | | |
| Female | 291 | 32.62% |
| Male | 601 | 67.38% |
| *Pregnancy Status* | | |
| Not pregnant at time of overdose | 208 | 23.32% |
| Pregnant at time of overdose | 10 | 1.12% |
| Unknown pregnancy status | 73 | 8.18% |
| *Race* | | |
| American Indian/ Alaskan Native | 1 | 0.11% |
| Asian | 2 | 0.22% |
| Black | 96 | 10.76% |
| Other | 25 | 2.80% |
| White | 764 | 85.65% |
| Unknown | 4 | 0.45% |
| *Ethnicity* | | |
| Hispanic | 61 | 6.84% |
| Non-Hispanic | 679 | 76.12% |
| Unknown | 152 | 17.04% |
| *Age (years)* | | |
| *mean (SD), range (min,max)* | *38.61 (13.38)* | *96(0 ,96)* |
| 0 - 3 | 3 | 0.34% |
| 4 - 9 | 1 | 0.11% |
| 10 - 14 | 0 | 0.00% |
| 15 - 24 | 75 | 8.41% |
| 25 - 34 | 345 | 38.68% |
| 35 - 44 | 226 | 25.34% |
| 45 - 54 | 106 | 11.88% |
| 55 - 64 | 91 | 10.20% |
| 65 - 74 | 38 | 4.26% |
| 75 - 84 | 5 | 0.56% |
| 85+ | 2 | 0.22% |
| *Employment Status* | | |
| Disabled | 48 | 5.38% |
| Employed | 181 | 20.29% |
| Minor (<18 years) | 6 | 0.67% |
| Retired | 36 | 4.04% |
| Student | 10 | 1.12% |
| Unemployed | 407 | 45.63% |
| Unknown | 204 | 22.87% |

| *(Continued)* | Frequency | Percent |
|---|---|---|
| *Primary Insurance* | | |
| Private insurance | 143 | 16.03% |
| Medicaid | 87 | 9.75% |
| Medicare | 77 | 8.63% |
| Military | 9 | 1.01% |
| District Cares* | 18 | 2.02% |
| Uninsured, Medicaid/District Cares pending | 214 | 23.99% |
| Uninsured, no insurance pending | 273 | 30.61% |
| Unknown | 71 | 7.96% |
| *Housing Type* | | |
| Private residence | 591 | 66.26% |
| Homeless/homeless shelter | 80 | 8.97% |
| Hotel/Motel | 13 | 1.46% |
| Institutionalized housing* | 9 | 1.00% |
| Recovery facility/sober housing | 78 | 8.74% |
| Other unstable housing* | 116 | 1.30% |
| Unknown | 5 | 0.56% |
| *Criminal Record History* | | |
| No criminal record history | 192 | 21.52% |
| Criminal record history (any) | 700 | 78.48% |
| Drug crimes (any) | 474 | 53.14% |
| DUI/DWI | 169 | 18.95% |
| Disorderly conduct | 173 | 19.40% |
| Violent crimes | 297 | 33.30% |
| Theft and fraud | 440 | 49.33% |
| Child endangerment | 33 | 3.70% |
| Prostitution | 51 | 5.72% |
| Other criminal history | 413 | 46.30% |
| *Past Medical History* | | |
| Chronic Pain | 155 | 17.38% |
| Insomnia | 12 | 1.35% |
| MRSA | 8 | 0.90% |
| Hepatitis A | 6 | 0.67% |
| Hepatitis B | 31 | 3.48% |
| Hepatitis C | 333 | 37.33% |
| HIV | 25 | 2.80% |
| STDs | 120 | 13.45% |

| (Continued) | Frequency | Percent |
|---|---|---|
| Mental health history (any) | 304 | 34.08% |
| ADHD | 18 | 2.02% |
| Anxiety | 176 | 19.73% |
| Bipolar disorder | 60 | 6.73% |
| Depression | 219 | 24.55% |
| Eating disorder/body dysmorphia | 4 | 0.45% |
| Personality disorder | 2 | 0.22% |
| PTSD | 28 | 3.14% |
| Schizophrenia | 17 | 1.91% |
| Unspecified mental illness | 8 | 0.90% |
| Known mental health hospitalizations | 108 | 12.11% |
| Known suicide attempts | 69 | 7.74% |
| *Narcotic Prescription Medication* | 174 | 19.51% |
| *Number of Prescriptions, mean (SD)* | *1.25 (0.49)* | |
| Codeine | 5 | 0.56% |
| Fentanyl | 3 | 0.34% |
| Hydrocodone | 5 | 0.56% |
| Hydromorphone | 6 | 0.67% |
| Methadone | 7 | 0.78% |
| Morphine | 15 | 1.68% |
| Oxycodone | 85 | 9.53% |
| Buprenorphine | 12 | 1.35% |
| Buprenorphine-Naloxone (Suboxone) | 32 | 3.59% |
| Tramadol | 17 | 1.91% |
| Diphenoxylate | 2 | 0.22% |
| Unspecified prescription narcotic | 9 | 1.01% |
| *Non-Narcotic Controlled Substance Medications* | 137 | 15.36% |
| *Number of Prescriptions, mean (SD)* | *1.43 (0.67)* | |
| Benzodiazepine | 94 | 10.54% |
| Stimulants | 17 | 1.91% |
| Nonbenzodiazepine sedatives | 17 | 1.91% |
| Barbiturate | 2 | 0.22% |
| Muscle relaxants | 3 | 0.34% |
| Anticonvulsants | 7 | 0.78% |
| *Substance Use History* | | |
| History of substance abuse | 735 | 82.40% |
| IV drug use | 270 | 30.27% |
| Prior overdose reported | 239 | 26.79% |

| (Continued) | Frequency | Percent |
|---|---|---|
| *SUD Treatment History* | | |
| SUD treatment (any) | 334 | 34.44% |
| Drug treatment facility | 261 | 29.26% |
| Buprenorphine-based | 107 | 12.00% |
| Methadone | 13 | 1.46% |
| Naltrexone | 2 | 0.22% |

**Table 4. Overdose incident information for non-fatal overdoses in 2020.**

| Variable | Frequency | Percent |
|---|---|---|
| *Type of Opioid Overdose* | | |
|     Heroin | 425 | 47.65% |
|     Fentanyl | 188 | 21.08% |
|     Oxycodone | 99 | 11.10% |
|     Methadone | 6 | 0.67% |
|     Buprenorphine | 23 | 2.58% |
|     Other prescription narcotics | 32 | 3.59% |
|     Unspecified opioid | 225 | 25.22% |
| *Opioid Route of Administration* | | |
|     Oral | 119 | 13.34% |
|     Intravenous (IV) | 154 | 17.26% |
|     Smoke | 37 | 4.15% |
|     Insufflation | 194 | 21.75% |
|     Transdermal | 6 | 0.67% |
|     Unknown route | 399 | 44.73% |
| *Polysubstance Overdose* | | |
|     Opioid only | 550 | 61.66% |
|     Opioid + non-opioid | 342 | 38.34% |
|     Opioid + non-opioid (alcohol excluded) | 217 | 24.33% |
| *Non-Opioid Substances Involved* | | |
|     Alcohol | 125 | 14.01% |
|     Amphetamine | 12 | 1.35% |
|     Methamphetamine | 6 | 0.67% |
|     Benzodiazepines | 106 | 11.88% |
|     Barbiturates | 3 | 0.34% |
|     Cocaine | 116 | 13.00% |
|     Marijuana | 34 | 3.81% |
|     Phencyclidine (PCP) | 0 | 0.00% |
|     Gabapentin | 4 | 0.45% |
|     GHB | 2 | 0.22% |
|     LSD/hallucinogen | 1 | 0.11% |
|     Kratom | 1 | 0.11% |
|     Muscle relaxant | 4 | 0.45% |
|     Other medication* | 31 | 3.48% |
| *Contributing Factors of Drug Use Reported* | | |
|     Contributing factor (any) | 173 | 19.39% |
|     Recent stress | 29 | 3.25% |
|     Depression/mental health | 43 | 4.82% |
|     Lack/loss of access to SUD treatment | 14 | 1.57% |
|     Family/relationship problems | 23 | 2.58% |

| *(Continued)* | Frequency | Percent |
|---|---|---|
| Loss of a loved one | 15 | 1.68% |
| Chronic pain | 49 | 5.49% |
| Wanting to try/experimenting | 20 | 2.24% |
| *Overdose Signs/Symptoms* | | |
| Pinpoint pupils | 194 | 21.75% |
| Decreased responsiveness/somnolence | 400 | 44.84% |
| Loss of consciousness | 620 | 69.51% |
| Respiratory depression/hypoxia | 285 | 31.95% |
| Cold/blue skin, lips, or fingernails | 56 | 6.28% |
| Gurgling or choking sounds | 5 | 0.56% |
| Nausea, vomiting, diaphoretic | 48 | 5.38% |
| Seizure | 18 | 2.02% |
| Tachycardia | 104 | 11.66% |
| Altered mental status | 328 | 36.77% |
| *Hospital Where Treated* | | |
| Boca Raton Regional Hospital | 12 | 1.35% |
| Delray Medical Center | 28 | 3.14% |
| Good Samaritan Medical Center | 77 | 8.63% |
| JFK Medical Center - Main Campus | 75 | 8.41% |
| JFK Medical Center - North Campus | 315 | 35.31% |
| Jupiter Medical Center | 78 | 8.74% |
| Lakeside Medical Center | 5 | 0.56% |
| Palm Beach Gardens Medical Center | 84 | 9.42% |
| Palms West Hospital | 27 | 3.03% |
| St. Mary's Medical Center | 137 | 15.36% |
| West Boca Medical Center | 54 | 6.05% |
| *Mode of Transportation to Hospital* | | |
| EMS/fire rescue | 786 | 88.12% |
| Police | 15 | 1.68% |
| Private vehicle/walk-in | 69 | 7.74% |
| Overdosed while in the hospital | 3 | 0.34% |
| Unknown | 19 | 2.13% |
| *Type of Care Received* | | |
| Inpatient | 276 | 30.94% |
| Outpatient | 616 | 69.06% |
| *Known Overdose ED Readmissions During 2020* | | |
| No known ER readmissions/ 1 known overdose | 677 | 75.90% |
| 1 readmission/ 2 overdoses total | 66 | 7.40% |
| 2 readmissions/ 3 overdoses total | 23 | 2.58% |
| 3 readmissions/ 4 overdoses total | 2 | 0.22% |
| 4 readmissions/ 5 overdoses total | 0 | 0.00% |
| 5 readmissions/ 6 overdoses total | 1 | 0.11% |

| (Continued) | Frequency | Percent |
|---|---|---|
| *Narcan Administration* | | |
| No Narcan given | 216 | 24.22% |
| Single dose given | 489 | 54.82% |
| Multiple doses given | 159 | 17.83% |
| Unknown | 28 | 3.14% |
| *Administered 1st Dose of Narcan* | | |
| EMS/fire rescue | 437 | 48.99% |
| Police | 8 | 0.90% |
| Hospital staff | 136 | 15.25% |
| Bystander/other | 48 | 5.38% |
| Unknown administrator | 19 | 2.13% |
| *Administered 2nd Dose of Narcan* | | |
| EMS/fire rescue | 52 | 5.83% |
| Police | 2 | 0.22% |
| Hospital staff | 99 | 11.10% |
| Bystander/other | 4 | 2.52% |
| Unknown administrator | 2 | 1.26% |
| *Complications of Overdose* | | |
| complication (any) | 244 | 27.35% |
| Acidosis | 15 | 1.68% |
| Acute kidney injury/kidney failure | 31 | 3.48% |
| Aspiration pneumonia | 60 | 6.73% |
| Cardiac arrest | 10 | 1.12% |
| Encephalopathy | 17 | 1.91% |
| Pneumonia, unspecified | 17 | 1.91% |
| Rhabdomyolysis | 36 | 4.04% |
| Sepsis | 48 | 5.38% |
| Respiratory failure | 51 | 5.72% |
| Required intubation | 46 | 5.16% |
| Other organ failure | 16 | 1.79% |
| Reported Toxicological Findings | | |
| Standard urine toxicology reported | 298 | 33.41% |
| Blood alcohol level reported | 433 | 48.54% |
| Fentanyl testing | 10 | 1.12% |
| *Positive Toxicology* | | |
| Amphetamines | 47 | 5.27% |
| Barbiturates | 9 | 1.01% |
| Benzodiazepines | 119 | 13.34% |
| Cocaine | 153 | 17.15% |
| Opiates | 87 | 9.75% |
| Cannabis | 102 | 11.43% |
| Methadone | 7 | 0.78% |

| (Continued) | Frequency | Percent |
|---|---|---|
| Phencyclidine (PCP) | 1 | 0.11% |
| Fentanyl | 10 | 1.12% |
| Blood Alcohol | 89 | 9.98% |
| *Blood alcohol level, mean (SD)* | *128.84 (88.73)* | *419.90 (10.10,430.00)* |

**Table 5. Demographics of fatal overdoses in 2020**

| Variable | Frequency | Percent |
|---|---|---|
| *Sex* | | |
|     Female | 123 | 23.30% |
|     Male | 404 | 76.52% |
|     Transgender Female | 0 | 0.00% |
|     Transgender Male | 1 | 0.19% |
| *Pregnancy Status* | | |
|     Not pregnant at time of death | 34 | 6.44% |
|     Pregnant at time of death | 3 | 0.57% |
|     Pregnant within 42 days of death | 2 | 0.38% |
|     Pregnant 43 days to 1 year of death | 3 | 0.57% |
|     Unknown if pregnant within 1 year of death | 82 | 15.53% |
| *Race* | | |
|     White | 478 | 90.53% |
|     Black | 39 | 7.39% |
|     Asian | 6 | 1.14% |
|     Multiracial | 5 | 0.95% |
| *Ethnicity* | | |
|     Hispanic (any) | 59 | 11.17% |
|     Chilean | 1 | 0.19% |
|     Colombian | 3 | 0.57% |
|     Cuban | 13 | 2.46% |
|     Dominican | 3 | 0.57% |
|     Granada | 1 | 0.19% |
|     Guatemalan | 2 | 0.38% |
|     Honduran | 1 | 0.19% |
|     Mexican | 10 | 1.89% |
|     Puerto Rican | 17 | 3.22% |
|     Spaniard | 1 | 0.19% |
|     Hispanic, unspecified | 7 | 1.33% |
|     Other, Brazilian | 1 | 0.19% |
|     Other, Haitian | 1 | 0.19% |
|     Other, West Indian | 1 | 0.19% |
|     Multiethnic | 2 | 0.38% |
|     Non-Hispanic/Haitian origin | 451 | 85.42% |
|     Unknown ethnicity | 13 | 2.46% |

| (Continued) | Frequency | Percent |
|---|---|---|
| *Age (years)* | | |
| mean (SD), range (min,max) | *38.58 (12.17)* | *65 (16,81)* |
| 0 - 3 | 0 | 0.00% |
| 4 - 9 | 0 | 0.00% |
| 10 - 14 | 0 | 0.00% |
| 15 - 24 | 52 | 9.85% |
| 25 - 34 | 176 | 33.33% |
| 35 - 44 | 151 | 28.60% |
| 45 - 54 | 77 | 14.58% |
| 55 - 64 | 59 | 11.17% |
| 65 - 74 | 12 | 2.27% |
| 75 - 84 | 1 | 0.19% |
| 85+ | 0 | 0.00% |
| *Florida Residency* | | |
| Florida resident, Palm Beach County | 451 | 85.42% |
| Florida resident, out of county | 29 | 5.49% |
| Non-Florida residency | 48 | 9.09% |
| *Driver's License Issued State* | | |
| Florida | 434 | 82.20% |
| New York | 8 | 1.52% |
| Massachusetts | 7 | 1.33% |
| North Carolina | 7 | 1.33% |
| Tennessee | 5 | 0.95% |
| Illinois | 4 | 0.76% |
| Maryland | 4 | 0.76% |
| New Jersey | 4 | 0.76% |
| Ohio | 4 | 0.76% |
| Texas | 4 | 0.76% |
| Other state | 21 | 3.98% |
| Unknown/no license issued | 26 | 4.92% |
| *Usual Occupation Industry* | | |
| Animal welfare | 8 | 1.52% |
| Art/Music | 9 | 1.70% |
| Automotive | 27 | 5.11% |
| Business/finance | 13 | 2.46% |
| Construction | 78 | 14.77% |
| Education | 21 | 3.98% |
| Electrical/plumbing | 17 | 3.22% |
| Farming/agriculture/landscaping | 23 | 4.36% |
| First responder | 4 | 0.76% |
| Healthcare | 26 | 4.92% |

| (Continued) | Frequency | Percent |
|---|---|---|
| Hospitality/food and beverage | 80 | 15.15% |
| HVAC | 7 | 1.33% |
| Maintenance/repair | 15 | 2.84% |
| Marine services | 8 | 1.52% |
| Real estate | 7 | 1.33% |
| Retail/sales | 69 | 13.07% |
| Never worked | 21 | 3.98% |
| Disabled | 4 | 76.00% |
| Other | 65 | 12.31% |
| Unknown occupation | 26 | 4.92% |
| *Education* | | |
| 8th grade or less | 11 | 2.08% |
| 9th-12th grade | 52 | 9.85% |
| High school graduate/GED completed | 247 | 46.78% |
| Some college, no degree | 97 | 18.37% |
| Associate degree | 47 | 8.90% |
| Bachelor's degree | 47 | 8.90% |
| Master's degree | 0 | 0.00% |
| Doctoral or professional degree | 6 | 1.14% |
| Unknown | 21 | 3.98% |
| *Veteran Status* | | |
| U.S. armed forces | 21 | 3.98% |
| *Living Situation* | | |
| Private residence | 370 | 70.08% |
| Homeless/homeless shelter | 35 | 6.63% |
| Hotel/motel | 19 | 3.60% |
| Institutionalized housing* | 4 | 0.76% |
| Recovery facility/sober housing | 39 | 7.39% |
| Other unstable housing* | 17 | 3.22% |
| Unknown | 44 | 8.33% |
| *Criminal Record / Legal History* | | |
| No criminal record history | 159 | 30.11% |
| Criminal record history (any) | 369 | 69.89% |
| Drug crimes (any) | 251 | 47.54% |
| Drug possession | 226 | 42.80% |
| Drug paraphernalia possession | 148 | 28.03% |
| Possession with intent to distribute | 68 | 12.88% |
| DUI/DWI | 105 | 19.89% |
| Disorderly Conduct | 68 | 12.88% |
| Violent Crimes | 135 | 25.57% |
| Theft and fraud | 204 | 38.64% |
| Child Endangerment Crimes | 17 | 3.22% |

| *(Continued)* | Frequency | Percent |
|---|---|---|
| Prostitution Crimes | 8 | 1.52% |
| *Past Medical History* | | |
| Shingles | 2 | 0.38% |
| MRSA | 6 | 1.14% |
| Hepatitis A | 0 | 0.00% |
| Hepatitis B | 7 | 1.33% |
| Hepatitis C | 104 | 19.70% |
| HIV | 3 | 0.57% |
| STDs | 52 | 9.85% |
| Cancer | 12 | 2.27% |
| Chronic Pain | 52 | 9.85% |
| Insomnia | 7 | 1.33% |
| Hypertension | 68 | 12.88% |
| Diabetes | 27 | 5.11% |
| Overweight (BMI ≥25) | 321 | 60.80% |
| Obese (BMI ≥30) | 165 | 31.25% |
| *Body mass index (BMI), mean (SD)* | *27.73 (6.51)* | |
| *Mental Health History* | | |
| Mental health history (any) | 159 | 30.11% |
| ADHD | 15 | 2.84% |
| Anxiety | 52 | 9.85% |
| Bipolar Disorder | 41 | 7.77% |
| Depression | 102 | 19.32% |
| Personality Disorder | 1 | 0.19% |
| Eating Disorder/Body Dysmorphia | 3 | 0.57% |
| PTSD | 7 | 1.33% |
| Schizophrenia | 10 | 1.89% |
| Unspecified Mental Illness | 7 | 1.33% |
| *Prescribed Narcotics (any)* | 52 | 9.85% |
| *Number of Prescription Narcotics, mean (SD)* | *1.15 (0.46)* | |
| Buprenorphine/Suboxone | 18 | 3.41% |
| Dilaudid | 1 | 0.19% |
| Fentanyl patch | 2 | 0.38% |
| Hydromorphone | 2 | 0.38% |
| Hydrocodone | 1 | 0.19% |
| Methadone | 4 | 0.76% |
| Morphine | 3 | 0.57% |
| Oxycodone | 20 | 3.79% |
| Tramadol | 6 | 1.14% |
| *Prescribed Non-narcotic Controlled Substance (any)* | 67 | 12.69% |
| *Number of Non-narcotic Controlled Substances, mean (SD)* | *1.42 (0.68)* | |
| Anabolic steroids/testosterone | 6 | 1.14% |

| (Continued) | Frequency | Percent |
|---|---|---|
| Anticonvulsant | 4 | 0.76% |
| Stimulant | 22 | 4.17% |
| Barbiturate | 2 | 0.38% |
| Benzodiazepine | 47 | 8.90% |
| Medical Marijuana | 1 | 0.19% |
| Muscle relaxant | 1 | 0.19% |
| Nonbenzodiazepine sedative | 6 | 1.14% |
| *Non-Controlled Prescribed Medication* | | |
| Non-controlled anticonvulsants (any) | 46 | 9.09% |
| Gabapentin | 34 | 6.44% |
| Other anticonvulsant | 20 | 3.79% |
| Muscle Relaxers | 18 | 3.41% |
| Antidepressants | 72 | 13.64% |
| Antipsychotics | 33 | 6.25% |
| *Substance Abuse History* | | |
| *Age (years) when substance abuse started, mean (SD)* | *20.6(7.3)* | |
| History of substance abuse | 514 | 97.35% |
| Prior non-fatal overdose | 98 | 18.56% |
| IV drug use | 180 | 34.09% |
| Prior SUD treatment | 236 | 44.70% |

**Table 6. Incident information for opioid overdoses in 2020.**

| Variable | Frequency | Percent |
|---|---|---|
| *Primary Cause of Death* | | |
|     Single substance toxicity | 152 | 28.79% |
|     Polysubstance toxicity | 373 | 70.64% |
|     Complication/sequelae of drug intoxication | 3 | 0.57% |
| *Number of Substances Listed as Cause of Death* | | |
|     1 | 153 | 28.98% |
|     2 | 186 | 35.23% |
|     3 | 121 | 22.92% |
|     4 | 48 | 9.09% |
|     5 | 17 | 3.22% |
|     6 | 2 | 0.38% |
|     7 | 1 | 0.19% |
| *Opioids Involved in Overdose* | | |
|     Buprenorphine | 5 | 0.95% |
|     Codeine | 1 | 0.19% |
|     Fentanyl | 498 | 94.32% |
|     Fentanyl analogs* | 131 | 24.81% |
|     Heroin | 58 | 10.98% |
|     Hydrocodone | 4 | 0.76% |
|     Hydromorphone | 2 | 0.38% |
|     Methadone | 14 | 2.65% |
|     Morphine | 16 | 3.03% |
|     Oxycodone | 36 | 6.82% |
|     Tramadol | 4 | 0.76% |
|     Unknown opioid | 3 | 0.57% |
| *Non-Opioids Involved in Overdose* | | |
|     Acetaminophen | 1 | 0.19% |
|     Alcohol | 91 | 17.23% |
|     Amphetamine | 22 | 4.17% |
|     Anticonvulsants | 5 | 0.95% |
|     Antidepressant | 11 | 2.08% |
|     Antihistamine | 11 | 2.08% |
|     Barbiturate | 1 | 0.19% |
|     Benzodiazepine | 67 | 12.69% |
|     Cocaine/metabolite | 151 | 28.60% |
|     Dextromethorphan | 2 | 0.38% |
|     Ketamine | 1 | 0.19% |
|     Kratom | 8 | 1.52% |
|     Nonbenzodiazepine Sedative | 3 | 0.57% |
|     Novel psychoactive substance | 2 | 0.38% |
|     MDMA | 4 | 0.76% |

| | Freq. | Percent |
|---|---|---|
| Methamphetamine | 8 | 1.52% |
| *(Continued)* | **Freq.** | **Percent** |
| Muscle Relaxant | 9 | 1.70% |
| *Combination of Drugs Listed as Cause of Death* | | |
| Fentanyl | 144 | 2727.00% |
| Fentanyl + fentanyl analog | 50 | 947.00% |
| Fentanyl + fentanyl analog + heroin | 9 | 170.00% |
| Fentanyl + fentanyl analog + heroin + other non-opioid | 8 | 152.00% |
| Fentanyl + fentanyl analog + heroin + other opioid + other non-opioid | 2 | 38.00% |
| Fentanyl + fentanyl analog + other non-opioid | 52 | 985.00% |
| Fentanyl + fentanyl analog + other opioid | 9 | 170.00% |
| Fentanyl + heroin | 13 | 246.00% |
| Fentanyl + heroin + other opioid | 2 | 38.00% |
| Fentanyl + heroin + other opioid + other non-opioid | 2 | 38.00% |
| Fentanyl + heroin + other non-opioid | 18 | 341.00% |
| Fentanyl + other opioid | 14 | 265.00% |
| Fentanyl + other opioid + other non-opioid | 23 | 436.00% |
| Fentanyl + other non-opioid | 152 | 2879.00% |
| Fentanyl analog | 1 | 19.00% |
| Heroin | 2 | 38.00% |
| Heroin + Other non-opioid | 2 | 38.00% |
| Other opioid | 5 | 95.00% |
| Other opioid + Other non-opioid | 17 | 322.00% |
| Unknown | 3 | 57.00% |
| *Medical Interventions Provided* | | |
| CPR | 111 | 21.02% |
| Narcan | 133 | 25.19% |
| Epinephrine | 6 | 114.00% |
| Mechanical ventilation/intubation | 126 | 23.86% |
| *Overdose Location Setting* | | |
| Airbnb | 4 | 0.76% |
| Airport | 1 | 0.19% |
| Business | 13 | 2.46% |

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| | Freq | Percent |
|---|---|---|
| Drug treatment facility | 28 | 5.30% |
| *(Continued)* | **Freq** | **Percent** |
| Gas station | 10 | 1.89% |
| Home | 303 | 57.39% |
| Hospital | 2 | 0.38% |
| Hotel/motel | 52 | 9.85% |
| Jail | 3 | 0.57% |
| Other private residence | 63 | 11.93% |
| Restaurant/bar | 9 | 1.70% |
| School | 1 | 0.19% |
| Street/other outdoor setting | 34 | 6.44% |
| Vacant house/building | 5 | 0.95% |
| *Motor Vehicle Involvement* | | |
| Overdosed occurred in a motor vehicle | 30 | 5.68% |
| *Place of Death* | | |
| Hospital setting | 121 | 22.92% |
| Dead on arrival | 9 | 1.70% |
| Emergency room/outpatient | 77 | 14.58% |
| Inpatient | 35 | 6.63% |
| Non-hospital setting | 407 | 77.08% |
| Decedent's residence | 252 | 47.73% |
| Hospice facility | 7 | 1.33% |
| Other | 148 | 28.03% |
| *Hospital* | | |
| Bethesda Hospital East | 17 | 3.22% |
| Bethesda Hospital West | 1 | 0.19% |
| Boca Raton Regional Hospital | 6 | 1.14% |
| Delray Medical Center | 11 | 2.08% |
| Good Samaritan Medical Center | 8 | 1.52% |
| JFK Medical Center Main | 28 | 5.30% |
| JFK Medical Center North Campus | 4 | 0.76% |
| Lakeside medical Center | 1 | 0.19% |
| Palm Beach Gardens Medical Center | 19 | 3.60% |
| Palms West Hospital | 5 | 0.95% |
| St. Mary's Medical Center | 11 | 2.08% |
| Wellington Regional Medical Center | 13 | 2.46% |
| West Boca Medical Center | 5 | 0.95% |
| *Manner of death* | | |
| Accident | 521 | 98.67% |
| Suicide | 6 | 1.14% |
| Undetermined | 1 | 0.19% |
| *Toxicology* | | |
| Volatiles | 154 | 29.17% |
| Amphetamines (any) | 68 | 12.88% |
| Amphetamine | 58 | 10.98% |

| | Freq | Percent |
|---|---|---|
| Methamphetamine | 25 | 4.73% |
| **(Continued)** | **Freq** | **Percent** |
| | | |
| MDMA | 5 | 0.95% |
| Analgesics (any) | 57 | 10.80% |
| Anesthetics (any) | 6 | 1.14% |
| Ketamine | 2 | 0.38% |
| Anticonvulsants (any) | 88 | 16.67% |
| Gabapentin | 71 | 13.45% |
| Levetiracetam | 10 | 1.89% |
| Antidepressants (any) | 113 | 21.40% |
| Antihistamines (any) | 55 | 10.42% |
| Antipsychotics (any) | 26 | 4.92% |
| Barbiturates (any) | 3 | 0.57% |
| Benzodiazepines (any) | 214 | 40.53% |
| 7-Amino Clonazepam | 59 | 11.17% |
| α-OH-alprazolam | 114 | 21.59% |
| Alprazolam | 119 | 22.54% |
| Chlordiazepoxide | 5 | 0.95% |
| Clonazepam | 7 | 1.33% |
| Demoxepam | 12 | 2.27% |
| Diazepam | 8 | 1.52% |
| Lorazepam | 20 | 3.79% |
| Nordiazepam | 26 | 4.92% |
| Oxazepam | 34 | 6.44% |
| Temazepam | 19 | 3.60% |
| Cannabinoids (any) | 164 | 31.06% |
| Cardiovasculars (any) | 20 | 3.79% |
| Miscellaneous (any) | 31 | 5.87% |
| Mitragynine | 13 | 2.46% |
| Muscle Relaxants (any) | 23 | 4.36% |
| Xylazine | 9 | 1.70% |
| Cyclobenzaprine | 8 | 1.52% |
| Novel Psychoactive Substances (any)* | 7 | 1.33% |
| Etizolam | 7 | 1.33% |
| Sedatives (any) | 5 | 0.95% |
| Zolpidem | 5 | 0.95% |
| Stimulants (any) | 447 | 84.66% |
| Benzoylecgonine | 289 | 54.73% |
| Caffeine | 203 | 38.45% |
| Cocaethylene | 25 | 4.73% |
| Cocaine | 113 | 21.40% |
| Cotinine | 253 | 47.92% |
| Nicotine | 16 | 3.03% |
| Urologicals (any) | 4 | 0.76% |

| (Continued) | Concentration mean(SD) | Freq | Percent |
|---|---|---|---|
| Designer opioids (any) | - | 343 | 64.96% |
| 4-ANPP | - | 341 | 64.58% |
| Acetylfentanyl | - | 150 | 28.41% |
| Butyrfentanyl | - | 3 | 0.57% |
| Carfentanil | - | 1 | 0.19% |
| Furanylfentanyl | - | 1 | 0.19% |
| Methoxyacetylfentanyl | - | 2 | 0.38% |
| Opioid Analgesics (any) | - | 525 | 99.43% |
| 6-acetylmorphine | 4.64 (1.99) | 7 | 1.33% |
| 6-beta-Naltrexol | - | 2 | 0.38% |
| 6-Monoacetylmorphine | - | 57 | 10.80% |
| Buprenorphine | 28.91 (88.77) | 26 | 4.92% |
| Codeine | 11.89 (14.35) | 46 | 8.71% |
| Dextromethorphan | 248.25 (236.04) | 4 | 0.76% |
| Dihydrocodeine | 4.35 (1.77) | 2 | 0.38% |
| EDDP | 206.38 (256.63) | 14 | 2.65% |
| Fentanyl | 24.79 (74.88) | 501 | 94.89% |
| Hydrocodone | 24.28 (10.17) | 12 | 2.27% |
| Hydromorphone | 32.40 (35.17) | 23 | 4.36% |
| Methadone | 465.91 (566.10) | 18 | 3.41% |
| Morphine | 65.97 (190.92) | 145 | 27.46% |
| Naloxone | - | 109 | 20.64% |
| Naltrexone | - | 1 | 0.19% |
| Norbuprenorphine | 19.44 (48.64) | 37 | 7.01% |
| Norfentanyl | 5.64 (15.50) | 419 | 79.36% |
| O-desmethyltramadol | 1052.00 (1073.39 | 29 | 5.49% |
| Oxycodone | 209.70 (724.30) | 51 | 9.66% |
| Oxymorphone | 26.66 (21.48) | 46 | 8.71% |
| Tramadol | 6602.40 (14179.72) | 46 | 8.71% |

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