



RIVERSIDE COUNTY EMS AGENCY
EMS SUSPECTED OPIOID OVERDOSE REPORT
2021

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PREPARED FOR RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

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This report was developed to monitor and describe suspected opioid overdose incidents based on Emergency Medical Services (EMS) electronic patient care reports (ePCRs) in the County of Riverside from January 1st, 2021 through December 31st, 2021. During this time, there were 4,747 suspected overdoses overall and 3,022 suspected opioid overdoses. Of all suspected overdoses, 181 on-scene fatalities occurred while 142 fatalities (nearly 80%) were considered opioid specific.

Suspected opioid overdose was also displayed by several other factors: age, gender, ethnicity, geography, naloxone administration, specific drug use, frequency of EMS encounters, and patients experiencing homelessness and/or mental health crisis. Analysis of age groups and gender determined that the 25–44 year-old category comprises 51% of all suspected opioid overdose cases, and males account for 80% of all suspected opioid overdose fatalities. Spatial analysis indicated that the Northwest EMS Zone accounted for the largest number of opioid overdose fatalities by zone with 844 overdoses (28%), nearly one third of all incidents, which is consistent with the most populous region in the county. In addition, Riverside city experienced 16.3% (490 incidents) of the suspected opioid overdoses from 1/1/2021-12/31/2021. Naloxone, an opioid antagonist given to reverse the effects of opiates, was documented to have been administered in 78% of suspected opioid overdose EMS calls (12% of the time naloxone was administered by someone other than EMS providers). The most common source of naloxone administration prior to EMS arrival was Law Enforcement (128 times). In addition, fentanyl and heroin were the most common causes of suspected overdose fatalities cases in Riverside County from 1/1/2021-12/31/2021.

Methodology

Suspected opioid overdose data was extracted from FirstWatch® “Trigger OD 2: Opioid Overdose” (January 1st, 2021- December 31st, 2021). A total of 4,398 unique electronic patient care reports were used out of a total of 5,602 records. The data was de-duplicated based on incident time and location, patient name, age, and sex. This process removed 1,204 duplicate incidents. Records were identified as suspected opioid overdose by symptomology, medications administered, medication response, narratives, and primary & secondary impressions of EMS providers on scene. This process removed a total of 1,376 records.

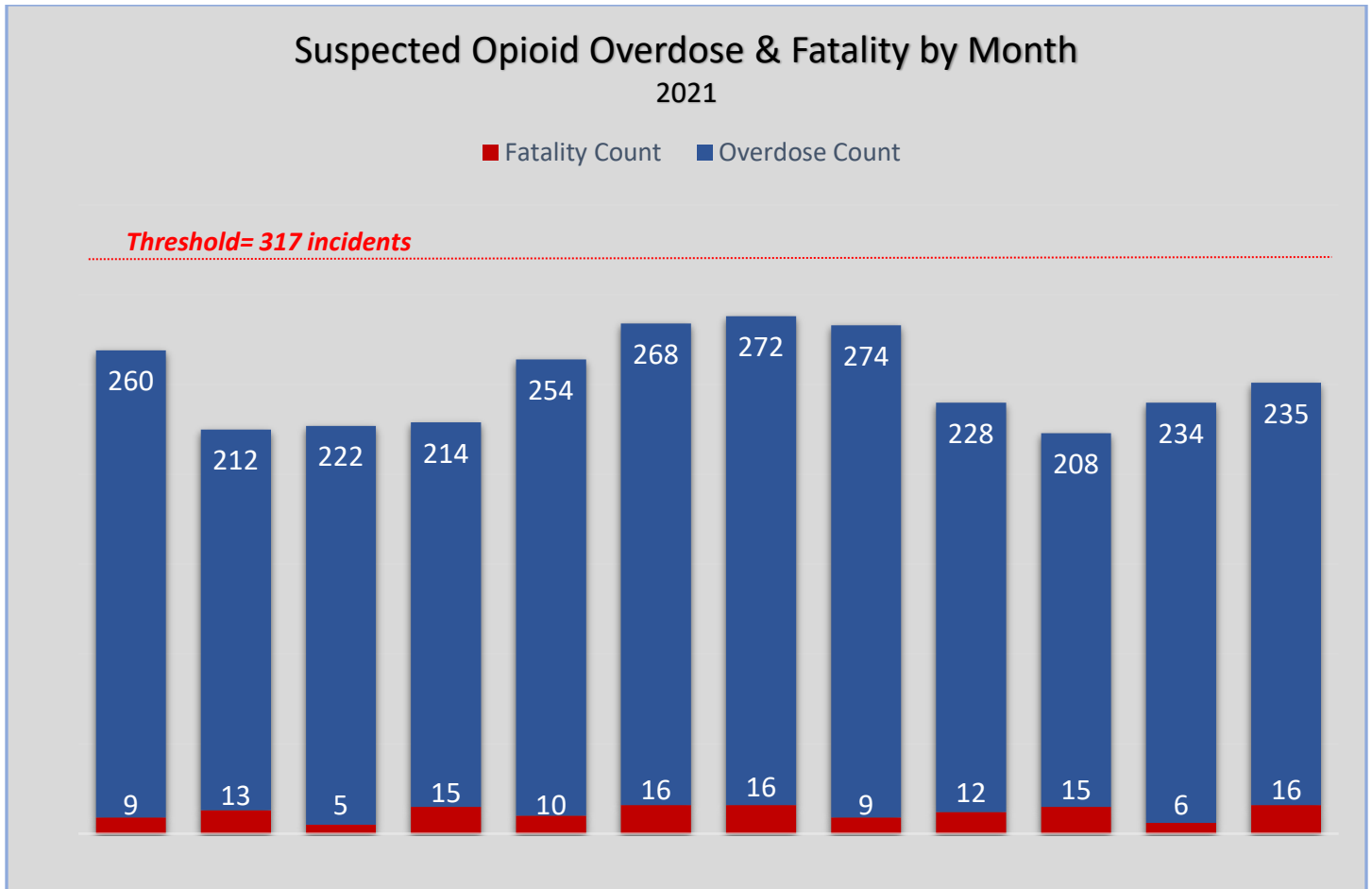
Spatial data was analyzed with Arc GIS. Map layers for EMS Zones (Ambulance and Fire Zones) and Riverside cities were used for figure 8A, 8B, 9A, and 9B. The cities and zones were tagged to fatality data from FirstWatch® “Trigger OD 2: Opioid Overdose” (January 1st, 2021-December 31st, 2021).

Data for figures 10A and 10B was extracted from FirstWatch® “Trigger OD 3: Opioid & All Drugs” (January 1st, 2021-December 31st, 2021). A total of 7,301 unique electronic patient care reports were used out of 11,545 records pulled. Records where no drug was mentioned in the narrative were excluded from the analysis (537 records, 11.1% of data). Cancelled calls were also removed (N=2,003). The data was de-duplicated based on incident location and time, and patient name, age, and sex. Records were identified as suspected overdose by symptomology, medications administered, medication response, narratives, and primary & secondary impressions of EMS providers on scene. This process removed a total of 2,554 records.

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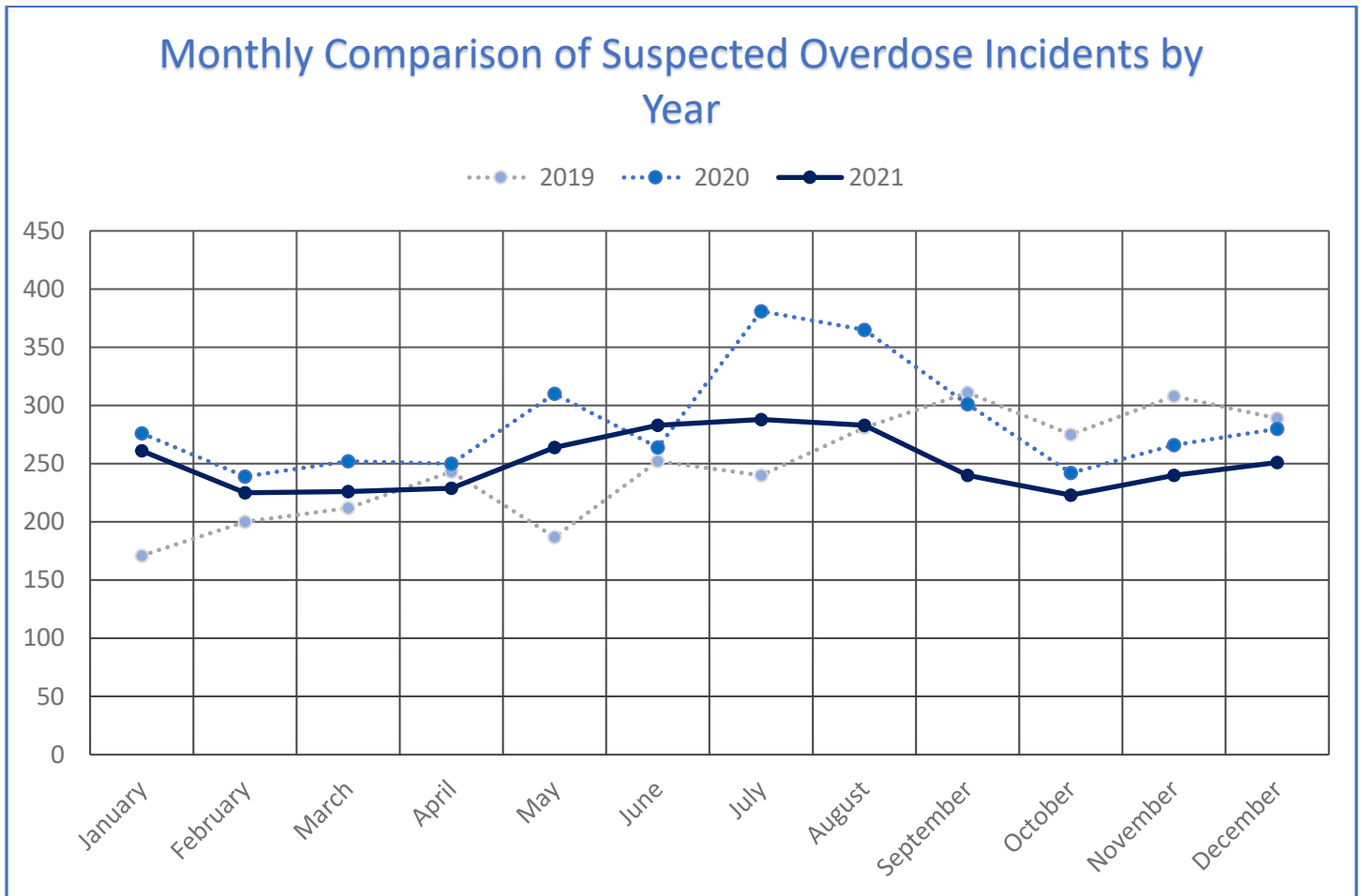
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Figure 1: Surveillance of Suspected Opioid Overdoses in the County of Riverside



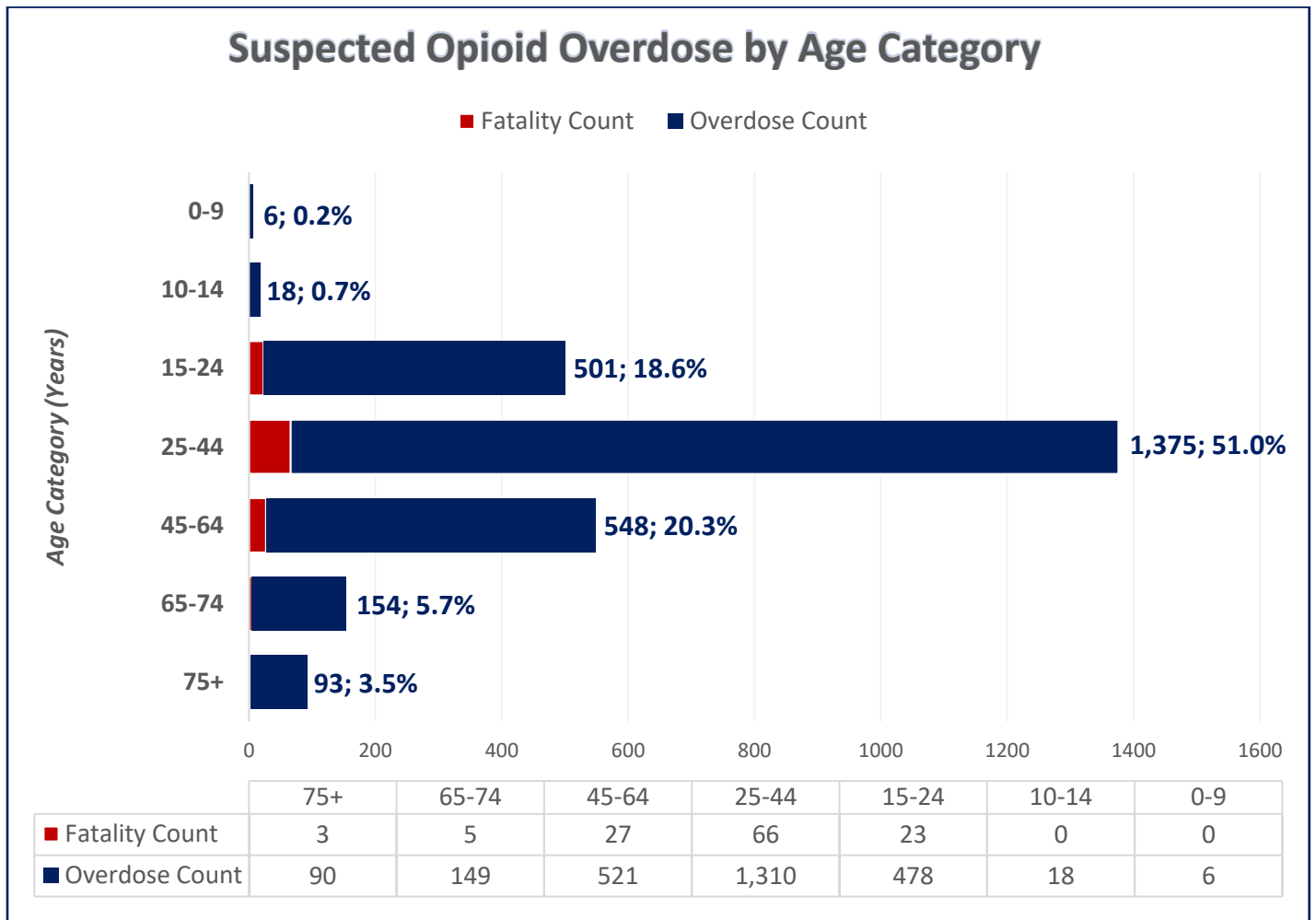
The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=3,022). The frequency of suspected opioid overdose cases was monitored and shown here as a monthly aggregate. This figure represents the number of suspected overdose cases by month. The red line represents two (2) standard deviations above the mean frequency per month of suspected opioid overdoses, calculated from 2018 data. There were no months during the year that exceeded that threshold.

Figure 2: Comparison of Suspected Opioid Overdose each Month by Year



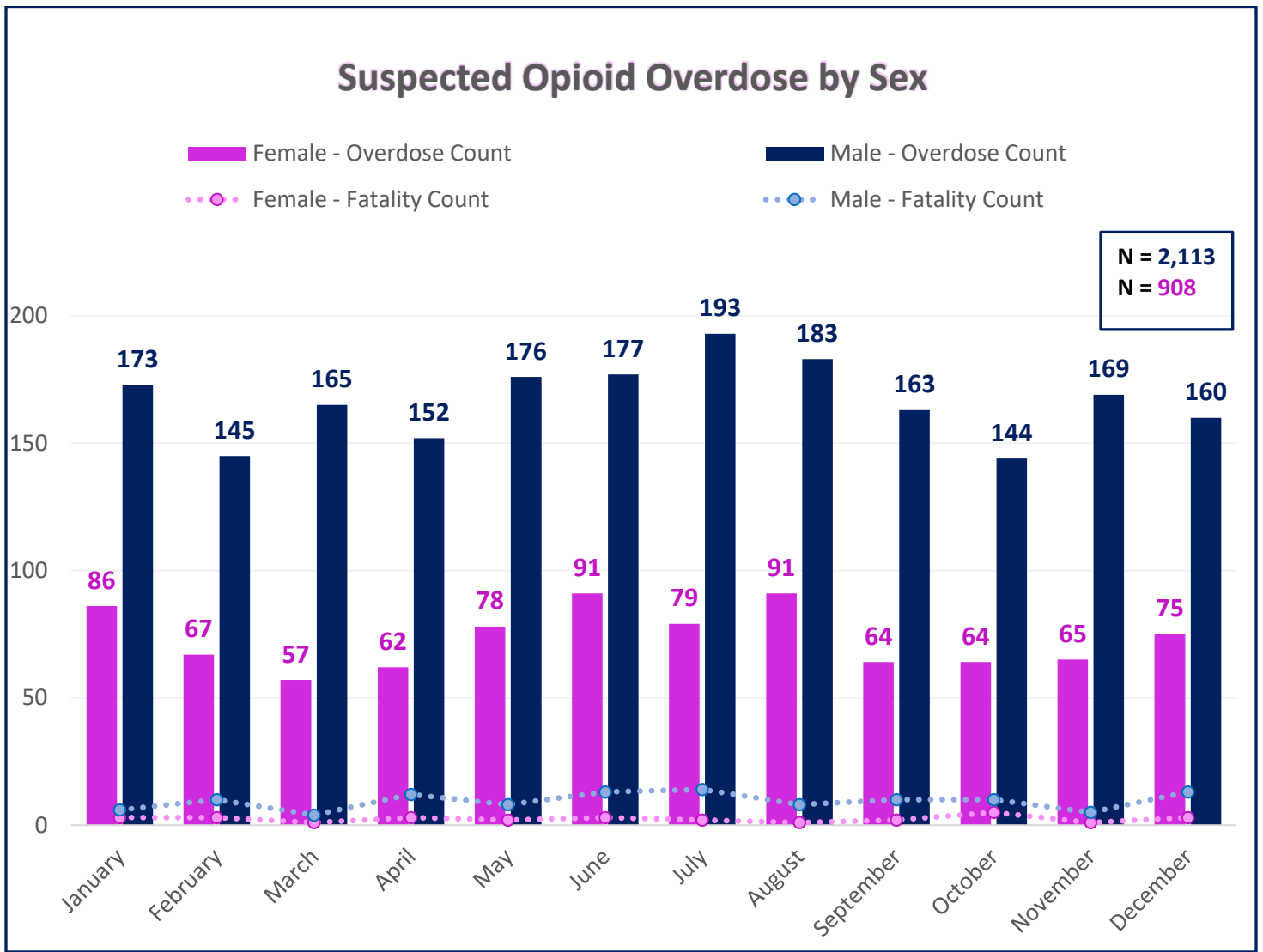
The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2019-December 31st, 2021, N=9,408). The greatest difference in the rate of suspected opioid overdose occurred in July (381 in 2020 to 288 in 2021). July was the only month to display the greatest volume of suspected overdoses in 2021 (288 incidents). *An ANOVA test was run to determine that there are no significant differences in the data from each year ($p>0.05$).

Figure 3: Suspected Opioid Overdoses by Age Category in 2021



The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=2,696). The 25-44 age group consistently represented the most significant age category for suspected opioid overdoses each year consisting of an average of 51% (1,375 patients) of the total suspected opioid overdoses. Records where no age was given were excluded from this analysis (327 records).

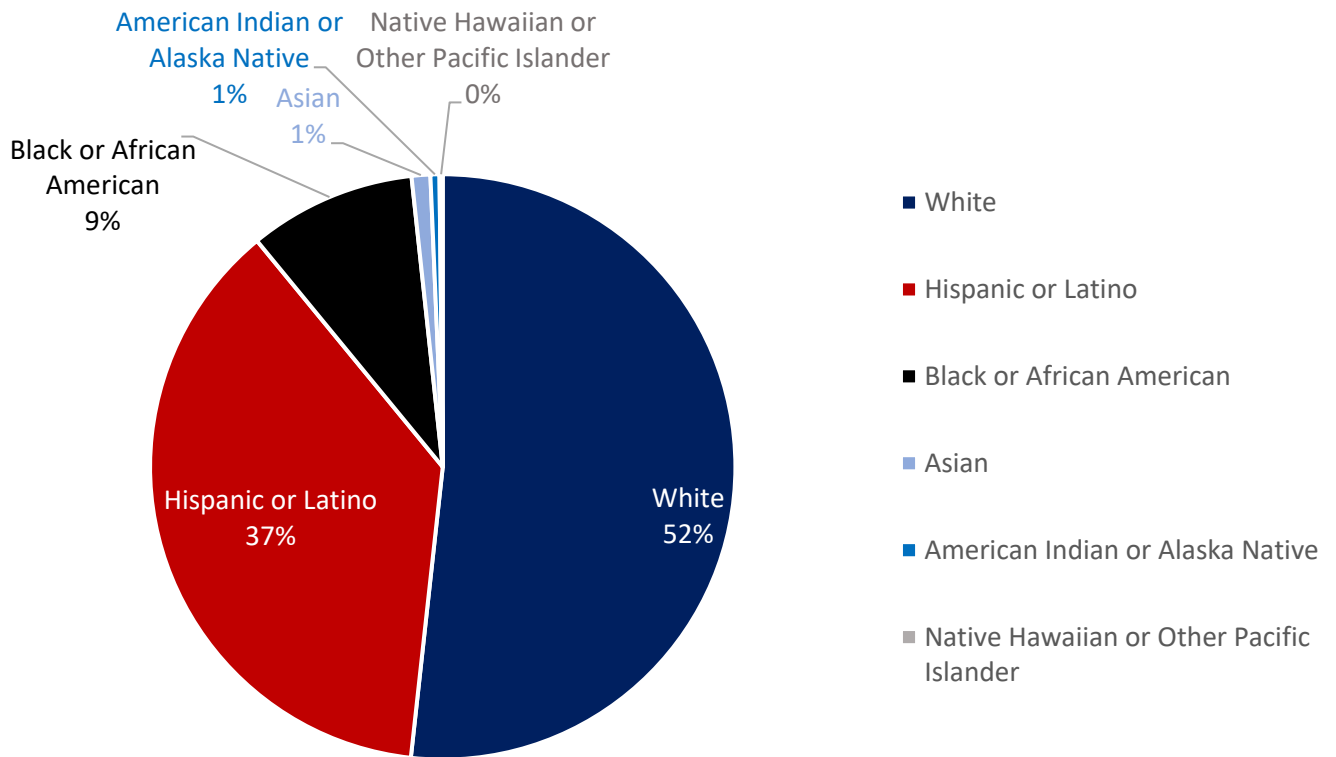
Figure 4: Suspected Opioid Overdoses by Sex in 2021



The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=3,021). Records in which gender sex was labeled “Unknown”, “Unable to Determine”, or “blank” were removed (1 record). Males made up 70% of all suspected opioid overdoses and 113 of all 142 suspected opioid overdose fatalities (80%).

Figure 5: Proportion of Suspected Opioid Overdoses by Patient Ethnicity in 2021

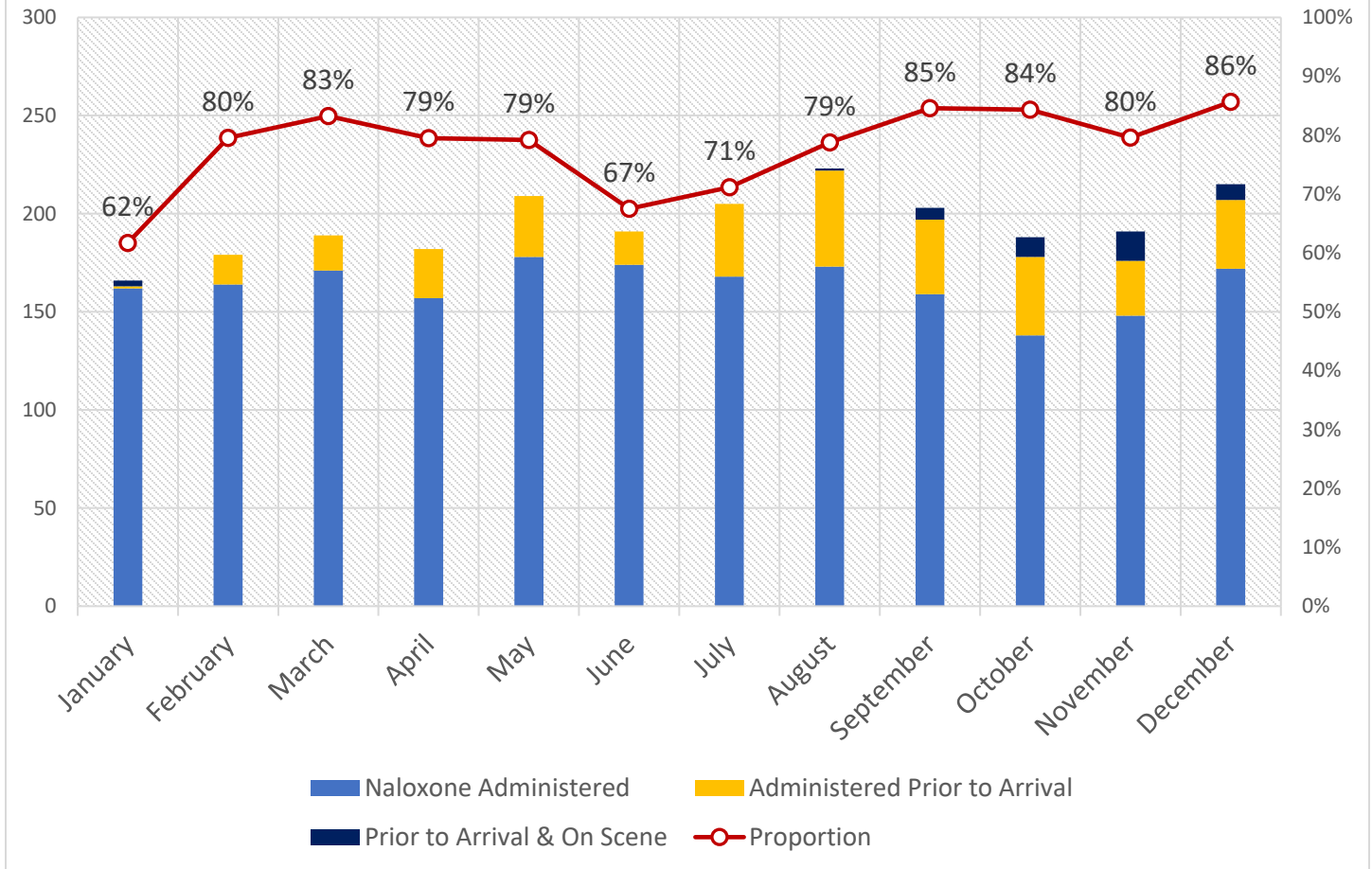
Proportion of Suspected Opioid Overdose Incidents by Patient Ethnicity



The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=2,814). The “White” ethnic group represented the greatest volume of suspected opioid overdoses consisting of an average of 52% (1,456 patients) of the total suspected opioid overdoses. Records where no ethnic group was selected were excluded from this analysis (208 records).

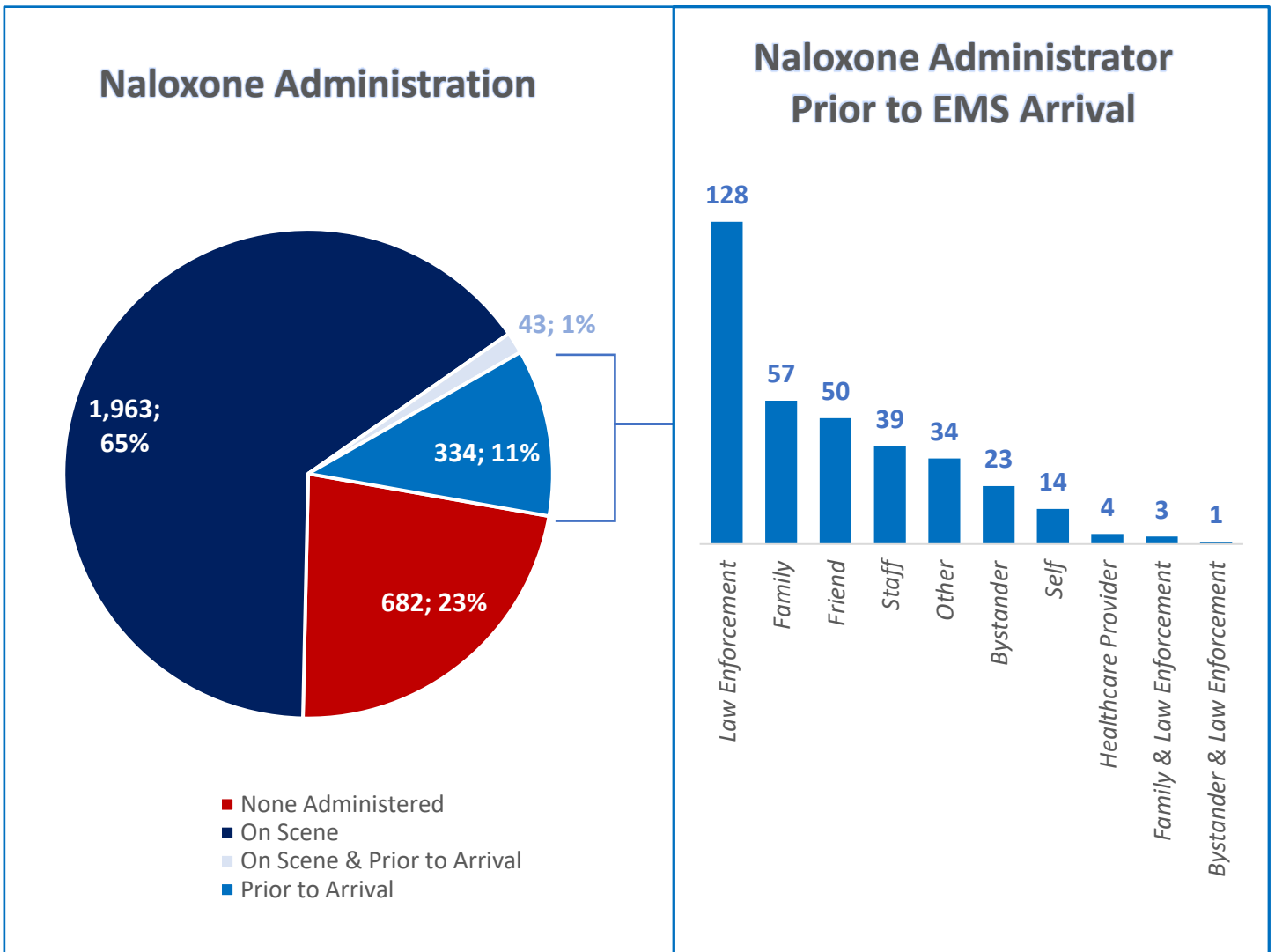
Figure 6A: Naloxone Administration in Suspected Opioid Overdose Incidents

Narcan Administration by Month in 2021



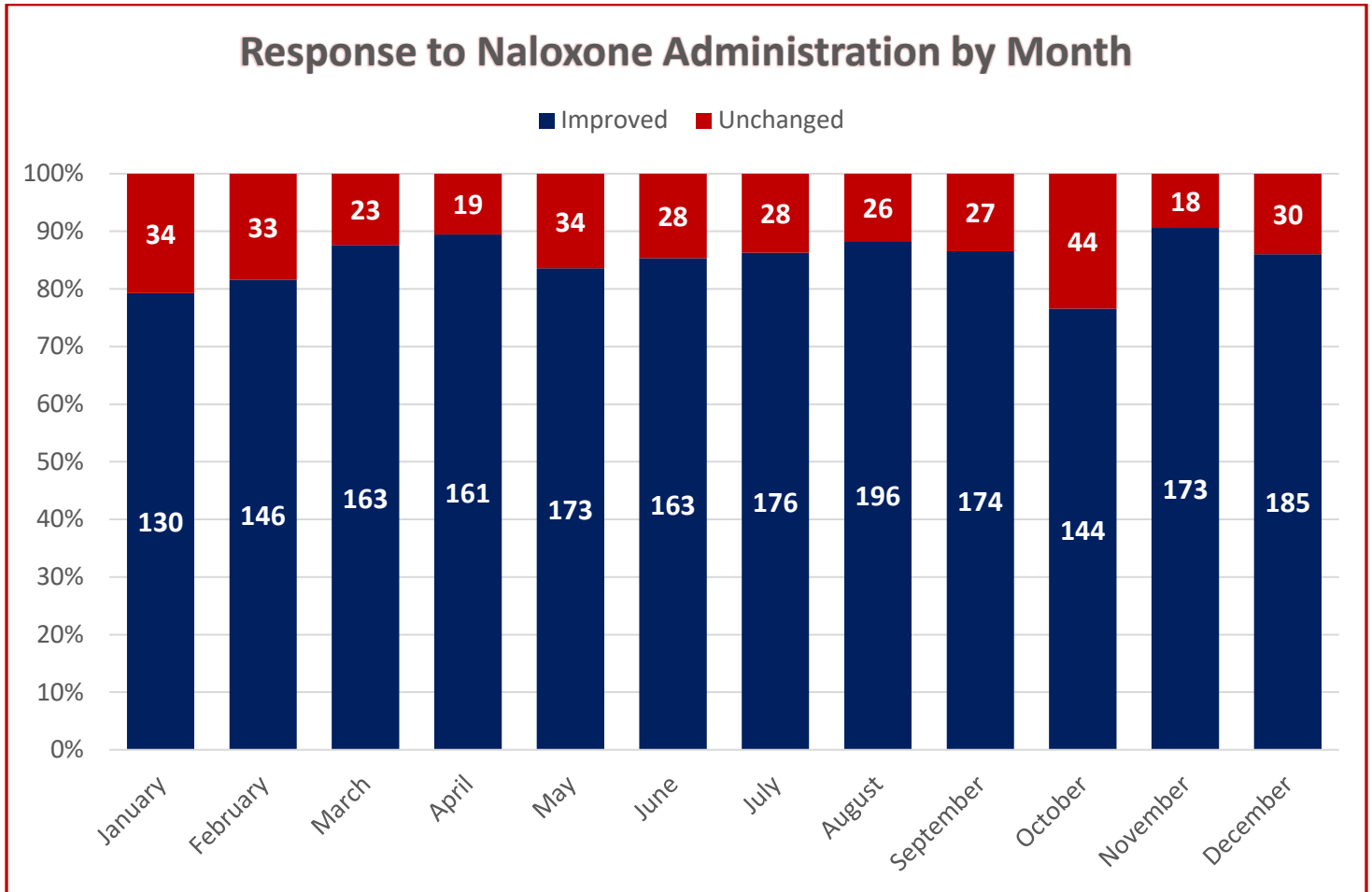
The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=3,022). Naloxone was administered in 77% of all suspected opioid overdose incidents. December had the greatest volume of suspected opioid overdose incidents where naloxone was administered with close to 215 incidents (86%).

Figure 6B: Naloxone Administrator in Suspected Opioid Overdose Incidents



This data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=3,022). In this analysis, naloxone was either administered by EMS providers, law enforcement/bystanders/others/etc, or not at all. Naloxone was administered by EMS providers in suspected opioid incidents nearly 66% of the time. Records also indicated that naloxone was administered by someone else in 12% of incidents. Law Enforcement was the most common source of administration prior to EMS arrival (128 times; 36%).

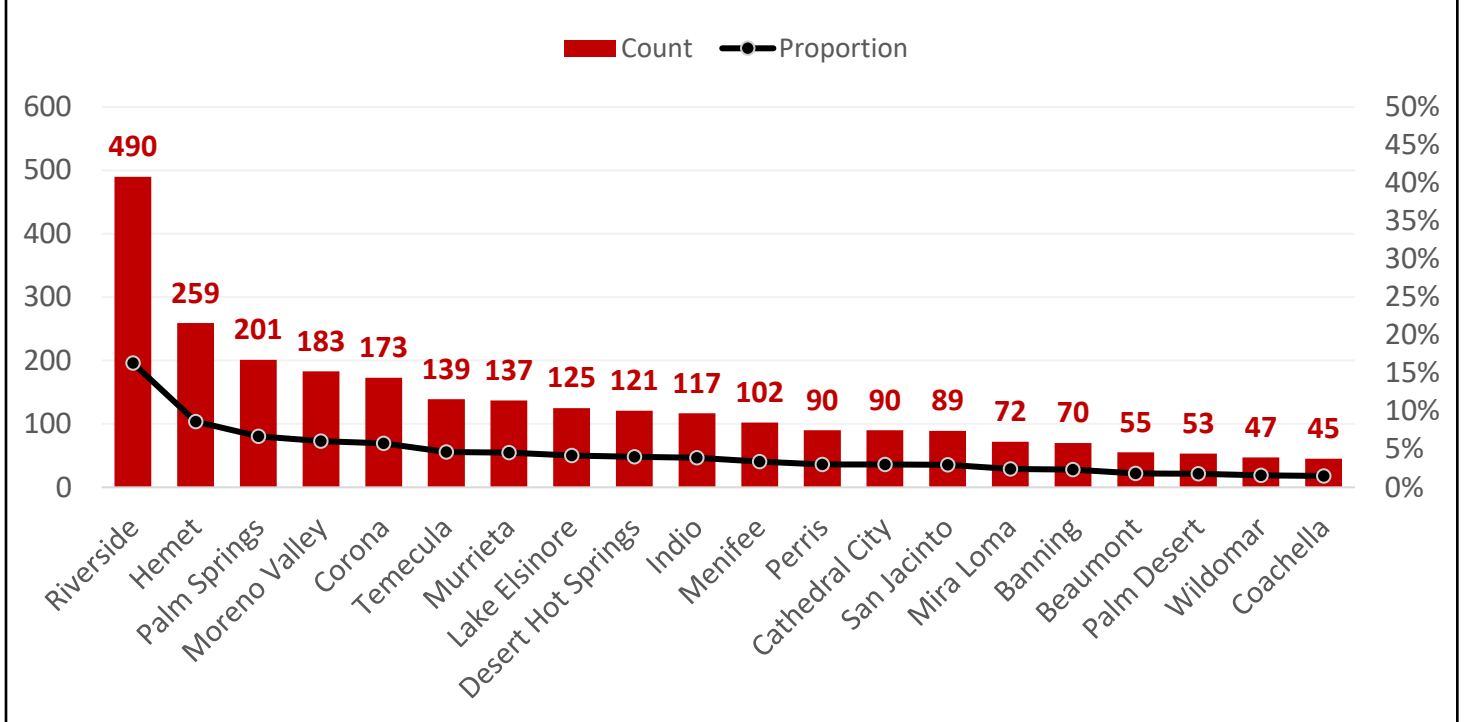
Figure 7: Treatment Efficacy of Naloxone Administration in Suspected Opioid Overdose Incidents



The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- December 31st, 2021 (N=2,328). The response to naloxone treatment in suspected opioid overdose calls was evaluated based on whether or not there was an improvement in patient mentation and/or respiration rate. The month with the greatest number of suspected opioid overdose incidents that indicated an improvement in patient response following naloxone administration was in November with close to 91%.

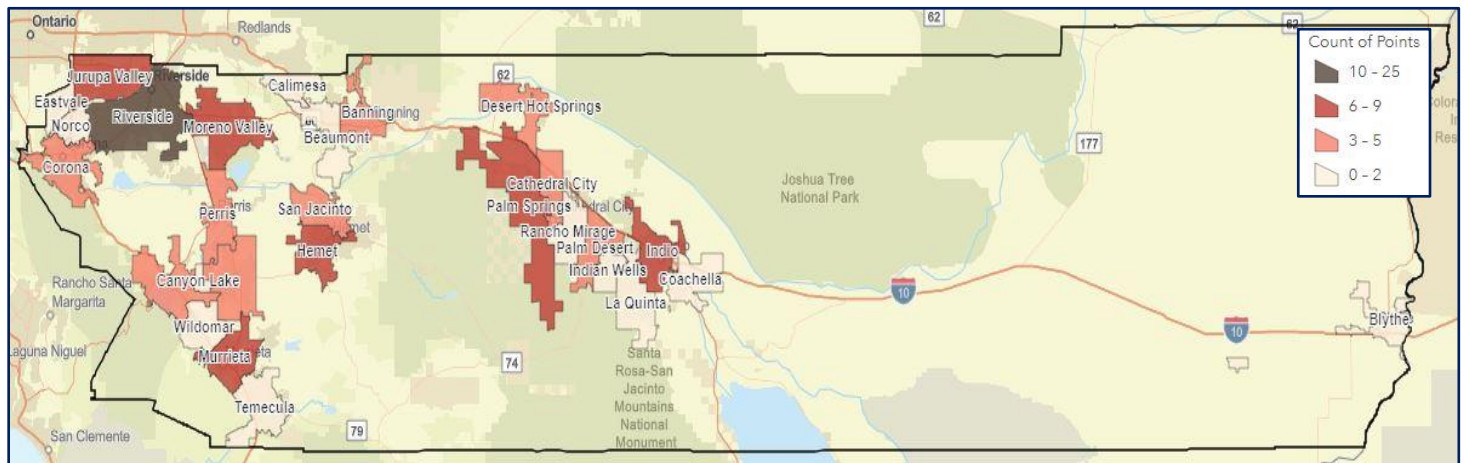
Figure 8A: Suspected Opioid Overdoses by City

Suspected Opioid Overdose by City in 2021



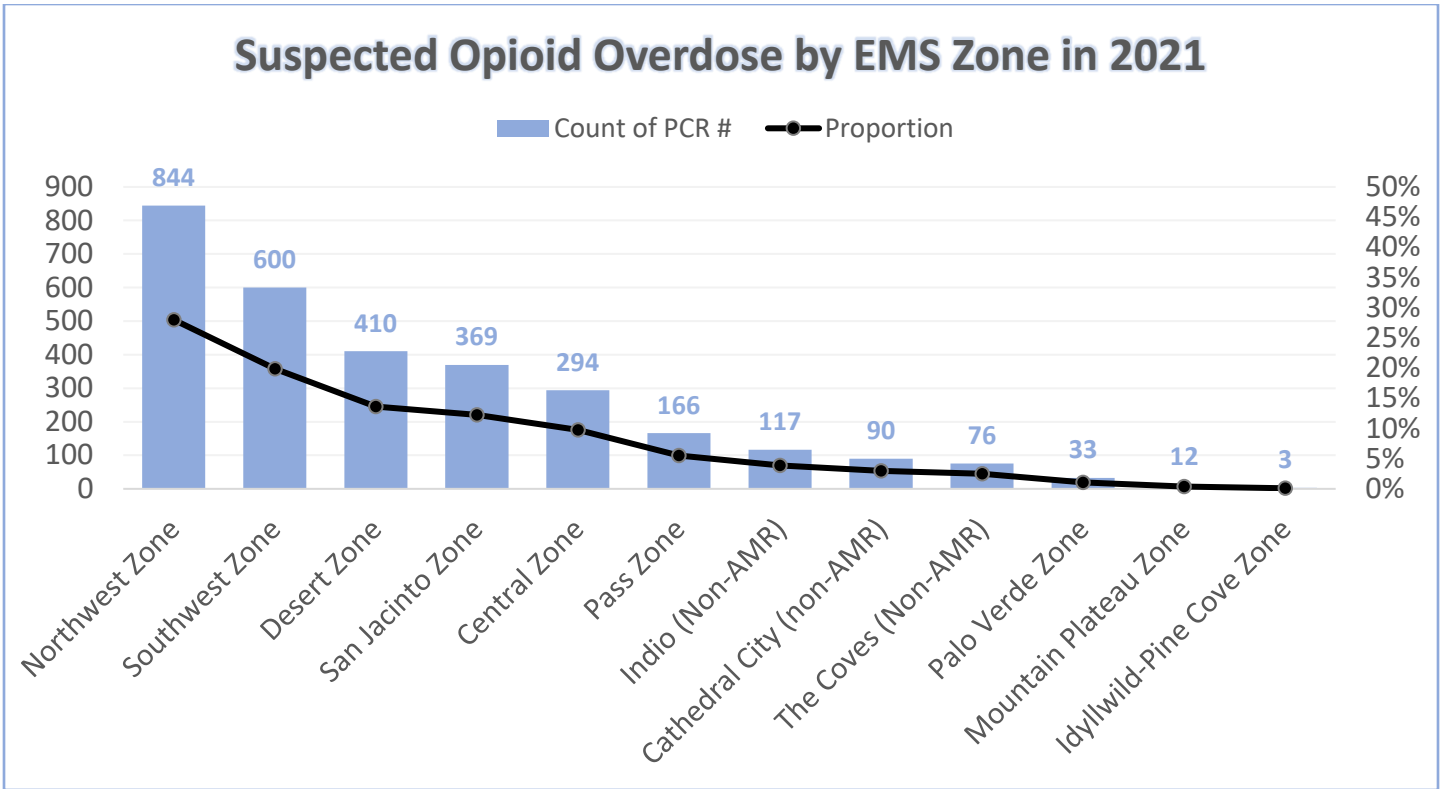
The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2021- December 31st, 2021) (N=3,002). The frequency of suspected opioid overdoses is greatest in Riverside (16.3%), followed by Hemet (8.6%), and Palm Springs (6.7%). The greatest volume of suspected opioid overdoses (490 incidents) comes from the most populous city in the county.

Figure 8B: Suspected Opioid Overdose Fatality by City



The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2021- December 31st, 2021); N=142. The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents by Riverside County city. Dark red areas are considered cities with higher concentrations of opioid overdose fatality incidents encountered by EMS providers (10-25 incidents). Riverside displays the greatest frequency of suspected opioid overdose fatalities.

Figure 9A: Suspected Opioid Overdoses by EMS Zone (Ambulance/Fire Zones)



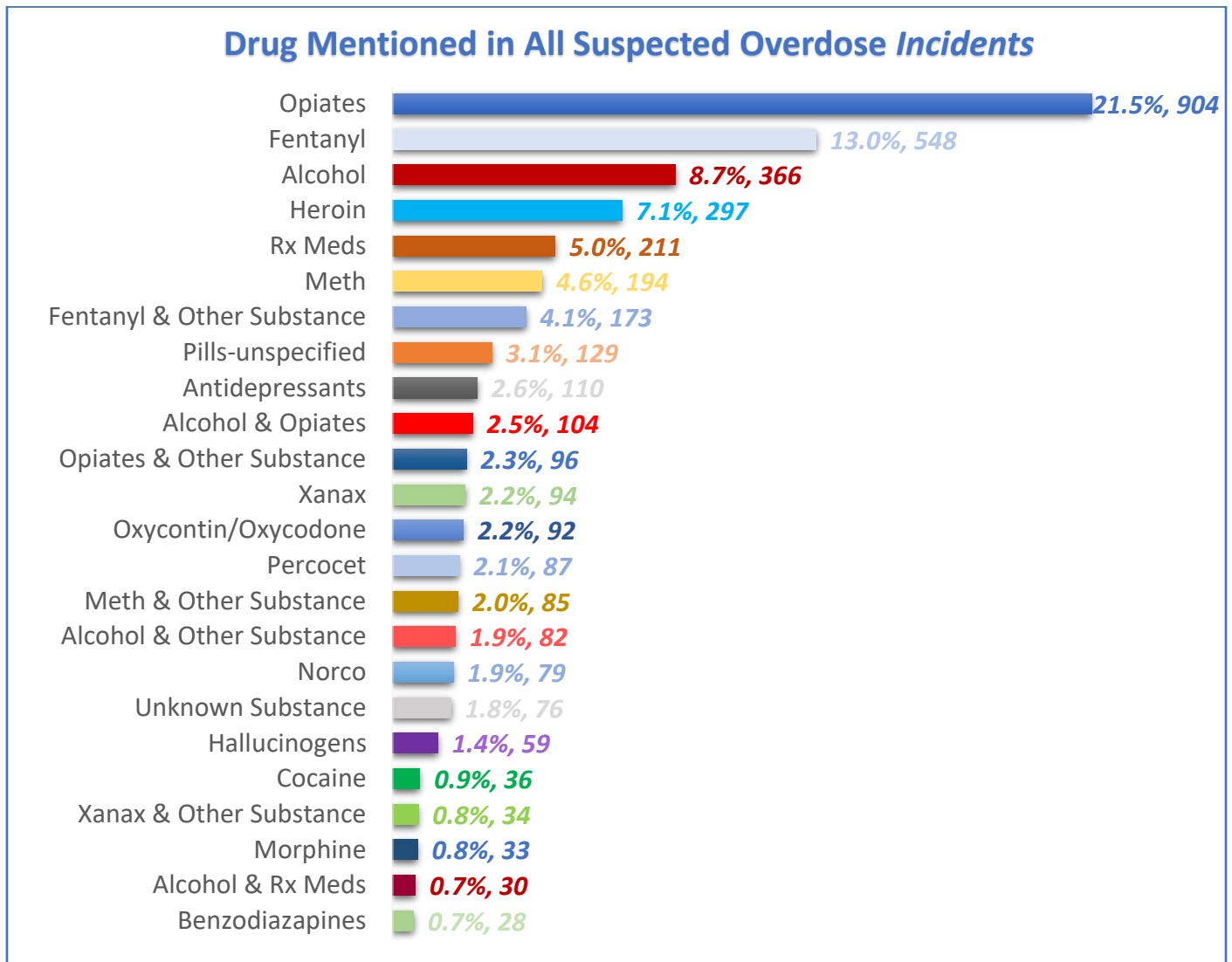
The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2021- December 31st, 2021); N=3,014. The ambulance/first responder zone data was taken from the GIS map layer-EMS Zone. That fatality data was tagged by zone accordingly. The Northwest EMS zone encountered the greatest proportion of suspected opioid overdoses at 28% and the largest number of suspected opioid overdoses in 2021 (844 overdoses).

Figure 9B: Suspected Opioid Overdose Fatality by EMS Zone (Ambulance/Fire Zones)



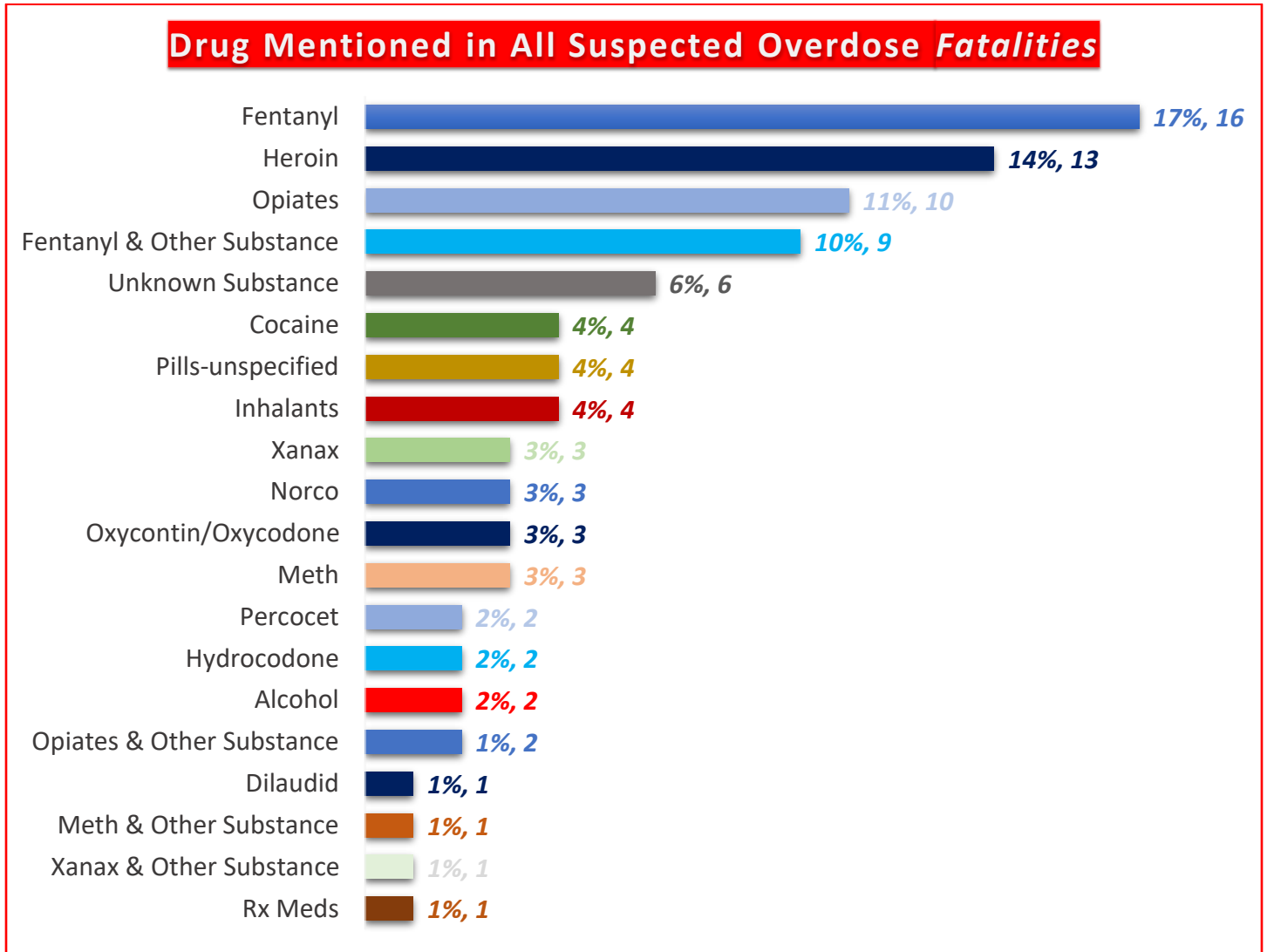
The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2021- December 31st, 2021). (N=142). The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents by EMS Zone. Dark blue areas are considered cities with higher concentrations of opioid overdose fatality incidents encountered by EMS providers (21-37 incidents). The Northwest and Desert zone accounted for the greatest number of fatalities.

Figure 10A: Frequency of Overdose by Drugs Mentioned in Patient Care Report Narrative



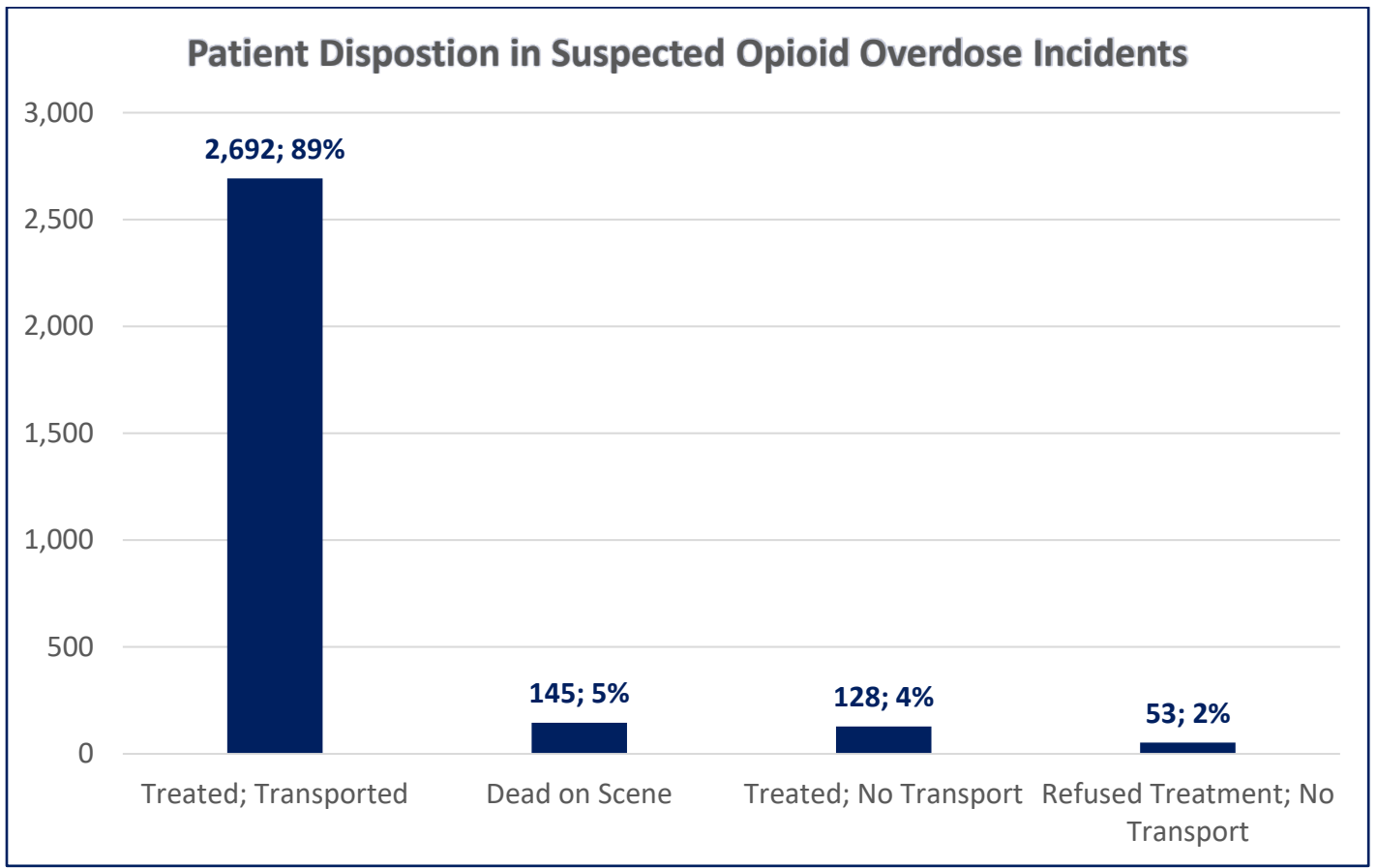
The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (January 1st, 2021- December 31st, 2021); N=4,210. Non-specified opiates and Fentanyl were the most common cause for suspected overdose incidents in 2021. Only the top 20 categories are listed, removing a total of 388 records. Narratives that did not contain specific drug terminology were excluded in the analysis (11.3% of total).

Figure 10B: Frequency of Fatal Overdose by Drugs Mentioned in Patient Care Report Narrative



The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (January 1st, 2021- December 31st, 2021); (N=94). Opioid-related drugs were the most commonly named narcotic in fatal drug overdose narratives (65%). Many of the narratives did not contain specific drug terminology and were therefore excluded in the analysis (N=87, 48.1% of the total).

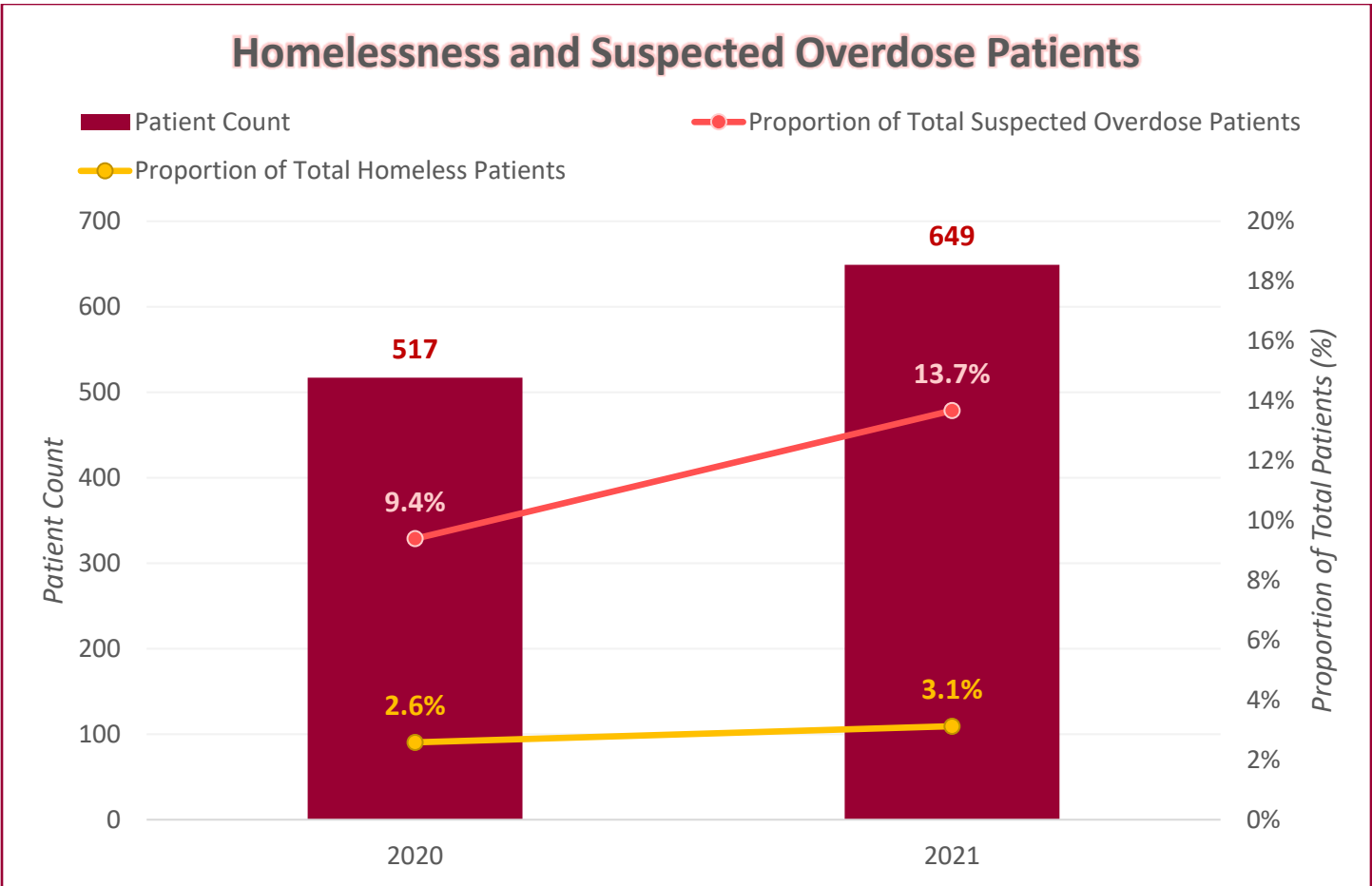
Figure 11: Suspected Opioid Overdose Incidents by Patient Disposition



The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1st, 2021- December 31st, 2021) (N=3,019). Incident/Patient disposition (eDisposition.12) was evaluated to determine the proportion of suspected overdoses resulting in patient transport to an emergency department. It was found that while the majority of patients were transported (89%), 2% were either unwilling to be treated and/or transported. Nearly 5% of the incidents were from suspected opioid overdose fatalities. *All data shown is in reference to pre-hospital patient disposition- data does not include outcome status.

Figure 12: Homeless Status of Suspected Overdose Patients in 2020-2021

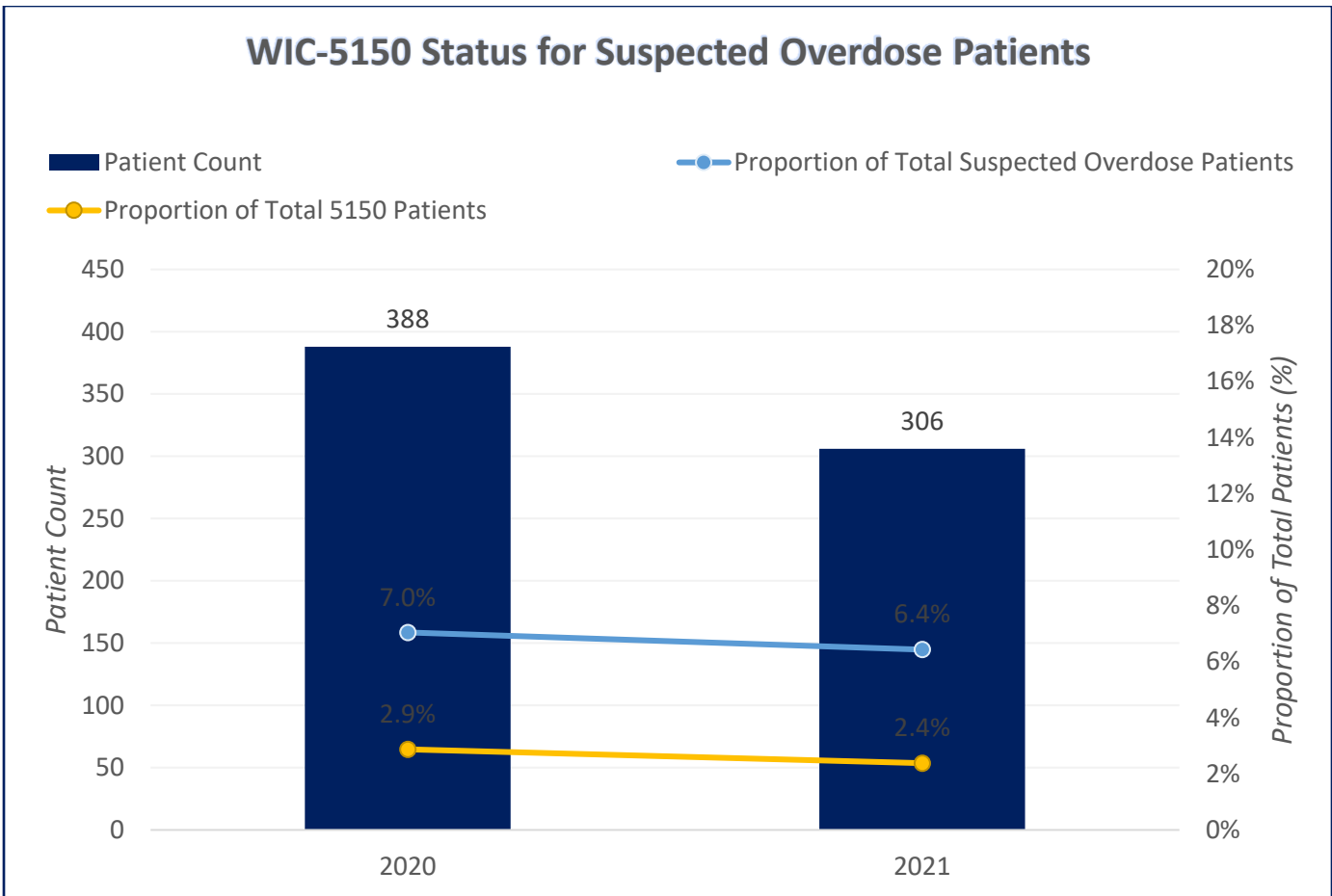
Homelessness and Suspected Overdose Patients



The following data was extracted from FirstWatch OD 3: Opioids & All Drugs (January 1st, 2020- December 31st, 2021; N=1,166) and ImageTrend ELITE using the field itpatient.025 "Is patient homeless?" to match records. The matched records were then aggregated as yearly totals. There was a greater volume of suspected overdose patients experiencing homelessness in 2021 (649 patients) compared to 2020 (517 patients). The proportion of these patients were compared against overall totals of patients experiencing homelessness and the total of suspected overdose patients encountered by EMS providers. In 2021, there was a total of 13.7% of suspected overdose patients experiencing homelessness out of the total number of suspected overdose patients encountered.

Figure 13: WIC-5150 Status of Suspected Overdoses Patients in 2020-2021

WIC-5150 Status for Suspected Overdose Patients



The following data was extracted from FirstWatch OD 3: Opioid Overdose & All Drugs (January 1st, 2020- December 31st, 2021, N=694) and ImageTrend ELITE to determine the co-occurrence of suspected overdose with Welfare and Institutional Code Section 5150 (WIC-5150) incidents. Electronic patient care record numbers were used to match records. The matched records were then aggregated as yearly totals. The proportion of suspected overdose WIC-5150 patients from the total WIC-5150 patients that EMS encountered throughout the year 2020 as well as 2021 are shown to provide context.

Data in this report is provided by the efforts of the Riverside County EMS System and its Providers in ensuring quality care and documentation of patient encounters.

This report was developed by Riverside County EMS Agency Research Specialist, Stephani Harrington, MPH, with the Data & Reporting Unit, and with support from the Riverside County Overdose Data to Action (RODA) Public Health Grant Partnership project. RODA is awarded by the Centers for Disease Control and Prevention (CDC) [Overdose Data to Action \(OD2A\) Program](#).

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