RIVERSIDE COUNTY EMS AGENCY
EMS SUSPECTED OVERDOSE REPORT
FY 2018 - 2021

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PREPARED FOR RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

EMS SUSPECTED OVERDOSE REPORT

This report was developed to monitor and describe the level of suspected opioid overdose EMS incidents in the County of Riverside from January 1st, 2018 through June 30th, 2021. During this time, there was a total of 8,941 suspected opioid overdoses. Of those, 434 were suspected overdose fatalities according to EMS records.

Suspected opioid overdose was also displayed by several other factors: age, gender, geography, narcan 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 41% of all suspected opioid overdose cases and males account for 71% 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 931 overdoses (27%), nearly one third of all incidents which is consistent with the most populous region in the county. In addition, Riverside city experienced an average of 15.1% (1,351 incidents) of suspected opioid overdoses from 7/1/2018-6/30/2021. Narcan was documented to have been administered in an average of 58% of suspected opioid overdose EMS calls (1.3% of the time narcan was administered by someone other than EMS providers). In addition, heroin and alcohol were the most common causes of suspected overdose fatalities cases in Riverside County from 7/1/2018-6/30/2021.

Comparing the frequency of suspected opioid overdose patient encounters from Jan 2018-June 2021 showed that 2020 incurred the highest average of repeat patient encounters for suspected opioid overdose (1.3 times). However, the partial year data from 2021 suggests that 2021 will be higher than 2020 by the end of the year. In other words, since June 2018, patients that experienced a suspected opioid overdose utilized EMS services on average more than once.

Methodology

Data from this report was extracted from FirstWatch® "Trigger OD 2: Opioid Overdose" (July 1st,2018- June 30th, 2021). A total of 8,941 unique electronic patient care reports were used out of 12,119 total records pulled. The data was de-duplicated based on incident location, name, time, age, and gender. This process removed 3,178 duplicate records.
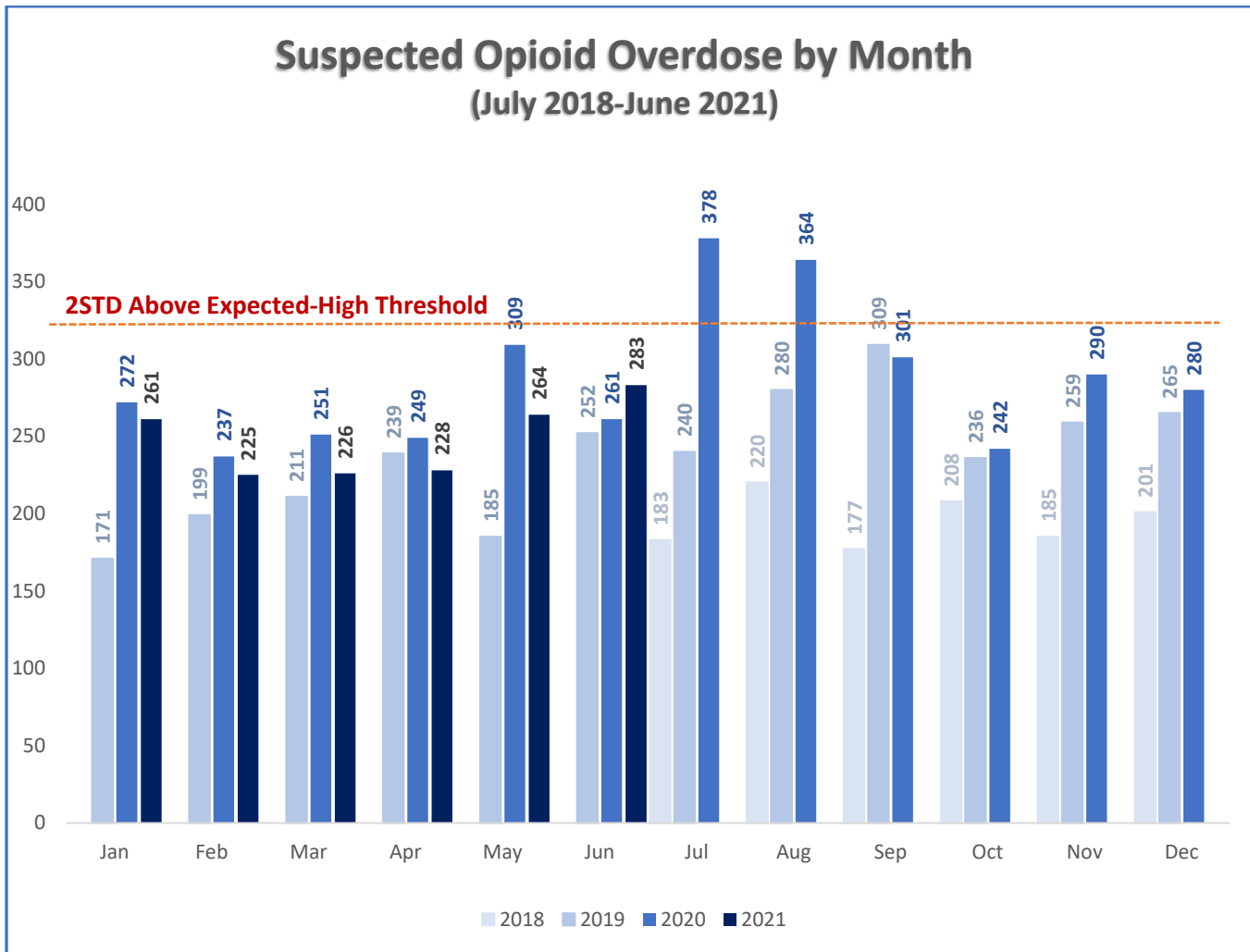
Spatial data was analyzed with Arc GIS. Map layers for EMS Zones (Ambulance and Fire Zones) and Riverside cities were used for figure 6A, 6B, 7A, and 7B. The cities and zones were tagged to fatality data from FirstWatch® "Trigger OD 2: Opioid Overdose" (July 1st, 2018-June 30th, 2021).

Data for figures 8A and 8B was extracted from FirstWatch® "Trigger OD 3: Opioid & All Drugs" (January 1st, 2020-June 30th, 2021). A total of 8,301 unique electronic patient care reports were used out of 14,650 total records pulled. Data that contained records where no drug was mentioned in the narrative were excluded for analysis (N=3,073). The data was de-duplicated based on incident location, time, age, and gender. This process removed a total of 6,349 duplicate records.
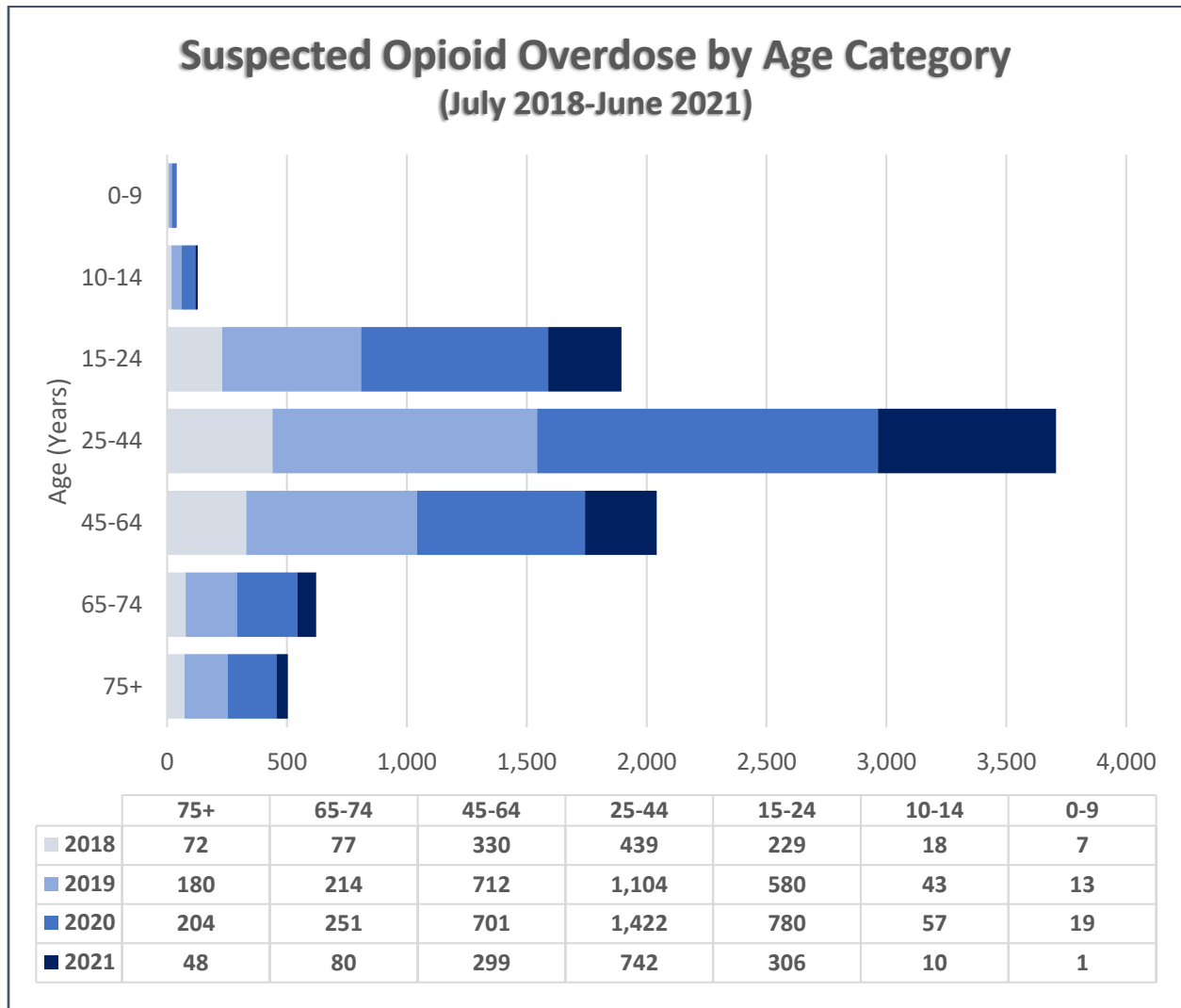
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Figure 1: Surveillance of Suspected Opioid Overdoses in the County of Riverside

Suspected Opioid Overdose by Month
(July 2018-June 2021)

2STD Above Expected-High Threshold
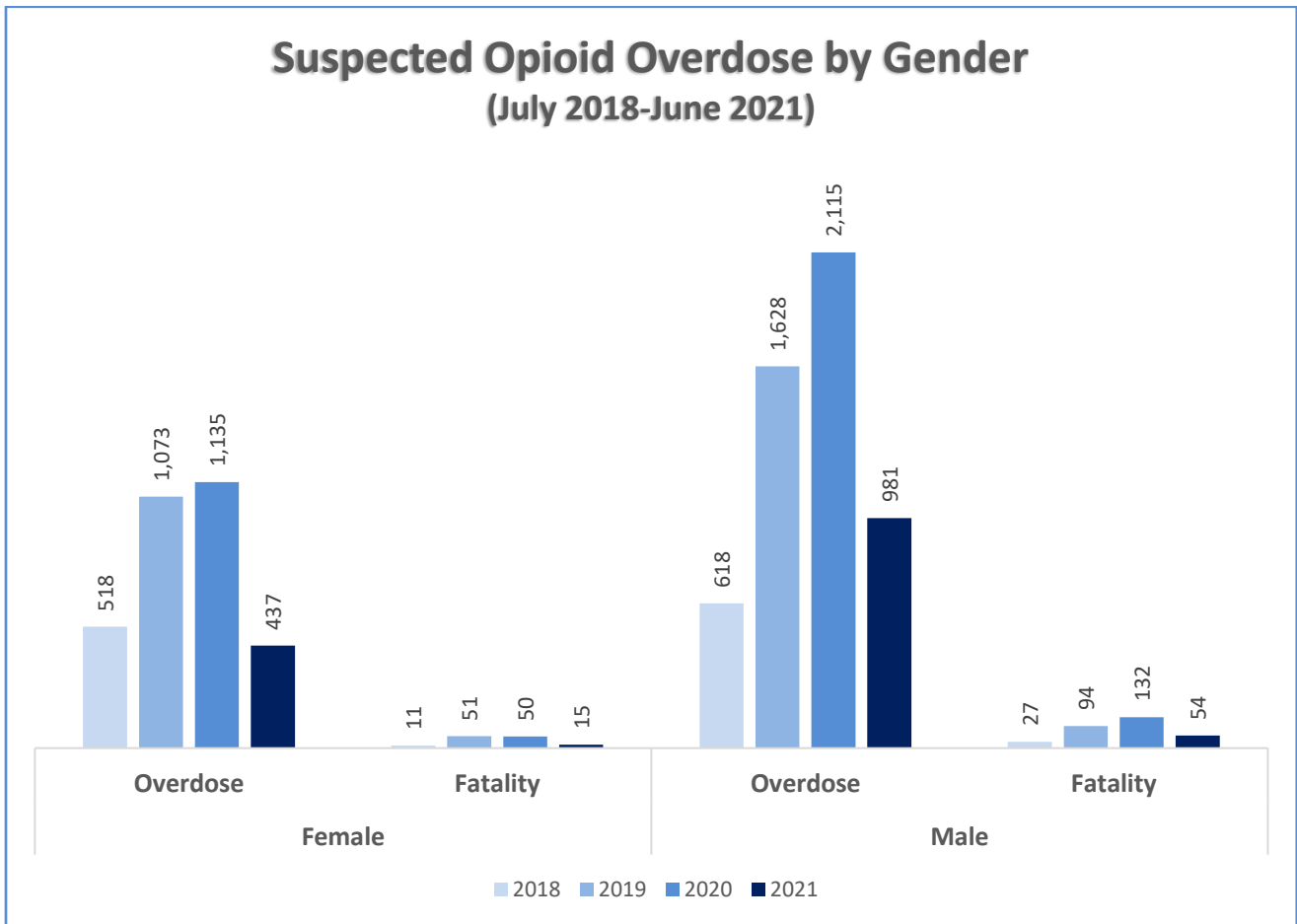
Legend: 2018, 2019, 2020, 2021

The following data was extracted from FirstWatch OD2- Opioid Overdose from July 1st, 2018- June 30th, 2018 (N=8,941). 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 lines shows 2 standard deviations above the mean frequency per month of opioid overdoses, calculated from 2018 data. There were a total 2 months that exceeded 2 standard deviations above the monthly mean frequency in July-August 2020. Months that displayed a higher frequency of incidents were monitored closely.

**Figure 2: Suspected Opioid Overdoses by Age Category & Year**

Suspected Opioid Overdose by Age Category
(July 2018-June 2021)

	75+	65-74	45-64	25-44	15-24	10-14	0-9
2018	72	77	330	439	229	18	7
2019	180	214	712	1,104	580	43	13
2020	204	251	701	1,422	780	57	19
2021	48	80	299	742	306	10	1

The following data was extracted from FirstWatch OD2- Opioid Overdose from July 1ˢᵗ, 2018- June 30ᵗʰ, 2021 (N=8,941). The 25-44 age group consistently represented the most significant age category for suspected opioid overdoses each year consisting of an average of 41% (3,707 patients) of the total suspected opioid overdoses. The proportion of 25-44 year old suspected opioid overdose patients has been increasing each year from 2018-2021, increasing from 37% (439 patients) to 50% (742 patients).

Figure 3: Suspected Opioid Overdoses by Gender & Year

Suspected Opioid Overdose by Gender
(July 2018-June 2021)

Female — Overdose: 518 (2018), 1,073 (2019), 1,135 (2020), 437 (2021)
Female — Fatality: 11 (2018), 51 (2019), 50 (2020), 15 (2021)
Male — Overdose: 618 (2018), 1,628 (2019), 2,115 (2020), 981 (2021)
Male — Fatality: 27 (2018), 94 (2019), 132 (2020), 54 (2021)
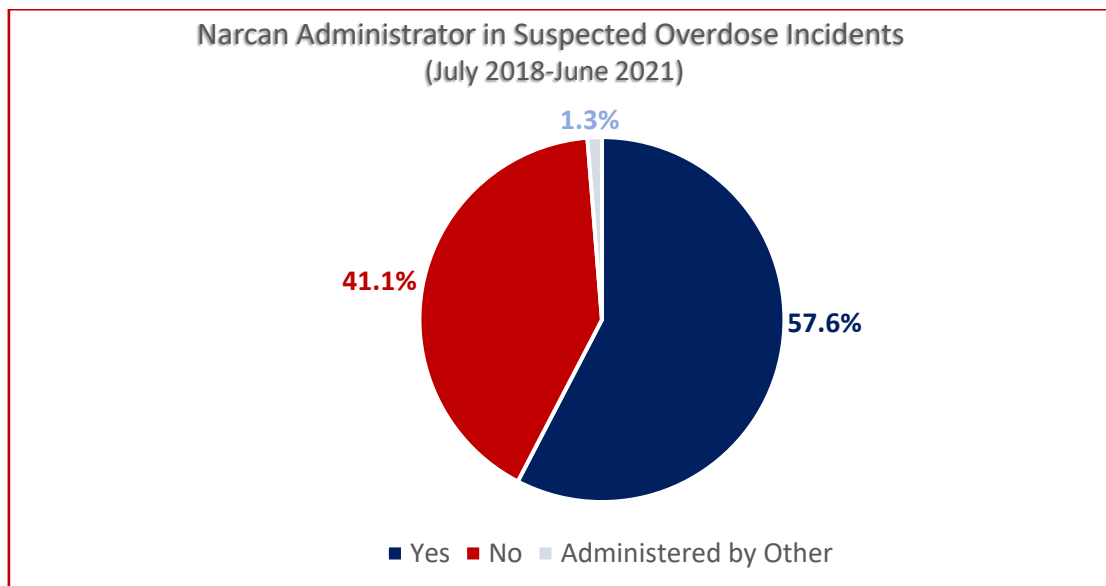
Legend: 2018, 2019, 2020, 2021

The following data was extracted from FirstWatch OD2- Opioid Overdose from July 1st, 2018- June 30th, 2021 (N=8,939). Records in which gender was labeled "Unknown", "Unable to Determine", or "blank" were removed (2 records). Males made up 60% of all suspected opioid overdoses and 307 of all 434 suspected opioid overdose fatalities (71%).

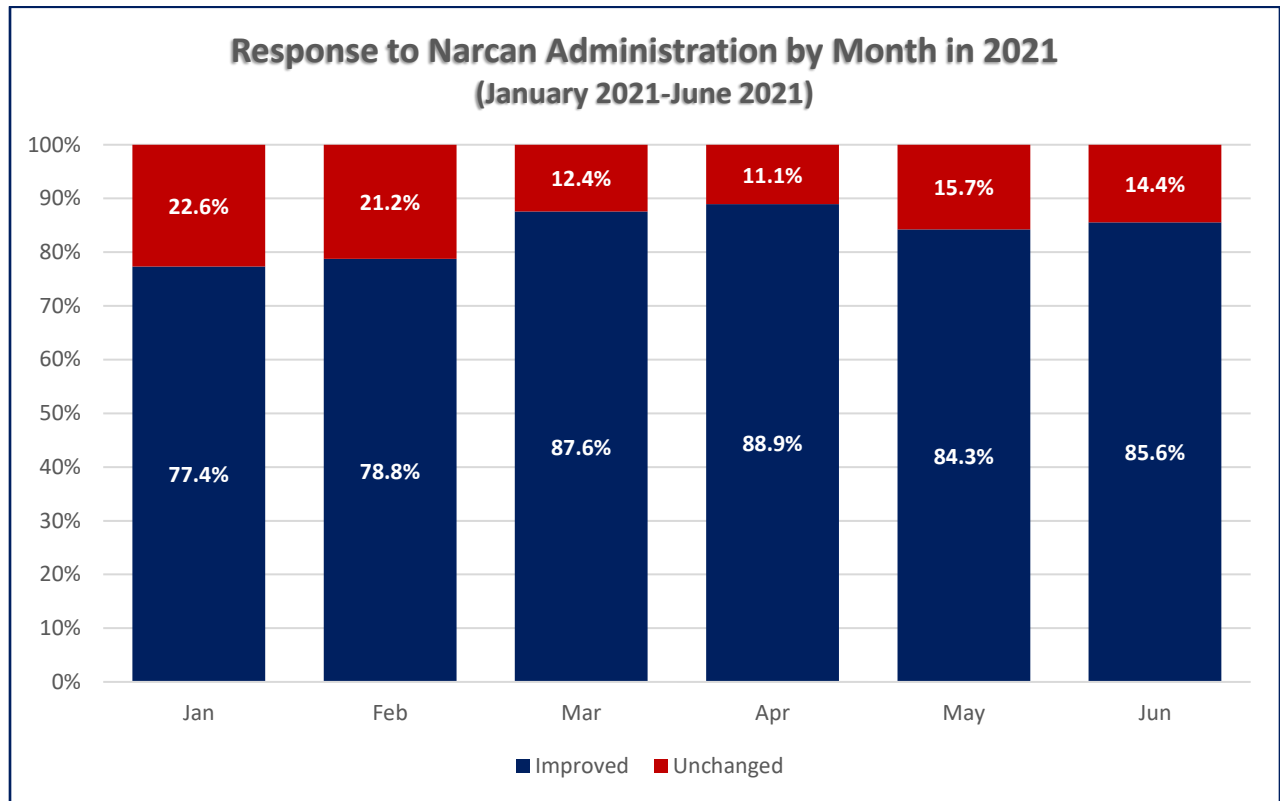**Figures 4A: Narcan Administration in Suspected Opioid Overdose Incidents**
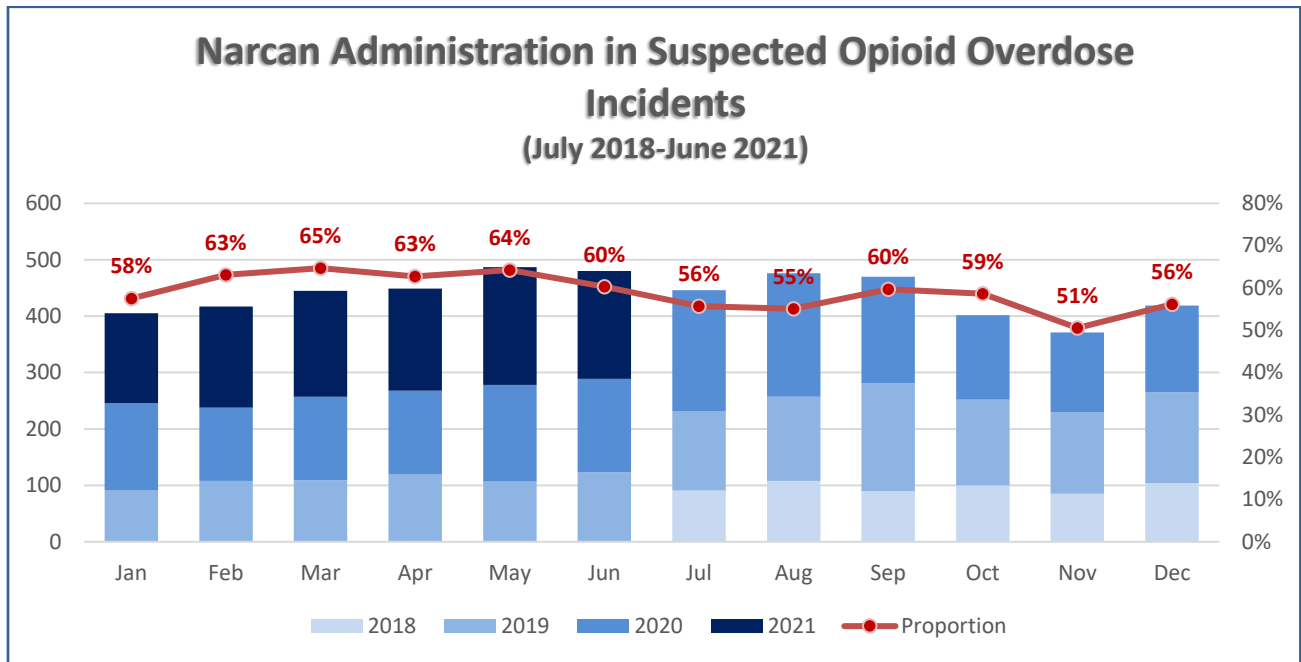
The following data was extracted from FirstWatch OD2- Opioid Overdose from July 1st, 20218- June 30th, 2021 (N=3,460). Narcan was administered in 58% of all suspected opioid overdose incidents. July had the greatest volume of suspected opioid overdose incidents where narcan was administered with close to 406 incidents (64%).

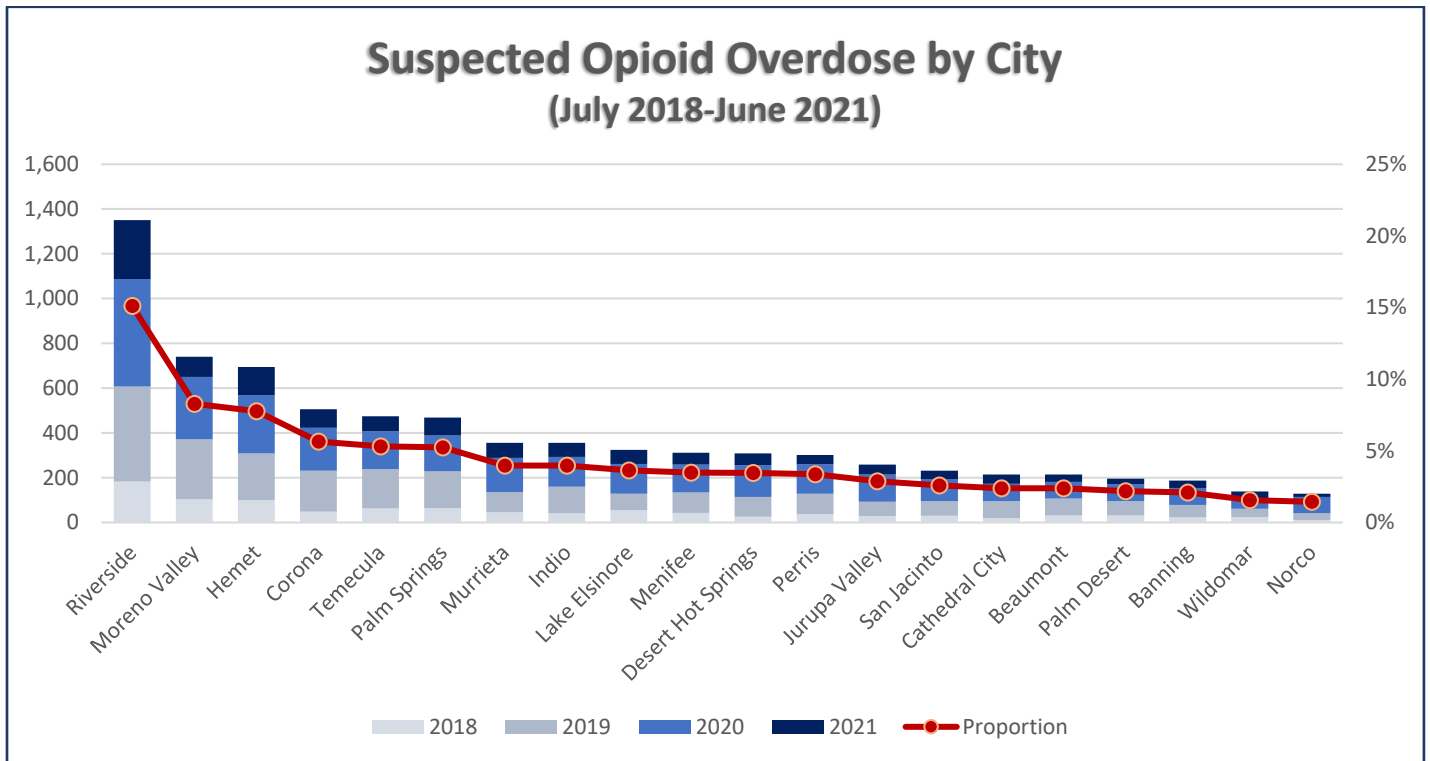**Figures 4B: Narcan Administrator in Suspected Opioid Overdose Incidents**

The following data was extracted from FirstWatch OD2- Opioid Overdose from July 1st, 20218- June 30th, 2021 (N=3,460). In this analysis, narcan was either administered by EMS providers, law enforcement/bystanders/others, or not at all. Narcan was administered by EMS providers in suspected opioid incidents nearly 58% of the time. Records also indicated that narcan was administered by someone else in 1.3% of incidents.

Figures 5: Treatment Efficacy of Narcan Administration in Suspected Opioid Overdose Incidents (NEW METRIC)

The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1st, 2021- June 30th, 2021 (N=1,306). The response to narcan treatment in suspected opioid overdose calls was evaluated based on whether or not there was an improvement in patient mentation and/or respiration rate. Since the beginning of 2021, there has been an overall improvement in patient response to narcan administration. For example, approximately 77.4% of suspected opioid overdose patients experienced an improvement following administration compared to June with approximately 85.6% improvement. The month with the greatest level of improvement was in April with close to 89% improvement in patient response.

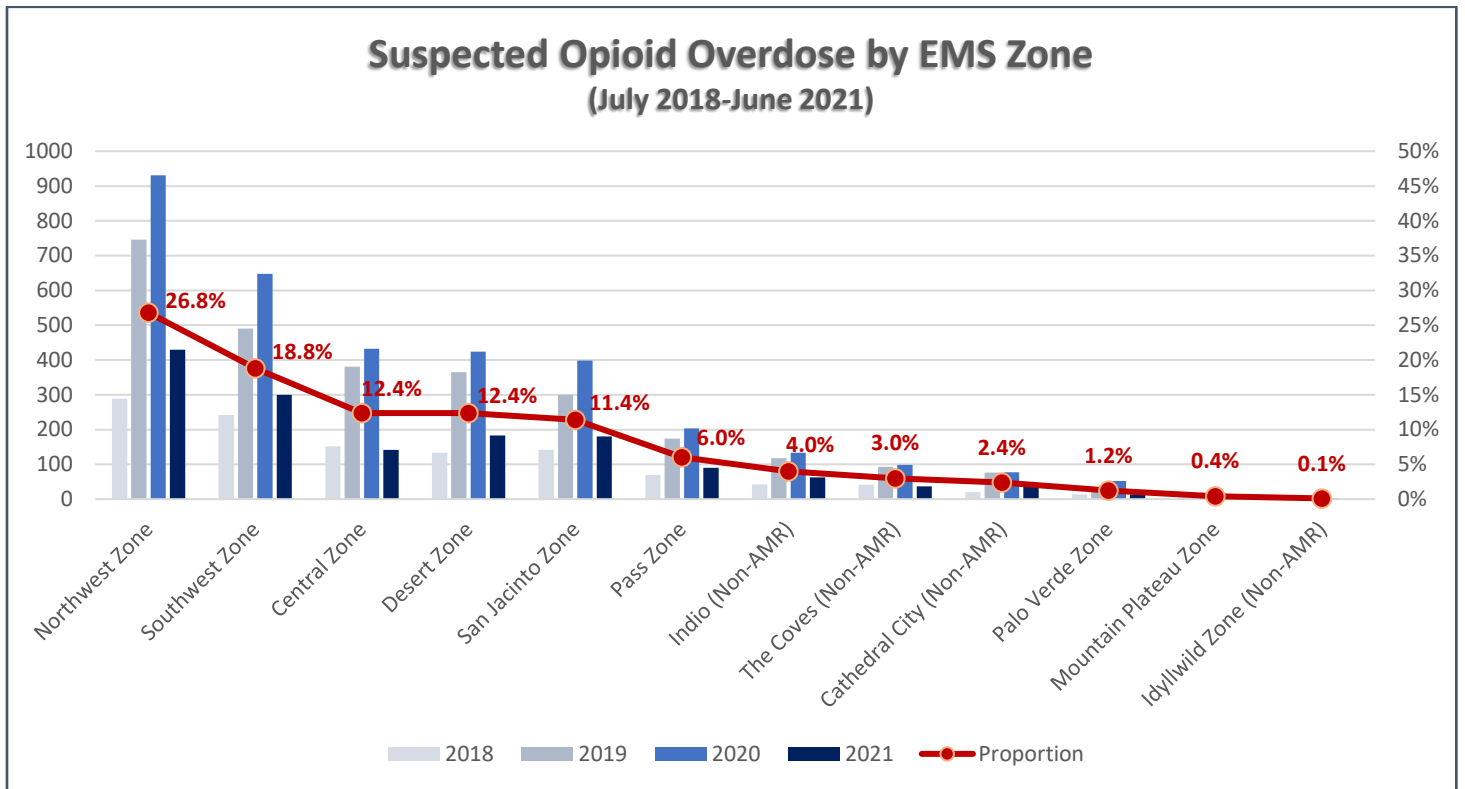**Figure 6A: Suspected Opioid Overdoses by City**

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021) (N=8,941). The frequency of suspected opioid overdoses is greatest in Riverside (15.1%), Moreno Valley (8.3%), and Hemet (7.8%). It is important to note that the greatest number of suspected opioid overdoses with 1,351 incidents, but the population is much greater which is to be expected.

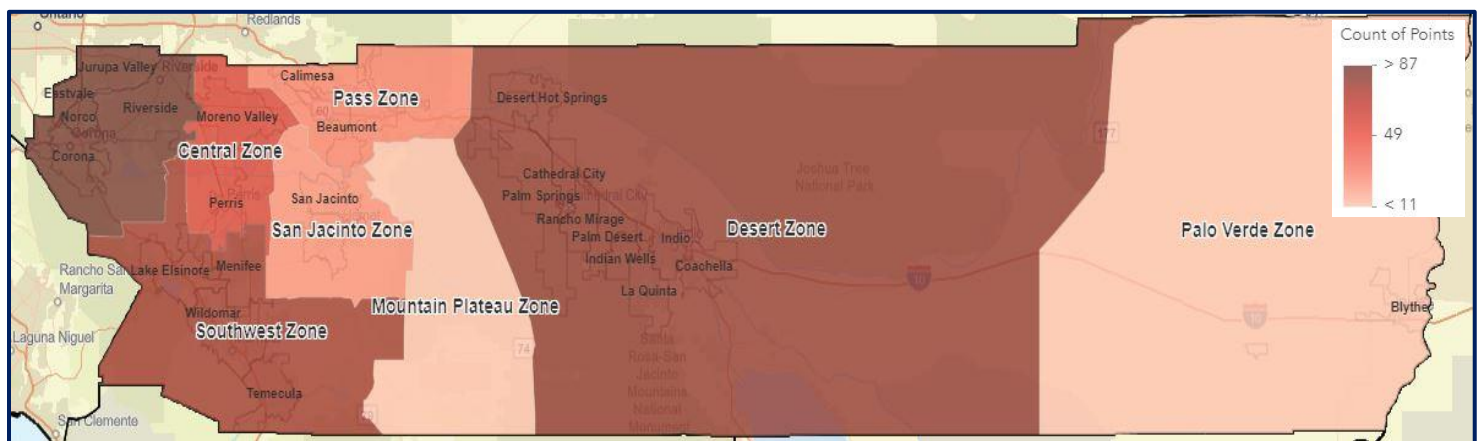**Figure 6B: Suspected Opioid Overdose Fatality by City**

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021). (N=434). The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents by Riverside County city. Dark blue areas are considered cities with higher concentrations of opioid overdose fatality incidents encountered by EMS providers (>23 incidents). Riverside, Moreno Valley, and Indio displays the greatest frequency of suspected opioid overdose fatalities.

Figure 7A: Suspected Opioid Overdose Fatality by EMS Zone (Ambulance/Fire Zones)
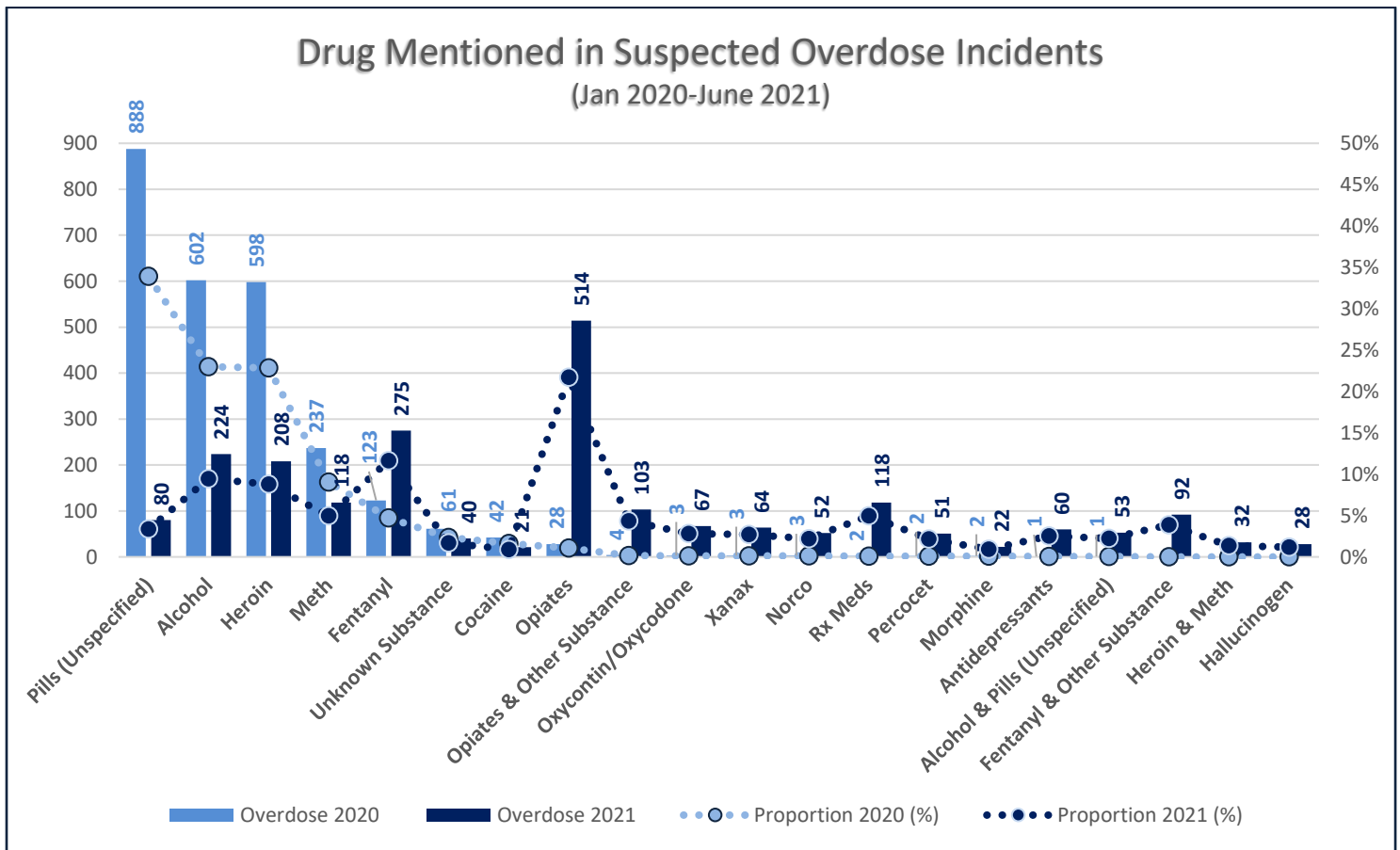

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021); N=8,941. The ambulance/first responder zone data was taken from the GIS map layer-EMS Zone. That fatality data was tagged by zone accordingly. The Northwest EMS zone encountered the greatest proportion of suspected opioid overdoses at 26.8% and the largest number of suspected opioid overdoses in 2020 (931 overdoses).

Figure 7B: Map of Suspected Opioid Overdose Fatality by EMS Zone (Ambulance/Fire Zones)
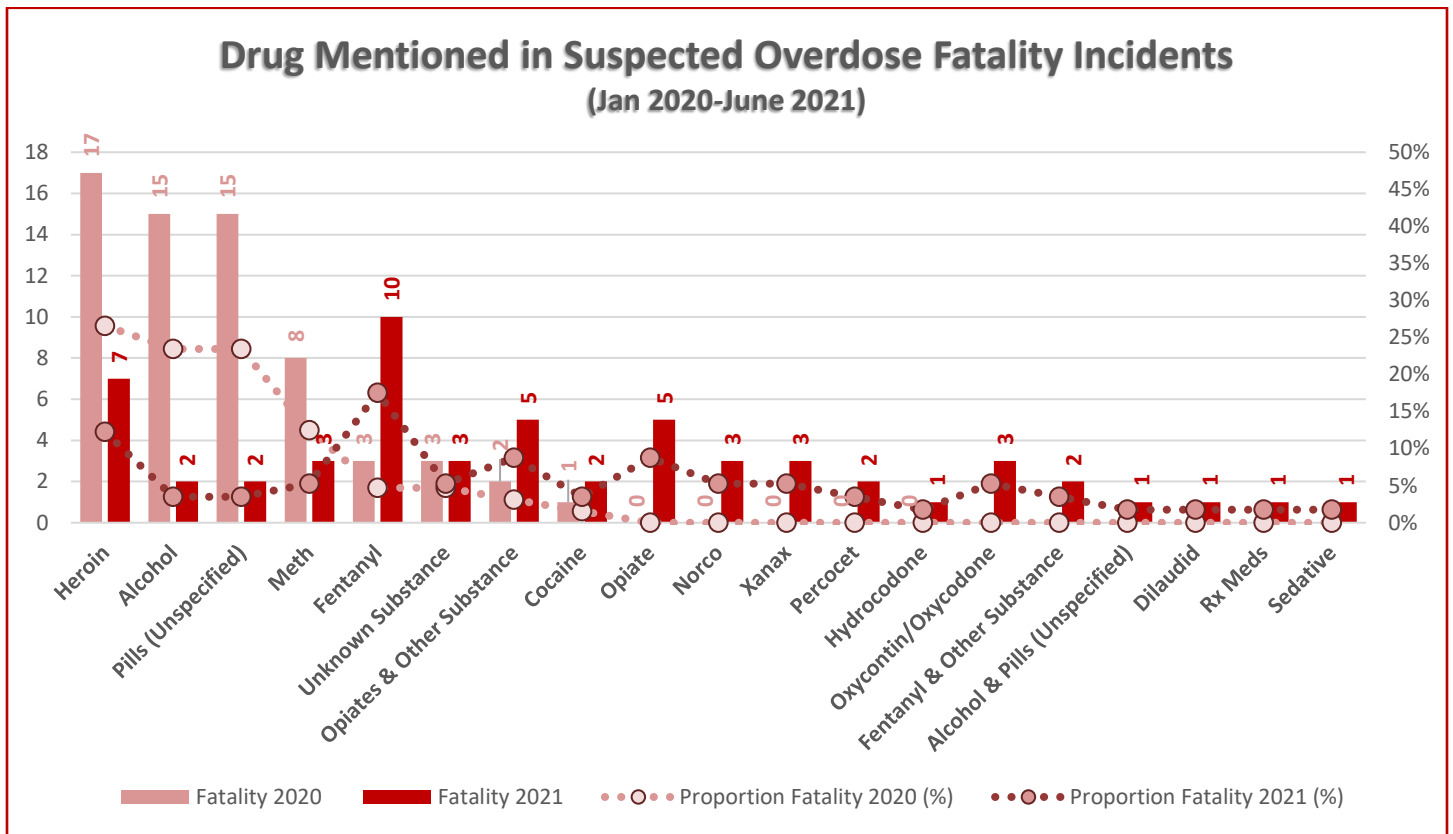

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021). (N=434). The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents by EMS Zone. Dark red areas are considered cities with higher concentrations of opioid overdose fatality incidents encountered by EMS providers (>87 incidents). The Northwest zone accounted for the greatest number of fatalities.

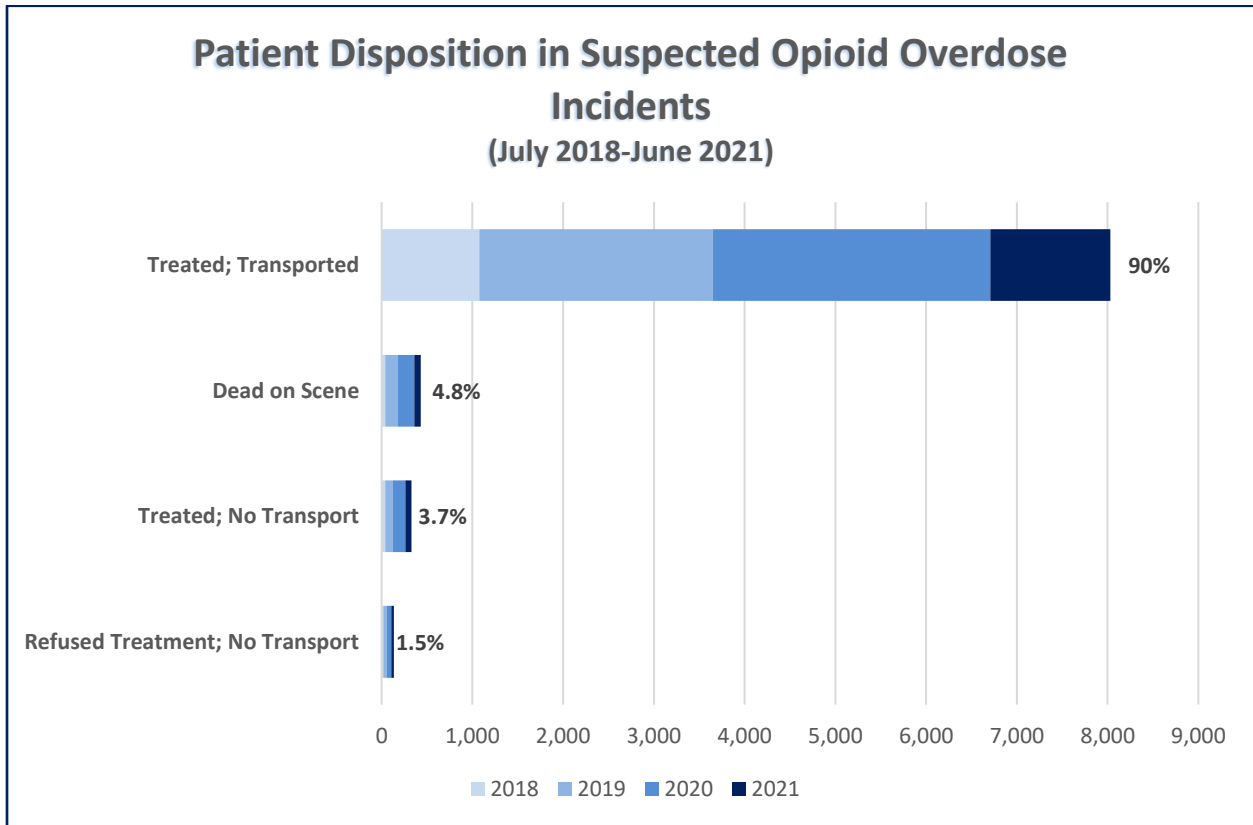**Figure 8A: Frequency of Overdose by Drugs Mentioned in Patient Care Report Narrative**

The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (January 1st, 2020-June 30th, 2021); (N=8,301). *Pills-unspecified, Alcohol, and* Heroin were the most common cause for suspected overdose incidents in 2020. "Pills" were used to code all different types of narcotics, most commonly used for opiates such as *Oxycodone* and *Percocet.* Narratives that did not contain specific drug terminology were excluded in the analysis (40% of total).

Figure 8B: Frequency of Fatal Overdose by Drugs Mentioned in Patient Care Report Narrative

Drug Mentioned in Suspected Overdose Fatality Incidents (Jan 2020-June 2021)

Legend: Fatality 2020 | Fatality 2021 | Proportion Fatality 2020 (%) | Proportion Fatality 2021 (%)
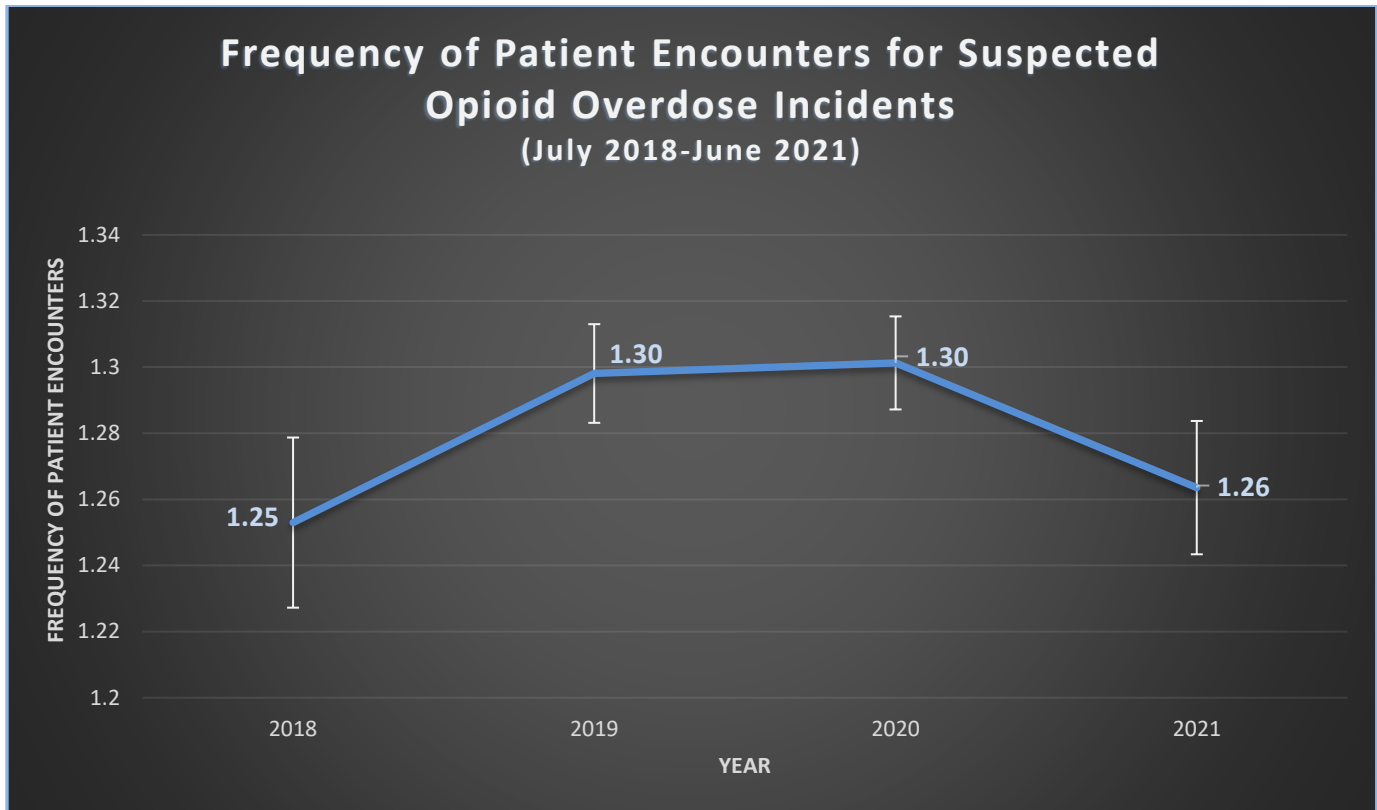
The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (January 1st, 2020-June 30th, 2021); (N=348). Opioid-related drugs were the most commonly named narcotic in fatal drug overdose narratives (~70%). Many of the narratives did not contain specific drug terminology and were therefore excluded in the analysis (N=226, 65%).

Figure 9: Suspected Opioid Overdose Incidents by Patient Disposition

Patient Disposition in Suspected Opioid Overdose Incidents
(July 2018-June 2021)

Treated; Transported — 90%
Dead on Scene — 4.8%
Treated; No Transport — 3.7%
Refused Treatment; No Transport — 1.5%

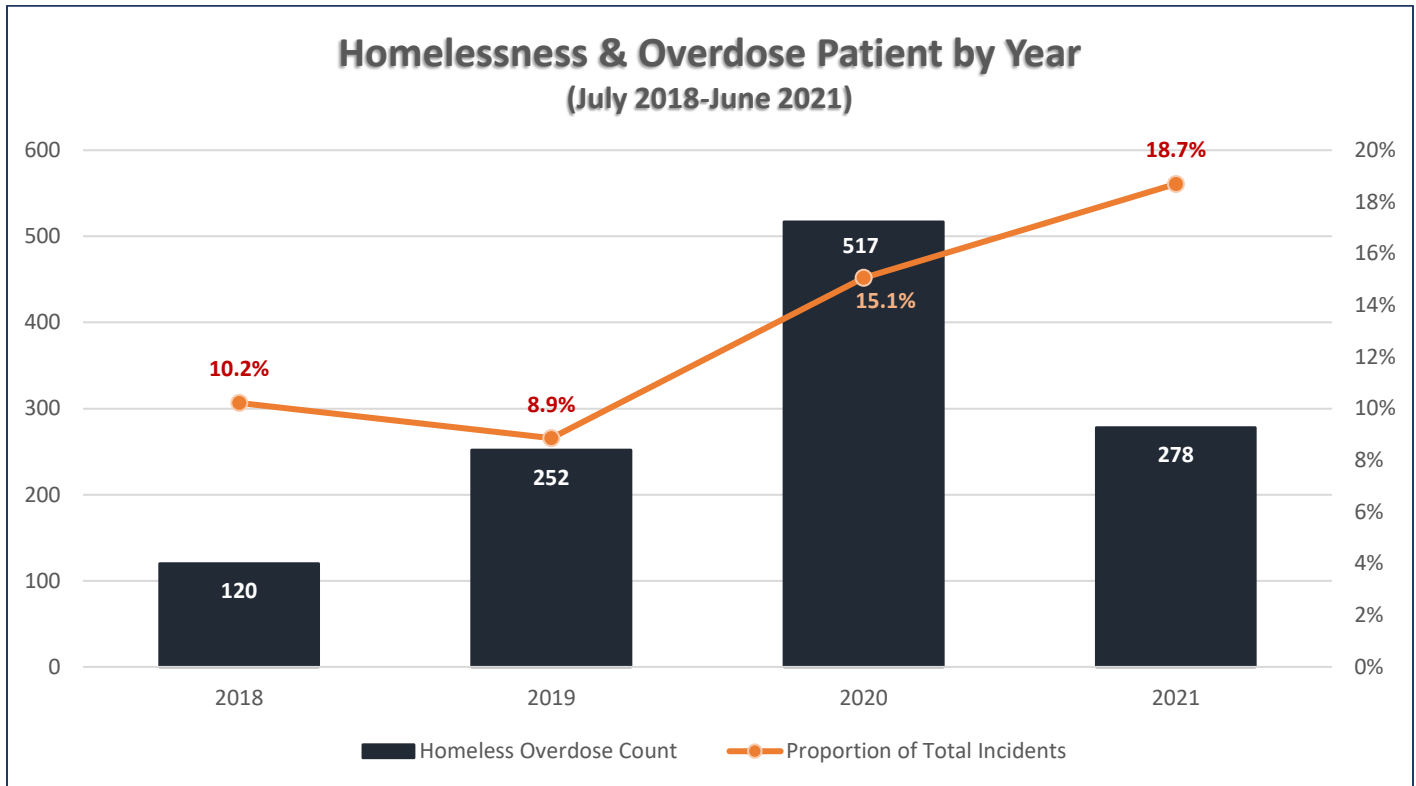Legend: ■ 2018 ■ 2019 ■ 2020 ■ 2021

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021)(N=8,924). Incident/Patient disposition (eDisposition.12) was evaluated to determine willingness of patient to comply with EMS provider recommendations. It was found that while the majority of patients were willing to be treated and transported by the EMS unit (90%), 5.2% were either unwilling to be treated and/or transported. The overall proportion of patient willingness to be treated and transported has increased each year. Nearly 5% of the incidents were from suspected opioid overdose fatalities. This could have antagonistic effects on the health of opioid overdose patients in the future.

Figure 10: Frequency of Patient Encounters with EMS Providers by Year
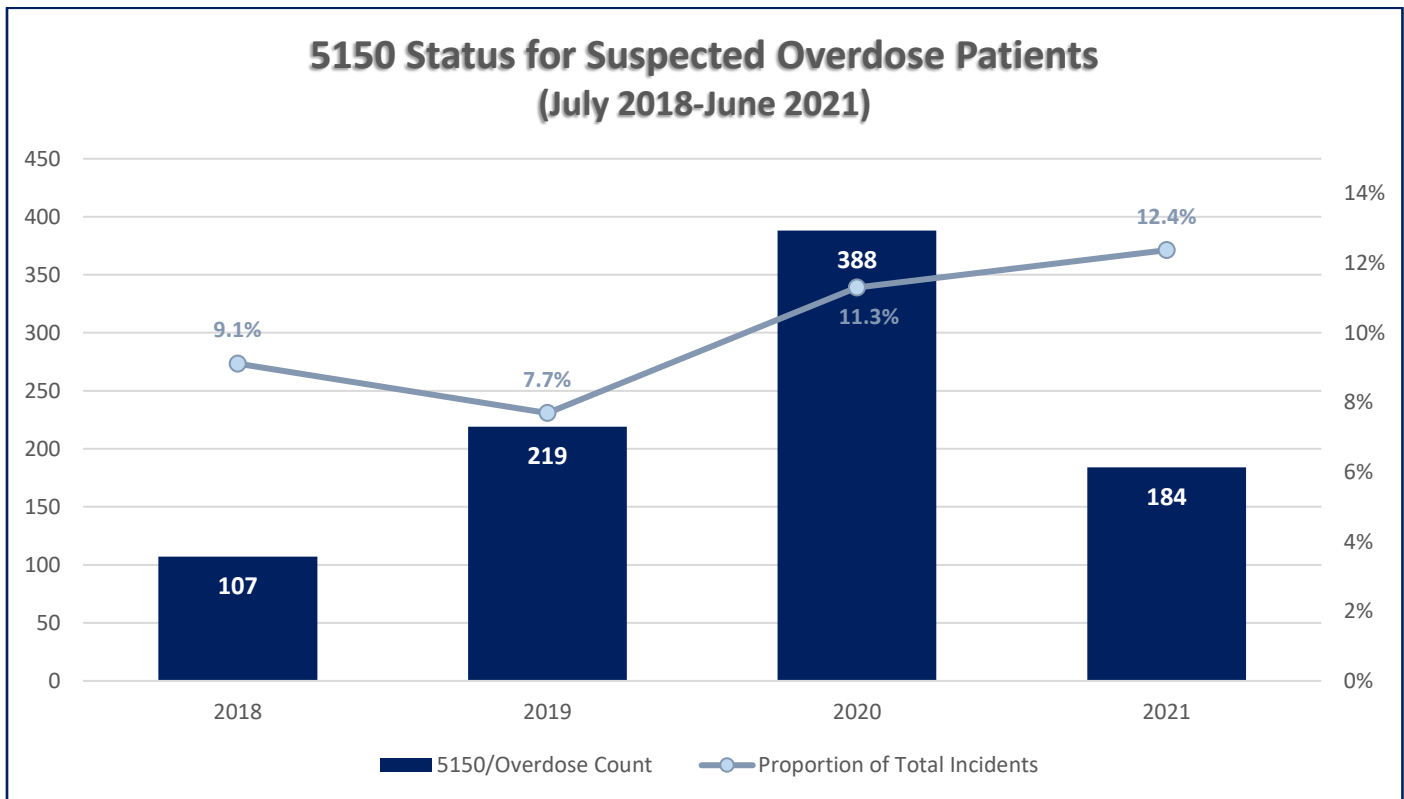

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021, N=8,941). The number of times that individual patients utilized EMS services for suspected opioid overdoses was calculated each year. The greatest frequency of EMS encounters by suspected opioid overdose patients occurred in 2020 at an average of 1.3 encounters. The error bars represent the standard error of the mean frequency for each year. There was a significant difference in the frequency of patient encounters from 2020 to 2021. However, it must be mentioned that 2021 only includes data from January 1st, 2021-June 30th, 2021 so this average can be expected to increase pending data from the rest of the year.

Figure 11: Homeless Status of Suspected Overdoses by Year

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021, N=1,167) and ImageTrend ELITE using the field itpatient.025 "Is patient homeless?" to match records. The matched records were then aggregated as yearly totals. The highest number of suspected overdose patients with homeless status occurred in 2020. However, it should be noted that totals from 2018 and 2021 only include half of the year and the total patients in 2021 (Jan-June, 278 patients) exceeds the same time period from 2020. Also, 2021 displayed the greatest proportion of suspected overdose patients with homeless status compared to the total number of suspected overdoses (18.7%) that year.

Figure 11: 5150 Status of Suspected Overdoses by Year

The following data was extracted from FirstWatch OD 2: Opioid Overdose (July 1st, 2018-June 30th, 2021, N=898) and ImageTrend ELITE using provider primary & secondary impression to determine whether or not a 5150 was issued during the incident. Electronic patient care record numbers were used to match records. The matched records were then aggregated as yearly totals. The highest number of suspected overdose patients with 5150 status occurred in 2020. However, it should be noted that totals from 2018 and 2021 only include half of the year and the total patients in 2021 (Jan-June, 184 patients) exceeds the same time period from 2020. Also, 2021 displayed the greatest proportion of suspected overdose patients issued a 5150-status compared to the total number of suspected overdoses (12.4%) that year.