



RIVERSIDE COUNTY EMS AGENCY  
**EMS SUSPECTED OVERDOSE REPORT:**  
*OPIOIDS & ALL DRUGS*  
2022

MAY 3, 2023

PREPARED FOR RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

# EMS SUSPECTED OVERDOSE REPORT

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This report was developed to monitor and describe suspected overdose incidents based on Emergency Medical Services (EMS) electronic patient care reports (ePCRs) in the County of Riverside from January 1<sup>st</sup>, 2022 through December 31<sup>st</sup>, 2022. During this time, there were 4,558 suspected overdoses overall and 3,130 suspected opioid overdoses. Of all suspected overdoses, 177 on-scene fatalities occurred while 151 fatalities (85.3%) were considered opioid-related. The frequency of suspected overdose patient encounters from January 1<sup>st</sup>, 2017 - December 31<sup>st</sup>, 2022 revealed that, on average, patients encountered EMS providers 5 times. For suspected overdose patients found dead at scene, there was an average of 3 prior EMS encounters.

Suspected overdose is displayed by several other factors: age, gender, ethnicity, geography, and frequency of EMS encounters. Suspected overdose for all drugs was also examined by substance use, patients experiencing homelessness and/or combined with a mental health crisis. Suspected opioid overdose calls were also examined by naloxone administration. Analysis of age groups and gender determined that the 25–44-year-olds comprise 51% of all suspected overdose cases, and males account for 67% of all suspected overdoses (73% of opioid only suspected overdoses). Spatial analysis indicated that the Northwest EMS Zone accounted for the largest number of suspected overdoses by zone with 1,303 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% (744 incidents) of the suspected overdoses from 1/1/2022-12/31/2022.

Naloxone, an opioid antagonist given to reverse the effects of opiates, was documented to have been administered in 91% of suspected opioid overdose EMS calls (26% 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 (398 incidents). In addition, fentanyl, alcohol, and methamphetamine were the most common causes of suspected overdose calls cases in Riverside County for 2022.

## Methodology

Suspected overdose data was extracted from FirstWatch® trigger “OD-3: Opioid & All Drugs” (OD-3) which looks at all suspected overdose EMS encounters; and trigger “OD-2: Opioid Overdose” (OD-2) which looks only at opioid-related overdose encounters. Riverside County’s dual 9-1-1 medical response system where a fire department medic unit and an ambulance transport provider medic unit arrive on-scene, generally results in two records per patient encounter. The data was de-duplicated based on incident time and location, disposition, patient age, and sex to get down to patient-level. Records were identified as suspected overdose by symptomology, medications administered, medication response, patient care record narratives and primary & secondary impressions of EMS providers on scene.

Data from the **OD-3** trigger which looks at all suspected overdoses, was extracted from January 1<sup>st</sup>, 2020 through December 31<sup>st</sup>, 2022. A total of 34,468 records were pulled. The validation process removed a total of 19,648 records, resulting in a final count of **14,820 unique** electronic patient care reports.

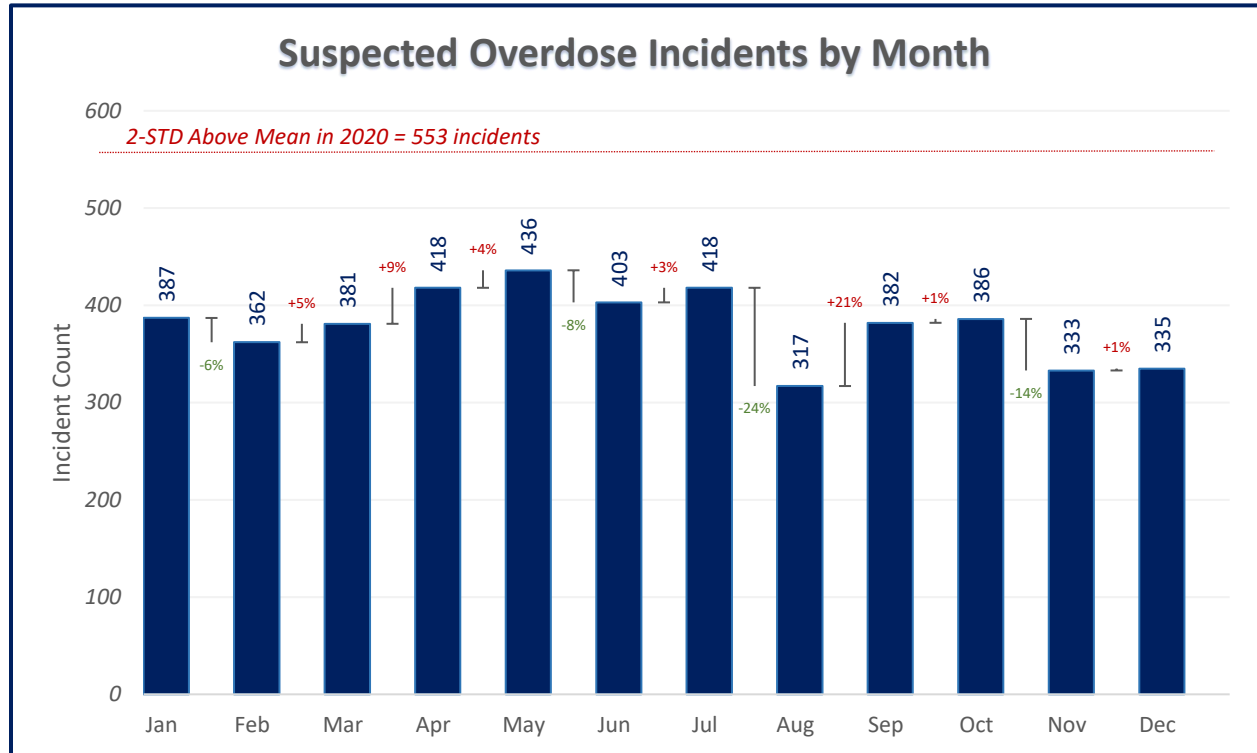
Data from the **OD-2** trigger which looks only at opioid related responses was extracted from January 1<sup>st</sup>, 2021 through June 30<sup>th</sup>, 2022. A total of 13,245 records were pulled. The validation process removed a total of 7,103 records resulting in a final count of **6,142 unique** electronic patient care reports.

Spatial data was analyzed with Arc GIS® mapping tools. Map layers for Riverside County’s defined EMS zones and Riverside cities were used for figure 6A, 6B, 7A, and 7B. The zip codes and zones were tagged to suspected overdose data from FirstWatch® trigger “OD-3: Opioids & All Drugs” for January 1<sup>st</sup>, 2022, through December 31<sup>st</sup>, 2022, only.

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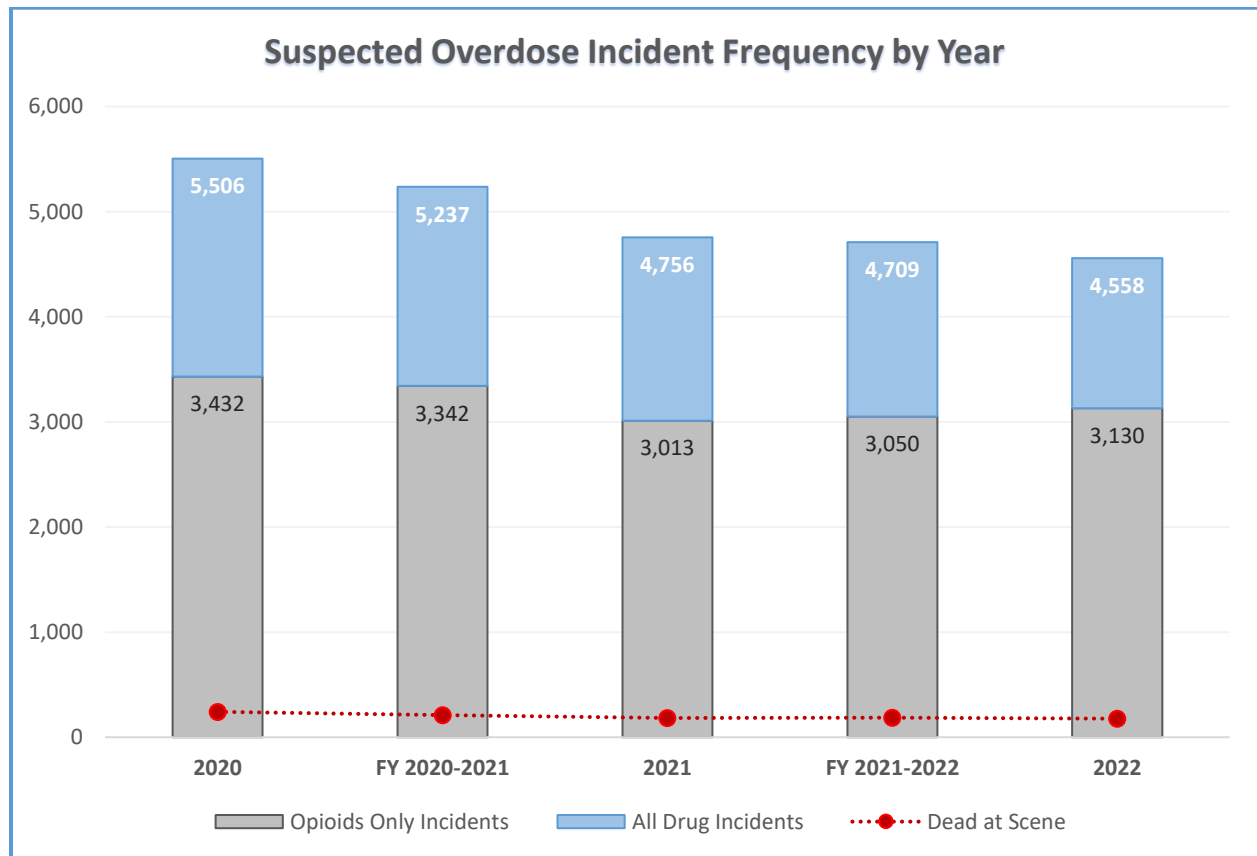
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**Figure 1: Surveillance of Suspected Overdoses in the County of Riverside**



The following data was extracted from FirstWatch OD3- Opioids & All Drugs from January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022 (N=4,558). The frequency of suspected overdose incidents 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 overdoses, calculated from 2020 calendar year data. There were no months during the year that exceeded that threshold.

**Figure 2: Comparison of Suspected Opioid & All Drug Overdoses by Year**

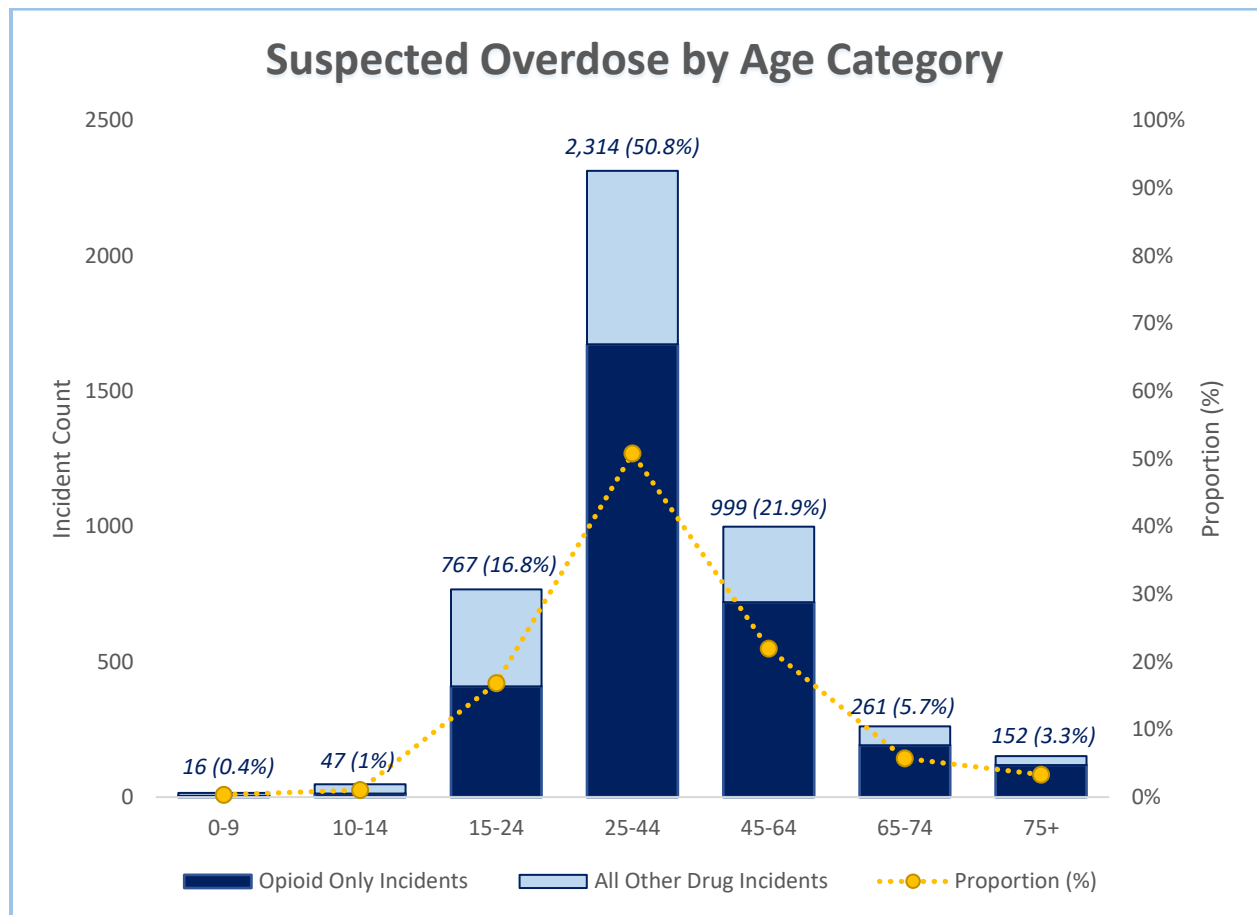


The data above was extracted from FirstWatch OD 3: Opioids & All Drugs (January 1<sup>st</sup>, 2020-December 31<sup>st</sup>, 2022, N=14,820). The 2020 calendar year displayed the greatest number of overdoses and fatalities. The greatest overall difference in suspected overdose volume that occurred was in the 2020-2021 fiscal year compared to 2021 with a drop in volume of 481 patients (-9.2%).

\*ANOVA test shows a significant difference between years ( $p < 0.05$ ).

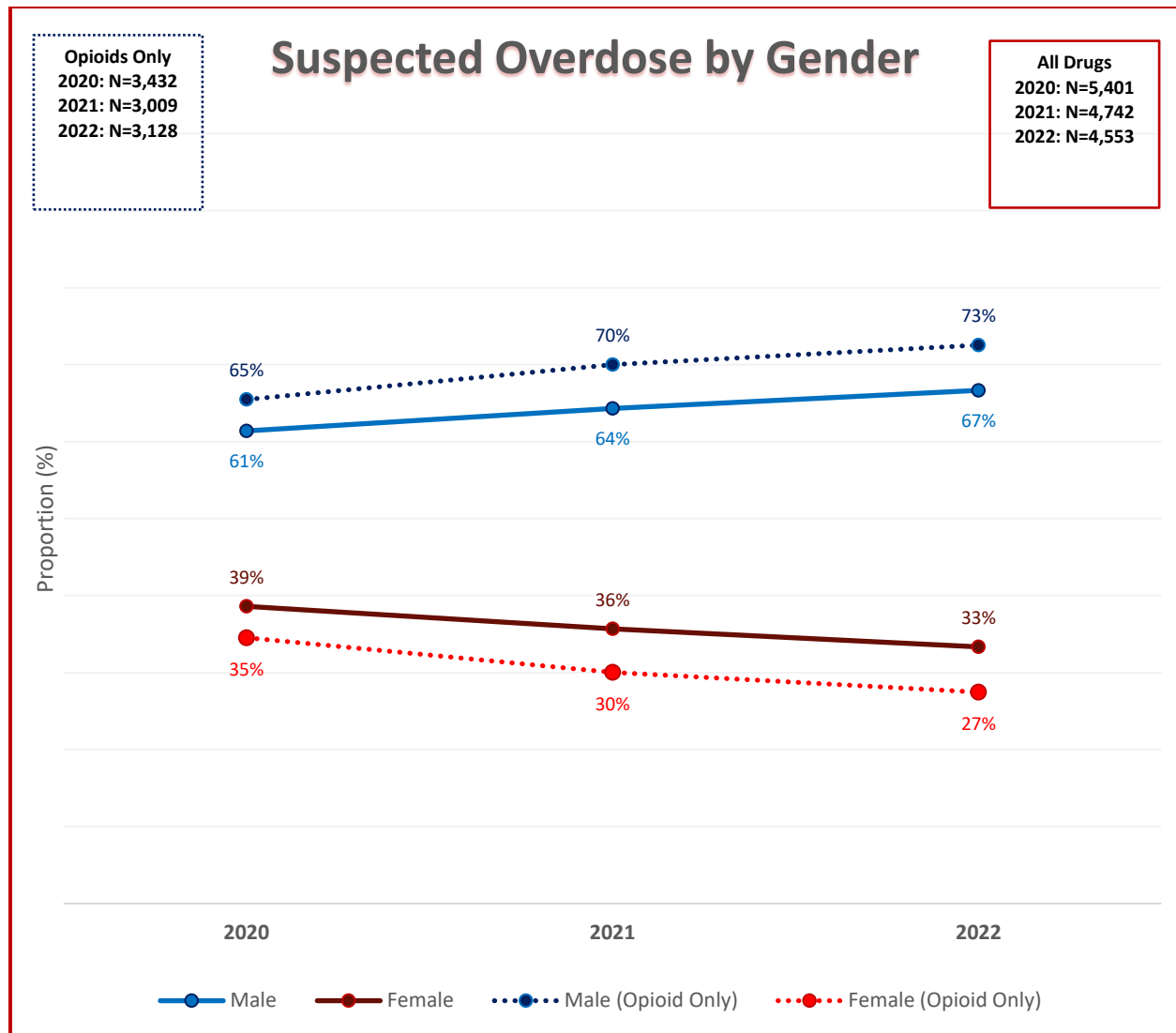
Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
2020	12	5,506	458.83	2,194.70		
2021	12	4,756	396.33	982.97		
2022	12	4,558	379.83	1,379.06		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	41,678	2	20,839	13.71972	4.61E-05	3.284918
Within Groups	50,124	33	1,518.91			
Total	91,802	35				

**Figure 3: Suspected Opioids & Other Drug Overdoses by Age Category**



The following data was extracted from FirstWatch OD3- Opioid & All Drugs from January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022 (N=4,556). The 25-44 age group represents the most substantial age category for suspected opioid and all drug overdoses each year consisting of an average of 51% (2,314 incidents) of the total suspected overdoses (1,673 incidents for opioid only suspected overdoses).

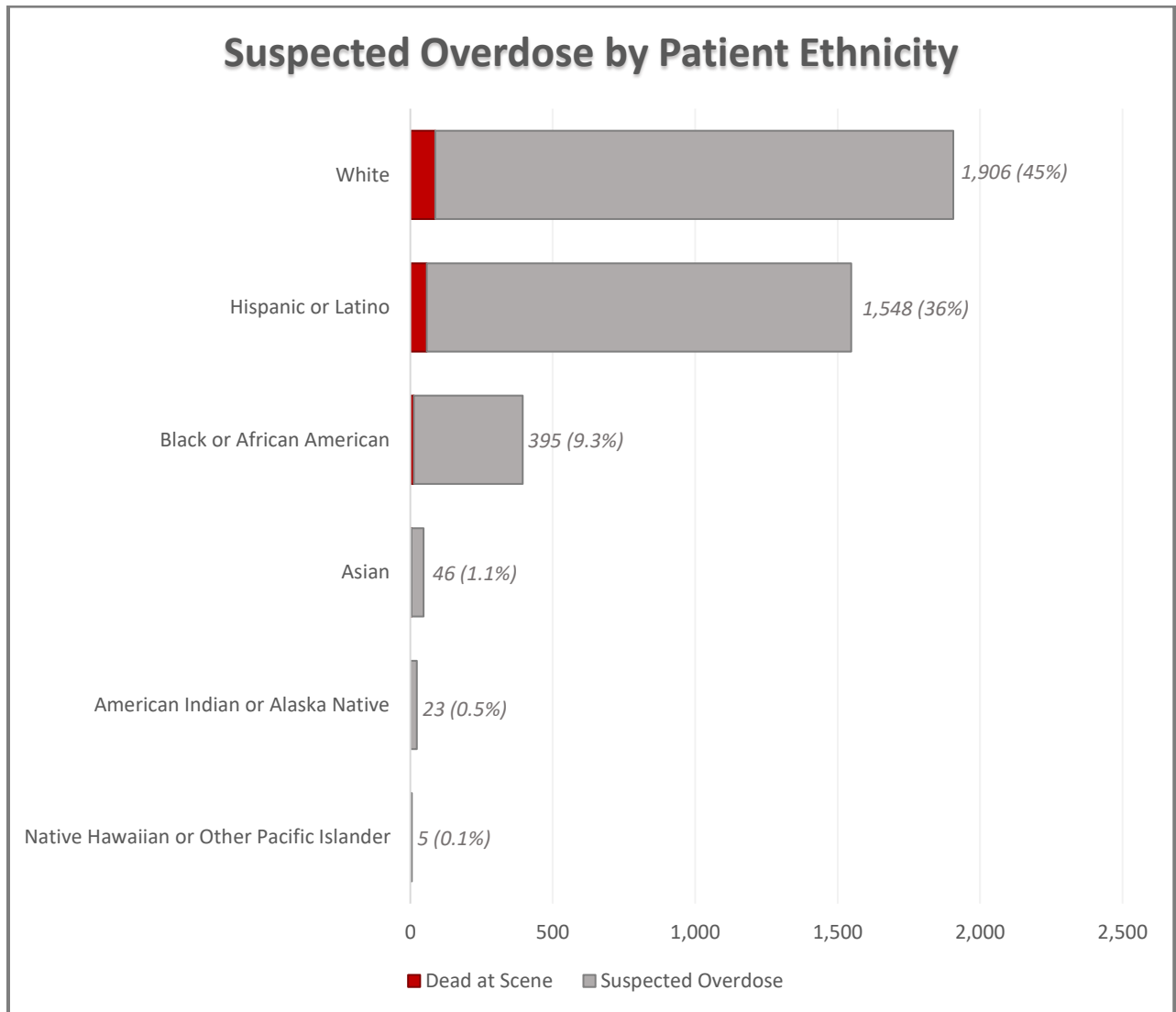
**Figure 4: Suspected Overdoses by Gender**



The following data was extracted from FirstWatch OD3- Opioid & All Drugs from January 1<sup>st</sup>, 2020-December 31<sup>st</sup>, 2022 (N=14,696). Records in which sex was labeled “Unknown”, “Unable to Determine”, or “blank” were removed (19 records). The greatest difference between male and females occurred in the 2022 calendar year; males made up 67% of suspected overdoses in 2022 and 73% of opioid-specific suspected overdoses.

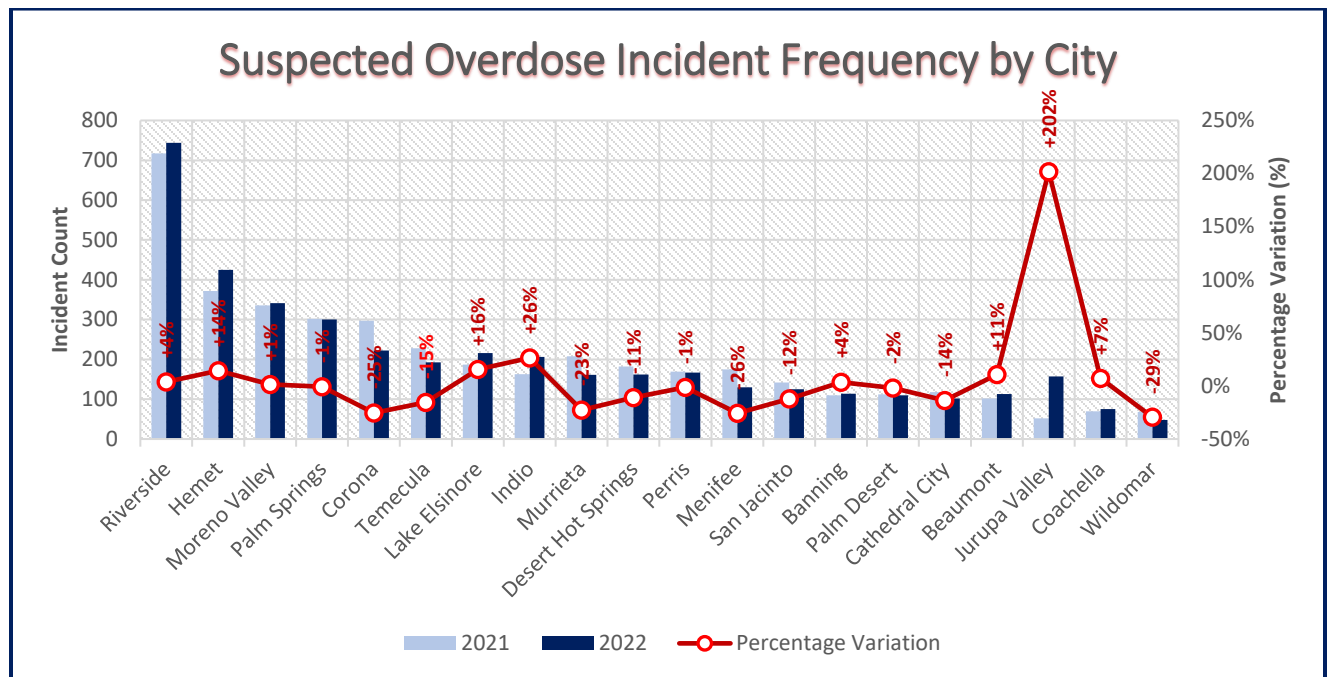


**Figure 5: Suspected Opioid Overdoses by Patient Ethnicity**



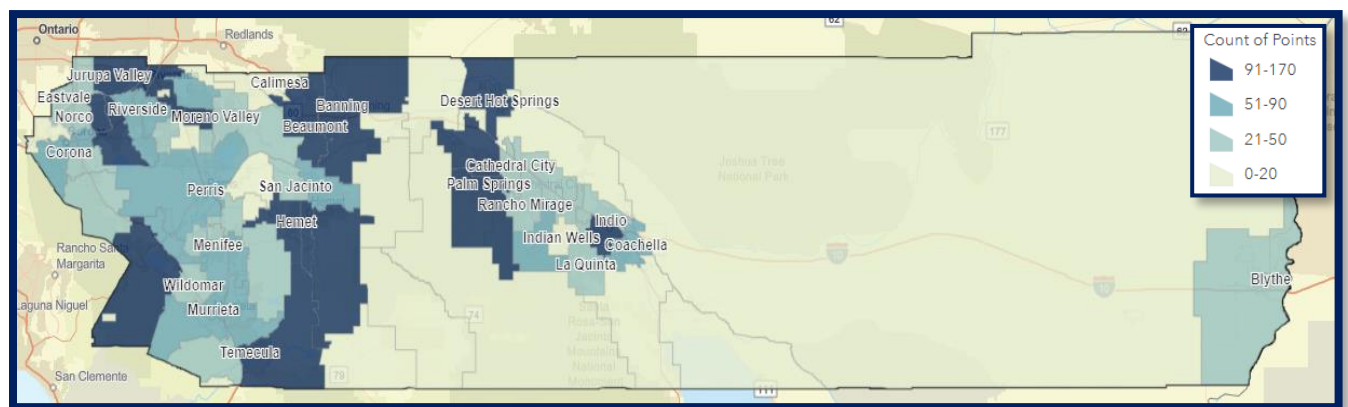
The following data was extracted from FirstWatch OD3- Opioid & All Drugs from January 1<sup>st</sup>, 2022-December 31<sup>st</sup>, 2022 (N=3,923). The “White” ethnic group represented the greatest volume of suspected overdoses consisting of 45% (1,906 patients) of the total suspected overdoses. Records that were blank or did not include patient ethnicity were removed from this figure (309 records; 7.3%).

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



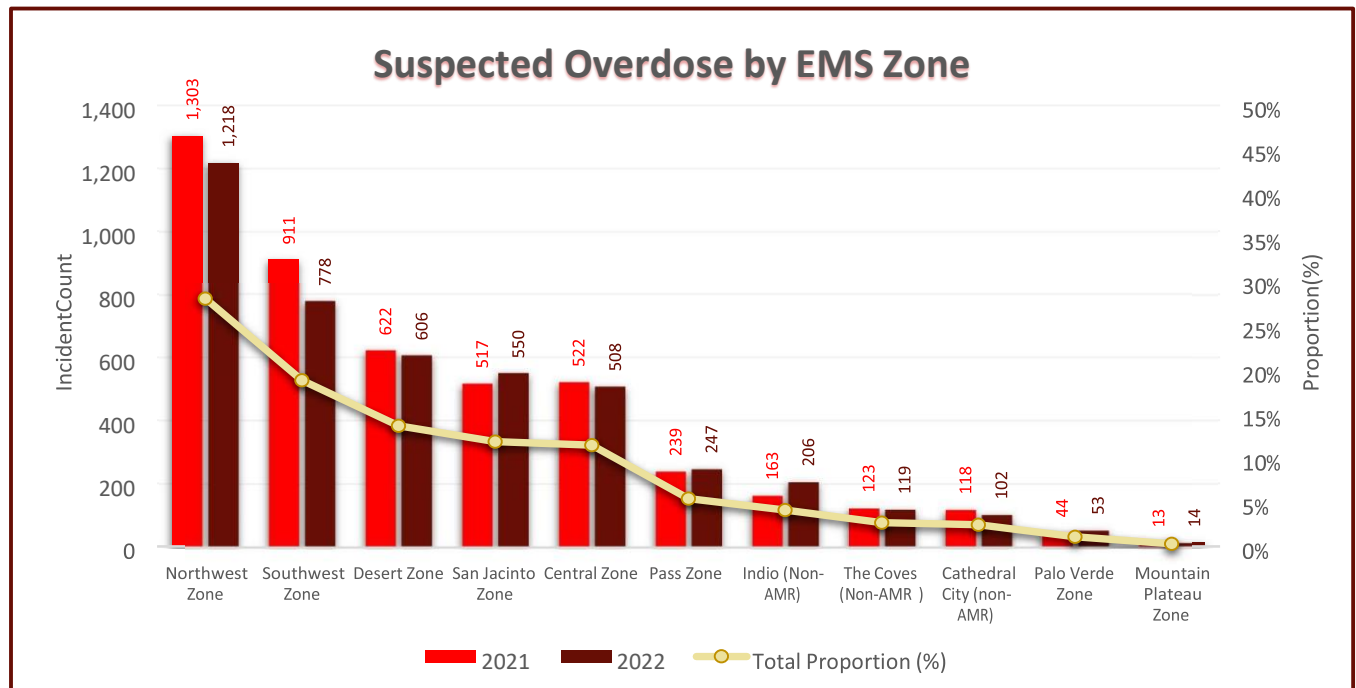
The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (January 1<sup>st</sup>, 2021-December 31<sup>st</sup>, 2022) (N=8,221). Only the top 20 cities are shown. The frequency of suspected opioid overdoses is greatest in Riverside for both 2021 and 2022 were greatest in Riverside, 717 incidents and 744 incidents respectively. Hemet displayed the second most frequent volume of suspected overdoses in both years, (372 incidents and 425 incidents respectively. The greatest variation from year to year occurred in Jurupa Valley with a 202% increase. A total of 1,073 incidents from other cities are not shown and 20 incidents did not include the city in the record.

**Figure 6B: Map of Suspected Overdose Incidents by Zip Code**



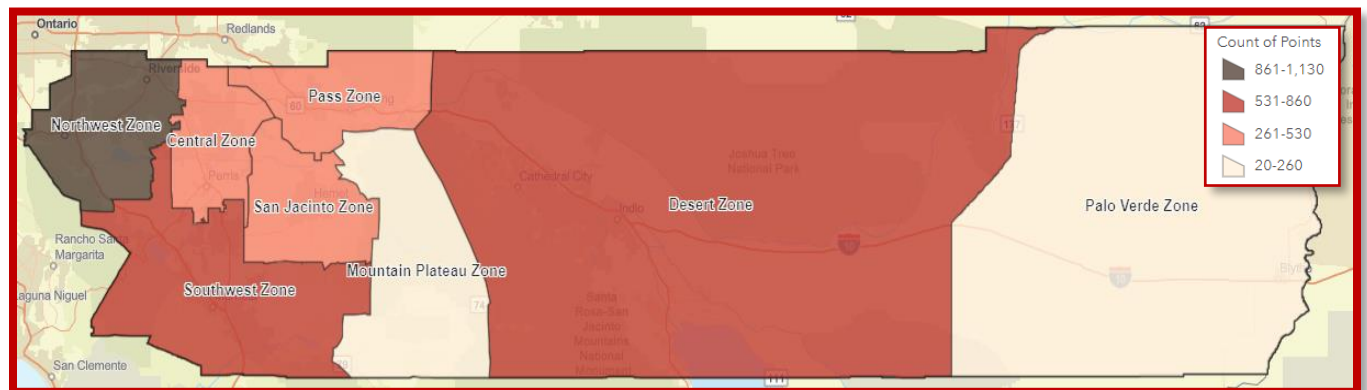
The following data was extracted from FirstWatch OD 3: Opioid Overdose January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022). (N=4,232). The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents within Riverside County. Dark blue areas are considered zip codes with higher concentrations of suspected overdose incidents encountered by EMS providers (91-170 incidents). Incidents that did not include GPS coordinate data were removed from this analysis (176 records).

**Figure 7A: Suspected Overdose Incidents by EMS Zone**



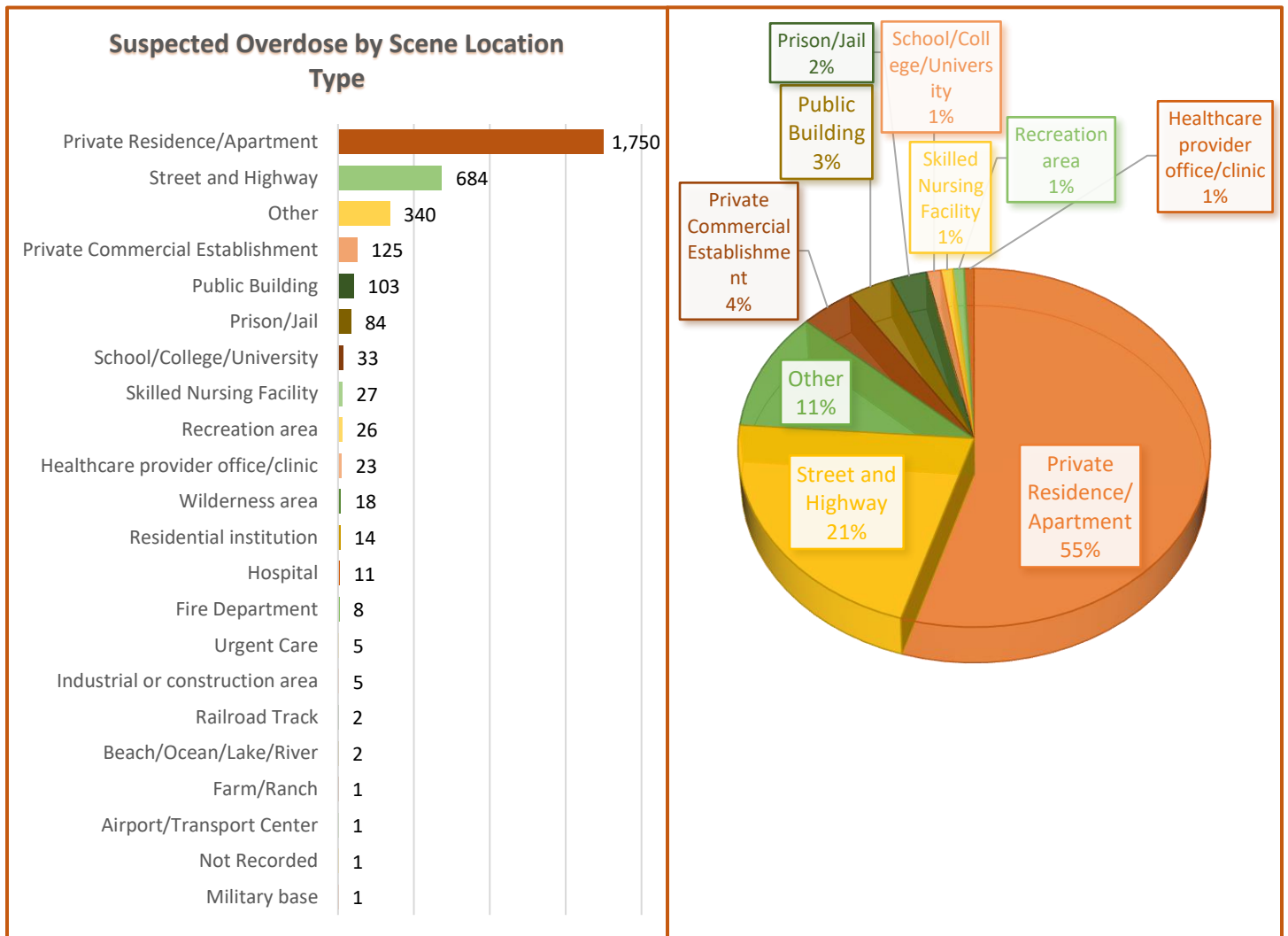
The following data was extracted from FirstWatch OD 2: Opioid Overdose (January 1<sup>st</sup>, 2021- December 31<sup>st</sup>, 2021); N=3,014. The ambulance/first responder zone data was taken from the GIS map layer-EMS Zone. That fatality data was tagged by zone accordingly. The Northwest EMS zone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

**Figure 7B: Map of Suspected Overdose Incidents by EMS Zone**



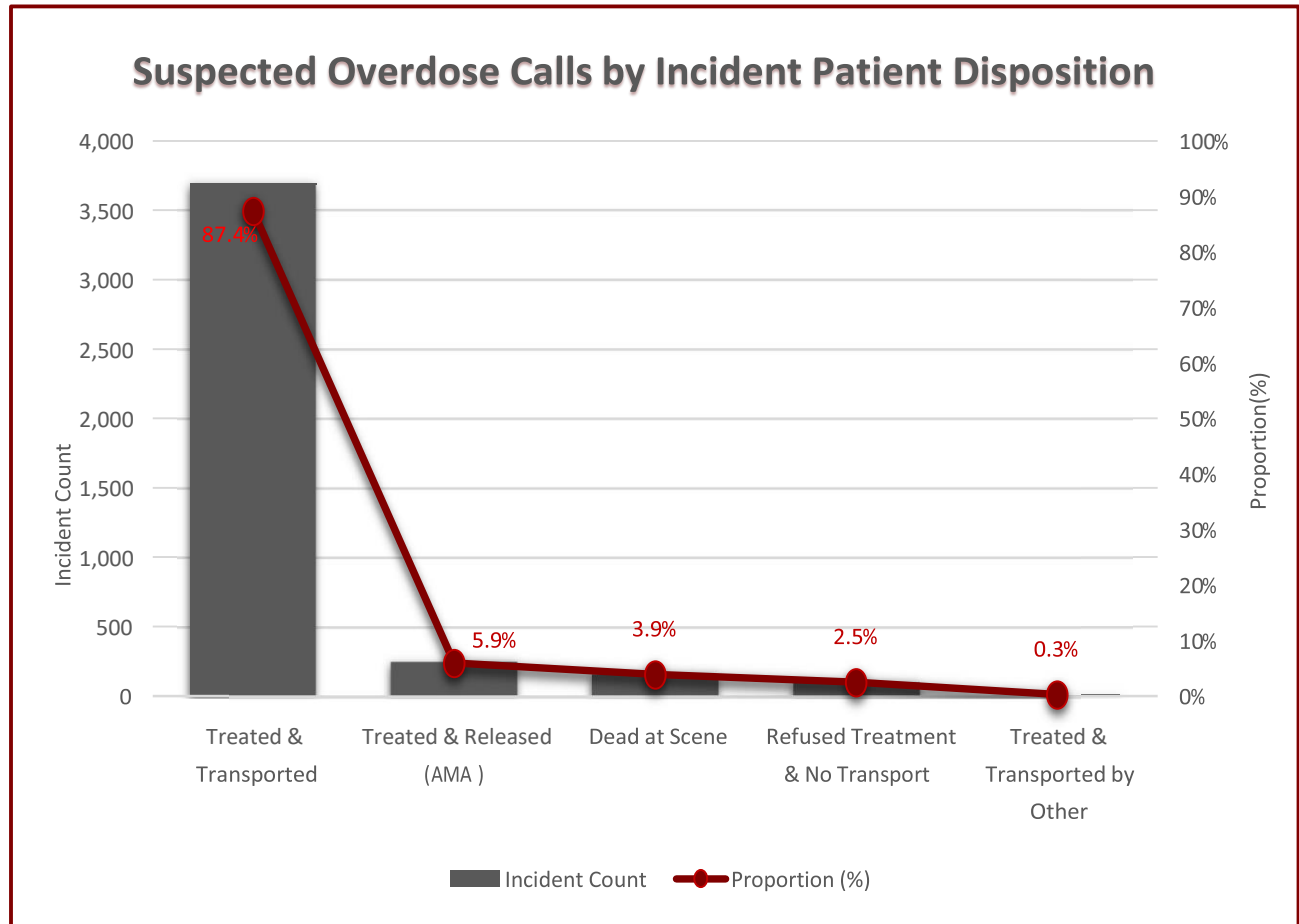
The following data was extracted from FirstWatch OD 3: Opioids & All Drugs (January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022). (N=4,056). The GPS coordinate data was then mapped on ArcGIS online as an aggregation of incidents by EMS Zone. Dark red areas represent zones with higher concentrations of suspected overdose incidents encountered by EMS providers (861-1,130 incidents). The Northwest zone accounted for the greatest number of incidents.

**Figure 8: Suspected Overdose by Incident Scene Location in 2022**



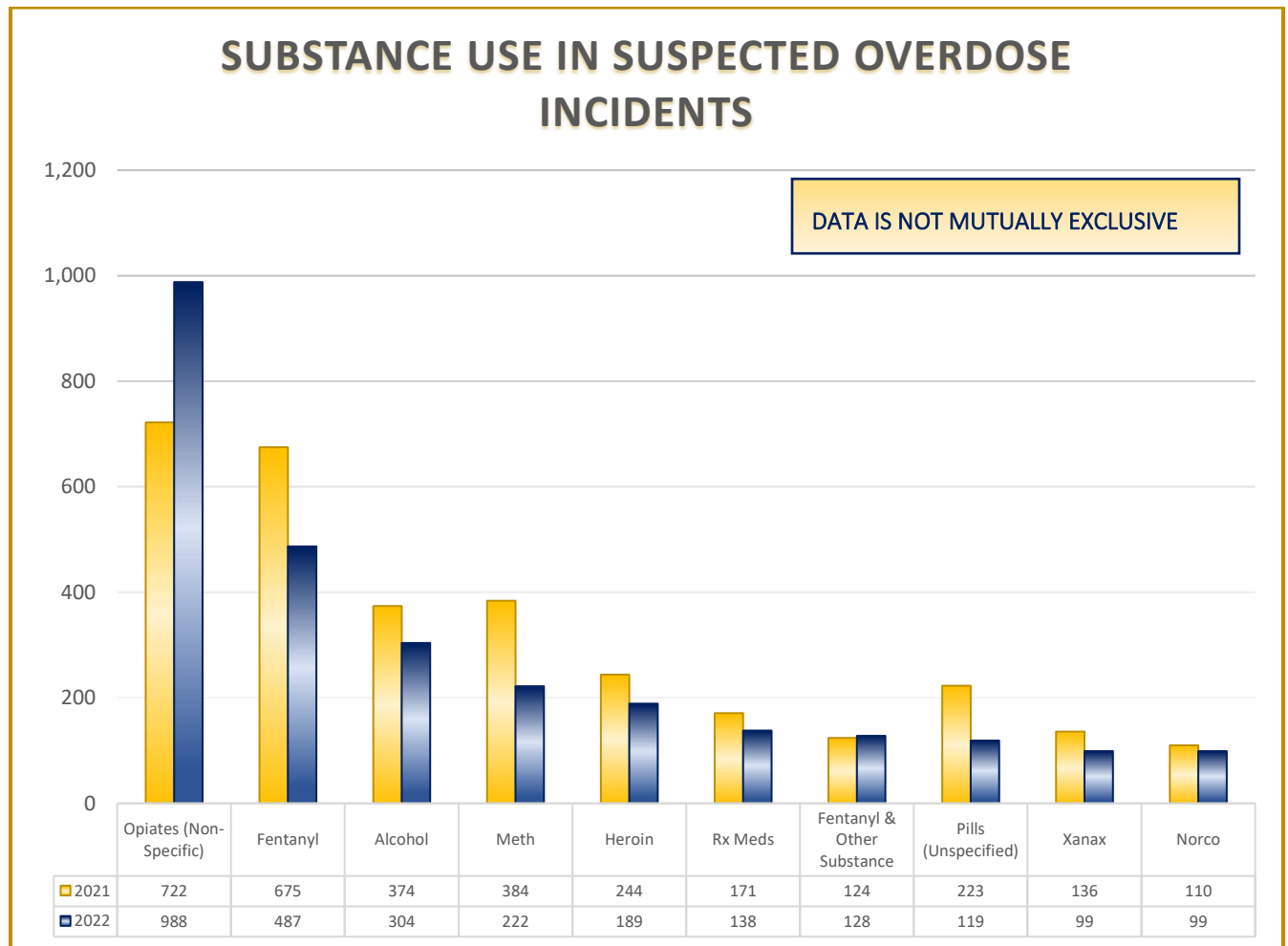
The following data was extracted from FirstWatch OD3- Opioid & All Drugs from January 1<sup>st</sup>, 2022-December 31<sup>st</sup>, 2022 (N=4,230). The greatest volume of suspected overdose incidents occurred in private residence/apartment settings (1,750 incidents; 55%). The street/highway was the second most common location type in which suspected overdose incidents occurred (684 incidents; 21%).

**Figure 9: Suspected Overdoses by Incident Patient Disposition in 2022**



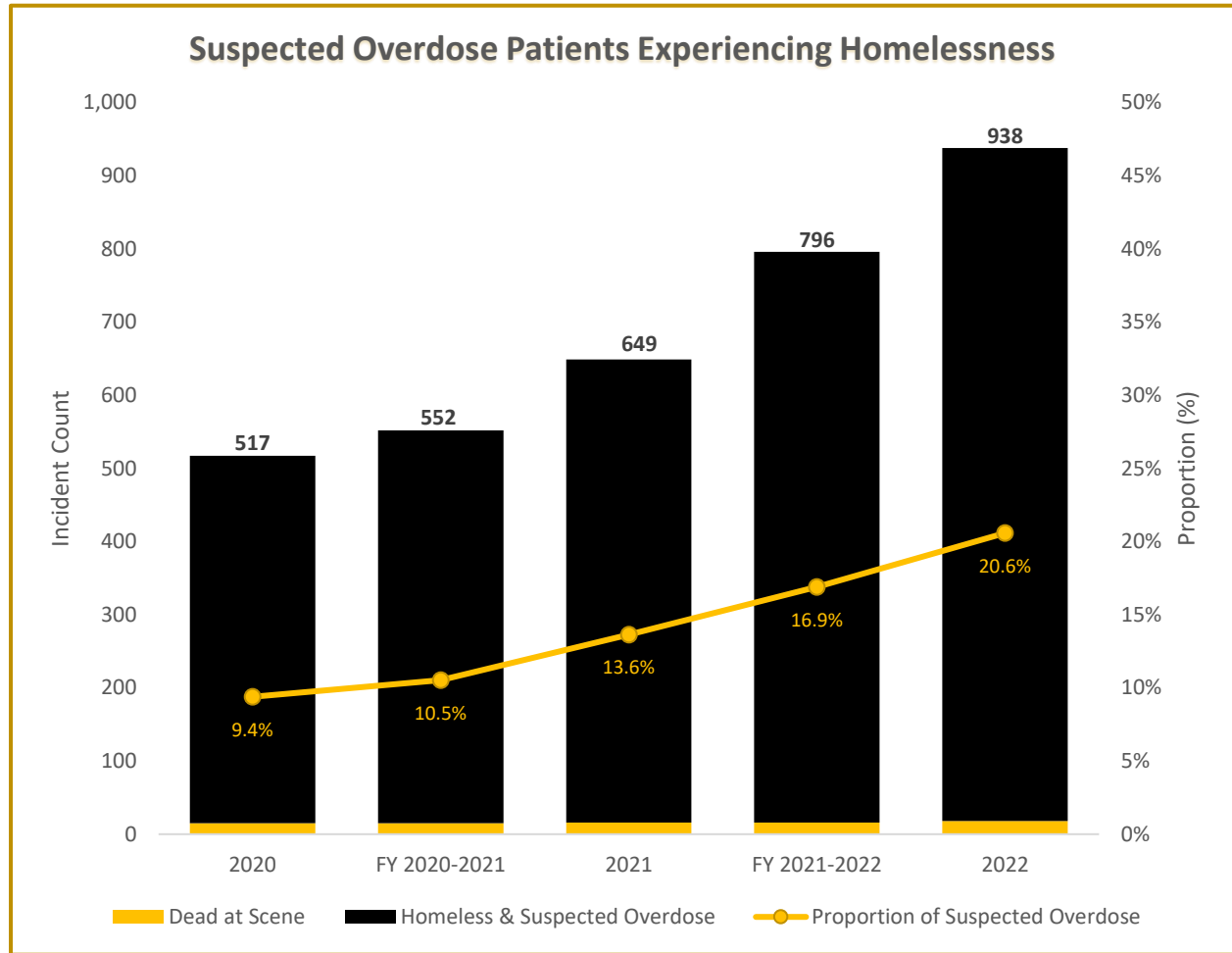
The following data was extracted from FirstWatch OD3- Opioid & All Drugs from January 1<sup>st</sup>, 2022-December 31<sup>st</sup>, 2022 (N=4,230). The majority of suspected overdose patients in 2022 were treated and transported by an EMS unit (3,696 incidents; 87%). Nearly 6% of patients were treated and released against medical advice (AMA). 2 records were excluded from analysis due to missing incident patient disposition information.

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



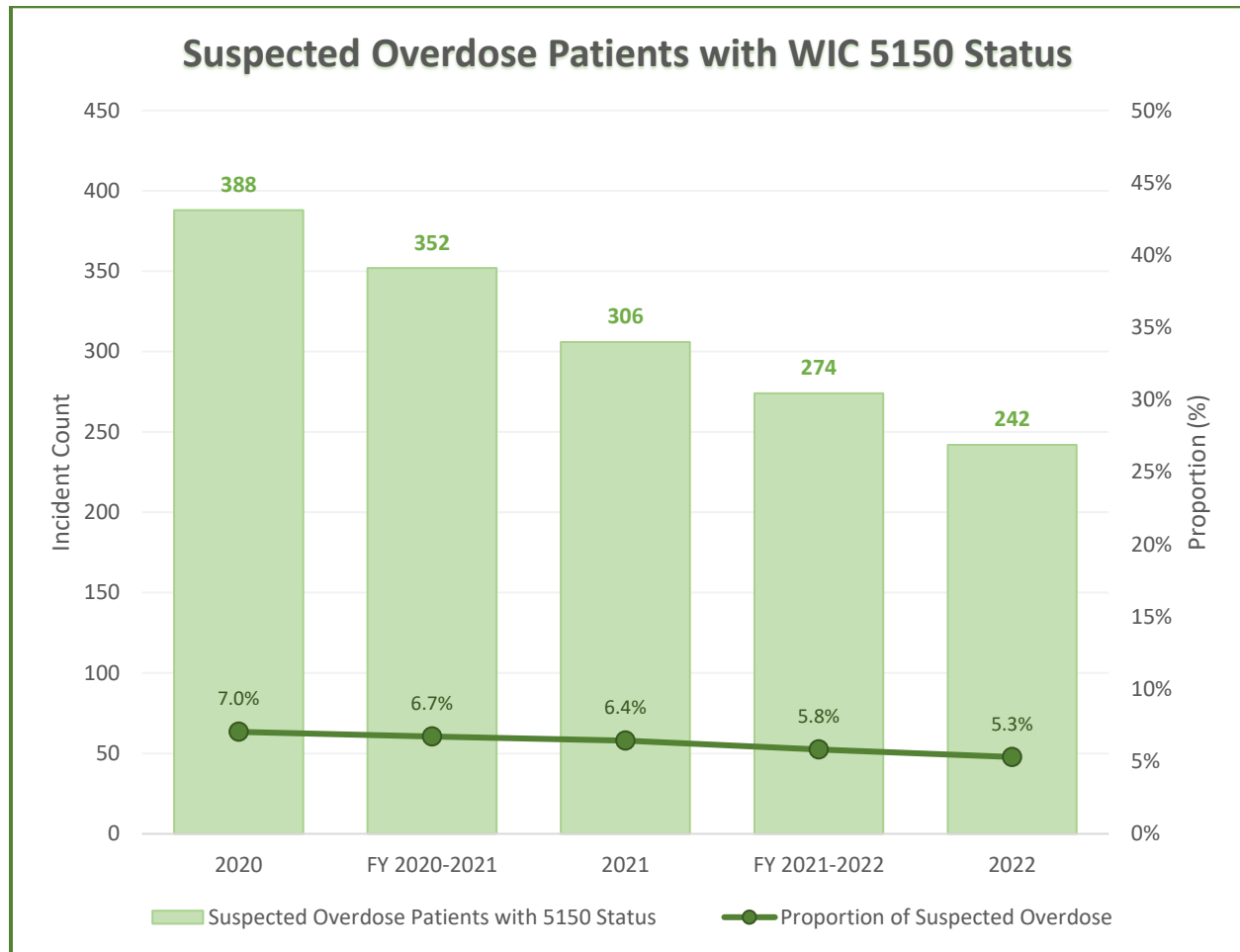
The following data was extracted from FirstWatch OD 3: Opioid & All Drugs (July 1<sup>st</sup>, 2020-June 30<sup>th</sup>, 2022); (N=9,884). Non-specified opiates, Fentanyl, and Alcohol were the most common cause for suspected overdose incidents in the 2021 & 2022 calendar years. Only the top 10 categories are listed (see Appendix B for other categories). Narratives that did not contain specific drug terminology were excluded in the analysis (11.3% of total).

**Figure 11: Suspected Overdose Patients Experiencing Homelessness**



The following data was extracted from FirstWatch OD 3: Opioids & All Drugs (January 1<sup>st</sup>, 2020- December 31<sup>st</sup>, 2022, N=2,104) 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 the 2022 calendar year (1/1/2022-12/31/2022). 2022 also displayed the greatest proportion of suspected overdose patients with homeless status overall (21%).

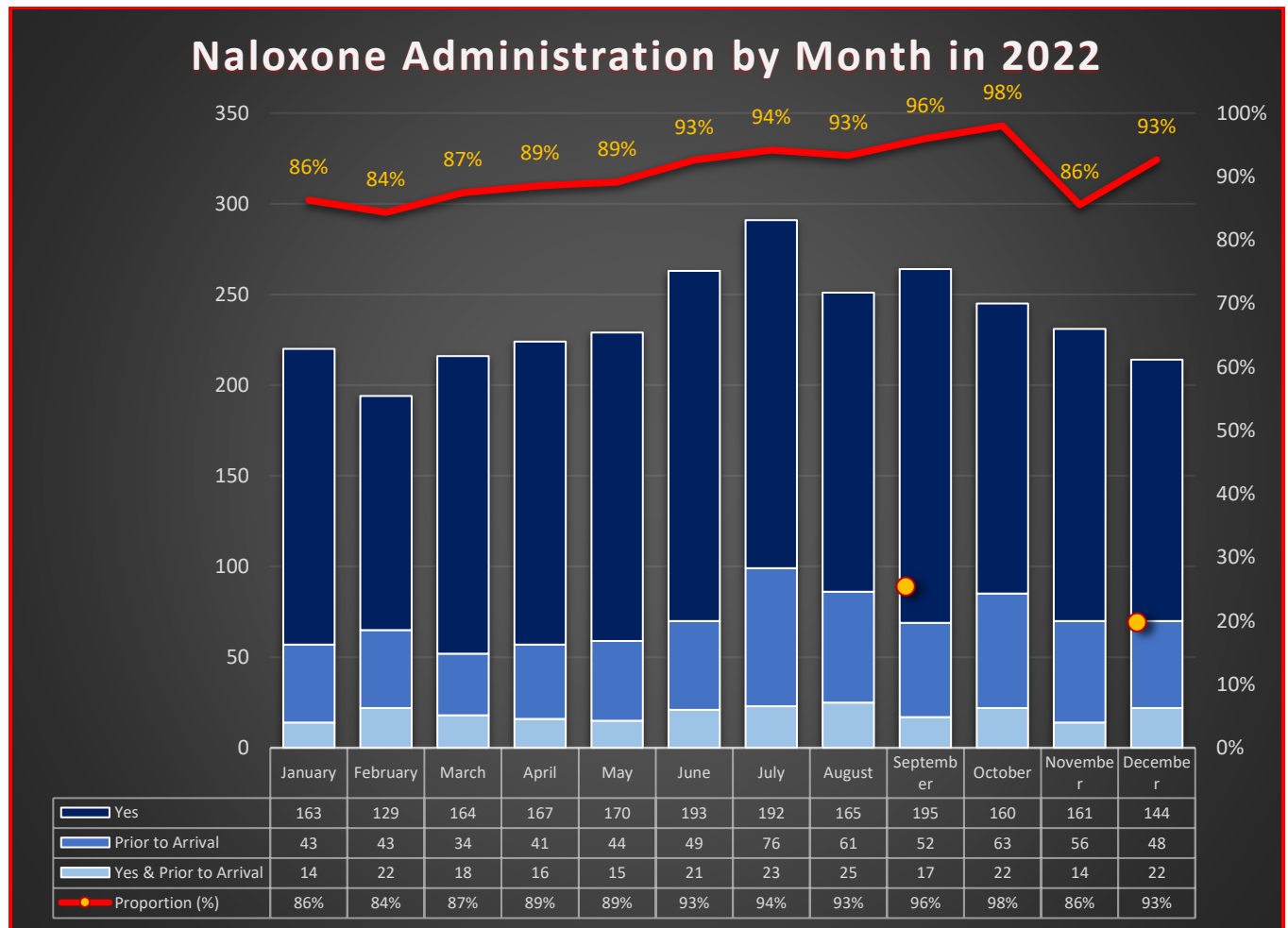
**Figure 12: Suspected Overdoses Patients with WIC 5150 Status**



The following data was extracted from FirstWatch OD 3: Opioid Overdose (January 1<sup>st</sup>, 2021- December 31<sup>st</sup>, 2021, N=898) and ImageTrend ELITE using provider primary & secondary impression to determine whether a WIC-5150 was issued during the incident. Electronic patient care record numbers were used to match records. The matched records were then aggregated as monthly totals. The highest number of suspected overdose patients with WIC-5150 status occurred in the month of November. Moreover, November displayed the greatest proportion of suspected overdose patients issued a 5150-status compared to the total number of suspected overdoses (8.7%) that year.

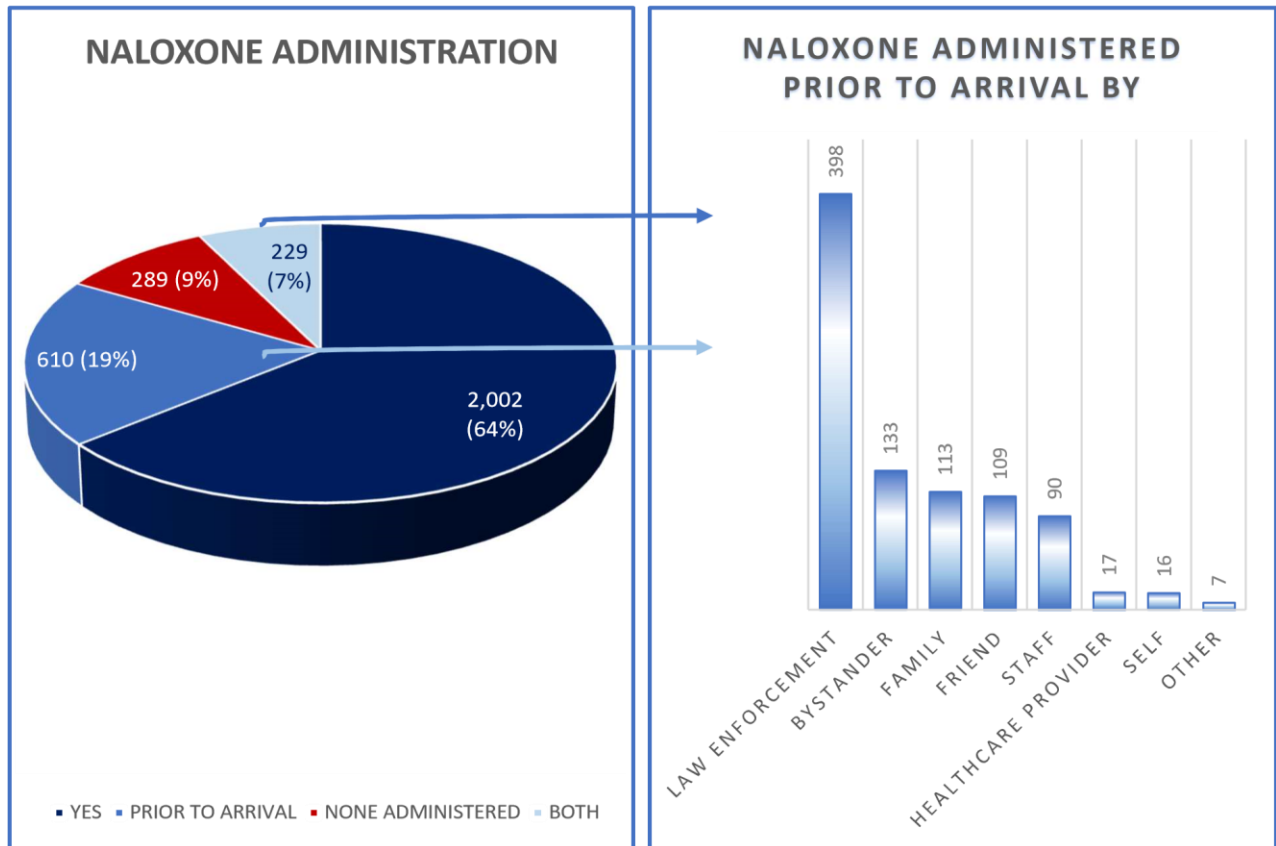


**Figure 13A: Naloxone Administration in Suspected Opioid Overdose Incidents**



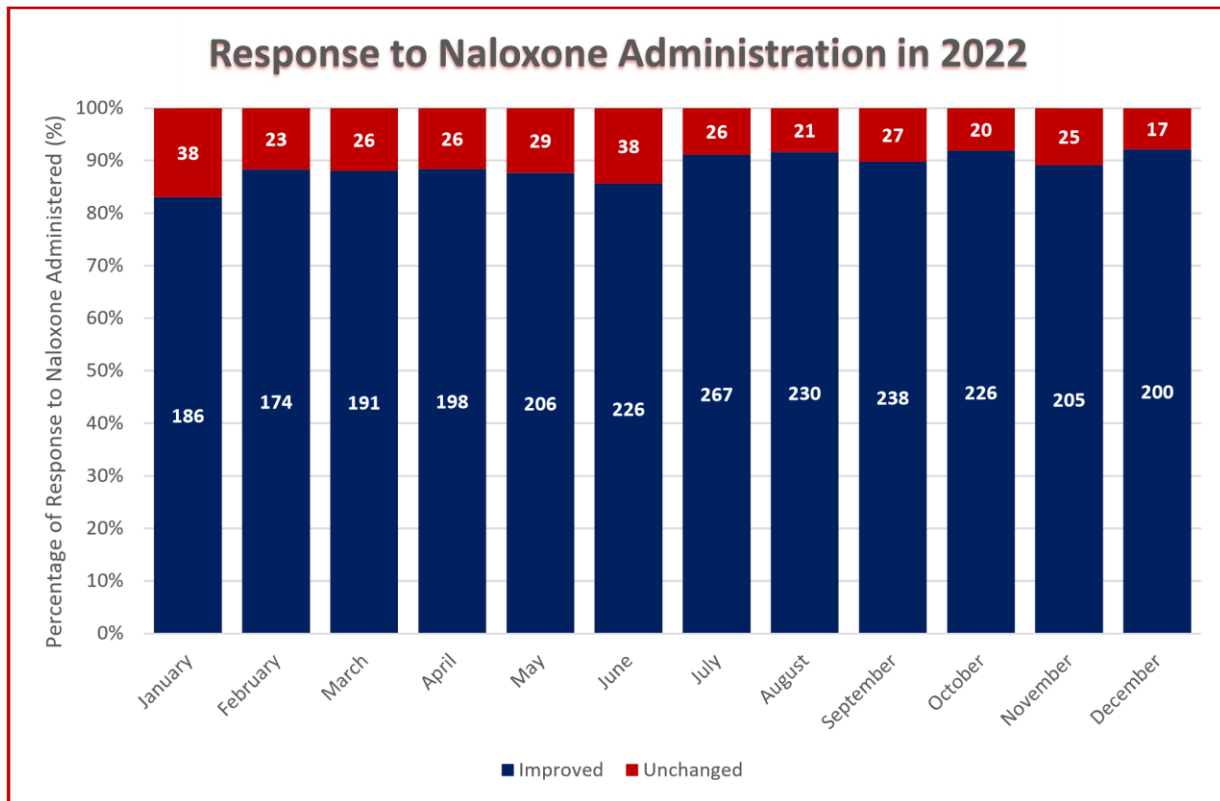
The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022 (N=3,130). Naloxone was administered in 91% of all suspected opioid overdose incidents. July displayed the greatest volume of suspected opioid overdose incidents where naloxone was administered with close to 291 incidents. October had the greatest proportion of suspected opioid overdose incidents where naloxone was administered with close to 245 out of a total of 250 incidents (98%).

**Figure 13B: Naloxone Administrator in Suspected Opioid Overdose Incidents**



This data was extracted from FirstWatch OD2- Opioid Overdose from January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022 (N=3,130). In this analysis, naloxone was either administered by EMS providers, law enforcement/bystanders/others/etc, or not at all. Naloxone was administered prior to EMS arrival on scene of suspected opioid incidents nearly 26% of the time. Law Enforcement was the most common source of administration prior to EMS arrival (398 times; 47%).

**Figure 14: Treatment Efficacy of Naloxone Administration in Suspected Opioid Overdose Incidents**

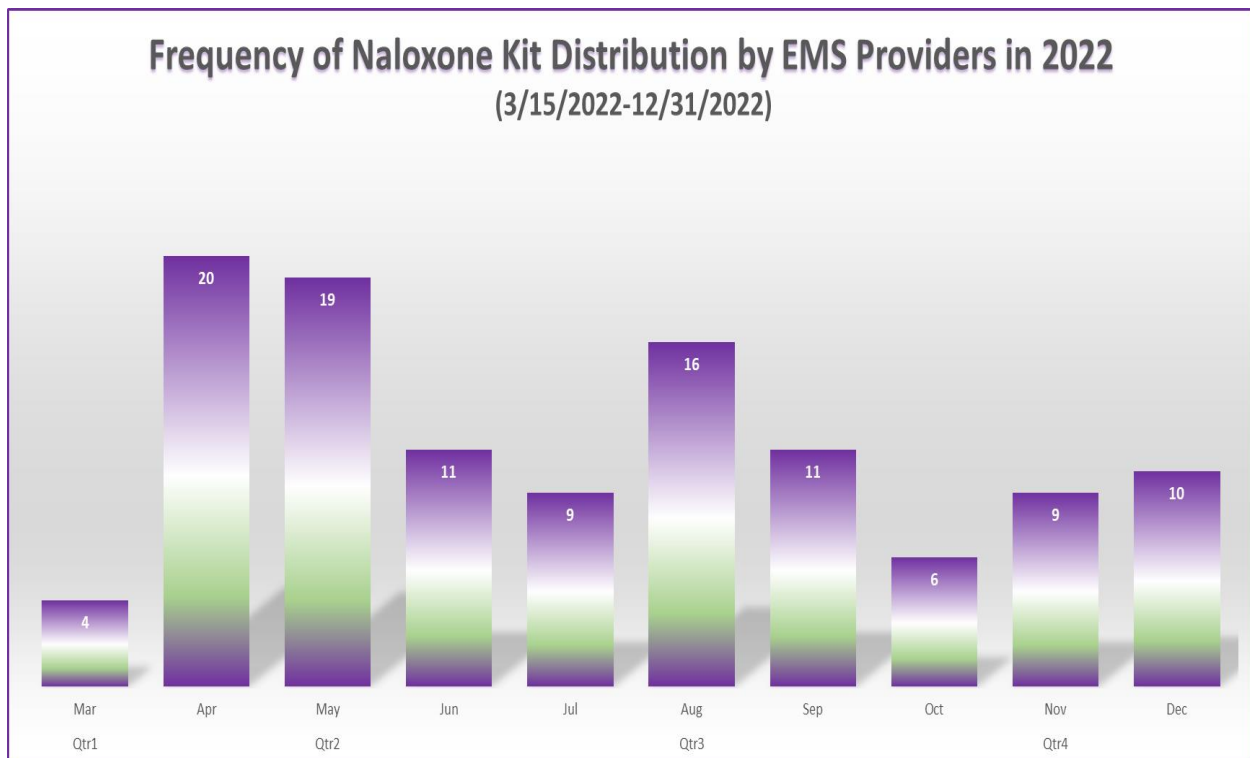


The following data was extracted from FirstWatch OD2- Opioid Overdose from January 1<sup>st</sup>, 2022- December 31<sup>st</sup>, 2022 (N=2,863). The response to naloxone treatment in suspected opioid overdose calls was evaluated based on whether there was an improvement in patient mentation and/or respiration rate. The month with the greatest level of improvement was in October with close to 92% improvement in patient responses. August also displayed a high level of improvement with approximately 92% of patient responses to naloxone treatment. 2 records were removed for a lack of clarity regarding patient response to the medication.

# LEAVE BEHIND NALOXONE PROGRAM

The Naloxone Distribution Project (NDP) is a federally funded “Leave Behind Naloxone” initiative administered by the Department of Health Care Services (DHCS) in California to combat opioid overdose-related deaths through the free distribution of Naloxone to qualifying entities for the purpose of distribution to persons at risk for opioid overdose and those in a position to assist those persons at risk. EMS agencies in California are qualified entities to participate in this program. The NDP program is currently active in Riverside County through other community-based organizations; but was initiated in the Riverside County EMS system on March 15<sup>th</sup>, 2022, under EMD-REMSA Policy [3310](#). Participating EMS providers can distribute Leave Behind Naloxone kits to high-risk individuals encountered by EMS personnel in the field.

**Figure 15: Frequency of Naloxone Kit distribution in Riverside County by EMS Providers in 2022**



The following data was extracted from ImageTrend® ELITE from March 15<sup>th</sup>, 2022- December 31<sup>st</sup>, 2022 (N=115). The leave behind naloxone program was implemented on 3/15/2022. There was an average of 11.5 kits distributed each month. April 2022 demonstrated the greatest volume of naloxone kits distributed with 20 kits. According to electronic patient care records, 7 of those kits were documented to have been utilized prior to EMS arrival on scene of suspected opioid overdose incidents.

**Figure 16: Frequency of Repeat Overdose Patient Encounters with EMS Providers**

Number of Encounters	Number of Encounters	Number of Encounters for Patients Found Dead at Scene	Proportion for Encounters Overall	Proportion for Encounters for Patients Found Dead at Scene
1	1186	68	41%	55%
2	546	18	19%	15%
3	285	7	10%	6%
4	202	10	7%	8%
5	132	6	5%	5%
6	78	3	3%	2%
7	65	4	2%	3%
8	59	1	2%	1%
9	43	1	1%	1%
10 or more	273	6	10%	5%

The following data was extracted from FirstWatch OD 3: Opioids & All Drugs (January 1<sup>st</sup>, 2017-December 31<sup>st</sup>, 2022). The number of times the same suspected overdose patients in 2022 utilized EMS services that year and previous years since 2017 was calculated. That frequency was compared to patients found dead at scene. The frequency of repeat EMS encounters by suspected overdose patients occurred at an average of 5 times [1,683] with a maximum of 683 encounters. For suspected overdose patients found dead at scene, there was an overall average of 3 encounters [1,20] with a maximum of 20 repeat encounters with EMS since January 1<sup>st</sup>, 2017.

## Appendix A. Distribution of EMS Suspected Overdose Incidents by City, 2021 v. 2022

City	2021	2022	Proportion (%)	Percentage Variation
Riverside	717	744	15.7%	3.8%
Hemet	372	425	8.6%	14.2%
Moreno Valley	336	341	7.3%	1.5%
Palm Springs	302	300	6.5%	-0.7%
Corona	297	222	5.6%	-25.3%
Temecula	228	193	4.5%	-15.4%
Lake Elsinore	187	216	4.3%	15.5%
Indio	163	206	4.0%	26.4%
Murrieta	208	161	4.0%	-22.6%
Desert Hot Springs	182	162	3.7%	-11.0%
Perris	169	167	3.6%	-1.2%
Menifee	175	130	3.3%	-25.7%
San Jacinto	142	125	2.9%	-12.0%
Banning	110	114	2.4%	3.6%
Palm Desert	112	110	2.4%	-1.8%
Cathedral City	118	102	2.4%	-13.6%
Beaumont	102	113	2.3%	10.8%
Jurupa Valley	52	157	2.3%	201.9%
Coachella	70	75	1.6%	7.1%
Wildomar	68	48	1.2%	-29.4%
Mira Loma	111	0	1.2%	-100.0%
Norco	57	46	1.1%	-19.3%
Eastvale	52	49	1.1%	-5.8%
La Quinta	55	41	1.0%	-25.5%
Blythe	41	52	1.0%	26.8%
Rancho Mirage	36	37	0.8%	2.8%
Cabazon	39	21	0.6%	-46.2%
Winchester	32	25	0.6%	-21.9%
Calimesa	27	20	0.5%	-25.9%
Homeland	22	23	0.5%	4.5%
Thousand Palms	13	28	0.4%	115.4%
Canyon Lake	26	14	0.4%	-46.2%
Anza	13	14	0.3%	7.7%
Thermal	12	12	0.3%	0.0%
Nuevo	14	9	0.2%	-35.7%
Indian Wells	11	9	0.2%	-18.2%
Mecca	8	9	0.2%	12.5%
Mead Valley	9	0	0.1%	-100.0%
Lakeland Village	9	0	0.1%	-100.0%
Home Gardens	9	0	0.1%	-100.0%

**Appendix B.** Distribution of drugs mentioned in Suspected Overdose Incidents by City, 2021 v. 2022

Drug Mentioned	2021	2022	Difference	Grand Total
Opiates (Non-Specific)	909	1,138	-229	2,047
Fentanyl	722	988	-266	1,710
Alcohol	675	487	188	1,162
Meth	374	304	70	678
Heroin	384	222	162	606
Rx Meds	244	189	55	433
Fentanyl & Other Substance	171	138	33	309
Pills (Unspecified)	124	128	-4	252
Xanax	223	119	104	342
Norco	136	99	37	235
Antidepressants	110	99	11	209
Unknown Substance	35	77	-42	112
Hallucinogens	68	68	0	136
Oxycodone/Oxycontin	120	64	56	184
Percocet	133	47	86	180
Meth & Opiates	38	40	-2	78
Morphine	48	39	9	87
Fentanyl & Meth	45	36	9	81
Benzodiazepines	28	36	-8	64
Cocaine	37	34	3	71
Muscle Relaxants	41	24	17	65
Alcohol & Opiates	99	17	82	116
Tramadol	27	14	13	41
Methadone	24	11	13	35
Inhalants	13	11	2	24
GHB	15	7	8	22
MDMA	18	8	10	26
Dilaudid	14	5	9	19

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*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 Emergency Management Department, Emergency Medical Services Division, Data & Reporting Unit Research Specialist, Stephani Harrington, MPH, 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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