



OPIOID-RELATED MORBIDITY AND MORTALITY IN ORANGE COUNTY, 2017-2021



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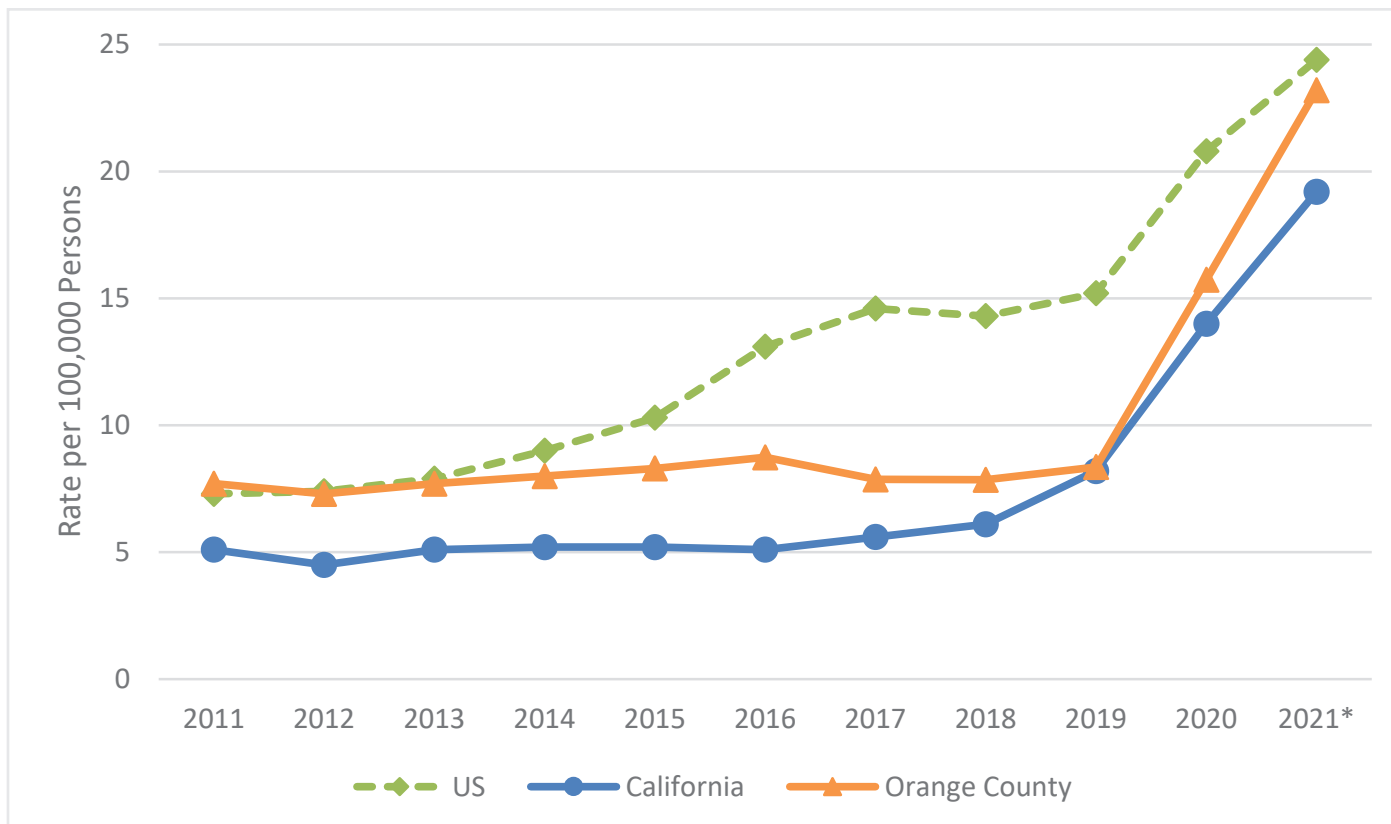
OPIOID-RELATED MORBIDITY AND MORTALITY IN ORANGE COUNTY, 2017-2021



INTRODUCTION

Opioid-related overdose deaths have seen a dramatic increase in the United States since the 1990s that has only accelerated in the past ten years (**Figure 1**). Over 107,000 drug overdose deaths were reported nationwide in 2021, of which about 75% involved opioids. The death rate trend continues to increase.^{1,2}

FIGURE 1. OPIOID-RELATED OVERDOSE DEATH RATE TRENDS, 2011-2021



The types of opioids involved can be identified by three waves over time with the first wave being prescription opioids.^{1,3} Opioid pain reliever (e.g., oxycodone and hydrocodone) prescribing quadrupled since 1999 due to its acceptance as a treatment for post-surgical and chronic pain, despite serious risks and lack of evidence about their long-term effectiveness.^{3,4} Opioid overdose deaths involving heroin saw a rise since 2010 marking the second wave of opioid overdose deaths.^{1,3} Increased availability combined with its relatively low price point (compared to prescription opioids) and high purity appear to be main reasons why heroin overdose deaths saw an upward trend.^{4,5} The third wave of opioid overdose occurred in 2013 with increased fentanyl overdose deaths.² It has been suggested that the sharp rise of fentanyl-related deaths was driven by an increased supply of illicitly manufactured fentanyl.^{6,7}

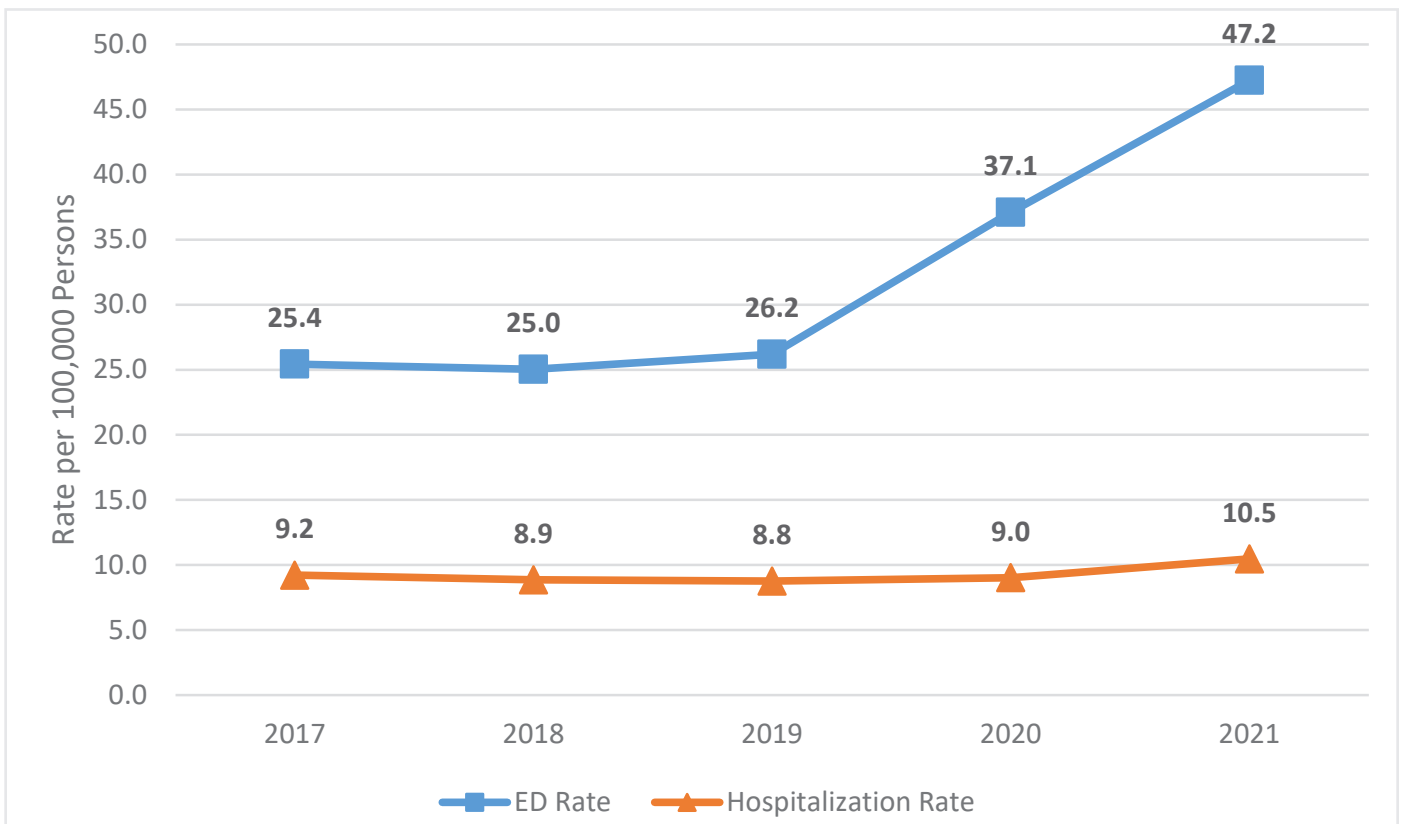
In this report we summarize opioid-related morbidity and mortality in Orange County (OC) in the context of these national trends. We examine trends, patterns, and characteristics in opioid-related overdoses/poisonings including emergency department visits, hospitalizations, and deaths in Orange County from 2017 to 2021.



EMERGENCY DEPARTMENT VISITS AND HOSPITALIZATION OF OPIOID-RELATED OVERDOSES

From 2017 to 2021, there was an 86% rate increase among emergency department (ED) visits related to opioid overdoses/poisonings (25.4 per 100,000 persons to 47.2; **Figure 2**). The rate of opioid-related overdoses among ED visits was relatively stable between 2017 and 2019 but climbed in 2020 and 2021. Opioid-related hospitalizations remained stable between 2017 and 2021; however, 2021 had the highest rate of 10.5 per 100,000 persons.

FIGURE 2. OPIOID-RELATED ED VISITS AND HOSPITALIZATIONS IN OC, 2017-2021



Overall, the majority of opioid-related ED visits were to White residents (63.5%, n=3,269) followed by Hispanic/Latino (26.4%, n=1,360) and Other (4.2%, n=218) residents (**Table 1**). The largest change among race/ethnicity groups was experienced by Black residents with a percent change of 233% between 2017 (n=12) and 2021 (n=40). All race/ethnicity groups also increased during this time period, albeit not as large an increase.

TABLE 1. RACE/ETHNICITY OF OPIOID-RELATED ED VISITS IN OC, 2017-2021

	2017	2018	2019	2020	2021	Total	% of Total
White	580	584	551	733	821	3,269	63.5
Hispanic/Latino	163	160	201	328	508	1,360	26.4
Asian/Pacific Islander (API)	22	17	10	22	36	107	2.1
Black	12	5	22	19	40	98	1.9
Other	31	24	35	52	76	218	4.2
Unknown	3	10	18	30	35	96	1.9
Total	811	800	837	1,184	1,516	5,148	

The majority of opioid-related ED patients were discharged to home or self-care (80.9%, n=4,166) or left against medical advice/discontinued care (12.0%, n=618) (**Table 2**). Very few deaths occurred during opioid-related ED visits (0.2%, n=10).

TABLE 2. DISPOSITION OF OPIOID-RELATED ED VISITS IN OC, 2017-2021

	2017	2018	2019	2020	2021	Total	% of Total
Discharged to home or self-care (routine discharge)	658	646	674	973	1,215	4,166	80.9
Left against medical advice or discontinued care	80	98	97	136	207	618	12.0
Psychiatric hospital	31	23	21	20	31	126	2.4
Expired	4	1	0	3	2	10	0.2
Other	38	32	45	52	61	228	4.4
Total	811	800	837	1,184	1,516	5,148	

When examining opioid subtypes involved in ED visits, natural/semi-synthetic opioids, synthetic opioids, and other opioids increased rapidly from 2017 to 2021 (**Table 3**). Synthetic opioid-related ED visits, which includes fentanyl, increased an alarming 2,207% between 2017 (n=27) and 2021 (n=623). Conversely, heroin- and methadone-related ED visits declined over time with heroin overdoses demonstrating the largest drop of 70% between 2017 (n=517) and 2021 (n=153).

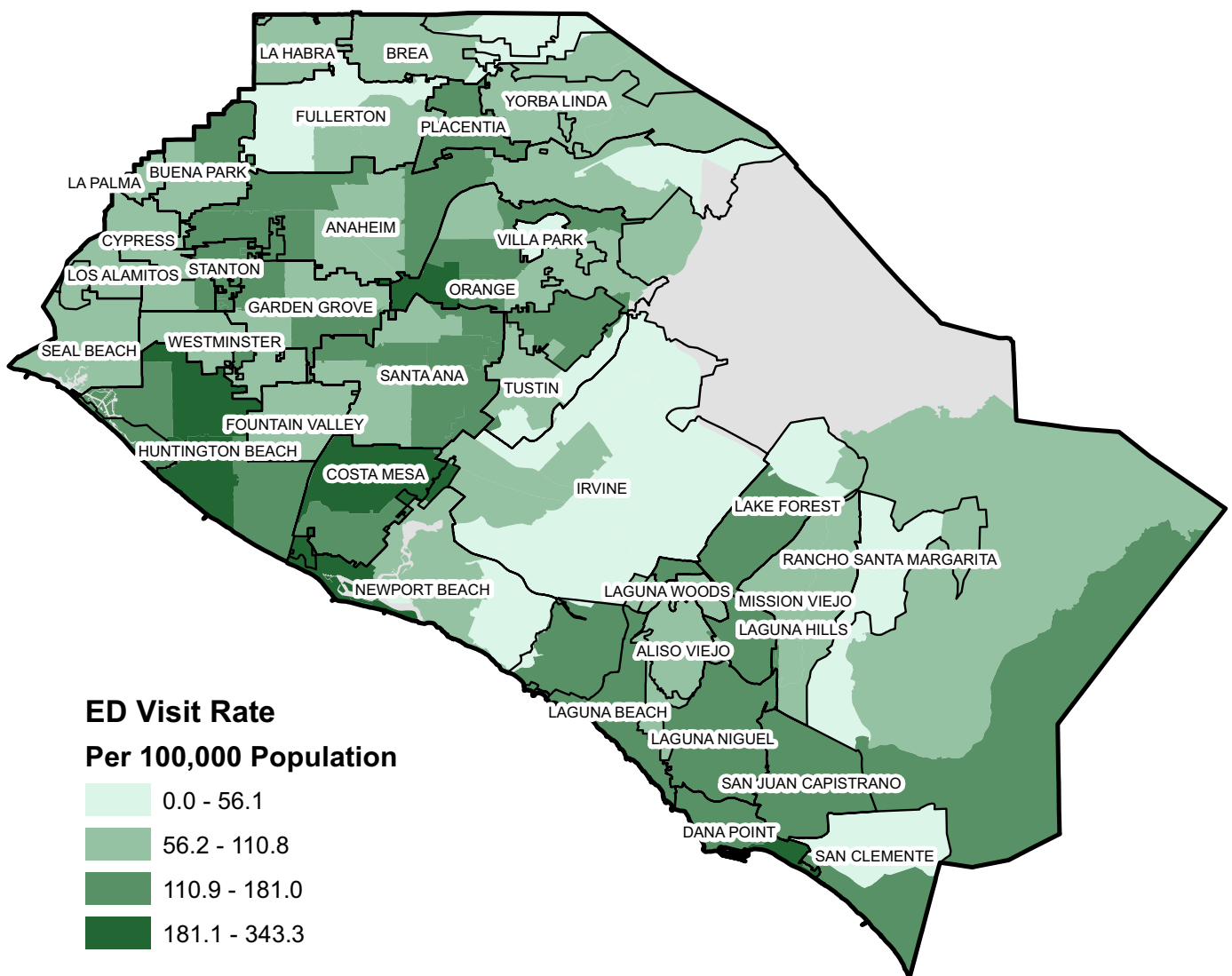
TABLE 3. OPIOID SUBTYPES INVOLVED IN ED VISITS IN OC, 2017-2021

	2017	2018	2019	2020	2021	Total	% of Total
Opium Poisoning	3	5	2	5	5	20	0.4
Heroin Poisoning	517	498	362	290	153	1,820	35.4
Natural/Semi-synthetic Opioid Poisoning	146	143	177	276	325	1,067	20.7
Methadone Poisoning	13	5	6	7	4	35	0.7
Synthetic Opioid Poisoning	27	44	112	330	623	1,136	22.1
Other Opioid Poisoning	105	105	178	276	406	1,070	20.8
Total	811	800	837	1,184	1,516	5,148	

OPIOID-RELATED EMERGENCY DEPARTMENT VISIT RATE BY ZIP CODE, 2019-2021*

Southern and coastal regions of Orange County had higher rates of opioid-related emergency department visits when compared to the rest of the county with the exception of one ZIP Code in Orange (**Map 1**). Costa Mesa (185.8 per 100,000 persons), Huntington Beach (178.9 per 100,000 persons), and San Juan Capistrano (177.2 per 100,000 persons) had the highest rates of opioid-related emergency department visits in Orange County (**Table 4**).

MAP 1. OPIOID-RELATED EMERGENCY DEPARTMENT VISIT RATE BY ZIP CODE, 2019-2021



Source: HCAI Emergency Department Data, 2019-2021

*Opioid-related emergency department visits were aggregated over three years in this geographic analysis in order to lend more stability to rate calculations by zip code.

TABLE 4. OPIOID-RELATED EMERGENCY DEPARTMENT VISIT RATE BY CITY, 2019-2021

City	# Visits 2019-2021	Rate per 100,000 persons	95% Confidence Interval	
Costa Mesa	209	185.8	161.5	212.8
Huntington Beach	355	178.9	160.7	198.5
San Juan Capistrano	62	177.2	135.9	227.2
Laguna Beach	39	169.5	120.6	231.8
Newport Beach	137	160.9	135.1	190.2
Dana Point	53	159.8	119.7	209.1
Santa Ana	431	138.8	126.0	152.6
Stanton	51	135.4	100.8	178.0
Anaheim	460	133.0	121.1	145.7
Orange	184	131.8	113.5	152.3
Laguna Hills	40	127.4	91.0	173.5
Los Alamitos	15	126.1	70.6	208.0
Placentia	63	121.6	93.4	155.6
Laguna Niguel	78	120.9	95.5	150.8
San Clemente	77	120.0	94.7	150.0
Garden Grove	193	112.2	96.9	129.2
Buena Park	88	104.4	83.8	128.7
Fountain Valley	59	103.2	78.6	133.1
Lake Forest	83	96.5	76.9	119.6
Mission Viejo	90	96.1	77.3	118.1
Aliso Viejo	48	92.6	68.3	122.7
Westminster	79	86.8	68.7	108.2
La Palma	13	83.4	44.4	142.6
Yorba Linda	56	82.2	62.1	106.8
La Habra	50	79.6	59.1	105.0
Tustin	63	78.4	60.2	100.3
Seal Beach	18	71.3	42.3	112.7
Fullerton	100	69.3	56.4	84.2
Laguna Woods	12	67.6	34.9	118.0
Cypress	30	59.5	40.2	85.0
Brea	28	59.3	39.4	85.7
Rancho Santa Margarita	24	50.1	32.1	74.5
Irvine	140	45.5	38.3	53.7
Villa Park*	NA	NA	NA	NA
Orange County	3,537	110.8	107.2	114.6

*Suppressed due to low counts

DEMOGRAPHIC PROFILES OF OC OPIOID-RELATED OVERDOSE DEATHS

Between 2017 and 2021, approximately 73.9%, or 1,488, of opioid-related overdose deaths were males (**Table 5**). The majority of deaths were among White residents accounting for nearly two-thirds (n=1,308, 64.9%) of opioid-related overdose deaths, followed by Hispanic/Latino (n=538, 26.7%), Asian/Pacific Islander (n=69, 3.4%), Other (n=56, 2.8%), and Black residents (n=43, 2.1%). Individuals aged 25-34 years comprised the highest number of opioid-related overdose deaths (n=543, 27.0%). The second largest group was 35-44 years of age (n=387, 19.2%) followed by the group of 45-54 years of age (n=342, 17.0%). The overall death rate from opioid-related overdose deaths nearly tripled in 2021 (23.2 per 100,000 persons) from 2017 (7.9 per 100,000 persons).

TABLE 5. DEMOGRAPHICS OF OPIOID-RELATED OVERDOSE DEATHS IN OC, 2017-2021

	2017	2018	2019	2020	2021	Total	% of Total
Gender							
Male	174	178	182	391	563	1,488	73.9
Female	77	73	85	111	180	526	26.1
Race/Ethnicity							
White	182	195	191	309	431	1,308	64.9
Hispanic/Latino	52	42	58	148	238	538	26.7
Asian/Pacific Islander	8	6	6	25	24	69	3.4
Black	2	2	2	10	27	43	2.1
Other	7	6	10	10	23	56	2.8
Age							
0-9	0	0	0	1	0	1	0.0
10-17	1	0	1	7	19	28	1.4
18-24	38	40	27	76	82	263	13.1
25-34	64	54	83	146	196	543	27.0
35-44	40	45	44	82	176	387	19.2
45-54	33	41	47	94	127	342	17.0
55-64	55	58	45	69	111	338	16.8
65+	20	13	20	27	32	112	5.6
Total Deaths	251	251	267	502	743	2,014	
Rate (per 100,000)	7.9	7.9	8.4	15.7	23.2		

When examining death rates by demographics, Black residents and children aged 10-17 years demonstrated the largest percent increases within their categories between 2017 and 2021 (**Table 6**). The death rate for Black residents increased 1,200% from 4.1 per 100,000 persons in 2017 to 54.5 per 100,000 persons in 2021. The death rate among Hispanic/Latino residents was the second highest percent increase of 350%

from 4.6 per 100,000 persons in 2017 to 20.8 per 100,000 persons in 2021. Children aged 10-17 years experienced the highest death rate increase among all age groups of more than 1800% from 2017 (0.3 per 100,000 persons) to 2021 (5.8 per 100,000 persons). Additionally, this age group only had 2 deaths prior to 2020 but jumped in 2020 and 2021.

TABLE 6. DEMOGRAPHIC RATES OF OPIOID-RELATED OVERDOSE DEATHS IN OC, 2017-2021

	2017	2018	2019	2020	2021
Gender					
Male	11.0	11.2	11.4	24.6	35.2
Female	4.8	4.6	5.3	6.9	11.2
Race/Ethnicity					
White	13.5	14.5	14.3	23.3	32.4
Hispanic/Latino	4.6	3.7	5.1	13.0	20.8
Asian/Pacific Islander	1.4	1.0	1.0	4.2	4.1
Black	4.1	4.1	4.1	20.4	54.5
Other	8.0	6.9	11.1	11.0	24.8
Age					
0-9	0.0	0.0	0.0	0.3	0.0
10-17	0.3	0.0	0.3	2.1	5.8
18-24	11.2	11.8	8.2	23.2	25.2
25-34	16.4	13.8	21.5	38.1	50.6
35-44	9.8	11.0	10.8	20.2	43.6
45-54	7.1	8.9	10.4	21.2	28.9
55-64	13.7	14.5	10.9	16.6	26.6
65+	4.3	2.8	4.0	5.3	6.0
Total Death Rate	7.9	7.9	8.4	15.7	23.2

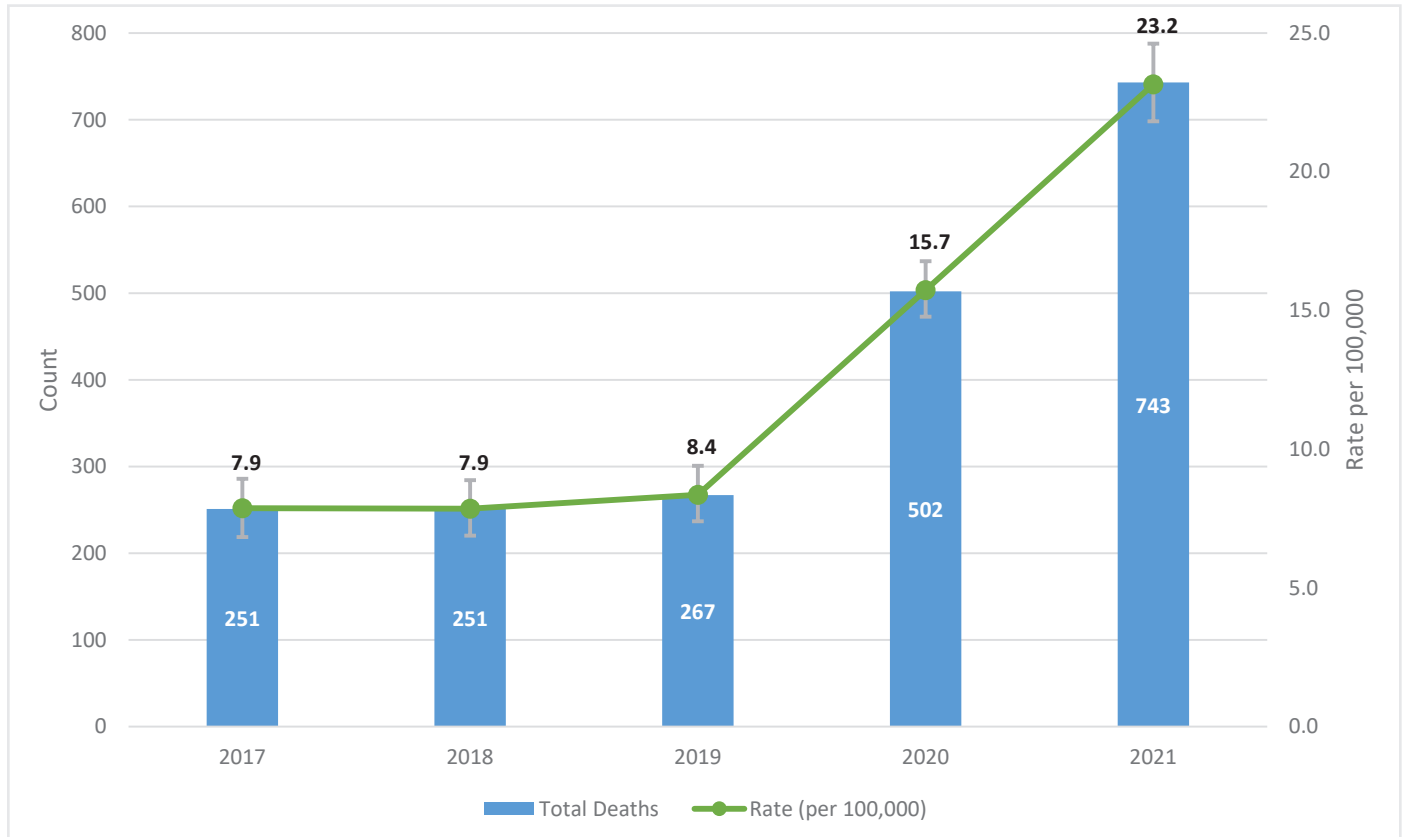


OPIOID-RELATED OVERDOSE DEATH TRENDS

Opioid-Related Overdose Death Rates

From 2017 to 2021, the overall rate of opioid-related overdose deaths increased in Orange County with 2021 having the highest rate of opioid overdose deaths (n=743, 23.2 per 100,000). The largest increase in opioid-related overdose deaths occurred in 2020 (n=502) jumping 88% from the previous year (n=267; **Figure 3**). The death rates from 2019 to 2021 were significantly higher from the previous year.

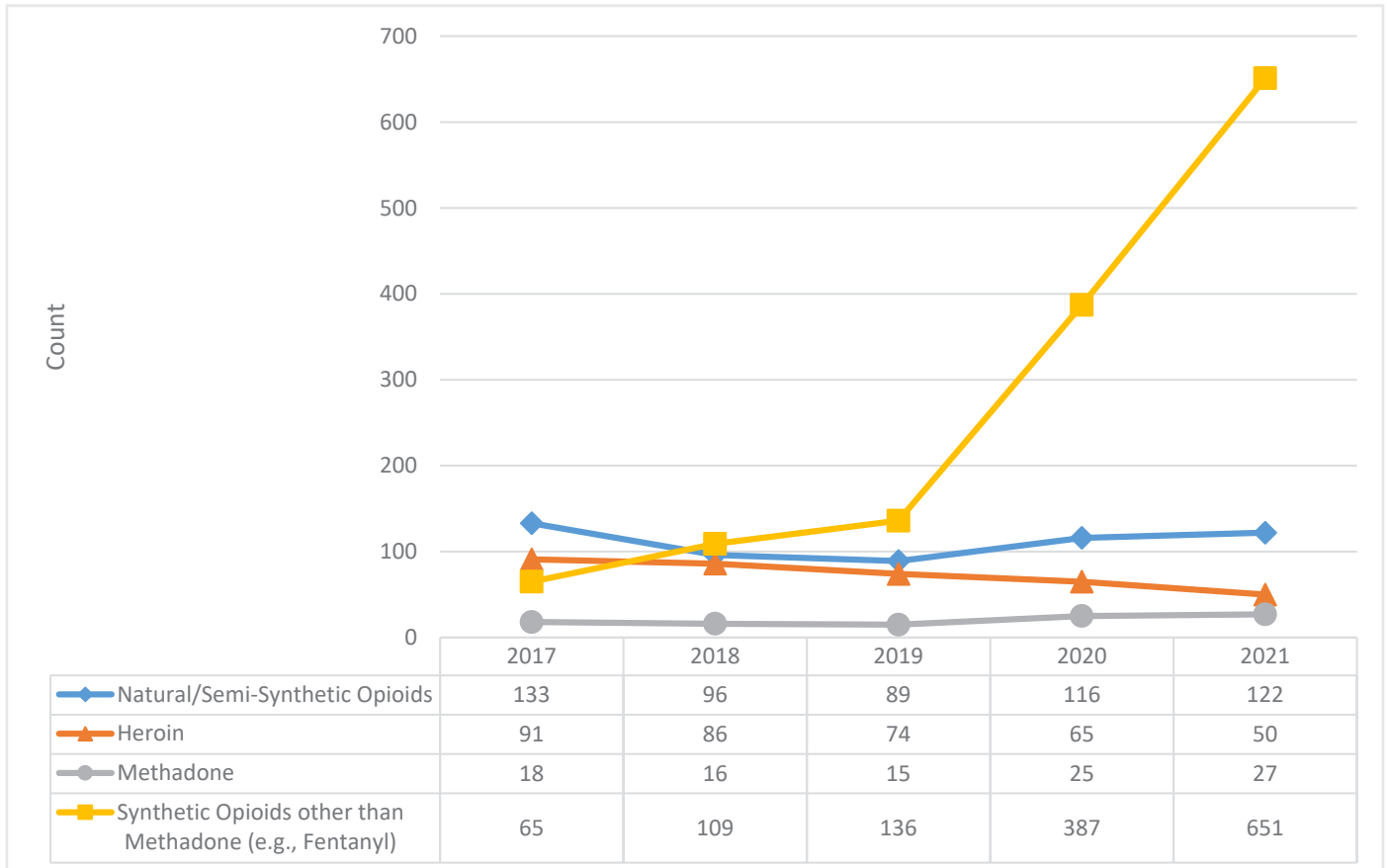
FIGURE 3. OPIOID OVERDOSE DEATH RATE TRENDS IN OC (INCLUDING 95% CONFIDENCE INTERVALS), 2017-2021



Opioid Subtypes

Synthetic opioids other than Methadone were the most common drug type found among opioid-related overdose deaths between 2017 and 2021 and significantly increased 379%, from 136 in 2019 to 651 in 2021 (**Figure 4**). Conversely, heroin involved in opioid overdose deaths dropped by 45%, from 2017 (n=91) to 2021 (n=50). Opioid-related overdose deaths involving methadone and natural/semi-synthetic opioids decreased from 2017 to 2019, but increased after 2019 to 2021.

FIGURE 4. OPIOID SUBTYPES IN OVERDOSE DEATHS IN OC*, 2017-2021



*Drug cause of death may indicate more than one type of opioid found prior to overdose.

Opioid Overdose Intent

The majority of opioid-related overdose deaths were accidental (92.5%), followed by intentional (6.1%), and undetermined (1.4%; **Table 7**). Examining the time trend of accidental overdoses from 2017 to 2021 indicates, that in proportion to the total of opioid-related deaths in a year, more opioid-related overdoses were accidental over time whereas the proportion of intentional, or suicide, overdoses was decreasing.

TABLE 7. INTENTION OF OPIOID-RELATED OVERDOSE DEATHS IN OC, 2017-2021

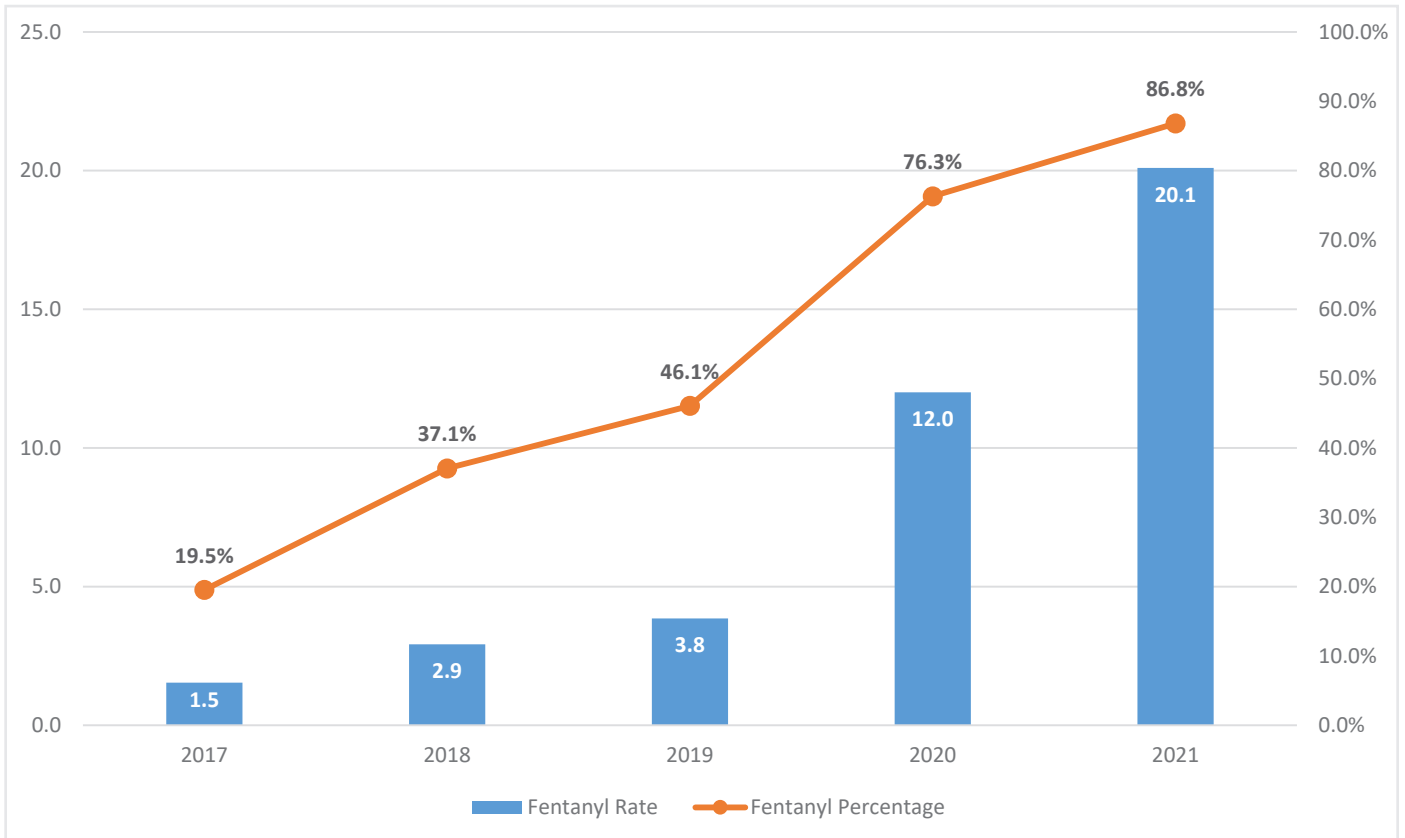
	2017	2018	2019	2020	2021	Total
Accident	222 (88.4%)	222 (88.4%)	238 (89.1%)	470 (93.6%)	711 (95.7%)	1,863 (92.5%)
Intentional	24 (9.6%)	21 (8.4%)	24 (9.0%)	26 (5.2%)	28 (3.8%)	123 (6.1%)
Undetermined	5 (2.0%)	8 (3.2%)	5 (1.9%)	6 (1.2%)	4 (0.5%)	28 (1.4%)
Total	251	251	267	502	743	2,014



Fentanyl

Since 2017, the rate and percent of fentanyl-involved deaths among opioid overdoses have increased markedly (**Figure 5**). The fentanyl-related overdose death rate increased 13.4 times in 2021 (20.1 per 100,000 persons) when compared to 2017 (1.5 per 100,000 persons). Over time, fentanyl has grown to become the most common opioid among opioid overdose deaths—found in 19.5% of deaths in 2017 to an astounding 86.8% of deaths in 2021.

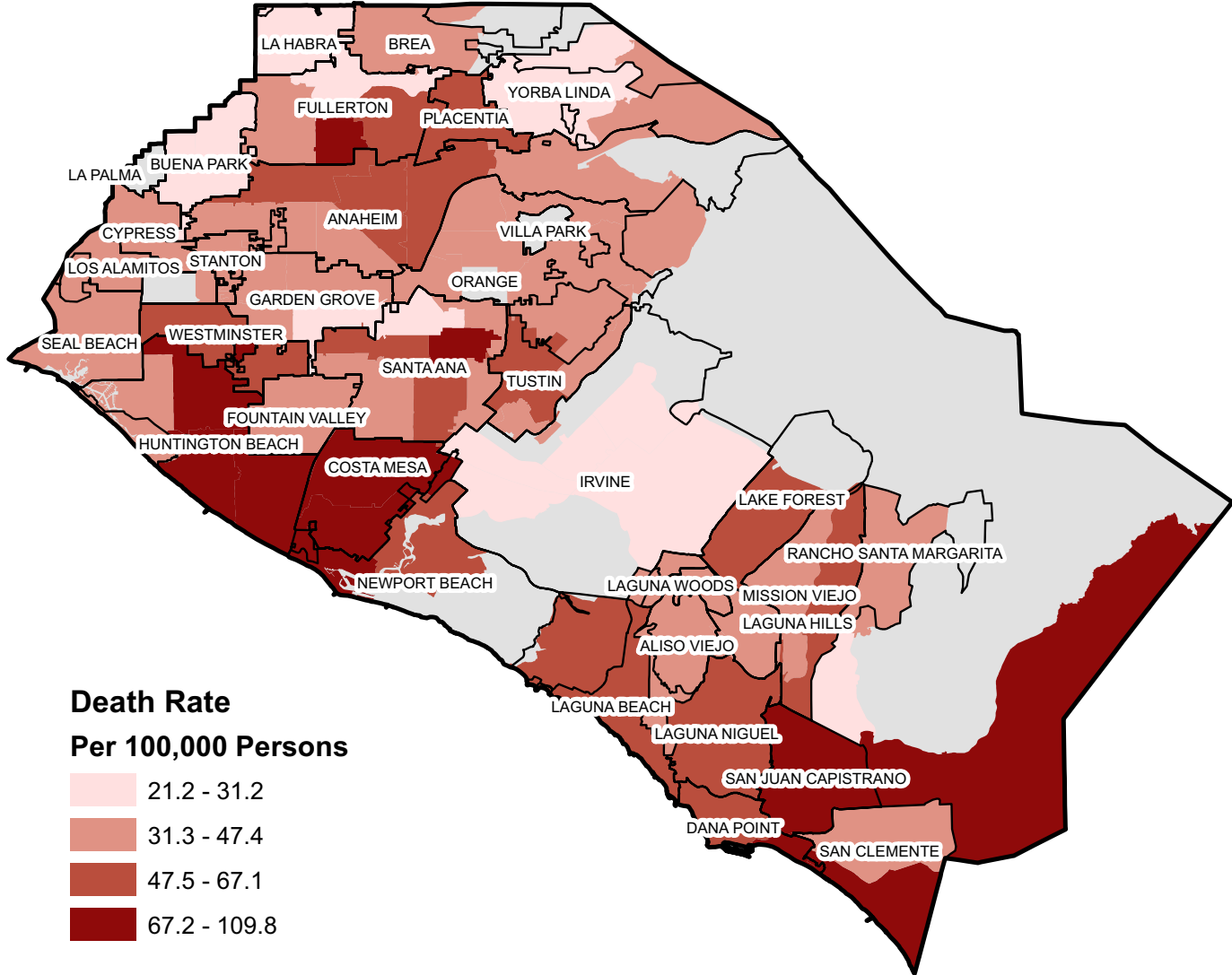
FIGURE 5. RATE AND PERCENT OF FENTANYL-RELATED DEATH AMONG OPIOID OVERDOSE DEATH IN OC



OPIOID-RELATED OVERDOSE DEATH RATE BY ZIP CODE AND CITY, 2019-2021*

Higher opioid-related overdose deaths occurred in coastal and southern areas of Orange County with an exception of one ZIP Code in Fullerton and one in Santa Ana. (Map 2). The highest opioid-related overdose death rate was in San Juan Capistrano (82.9 per 100,000 persons), followed by Costa Mesa (73.8 per 100,000 persons), and Huntington Beach (72.1 per 100,000 persons) (Table 8).

MAP 2. OPIOID-RELATED OVERDOSE DEATH RATE BY ZIP CODE, 2019-2021



Source: California Comprehensive Death File, 2019-2021

*Opioid-related deaths were aggregated over three years in this geographic analysis in order to lend more stability to rate calculations by zip code.

TABLE 8. OPIOID-RELATED DEATH RATE BY CITY, 2019-2021

City	# Deaths 2019-2021	Rate per 100,000 persons	95% Confidence Interval	
San Juan Capistrano	29	82.9	55.5	119.0
Costa Mesa	83	73.8	58.8	91.5
Huntington Beach	143	72.1	60.7	84.9
Los Alamitos	8	67.2	29.0	132.5
Laguna Niguel	43	66.6	48.2	89.7
Newport Beach	54	63.4	47.6	82.7
Santa Ana	184	59.3	51.0	68.5
San Clemente	38	59.2	41.9	81.3
Dana Point	19	57.3	34.5	89.5
Placentia	29	56.0	37.5	80.4
Anaheim	189	54.6	47.1	63.0
Fullerton	77	53.3	42.1	66.7
Laguna Beach	12	52.2	27.0	91.1
Mission Viejo	48	51.2	37.8	67.9
Tustin	41	51.0	36.6	69.2
Westminster	45	49.5	36.1	66.2
Lake Forest	40	46.5	33.2	63.3
Rancho Santa Margarita	22	45.9	28.8	69.5
Fountain Valley	24	42.0	26.9	62.5
Orange	54	38.7	29.1	50.5
Yorba Linda	26	38.2	24.9	55.9
Cypress	19	37.7	22.7	58.9
Seal Beach	9	35.7	16.3	67.7
Laguna Hills	11	35.0	17.5	62.7
Garden Grove	60	34.9	26.6	44.9
Aliso Viejo	18	34.7	20.6	54.9
Villa Park	2	34.1	4.1	123.2
Brea	16	33.9	19.4	55.0
Laguna Woods	6	33.8	12.4	73.5
Stanton	12	31.9	16.5	55.6
La Habra	17	27.1	15.8	43.4
Buena Park	22	26.1	16.4	39.5
Unknown	30	22.6	15.2	32.2
Irvine	61	19.8	15.2	25.5
La Palma	3	19.3	4.0	56.3
Orange County	1,512	47.4	45.0	49.8

SUMMARY

Overall emergency department visits related to opioid overdoses have increased between 2017 and 2021 which can be explained by the increased use of synthetic opioids within the same time period. Synthetic opioids, such as fentanyl, involved in ED visits continue to trend upward with no signs of slowing down. Nearly all of opioid-related emergency department visits (92.9%) resulted in home/self-care discharge or leaving against medical advice/discontinued care. Although the majority of opioid-related emergency department visits were among White residents (63.5%), the largest increase (233%) between 2017 and 2021 occurred among Black residents. Opioid overdose hospitalization rates remained relatively stable during this time period.

Rates of opioid-related overdose deaths rose between 2018 and 2021 and were statistically significant from 2019 to 2021. Males (73.9%) and White residents (64.9%) accounted for the majority of opioid-related overdose deaths when compared to their respective groups. Opioid-related overdose deaths were overwhelmingly identified as accidental.

The pattern of opioid-related overdose deaths in Orange County has changed since 2017. Natural/semi-synthetic opioids (i.e., hydrocodone, codeine, and morphine) and heroin involved in overdose deaths have decreased overall. However, methadone slightly increased the past few years. Synthetic opioids such as fentanyl jumped at an alarming rate. Fentanyl became the most common opioid driving opioid-related overdose deaths in 2020 and 2021. This is consistent with existing literature highlighting rapid increases in drug overdose deaths involving fentanyl nationwide since 2010 and, moreover, the acceleration of illicitly manufactured fentanyl contributing to accidental deaths.^{2, 8}

Geographically, the highest rates of opioid-related emergency department visits and overdose deaths were seen in coastal and southern regions of Orange County. Ongoing surveillance of opioid-related overdose deaths is needed to monitor changes in overall rates, shifting trends in types of opioids, demographic characteristics, and geographical patterns of those most at risk of an opioid overdose death and provide relevant and up-to-date information for prevention efforts and treatment services to reduce the misuse of opioids and needless loss of life.

Definitions

Natural/Semi-Synthetic Opioids: Includes codeine, morphine, hydrocodone, and oxycodone.

Synthetic opioids other than methadone: Includes fentanyl, fentanyl analogs, and tramadol.

Data

The data used in this study were the California Comprehensive Death File (CCDF) from the California Department of Public Health and the Emergency Department (ED) and Patient Discharge Data (PDD) from the California Department of Health Access and Information.

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