

# 2022 Wake County Drug Overdose Integrated Epidemiologic Profile

June 2023



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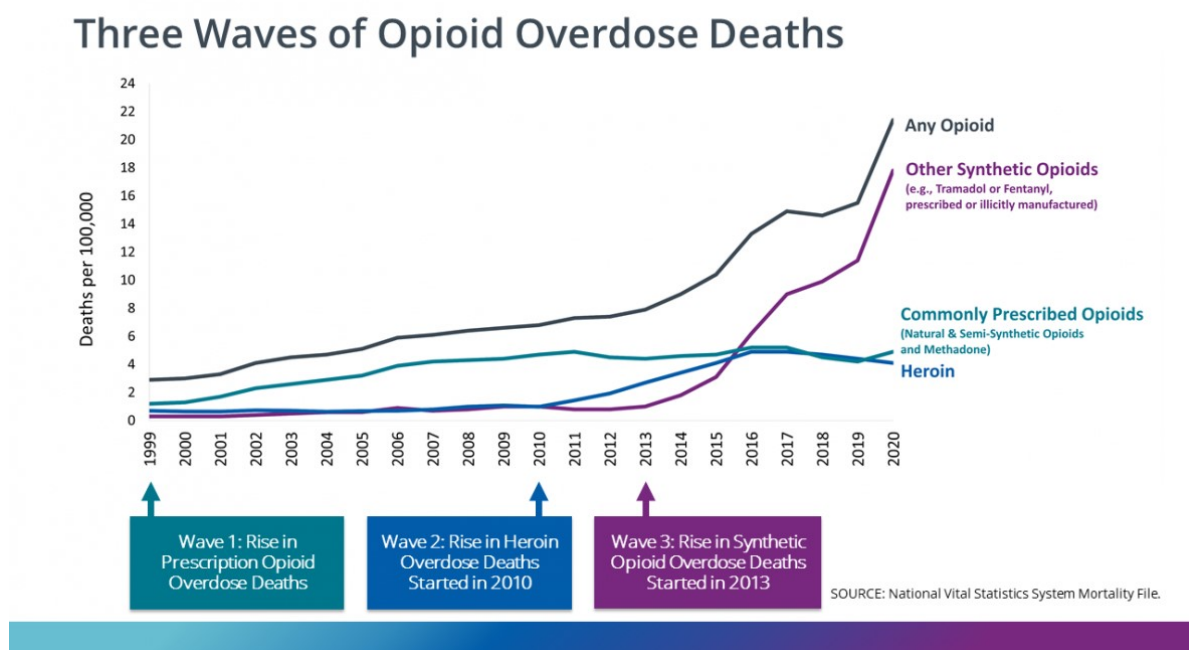
## EXECUTIVE SUMMARY

The number of drug overdose deaths in the U.S. has quintupled from 1999 to 2020, and nearly 75% of overdose deaths in the U.S. in 2020 involved an opioid.<sup>1</sup> In 2021, an estimated 107,622 drug overdose deaths (provisional data from the CDC's National Center for Health Statistics) took place in the United States, which is an increase of nearly 15% from the 93,655 overdose deaths estimated in 2020.<sup>4</sup> In North Carolina, more than 28,000 individuals have lost their lives to overdoses between 2000 to 2020.<sup>5</sup> In Wake County, there were more than 1,800 overdose deaths between 2000 to 2021, with the annual counts increasing by over 80% between 2019 (130) and 2021 (240).<sup>6</sup> Increases were seen at the state and national levels during the same period as well (40% and 30%, respectively).

*Opioids are a class of drugs that include the illegal drug heroin, synthetic opioids such as fentanyl, and pain relievers available legally by prescription, such as oxycodone (OxyContin®), hydrocodone (Vicodin®), codeine, morphine, and many others.*

The increase in overall drug overdose deaths is being driven not just by opioid overdoses but overdoses involving cocaine or cocaine and opioids since it has become common for opioids to be found in the cocaine supply. This is demonstrated in the three waves of the opioid epidemic as seen in Figure 1 below. The first wave of deaths from the opioid epidemic began in the late 1990s when there was a rise in prescription opioid overdose deaths.<sup>1</sup> The second started around 2010 with a rise in heroin-specific overdose deaths, and the third wave only a few years later around 2013 with a rise in synthetic opioid overdose deaths.<sup>1</sup>

Figure 1: CDC's "Three Waves of Opioid Overdose Deaths"



Source: "Understanding the Opioid Overdose Epidemic", Centers for Disease Control and Prevention (CDC), 06/13/2023.

Figures 5 and 6 in this report show counts and rates for all drug overdose deaths (including non-opioid substances as well) in Wake County following a similar trend line increasing from 28 overdose deaths in 2000 to 223 in 2021. At the national level, there is also evidence of a 4th wave emerging in recent years as deaths continue to increase. This is due to several factors including

- more restrictive opioid prescribing practices
- the COVID-19 pandemic
- increased availability of illicit synthetic opioids, and
- the reduction of access to pain management procedures, which leads patients to seek remedies on their own.<sup>2</sup>

Substance use disorder (SUD), recognized as a medical condition, affects the brain and changes behavior.<sup>3</sup> It involves some pattern of regular or compulsive substance use. Addiction is the result of psychological or physiological dependence on that use. There is not one single driving factor that leads to addiction; it is a confluence of many factors and anyone can have substance use disorder.<sup>3</sup> At the national level, approximately 1 in 7 Americans has experienced a substance use disorder.<sup>3</sup>

According to the U.S. Census Bureau estimates, there were 1,150,204 residents of Wake County as of 2021 and an estimate of 1,175,021 residents as of July 2022. This shows a minimum growth of at least 27.6% in Wake County residents since the 2010 Census (population as of the 2010 count was 900,993). As Table 1 shows, based on 2021 estimates, approximately 61% of the county population are under the age of 45 and approximately 55% are between the ages of 25-64. More than half of the population is female with a ratio of 100 females to 96 males. Additionally, Wake County is 57.1% Non-Hispanic White, 18.1% Non-Hispanic Black, and 11.4% Hispanic. Other races and mixed-race are included in Table 2 of this report. Tables 3-7 provide additional information on the sociodemographic composition of Wake County residents including marital status, education level, socio-economic status, employment status, and health insurance coverage, all of which can be risk factors for substance use and drug overdoses.

The risk of an opioid overdose for individuals using cocaine, methamphetamine, or other non-opioid illicit substances in the 1990s and early 2000s would have been minimal or likely nonexistent. The risk of overdose during the current wave of the opioid epidemic is much higher due to a rise in synthetic opioids such as fentanyl and non-opiates such as cocaine now being “cut” (diluted or mixed) with fentanyl without the user knowing.



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*More than 28,000 North Carolinians lost their lives to drug overdoses between 2000 to 2020.<sup>5</sup>*



*There were more than 1,800 drug overdose deaths in Wake County between 2000 to 2021. The number of deaths increased by over 80% between 2019 (130) and 2021 (240).<sup>6</sup>*

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Fentanyl was originally created to legally manage pain from cancer. It entered the illicit drug market because it was cheaper than heroin for dealers and gave their product a higher potency. It is now being mixed in at a broader distribution level. Now, illicit fentanyl looks like other drugs when in powder form. It is commonly mixed with drugs such as heroin, cocaine, and methamphetamine and molded into pills that are made to resemble other prescription opioids, even though fentanyl is 50 times stronger than heroin and 100 times stronger than morphine.<sup>10</sup> The U.S. Drug Enforcement Administration (DEA) has found that approximately 6 out of 10 fake pills that were laced with fentanyl contained a potentially fatal dosage of it.<sup>11</sup> This is why “one pill can kill” in the current drug market.

Figure 8 in this report shows the rapid increase with which fentanyl has been detected in drug overdose deaths in Wake County. Overdose deaths of Wake County residents that included fentanyl had a rate of 14.1 per 100,000 population in 2021, which was nearly double the rate of 7.1 per 100,000 only two years prior in 2019.

## OVERVIEW

The 2022 Wake County Drug Overdose Integrated Epidemiologic Profile describes the burden of the drug overdose crisis on the population of Wake County in terms of socio-demographic and geographic characteristics of people experiencing drug overdoses. The profile represents a data-driven resource for local level partners and community members to understand current drug overdose trends, patterns, and possible risk factors in Wake County. Lastly, the profile also makes recommendations for allocating drug overdose prevention and care resources, planning programs, and evaluating programs and policies.

### Goals of this Drug Overdose Integrated Epidemiologic Profile:

- Describe the socio-demographic characteristics of the general population in Wake County for comparison to overdose statistics
- Provide a thorough description of drug overdose morbidity and mortality, using data, among various populations (age, race, sex, ZIP Code, etc.) in Wake County
- Provide insights for overdose prevention

## DATA SOURCES

### United States Census Bureau

The Census Bureau collects and provides information about the people and economy of the United States. The Census Bureau’s website (<http://www.census.gov/>) includes data on demographic characteristics of the population, family structure, educational attainment, income level, and the proportion of persons who live at or below the federal poverty level. State and county-specific data are easily accessible, and valuable to understand a population. In this profile, 2021 American Community Survey (ACS) (Census Bureau) 1-year and 5-year estimates are reported for Wake County as well as N.C.

## **North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT)**

This profile uses emergency department (ED) and emergency medical services (EMS) data from NC DETECT. NC DETECT is North Carolina's statewide syndromic surveillance system. It was created by the North Carolina Division of Public Health (NC DPH) in 2004 in collaboration with the Carolina Center for Health Informatics (CCHI) in the UNC Department of Emergency Medicine to address the need for early event detection and timely public health surveillance in North Carolina using a variety of secondary data sources.

Authorized users are currently able to view data from emergency departments, North Carolina Poison Control, and emergency medical services (EMS), as well as pilot data from select urgent care centers. NC DETECT is designed, developed, and maintained by CCHI staff with funding by the NC DPH. New functionality is added regularly based on end user feedback. This report includes 5-year trend (2018-2022) ED and EMS data.

### **North Carolina Department of Health and Human Services (NCDHHS) Opioid and Substance Use Action Plan**

To address the overdose crisis, the NCDHHS worked with community partners to develop North Carolina's Opioid and Substance Use Action Plan. From that collaboration, the Opioid and Substance Use Action Plan data dashboard was built. The data dashboard provides integration and visualization of state, regional, and county-level metrics for partners across North Carolina to track progress toward reaching the goals outlined in the plan.

### **NCDHHS Injury and Violence Prevention Branch**

NCDHHS' Injury and Violence Prevention Branch website includes statewide summary data, a link to the Opioid and Substance Use Action Plan Data Dashboard, monthly data updates, and county-level data. This branch of NCDHHS also provides data for drug overdoses, along with other injuries, by customizable requests. Some of the overdose death data for Wake County, particularly broken up by demographic categories, was provided through a request made to the Injury and Violence Prevention Branch in 2022.

## **STRENGTHS AND LIMITATIONS**

The 2022 Wake County Drug Overdose Integrated Epidemiologic Profile provides important information that local partners can use as a resource for prevention strategies. Strengths of this profile include robust datasets and detailed analyses. Comprehensive population demographics data from the Census Bureau offer community context. Data from the NC Overdose and Substance Use Action Plan data dashboard include many data points that can be compared with other counties and to statewide rates. NC DETECT data are near real-time data from Wake County ED and EMS that are updated daily and can demonstrate trends in non-fatal overdoses. Additionally, all naloxone administrations performed by EMS are recorded in NC DETECT.

The NCDHHS Injury and Violence Prevention Branch website has additional data available for all counties and state-wide and can provide specific data for Wake County upon request by the WCHHS Epidemiology Program. Overdose data provided by the Branch and through the Overdose and Substance Use Action Plan data dashboard include information and trends regarding the breakdown of certain demographic categories including biological sex, age, race, and ethnicity.

While there are many strengths in the data sources that are included in this profile, some limitations must be acknowledged. There is a significant delay in the reporting and finalization of death data in North Carolina. Due to this delay, the death data in this report is through 2021 as 2022 data has not been finalized yet. NC DETECT data are de-identified to some degree, resulting in classifiers not capturing all overdoses. Additionally, non-standard reporting across hospital systems can make this data hard for the system to interpret. Due to the COVID-19 pandemic, EMS data reporting into NC DETECT (early 2020) was interrupted. Specific EMS data may be limited to the year of 2020 in this report. Lastly, an incident in which EMS responded and administered naloxone may not necessarily have been an opioid-related overdose but protocols led to administration of the medication and the incident was reported as such.

## **GEOGRAPHY AND SOCIODEMOGRAPHIC COMPOSITION OF GENERAL POPULATION, WAKE COUNTY, N.C.**

### **Geographical Description of Wake County, N.C.**

Wake County is in the northeast central region of North Carolina, where the North American Piedmont and Atlantic Coastal Plain regions meet. It is the second most populated county in North Carolina with a population of about 1.1 million people, and the county population is growing more than twice as fast as the rest of the state. Wake County grows by approximately 62 people per day and added 225,000 people over the last decade.<sup>12</sup>

**Figure 2: Geographical Location of Wake County, N.C.**



Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

## Demographic Composition

In 2021, the median age of people living in Wake County was 37.4 years. About half of the population (55.2%) in Wake County are between the ages 25-64 years. Nearly one-third of the population (32.3%) is younger than 25 years old; and about 11.2% of the population is 65 years and older. The female to male ratio in Wake County is 100:96.

The four largest ethnic groups in Wake County are White (Non-Hispanic) (57.1%), Black or African American (Non-Hispanic) (18.1%), Hispanic or Latino (11.4%) and Asian (8.6%) (Table 2).

**Table 1: Population Distribution by Age Group and Sex, Wake County, NC 2021**

Age Group	Males N = 562,593	%	Females N = 587,611	%	Total Population N = 1,150,204	%
<15	111,472	19.8%	106,567	18.1%	218,039	19.0%
15-24	76,262	13.6%	76,192	13.0%	152,454	13.3%
25-34	81,789	14.5%	85,390	14.5%	167,179	14.5%
35-44	83,870	14.9%	87,727	14.9%	171,597	14.9%
45-54	80,495	14.3%	81,537	13.9%	162,032	14.1%
55-64	65,602	11.7%	69,222	11.8%	134,824	11.7%
65+	63,103	11.2%	80,976	13.8%	144,079	12.5%

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

**Table 2: Population Distribution by Race/Ethnicity, Wake County, NC 2021**

Race/Ethnicity	Total Population *1,129,410	%
Non-Hispanic White	645,020	57.1%
Non-Hispanic Black	204,535	18.1%
Hispanic or Latino	128,241	11.4%
American Indian/Alaska Native	2,760	0.2%
Asian	96,665	8.6%
Two or more races	45,526	4.0%
Native American	453	0.04%

\*This is the total including residents who identified as “other” race, which is not shown in the current table.

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

## Poverty, Income, and Education

In 2021, the median household income for Wake County was \$91,299 compared to \$61,972 for North Carolina. About 9.5% of the population was below the federal poverty level, compared to 13.4% for the state (Table 3). Of those residing in Wake County, 8.9% of males and 10% of females live below the federal poverty level. When broken down by race and ethnicity, 6.8% of Non-Hispanic White, 14.2% of Non-Hispanic Black or African-American, 22% of Hispanic or Latino and 6.1% of the Asian population live below the federal poverty level.

More than half (56.7%) of the population aged 25 years and older in Wake County has a bachelor's degree or higher. While 13.8% of the population has a high school diploma/GED, only 6.2% of population reported having an education less than high school (Table 4).

**Table 3: Socioeconomic Characteristics of Population, Wake County and North Carolina, 2021**

Characteristics	Wake County	North Carolina
Median household income	\$91,299	\$61,972
Average per capita income	\$46,470	\$35,254
<b>Federal Poverty Level</b>		
Individual	9.5%	13.4%
Male	8.9%	12.1%
Female	10%	14.6%
<b>Federal Poverty Level by age group</b>		
<18	10.6%	18.1%
18-64	9.4%	12.6%
>=65	7.4%	10.2%
<b>Federal Poverty Level by Race and Ethnicity</b>		
Non-Hispanic White	6.8%	9.7%
Non-Hispanic Black	14.2%	20.6%
Hispanic and Latino	22%	22.9%
Asian	6.1%	8.5%

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

**Table 4: Educational Status (Age ≥ 25 Years) of the Population, Wake County, NC 2021**

Education	Males N= 374,859	%	Females N= 404,852	%	Total Population N= 779,711	%
Less than High School	26,274	7.0%	22,167	5.5%	48,441	6.2%
High School Diploma/GED	56,694	15.1%	51,085	12.6%	107,779	13.8%
Some College, no degree	54,155	14.4%	62,818	15.5%	116,973	15.0%
Associate degree	27,373	7.3%	36,635	9.0%	64,008	8.2%
Bachelor's degree	129,442	34.5%	134,216	33.1%	263,658	33.8%
Graduate or Professional degree	80,921	21.6%	97,931	24.2%	178,852	22.9%

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau.03/2023.

## Marital Status, Employment, and Healthcare Coverage

Table 5 shows marital status information by sex of those 15 years of age and older in Wake County. More than half (52.5%) of the population reported being married. Additionally, 11.6% females and 7.5% of males reported being divorced, while 34% of the population has never been married, and 3.9% of the population (mostly females) reported being widowed.

Table 6 provides information on the employment status of the civilian labor force of those 16 years old and older for Wake County and North Carolina. The civilian labor force, or currently active workforce, is defined as all civilian noninstitutionalized residents who fulfil the requirements for inclusion among the employed or the unemployed. The employed of Wake County (65.5%) are defined as those who work for pay or profit at least one hour a week, or have a job, but are temporarily on leave due to illness, industrial action, etc. Those that are unemployed (3.7%) are defined as people without work but are actively seeking a job and currently available to start work.

Table 7 shows the percentage of the Wake County population covered by the health insurance compared to the state. More than half (66.2%) of the population has insurance through their employer, 10.5% of the population has Medicare, 12.5% is covered by Medicaid and 8.2% reported not having any insurance.

**Table 5: Marital Status (Age ≥ 15 years) of the Population, Wake County, NC 2021**

Marital Status (> 15 years)	Males N = 425,917	%	Females N = 451,949	%	Total Population N = 877,866	%
<b>Married</b>	232,582	54.6%	228,279	50.5%	460,861	52.5%
<b>Divorced</b>	32,125	7.5%	52,306	11.6%	84,431	9.6%
<b>Never married</b>	153,938	36.1%	144,281	31.9%	298,219	34.0%
<b>Widowed</b>	7,272	1.7%	27,083	6.0%	34,355	3.9%

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

**Table 6: Employment Status (Age ≥ 16 Years) of the Population, Wake County, NC 2021**

Employment Status	Wake County		North Carolina	
Characteristics	Total	%	Total	%
<b>In Labor Force</b>	634,149	69.2%	5,301,767	62.2%
<b>Employed</b>	600,095	65.5%	4,889,866	57.4%
<b>Unemployed</b>	33,535	3.7%	300,438	3.5%

Percentages may not sum to 100% due to rounding.

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

**Table 7: Health Insurance Coverage in Wake County and North Carolina, 2021**

Health Insurance Coverage	Wake County (%)	North Carolina (%)
<b>Employer</b>	66.2%	51.9%
<b>Individual</b>	NSD	NSD
<b>Medicaid</b>	10.5%	18.7%
<b>Medicare</b>	12.9%	19.2%
<b>Non-group</b>	15.6%	15.2%
<b>Military/VA</b>	2.1%	2.8%
<b>Uninsured</b>	8.2%	10.4%

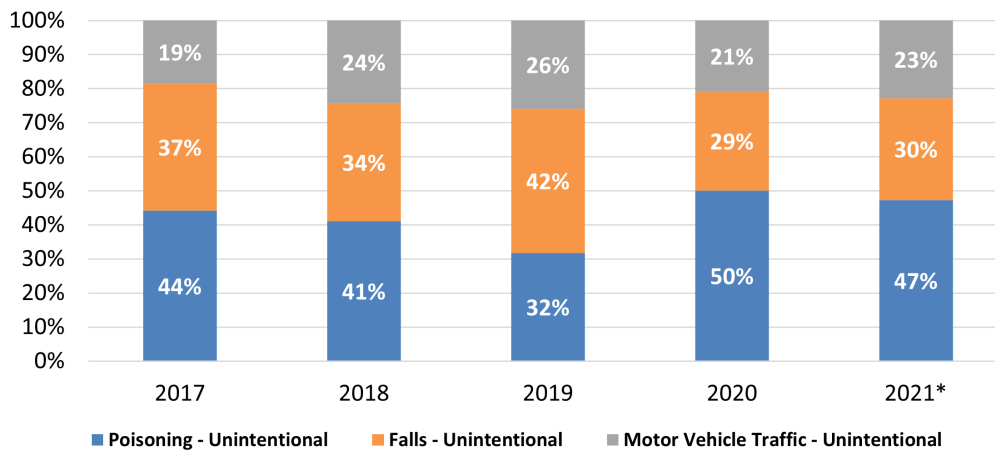
Percentages may not sum to 100% due to rounding. NSD = No Statistical Data

Source: 2021 American Community Survey Estimates, United States Census Bureau. 03/2023.

## DRUG OVERDOSE MORTALITY – TOTAL DEATHS

Figure 3 shows the proportion of injury deaths in Wake County between 2017-2021 of the three top categories. Drug overdoses make up a majority of the “Poisoning-Unintentional” category. Unintentional poisonings make up nearly half of the top causes of injury death in Wake County in recent years. Figure 4 details the top five causes of injury death; unintentional poisonings quickly surpassed unintentional falls as the top cause of injury death in 2020 and remained well above the other four causes in 2021.

**Figure 3: Percentage of the Top Three Causes of Injury Death, Wake County, 2017-2021\***



**Figure 4: Death Rates, Top Five Causes of Injury Death, Wake County, 2017-2021\***

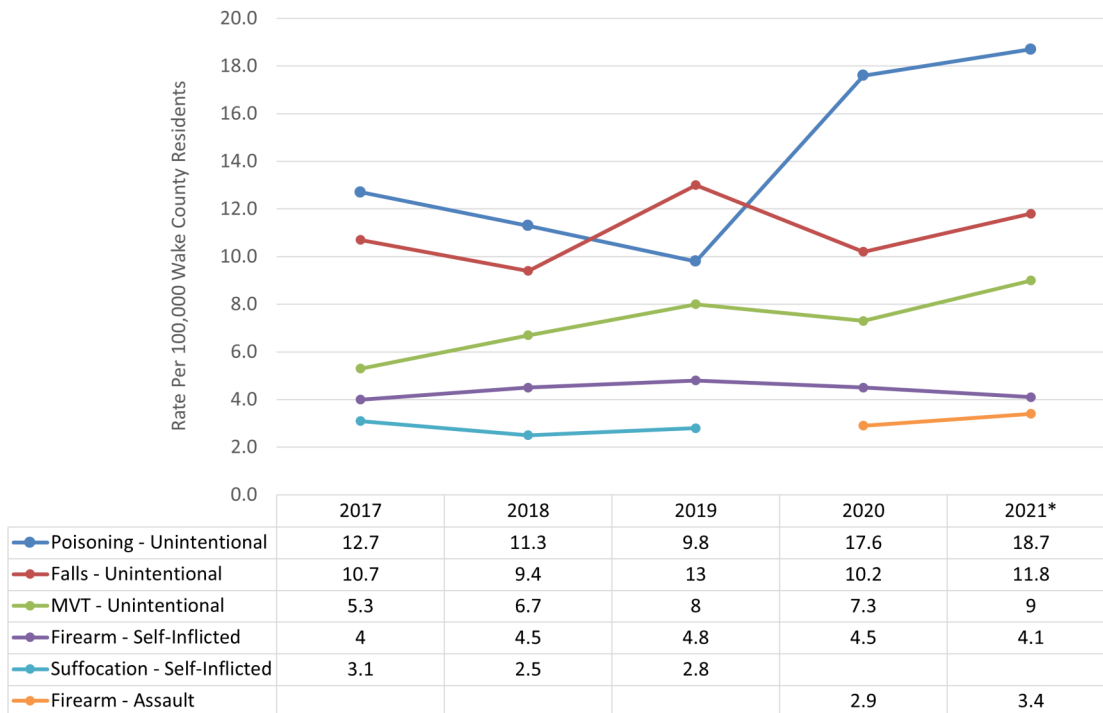
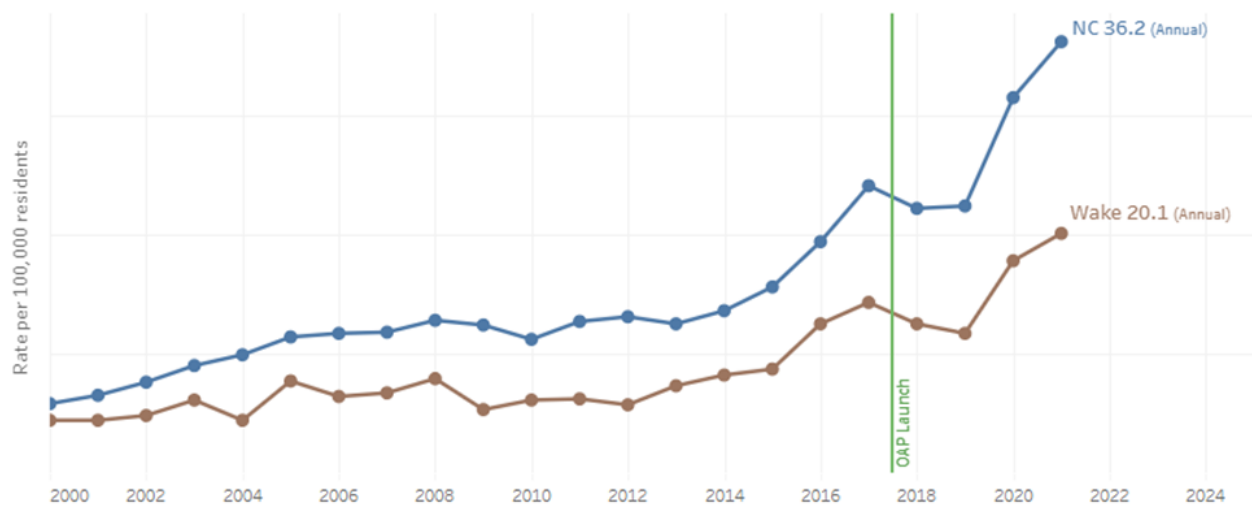


Figure 3 and Figure 4: 2021 data are provisional.

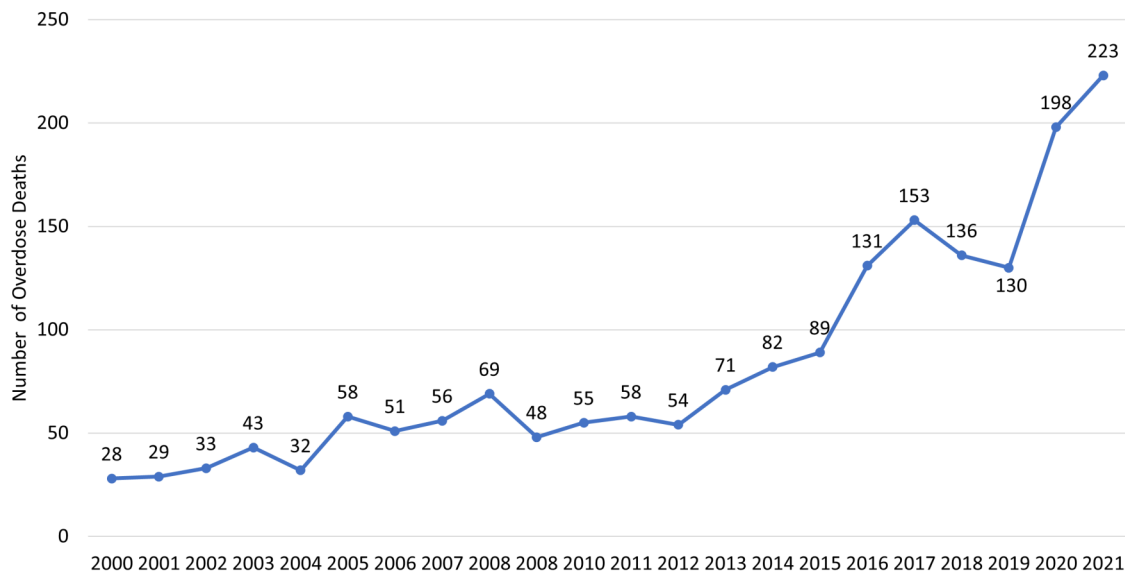
Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 09/21/2022.

There was an increase of over 80% of overdose deaths in Wake County between 2019 to 2021. This was the largest increase over a two-year period that Wake County has seen. However, Figure 5 shows that Wake County’s rate of overdose deaths per 100,000 population remains lower than the statewide rate in N.C. Figures 5 and 6 also show that there was a slight decrease in overdose deaths in 2018 and 2019 before a dramatic increase in 2020 and 2021. Figures 5 and 6 include deaths involving all types of medications and drugs: opioids (commonly prescription opioids, heroin, and synthetic narcotics like fentanyl and fentanyl-analogues), stimulants (cocaine, methamphetamine), benzodiazepines, and others. This metric includes fatal overdoses of all intents; however, over 90% of these deaths are unintentional. Societal and financial effects of the COVID-19 pandemic may have contributed to the increase in overdose deaths in 2020 and 2021.

**Figure 5: Drug Overdose Death Rates, NC Compared to Wake County, 2000-2021**



**Figure 6: Drug Overdose Death Counts in Wake County, 2000-2021**



Source Figures 5 and 6: Opioid and Substance Use Action Plan Data Dashboard, NCDHHS. 06/14/2023.

## Drug Overdose Mortality - Demographics and Geographical Analyses

The demographic breakdown shown in Table 8 is for unintentional poisoning deaths. While other poisonings may also be included, drug overdoses make up a large majority of poisoning deaths. Due to a limitation in how deaths by substances are classified, demographic analyses are currently conducted for unintentional poisoning deaths. As of September 2022, there were 779 unintentional poisoning deaths in Wake County from 2017-2021, (as 2021 data provided in this report are provisional), a significant increase (15.6%) from 2016-2020. Similar to previous years, males (74.8%), White Non-Hispanics (69.5%), and people ages 25-54 (73.2%) had the highest percentages of unintentional poisoning deaths. Notably, the Black Non-Hispanic poisoning death rate increased by 37.4% from 2016-2020 to 2017-2021.

**Table 8: Unintentional Poisoning Deaths, Wake County, 2017-2021\***

	Number	Percent	Rate per 100,000
<b>Sex</b>			
Female	196	25.2	6.9
Male	583	74.8	21.6
<b>Race/Ethnicity**</b>			
White (NH)	541	69.5	16.1
Black (NH)	191	24.5	16.7
American Indian (NH)	***	***	***
Asian (NH)	7	0.9	1.6
Hispanic	34	4.4	5.9
Other (NH)/Unknown	5	0.6	-
<b>Age Group</b>			
0-14	***	***	***
15-24	94	12.1	12.9
25-34	257	33.0	31.3
35-44	184	23.6	22.3
45-54	129	16.6	16.4
55-64	90	11.6	14.2
65+	24	3.1	3.6
<b>Total</b>	<b>779</b>	<b>100</b>	<b>14.1</b>

\*2021 data are provisional. \*\*"NH" means non-Hispanic ethnicity.

\*\*\* Number, percentage, and rate suppressed for counts between 1-4.

Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 09/21/2022.

Table 9 provides marital status and education information for Wake County residents who died from an unintentional poisoning death between 2017-2021. Individuals who were never married represent the highest percentage of unintentional poisoning deaths among marital status groups. The most common level of education attained for individuals that died of an unintentional poisoning death was a high school diploma or GED; these trends occurred across all five years between 2017-2021.

**Table 9: Unintentional Poisoning Deaths by Marital Status and Education Level, Wake County, 2017-2021**

	2017		2018		2019		2020		2021	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
<b>Marital Status</b>										
Married	32	23.5%	21	17.1%	23	21.1%	31	15.6%	27	11.6%
Divorced	22	16.2%	20	16.3%	12	11.0%	34	17.1%	36	15.5%
Married but Separated	4	2.9%	4	3.3%	2	1.8%	5	2.5%	8	3.4%
Never Married	75	55.1%	73	59.3%	65	59.6%	118	59.3%	155	66.8%
Widowed	2	1.5%	5	4.1%	4	3.7%	7	3.5%	3	1.3%
Not Classifiable	1	0.7%	0	0.0%	3	2.8%	4	2.0%	3	1.3%
<b>Education Level</b>										
8th grade or less	4	2.9%	3	2.4%	1	0.9%	3	1.5%	5	2.2%
9th-12 grade, no diploma	15	11.0%	16	13.0%	13	11.9%	22	11.1%	39	16.8%
High school graduate or GED completed	46	33.8%	57	46.3%	41	37.6%	84	42.2%	104	44.8%
Some college credit but no degree	29	21.3%	29	23.6%	33	30.3%	44	22.1%	38	16.4%
Associate degree	14	10.3%	6	4.9%	9	8.3%	22	11.1%	12	5.2%
Bachelor's degree	22	16.2%	9	7.3%	10	9.2%	14	7.0%	22	9.5%
Master's degree	6	4.4%	2	1.6%	1	0.9%	4	2.0%	7	3.0%
Doctorate	0	0.0%	1	0.8%	0	0.0%	2	1.0%	2	0.9%
Unknown	0	0.0%	0	0.0%	1	0.9%	4	2.0%	3	1.3%
<b>Total</b>	<b>136</b>		<b>123</b>		<b>109</b>		<b>199</b>		<b>232</b>	

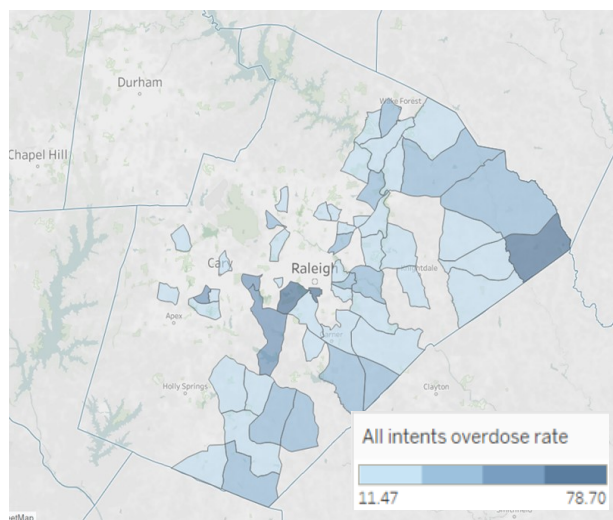
Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 04/24/2023.

Figure 7 shows a geographical analysis of drug overdose death data presenting the rate of unintentional drug overdose deaths by census tract in Wake County. The darker areas with the higher rates are in south/southwest Raleigh and Zebulon on the eastern edge of the county.

## DRUG OVERDOSE MORTALITY – DRUG TYPES

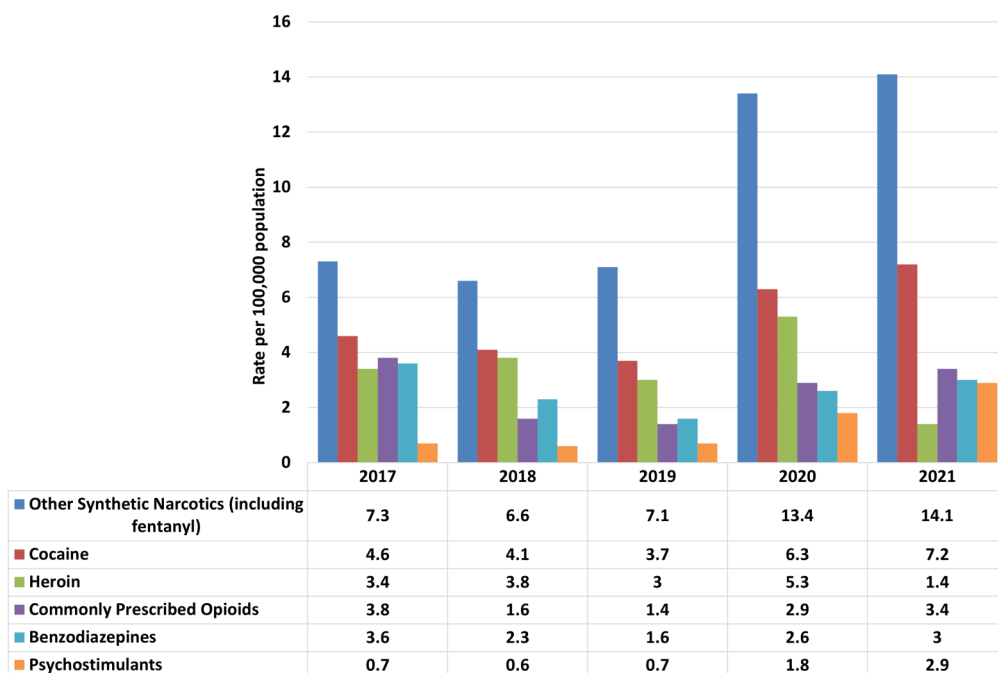
Figure 8 below shows rates of drug overdose deaths that contain positive toxicology reports of certain substances. It should be noted that one drug overdose death can be counted in multiple substance categories. Additionally, many drug overdose deaths have positive toxicology results for multiple substances. Figure 8 shows a substantial increase in drug overdose deaths by other synthetic narcotics (which includes fentanyl) in 2021. It also shows a smaller increase in cocaine (including both crack and powder), and a decrease in deaths by heroin in 2021 as well.

**Figure 7: Wake County All Medication/Drug Overdose Rates Mapped by Census Tract, All Intents, 2017-2021**



\*Census Tracts with 1-4 drug overdose deaths during this time were suppressed from this map because rates calculated from small numbers are not reliable. All census tracts highlighted in the map had more than 4 drug overdose deaths between 2017-2021.  
Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 02/2023.

**Figure 8: Overdose Death Rates by Substance, Wake County, 2017-2021**



Note: Overdose deaths usually involve a combination of drugs. Individual deaths may be reported in more than one category.

Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 09/21/2022.

Table 10 shows other synthetic narcotic (e.g. fentanyl) overdose deaths increased by 29.1% from 2016-2020 to 2017-2021. Subgroups that saw significant increases in death rates were males, Black Non-Hispanics, and people ages 25-44.

Table 11 shows that the overall cocaine overdose death rate increased by 18.1% from 2016-2020 to 2017-2021. Black Non-Hispanics continue to be disproportionately represented among cocaine deaths. During 2017-2021, Black Non-Hispanics died from cocaine overdoses more than double the rate of White Non-Hispanics and more than five times the rate of Hispanics. Additionally, males died from cocaine overdoses at a substantially higher rate than females.

**Table 10: Other Synthetic Narcotic Overdose Deaths, Wake County, 2017-2021\***

	Number	Percent	Rate per 100,000		Number	Percent	Rate per 100,000
<b>Sex</b>				<b>Age Group</b>			
Female	130	24.0	4.6	0-14	0	0.0	0.0
Male	411	76.0	15.2	15-24	80	14.8	11.0
				25-34	199	36.8	24.3
<b>Race/Ethnicity**</b>				35-44	133	24.6	16.1
White Non-Hispanic (NH)	376	69.5	11.2	45-54	79	14.6	10.1
Black (NH)	134	24.8	11.7	55-64	41	7.6	6.5
American Indian (NH)	0	0.0	0.0	65+	9	1.7	1.4
Asian (NH)	***	***	***	<b>Total</b>	<b>541</b>	<b>100</b>	<b>9.8</b>
Hispanic	23	4.3	4.0				
Other (NH)/ Unknown	***	***	***				

\*2021 data are provisional. \*\* "NH" means non-Hispanic ethnicity. \*\*\* Number, percentage, and rate suppressed for counts between 1-4. Source: NCDHHS Division of Public Health, Injury and Violence Prevention Branch, 09/22/2022.

**Table 11: Cocaine Overdose Deaths, Wake County, 2017-2021\***

	Number	Percent	Rate per 100,000		Number	Percent	Rate per 100,000
<b>Sex</b>				<b>Age Group</b>			
Female	59	20.6	2.1	0-14	0	0.0	0.0
Male	228	79.4	8.5	15-24	22	7.7	3.0
				25-34	95	33.1	11.6
<b>Race/Ethnicity**</b>				35-44	68	23.7	8.2
White (NH)	153	53.3	4.5	45-54	55	19.2	7.0
Black (NH)	117	40.8	10.2	55-64	41	14.3	6.5
American Indian (NH)	0	0.0	0.0	65+	6	2.1	0.9
Asian (NH)	***	***	***	<b>Total</b>	<b>287</b>	<b>100</b>	<b>5.2</b>
Hispanic	11	3.8	1.9				
Other (NH)/ Unknown	***	***	***				

\*2021 data are provisional. \*\* "NH" means non-Hispanic ethnicity. \*\*\* Number, percentage, and rate suppressed for counts between 1-4. Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 09/22/2022.

The heroin overdose death rate decreased slightly by 7.4% from 2016-2020 to 2017-2021. Males died at a much higher rate than females and White Non-Hispanics died at a higher rate than other racial/ethnic groups (Table 12).

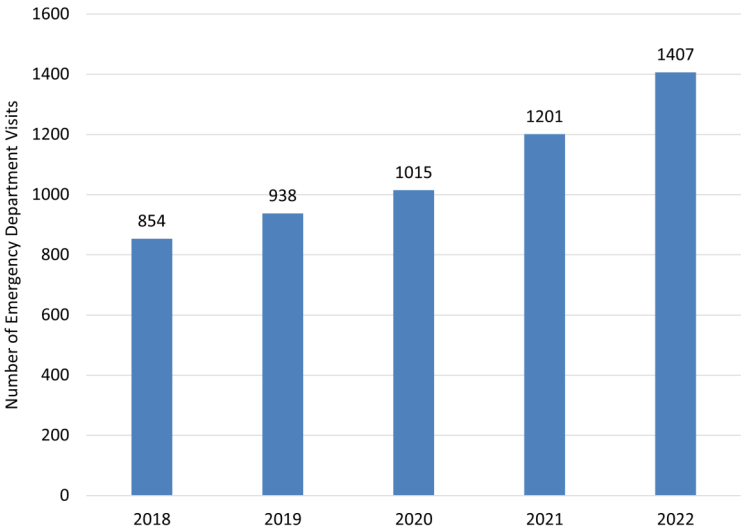
Table 12: Heroin Overdose Deaths, Wake County, 2017-2021*							
	Number	Percent	Rate per 100,000		Number	Percent	Rate per 100,000
<b>Sex</b>				<b>Age Group</b>			
Female	38	20.3	1.3	0-14	0	0.0	0.0
Male	149	79.7	5.5	15-24	23	12.3	3.1
<b>Race/Ethnicity**</b>				25-34	66	35.3	8.0
White (NH)	142	75.9	4.2	35-44	54	28.9	6.6
Black (NH)	32	17.1	2.8	45-54	28	15.0	3.6
American Indian (NH)	***	***	***	55-64	13	7.0	2.0
Asian (NH)	***	***	***	65+	***	***	***
Hispanic	10	5.4	1.7	<b>Total</b>	187	100	3.4
Other (NH)/Unknown	0	0.0	0.0				

\*2021 data are provisional. \*\*“NH” means non-Hispanic ethnicity. \*\*\* Number, percentage, and rate suppressed for counts between 1-4. Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 09/22/2022.

## DRUG OVERDOSE MORBIDITY – TOTAL EMERGENCY DEPARTMENT VISITS

From 2018 to 2022, there were approximately 5,415 emergency department (ED) visits for suspected drug overdoses of unintentional or undetermined intent in Wake County. This metric has been steadily increasing over the past 5 years, as seen below in Figure 9.

**Figure 9: Unintentional or Undetermined Intent Medication or Drug Overdose Emergency Department (ED) Visits, Wake County, 2018-2022**

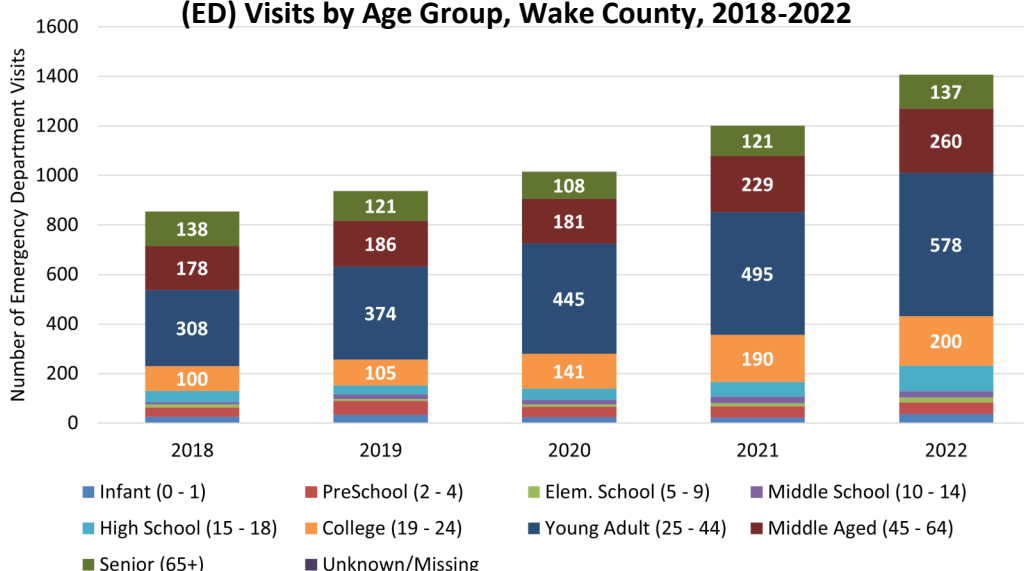


Source: NC DETECT, NCDHHS  
Division of Public Health,  
UNC School of Medicine,  
01/25/2023.

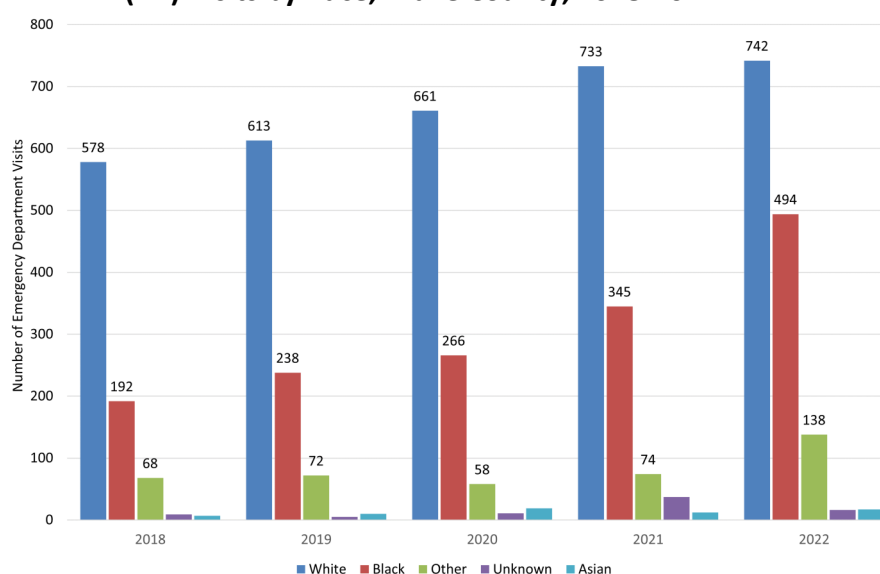
## DRUG OVERDOSE MORBIDITY – EMERGENCY DEPARTMENT VISIT DEMOGRAPHICS AND GEOGRAPHICAL ANALYSES

The demographic characteristics of individuals visiting an Emergency Department (ED) for suspected drug overdoses are shown throughout Figures 10—13. The highest portion of unintentional or undetermined overdose-related ED visits from 2018-2022 occurred in the 25–44-year-old age group, with the second largest age group being 45–64-year-olds. Males were more likely to visit the ED for a suspected drug overdose compared to females, as shown in Figure 12. Whites were more likely to visit the ED for suspected drug overdose compared to all other races; however, Figure 11 shows ED visits for unintentional and undetermined drug overdoses among the white population started to plateau between 2021 and 2022, while ED visits among the black population continued to rise in 2022.

**Figure 10: Unintentional or Undetermined Intent Medication or Drug Overdose Emergency Department (ED) Visits by Age Group, Wake County, 2018-2022**

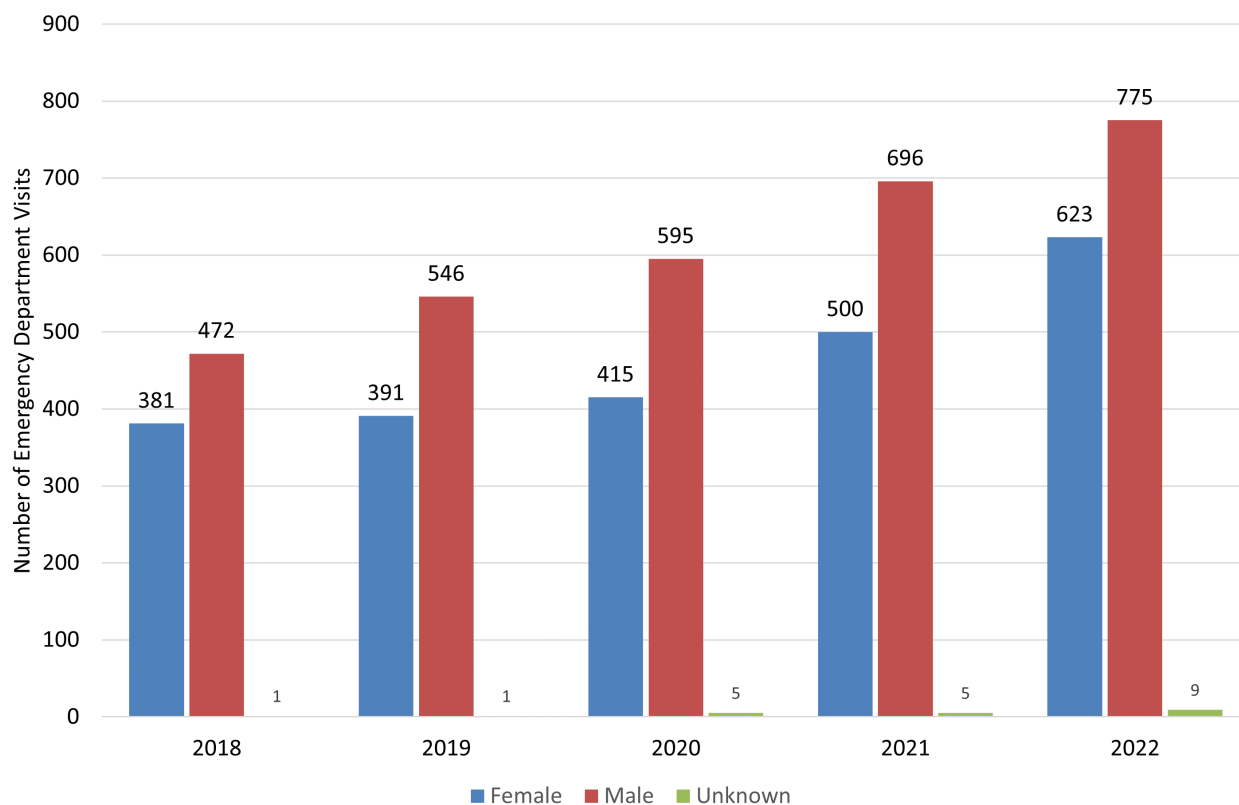


**Figure 11: Unintentional or Undetermined Intent Medication or Drug Overdose Emergency Department (ED) Visits by Race, Wake County, 2018-2022**

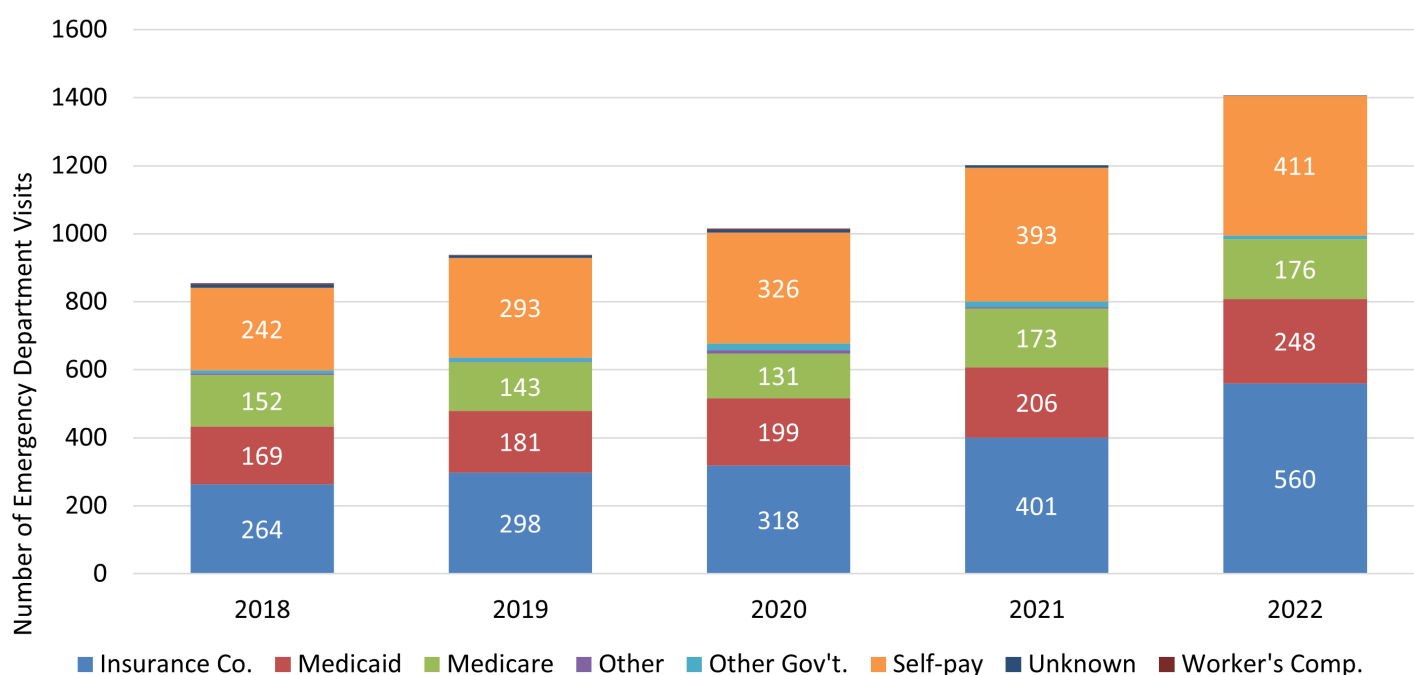


Source Figures 10 and 11: NC DETECT, NCDHHS Division of Public Health, UNC School of Medicine, 01/25/2023.

**Figure 12: Unintentional or Undetermined Intent Medication or Drug Overdose Emergency Department (ED) Visits by Sex, Wake County, 2018-2022**



**Figure 13: Insurance Status of Unintentional or Undetermined Intent Medication or Drug Overdose Emergency Department (ED) Visits, Wake County, 2018-2022**



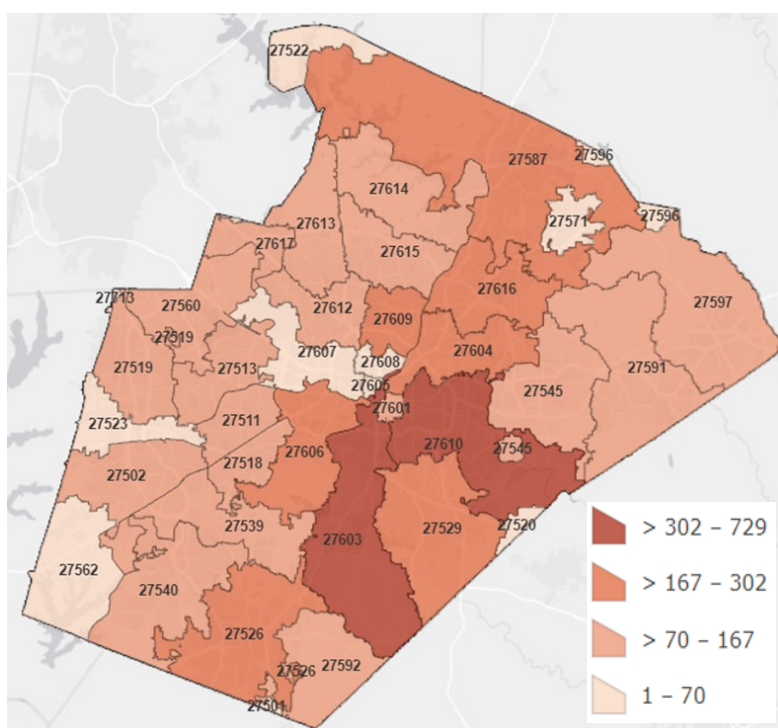
Source Figures 12 and 13: NC DETECT, NCDHHS Division of Public Health, UNC School of Medicine, 01/25/2023.

## Geographic Analysis

Figure 14 shows a geographical analysis of NC DETECT data presenting the number of ED visits due to all drug overdose by the patient's residential ZIP Code for 2018-2022. The Wake County patient residential zip codes with the highest number of ED visits due to all drug/medication overdoses were 27610 and 27603.

Table 13 shows the top 10 ZIP Codes for ED visits related to all drug and specific drug overdoses. Three of the top five are in Raleigh; 27529 includes Garner and White Oak, and 27587 includes Wake Forest and multiple surrounding smaller communities.

**Figure 14: Number of ED Visits for All Drug/Medication Overdoses in Wake County by Patient Residential Zip Code, 2018-2022**



Source: NC DETECT, NCDHHS Division of Public Health, UNC School of Medicine, 04/11/2023.

**Table 13: Top 10 Zip Codes for All Drug/Medication Overdose ED Visits  
Wake County 2018-2022**

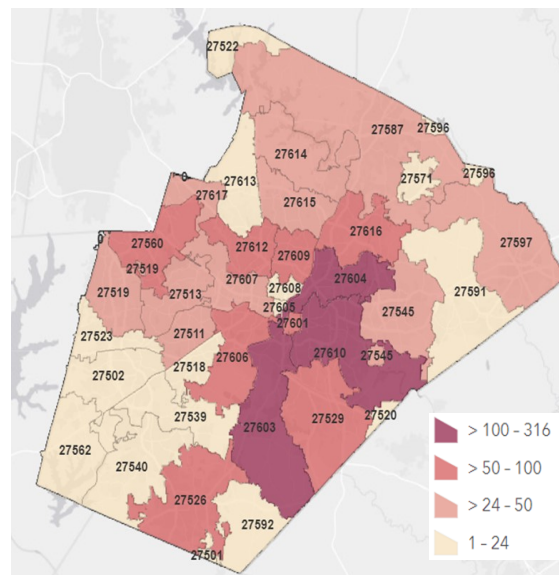
Patient Residential Zip Code	Overdose ED Visits, 2018-2022	Patient Residential Zip Code	Overdose ED Visits, 2018-2022
27610	729	27526	232
27603	414	27606	221
27529	302	27609	192
27604	263	27615	167
27587	258	Source: NC DETECT, NCDHHS Division of Public Health, UUNC School of Medicine, 04/11/2023.	
27616	249		

## DRUG OVERDOSE MORBIDITY – EMERGENCY MEDICAL SERVICES NALOXONE ADMINISTRATION AND COMMUNITY NALOXONE REVERSALS

Figure 15 represents a geographical analysis of EMS data showing the number of suspected opioid overdoses Wake County EMS responded to in 2021 and 2022 by the zip code of the response location. These zip code counts were gathered from the address EMS was dispatched to and include both private and public locations. The top three zip codes had over 100 EMS responses to suspected opioid overdoses between 2021-2022.

During 2021 and 2022, Wake County EMS responded to 1,172 calls that required naloxone administration. Due to the COVID-19 pandemic, complete data is unavailable for this metric in 2020. This count does not specify the dosage or number of doses given at each call, just only that naloxone was given by Wake County EMS. There was a slight decrease in calls responses requiring naloxone administration in 2022 when compared to 2021.

**Figure 15: EMS Responses to Suspected Opioid Overdoses in Wake County by Response Location Zip Code, 2021 and 2022**



**Figure 16: EMS Responses Where Naloxone Was Administered, Wake County, 2021 and 2022**

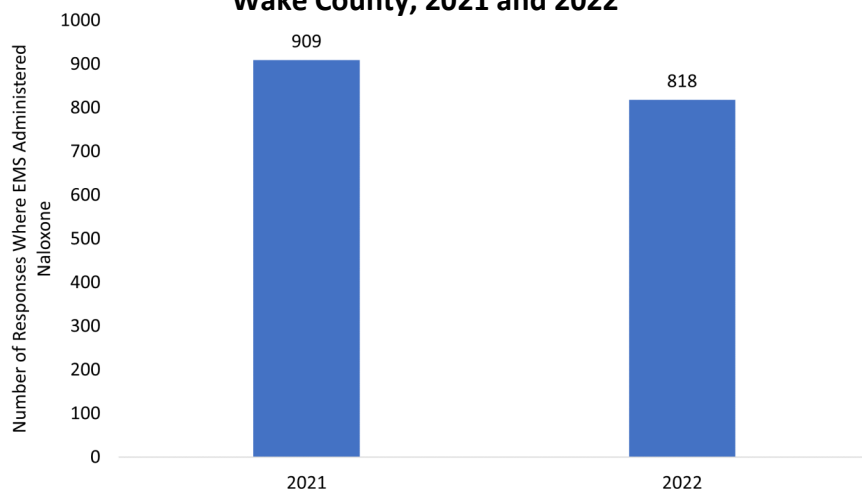


Table 14 shows the top 10 zip codes in Wake County where EMS responded to suspected opioid overdoses during 2021 and 2022. Similar to the all drug/medication overdose analysis of ED visits (Table 13), 27610 was the top zip code for EMS suspected opioid overdose responses during 2021 and 2022.

Additionally, 4 out of the top 5 zip codes for EMS suspected opioid overdose responses are also in the top 5 for the ED all drug/medication visits by patient’s residential zip code. 27601 (Raleigh) was fifth in EMS suspected opioid overdose responses in 2021 and 2022 but was not in the top 10 for drug/medication overdose ED visits between 2018-2022.

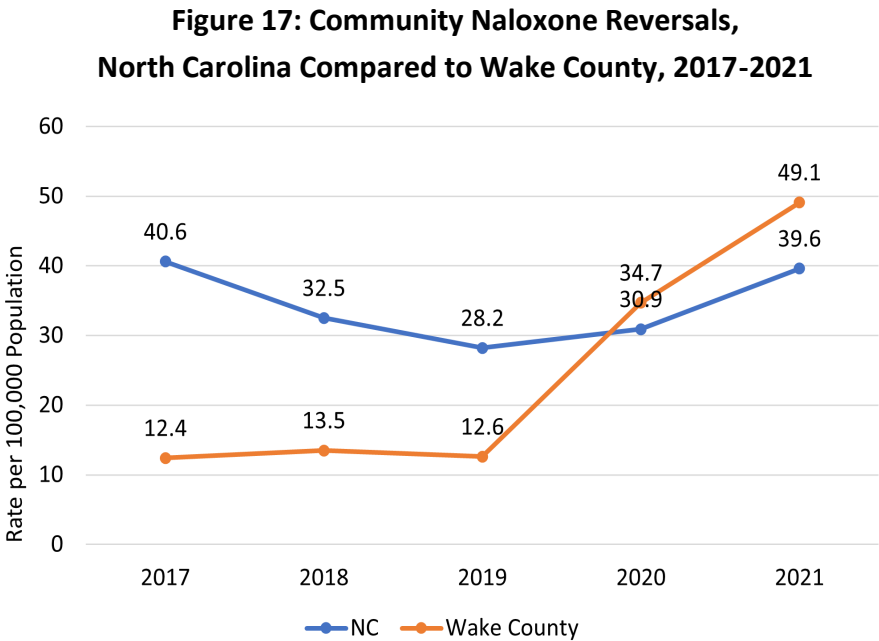
Naloxone distribution is one of many major resources that is used to combat opioid overdose-related deaths in Wake County. Community naloxone reversals are an important metric to track because when a person is overdosing from an opioid or substance that has been unknowingly mixed with an opioid, their chances of survival are greater the sooner they are given naloxone, an opioid antagonist and known life-saving medication. Distributing naloxone to the general community, substance users, their friends and family helps ensure naloxone can be given as soon as possible when a person is experiencing an opioid overdose and avoiding a delay in waiting for law enforcement or EMS to arrive.

Shown in Figure 17 are the results of a survey distributed by the North Carolina Department of Health and Human Services (NCDHHS). Community organizations and individuals complete the survey when an overdose reversal using naloxone takes place, and it was administered by someone who is not a first responder. As can be seen in Figure 17, the rate of community naloxone reversals in Wake County passed the statewide rate for North Carolina in 2020.

**Table 14: Top 10 Zip Codes for EMS Responses to Suspected Opioid Overdoses, Wake County, 2021 and 2022**

Response Location Zip Code	EMS Responses to Suspected Opioid Overdoses
27610	316
27604	178
27603	163
27529	89
27601	87
27616	73
27612	61
27609	60
27560	59
27606	57

Source: NC DETECT, NCDHHS, Division of Public Health, UNC School of Medicine, 04/11/2023.



Source: Opioid and Substance Use Action Plan Data Dashboard, NCDHHS. 01/2023.

## IN CONCLUSION

This integrated epidemiologic profile provides guidance for drug overdose prevention and control efforts by combining multiple data sources and identifying populations most affected by drug overdoses in Wake County. Recent trends show that males were consistently more likely to die from an overdose and visit the ED for a suspected drug overdose than females. Between 2017-2021, the Non-Hispanic Black population had a slightly higher rate of dying from an unintentional poisoning (majority of drug overdoses) than the Non-Hispanic White population. The 25-34 and 35-44 age groups accounted for over 50% of unintentional poisoning deaths in Wake County between 2017-2021. Wake County has also seen a substantial increase in the number of deaths with toxicology results positive for synthetic opioids (which includes fentanyl) in recent years, along with a smaller, steadier increase in deaths with toxicology results positive for cocaine. Emergency Department data showed that the age group making up the largest portion of ED visits for unintentional or undetermined overdoses were young adults (25-44). Additionally, the White Non-Hispanic population had slight increases in ED visits but started to plateau, while the Black Non-Hispanic population has had a steady increase in ED visits in recent years. Finally, a majority of these ED visits are individuals who self-pay or have health insurance through a government program.

Geographic analyses of drug overdose deaths, ED visit information from NC DETECT, and EMS suspected opioid overdose data from NC DETECT were able to be conducted. The census tracts with the highest rates of drug overdose deaths in Wake County between 2017 to 2021 were in Zebulon and part of Raleigh (south/southwest). The patient residential zip codes with the highest counts of ED visits for drug overdoses and with the highest counts of EMS responses to suspected opioid overdoses were in east and southeast Raleigh. This report delves into the sociodemographic factors of Wake County in general and then specifically drug overdose deaths and drug overdose morbidity. The intent of this report is to inform and support prevention and harm reduction strategies with a focus on populations at higher risk for drug overdoses within Wake County.

## REFERENCES

1. "Understanding the opioid overdose epidemic". cdc.gov. *Centers for Disease Control and Prevention*. June 1, 2022. Web. 02/03/2023. <https://www.cdc.gov/opioids/basics/epidemic.html#:~:text=The%20third%20wave%20began%20in,%2C%20counterfeit%20pills%2C%20and%20cocaine>
2. Manchikanti, L., Singh, V. M., Staats, P. S., Trescot, A. M., Prunskis, J., Knezevic, N. N., Soin, A., Kaye, A. D., Atluri, S., Boswell, M. V., Abd-Elseyed, A., & Hirsch, J. A. (2022). "Fourth Wave of Opioid (Illicit Drug) Overdose Deaths and Diminishing Access to Prescription Opioids and Interventional Techniques: Cause and Effect". *Pain Physician*, 25(2), 97–124. March/April 2022. Web. 06/14/2023. <https://www.painphysicianjournal.com/current/pdf?article=NzQxOQ%3D%3D&journal=142>
3. "Stigma Reduction". cdc.gov. *Centers for Disease Control and Prevention*. April 10, 2023. Web. 02/03/2023. <https://www.cdc.gov/stopoverdose/stigma/index.html#:~:text=Addiction%20can%20happen%20to%20anyone&text=There%20is%20not%20one%20single,they%20are%20prescribed%20by%20doctors>
4. "U.S. overdose deaths in 2021 increased half as much as in 2020 - but are still up 15%". cdc.gov *Centers for Disease Control and Prevention*. May 11, 2022. Web. 02/03/2023. [https://www.cdc.gov/nchs/pressroom/nchs\\_press\\_releases/2022/202205.htm](https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2022/202205.htm)
5. "Overdose Epidemic". ncdhhs.gov *North Carolina Department of Health and Human Services*. (n.d.). Web. Retrieved 02/03/2023. <https://www.ncdhhs.gov/about/departments-initiatives/overdose-epidemic#:~:text=From%202000%2D2020%20more%20than,straining%20prevention%20and%20treatment%20efforts>
6. "Opioid and Substance Use Action Plan Data Dashboard". ncdhhs.gov *North Carolina Department of Health and Human Services*. n.d. Web. 02/03/2023. <https://www.ncdhhs.gov/opioid-and-substance-use-action-plan-data-dashboard>
7. "A qualitative assessment of circumstances surrounding drug overdose deaths during early stages of the COVID-19 pandemic". cdc.gov. *Centers for Disease Control and Prevention*. August 22, 2022. Web. 02/03/2023. <https://www.cdc.gov/drugoverdose/databriefs/sudors-2.html#:~:text=during%20future%20emergencies-,Introduction,began%20accelerating%20in%20March%202020>
8. "North Carolina reports 40% increase in overdose deaths in 2020 compared to 2019; NCDHHS continues fight against overdose epidemic". ncdhhs.gov. *North Carolina Department of Health and Human Services*. March 21, 2022. Web. 02/03/2023. <https://www.ncdhhs.gov/news/press-releases/2022/03/21/north-carolina-reports-40-increase-overdose-deaths-2020-compared-2019-ncdhhs-continues-fight-against#:~:text=This%20stark%20increase%20during%202020,2019%20to%203%2C304%20in%202020>
9. "High risk substance use in youth". cdc.gov. *Centers for Disease Control and Prevention*. September 29, 2022. Web. 02/03/2023. <https://www.cdc.gov/healthyyouth/substance-use/index.htm>
10. "Fentanyl facts". cdc.gov. *Centers for Disease Control and Prevention*. February 23, 2022. Web. 02/03/2023. <https://www.cdc.gov/stopoverdose/fentanyl/index.html>
11. "One pill can kill". dea.gov. *United States Drug Enforcement Administration*. n.d. Web. 02/03/2023. <https://www.dea.gov/onepill>
12. "Growth and Population Trends: Wake County, N.C.". wake.gov. *Wake County Government*. n.d. Web. 03/28/2023. <https://www.wake.gov/departments-government/planning-development-inspections/planning/census-demographics/growth-and-population-trends>