miOttawa Department of Public Health

Tell us what you think of this report

Scan code or click HERE

Death by Overdose Ottawa County, MI

2010-2021

At the time of publication, 2021 overdose death data for Ottawa County, Michigan, and the United States were considered preliminary until Vital Records data were finalized. Ottawa County data in this report are as of September 2022.

Compiled by Tiffany Simecki, OCDPH Epidemiologist
Published October 2022

Table of Contents

Introduction

The following report is a compilation of data and statistics about Ottawa County residents who died by overdose. Overdose death is a serious public health issue affecting our community. Each event has a profound impact on surviving friends and family and is a preventable tragedy. It is also important to recognize that non-fatal overdoses occur, and people experiencing them may have different characteristics than people who die by overdose. Non-fatal overdoses are not included in this report.

The aim of this report is to provide an accurate representation of overdose deaths in Ottawa County. Most data come from Vital Records, a data collection system used across the United States recognized as the universal standard for counting and describing death. Another data source, the Ottawa County Youth Assessment Survey (YAS), is a trusted local survey that helps us understand drug accessibility, perceived risk, and past/current substance use among teens in the community.

As you read through this report, please remember that each overdose death is a unique person. Every person counted here had a different set of circumstances and life experiences. While considerable effort is made to learn about each overdose death, many circumstances remain unknown. Because substance use and the risks of overdose have many potential causes, it is difficult to completely answer why each overdose death occurred. Despite these challenges, the data presented in this report can offer broad insights into which groups of people are more affected or at-risk.

Community partners are dedicated to tracking and preventing overdose deaths – particularly those associated with opioids. As of the writing of this report, a Public Health Emergency Declaration is ongoing as a result of the continued consequences of the opioid crisis,[1] a crisis which likely reduced life expectancy in the United States from 2015-2017.[2] Opioids remain relatively easy to obtain, are addictive, and, with increased availability of synthetic opioids, may create high risk for overdose. Additionally, while fewer Ottawa County teens report using opioids or prescription drugs in recent years, many youth remain at elevated risk. According to the 2021 YAS, 22% of teens reported that prescription drugs would be easy to access, and 40% of teens who tried a prescription drug in their lifetime also reported that they've used in the past 30 days.[3] Across the nation, 3.4% of people aged 12 and older are estimated to have misused opioids in the last year. Assuming a similar rate of use in Ottawa County, thousands of youth and adults may be at risk for further misuse, addiction, and possible overdose.[4]

Lastly, we'd like to acknowledge the tireless work of our community – our schools, healthcare workers, mental health service providers, law enforcement, local non-profit organizations, and the many community members and groups who respond to overdose and implement prevention programs. Ottawa County's overdose death rate remains much lower than the State of Michigan and the United States overall, which may be due, in part, to the efforts of passionate and committed community members who make overdose prevention a top priority.

Overview: Overdose in Ottawa County

- In 2021, 29 Ottawa County residents died by overdose, the lowest of any year since 2013.
- Across the last 23 years, the rate of overdose deaths in Ottawa County has been increasing, even after accounting for population increases; however, since 2017 the rate of overdose deaths has stabilized. There is little evidence of a recent increase or decrease in the rate of overdose deaths in Ottawa County.
- Since 2000, Ottawa County overdose death rates are consistently lower than Michigan and the United States.
- Over the last twelve years, groups of people in Ottawa County with higher overdose death rates are:
    - Males
    - People 50 years and older
    - Those who identify as White, Non-Hispanic
    - Residents of the northwest and southwest quadrants of the County
- There have been higher rates of overdose deaths on the west side of the County, compared to the east side.
- Over the last five years, there has been a decrease in the proportion of overdose deaths involving any opioid and an increase in the proportion of overdose deaths involving psychostimulants with abuse potential (primarily methamphetamine).
- The proportion of deaths involving synthetic opioids have also been increasing in Ottawa County.
- Reported teen substance use remains low and has been decreasing since 2005 in Ottawa County. However, teens report that many substances, such as prescription drugs, are easy to obtain, and more teens are using prescription drugs at younger ages.

Overview: Overdose in the United States and Michigan

Background
In 2020, overdose continued to be an ongoing epidemic in the United States and in Michigan, with substantial effects on families, communities, workplaces, and the economy.[5] The considerable impact of overdose has led the Centers for Disease Control and Prevention (CDC)[6] and the State of Michigan[7] to recognize overdose as a public health crisis.

Statistics
The overdose death rate in the United States decreased 5% in 2018 after increasing from 1999-2017.[8] Although a brief decline was identified in 2018, the rate of overdose deaths increased by nearly 30% from 2019 to 2020.[9] Preliminary 2021 data for the United States shows a continued increase.[10]

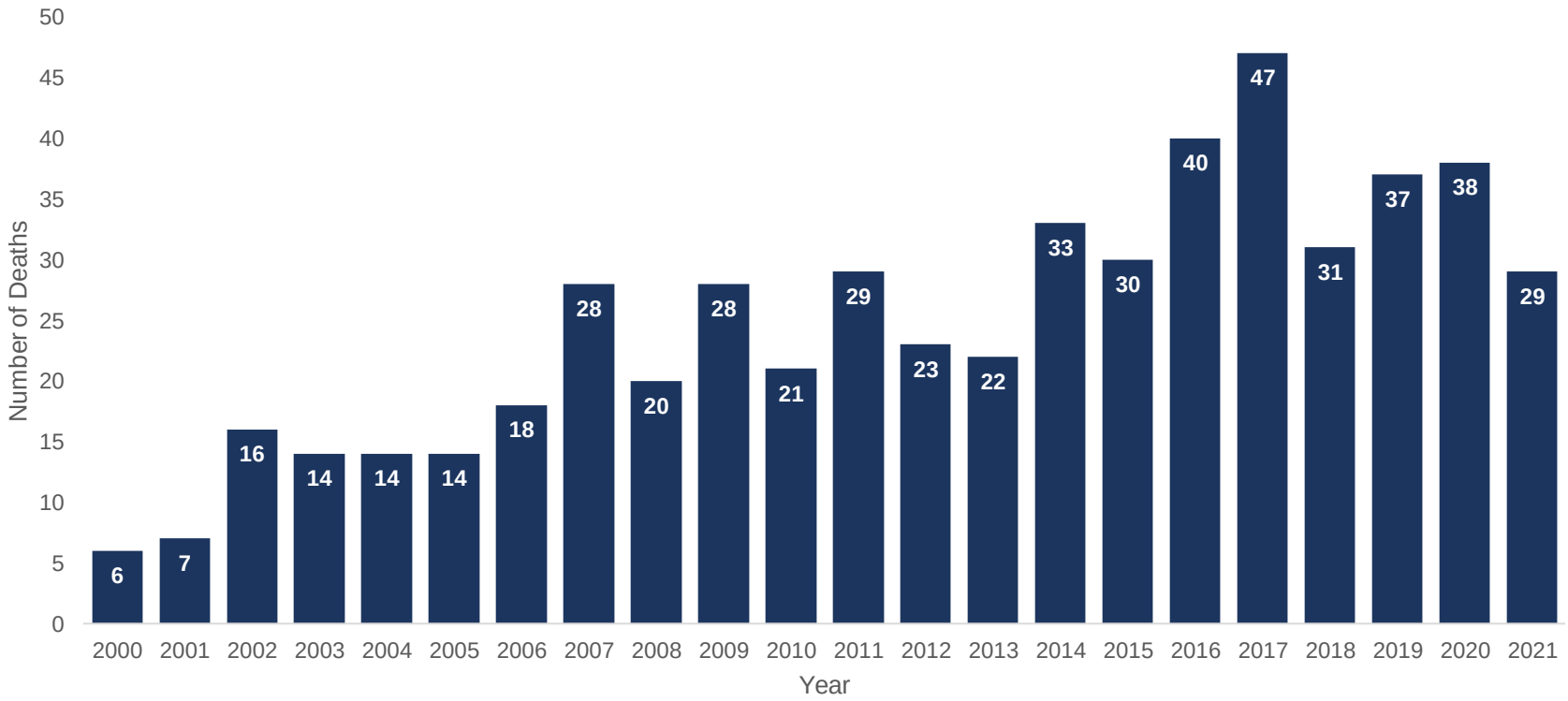
Like the United States, overdose death rates in Michigan increased 17% from 2019 to 2020[11] after years of increasing trends (six-fold from 4.6 per 100,000 in 1999 to 26.7 per 100,000 in 2018).[12] Preliminary 2021 data shows overdose death rates remain elevated in Michigan.[10]

At-Risk Populations
According to the CDC, the national overdose epidemic is affecting people of all racial and ethnic groups, in cities, suburbs, small towns, and rural areas, and rates of drug overdose are rising among almost all groups. In 2020, disparities in overdose deaths were noted with the largest year-to-year relative rate increases among Black people aged 15-24, American Indian/Alaska Native aged 25-44, and White people aged 15-24.[13]

In 2020, populations in Michigan bearing more of the overdose death burden were Black males living in large and mid-sized urban areas, and White males in rural areas.[14]

Prevention
The CDC and the State of Michigan have both provided strategic frameworks or recommendations for addressing overdose. Recommended prevention efforts from both organizations include comprehensive approaches, broad partnerships and collaboration, and prioritization of data and research.[6,15]

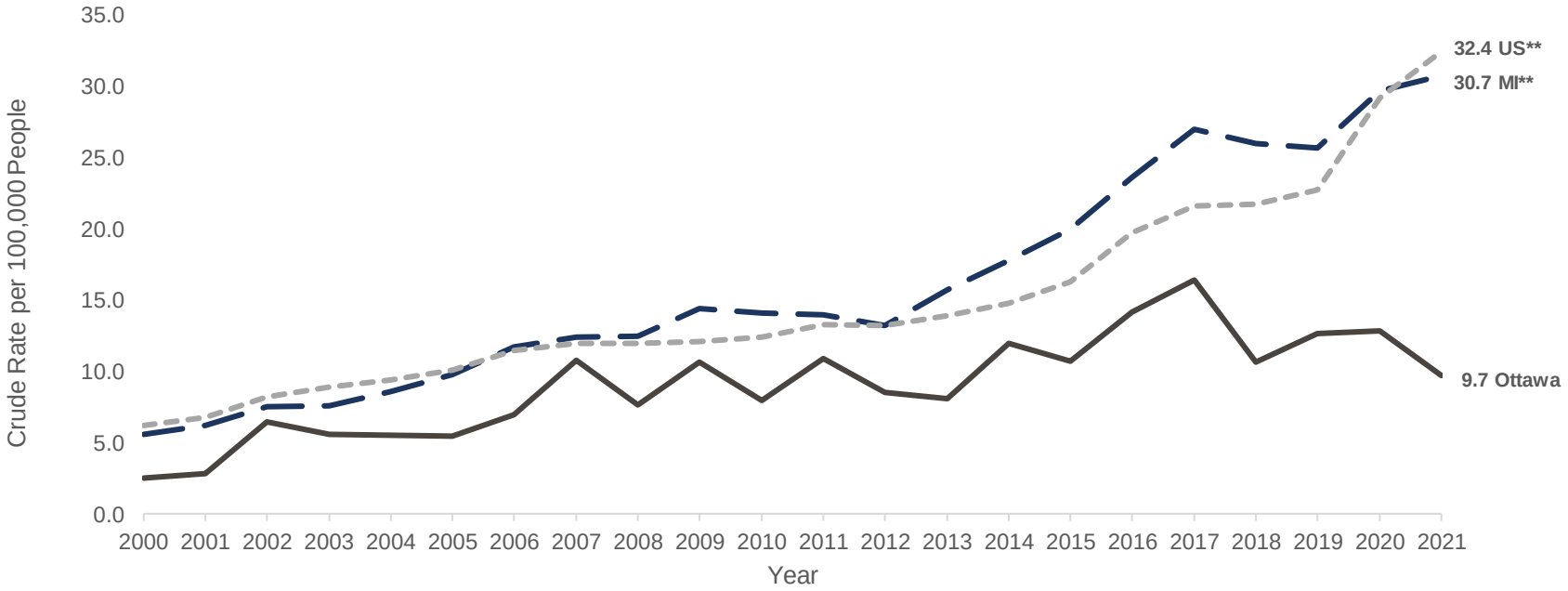
Number of Deaths by Overdose, Ottawa County, 2000-2021



Note: Annual death counts displayed here may differ slightly from drug overdose data provided by the State of Michigan at this link https://mi-suddr.com/opioids/

In 2021, 29 Ottawa County residents died by overdose, less than the 38 deaths observed in 2020. Over the last two decades, the number of overdoses has increased; however, the population of Ottawa County has also seen rapid growth. To account for changes in population growth, an overdose death rate is calculated. The rate of overdose deaths over time is illustrated on the next slide and includes a comparison to the United States and the State of Michigan.

Death by Overdose Rates, 2000-2021



**Data is sourced from the National Vital Statistics System. Overdose deaths for 2021 are preliminary https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm
Note: Prior to 2007, most years had fewer than 20 deaths by overdose reported among Ottawa County residents, which may reduce the stability of rates for those years.

While the rate of death by overdose remains lower in Ottawa County than in the State of Michigan and the United States, data indicate that as of 2021, there is a statistically significant increase in annual overdose deaths in Ottawa County over the past 23 years. Although a long-term increasing trend exists, over the last five years, no upward or downward trend is detected, suggesting that the overall overdose death rate has been stabilizing in Ottawa County.

From 2010 to 2020, Ottawa County's population grew 11.7%, making it the fastest growing county in Michigan.[16] The number of overdose deaths occurring among Ottawa County residents over this time also increased. To account for population changes, it is best to utilize the rate of overdose deaths, rather than the number of overdose deaths, for making comparisons across time and different groups.

miOttawa Department of Public Health

Characteristics of People Who Died by Overdose (All Ages) Ottawa County, MI

2010-2021

Characteristics of People Who Died by Overdose, 2021

Age Group	Count	%
<20	1	3%
20-29	3	10%
30-39	6	21%
40-49	9	31%
50-59	7	24%
60-69	3	10%
70-79	0	0%
80+	0	0%
TOTAL	29	100%

Race/Ethnicity	Count	%
White	27	93%
Hispanic	1	3%
Asian	0	0%
Black	0	0%
Other	1	3%
TOTAL	29	100%

Sex	Count	%
Male	22	76%
Female	7	24%
TOTAL	29	100%

Manner	Count	%
Accident	24	83%
Suicide	4	14%
Homicide	0	0%
Pending	0	0%
Indeterminate	1	3%
TOTAL	29	100%

Marital Status	Count	%
Divorced	8	28%
Married	7	24%
Never Married	12	41%
Separated	0	0%
Widowed	2	7%
Unknown	0	0%
TOTAL	29	100%

Veteran	Count	%
Yes	1	3%
No	28	97%
TOTAL	29	100%

Month	Count	%
January	3	10%
February	2	7%
March	2	7%
April	5	17%
May	3	10%
June	1	3%
July	1	3%
August	2	7%
September	5	17%
October	2	7%
November	1	3%
December	2	7%
TOTAL	29	100%

Quadrant*	Count	%
NW	6	21%
NE	4	14%
SW	10	34%
SE	9	31%
TOTAL	29	100%

*Of residence

In 2021, most deaths by overdose were among White men. Although people younger than 50 years of age contributed more deaths in 2021 than those 50 years and older, the rate of overdose death across the last twelve years has been higher among people 50 years of age and older. See slide 11 for more information.

The SW quadrant contributed the most overdose deaths in 2021. Most deaths by overdose were accidental (unintentional) meaning a drug was taken accidentally, too much of a drug was taken accidentally, the wrong drug was given or taken in error, or an accident occurred in the use of a drug(s) in medical and surgical procedures.[17] Unlike suicide, death by overdose was a relatively rare cause of death for veterans in 2021, with only one death reported.

Characteristics of People Who Died by Overdose, 2010-2021

Age Group	Count	%
<20	10	3%
20-29	65	17%
30-39	72	19%
40-49	90	24%
50-59	88	23%
60-69	43	11%
70-79	6	2%
80+	6	2%
TOTAL	380	100%

Race/Ethnicity	Count	%
White	333	88%
Hispanic	26	7%
Asian	1	0%
Black	7	2%
Other	13	3%
TOTAL	380	100%

Sex	Count	%
Male	232	61%
Female	148	39%
TOTAL	380	100%

Manner	Count	%
Accident	261	69%
Suicide	59	16%
Homicide	0	0%
Pending	1	0%
Indeterminate	59	16%
TOTAL	380	100%

Marital Status	Count	%
Divorced	90	24%
Married	99	26%
Never Married	151	40%
Separated	1	0%
Widowed	39	10%
Unknown	0	0%
TOTAL	380	100%

Veteran	Count	%
Yes	26	7%
No	354	93%
TOTAL	380	100%

Month	Count	%
January	23	6%
February	38	10%
March	36	9%
April	35	9%
May	34	9%
June	23	6%
July	26	7%
August	32	8%
September	44	12%
October	29	8%
November	30	8%
December	30	8%
TOTAL	380	100%

Quadrant*	Count	%
NW	110	29%
NE	58	15%
SW	144	38%
SE	65	17%
TOTAL	377	100%

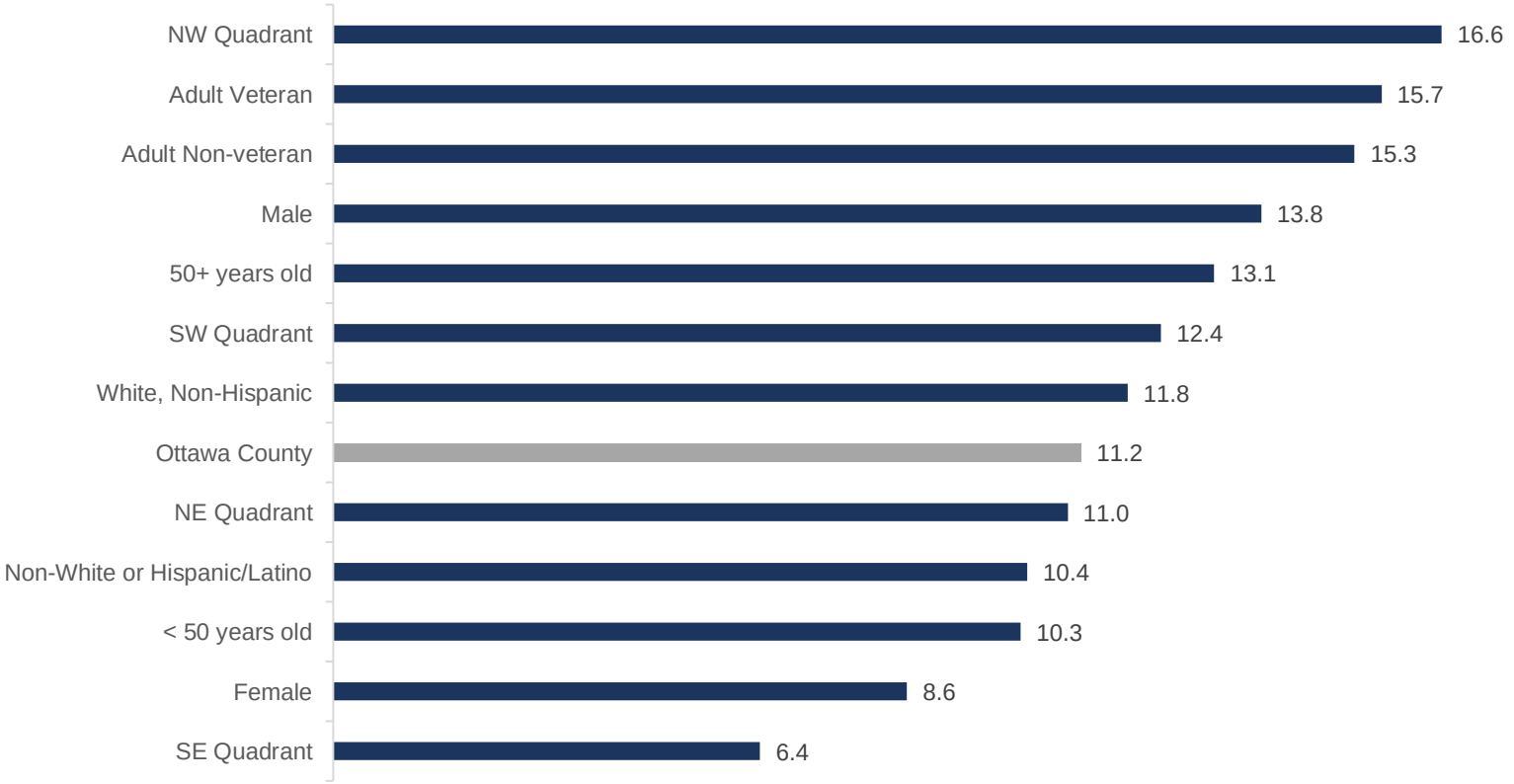
*Of residence

Note: Three decedents were not assigned to a quadrant due to missing address information.

From 2010-2021, 380 people died by overdose in Ottawa County. Most deaths by overdose were among White people, people younger than 50 years of age (however, the overdose death rate is higher for people aged 50 and older, see slide 11), and residents that lived in the SW and NW quadrants of Ottawa County. Accidental overdoses made up 69% of deaths, contributing 261 overdose fatalities over the last twelve years.

In Ottawa County, slightly more deaths by overdose occurred in September. However, nationally and in Michigan, there is little evidence that specific months of the year consistently have more (or less) deaths by overdose, except for intentional overdose, which may increase in the spring and early summer, similar to suicide.[18]

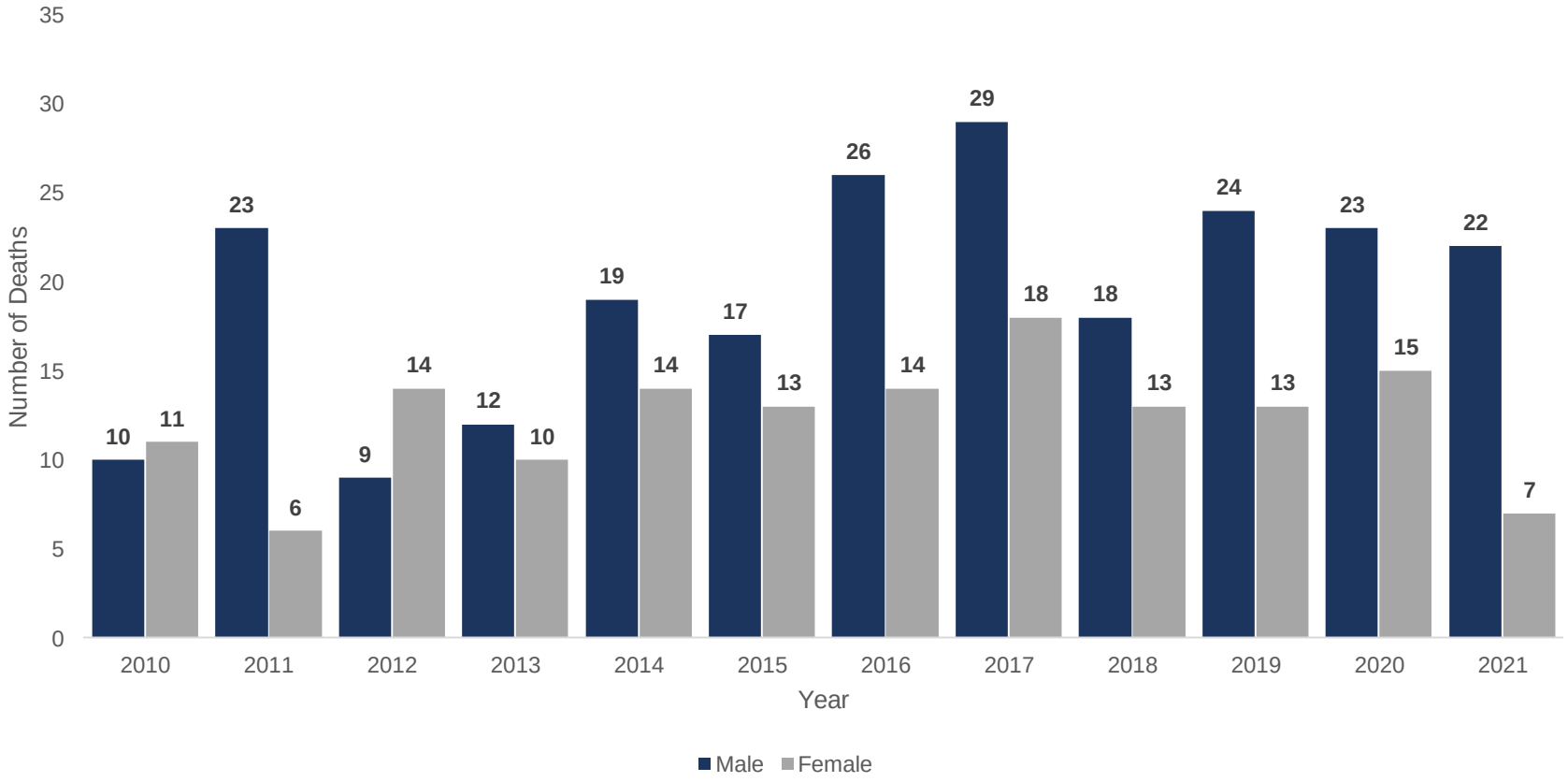
Groups With a Higher Burden of Death by Overdose, 2010-2021



Rates of deaths by overdose that occurred in the last twelve years are illustrated above and offer insights into which groups bear more of the overdose death burden compared to other groups and Ottawa County overall.

Residents living in the NW quadrant of the county have the highest rate of death by overdose compared to any other group. Other groups with higher rates of overdose deaths compared to the County overall include veterans, adults who are not veterans, males, those aged 50+, people living in SW quadrant, and White, Non-Hispanic people.

Sex of People Who Died by Overdose, 2010-2021



Every year for the last nine years, more males have died by overdose than females. Although not displayed here, from 2001-2021 there was a long-term statistically significant increase in the overdose death rate among males; a statistically significant trend was not found among females. From 2010-2021, the overdose death rate among males was 1.6 times higher than the rate among females.

Michigan and the United States have reported a similar trend with males consistently bearing more of the overdose death burden than females.[8,12]

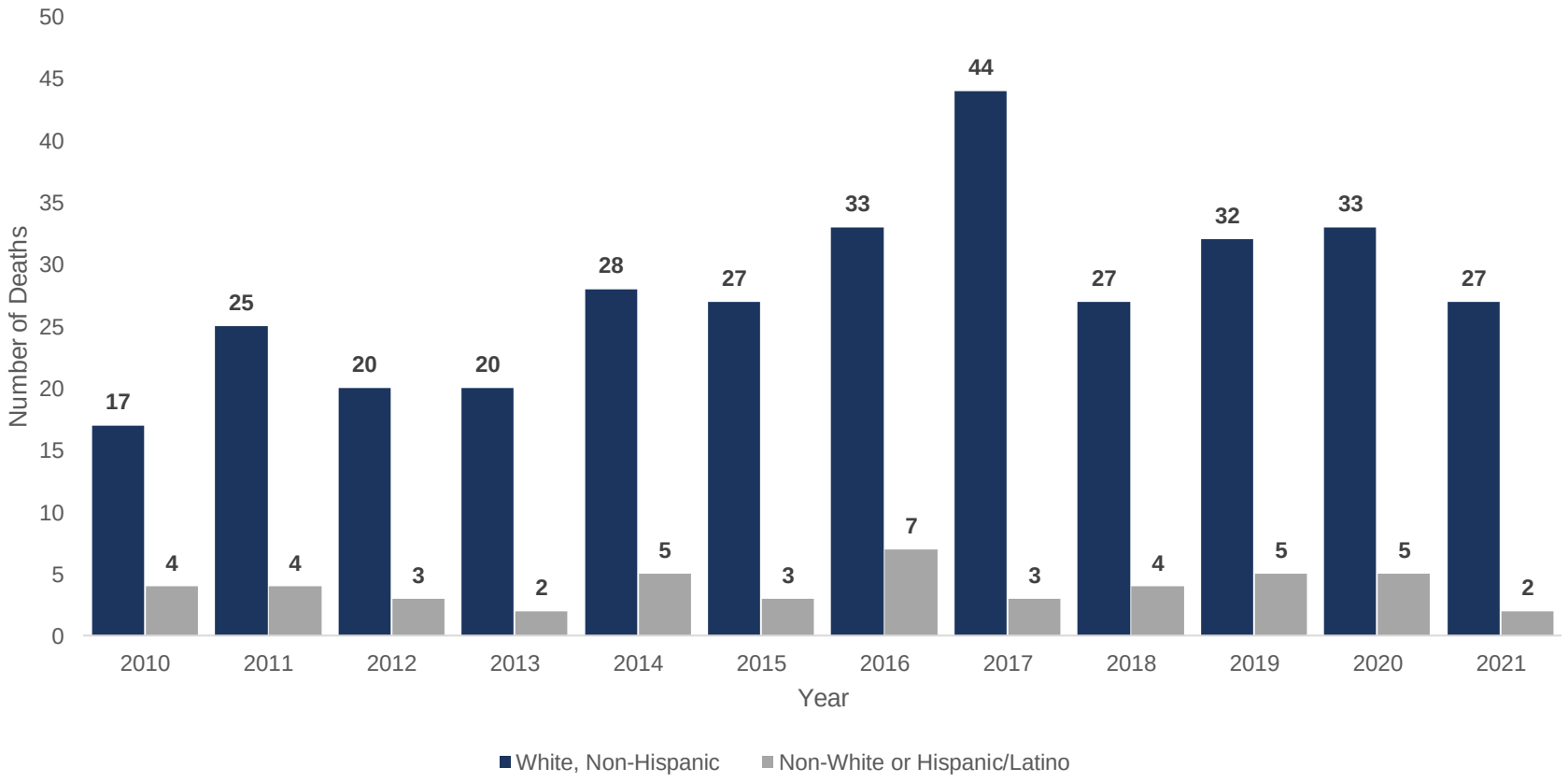
Age of People Who Died by Overdose, 2010-2021

Year	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total
2010	1	6	1	8	2	2	0	1	**21**
2011	1	4	8	8	5	3	0	0	**29**
2012	0	4	2	7	8	1	0	1	**23**
2013	0	5	2	4	8	3	0	0	**22**
2014	1	3	12	6	10	0	0	1	**33**
2015	2	1	5	7	7	5	1	2	**30**
2016	2	9	7	4	9	8	1	0	**40**
2017	0	13	8	13	4	7	1	1	**47**
2018	2	10	7	5	4	2	1	0	**31**
2019	0	4	4	9	13	6	1	0	**37**
2020	0	3	10	10	11	3	1	0	**38**
2021	1	3	6	9	7	3	0	0	**29**
Total	**10**	**65**	**72**	**90**	**88**	**73**	**6**	**6**	**380**

The CDC notes that overdose deaths have affected many age groups.[19] In Ottawa County, almost all age groups have experienced a substantial number of overdose deaths from 2010-2021. The age group with the most deaths reported was people 40-49 years of age (90 deaths), followed closely by those 50-59 years of age (88 deaths). Generally, overdose death rates among age groups 30-69 years of age are similar, while the younger and oldest age groups tend to have lower overdose death rates.

Ten teen overdose deaths occurred over the last twelve years. Among these ten teen overdose deaths, 6 (60%) were ruled suicides, a statistically higher proportion compared to people aged 20+. Among those aged 20+, only 14% of overdose deaths were ruled as suicides. This data suggests that teens may be more likely to utilize overdose as a means of suicide than older adults.

Race/Ethnicity of People Who Died by Overdose, 2010-2021



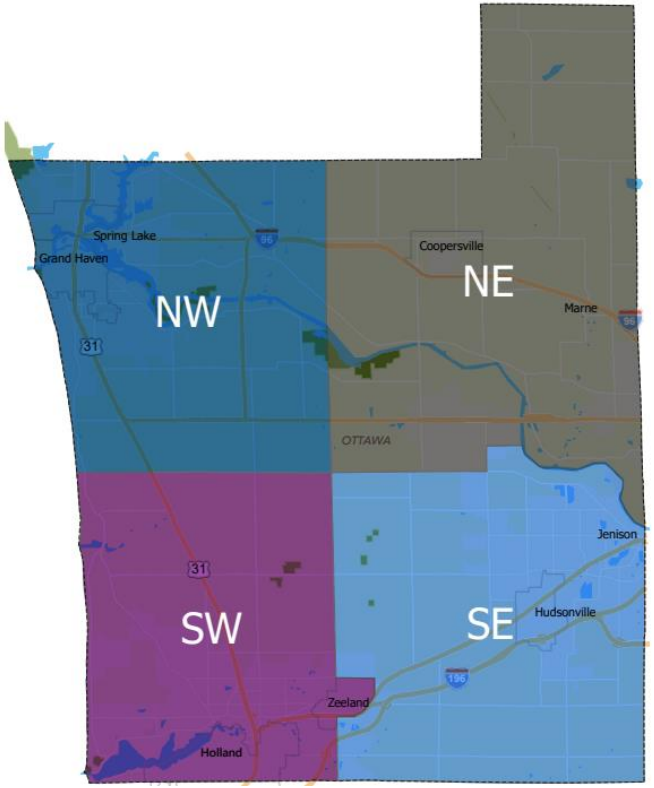
Over the last twelve years most overdose deaths occurred among White, Non-Hispanic people. Although not displayed here, the rate of overdose deaths among White, Non-Hispanic people is slightly higher (11.8 per 100,000 people) than Ottawa County overall (11.2 per 100,00 people) and higher than Non-White or Hispanic/Latino people (10.4 per 100,00 people) (see slide 11). In 2021, two overdose deaths were reported among Non-White or Hispanic/Latino people. The highest number of overdose deaths among racial or ethnic minority groups in a single year was recorded in 2016, when 7 deaths were reported.

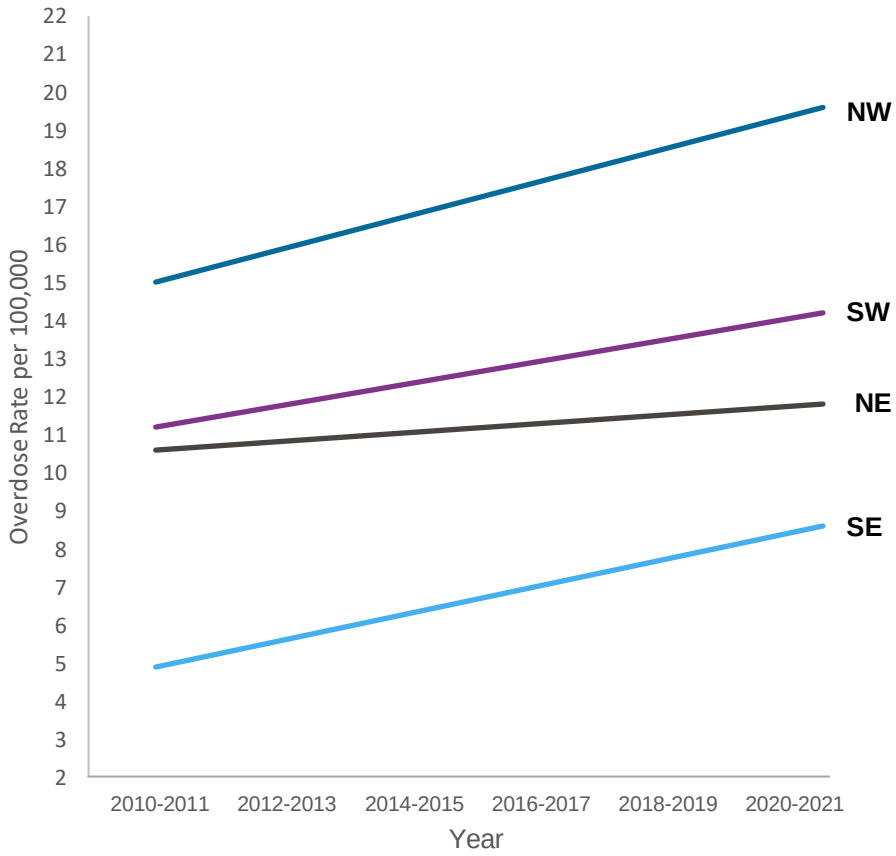
miOttawa Department of Public Health

Death by Overdose by County Quadrants Ottawa County, MI

2010-2021

Quadrant Trends Over Time, 2010-2021





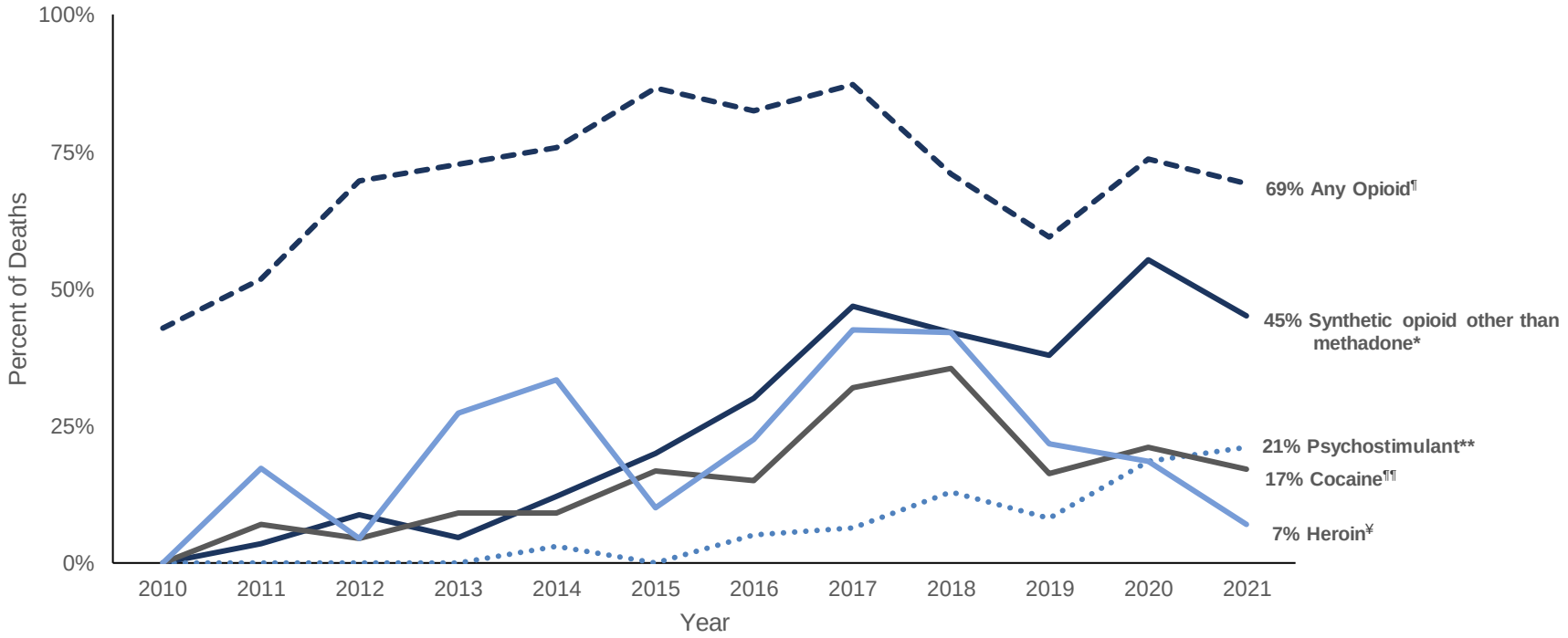
Nearly 30% of overdose deaths from 2010-2021 occurred in the NW quadrant of Ottawa County. The overdose death rate in the NW quadrant from 2010-2021 was higher than the rate for Ottawa County with 16.6 deaths per 100,000 people compared to 11.2 deaths per 100,000 in the County overall. Over the last twelve years statistically significant trends in overdose death rates were not detected in any of the quadrants, despite a slow observed increase in rates over time across all quadrants.

miOttawa Department of Public Health

Drug Types Involved in Death by Overdose Ottawa County, MI

2010-2021

Drug Types Involved in Deaths by Overdose, 2010-2021



*Synthetic opioids include, but are not limited to, fentanyl, fentanyl analogs (e.g., carfentanyl), and tramadol. Methadone cases included in the Any Opioid category.
**Psychostimulants with abuse potential are not opioids and include such drugs as amphetamine and methamphetamine.
¶ All opioid substances including heroin, methadone, and synthetic opioids.
¶¶ Cocaine is not an opioid substance.
¥Heroin is an illegal, non-synthetic opioid.

Over the last twelve years the proportion of overdose deaths involving synthetic opioids other than methadone has continued to increase, as have deaths involving psychostimulants with abuse potential (usually methamphetamine). However, since 2017 the proportion of overdose deaths involving any opioid has decreased from 87% in 2017 to 69% in 2021. The proportion of overdose deaths involving psychostimulants with abuse potential has moved in the opposite direction, increasing from 6% in 2017 to 21% in 2021.

Drug Use Reported by Teens

	Ottawa County*		Michigan**	United States**
Issue Area	2021	2019	2019	2019
I have used methamphetamines (also called speed, crystal, crank, ice, chalk, fire, or glass)	1.5%	1.4%	2.6%	2.1%
I have used heroin (also called smack, junk, or China White)	0.9%	1.1%	2.2%	1.8%
I have used cocaine (any form of cocaine, such as powder, crack, or freebase)	2.0%	2.5%	3.4%	3.9%
During the past 30 days, I have used a needle to inject an illegal drug into my body	0.6%	N/A	N/A	N/A
Ever injected any illegal drugs (used a needle to inject drug into their body, one or more times during their life)	N/A	N/A	2.2%	1.6%

*Data sourced from 2021 Ottawa County Youth Assessment Survey (YAS) [3] which includes 8th,10th,12th graders.
**Data is sourced from Youth Risk Behavior Survey (YRBS) Youth Online: High School YRBS - United States 2019 Results | DASH | CDC which includes 9th-12th graders.

The proportion of Ottawa County teens reporting ever using methamphetamines, heroin, or cocaine in their lifetime remains low and has been decreasing since 2005. Lifetime use reported by Ottawa County teens for all three substances remains lower than the state and nation. Almost 8.5% of Ottawa County teens reported it would be sort of easy or very easy to get a drug like cocaine, LSD, heroin, or methamphetamine. And 10% believe there is no or slight risk to using methamphetamine (meth, crank, ice, chalk, fire or glass).[3]

Lifetime and current prescription drug use reported among Ottawa County teens have been decreasing since 2013. However, teens are reporting prescription drug use at younger ages.

Overdose Prevention Activities in Ottawa County and the Region

The Ottawa County Opiate Overdose Taskforce

The Opiate Taskforce is a collaboration of healthcare professionals, treatment providers, law enforcement, individuals in recovery, and community members with a vision to minimize the impacts of the opioid crisis in Ottawa County. This is done through education of professionals and community members, increased Narcan distribution, advocacy for increased access to treatment, and a focus on the safe disposal of medications.

For more information on prevention and treatment, please visit:
https://www.miottawa.org/Health/CMH/services.htm

The Grand Rapids Red Project (Regional)

The Red Project is a regional non-profit dedicated to improving health, reducing risk, and preventing HIV. The organization provides a range of services, including overdose prevention.

To learn more about the Red Project, please visit:
https://redproject.org/

References

1. https://www.phe.gov/emergency/news/healthactions/phe/Pages/default.aspx
2. https://www.annualreviews.org/doi/10.1146/annurev-publhealth-082619-104231
3. http://www.ottawacountyyouth.org/wp-content/uploads/reports/2021/2021_YAS_Report.pdf
4. https://www.samhsa.gov/data/sites/default/files/reports/rpt35325/NSDUHFFRPDFWHTMLFiles2020/2020NSDUHFFR1PDFW102121.pdf
5. https://www.rand.org/content/dam/rand/pubs/external_publications/EP60000/EP68838/RAND_EP68838.pdf
6. https://www.cdc.gov/drugoverdose/prevention/pdf/CDC-Efforts-to-Prevent-Overdoses_2022-2024.pdf
7. https://www.michigan.gov/opioids/crisis-response
8. https://www.cdc.gov/nchs/data/databriefs/db394-H.pdf
9. https://www.cdc.gov/opioids/basics/epidemic.html
10. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm
11. https://www.cdc.gov/drugoverdose/deaths/2019-2020-increase.html
12. https://www.michigan.gov/-/media/Project/Websites/mdhhs/Folder4/Folder29/Folder3/Folder129/Folder2/Folder229/Folder1/Folder329/Drug_Overdose_Deaths_M_2018-2019.pdf?rev=a267887738b14188bf274e9055d84cc3
13. https://www.cdc.gov/mmwr/volumes/71/wr/pdfs/mm7129e2-H.pdf
14. https://www.michigan.gov/-/media/Project/Websites/opioids/documents/Provisional_2020_Overdose_Data_Brief_Report.pdf?rev=1ffc95f8ab6942af8390c74dbc3be5fa

References (continued)

15. https://www.michigan.gov/opioids/crisis-response
16. https://content.govdelivery.com/accounts/MIOTTAWA/bulletins/2d76c53
17. https://nida.nih.gov/research-topics/treatment/intentional-vs-unintentional-overdose-deaths
18. https://ajp.psychiatryonline.org/doi/10.1176/appi.ajp.2021.21060604
19. https://www.cdc.gov/nchs/data/databriefs/db428.pdf

Definitions

Indicator	Definition	ICD-10 Codes/Detailed Explanation
Overdose deaths	All poisoning deaths involving any drug or substance, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14.
Overdose deaths involving any opioid	All poisoning deaths involving opioid pain relievers, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14 AND opioid in all other causes of death: T40.0, T40.1, T40.2, T40.3, T40.4, T40.6.
Overdose deaths involving heroin (heroin is an opioid)	All poisoning deaths involving heroin, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14 AND heroin in all other causes of death: T40.1.
Overdose deaths involving synthetic opioid other than methadone	All poisoning deaths involving a synthetic opioid other than methadone, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14 AND any synthetic opioid other than methadone in all other causes of death: T40.4.
Overdose deaths involving cocaine (cocaine is not an opioid)	All poisoning deaths involving cocaine, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14 AND cocaine in all other causes of death: T40.5.
Overdose deaths involving psychostimulants with abuse potential (psychostimulants are not opioids)	All poisoning deaths involving psychostimulants with abuse potential, all causes of death, all manners of death except natural.	Underlying cause of death, determined from the field designated as such, or, where missing, from the first-listed multiple cause of death field: X40-44, X60-64, X85, Y10-14 AND psychostimulant with abuse potential in all other causes of death: T43.6.

Adapted from New York State Department of Health

Methods

Definitions

- Drug overdose deaths include events with an underlying cause of death code of X40-X44, X60-X64, X85, or Y10-Y14. Alcohol poisoning deaths are not included in this report.
- County quadrants are used in this report to highlight geographical differences in overdose death rates. The boundaries for each quadrant are generally 96th Avenue (north to south) and Fillmore Avenue (east to west). Quadrant boundaries deviate slightly in Zeeland, where the city is placed in the SW quadrant, and in Georgetown, where the area north of the Grand River but south of Fillmore (if Fillmore extended directly east) is included in the NE quadrant. This method has two purposes: 1) it utilizes natural recognizable boundaries such as city limits and rivers, and 2) it incorporates census tract boundaries which can be used to determine an underlying population and calculate a rate. Those that died by overdose were assigned a quadrant based on residence. See slide 16 for a map of quadrant boundaries.

Analytical Methods

- Deaths counted in this report are by residence of the decedent, not location of death.
- Rates are unadjusted; the unit for rates in this report is the number of events per 100,000 people.
- Because death by overdose is a relatively rare event each year in Ottawa County, multiple years are often combined to improve statistical stability, particularly for rates over time.
- Ottawa County data prior to 2010 was obtained from CDC Wonder.
- Michigan and United States overdose death rate data from 2010-2020 was obtained from CDC Wonder. Preliminary reported overdose death counts for Michigan and United States in 2021 were obtained from the National Vital Statistics System, rates were calculated using American Community Survey (ACS) 1-year population estimates.
- Population data when evaluating age categories and sex were obtained from CDC Wonder. These estimates are bridged-race population estimates after release of the bridged-race intercensal population estimates for July 1, 2010-July 2019.
- Population data when evaluating county rates utilized American Community Survey (ACS) 1-year estimates.
- Population data when evaluating quadrant rates utilized ACS 5-year estimates.

Methods (continued)

Trend Analysis

Overall (1999-2021)

Ottawa County death by overdose trend was assessed from 1999-2021 using joinpoint analysis with annual population offset to accommodate for population changes. The joinpoint model selecting zero joinpoints to encompass the full study period indicated that Year was significantly associated with an annual increase in the number of overdoses ($p < .0001$).

- The final joinpoint model selected included two joinpoint, segmenting the study period into three time periods, 1999-2002, 2002-2017, 2017-2021.
  - From 1999-2002, year was not significantly associated with an annual increase/decrease in the number of overdoses ($p=0.173$).
  - From 2002-2017, year was significantly associated with an annual increase in number of overdoses ($p < 0.001$).
  - From 2017-2021, year was not significantly associated with an annual increase/decrease in the number of overdoses ($p=0.287$) indicating that over the last five years death by overdose has plateaued.

Age

Ottawa County death by overdose trend was assessed from 2010-2021 for decedents less than 50 years old and decedents 50 years and older using joinpoint analysis. Deaths by overdose were grouped into two-year time periods to accommodate for small numbers.

- The final joinpoint model selected for the <50 age group included zero joinpoints which indicated that year was not significantly associated with an annual increase/decrease in the number of overdoses ($p=0.475$) for the <50 age group from 2010-2021.
- The final joinpoint model selected for the 50+ age group included zero joinpoints which indicated that year was not significantly associated with an annual increase/decrease in the number of overdoses ($p=0.454$) for the 50+ age group from 2010-2021.

Methods (continued)

Trend Analysis

Sex

Ottawa County death by overdose trend was assessed from 2001-2021 by sex using joinpoint analysis. Deaths by overdose were grouped into three-year time periods to accommodate for small numbers.

- The final joinpoint model selected for males included zero joinpoints indicating that year was significantly associated with an annual increase in number of overdoses (p=0.019).
- The final joinpoint model selected for females included zero joinpoints indicating that year was not significantly associated with an annual increase/decrease in number of overdoses (p=0.078).

Quadrant

Ottawa County death by overdose trend was assessed from 2010-2021 analyzing quadrant of residences using joinpoint analysis. Deaths by overdose were grouped into two-year time periods to accommodate for small numbers. Decedents were assigned to a specific quadrant based on the census tract they resided in at the time of death.

- The final joinpoint model selected for the NE quadrant included zero joinpoints indicating that year was not significantly associated with an annual increase/decrease in number of suicides (p=0.752).
- The final joinpoint model selected for the NW quadrant included zero joinpoints indicating that year was not significantly associated with an annual increase/decrease in number of suicides (p=0.612).
- The final joinpoint model selected for the SE quadrant included zero joinpoints indicating that year was not significantly associated with an annual increase/decrease in number of suicides (p=0.307).
- The final joinpoint model selected for the SW quadrant included zero joinpoints indicating that year was significantly associated with an annual increase in number of suicides (p=0.506).