DEPARTMENT OF HEALTH

Nonfatal Emergency Department Visits for Drug Overdose Among Minnesota Residents

2016-2020

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Minnesota Department of Health
Injury and Violence Prevention Section
PO Box 64882
Saint Paul, MN 55164-0882
651-201-4169
shelbi.giesel@state.mn.us
www.health.state.mn.us

To obtain this information in a different format, email DrugODEpi@state.mn.us.

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Key Findings

- In 2020, for every 1 overdose death, there were 14 nonfatal overdoses.
- Statewide, emergency department (ED) visits for nonfatal drug overdoses continued to increase in 2020, and the increase was more pronounced in the 7-county Metro compared to Greater Minnesota.
- Nonfatal overdoses involving opioids (excluding heroin) saw a sharp increase in 2020, surpassing the number of nonfatal overdoses involving heroin for the first time.
- Minnesotans aged 15-34 experienced the largest number of nonfatal overdoses and accounted for 55% of all overdoses treated in the emergency department.
- American Indian Minnesotans were nine times more likely and African American Minnesotans were three times more likely than white Minnesotans to experience a nonfatal overdose of unintentional or undetermined intent.
- Beginning in March 2020 and throughout the remainder of the year, there was a substantial decline in ED visits. However, ED visits for nonfatal overdoses involving opioids remained higher than 2019 levels for each month of 2020, signifying that despite an ongoing global pandemic, the opioid epidemic continues to be pervasive.

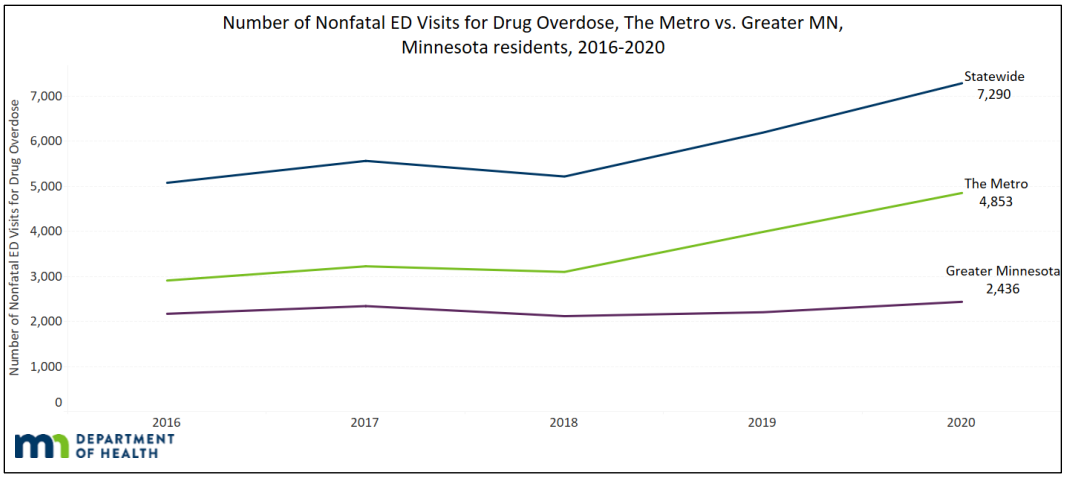
Overview

Nonfatal drug overdoses continue to affect the lives of many Minnesotans. Among Minnesota residents in 2020, there were 14,475 nonfatal drug overdoses (across all drug categories and intents) treated in the hospital (including emergency department visits and inpatient hospitalizations). This means that, in 2020, for every one drug overdose death, there were 14 nonfatal overdoses treated in the hospital. Oftentimes injury intent (e.g., unintentional, self-harm, undetermined) and trends in nonfatal overdoses treated in EDs differ compared to hospitalizations. Because of these differences, and that the majority of nonfatal drug overdoses are treated in the ED, this report focuses on unintentional (i.e., accident) and undetermined nonfatal drug overdoses treated in the ED, summarizing five-year trends (2016-2020) for Minnesota residents, with a particular focus on 2020 nonfatal drug overdoses and the impacts of the COVID-19 pandemic.

The Seven-county Metro compared to Greater Minnesota

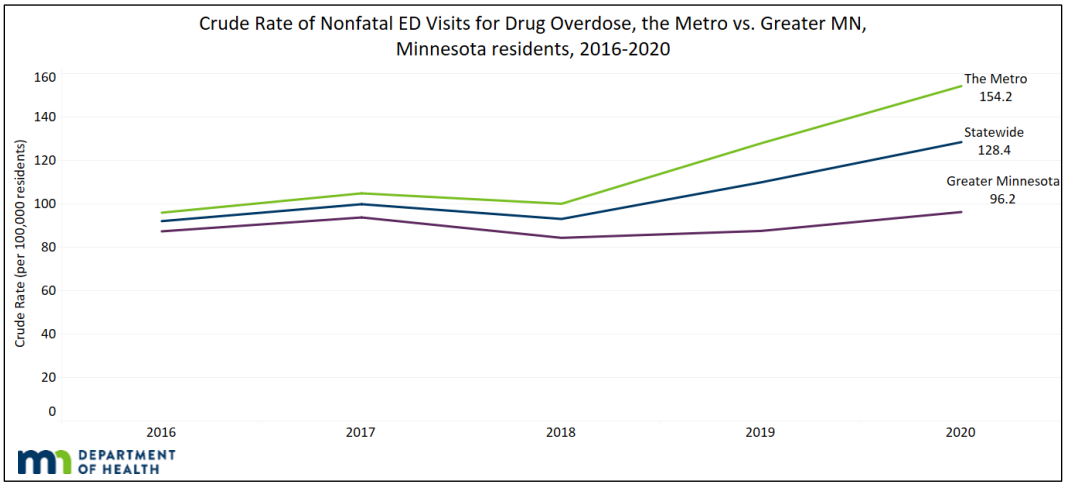
In 2020, 74% of all reported nonfatal drug overdoses of unintentional and undetermined intent were treated in the ED (7,290 out of 9,916 overdoses). Statewide, the number of ED visits for nonfatal overdoses increased 44% from 2016 to 2020 (5,079 to 7,290 overdoses), with much of this increase occurring in the previous two years (Chart 1). In 2020, ED visits for nonfatal overdoses increased 18% from 2019 (6,196 to 7,290 overdoses). However, trends in nonfatal overdoses vary between the 7-county Metro (the Metro) and Greater Minnesota. From 2016 to 2018, the rates of nonfatal overdoses were relatively similar between the Metro and Greater Minnesota (Chart 2). Beginning in 2019, the rate of nonfatal overdoses began to accelerate in the Metro, whereas in Greater Minnesota the rate of nonfatal overdoses has increased only modestly. From 2019 to 2020, the rate of nonfatal overdoses increased 21% (127.9 to 154.2 per 100,000 residents) in the Metro. In Greater Minnesota, the rate of nonfatal overdoses increased 10% over the same time period (87.5 to 96.2 per 100,000 residents).

Chart 1. Since 2018, the number of nonfatal overdoses has continued to increase in the Metro and has only slightly increased in Greater Minnesota.



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Chart 2. From 2016-2018, rates of nonfatal overdoses were similar in the Metro and Greater Minnesota but beginning in 2019 rates have increased more rapidly in the Metro.

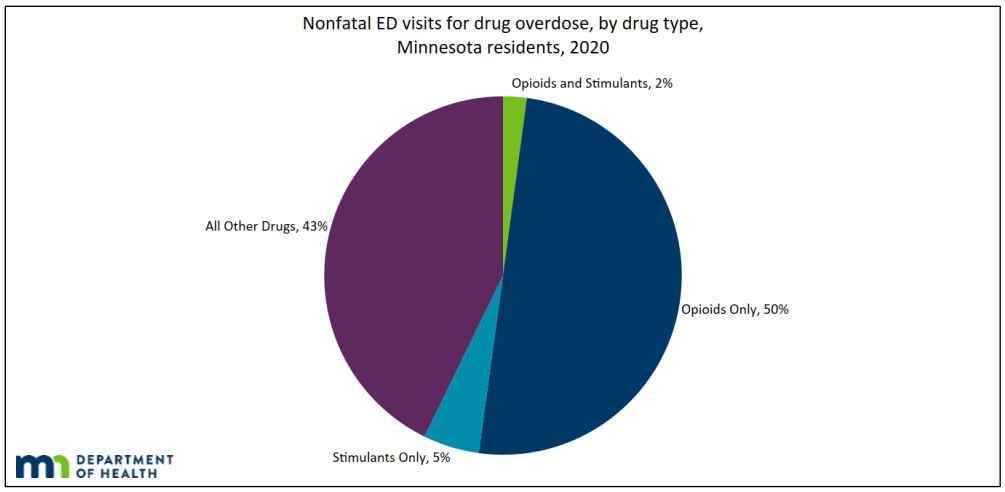


SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Nonfatal Overdoses by Drug Type

Nonfatal drug overdoses treated in the ED were further categorized by the involvement of opioids or stimulants because these are the substances primarily driving the increase in overdose ED visits (see Appendix I for case definition). In 2020, opioids and stimulants were involved in 57% of nonfatal overdoses – 50% involved opioids (3,649 overdoses), 5% involved stimulants (370 overdoses), and 2% involved both opioids and stimulants (155 overdoses) (Chart 3). The remaining 43% of nonfatal overdoses involved other drugs without suspected opioid or stimulant involvement (e.g., benzodiazepines, antipsychotics, antidepressants, etc.) (3,116 overdoses).

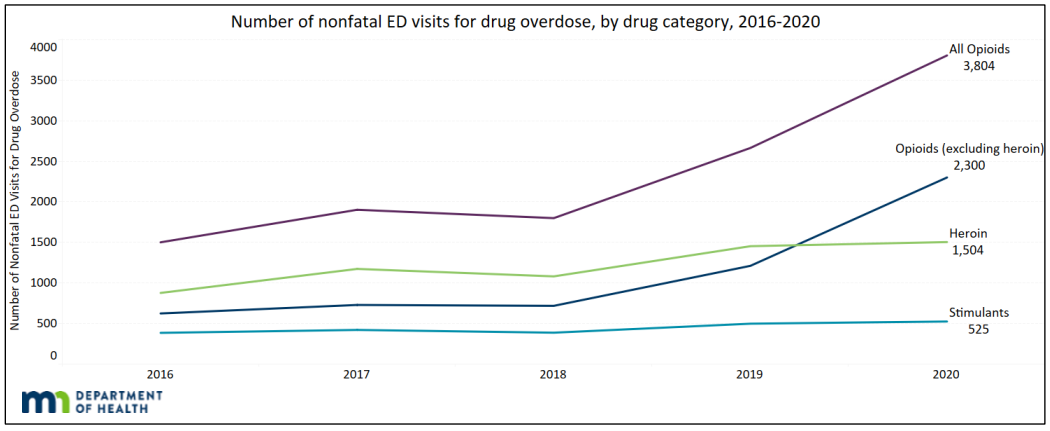
Chart 3. Opioids or stimulants were involved in 57% of ED visits for nonfatal overdoses.



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2020.

From 2016 to 2020, the number of nonfatal overdoses involving all opioids increased 153% (1,501 to 3,804 overdoses), with much of the increase occurring in the previous two years (Chart 4). From 2019 to 2020 alone, the number of nonfatal overdoses involving all opioids increased 43% (2,664 to 3,804 overdoses). This substantial increase was largely driven by increases in overdoses involving opioids, excluding heroin, which saw an increase of 90% from 2019 to 2020 (1,211 to 2,300 overdoses). From 2016 to 2020, heroin overdoses increased 71% (877 to 1,504 overdoses). However, heroin overdoses remained relatively stable from 2019 to 2020, increasing by 4% (1,453 to 1,504 overdoses). From 2016 to 2020, nonfatal overdoses involving stimulants increased 36% (385 to 525 overdoses). Similar to heroin, stimulant overdoses remained relatively stable from 2019 to 2020, increasing 5% (498 to 525 overdoses).

Chart 4. All Opioids, particularly opioids excluding heroin, sharply increased in 2020.



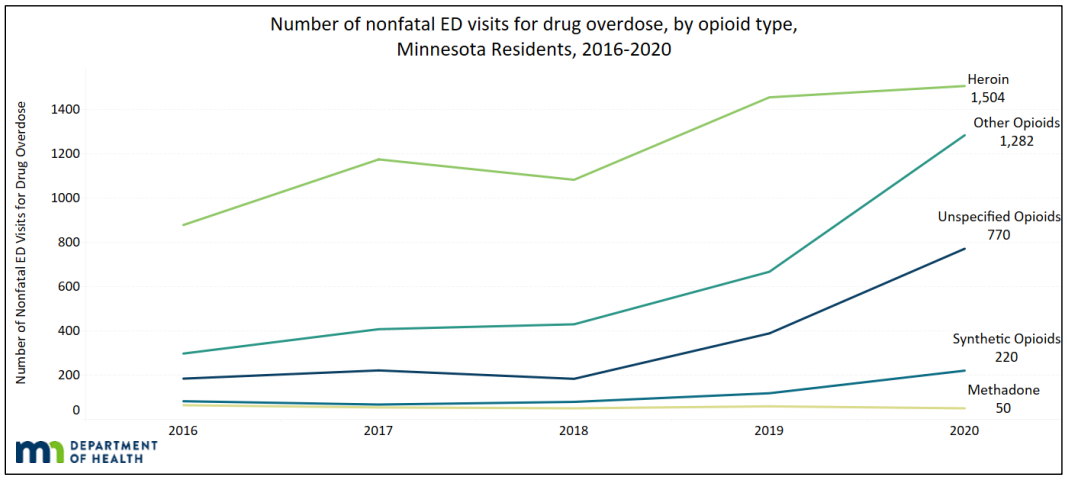
SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Opioid-involved Nonfatal Overdoses

When further breaking down the different types of opioid diagnoses in nonfatal overdoses, heroin was involved in the largest number of nonfatal overdoses (Chart 5). However, the categories of other opioids, unspecified opioids, and synthetic opioids substantially increased from 2019 to 2020 (see Appendix I for case definitions). Over that time period, overdoses involving:

- other opioids (e.g., oxycodone, codeine, hydrocodone) increased 92% (666 to 1,282 overdoses),
- unspecified opioids increased 98% (388 to 770 overdoses),
- and synthetic opioids (e.g., fentanyl, tramadol) increased 86% (118 to 220 overdoses).

Chart 5. Among nonfatal overdoses involving opioids, the categories of other opioids, unspecified opioids, and synthetic opioids sharply increased in 2020 whereas overdoses involving heroin remained relatively stable.



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

It is important to emphasize that the drugs involved in nonfatal overdoses treated in the ED are typically self-reported by the patient or determined by presenting symptoms at the hospital; often, toxicology testing is not completed (See Appendix I for more details). Because it is difficult to determine which specific drugs were present without toxicological results, and due to the lack of detail from ICD-10-CM diagnosis codes, the interpretation of drug-specific trends requires caution.

Minnesota Drug Overdose and Substance Use Pilot Surveillance System (MNDOSA)

As previously mentioned, ED-treated nonfatal overdoses rarely undergo toxicology testing; thus, MDH developed MNDOSA to better understand the burden of substance misuse and drug overdose in Minnesota by identifying cases and performing expanded toxicology testing for hospital visits related to substance use through partnership with a pilot group of five hospitals within a regional hospital system in northeast Minnesota. MNDOSA toxicology findings, along with clinical impressions and encounter-level data, provide critical insight into interpreting nonfatal overdose trends. For more in-depth information on MNDOSA, including methods used, aims, and the importance of participation, please see Appendix III.

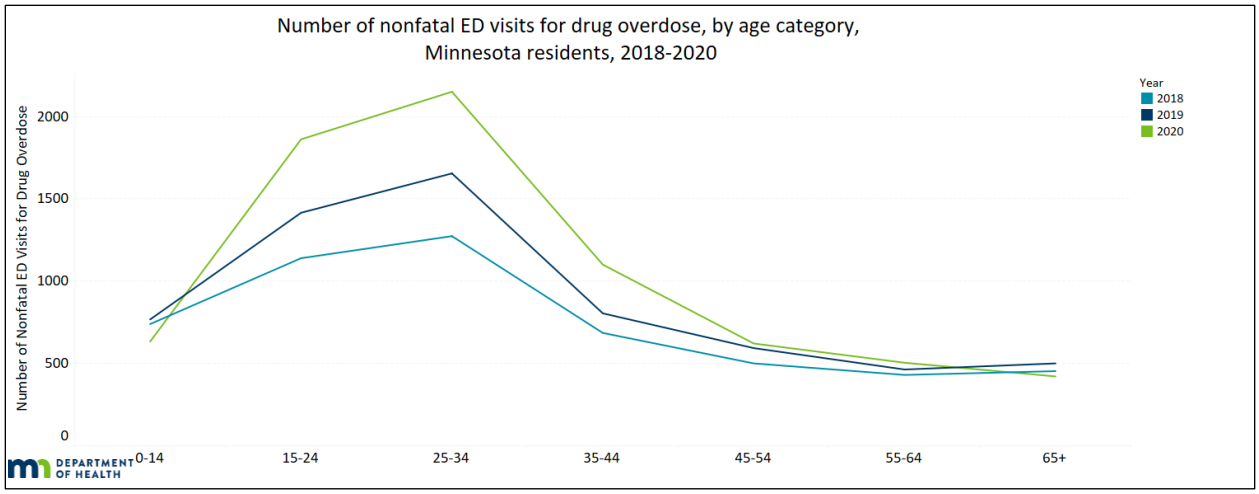
The Role of Fentanyl and Rising Drug Overdoses

MNDOSA findings were used to provide insight into the large increase in ED visits for nonfatal overdoses involving opioids excluding heroin in 2020 (Chart 5). Out of 62 identified MNDSOA cases from five partnering hospitals in northeast Minnesota, 50% had a synthetic opioid present, including fentanyl and fentanyl analogs (31 cases). Additionally, synthetic opioids were present for 91% of cases where any type of opioid was present (31 out of 34 cases). Synthetic opioids, particularly fentanyl and fentanyl analogs, continue to pose a major public health problem and further exacerbate the opioid epidemic in the state and nationwide. These findings from MNDOSA and similar state trends seen in synthetic opioid-involved drug overdose deaths (See Preliminary 2020 Drug Overdose Deaths Report (https://www.health.state.mn.us/communities/opioids/documents/drugoverdosereport2020.pdf)) make it reasonable to suspect that synthetic opioids, particularly fentanyl and fentanyl analogs, played a key role in the overall increase in ED visits for nonfatal overdoses involving opioids excluding heroin.

Age of Nonfatal Overdoses

In 2020, Minnesotans aged 15-34 experienced the largest number of nonfatal overdoses, accounting for 55% of all nonfatal overdose ED visits (Chart 6). In addition, Minnesotans aged 15-34 experienced the largest increases in overdoses from 2019 to 2020. From 2019 to 2020, nonfatal overdoses increased 32% among the 15- to 24-year-old age group (1,415 to 1,861 overdoses). Among the 25- to 34-year-old age group, nonfatal overdoses increased 30% (1,654 to 2,150 overdoses). Minnesotans aged 35-44 also experienced a considerable increase from 2019 to 2020, increasing 37% (804 to 1,100 overdoses).

Chart 6. Minnesotans aged 15-34 make up the majority of nonfatal overdoses and these age groups have seen large increases in nonfatal overdoses since 2018.

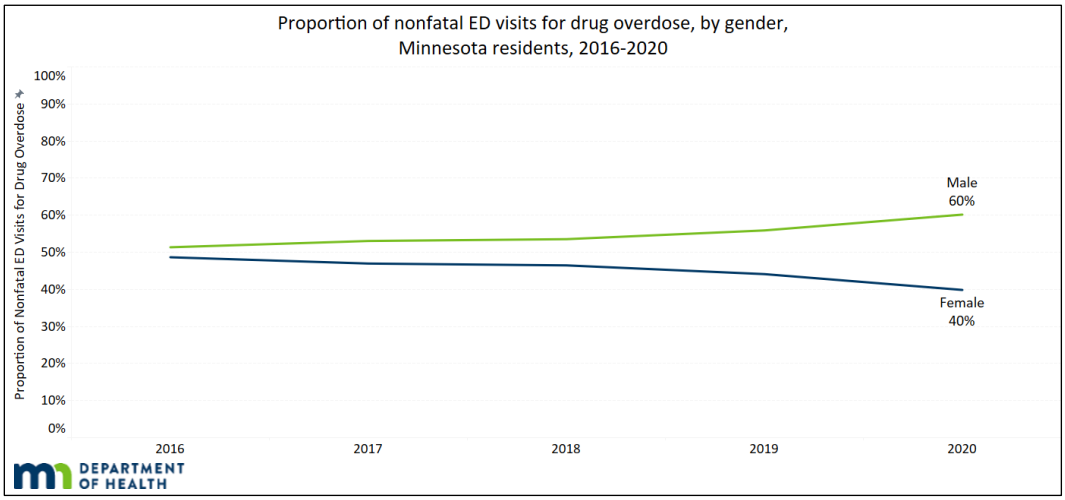


SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2018-2020.

Gender of Nonfatal Overdoses

In 2016, nonfatal overdoses occurred almost equally between females and males (49% and 51%, respectively) (Chart 7). Since 2017, males have accounted for a larger proportion of nonfatal overdoses and the difference in the proportion of nonfatal overdoses between females and males has grown larger, most notably in the previous two years. In 2020, males accounted for 60% and females accounted for 40% of all ED visits for nonfatal overdoses.

Chart 7. Males accounted for a larger proportion of ED visits for nonfatal overdoses in 2020.



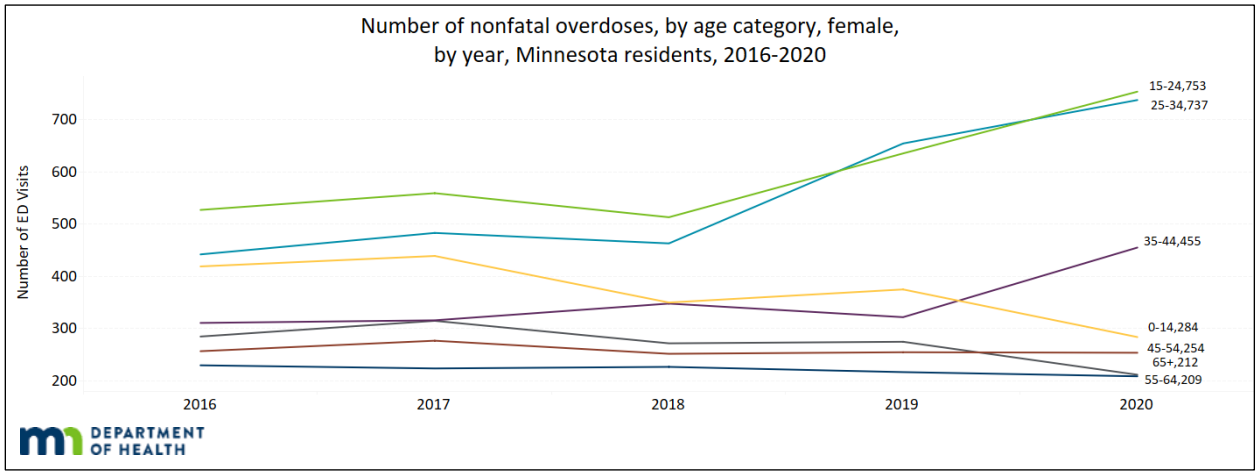
SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Age and Gender of Nonfatal Overdoses

Nonfatal Overdose for Female Minnesotans by Age Group

Since 2016, trends in nonfatal overdoses by age group vary between females and males. Among female Minnesotans, the 15- to 24-year age group experienced the greatest number of overdoses from 2016-2018 (Chart 8). Beginning in 2019, the 15- to 24- and 25 to 34-year age groups experienced the greatest number of overdoses. From 2019 to 2020, overdoses among 15- to 24-year-old female Minnesotans increased 19% (635 to 753 overdoses) and have increased 43% since 2016 (527 overdoses). Female Minnesotans aged 25 to 34 experienced the next largest number of overdoses and have seen a considerable increase from the previous two years. From 2019 to 2020, overdoses among 25- to 34-year-old female Minnesotans increased 13% (654 to 737 overdoses) and have increased 67% since 2016 (442 overdoses). Female Minnesotans aged 35 to 44 saw the largest increase from 2019 to 2020, increasing 41% (322 to 455 overdoses). Since 2016, nonfatal overdoses have decreased 32% among female Minnesotans aged 0 to 14 (419 to 284 overdoses); remained relatively stable among those aged 45 to 54 (257 to 254 overdoses); decreased 9% among those aged 55 to 64 (230 to 209 overdoses); and decreased 26% among those aged 65 and older (285 to 212 overdoses).

Chart 8. Among female Minnesotans, the 15-24- and 25-34-year age groups experienced the largest number of nonfatal overdoses, with a recent increase among both age groups beginning in 2019.

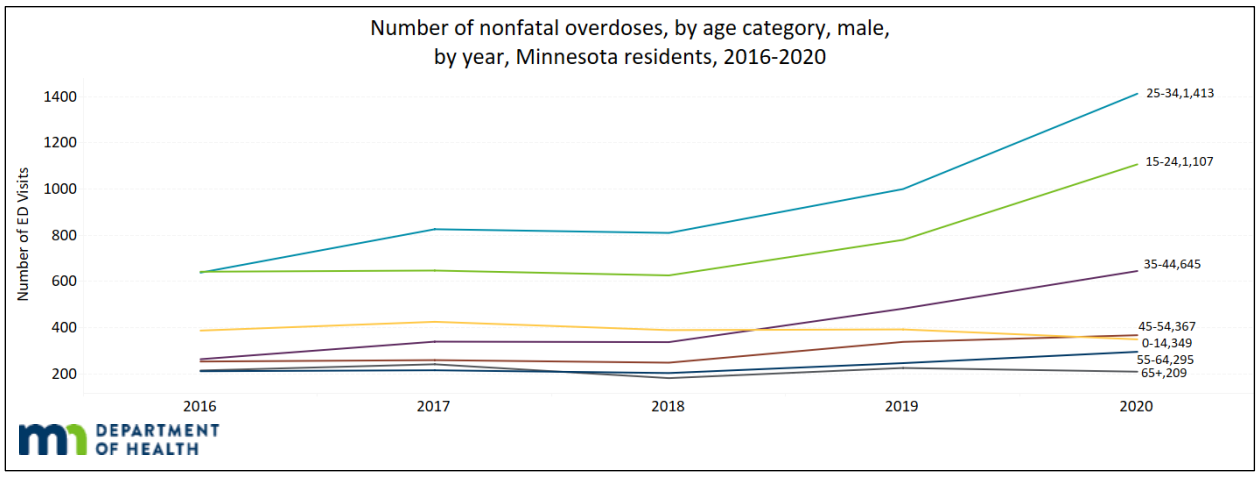


SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Nonfatal Overdose for Male Minnesotans by Age Group

Among male Minnesotans, the 25- to 34-year-old age group experienced the greatest number of overdoses and have seen a substantial increase since 2018 (Chart 9). From 2019 to 2020, overdoses among 25- to 34-year-old male Minnesotans increased 41% (1,000 to 1,413 overdoses) and have increased 121% since 2016 (638 overdoses). Male Minnesotans aged 15 to 24 experienced the next largest number of overdoses and have seen a similarly substantial increase since 2018. From 2019 to 2020, overdoses among 15- to 24-year-old male Minnesotans increased 42% (780 to 1,107 overdoses) and have increased 72% since 2016 (642 overdoses). Male Minnesotans aged 35 to 44 have similarly seen an uptick in overdoses the previous two years, increasing 34% from 2019 to 2020 (482 to 645 overdoses). Since 2016, nonfatal overdoses have decreased 10% among male Minnesotans aged 0 to 14 (387 to 349 overdoses); increased 45% among those aged 45 to 54 (253 to 367 overdoses); increased 40% among those aged 55 to 64 (211 to 295 overdoses); and remained relatively stable for those 65 and older (214 to 209 overdoses).

Chart 9. Among male Minnesotans, the 25–34-year age group have experienced the largest number of nonfatal overdoses since 2016.



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020.

Race Disparities in Nonfatal Overdoses

Understanding Minnesota's Race Disparities in Overdose

In Minnesota, African American and American Indian populations are experiencing a greater burden of drug overdose than white populations. Factors like systemic racism have prevented communities of color from having equal access to the resources needed to be healthy. Poverty, Adverse Childhood Experiences, intergenerational trauma, and intergenerational substance use are all social determinants of health influenced by systemic racism. The health inequities experienced by communities of color, as a result of social determinants of health and systemic racism, contribute to drug overdose disparities for communities of color.

All program and policy decisions about substance use disorder must include a racial equity lens in order to address the race rate disparity within African American and American Indian populations. These data and information are intended to inform drug overdose epidemic prevention and response efforts.

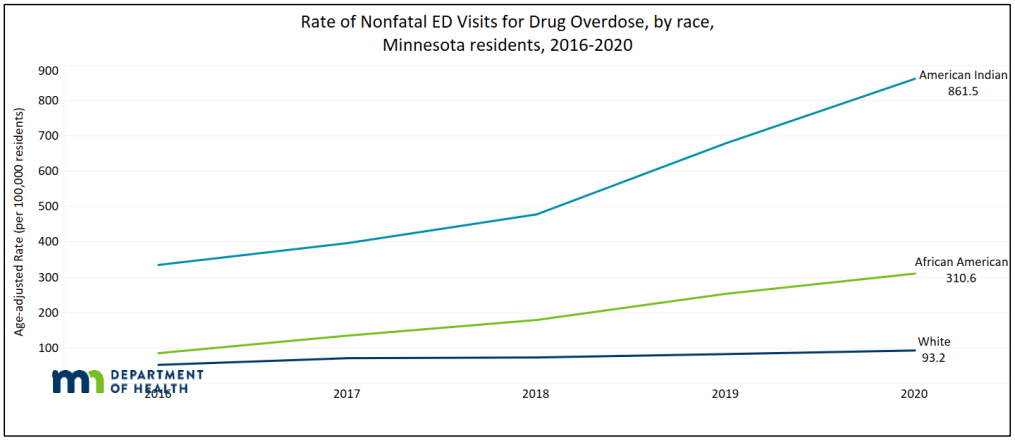
Please see the Differences in Rates of Drug Overdose Deaths by Race Report (PDF) (https://www.health.state.mn.us/communities/opioids/documents/raceratedisparity2019prelimfinal.pdf) for a more comprehensive summary of the interplay between systemic racism, social determinants of health, and the resulting disparity in race-rates for drug overdose in Minnesota.

Trends in Nonfatal Overdose by Race

Similar to race disparities in overdose deaths, there are significant differences in rates of nonfatal overdose by race. In 2020, American Indian Minnesotans were nine times more likely to be treated in the ED for a nonfatal overdose of unintentional or undetermined intent than white Minnesotans (Chart 10). African American Minnesotans were three times more likely to be treated in the ED for a nonfatal overdose of unintentional or undetermined intent than white Minnesotans. To put this into perspective, there were 4,161 white Minnesotans who were treated in the ED for nonfatal drug overdoses of unintentional or undetermined intent. If the American Indian nonfatal overdose rate were seen in the white population, that would equate to 41,555 nonfatal overdoses among white Minnesotans. If the African American nonfatal overdose rate were seen in the white population, that would equate to 14,988 nonfatal overdoses among white Minnesotans.

The rate of nonfatal overdose for white Minnesotans has increased since 2016 (52.5 to 93.2 per 100,000 white residents). However, the rate has increased much more rapidly among American Indian (335.1 to 861.5 per 100,000 American Indian residents) and African American (85.6 to 310.6 per 100,000 African American residents) Minnesotans and the disparities continue to worsen.

Chart 10. The nonfatal overdose race-rate disparity has continued to increase since 2016.

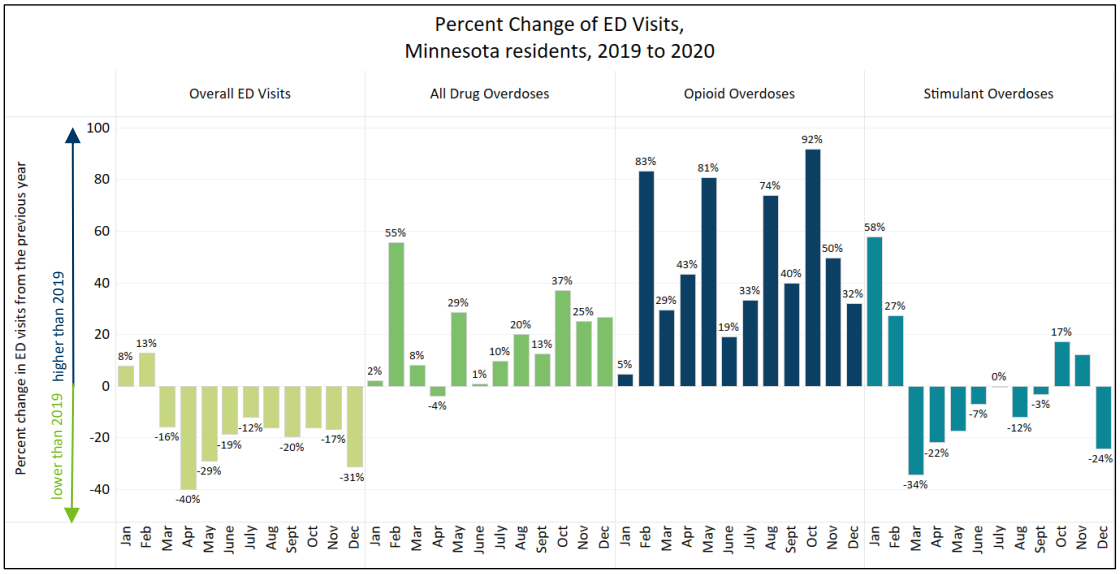


SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2016-2020

Impacts of the COVID-19 Pandemic

In March 2020, the World Health Organization declared COVID-19 a pandemic and stay-at-home orders were enacted in Minnesota and around the world. As a result, many facets of our daily lives were impacted, including utilization of the ED. Beginning in March 2020, there was a substantial decline in ED visits in the United States, likely in part due to delays in seeking or avoiding care due to the pandemic.[1] However, nonfatal overdoses in the United States did not experience a similar decline.[1] Similar to nationwide trends, ED visits in Minnesota substantially declined beginning in March and throughout the remainder of the year compared to 2019 levels (Chart 11). Similarly, overall, ED visits for nonfatal overdoses initially declined in April but returned to higher than 2019 levels from May through December 2020. Nonfatal overdoses involving opioids did not follow this same trend – ED visits for nonfatal overdoses involving opioids remained higher than 2019 levels for each month of 2020. This trend signifies that despite an ongoing global pandemic, the opioid epidemic continues to be pervasive and requires continuing, comprehensive drug overdose prevention and response efforts.

Chart 11. Overall emergency department visits were much lower in 2020 compared to 2019. ED visits for nonfatal drug overdoses were higher and did not see a similar decline.



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2019-2020.

Drug Overdose Prevention and Response Efforts

Preventing substance use, misuse, and overdose in Minnesota requires all of us working together. MDH works with a variety of partners in their overdose prevention efforts including pharmacies, syringe service programs (SSPs), and the Department of Corrections.

Naloxone Access for Preventing Opioid Overdose

Naloxone (https://www.health.state.mn.us/communities/opioids/basics/naloxone.html), also known as Narcan®, is a life-saving medication that can be used to reverse the effects of opioids during an overdose. Anyone can carry naloxone, and it is available through a number of sources in Minnesota. MDH works in partnership with pharmacies and SSPs to improve access and distribution of naloxone. Additionally, MDH works closely with Emergency Medical Services (EMS) Regional Directors to provide naloxone and training for first responders throughout the State of Minnesota.

Linkage to Care for Substance Use Disorder Treatment and Recovery Support

Syringe Service Programs Linkage to Care

MDH provides funding to Minnesota's SSPs to enhance linkage to care for chemical health, infectious disease, mental health, and basic needs care. All SSP Linkage to Care grantees work to enhance existing pathways to care, create new pathways to care, and provide immediate point-of-care linkage for SSP clients.

Emergency Department (ED) Linkage to Care

Emergency departments implement Peer Recovery Specialist services for treatment linkage and recovery support for nonfatal overdose patients.

EMS Linkage to Care

EMS supports linkage to substance use disorder treatment and recovery support through follow-up visits with individuals who have interacted with partnering EMS agencies due to nonfatal overdose.

Department of Corrections Linkages to Care

MDH provides funds to the Department of Corrections to link incarcerated Minnesotans in the state prison system who have been diagnosed with opioid use disorder with culturally responsive treatment linkage and long-term recovery planning in their region upon release.

For more comprehensive information on Drug Overdose and Prevention response efforts, please visit the MDH Response to Substance Use and Overdose Across Minnesota (https://www.health.state.mn.us/communities/opioids/mnresponse/opioidstateplan.html) on the Minnesota Department of Health website.

Conclusions

Nonfatal drug overdoses occur much more frequently than fatal drug overdoses. Many individuals who experience one overdose are more likely to experience another.[2] Data collection and analysis of ED visits for nonfatal drug overdoses allows for more effective tracking of overall overdose trends. This information in turn aids the continued improvement of intervention and response efforts, especially as we move forward and navigate a post-pandemic world and a changing drug overdose landscape. Further information about Minnesota nonfatal drug overdoses, including county-level information and breakdown by type of drug, can be found at the Minnesota Injury Data Access System (MIDAS) (https://www.health.state.mn.us/communities/injury/midas/index.html) on the Minnesota Department of Health website.

References

1. Centers for Disease Control and Prevention. (2021). *Suspected Nonfatal Drug Overdoses during COVID-19.* Retrieved from Centers for Disease Control and Prevention: https://www.cdc.gov/drugoverdose/nonfatal/states/covid-19.html
2. Suffoletto B, Zeigler A. Risk and protective factors for repeated overdose after opioid overdose survival. Drug Alcohol Depend 2020 Feb 5; 209:107890. DOI: 10.1016/j.drugalcdep.2020.107890

Suggested Citation

Giesel, S. and Wright, N., Nonfatal Emergency Department-Treated Drug Overdoses Among Minnesota Residents 2016-2020. Saint Paul, MN: Minnesota Department of Health, September 2021.

Appendix

Appendix I

Within this report, the data consist of Minnesota residents treated for nonfatal drug overdoses in Minnesota and North Dakota hospitals. A limitation of the data source is the drug(s) suspected to be involved in ED visits are often self-reported by the patient or determined by presenting symptoms at the hospital. Often, toxicology tests are not run for these patients to determine the specific substances involved. These are limitations for this data source and necessitate caution in interpreting drug category-specific findings. All drug overdoses referenced in this summary are suspected drug overdoses. The data also treat suspected opioid overdoses, suspected heroin overdoses, and suspected stimulant overdoses as subsets of suspected drug overdoses. Furthermore, suspected heroin overdoses are also a subset of suspected opioid overdoses. The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, used to classify these categories, are shown in the following table.

ICD-10-CM Codes for Drug Overdose Case Definition

DRUG	Any Mention of Diagnosis	AND a 5th/6th character of:	AND a 7th character of:
All Drug	**T36-T50:** Poisoning by drugs, medicaments and biological substances	For T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9, a 5th character, for all others, a 6th character 1. Accidental (unintentional) 2. Intentional self-harm 4. Undetermined intent *Does not include:* 3. Assault 5. Adverse effect 6. Underdosing	A: Initial encounter *Does not include:* D: Subsequent encounter S: Sequela
All Opioids	**T40.0X:** Poisoning by opium **T40.1X:** Poisoning by heroin **T40.2X:** Poisoning by other opioids **T40.3X:** Poisoning by methadone **T40.4X:** Poisoning by synthetic narcotics *replaced on 10/1/2020 **T40.41:** Poisoning by fentanyl or fentanyl analogs *added on 10/1/2020 **T40.42:** Poisoning by tramadol *added on 10/1/2020 **T40.49:** Poisoning by other synthetic narcotics *added on 10/1/2020 **T40.60:** Poisoning by unspecified narcotics **T40.69:** Poisoning by other narcotics		
Heroin	**T40.1X:** Poisoning by heroin		
Stimulants	**T40.5X:** Poisoning by cocaine **T43.60:** Poisoning by unspecified psychostimulants **T43.61:** Poisoning by caffeine **T43.62:** Poisoning by amphetamines, **T43.63:** Poisoning by methylphenidate **T43.64:** Poisoning by ecstasy **T43.69:** Poisoning by other psychostimulants		

Appendix II

The Minnesota Department of Health receives approximately 95% of hospital discharge data from the Minnesota Hospital Association, including ED visits. These data cover all 87 Minnesota counties and can

include reports from all 132 acute care hospitals in the state. Nonfatal drug overdose hospital discharge data is reported to the Centers for Disease Control and Prevention (CDC) in quarterly Drug Overdose Surveillance and Epidemiology (DOSE) submissions. The primary categories analyzed in the DOSE submission are opioid overdoses, heroin overdoses, stimulant overdoses, and all other drug overdoses.

Appendix III

MDH developed the Minnesota Drug Overdose and Substance Use Pilot Surveillance System (MNDOSA) to better understand the burden of substance misuse and drug overdose in Minnesota. Through partnership with a pilot group of five hospitals within a regional hospital system in northeast Minnesota, MNDOSA aims to identify emerging substances in near-real time to inform clinicians, toxicologists, and prevention partners about substance misuse patterns and to guide strategies and decision-making. Patients presenting to the ED where the principal diagnosis is attributed to misuse of drugs (excluding sole alcohol use and self-harm) are reported to MDH daily. A subset of these cases, including patients who died, are hospitalized, have an atypical clinical presentation or are part of a suspected cluster, are identified for expanded toxicology testing. Hospital-treated nonfatal overdoses rarely undergo toxicology testing; thus, MNDOSA findings from toxicology testing, along with clinical impressions and encounter-level data, provide critical insight in interpreting nonfatal overdose trends. In 2020, 62 cases meeting the above criteria (Patients of Special Interest) were reported to MDH and had urine and/or blood samples collected for toxicology testing.