



DORM

Data-Informed Overdose Risk Mitigation

2021 Annual Report

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I. EXECUTIVE SUMMARY

Overview

In 2018, Governor Larry Hogan signed House Bill 922, known as the Chapter 211 Act, into law, which requires the Maryland Department of Health (MDH) to produce an annual report examining the history of individuals in the State of Maryland who suffered a fatal overdose. The report shall include an assessment of multiple factors associated with fatal and nonfatal overdose risk and programs targeted at opioid use and misuse, among other issues. This assessment shall further include accessing and, where feasible, establishing links to at least 18 distinct data sources or datasets possessed by multiple state agencies. Collectively, the examination, collaboration, assessment, and report are subsequently referred to as the Data-Informed Overdose Risk Mitigation (DORM) initiative. The report is due to the Governor and General Assembly on July 1 of each year, with the statute sunseting on July 1, 2024.

This year's report builds on work from last year and includes linked analyses using data sets provided by the Vital Statistics Administration (VSA), the Prescription Drug Monitoring Program (PDMP), the Health Services Cost Review Commission (HSCRC), the Public Behavioral Health System (PBHS), and Maryland Medicaid. Additionally, programmatic data was provided from numerous divisions within MDH, including the Center for Harm Reduction Services (CHRS) and the Environmental Health Bureau.

To support more secure usage of linked data, the Opioid Operational Command Center (OCCC), partnered with the MDH Behavioral Health Administration (BHA), Chesapeake Regional Information System for our Patients (CRISP), Maryland's health information exchange, and the Johns Hopkins Bloomberg School of Public Health to migrate certain linked datasets supporting this project onto the Maryland Total Human Services Integrated Network (MD THINK) platform, Maryland's cloud-based data storage and management system. The partnership with MD THINK demonstrated the potential for leveraging this platform to support more secure data sharing and robust analytics to support DORM as well as other health and human service data initiatives in the future.

High-Level Findings

Data detailed in this year's DORM report show that in 2020, there were 2,799 overdose-related fatalities, the highest annual total in the State of Maryland's history to date. Additionally, there continues to be a growing disparity in overdose-related deaths in the Black community. Between 2016 and 2020, overdose deaths among non-Hispanic Black Marylanders rose by 64.5 percent as compared to deaths in the non-Hispanic white community, which increased by 15.3 percent.

Between 2017 and 2020, 70.4 percent of overdose decedents were enrolled in Medicaid at some point in the 12 months preceding their death, which highlights an opportunity to increase comprehensive wraparound support to high-risk populations. Additionally, 69.2 percent of individuals who died from overdose had an interaction with a Maryland hospital in the six years preceding their death, which highlights the hospital system as an important touchpoint for individuals with substance use disorder (SUD). Furthermore, of overdose decedents who were engaged in Maryland's Public Behavioral Health System, 48.8 percent died within 30 days, showing a large proportion of people who are dying from overdose are engaged with the healthcare system.

Analyses conducted using data obtained from the PDMP show there may be racial disparities among individuals receiving buprenorphine to treat opioid use disorder. For data where race was available, analyses showed white Marylanders are proportionately receiving more buprenorphine as compared to their share in the general population when compared to Black Marylanders. Between 2016 and 2021, 53.2 percent of individuals receiving buprenorphine were white and 23.6 percent were Black.

Policy Implications

The findings in this year's report have important policy implications, including the need to continue addressing growing racial disparities in overdose deaths and examining fatal overdose rates among individuals aged 55 and older. One potential area of opportunity to reduce overdose deaths among Black Marylanders includes expanding access to buprenorphine for treatment of opioid use disorder (OUD).

Another potential area of intervention is expanding targeted naloxone distribution to friends and family members of people who use drugs. Statewide Unintentional Drug Overdose Reporting Surveillance (SUDORS) data shows that the majority of overdose-fatalities occurred in residences, and in most cases, there was a bystander present, pointing to the continued need to expand community-based naloxone distribution and to understand barriers for bystander naloxone administration.

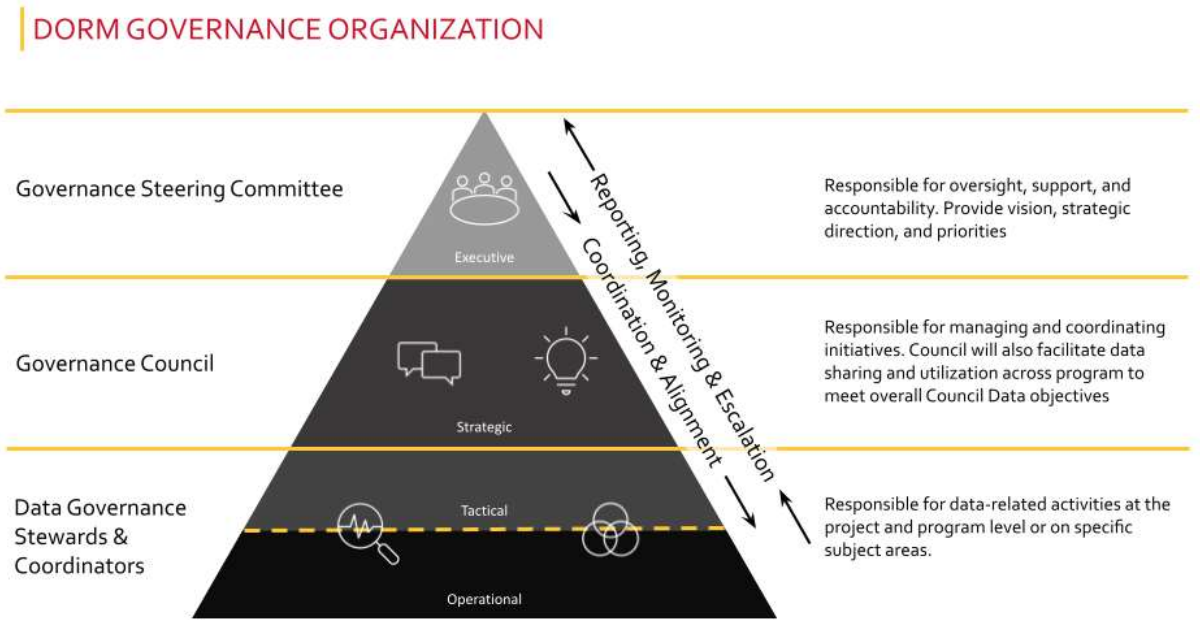
The MDH CHRS operates a successful community-based naloxone distribution program, which will be expanded based on the enactment of the Statewide Targeted Overdose Prevention (STOP) Act of 2022, which was passed unanimously by the Maryland General Assembly and signed into law by Governor Hogan. The STOP Act will expand targeted naloxone distribution by requiring certain entities, such as hospital systems, outpatient SUD treatment facilities, and correctional settings, to offer naloxone to individuals they serve. This legislation has the potential to be very impactful because targeted naloxone distribution among high-risk populations has been shown to decrease overdose rates.

Project Governance and Next Steps

Data insights derived through the DORM initiative have aided the state in its efforts to address the overdose crisis and the Hogan-Rutherford Administration is committed to ensuring the project foundation is built to sustain production of meaningful analysis to guide policy and programmatic decision-making into the future. Over the past year, substantial progress has been made to promote the DORM initiative as the state's overdose-related data hub. In July 2021, the Opioid Operational Command Center (OCCC) partnered with the MDH Data Office and MD THINK to migrate various linked data sets from CRISP onto the MD THINK platform, which has enabled the project to enhance data security while providing data scientists with a sophisticated platform to conduct analyses.

Throughout the past year, DORM leadership has partnered with Maryland's Chief Data Officer to develop a sustainable project governance structure to standardize operations and ensure coordination of activities and communication. Figure 1, below, represents the various levels of organization that will guide how DORM will be implemented in future years. The DORM Governance Steering Committee will work to implement this governance model as we enter the next phase of this initiative and onboard additional datasets, including data from the Maryland Institute for Emergency Medical Services Systems (MIEMSS) and the Department of Public Safety and Corrections (DPSCS) within the next year.

Figure 1: Data-Informed Overdose Risk Mitigation Governance Structure

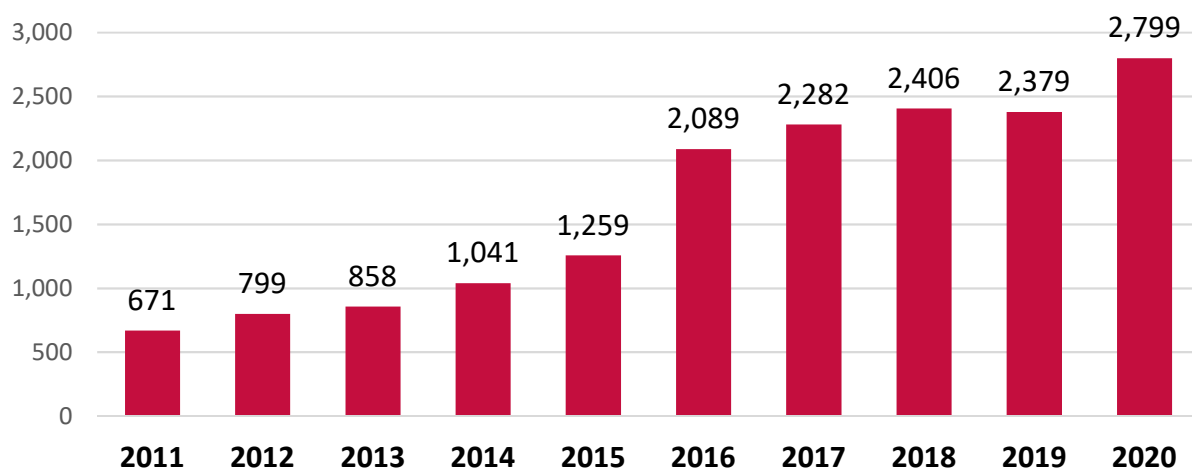


II. OVERDOSE DEATHS IN MARYLAND

The data shown below provide a demographic profile of individuals who experienced a fatal overdose in Maryland in recent years.

Data provided by the Vital Statistics Administration (VSA) of the Maryland Department of Health (MDH) show the number of unintentional drug-and-alcohol-related overdose fatalities increased from 671 deaths in 2011 to 2,799 deaths in 2020, or by 317.1 percent. There was a 17.7-percent increase in overdose-related deaths in 2020 as compared to 2019, when there were 2,379 fatal overdoses in the state.¹

Figure 2: Fatal Overdoses Involving All Substances (2011–2020)



Gender

In 2020, 72.1 percent of overdose decedents were male. This trend has been consistent in the last five years; males have consistently accounted for more overdose fatalities than females. However, as illustrated in Figure 3, below, the rate of increase among males and females has been similar in recent years. Between 2016 and 2020, fatal overdoses among males increased by 33.4 percent (from 1,513 to 2,019 overdose deaths) and by 35.9 percent among females (from 574 to 780 overdose deaths).²

Age

In the last five years, overdose fatalities have increased among all age groups in Maryland except for individuals under the age of 25. Since 2018, individuals over the age of 55 have also surpassed all other age groups for fatal overdoses. From 2015 to 2020, fatal overdoses increased by 81.4 percent (from 424 to 769) among individuals over the age of 55 while decreasing by 11.2 percent (from 161 to 143) among individuals under the age of 25.³

¹ Maryland Vital Statistics Annual Report 2020"; Vital Statistics Administration, Maryland Department of Health.

² Ibid.

³ Ibid.

Figure 3: Fatal Overdoses by Age (2016–2020)

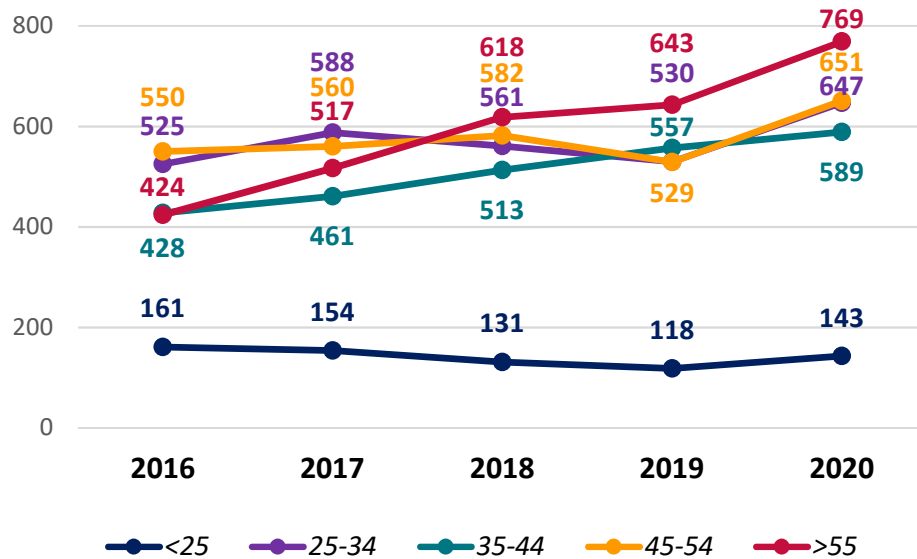
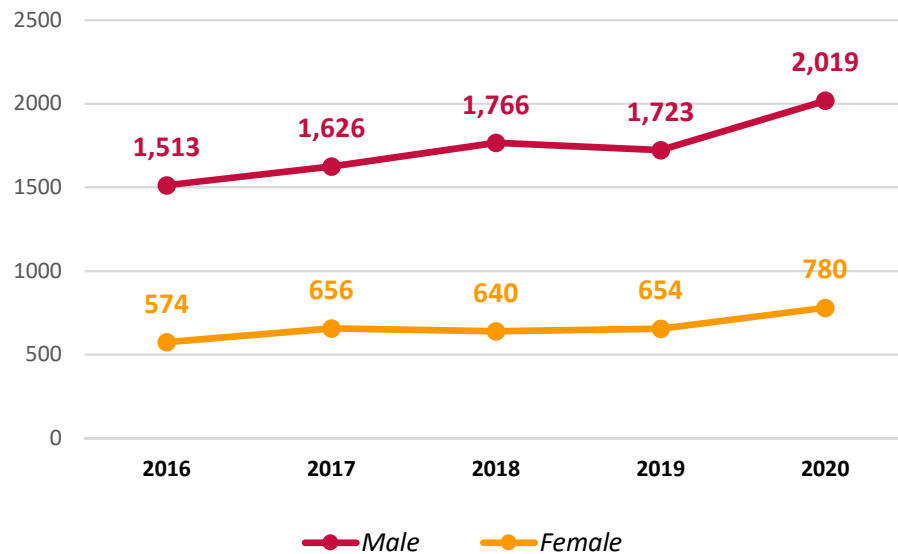


Figure 4: Fatal Overdoses by Gender (2016–2020)

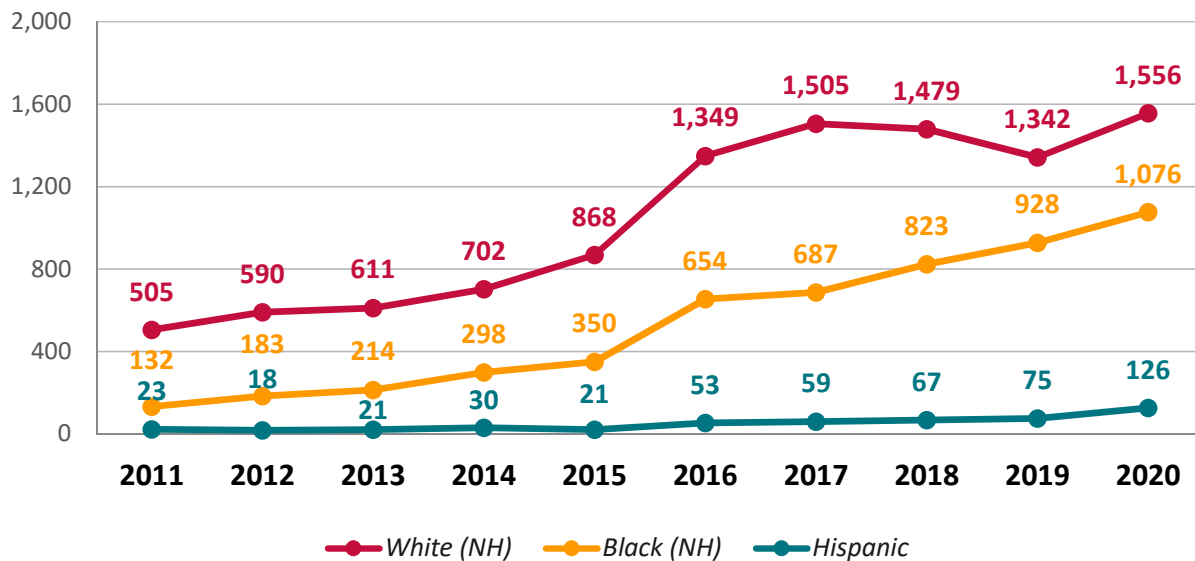


Race & Ethnicity

Between 2016 and 2020, the growth of overdose fatalities among non-Hispanic Black Marylanders has outpaced those among non-Hispanic white Marylanders. During this time, the number of overdose fatalities increased 15.3 percent, from 1,349 to 1,556, among non-Hispanic white Marylanders, and by 64.5 percent, from 654 to 1,076, among non-Hispanic Black Marylanders.⁴

⁴Ibid.

Figure 5: Overdose Deaths by Race/Ethnicity (2011–2020)



Preliminary fatal overdose data for 2021 may show the large increase observed among non-Hispanic white Marylanders in 2020 could be an aberration and that fatal overdose rates by race/ethnicity could be reverting to trends observed prior to the coronavirus pandemic. According to preliminary data, there were 1,412 fatal overdoses among non-Hispanic white Marylanders, 9.3 percent fewer than in 2020, while there were 1,165 overdose deaths among non-Hispanic Black Marylanders, 8.3 percent more than in 2020.⁵

While both non-Hispanic white Marylanders and non-Hispanic Black Marylanders experienced disproportionate rates of overdose in relation to their share of Maryland's population, this disparity was larger among non-Hispanic Black Marylanders than in their non-Hispanic white counterparts. For example, in 2020, 56.4 percent of fatal overdoses involved non-Hispanic white Marylanders, a group that made up 50.6 percent of Maryland's population (a difference of 5.8 percent). Non-Hispanic Black Marylanders, meanwhile, experienced 39.0 percent of fatal overdoses in Maryland while making up 31.1 percent of the state's population (a difference of 7.9 percent).⁶

Table 1: Population Disparity Among Non-Hispanic White and Black Marylanders (2020)

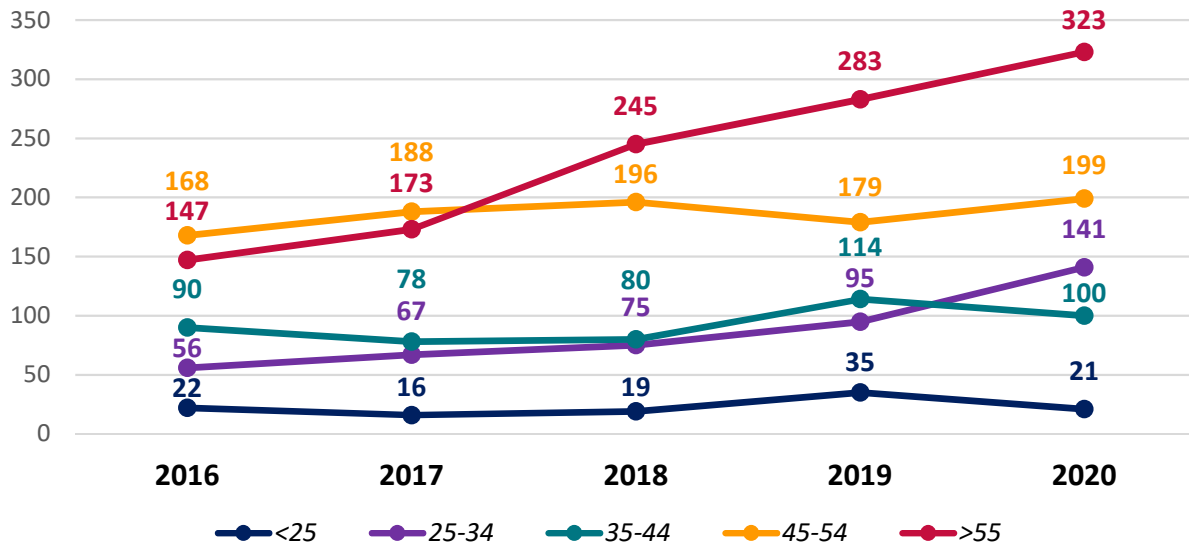
Race/Ethnicity	2020 Population Share	2020 Overdose Death Share	Difference
NH White	50.6%	56.4%	5.8%
NH Black	31.1%	39.0%	7.9%

⁵ OOC Overdose Data Dashboard.

⁶Ibid.

Non-Hispanic Black Marylanders above the age of 55 have been among the groups most impacted by fatal overdoses in Maryland. Deaths among Non-Hispanic Black Marylanders aged 55 and older have increased by 119.7 percent since 2016, from 147 to 323. For comparison, overdose deaths among non-Hispanic white Marylanders over the age of 55 increased by 55.7 percent, from 158 to 246, during the same timeframe.⁷

Figure 6: Fatal Overdoses Among Non-Hispanic Black Marylanders by Age (2016–2020)



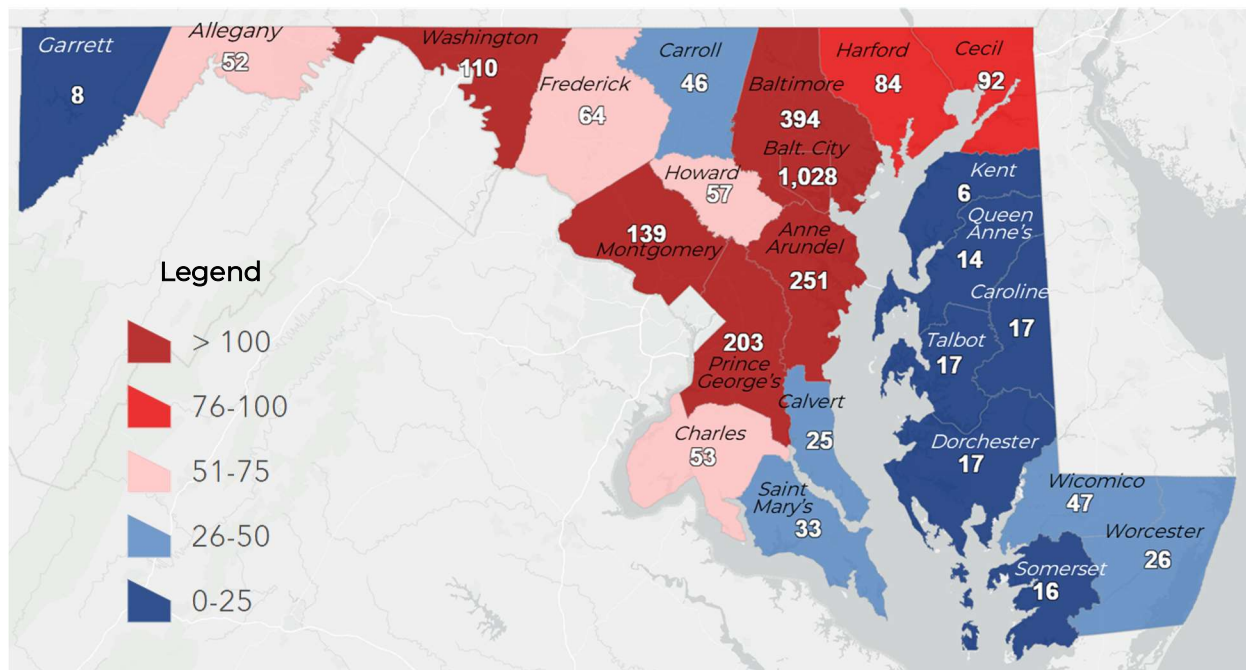
Geography

Overdose deaths in Maryland are largely concentrated in the central region of the state. In 2020, 59.77 percent of all overdose deaths occurred in Baltimore City (1,028), Baltimore County (394), and Anne Arundel County (251).⁸

⁷ Ibid.

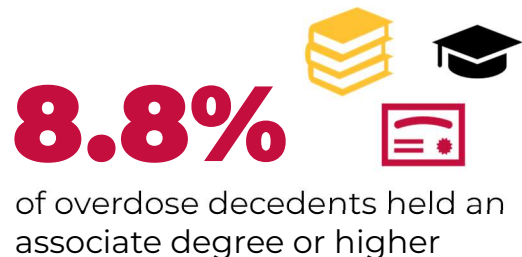
⁸ Ibid.

Map 1: Fatal Overdoses by County, All Substances (2020)



Educational Attainment

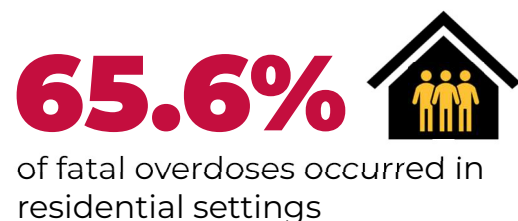
According to the Statewide Unintentional Drug Overdose Reporting System (SUDORS), in 2020, 52.1 percent of overdose decedents had a high school diploma or equivalent degree, and 23.2 percent had less than a high school diploma or equivalent.⁹ In contrast, 8.8 percent of people who died from an overdose in 2020 had an associate's degree or higher.¹⁰



These findings indicate lower educational attainment may be associated with overdose risk and higher educational attainment can be a protective factor against fatal overdose.

Bystanders in Residential Settings

In 2020, 65.6 percent of people who died from an overdose were found in a residence. Of those who died in a residence, there was a bystander present in 68.5 percent of cases, 51.4 percent of which were family members or friends. Naloxone was administered in only 17.7 percent of cases, which illustrates an opportunity to expand targeted naloxone distribution.



⁹ Statewide Unintentional Drug Overdose Reporting System (SUDORS) 2020.

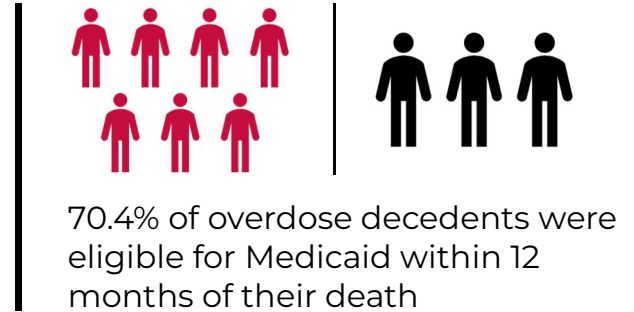
¹⁰ Ibid.

Out of the 17.7 percent of cases in which naloxone was administered following an overdose in a residential setting, 61.6 percent of naloxone administrations were conducted by a first responder. This highlights the need to increase bystander administration of naloxone.

Medicaid Eligibility

A large majority (70.4 percent) of Individuals who died from an overdose in 2020 were enrolled in Medicaid within 12 months of their death.¹¹

Between 2017 and 2020, overdose decedents who were eligible for Medicaid within the 12 months preceding their death increased from 65 percent to 70.4 percent.



¹¹ The Hilltop Institute. (2022, June 7). Medicaid Data for DORM Report. Baltimore, MD: UMBC.

III. OVERDOSE RISK FACTORS

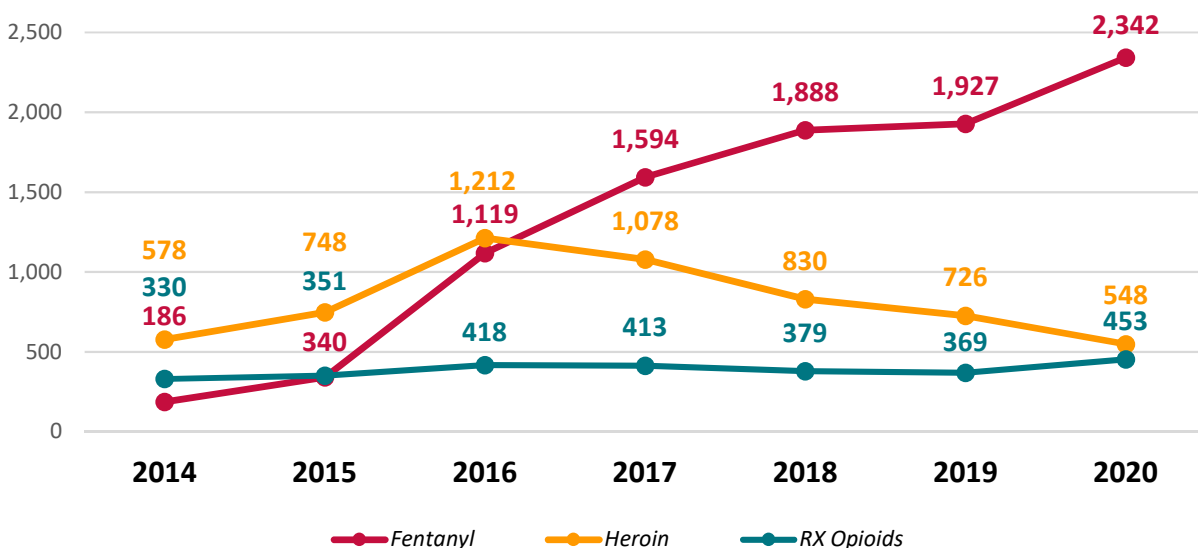
As the data in the following sections illustrate, there are various factors associated with an individual's risk of experiencing a fatal overdose. These factors include, but are not limited to:

- Involvement with illicit drug markets (i.e., purchasing or usage of illicit drugs) characterized by inconsistency in drug potency and composition;
- Compulsive use of opioids, such as that associated with a clinical diagnosis of opioid use disorder (OUD), despite experiencing significant harms;
- Previous non-fatal overdose events;
- Medical and behavioral health comorbidities, including acute and chronic conditions such as chronic pain;
- Use of opioids in combination with other substances ("polysubstance use"), including prescription medications and alcohol; and
- Involvement with the criminal justice system, drug treatment or detoxification programs, or extended inpatient hospital stays that may result in reduced tolerance.

Drug Supply Characteristics

Beginning in 2014, the presence of illicitly-manufactured fentanyl in the drug supply in Maryland has grown rapidly and has since become the leading contributor to overdose deaths in the state. Although initially viewed as an adulterant in heroin, fentanyl has become pervasive in illicit drug markets throughout the state, competing with or largely displacing heroin in the illicit drug supply. By 2020, fentanyl was involved in 83.7 percent of all fatal overdoses.¹²

Figure 7: Fatal Overdose Involving Fentanyl, Heroin, and Prescription Opioids (2014–2020)



¹² "Maryland Vital Statistics Annual Report 2020"; Vital Statistics Administration, Maryland Department of Health.

Abrupt changes in the composition of illicit drugs can potentially lead to increases in overdose deaths, and efforts to better understand the illicit drug market can help inform overdose-related mitigation efforts. Two ways in which the State of Maryland can track the illicit drug supply are through drug seizures analysis from the Washington/Baltimore High-Intensity Drug Trafficking Area (W/B HIDTA) and through drug-checking programs, such as the MDH Rapid Analysis of Drugs (RAD) pilot program.

HIDTA Drug Seizures

In a recent study, W/B HIDTA analyzed drug seizure data from 2018 through the third calendar quarter of 2021 from multiple labs throughout Maryland to understand the evolving drug environment. Six categories of drugs were evaluated using the aggregate total of samples analyzed from all contributing labs.

Heroin

From 2018 to 2021, there was a slight fluctuation in the volume of heroin samples submitted to labs in Maryland, with a minimal decrease in samples overall from 7 percent in 2018 to 6 percent in 2021. Information on samples submitted to the labs for 2018 is limited. Between 2019 and 2020, heroin samples increased from 6 percent to 10 percent, and in 2021 samples decreased to 6 percent.¹³

Fentanyl and Fentanyl Analogs

Between 2018 and 2021, the volume of fentanyl samples submitted to Maryland labs increased from 5 percent to 20 percent. Fentanyl analog sample data are not available for 2018. From 2019 to 2021, fentanyl analog samples decreased from 2 percent to 1 percent.¹⁴

Prescription and Other Opioids

From 2019 to 2021, the volume of prescription opioid samples submitted to the labs decreased slightly from 7 percent to 6 percent. From 2019 to 2021, “other opioid” samples increased from 7 percent to 12 percent. “Other” opioid samples are defined as certain classes of prescription opioids. Data for prescription opioid and “other opioid” samples submitted to Maryland labs are not available for 2018.¹⁵

Cocaine

From 2018 to 2021, the volume of cocaine samples increased in Maryland from 20 percent to 28 percent.¹⁶

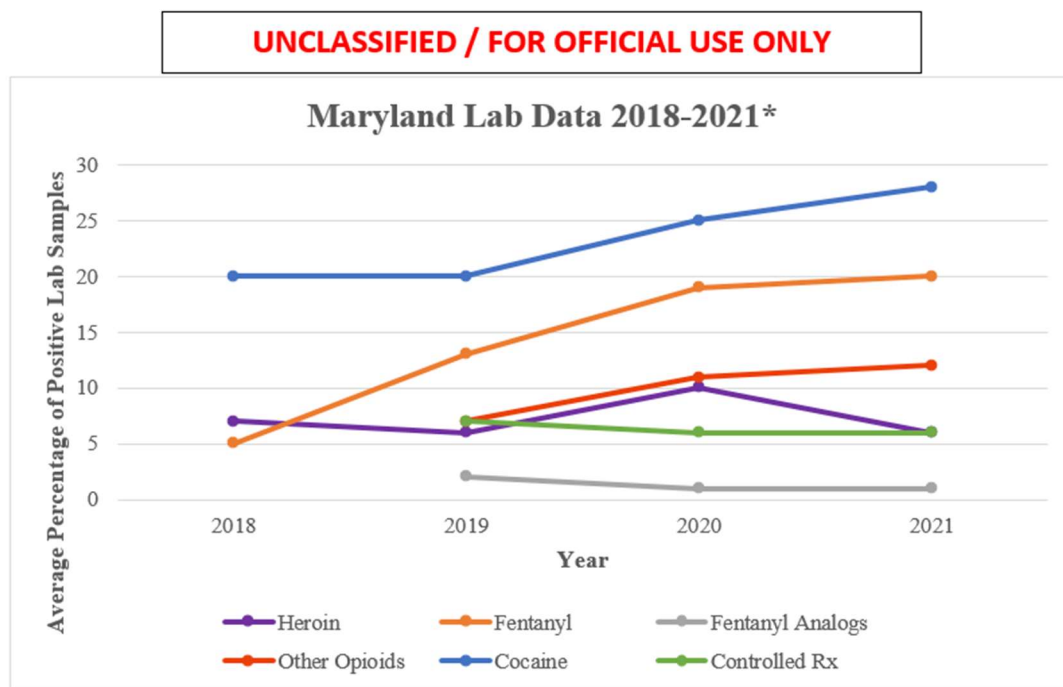
¹³ “Heroin, Fentanyl, Cocaine and Prescription Opioid Drug Trends in the State of Maryland 2018-2021”; Washington/Baltimore HIDTA Investigative Support Center; 2022

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

Figure 8: Maryland Lab Data from Seized Drugs (2018–2021*)



* This is an overview of data from multiple Maryland labs from 2018 to 3Q 2021. Not representative of all drugs seized in Maryland.

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Rapid Analysis of Drugs Program

In October of 2021, the MDH Center for Harm Reduction Services (CHRS) launched the Rapid Analysis of Drugs (RAD) pilot project, a statewide drug-checking program at eight Syringe Service Programs (SSPs) across Maryland. RAD is a multi-agency collaboration designed to better understand the dynamics of the drug market, provide critical information about new and emerging trends in the drug supply to inform harm reduction education and interventions, and provide people who use drugs with knowledge about the drug supply to inform decisions and reduce risks. The project also uses surveillance of the illicit drug market to fill gaps in Maryland's overdose response strategy by monitoring the supply.

The RAD project utilizes existing programmatic infrastructure and Direct Analysis in Real-Time Mass Spectrometry (DART-MS) to collect and test drug paraphernalia (e.g., pipes, cookers, capsules, foil, baggies, etc.) voluntarily provided to SSPs by program participants. SSPs mailed samples collected from participants to the National Institute of Standards and Technology (NIST) for testing, where the DART-MS is housed. NIST and CHRS are then able to share testing results back to SSPs and participants within a week. SSP law protects staff, volunteers, and participants from arrest, charge, and prosecution for possessing or distributing drug paraphernalia when it is due to direct program activities. Samples are provided anonymously, and each program utilizes different methods to provide results back to participants. Participating SSPs are located in Baltimore City, Baltimore County, Calvert County, Cecil County, Frederick County, Washington County, and Wicomico County.

Since implementation, approximately 400 samples have been collected and tested through RAD. Various drugs and drug combinations have been identified including the presence of fluorofentanyl, a synthetic opioid more potent than fentanyl, and a growing prevalence of xylazine in samples collected from program participants. CHRS has also identified various rare synthetic cathinones (or bath salts) in combination with fentanyl. SSPs have utilized RAD as a service for participants and a useful tool of engagement, increasing opportunities for education on risk reduction, overdose prevention strategies, emerging drug contents, and injection-related wound prevention and care. At present, further sample collection is needed to understand the extent to which results are representative of the current and changing drug supply; the current number of available samples is not yet sufficient to characterize Maryland's illicit drug supply as a whole.

CHRS intends to expand the RAD Project to additional SSP sites in the coming months and years. Continuation and expansion of RAD will allow for more comprehensive monitoring of the drug supply and further analysis of trends over time, detection of unpredictable changes in the illicit drug market that may increase overdose risk, and more robust analysis of the drug supply throughout different Maryland jurisdictions.

Recent Incarceration

Data collected through SUDORS showed that at least 3.4 percent of overdose decedents in 2020 were released from a prison, jail, or detention center in the 30 days prior to their death.

3.4%  

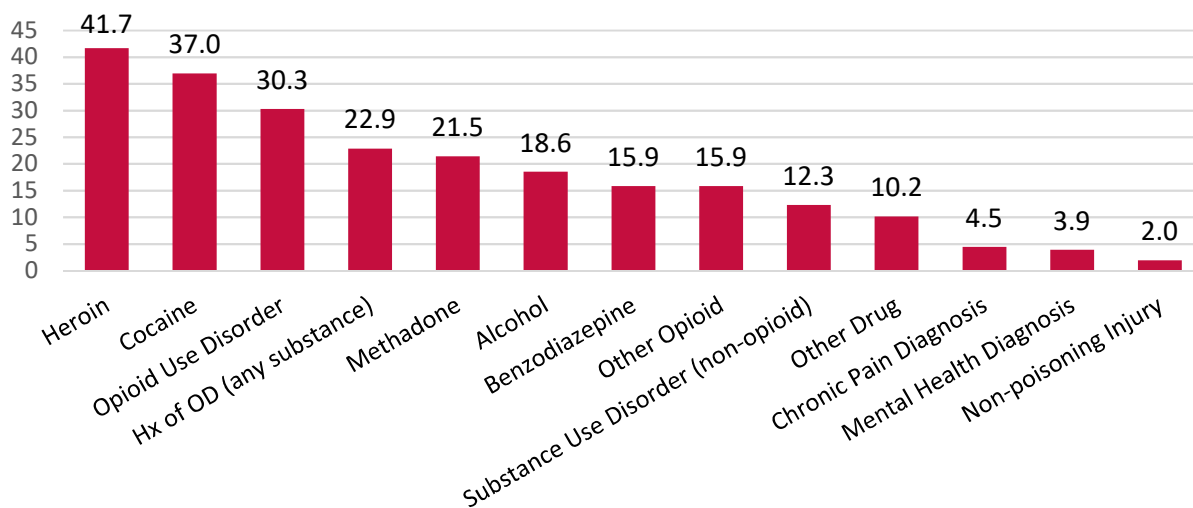
of overdose decedents in 2020 were released from incarceration in the 30 days prior to their death

Comorbidities

Data show that between 2016 and 2021, overdose decedents with mental and behavioral health comorbidities were more likely to experience a fatal overdose. According to data provided by the Health Services Cost Review Commission (HSCRC), individuals who experienced a heroin-related overdose had 41.7 times the risk of experiencing a subsequent fatal overdose involving any substance as compared to the general population accessing health services who did not experience a heroin-related overdose during the study period. While the degree of risk associated with each diagnosis varied between each diagnosis, every combination raised the overall risk of a fatal overdose.¹⁷

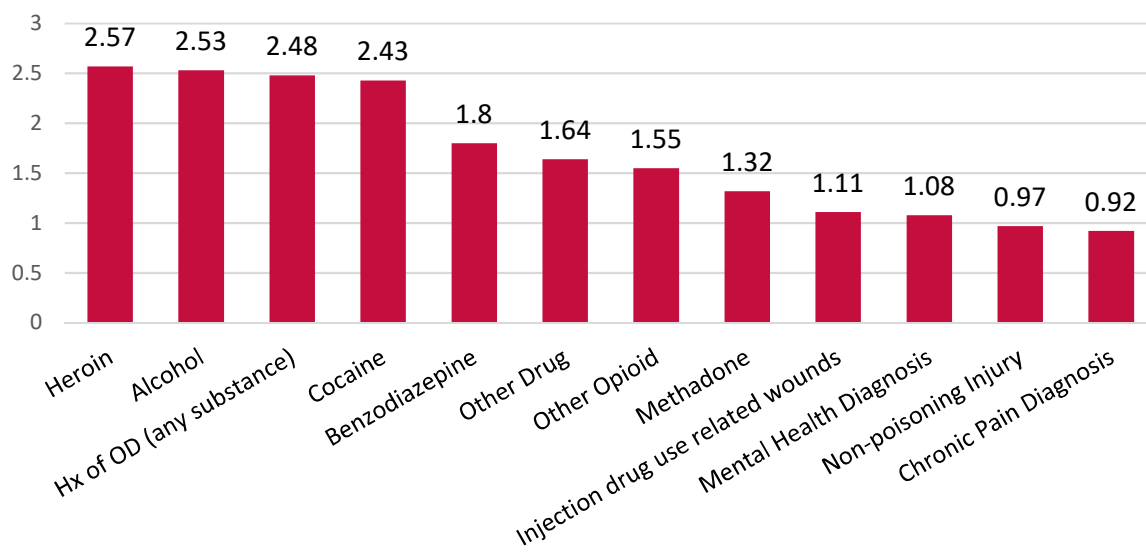
¹⁷ HSCRC and overdose death records data, 2016-2021.

Figure 9: Relative Risk of Overdose Death Predicted by Previous Diagnosed Overdose and Related Conditions (2016–2021)



When comparing people with OUD, individuals who had an additional comorbidity were more likely to have a higher risk for a fatal overdose as compared to those who only had an OUD diagnosis. For example, individuals with diagnosed OUD who also had a diagnosis of alcohol dependency during the study period were 2.5 times more likely to experience a fatal overdose than an individual with OUD and no history of alcohol dependency.

Figure 10: Relative Risk of Overdose Death Predicted by Previous Overdose Among Those with Diagnosed OUD Relative to Intoxication Deaths (2016–2021)



IV. SERVICE UTILIZATION

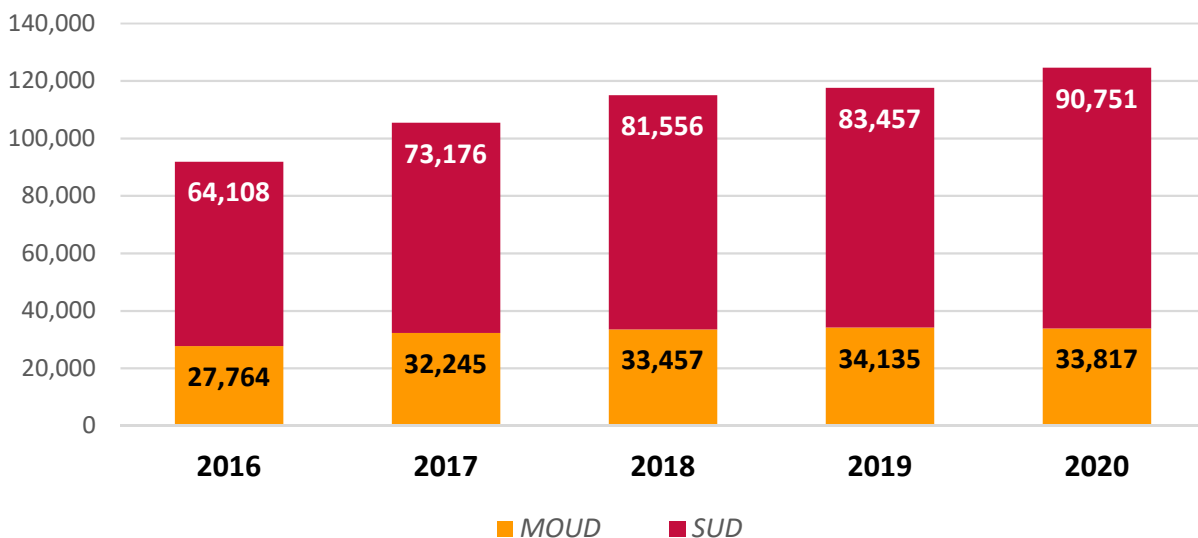
Service expansion for individuals who use drugs and have clinically diagnosed SUDs has grown in recent years. The following sections shown below provide data focused on health care service utilization.

- Medication for Opioid Use Disorder
- Other Mental Health and SUD Services
- Targeted Naloxone Distribution
- Syringe Service Programs
- Non-Behavioral Health Services
- Hospital Characteristics
- Service Utilization by Medicaid Participants

Medication for Opioid Use Disorder

Data from Maryland's Public Behavioral Health System (PBHS), which provides publicly-funded services for individuals who are enrolled in Medicaid or who are uninsured, shows the number of Marylanders who received any type of substance use disorder (SUD) service, including MOUD, increased by 41.6 percent (from 64,108 in 2016 to 90,751 in 2020). The number of individuals who received MOUD through PBHS, including buprenorphine, methadone, and long-acting naltrexone, increased by 21.8 percent (from 27,764 in 2016 to 33,817 in 2020).¹⁸

Figure 11: All SUD and MOUD PBHS Service Participants by Year (2016–2020)

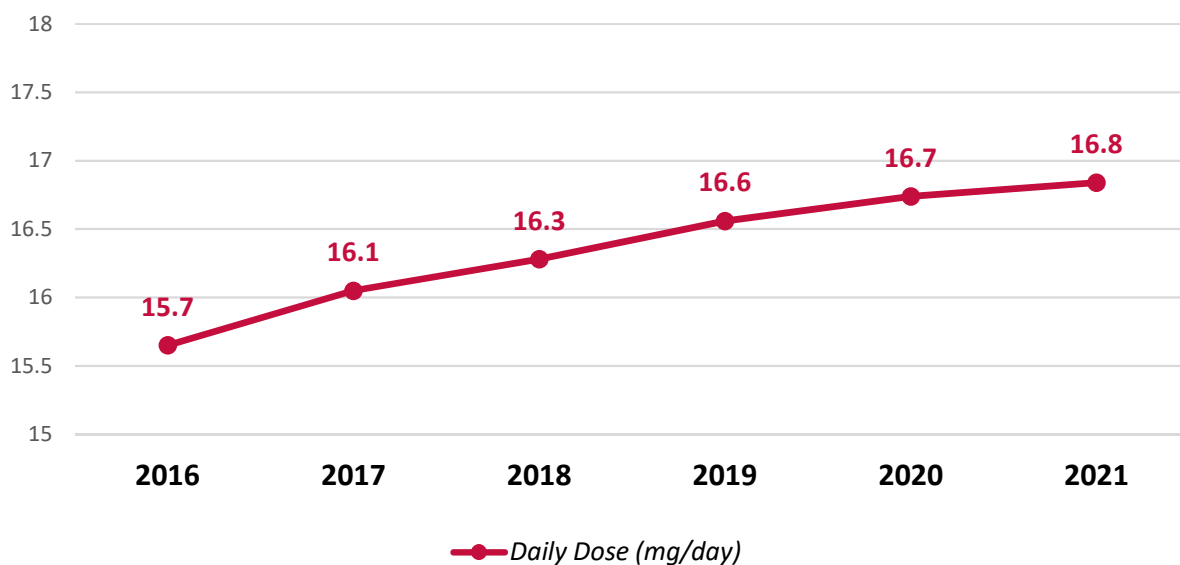


¹⁸ Analysis by the University of Maryland Systems Evaluation Center using Overdose Death data from the Vital Statistics Administration and Office of the Chief Medical Examiner and claims data from BHA and Optum.

Buprenorphine Access

Figures 12 through 15 illustrate data from Maryland's Prescription Drug Monitoring Program (PDMP) involving all payor sources. As the data show, buprenorphine access has expanded in Maryland over the past five years. Between 2016 and 2021, over 16,000 additional individuals received buprenorphine treatment for OUD, increasing from 26,204 buprenorphine recipients in 2016 to 42,647 buprenorphine recipients in 2021.¹⁹

Figure 12: Individuals with at Least One Dose of Buprenorphine Dispensed in a Year (2016–2021)



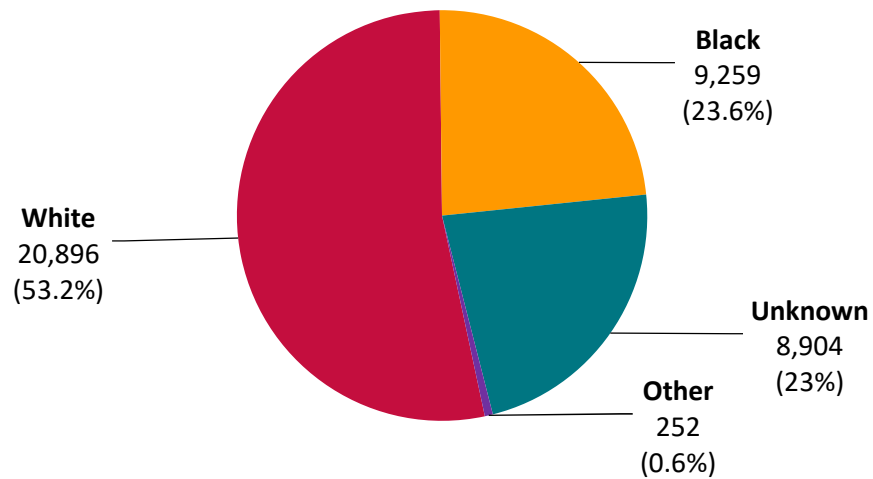
For the study period, when race data were available, white Marylanders received buprenorphine at disproportionately higher rates than their Black counterparts. In Maryland, 53.2 percent of individuals receiving buprenorphine were white and 23.6 percent were Black. While Maryland's population was 48.7 percent non-Hispanic white and 29.5 percent non-Hispanic Black in 2020,²⁰ there is a disparity when looking at buprenorphine recipients compared to overdose deaths. As previously illustrated in Table 1, Black overdose-related fatalities comprise 39.0 percent of overdose fatalities, yet only 23.6 percent of buprenorphine is currently being dispensed to Black Marylanders.²¹

¹⁹ The Center for Population Health Information Technology (CPHIT) in the Department of Health Policy & Management of the Johns Hopkins Bloomberg School of Public Health.

²⁰ "Maryland Vital Statistics Annual Report 2020"; Vital Statistics Administration, Maryland Department of Health

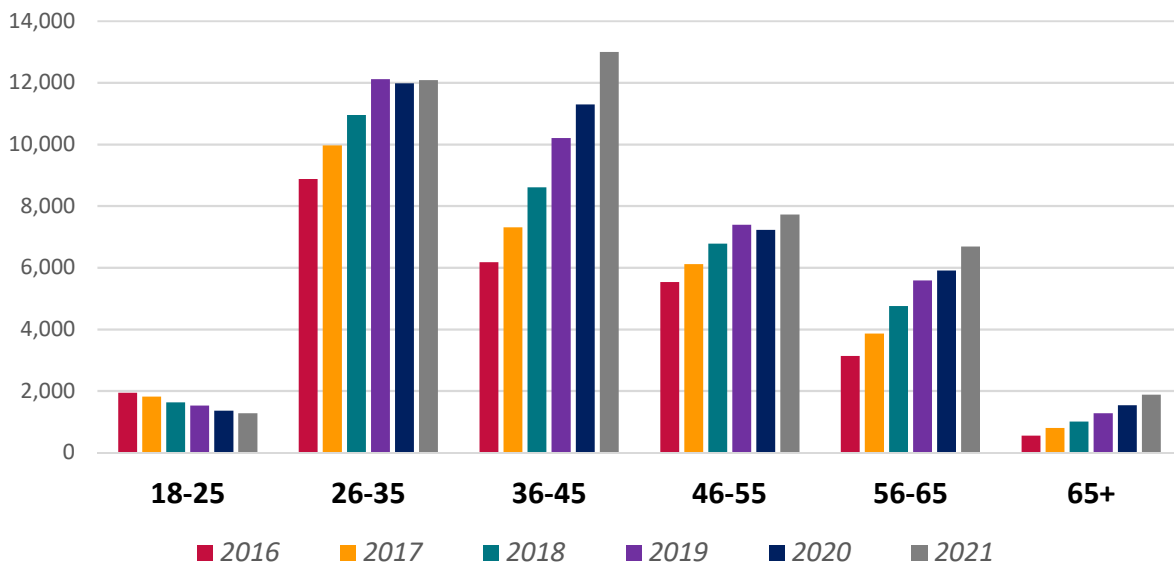
²¹ The Center for Population Health Information Technology (CPHIT) in the Department of Health Policy & Management of the Johns Hopkins Bloomberg School of Public Health.

Figure 13: Buprenorphine Dispensed by Race (2020)



From 2016 to 2021, buprenorphine dispensing among individuals between the ages of 18 and 25 steadily decreased while increasing among all other age groups. Individuals between the ages of 26 and 45 made up almost 60 percent of all buprenorphine recipients during this timeframe. However, growth in the number of buprenorphine recipients over time was concentrated among individuals between the ages of 36 and 45, which increased from 23.6 percent of all buprenorphine recipients in 2016 to 30.5 percent in 2021. Individuals aged 56 to 65 receiving buprenorphine increased from 12.0 percent of recipients in 2016 to 15.7 percent in 2021. Lastly, the proportion of individuals who were dispensed buprenorphine aged 65 and older increased from 2.1 percent of recipients in 2016 to 4.4 percent in 2021.²²

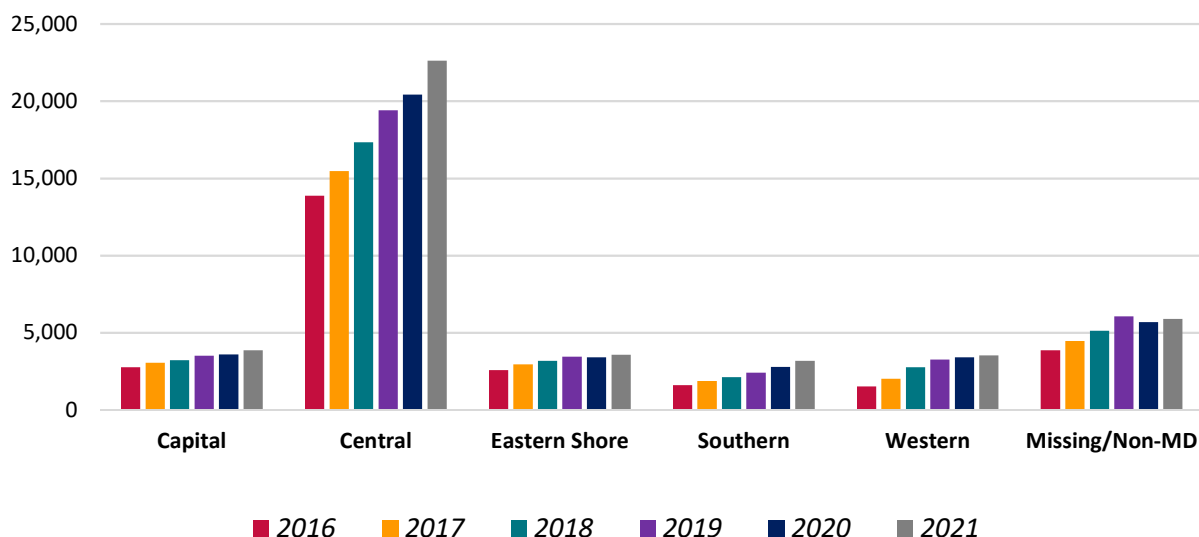
Figure 14: Buprenorphine Dispensed by Age (2016-2021)

²² Ibid.

In 2020, individuals over the age of 55 made up 18.9 percent of buprenorphine recipients while making up 27.5 percent of overdose decedents. This illustrates the opportunity to expand buprenorphine access among older populations.²³

Geographically, all Maryland regions experienced growth in the number of individuals receiving buprenorphine, with Central Maryland seeing the greatest increase (13,863 in 2016 and 22,620 in 2021). Western Maryland experienced the largest growth by percentage during this time frame, comprising 5.8 percent of buprenorphine recipients in 2016 and 8.3 percent of recipients in 2021.²⁴ Every region saw increases in the total number of individuals who were dispensed buprenorphine, however, the Capital and Eastern Shore regions showed a slight decrease in the overall percent of buprenorphine dispensed while all other regions stayed relatively consistent or increased. Central Maryland, which contains the majority of overdose decedents, increased at the second-fastest rate overall at nearly 50 percent increase over five years, second only to the western region which increased by over 130 percent over five years.

Figure 15: Buprenorphine Dispensed by Region (2016-2021)



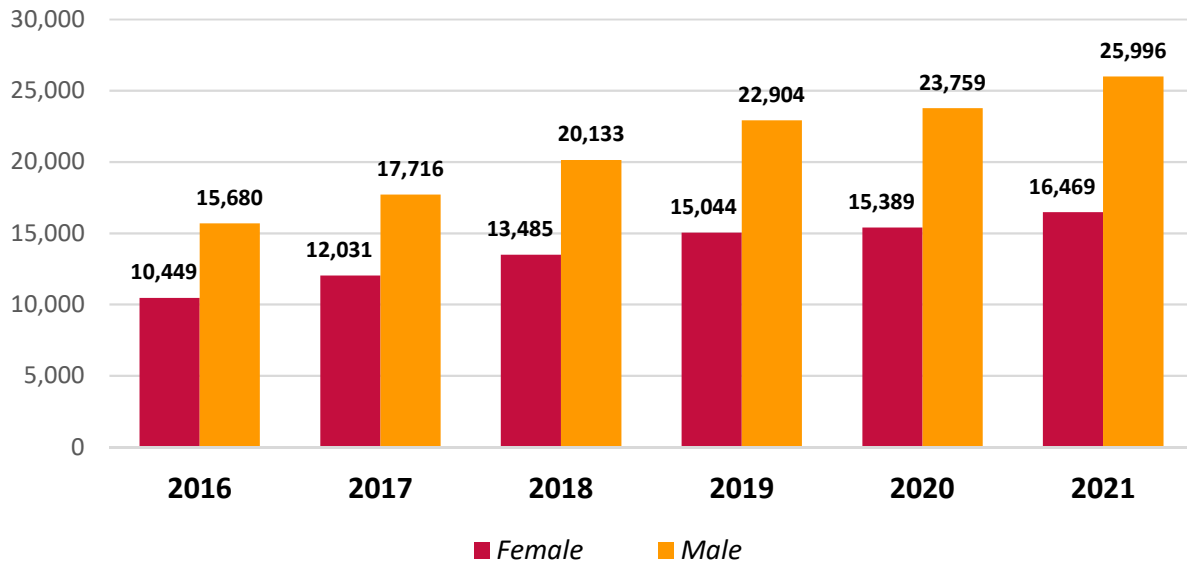
Buprenorphine dispensing by gender remained consistent with around 60 percent of males and 40 percent of females receiving medication from 2016 to 2021. Considering males accounted for a large majority, 72.1 percent, of overdose fatalities, this may represent an opportunity to expand buprenorphine among males with OUD.²⁵

²³ Ibid.

²⁴ Ibid.

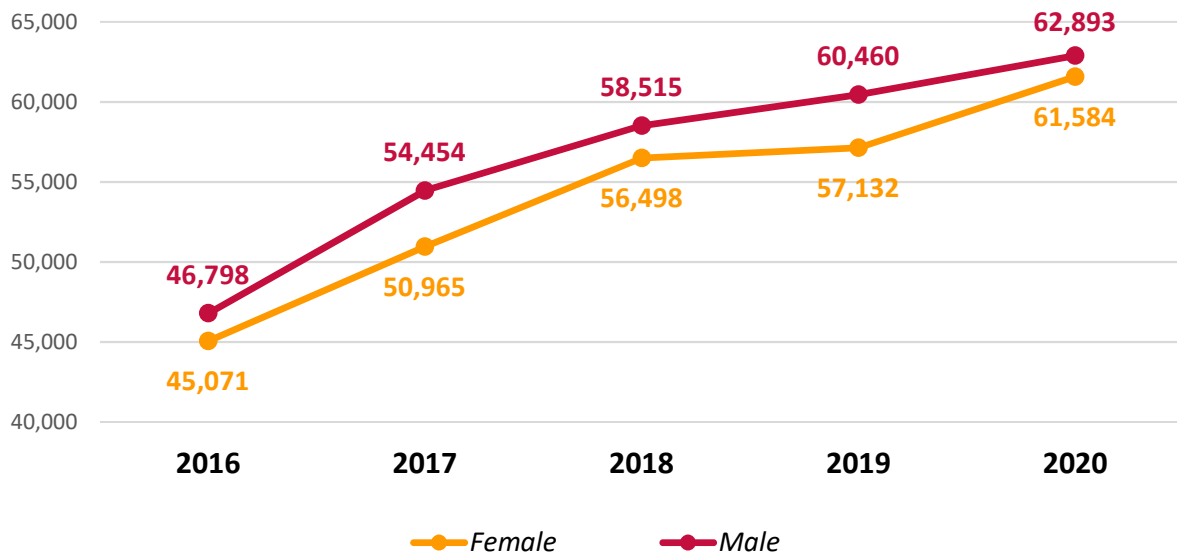
²⁵ Ibid.

Figure 16: Buprenorphine Dispensed by Gender (2016–2021)



In contrast to the gender trends observed among overdose decedents, PBHS SUD services were almost equally divided among men and women.²⁶

Figure 17: SUD PBHS Participants by Gender (2016–2020)

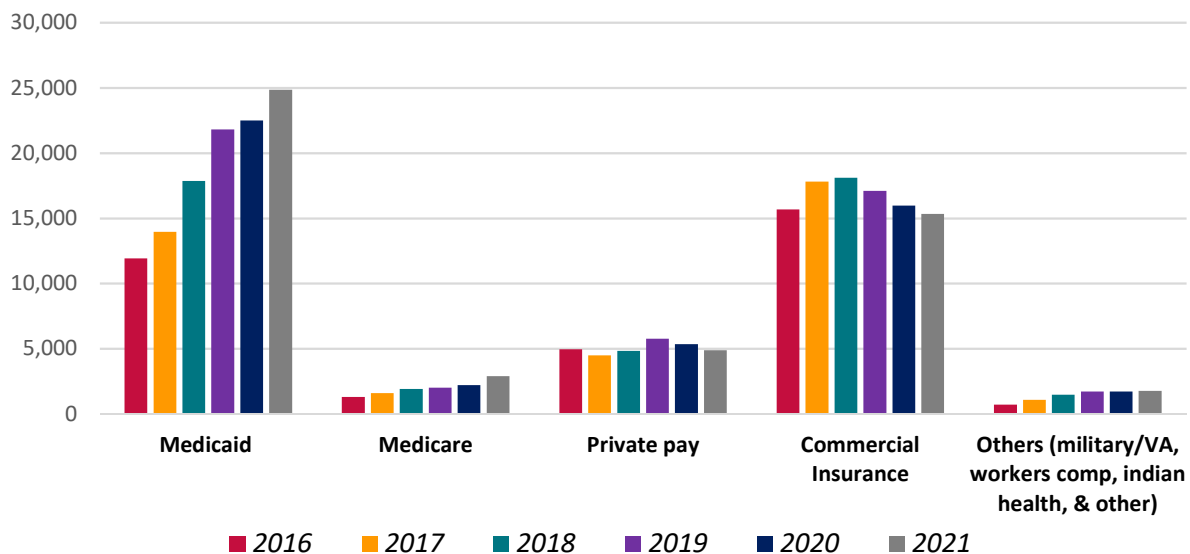


²⁶ PBHS Analysis by the University of Maryland Systems Evaluation Center using Overdose Death data from the Vital Statistics Administration and Office of the Chief Medical Examiner and claims data from BHA and Optum.

Medicaid Coverage

From 2016 to 2021, there was an increase in the total number of individuals dispensed buprenorphine, from 26,204 in 2016 to 42,647 in 2021. Medicaid and Medicare coverage for buprenorphine services increased each year from 2016 to 2021, while the number of individuals receiving services using another method of payment either remained consistent or decreased.

Figure 18: Individuals Dispensed Buprenorphine by Payment Type (2016–2021)



**Buprenorphine payment source covers at least one prescription paid. An individual could have their prescription paid for by multiple sources within a year. The total number of individuals covered by all sources can add up to more than the number of individuals dispensed buprenorphine within a year.*

Table 2, below, presents the number and percentage of individuals who were enrolled in Medicaid at any point within 12 months of their death and received any form of MOUD between 2017 and 2020. Buprenorphine treatment was consistently the most utilized type of MOUD among participants. The number of participants who received buprenorphine treatment increased by 6.0 percent during this time frame. Methadone treatment was the next most commonly utilized MOUD among participants, decreasing by 6.8 percent across the evaluation period.²⁷ Naltrexone treatment was the least common type of MOUD, with a slight decrease of 0.8 percent in participants from 2017 to 2018 followed by a sudden increase in 2019 of 2.8 percent and a sharp decline in 2020 of 5 percent. The number of relevant dispenses and services billed for buprenorphine and methadone increased sharply between 2017 and 2018, as well as between 2019 and 2020. Trends for participants enrolled in Medicaid within 12 months of an overdose death and for participants enrolled in Medicaid at the time of overdose death are similar.

²⁷ The Hilltop Institute. (2022, June 7). Medicaid Data for DORM Report. Baltimore, MD: UMBC.

Table 2. Medicaid Participants Who Received MOUD Within a Year of their Death (2017–2020)

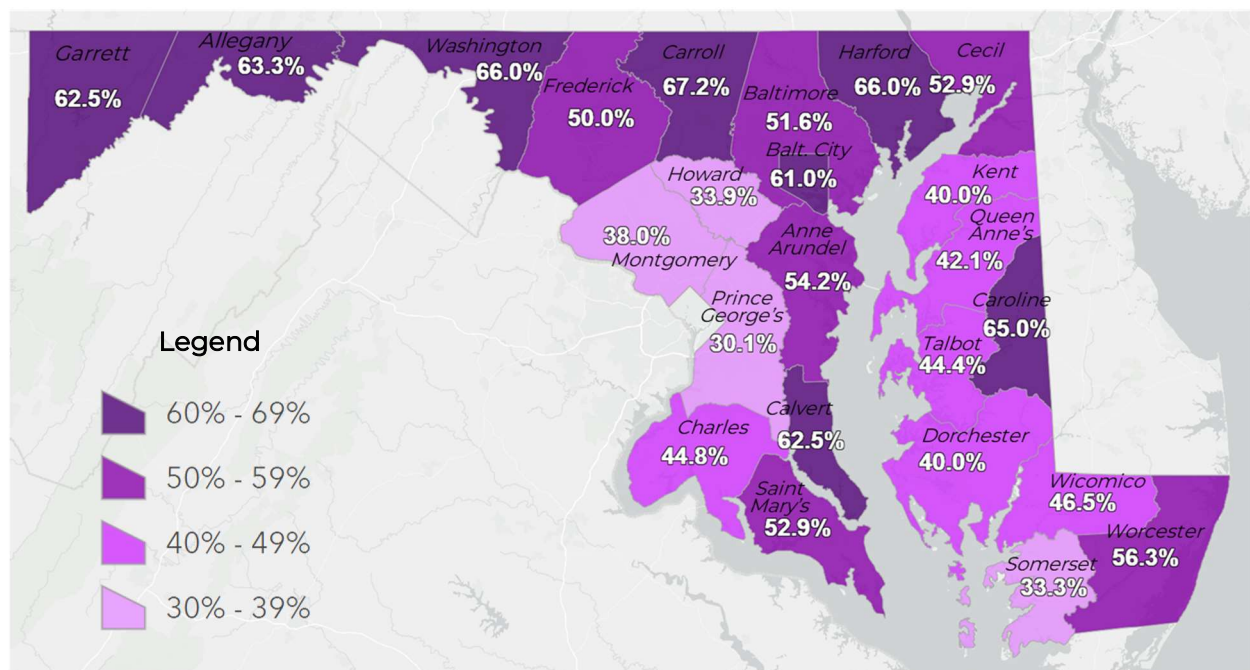
Event Type	Enrolled Within One Year of Death					
	2017			2018		
	Number of Participants	Percent of Total	Number of MOUD Dispenses or Services	Number of Participants	Percent of Total	Number of MOUD Dispenses or Services
At least one Buprenorphine treatment	242	52.40%	2,921	294	53.30%	5,637
At least one Methadone treatment	236	51.10%	5,720	263	47.60%	6,884
At least one Naltrexone treatment	68	14.70%	214	77	13.90%	183
Total	462	-	8,855	552	-	12,704
Event Type	2019			2020		
	Number of Participants	Percent of Total	Number of MOUD Dispenses or Services	Number of Participants	Percent of Total	Number of MOUD Dispenses or Services
At least one Buprenorphine treatment	338	58.7%	5,568	384	58.4%	9,139
At least one Methadone treatment	254	44.1%	6,408	291	44.3%	8,538
At least one Naltrexone treatment	96	16.7%	281	77	11.7%	254
Total	576	-	12,257	657	-	17,931

Other (non-MOUD) Mental Health and SUD Services

PBHS Service Connection

In 2020, 51.0 percent of overdose decedents were engaged in PBHS, excluding out-of-state residents or individuals whose county of residence was unknown.²⁸ The following seven counties and Baltimore City had over 60 percent of their overdose decedents engaged in PBHS services: Allegany County, Baltimore City, Baltimore County, Calvert County, Caroline County, Carroll County, Garrett County, and Harford County. The following four counties had less than 40 percent of their overdose decedents engaged in PBHS services: Howard County, Montgomery County, Prince George's County, and Somerset County. Carroll County had the highest percentage of overdose decedents engaged in the PBHS at 67.2 percent.

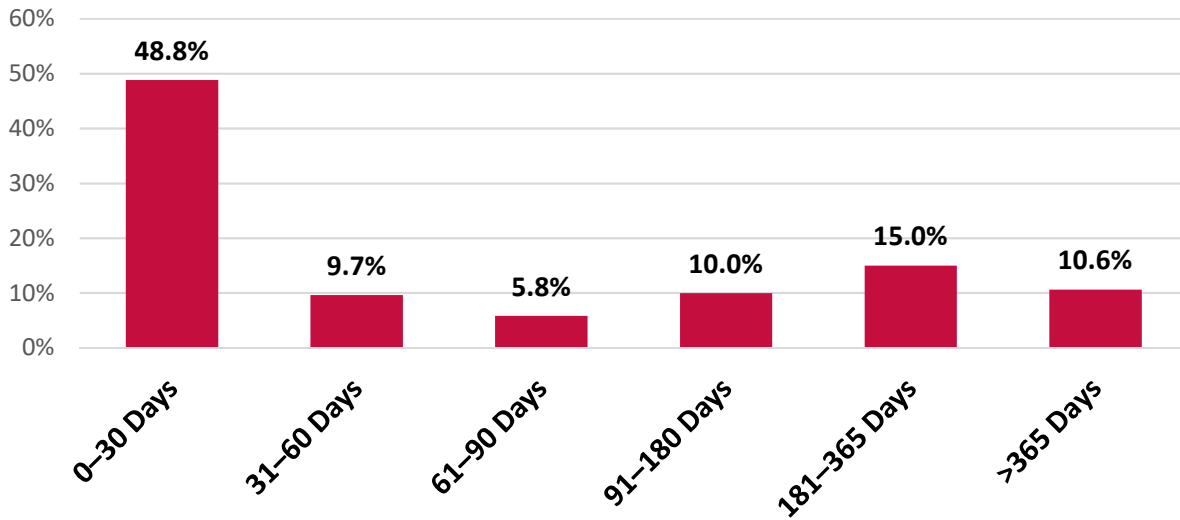
Map 2: Overdose Decedents Engaged in PBHS Services by County of Residence (2020)



Of individuals who were enrolled in PBHS who had a fatal overdose in 2020, 48.8 percent died within 30 days of their last interaction with treatment or recovery services.

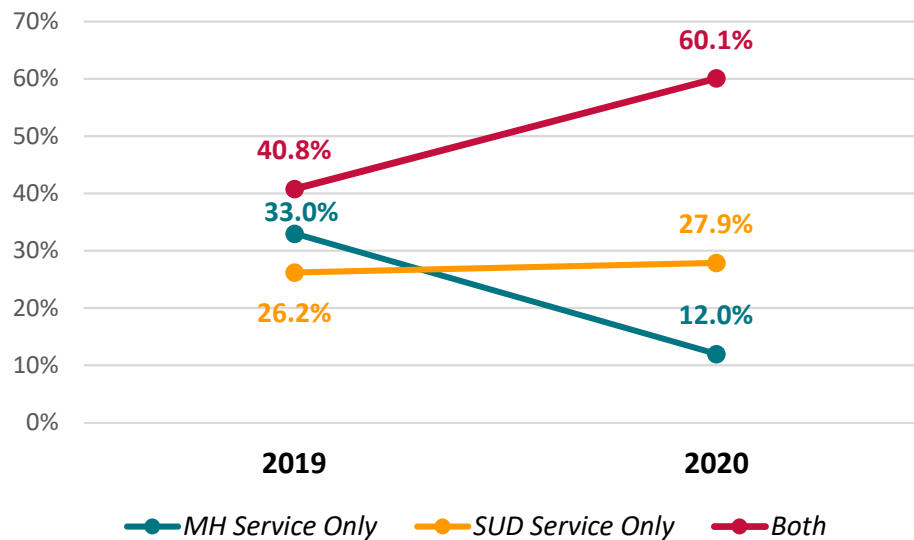
²⁸ University of Maryland Systems Evaluation Center analysis using overdose death data from the Vital Statistics Administration and Office of the Chief Medical Examiner, and claims data from BHA and Optum.

Figure 19: Days Between Death and Last PBHS Service (2020)



From 2019 to 2020, there was a shift from individuals receiving exclusive mental health services to receiving services for both mental health and SUD. Recognizing the prevalence of co-occurring mental health and SUD conditions, there have been major funding increases to promote and support SUD services and there have been statewide efforts for mental health providers to assess possibilities of dual-diagnoses with their clients and promote SUD services for those in need of such services.

Figure 20: PBHS Service Comparison Among Unintentional Overdose Decedents (2019-2020)



Targeted Naloxone Distribution

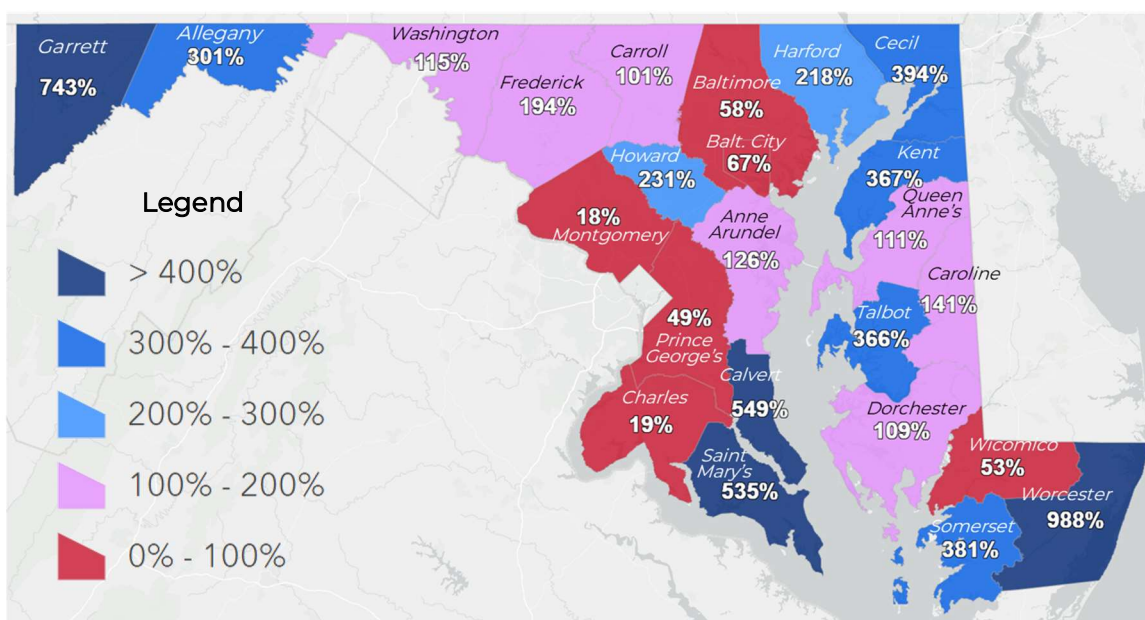
Providing naloxone to individuals who are at the highest risk for overdose is a critical strategy for reducing overdose-related mortality. Targeted naloxone distribution programs work best when: 1) naloxone is provided to people at high risk of experiencing or witnessing overdose; 2) outreach workers, harm reduction staff, and trusted clinicians are properly educated and comfortable distributing naloxone to those using illicit opioids or receiving a high-risk opioid prescription; and 3) people who use drugs and first responders are educated about how the medication works. To have the greatest impact in preventing overdose death, individuals need to feel comfortable carrying and using naloxone.

To better understand how local jurisdictions are reaching people at the highest risk for overdose with naloxone distribution efforts, CHRS developed a naloxone saturation formula to track and identify the correlation between the level of distributed naloxone compared to the number of overdose fatalities in each corresponding county or city.

Applying the naloxone saturation formula provides a framework for how to best address naloxone distribution in communities. Technical assistance and resource allocation can be provided to jurisdictions to ensure jurisdictions are able to reach people at greatest risk for overdose with naloxone and to ensure naloxone is distributed at levels where it can contribute to the greatest possible decrease in overdose fatalities.

The map below shows naloxone saturation in 2021 by jurisdiction. In 2021, six jurisdictions did not reach naloxone saturation targets, seven jurisdictions were between 0.0 and 49.9 percent above saturation targets, one jurisdiction achieved naloxone saturation between 50 and 100 percent, and 11 jurisdictions achieved more than 100 percent of their targeted naloxone saturation, more than double the jurisdictions than last year, according to the applied formula.²⁹

Map 3: Naloxone Saturation Map of Maryland (2021)



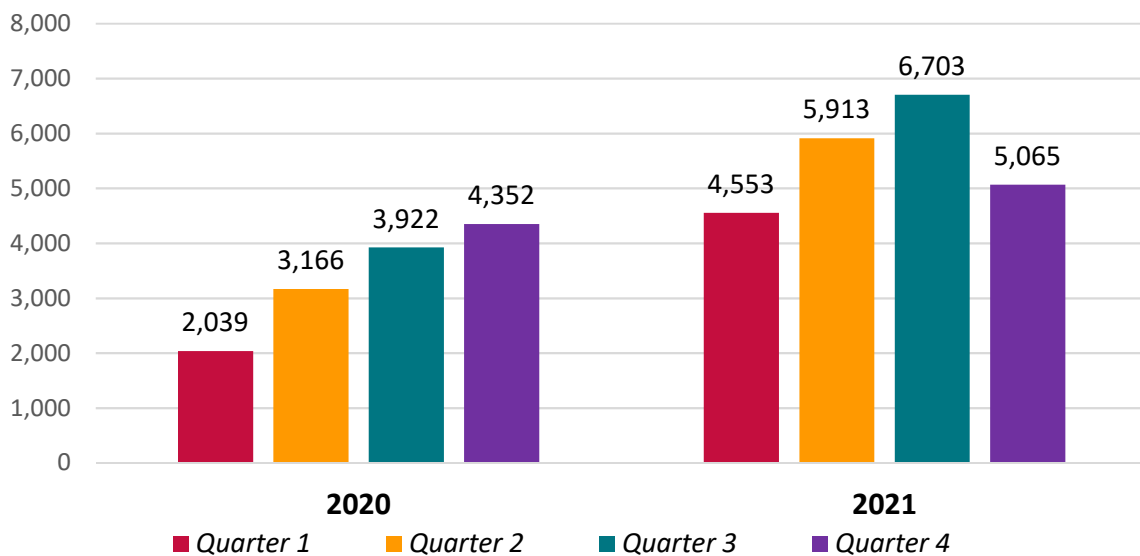
²⁹ Center for Harm Reduction Services. Overdose Response Program Training Report.

Syringe Service Programs

SSPs are community-based programs that offer an array of services, including provisions to curtail the transmission of infectious disease, linkages to SUD treatment, and other social support resources, such as vaccinations, overdose education and naloxone distribution, wound care, and both testing and linkage to care for infectious disease. There were 20 approved SSPs in Maryland by the end of the 2021 calendar year.

In 2021, 22,234 individuals were served by SSPs, up substantially from 2020, when 13,479 individuals were served despite a decrease in the fourth calendar quarter of 2021 due to limited holiday operating hours and COVID-19-related challenges. There were 43,670 linkages to care made for individuals engaged with SSPs in 2021, demonstrating the importance of these programs in serving people who use drugs with low-barrier services.³⁰

Figure 21: Individuals Served Through SSPs by Quarter (2020–2021)



SSPs collect program demographic information, including race and ethnicity, through unique identifiers when registering participants. In 2021, 45.3 percent of participants reported their race/ethnicity as white, 45.2 percent as Black, 1.1 percent as Hispanic or Latino, 0.3 percent as Asian, 0.3 percent as American Indian or Alaskan Native, 0.1 percent Native Hawaiian or Pacific Islander, and 1.6 percent as other. However, seven of the nineteen operational programs (36.8 percent) were in Baltimore City and account for 75.4 percent of total participants served during 2021. Race/ethnicity of Baltimore City is 62.3 percent Black, 29.7 percent white, and 5.4 percent Hispanic or Latino. This could indicate a need to increase participation in SSPs by Black Marylanders.

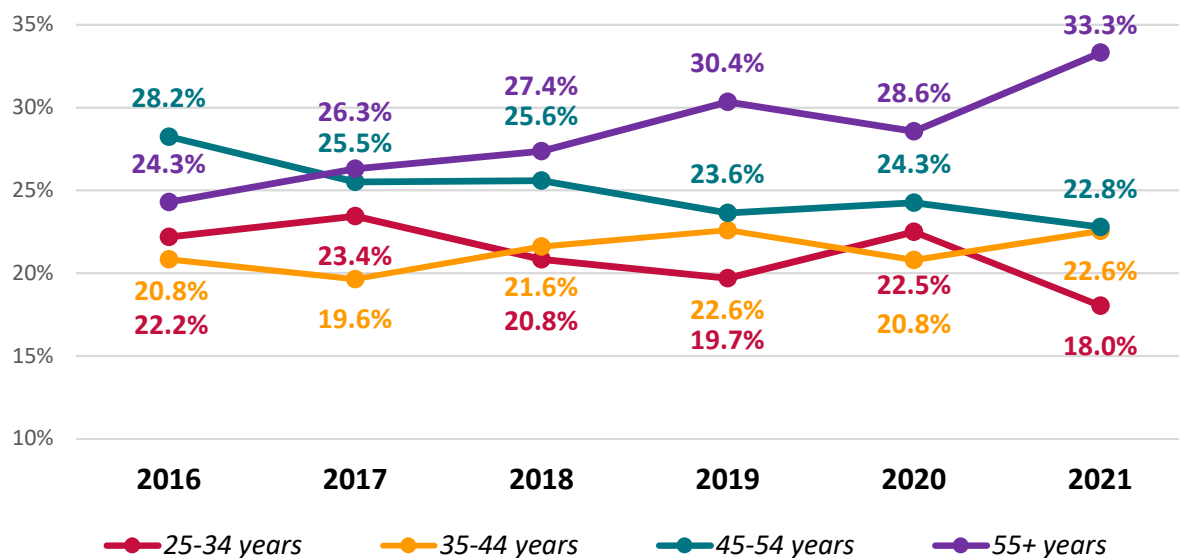
³⁰ Ibid.

Non-Behavioral Health Services

Controlled Substance Dispensing Demographics

Trends involving fatal overdoses among individuals who were dispensed controlled substances between 2016 and 2020 mirrored the trends seen in total fatal overdoses during the same time frame. For example, between 2016 and 2020, overdose decedents over the age of 55 who were dispensed a controlled substance were at a higher risk of a fatal overdose while the proportion of individuals between the ages of 25 and 34 who were dispensed a controlled substance decreased in the overall percentage of overdose fatalities. The proportion of overdose decedents under the age of 25 remained comparatively low throughout the time frame.³¹

Figure 22: Overdose Decedents with Controlled Substance Dispense Records in the PDMP by Age Category (2016–2021)



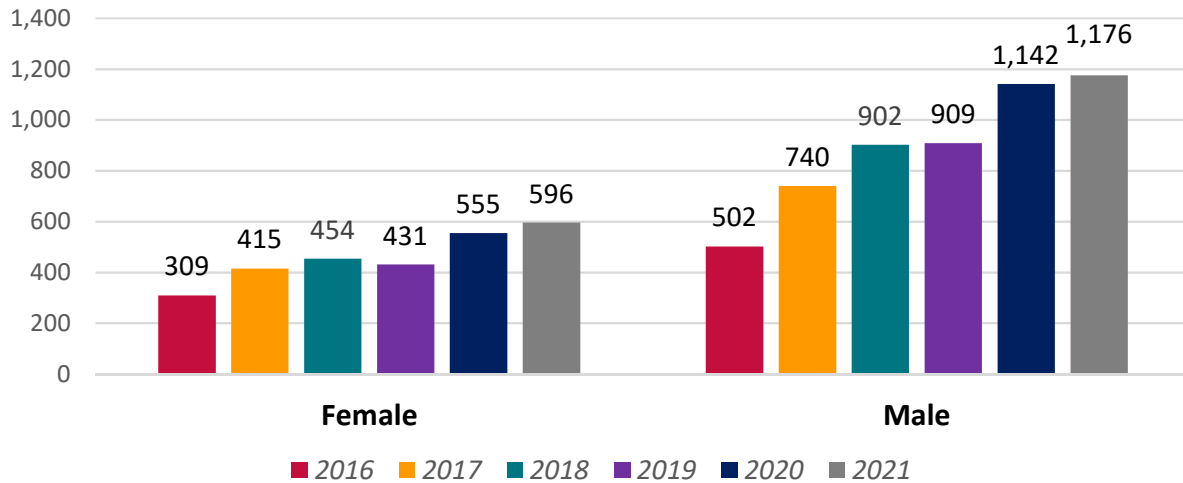
Note: The under 25 age group was consistent at 2.8 percent and was omitted to focus on more variable values.

Male overdose decedents dispensed a controlled substance increased from 61.9 percent in 2016 to 66.4 percent in 2021, while female decedents dispensed a controlled substance decreased from 38.1 percent in 2016 to 33.6 percent in 2021.³²

³¹ BHA linked PDMP and ODR data.

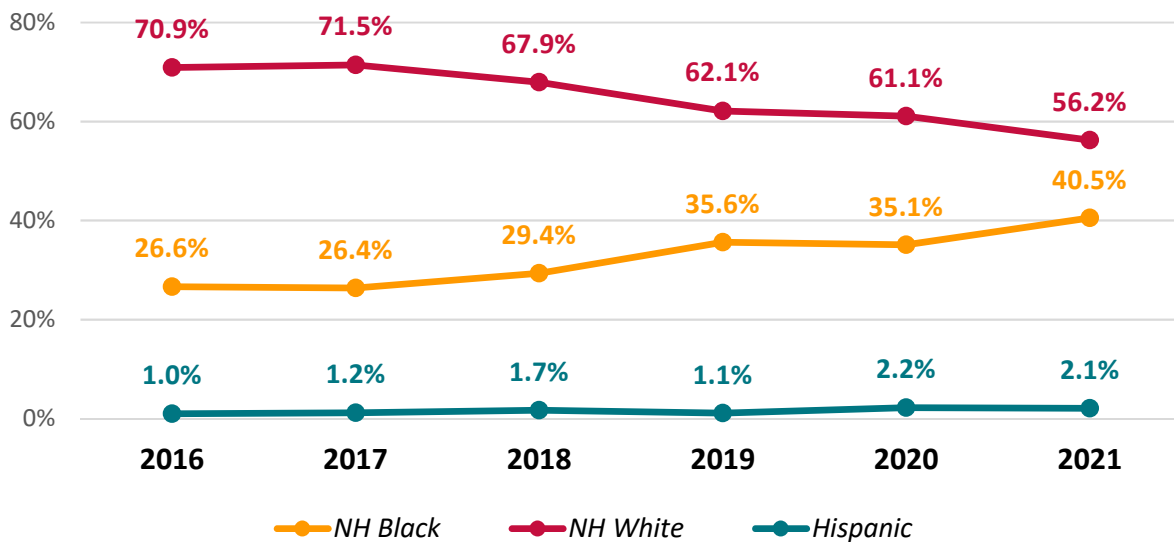
³² Ibid.

Figure 23: Overdose Decedents with a Controlled Substance Dispensed by Gender (2016–2021)



In 2021, the proportion of non-Hispanic Black overdose decedents with dispense records between 2016–2021 consisted of 40.5 percent of the total while non-Hispanic white decedents consisted of 56.2 percent overall. Non-Hispanic white decedents experienced a 73.2 percent increase during this time frame (from 575 to 996) while non-Hispanic Black decedents saw an increase of 232.4 percent (from 216 to 718) over the 5-year span. Similar to total fatal overdose trends, overdose fatalities among non-Hispanic white individuals who were dispensed a controlled substance largely decreased from 2016 to 2021, while overdose fatalities among non-Hispanic Black individuals who received controlled substances increased.³³

Figure 24: Percent of Overdose Decedents with a Controlled Substance Dispensed by Race (2016–2021)



³³ Ibid.

Hospital Characteristics

The HSCRC collects a variety of demographic, financial, and other clinical information related to patient care (e.g., nature of admission, diagnostic codes, etc.) at acute care and licensed specialty hospitals across the State of Maryland. Between 2016 and 2021, 9,353 overdose decedents received care through Maryland's hospital system in an inpatient or emergency department facility at some point during the same six-year period. This represents 69.2 percent of the 13,520 individuals who suffered a fatal overdose during this timeframe.

Of the individuals who died from an overdose with an HSCRC record between 2016 and 2021, 41.2 percent had received care for an overdose-related encounter at some point in the six-year study period. About one-quarter (24.9 percent) of individuals who died from an overdose had a chronic pain diagnosis, as compared to 6.9 percent of non-overdose decedents with HSCRC records. About one-fifth (21.6 percent) of non-overdose decedents had a mental health diagnosis, while 52.2 percent of individuals with an HSCRC record who died from an overdose had a mental health diagnosis. Less than half (46.5 percent) of people with an HSCRC record who died from an overdose were previously diagnosed with OUD and 58.8 percent of people with an HSCRC record who died from an overdose were previously diagnosed with a non-opioid SUD.³⁴

Table 3: HSCRC Encounters by Prior Diagnosis (2016–2021)

Prior Diagnosis	Non-Overdose Decedents with HSCRC Records		Overdose decedents with HSCRC Records	
Total Individuals	3,139,422		9,353	
	N	%	N	%
Overdose-related encounters, ever	89,796	2.9	3,858	41.2
Overdose-related encounters, by substance				
Heroin	19,094	0.6	2,057	22
Methadone	2,698	0.1	180	1.9
Other Opioids	35,329	1.1	1,477	15.8
Alcohol	2,915	0.1	167	1.8
Benzodiazepine	11,849	0.4	553	5.9
Cocaine	5,583	0.2	638	6.8
Other Drugs	35,430	1.1	996	10.6
OUD	83,267	2.7	4,345	46.5
SUD (non-opioid)	321,005	10.2	5,499	58.8
Non-poisoning Injury	1,161,708	37	5,025	53.7
Chronic Pain Diagnosis	216,360	6.9	2,331	24.9
Mental Health Diagnosis	676,951	21.6	4,848	52.2

Even though there was an increasing trend in fatal overdoses each year, this data illustrates a downward trend among individuals with OUD, SUD, chronic pain, or mental health diagnosis who were not

³⁴ HSCRC and overdose death records data, 2016–2021.

interacting with hospital services at the same level they were in previous years. Fewer people reporting to hospitals for services could be attributed to expanded community-based services.³⁵

Table 4: HSCRC Encounters by Prior Diagnosis (2016–2021)

HSCRC Encounters by Prior Diagnosis	2016		2017		2018		2019		2020		2021	
Total deaths (N)	1,848		2,008		2,241		2,235		2,629		2,559	
	N	%	N	%	N	%	N	%	N	%	N	%
Any service utilization	963	52.1	1,003	50	1,044	46.6	970	43.4	1,093	41.6	1,132	44.2
Overdose-related services	337	35	337	33.6	345	33	316	32.6	342	31.3	323	28.5
ODU	353	36.7	355	35.4	364	34.9	358	36.9	356	32.6	382	33.7
Non-Opioid SUD	461	47.9	467	46.6	477	45.7	444	45.8	498	45.6	520	45.9
Non-poisoning Injury	267	27.7	265	26.4	298	28.5	308	31.8	313	28.6	334	29.5
Chronic Pain Diagnosis	160	16.6	140	14	164	15.7	144	14.8	162	14.8	162	14.3
Mental Health Diagnosis	381	39.6	405	40.4	437	41.9	406	41.9	446	40.8	423	37.4

Service Utilization by Medicaid Participants

Table 5, below, presents the number and percentage of participants who had an ambulatory care visit, outpatient emergency department visit, or inpatient admission during the year of their fatal overdose. Between 2017 and 2020, the majority of these individuals had an ambulatory care visit during the year of their fatal overdose; the percentage with an ambulatory care visit rose from 59.4 percent in 2017 to 63.4 percent in 2020.³⁶

63.4%



of overdose decedents enrolled in Medicaid in 2020 received ambulatory care in the year of their death

The proportion of participants with a fatal overdose who had an outpatient emergency department visit or an inpatient admission experienced a decrease of 4.4 percent and 5.2 percent respectively over the evaluation period.³⁷

³⁵ Ibid.

³⁶ The Hilltop Institute. (2022, June 7). Medicaid Data for DORM Report. Baltimore, MD: UMBC.

³⁷ Ibid.

Table 5: Service Utilization of Medicaid Participants (Any Period of Eligibility) before a Fatal Overdose (2017–2020)

Service Type	2017		2018		2019		2020	
	#	%	#	%	#	%	#	%
Ambulatory Care	822	59.4%	897	59.4%	901	62.0%	1,124	63.4%
Outpatient ED	677	48.9%	711	47.1%	674	46.4%	789	44.5%
Inpatient Admission	407	29.4%	411	27.2%	385	26.5%	429	24.2%
Total	1,384		1,509		1,453		1,774	

Table 6, below, displays data for inpatient admissions with a diagnosis of poisoning within one year of death and within one day of death. Across both timeframes, the percentage of participants who had an inpatient admission with a diagnosis of poisoning during the respective timeframe decreased over the evaluation period. The number of participants who had an admission with a diagnosis of poisoning within a year of death decreased from 8.6 percent in 2017 to 6.2 percent in 2020, and the percentage of participants who had an admission with a diagnosis of poisoning within one day of their death fell from 3.0 percent to 1.9 percent. The number of users and the number of visits also decreased for both timeframes over the evaluation period. Trends for participants enrolled in Medicaid within 12 months of overdose death and for participants enrolled in Medicaid at the time of overdose death are similar.³⁸

Table 6. Number of Visits and Participants (Any Period of Enrollment) with an Inpatient Admission with a Diagnosis of Poisoning Before a Fatal Overdose (2017–2020)

Year of Fatal Overdose	Within Year of Death				Within 1 Day of Death			
	Visits	Users	Total Enrollees	% of Total	Visits	Users	Total Enrollees	% of Total
2017	149	121	1,413	8.60%	46	43	1,413	3.00%
2018	142	121	1,548	7.80%	50	47	1,548	3.00%
2019	151	118	1,513	7.80%	38	33	1,513	2.20%
2020	139	114	1,834	6.20%	35	34	1,834	1.90%

³⁸ Ibid.

V. POLICY IMPLICATIONS AND NEXT STEPS

Taken together, the findings presented in this report highlight several important considerations and opportunities for Maryland to continue its work to improve overdose-related morbidity and mortality in the state.

1. Continue to Address Growing Racial Disparities

In August 2022, Maryland's Racial Disparities in Overdose Task Force, an extension of the Interagency Heroin and Opioid Coordinating Council chaired by Lt. Governor Boyd Rutherford, will release a report looking at overdose deaths among Black Marylanders, specifically in Baltimore City and Anne Arundel, Baltimore and Prince George's Counties. The report will include policies and programmatic considerations for reducing overdose mortality in these areas where the highest number of Black overdose deaths are occurring.

2. Expand Buprenorphine Access for Black Marylanders

Based on available data, white Marylanders are proportionately dispensed buprenorphine more often than Black Marylanders. There is a need to further understand barriers to expanding access to buprenorphine among Black Marylanders to eliminate those barriers.

3. Identify Culturally Competent Strategies to Address Increasing Overdose Death Rates among Older Adults

With the growing rate of overdose deaths among individuals aged 55 and older, specifically among Black men, more exploration is needed into the drivers of this trend. The OOC will work with the Behavioral Health Administration in coordination with the Maryland Department of Aging to further understand these trends and to identify appropriate and culturally sensitive interventions that can be tailored to reach this population.

4. Bolster Targeted Outreach and Care Coordination for Medicaid-Eligible Populations

Over 70 percent of overdose decedents were Medicaid-eligible within 12 months before their death.³⁹ Continued outreach efforts are needed to connect the Medicaid-eligible population to health care services and to bolster efforts to address the social determinants of health among this population. Opportunities to achieve this include scaling the *Non-Fatal Overdose Notification* pilot project with MDH Public Health Services and CRISP, Maryland's Health Information Exchange. This pilot provides real-time notifications on non-fatal overdoses to local health departments to facilitate targeted care coordination. Coordination with Medicaid's housing linkage initiatives will further address social determinant drivers of overdose risk.

Additionally, the MDH Medicaid Administration should continue to explore outcomes from the Collaborative Care Model to identify the feasibility of scaling this program.

³⁹ Ibid.

5. Continue to Expand Targeted Naloxone Distribution with an Emphasis on Understanding Barriers to Bystander Administration

With nearly two-thirds of overdose deaths occurring in residences in 2020, the vast majority of which involved a bystander present, there is an opportunity to continue targeted naloxone distribution to the friends and families of people who use drugs. Given the small percentage of cases in which naloxone was administered for people who died in a residence, there is an opportunity to further explore contributing factors that are preventing bystander intervention. The OOC will work with the MDH CHRS to continue exploring these barriers and to identify strategies to mitigate them.

To further assist the state in achieving targeted naloxone distribution, and based on prior findings of DORM, the Hogan Rutherford Administration introduced the Statewide Targeted Overdose Prevention (STOP) Act of 2022, which was passed unanimously by the Maryland General Assembly. This bill makes Maryland a national leader in targeted naloxone distribution by requiring certain entities that interact with people at high risk of overdose (such as hospitals, outpatient SUD treatment providers, correctional facilities, and homeless service providers) to offer naloxone to the individuals they serve. Entities named in this bill were identified based on literature and insights gleaned from the 2020 DORM report. Once fully implemented, this legislation has the potential to prevent hundreds of overdose deaths each year.

6. Continue to Expand Linkages to Care for People Engaged with High-Risk Settings, Including the Criminal Justice System, the Public Behavioral Health System (PBHS), and Hospitals

The criminal justice setting remains an important touch-point for individuals with SUD. As local detention centers work to comply with the provisions of House Bill (HB) 116 of 2019, technical assistance and resources should be provided to local detention centers to ensure that there is comprehensive care coordination in place for people leaving incarceration. The OOC is using \$8 million in funding received from the state's settlement with McKinsey and Company to support local detention centers as they establish infrastructure to provide OUD screening, as well as MOUD when clinically indicated, and facilitated reentry services for people with OUD as they exit incarceration. Additionally, CHRS will partner with criminal-legal agencies to ensure the provision of naloxone to people at risk of overdose in compliance with the STOP Act of 2022.

The data presented in this report show only that 41 percent of people who died from an overdose and had received care at a Maryland hospital had received care for overdose-related events. This shows that there are other conditions for which individuals at risk for overdose are seeking care. Increased coordination between MDH and Maryland's hospital system to share information on common comorbidities for people who are dying from an overdose can help to identify additional opportunities to screen people for SUD and connect them with resources. Additional targeted analyses from the DORM initiative could include common morbidities of those decedents who seek hospital care.

Individuals who are engaged in SUD treatment are vulnerable for overdose if they use drugs after a period of abstinence or reduced use. Of individuals who were enrolled in the PBHS who had a fatal overdose in 2020, 48.8 percent died within 30 days of their last service. This shows that people who are at risk for fatal overdose are frequently engaged in health services, illustrating an opportunity to provide more comprehensive wraparound support.

7. Continue to Explore Cocaine and Fentanyl-Related Deaths to Better Tailor Interventions for People Who Use Drugs

Overdose deaths involving cocaine and fentanyl continue to increase. The drug seizure data presented in this report show that cocaine is the most commonly seized drug followed by fentanyl. This finding highlights the need to further examine the increase in these deaths and to identify the proportion of individuals who are polysubstance users versus those who are using adulterated drugs unknowingly. Additional information on drug-use patterns can help the state tailor specific outreach efforts.

Expanding drug-checking programs to provide real-time data and analysis of drug composition can help public health and public safety officials to better understand changes in the supply of illicit drugs in real-time.

Acknowledgments

The OOC would like to acknowledge and thank the following partners for their contribution to the 2021 DORM report:

- Chesapeake Regional Information Systems for our Patients (CRISP)
- Johns Hopkins Bloomberg School of Public Health
- Maryland Department of Health
- Behavioral Health Administration
- Center for Harm Reduction Services
- Environmental Health Bureau
- Health Services Cost Review Commission
- Overdose Data to Action Program
- Prescription Drug Monitoring Program
- Vital Statistics Administration
- Maryland Total Human-services Integrated Network (MD THINK)
- The Hilltop Institute, University of Maryland Baltimore County
- The University of Maryland School of Medicine Systems Evaluation Center

VI. CONSIDERATIONS AND LIMITATIONS TO ANALYSIS

Health Services Cost Review Commission (HSCRC)

- The validity of matching individuals across disparate datasets is not wholly guaranteed and limited by the availability and accuracy of the data contained within the informant data sources
- Official drug and alcohol intoxication deaths for 2021 are considered preliminary and subject to change until officially validated and released by the VSA
- Demographics and geographic residence were compared between overdose decedents and non-overdose decedents with inpatient and/or emergency department records captured within the HSCRC or overdose death registry between 2016-2021
 - Individuals identified as non-overdose decedents may either be alive or deceased due to means other than drug intoxication during the study period
- Encounters consist of any health services encounter captured in the HSCRC between 2016-2021.
- Small data sets have been suppressed to protect privacy
- The total of "Overdose-related encounters, by substance" will sum to a greater total than overall overdose-related encounters
 - An individual may have had multiple overdoses, by multiple substances but would only be counted once under "Overdose-related encounters, ever" and once per specified substance(s)
- Other drugs include amphetamine, barbiturates, non-opioid analgesics, and other drug poisonings

Prescription Drug Monitoring Program (PDMP)

- All tables evaluate overdose decedents from 2016 to 2021 who also had dispense records in the PDMP (n=8136)
- All tables come from data in the PDMP and Overdose Death Record (ODR) datasets pulled from CRISP on 5.22.22
- Tables grouped by year of death for each overdose decedent as recorded in the ODR

Center for Harm Reduction Services (CHRS)

- Some active ORPs may be missing reports due to reporting lag
- Kit/unit estimates are based on the assumption of two doses dispensed per kit/unit, which may occasionally be incorrect
 - CHRS collects naloxone dispense data in terms of doses
 - Each kit/unit of naloxone includes two (2) doses
- Incomplete (not yet submitted) reports could impact data totals

HIDTA

- The samples in this report are not representative of all drugs seized in the entire state of Maryland
- Some data for 2018 did not include all specified drugs, as detailed in the report

Hilltop

- The data provided follow the Department's suppression guidelines (i.e., cells with 10 or fewer participants are suppressed to avoid potential identification of participants)
- Hilltop used the list of overdose deaths provided by the VSA to identify Medicaid participants who died of an overdose
 - After confirming that participants were enrolled in Medicaid at any point, Hilltop identified participants who had been enrolled in Medicaid for at least one day in the year prior to their death and/or at the time of their death.
 - Only participants who were eligible for Medicaid within a year of their death were included in the analysis
 - Demographic characteristics included those who were enrolled in Medicaid at any point during the year prior to their overdose, participants were not necessarily enrolled at the time of their death
 - "eligible/eligibility" and "enrolled/enrollment" are used interchangeably
- Hilltop gathered all fee-for-service (FFS) claims and managed care organization (MCO) encounters for the services targeted for this analysis (e.g. MOUD, non-fatal poisoning, ED visits, ambulatory care visits, and inpatient admissions)
- Medicaid participants who died due to an overdose may have died due to a non-opioid-related drug
- ED visits were defined as an institutional claim or encounter with a revenue code starting with "045" or "0981"
 - ED visits resulting in an inpatient admission were classified as inpatient admissions
 - Inpatient admissions were defined as inpatient institutional claims or encounters with a claim type of "I" or "M"
- The measurement period included the year prior to the participant's death
- Events were identified using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes selected by the Department
- The data presented are current as of March 2022

Johns Hopkins Bloomberg School of Public Health Center for Population Health IT

These tables report on an analysis of matched records from three statewide databases spanning January 2016 to 2021.

- The Prescription Drug Monitoring Program (PDMP) is the source used to identify buprenorphine products (the focus is on buprenorphine that is indicated for the treatment of OUD, such as combination buprenorphine-naloxone sublingual strips) and used to identify other controlled medications such as opioid analgesics (e.g., oxycodone, hydrocodone, benzodiazepines, and stimulants)
- The HSCRC records include outpatient hospital departments, emergency departments, and inpatient care
 - ICD-10 diagnosis codes were associated with admissions to identify opioid-related visits (e.g., for OUD treatment or for opioid overdose)
 - A small number of fatal overdoses are uniquely identified in hospital records (e.g., an admission for an overdose where the disposition of the visit is death)
- The Office of the Chief Medical Examiner (OCME) includes toxicology information used to ascertain whether a death involved any drugs and which drugs specifically
 - We identify deaths that involve any opioids (e.g., fentanyl, heroin, prescription opioids, methadone)

Public Behavioral Health System

- Claims are through March 2022 and data is subject to change from delayed claims
 - Outpatient services are generally not covered by Medicare
- Sources of Overdose Deaths
 - Office of the Chief Medical Examiner/VSA Database
 - Unintentional Overdose Deaths Only
 - Based on data through February 2022
- All data is provisional and subject to updating
- Prior to January 1, 2020, race was collected independently as part of the registration process; a decision was made that this violated parity and race had to be determined using Medicaid eligibility data that contains many records missing race information
- The decrease in 2021 may be the result of delayed claims adjudication and correction
- The 2020 and 2021 decreases may be the result, in part, of delays in claims adjudication and correction
- The decreases in the 55 and over category in 2020 are due to Medicare beginning to cover the service starting 1/1/2020

Acronyms

- Center for Harm Reduction Services (CHRS)
- Center for Substance Abuse Research (CESAR)
- Chesapeake Region Information System for our Patients (CRISP)
- Direct Analysis in Real Time Mass Spectrometry (DART-MS)
- Food and Drug Administration (FDA)
- Health Services Cost Review Commission (HSCRC)
- Managed Care Organization (MCO)
- Maryland Department of Health (MDH)
- Maryland's Total Human Services Integrated Network (MD THINK)
- Medication for Opioid Use Disorder (MOUD)
- National Institute of Standards and Technology (NIST)
- Opioid Operational Command Center (OCCC)
- Opioid Use Disorder (OUD)
- Overdose (OD)
- Overdose Death Record (ODR)
- Public Behavioral Health System (PBHS)
- Rapid Analysis of Drugs (RAD)
- Statewide Targeted Overdose Prevention (STOP)
- Statewide Unintentional Drug Overdose Reporting System (SUDORS)
- Substance Use Disorder (SUD)
- Syringe Service Programs (SSPs)
- University of Maryland Medical System (UMMS)
- Vital Statistics Administration (VSA)
- Washington/Baltimore High-Intensity Drug Trafficking Area (W/B HIDTA)

VII. CITATIONS

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- The Hilltop Institute. (2022, June 7). Medicaid Data for DORM Report. Baltimore, MD: UMBC.
- “Maryland Vital Statistics Annual Report 2020”; Vital Statistics Administration, Maryland Department of Health.
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VIII. APPENDIX A: CHRS

Naloxone Distribution and Training Saturation by Jurisdiction (2021)

Jurisdiction	Kits Distributed to At-Risk Individuals Calculation, Calendar year 2021, January			Kits Distributed to At-Risk Individuals Calculation, Calendar year 2021, January		Diff.: Target - Actual	
	# People Trained by ORP location	Est. # Kits Distributed to At-Risk People (by ORP)	Est. # Kits Distributed to At-Risk People	Opioid OD Deaths (Incident Location)	Kit Distribution Target (20x # deaths)	#	%
Allegany County	451	1,625	1,625	27	540	1,085	201%
Anne Arundel County	4,107	4,135	4,135	164	3,280	855	26%
Baltimore City	20,865	10,178	10,178	762	15,240	-5,062	-33%
Baltimore County	2,260	3,218	3,218	278	5,560	-2,342	-42%
Calvert County	395	1,318	1,318	12	240	1,078	449%
Caroline County	60	141	141	5	100	41	41%
Carroll County	816	866	866	43	860	6	1%
Cecil County	3,097	4,489	4,489	57	1,140	3,349	294%
Charles County	25	84	84	22	440	-356	-81%
Dorchester County	500	392	392	18	360	32	9%
Frederick County	518	1,357	1,357	35	700	657	94%
Garrett County	181	594	594	4	80	514	643%
Harford County	2,198	2,615	2,615	60	1,200	1,415	118%
Howard County	1,043	970	970	21	420	550	131%
Kent County	298	440	440	6	120	320	267%
Montgomery County	72	333	333	92	1,840	-1,507	-82%
Prince George's County	1,673	1,226	1,226	124	2,480	-1,254	-51%
Queen Anne's County	63	178	178	8	160	18	11%
Somerset County	133	685	685	9	180	505	281%
St. Mary's County	1,722	3,209	3,209	30	600	2,609	435%
Talbot County	123	658	658	9	180	478	266%
Washington County	1,355	1,610	1,610	70	1,400	210	15%
Wicomico County	295	373	373	35	700	-327	-47%
Worcester County	634	2,569	2,569	13	260	2,309	888%
Total	42,882	43,262	43,262	1,904	38,080	5,182	14%

IX. APPENDIX B: PBHS

Service Use by Service Category and Type for Overdose Decedents Active in PBHS (2020)

Service Category	Mental Health Only	SUD Only	Both	Total	%
Case Management	5	0	43	48	3.3%
Crisis	7	0	44	51	3.5%
Mental Health Inpatient	23	0	207	230	15.8%
Mobile Treatment	8	0	20	28	1.9%
Mental Health Outpatient	151	0	759	910	62.4%
Psychiatric Rehabilitation	38	0	236	274	18.8%
Residential Rehabilitation	6	0	7	13	0.9%
Supported Employment	4	0	7	11	0.8%
SU Inpatient	0	10	90	100	6.9%
SU Outpatient	0	215	714	929	63.7%
SU Partial Hospitalization	0	13	137	150	10.3%
SU Labs	0	188	644	832	57.1%
SU MD Recovery Net	0	2	32	34	2.3%
SU MOUD	0	157	314	471	32.3%
SU IOP	0	47	333	380	26.1%
SU OP Detox	0	2	28	30	2.1%
SU IP Detox	0	4	41	45	3.1%
SUD Residential Services	0	75	308	383	26.3%

Overdose Decedents Active in PBHS at Time of Death (2020)

Jurisdiction	N	%	% of Decedents Engaged in PBHS Services	Legend
Allegany	31	2.10%	63.30%	60% - 69%
Anne Arundel	141	9.70%	54.20%	50% - 59%
Baltimore	221	15.20%	51.60%	50% - 59%
Baltimore City	517	35.50%	61.00%	60% - 69%
Calvert	20	1.40%	62.50%	60% - 69%
Caroline	13	0.90%	65.00%	60% - 69%
Carroll	39	2.70%	67.20%	60% - 69%
Cecil	45	3.10%	52.90%	50% - 59%
Charles	26	1.80%	44.80%	40% - 49%
Dorchester	6	0.40%	40.00%	40% - 49%
Frederick	34	2.30%	50.00%	50% - 59%
Garrett	5	0.30%	62.50%	60% - 69%
Harford	64	4.40%	66.00%	60% - 69%
Howard	19	1.30%	33.90%	30% - 39%
Kent	2	0.10%	40.00%	40% - 49%
Montgomery	52	3.60%	38.00%	30% - 39%
Prince George's	53	3.60%	30.10%	30% - 39%
Queen Anne's	8	0.50%	42.10%	40% - 49%
Somerset	7	0.50%	33.30%	30% - 39%
St. Mary's	18	1.20%	52.90%	50% - 59%
Talbot	8	0.50%	44.40%	40% - 49%
Washington	64	4.40%	66.00%	60% - 69%
Wicomico	20	1.40%	46.50%	40% - 49%
Worcester	9	0.60%	56.30%	50% - 59%

X. APPENDIX C: JHU

Buprenorphine Dispensed by Category (2016–2021)

		2016	2017	2018	2019	2020	2021	Total
Denominator	<i>Individuals with at least one BUP for OUD RX in the year</i>	26,204	29,844	33,730	38,089	39,305	42,647	209,819
Gender	<i>Missing</i>	75	97	112	141	157	182	764
	<i>Female</i>	10,449	12,031	13,485	15,044	15,389	16,469	82,867
	<i>Male</i>	15,680	17,716	20,133	22,904	23,759	25,996	126,188
Age	<i>18-25</i>	1,936	1,814	1,631	1,523	1,355	1,273	9,532
	<i>26-35</i>	8,878	9,962	10,953	12,121	11,984	12,084	65,982
	<i>36-45</i>	6,175	7,305	8,609	10,202	11,298	13,001	56,590
	<i>46-55</i>	5,536	6,110	6,774	7,389	7,230	7,720	40,759
	<i>56-65</i>	3,130	3,860	4,758	5,583	5,908	6,690	29,929
	<i>65+</i>	549	793	1,005	1,271	1,530	1,879	7,027
Race	<i>Black</i>	5,688	6,527	8,116	9,371	9,268	9,231	48,201
	<i>White</i>	15,058	17,359	19,187	20,875	20,986	20,789	114,254
	<i>Other</i>	198	217	225	262	246	297	1,445
	<i>Missing</i>	5,260	5,741	6,202	7,581	8,805	12,330	45,919
Region of Residence	<i>Capital</i>	2,766	3,056	3,227	3,501	3,598	3,860	20,008
	<i>Central</i>	13,863	15,477	17,342	19,414	20,419	22,620	109,135
	<i>Eastern Shore</i>	2,581	2,955	3,168	3,441	3,406	3,568	19,119
	<i>Southern</i>	1,602	1,870	2,113	2,410	2,790	3,179	13,964
	<i>Western</i>	1,524	2,024	2,758	3,255	3,403	3,529	16,493
	<i>Missing/Non-Maryland</i>	3,868	4,462	5,122	6,068	5,689	5,891	31,100

Clinical Comorbidities	<i>1+ Mental health diagnosis-psych admission</i>	1,322	1,514	1,598	1,601	1,150	1,019	8,204
	<i>1+ Chronic pain</i>	1,840	2,320	2,692	3,064	2,668	2,673	15,257
	<i>1+ Surgery</i>	10,167	11,553	13,643	14,528	13,628	13,968	77,487
	<i>1+ Cancer</i>	293	359	462	511	443	478	2,546
Healthcare Use	<i>1+ IP visit</i>	4,255	4,880	5,514	6,143	5,412	5,355	31,559
	<i>1+ ED visit</i>	11,067	12,800	14,687	15,930	14,097	13,945	82,526
Payer (Rx Payment Source)	<i>1+ RX paid by Medicaid</i>	11,917	13,968	17,854	21,801	22,498	24,858	112,896
	<i>1+ RX paid by Medicare</i>	1,300	1,587	1,903	2,009	2,209	2,882	11,890
	<i>1+ RX paid by private pay</i>	4,957	4,487	4,830	5,759	5,353	4,885	30,271
	<i>1+ RX paid by commercial insurance</i>	15,668	17,807	18,111	17,103	15,962	15,328	99,979
	<i>1+ RX paid by others (military/VA, workers comp, Indian health, & other)</i>	720	1,084	1,466	1,724	1,716	1,754	8,464

Trends in Buprenorphine Dispensing Characteristics

	2016	2017	2018	2019	2020	2021	Total
All buprenorphine for OUD prescriptions	283,445	331,424	395,266	466,234	470,061	470,650	2,417,080
Days' supply	18.84	18.27	17.28	16.9	18.36	19.06	18.08
Quantity per Day	1.83	1.82	1.78	1.76	1.74	1.74	1.77
Daily Dose	14	14.11	14.32	14.38	14.44	14.41	14.31
Total Dose (MG)	267.14	263.31	252.35	247.95	270.04	280.69	263.7
% RX paid by Medicaid	38.21%	40.10%	47.42%	54.93%	56.25%	57.62%	50.49%
% RX paid by Medicare	3.54%	4.03%	4.14%	3.94%	3.75%	5.81%	4.27%
% RX paid by self-pay/cash	7.66%	6.14%	5.50%	4.96%	4.92%	4.61%	5.45%
% RX paid by commercial insurance	48.91%	47.73%	41.05%	33.98%	32.73%	29.87%	37.73%
% RX paid by others (military/VA, workers comp, Indian health, & other)	1.67%	1.99%	1.88%	2.18%	2.35%	2.09%	2.06%

XI. APPENDIX D: HSCRC

Relative risk of overdose death predicted by previous diagnosed overdose or related conditions (2016-2021)

Predictor	All intoxication deaths	Opioid-related intoxication deaths	Nonopioid-related intoxication deaths
Any history of non-fatal overdose	22.90 (21.99, 23.85)	24.17 (23.16, 25.23)	15.16 (13.26, 17.33)
History of non-fatal overdose by substance type			
Heroin	41.69 (39.78, 43.70)	45.93 (43.75, 48.21)	14.74 (11.79, 18.45)
Methadone	21.45 (18.59, 24.74)	23.42 (20.26, 27.08)	5.84 (2.43, 14.05)
Other Opioids	15.86 (15.01, 16.75)	16.79 (15.86, 17.77)	9.32 (7.55, 11.50)
Alcohol	18.56 (15.99, 21.53)	18.40 (15.69, 21.57)	21.83 (14.05, 33.95)
Benzodiazepine	15.89 (14.61, 17.29)	15.90 (14.54, 17.39)	17.08 (13.19, 22.12)
Cocaine	36.98 (34.26, 39.92)	35.20 (32.37, 38.28)	62.70 (51.17, 76.82)
Other Drugs	10.18 (9.54, 10.87)	9.99 (9.32, 10.71)	12.38 (10.26, 14.93)
Opioid Use Disorder	30.31 (29.12, 31.55)	33.90 (32.49, 35.36)	11.39 (9.84, 13.17)
Substance Use Disorder (non-opioid)	12.33 (11.84, 12.85)	11.85 (11.35, 12.37)	18.09 (15.85, 20.65)
Non-poisoning Injury	1.97 (1.89, 2.05)	1.98 (1.90, 2.07)	1.90 (1.68, 2.15)
Chronic Pain Diagnosis	4.45 (4.24, 4.66)	4.55 (4.33, 4.78)	3.68 (3.16, 4.28)
Mental Health Diagnosis	3.94 (3.79, 4.11)	3.96 (3.79, 4.13)	3.88 (3.43, 4.40)

Relative risk of overdose death predicted by previous overdose among those with diagnosed substance use disorder relative to intoxication deaths (2016-2021)

Predictor	All intoxication deaths	Opioid-related intoxication deaths	Nonopioid-related intoxication deaths
Any history of non-fatal overdose	6.38 (6.06, 6.72)	6.91 (6.53, 7.30)	3.88 (3.33, 4.53)
Non-fatal overdose by substance			
Heroin	7.76 (7.33, 8.21)	8.73 (8.23, 9.27)	2.64 (2.06, 3.37)
Methadone	4.16 (3.55, 4.87)	4.62 (3.94, 5.42)	0.95 (0.36, 2.53)
Other Opioids	4.73 (4.44, 5.04)	5.08 (4.76, 5.43)	2.72 (2.17, 3.41)
Alcohol	3.76 (3.23, 4.38)	3.82 (3.24, 4.50)	3.64 (2.29, 5.81)
Benzodiazepine	3.80 (3.47, 4.17)	3.86 (3.50, 4.25)	3.70 (2.81, 4.89)
Cocaine	6.65 (6.13, 7.22)	6.41 (5.86, 7.01)	9.88 (7.96, 12.26)
Other Drugs	3.08 (2.86, 3.31)	3.07 (2.84, 3.32)	3.28 (2.66, 4.04)
Non-poisoning Injury	1.35 (1.28, 1.43)	1.37 (1.29, 1.45)	1.26 (1.08, 1.47)
Chronic Pain Diagnosis	2.16 (2.04, 2.28)	2.22 (2.09, 2.36)	1.79 (1.51, 2.12)
Mental Health Diagnosis	1.93 (1.83, 2.04)	2.00 (1.89, 2.13)	1.53 (1.31, 1.79)

Relative risk of overdose death predicted by previous overdose among those with diagnosed opioid use disorder relative to intoxication deaths (2016-2021)

Predictor	All intoxication deaths	Opioid-related intoxication deaths	Nonopioid-related intoxication deaths
Any history of non-fatal overdose	2.48 (2.34, 2.63)	2.43 (2.29, 2.58)	4.11 (3.11, 5.44)
Non-fatal overdose by substance			
Heroin	2.57 (2.42, 2.72)	2.64 (2.48, 2.80)	1.69 (1.26, 2.25)
Methadone	1.32 (1.133, 1.53)	1.37 (1.17, 1.59)	0.44 (0.14, 1.38)
Other Opioids	1.55 (1.45, 1.66)	1.53 (1.43, 1.64)	2.02 (1.53, 2.67)
Alcohol	2.53 (2.13, 3.00)	2.53 (2.12, 3.01)	2.95 (1.39, 6.23)
Benzodiazepine	1.80 (1.63, 1.99)	1.74 (1.57, 1.93)	3.12 (2.17, 4.49)
Cocaine	2.43 (2.22, 2.66)	2.28 (2.07, 2.51)	6.38 (4.73, 8.61)
Other Drugs	1.64 (1.52, 1.78)	1.55 (1.42, 1.68)	3.93 (2.98, 5.19)
Non-poisoning Injury	0.97 (0.92, 1.03)	0.98 (0.92, 1.04)	0.82 (0.64, 1.07)
Chronic Pain Diagnosis	0.92 (0.87, 0.98)	0.91 (0.85, 0.97)	1.18 (0.91, 1.53)
Mental Health Diagnosis	1.08 (1.02, 1.15)	1.06 (0.99, 1.13)	1.63 (1.21, 2.20)

XII. APPENDIX E: HILLTOP

Demographic Characteristics of Medicaid Participants with Eligibility within One Year Prior to Fatal Overdose (2017–2020)

Demographic Characteristics	2017		2018		2019		2020	
	#	%	#	%	#	%	#	%
Age (Years)								
0 - 20	16	1.1%	17	1.1%	21	1.4%	29	1.6%
21 - 39	627	44.4%	619	40.0%	615	40.6%	701	38.2%
40 - 64	745	52.7%	868	56.1%	840	55.5%	1,045	57.0%
65 and older	25	1.8%	44	2.8%	37	2.4%	59	3.2%
Race/Ethnicity								
Black	432	30.6%	549	35.5%	597	39.5%	721	39.3%
White	852	60.3%	866	55.9%	745	49.2%	937	51.1%
Other/Unknown	129	9.1%	133	8.6%	171	11.3%	176	9.6%
Gender								
Female	447	31.6%	471	30.4%	480	31.7%	574	31.3%
Male	966	68.4%	1,077	69.6%	1,033	68.3%	1,260	68.7%
Last Managed Care Organization								
Aetna	-	-	14	0.9%	29	1.9%	49	2.7%
Amerigroup	170	12.0%	191	12.3%	184	12.2%	207	11.3%
Carefirst	63	4.5%	76	4.9%	60	4.0%	94	5.1%
JAI	73	5.2%	83	5.4%	85	5.6%	108	5.9%
Kaiser	46	3.3%	34	2.2%	48	3.2%	54	2.9%
Maryland Physicians Care	230	16.3%	273	17.6%	268	17.7%	313	17.1%
Medstar	83	5.9%	102	6.6%	97	6.4%	123	6.7%
Priority Partners	264	18.7%	296	19.1%	261	17.3%	318	17.3%
UnitedHealthcare	182	12.9%	152	9.8%	147	9.7%	170	9.3%
No MCO	302	21.4%	327	21.1%	334	22.1%	398	21.7%
Total	1,413		1,548		1,513		1,834	

Number of Visits and Participants (Any Period of Enrollment) with an ED Visit or Inpatient Admission with a Diagnosis of Poisoning Within One Day of Death (2017–2020)

Year of Fatal Overdose	Number of Participants with a Visit or Admission	Total Participants	Percentage with At Least One Visit or Admission
<i>2017</i>	60	1,413	4.2%
<i>2018</i>	62	1,548	4.0%
<i>2019</i>	53	1,513	3.5%
<i>2020</i>	45	1,834	2.5%