Maryland
DEPARTMENT OF HEALTH

DORM

Data-Informed Overdose Risk Mitigation

2023 Annual Report

Released: July 1, 2024

This report was prepared by the Maryland Department of Health pursuant to Maryland Code Annotated, Health-General Article § 7.5–701. A copy of this report was delivered to the Maryland General Assembly pursuant to the Maryland State Government Code § 2-1257 (2019).

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I. EXECUTIVE SUMMARY

Overview

In 2018, House Bill (HB) 922, known as the Chapter 211 Act, was signed into law, requiring 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 (OD). As Chapter 211 specifies, this report shall include an assessment of multiple factors associated with fatal and non-fatal overdose (NFOD) risk and program and service service utilization related to substance use, among other issues, such as racial/ethnic disparities, comorbidities that increase the risk of fatal overdose, drug supply characteristics, Medical Assistance eligibility, naloxone distribution and training and use of harm reduction services. This report seeks to link de-identified, person-level data from at least 18 distinct data sources or data sets 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 1st of each year, with the statute sunsetting on July 1, 2024.

This year's report builds on work from previous years 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 offices within MDH, including the Center for Harm Reduction Services (CHRS) and the Environmental Health Bureau.

Maryland's Office of Overdose Response (MOOR), partnered with the MDH Behavioral Health Administration (BHA), and Chesapeake Regional Information System for our Patients (CRISP), Maryland's health information exchange, to migrate certain linked data sets supporting this project onto the Maryland Total Human-services Integrated Network (MD THINK) platform, Maryland's cloud-based data storage and management system to support the analysis for this report.

High-Level Findings

There were 2,577 OD-related fatalities in Maryland in 2022, according to data provided by the VSA. This represents an 8.0 percent decrease from 2,800 in 2021 which was the highest annual total in the State of Maryland's history. While the data is preliminary, OD fatalities appear to be continuing this downward trend in 2023. Fentanyl continues to be the leading contributor to OD deaths and was involved in 79.9 percent of OD deaths in 2022. Since 2018, cocaine involvement in OD fatalities has been increasing and has consistently been the second-most common substance involved in fatal ODs and was involved in 39.8 percent of OD deaths in 2022.

Across the state, the jurisdictions with the highest count of overdose deaths are: Baltimore City (989), Baltimore County (337), Prince George's County (210), Anne Arundel County (184), Washington County (114), and Montgomery County (109). These six jurisdictions all had over 100 all-intoxication overdose deaths in 2022, however, this list is not representative of the jurisdictions with the highest overdose death rates, which takes into account population size. The jurisdictions with the highest overdose fatality rates are: Baltimore City (173.5 per 100,000), Cecil County (82.0), Washington County (73.3), Allegany (58.0), Dorchester County (55.0), and Somerset County (53.0). These six jurisdictions all had rates greater than the overall state average of 41.8 per 100,000.

The Maryland Emergency Department Drug Surveillance (MD-EDDS) Program analyzes patient toxicology results in electronic health records (EHRs) for OD patients treated in local emergency departments (EDs). MD-EDDS provided 20 hospitals across the state with urine dipsticks to test for fentanyl and found the substance in all the hospitals, none of which routinely tested for fentanyl at the time. Data collected by MD-EDDS shows that opiate positives declined dramatically, from 40 percent in 2016 to 11 percent in 2023. This decrease is likely explained by the more limited availability of heroin, as fentanyl became more prominent.

In 2023, 2 out of 20 hospitals had rates too low to display. Out of the remaining 18 hospitals, 10 reported series lows in the percentage positive for opiates, 11 reported series highs in the percentage positive for cocaine, 7 reported series highs in the percentage positive for THC with 2 near a series high, and 6 reported series highs for amphetamine/methamphetamine with 3 near their series high.

Maryland has continued to experience growing disparity in OD-related deaths across demographic groups and geographic areas. Between 2017 and 2022, OD deaths among non-Hispanic Black and Hispanic individuals increased, while OD deaths among non-Hispanic Whites decreased. Between 2017 and 2022, fatal ODs among people aged 35-44 years and 55 and over have increased, while decreasing among those under the age of 35 and between 44-55 years of age. Overall, the number of individuals who received a prescription for buprenorphine was lower among older adults. Non-Hispanic Black individuals aged 55 and over have been among the groups most impacted by fatal ODs in Maryland, with OD deaths among this cohort increasing more than four times (352 percent) since 2015 while concurrently receiving low rates of buprenorphine prescriptions. Opioid overdose deaths in individuals aged 55 and older accounted for 32 percent of total overdoses, but this group only accounted for 22 percent of all PBHS buprenorphine prescriptions in 2022.

Data from Maryland's PBHS, which provides publicly funded services for individuals who are enrolled in Medicaid or who are uninsured, shows the number of individuals who received any type of substance use disorder (SUD) service, excluding Medication for Opioid Use Disorder (mOUD), in Maryland increased by 30.2 percent from fiscal years (FY) 2016 to 2019 before decreasing during the pandemic by 11.8 percent between FY2019 and FY2021. Since FY2021, SUD service use excluding mOUD has rebounded, increasing by 11.2 percent between FY2021 and FY2023 and is nearly back to pre-pandemic levels. The number of individuals who received mOUD through the PBHS, including buprenorphine, methadone, and long-acting naltrexone, also increased by 22.9 percent from FY2016 to FY2019. However, mOUD service use has trended down since FY2019, decreasing by 21.1 percent between FY2019 and FY2023.

Most OD deaths in 2022 occurred in any residential setting, including residential treatment programs, etc, and in most cases there was a bystander present. In 2022, 57.5 percent of all fatal ODs occurred in a residence and did not have naloxone administered. The administration rate of bystanders administering naloxone has been increasing from 8.5 percent in 2019 to 14.0 percent in 2022. This shows an increase of 5.5 percentage points over four years. Naloxone distribution, training, and de-stigmatization campaigns likely have had an impact on this statistic, getting more trained bystanders with access to Naloxone throughout Maryland communities. Even though this is a positively increasing trend, more training, innovative Naloxone distribution strategies, and targeted awareness and de-stigmatization campaigns are needed throughout Maryland communities to bring that number up from 14 percent.

This report highlights several individual and community characteristics associated with increased risk of fatal overdose. Analysis of HSCRC Hospital Case-Mix data showed that between 2016 and 2022, OD decedents with a previous NFOD involving Heroin or Cocaine were 42.05 and 35.96 times more likely to

experience a subsequent fatal OD respectively compared to the general population accessing hospital based health services. While the degree of risk associated with each diagnosis related risk factor varied substantially, every combination raised the overall risk of a fatal OD. Individuals with Opioid Use Disorder (OUD) who had a co-occurring SUD or mental health related comorbidity were at substantially higher risk for a fatal OD as compared to those with only an OUD diagnosis. Review of OD decedents who were engaged in PBHS services prior to their death, showed that individuals who received services for co-occurring SUD and mental health related conditions accounted for nearly two-thirds (64.5 percent) of all PBHS involved decedents and this group has increased at a faster rate than individuals with who received services for a SUD or mental health condition alone more than doubling since 2016.

Policy Implications

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

1. **Continue to Address Racial, Geographic and Other Disparities that are Driving the Increase in Overdose Fatalities**

Maryland has seen an eight percent decrease in overdose deaths between 2021 and 2022, following the increases experienced during the pandemic. Despite an overall decrease, each demographic group and jurisdiction has differing trends in recent years, with some groups decreasing while others increasing. An examination of these disparities allows for the identification of high need populations to focus resources on curbing the increases.

Overdose deaths in Maryland among non-Hispanic Black and Hispanic individuals increased while OD deaths among non-Hispanic White individuals declined between 2017 and 2022. Adults aged 35-44 and over 55 years of age are increasingly at higher risk for fatal overdose. Those aged 35-44 are increasing in all regions except for the Southern region of the state, and those aged 55 and older are increasing in all but the Capital region. In comparison, OD deaths in all other age cohorts decreased between 2017 and 2022. Older Non-Hispanic Black individuals have been among the groups most impacted by fatal ODs in Maryland. Overdose fatalities among this group have significantly outpaced those of Non-Hispanic White individuals and have nearly doubled since 2017.

In August 2022, Maryland's Racial Disparities in Overdose Task Force released a report which included policies and programmatic considerations for reducing OD mortality in Black communities. The report identified four overarching policy recommendations, including: 1) Increasing access to innovative low-barrier treatment; 2) Reducing stigma for those who use drugs; 3) Increase availability of harm reduction strategies in non-traditional settings; and 4) increase transparency in State and local resource allocation. Since the task force report, the Maryland Overdose Response Advisory Council (MORAC) was established to coordinate the implementation of the four recommendations.

Among the twenty-four jurisdictions in Maryland, overdose fatality rates vary substantially. In 2022, the state of Maryland overall has an overdose fatality rate of 41.8 per 100,000, a decrease from 45.4 in 2021. The jurisdictions with the highest rates include: 173.5 per 100,000 in Baltimore City (187.2 in 2021), 82.0 in Cecil County (83.7 in 2021), and 73.3 in Washington County (66.5 in 2021). Baltimore City has a rate more than four times greater than the state average and more than twice as large as the next highest jurisdiction, Cecil County, which has a rate that is more than double the rate of the state average. Seven of the nine jurisdictions that make up the Eastern Shore of Maryland have rates in the top 50 percent of the highest overdose fatality rates.

As documented in this report, several individual and community factors contribute to the risk of overdose death including a previous NFOD event, a history of incarceration, and demographic disparities. Understanding the community characteristics that contribute to increased social and community vulnerability and risk is essential. The CDC Social Vulnerability Index takes these risk factors and creates a social vulnerability score with a scale of zero to one, with one having the highest levels of social vulnerability. While community and social vulnerability was not specifically analyzed in this report, those jurisdictions with the highest rates of overdose fatalities, also had among the highest social vulnerability

scores, all with scores above 80th percentile on the index. The jurisdictions with the highest vulnerability were Wicomico County (1.0), Somerset County (0.96) and Baltimore City (0.91).

To effectively address Maryland's overdose epidemic and reduce fatalities, a multi-pronged, data-informed and targeted approach will be needed. Work is currently underway at MDH to better understand and map the level of overdose risk across Maryland communities, as well as the availability and gaps in essential substance use services to guide program development and direct resources to those geographic areas and populations with the greatest needs. To advance this work, MDH is currently developing a Maryland Substance Use Vulnerability Index tool, utilizing the Michigan model. This analytic tool will be used to assess community vulnerability to adverse substance use outcomes and to more effectively target statewide opioid response resources to where they are most needed and will have the greatest impact.

2. Continue to Promote Naloxone Training and Distribution

Naloxone is our most effective tool in preventing fatal ODs. In 2022, many of all fatal ODs occurred in a residence and did not have naloxone administered which shows the continuing need for enhancing the availability and expanding the use of naloxone in Maryland communities. A bystander was present in many fatal OD cases, and Naloxone was administered in only a fraction of all residential cases. This highlights the continued need to promote bystander administration of naloxone through training and dispensing of naloxone, as well as education on Maryland's Good Samaritan Law. Particular attention should be focused on expanding education and training among friends and family members of people who use drugs. OD education and naloxone distribution targeted towards people who use drugs remains the top priority because they are best positioned to respond to an OD due to the frequency with which they witness them.

The BHA Center for Harm Reduction Service (CHRS) operates a successful community-based naloxone distribution program, which has expanded because of the enactment of the Statewide Targeted Overdose Prevention (STOP) Act of 2022. The STOP Act expanded targeted naloxone distribution efforts in Maryland by requiring certain entities, such as hospital systems, certain outpatient SUD treatment facilities, and correctional settings, to offer naloxone to certain individuals they serve. Naloxone distribution increased overall by 63 percent between 2022 and 2023, and increased in all but three jurisdictions: Frederick, Queen Anne's, and Cecil Counties. Policymakers should consider taking steps to ensure that adequate and consistent supply of naloxone is available for statewide distribution.

3. Increase Access to mOUD

mOUD use by Public Behavioral Health Service (PBHS) recipients was trending up before the pandemic but decreased in FY 2020 and each year after. In contrast, other SUD services excluding mOUD, while decreasing during the pandemic, have rebounded in FY 2022 and FY 2023 close to pre-pandemic levels. Among the three forms of mOUD analyzed, Buprenorphine was the only one to increase between 2017 and 2022, while both Methadone and Naltrexone decreased. In fiscal year 2021, there were 99 OTP providers and 28,511 OTP service recipients for an overall ratio of one OTP provider for every 288 OTP service recipients, a decrease from 1:346 in FY21. Policymakers should continue to identify opportunities to expand low-barrier access to buprenorphine, such as Emergency Medical Services (EMS) and ED induction, and the use of mobile treatment vans and technology applications that allow for self-administration under supervision to facilitate access to high-risk populations and vulnerable and under-resourced communities.

Maryland facilitated learning collaboratives with partner agencies to provide technical assistance to local detention centers to provide mOUD treatment, in accordance with the Maryland mOUD Examinations and Treatment Act (2020). In addition to providing technical assistance, funds were awarded through the State Opioid Response (SOR) grant, the Opioid Restitution Fund, and independent grants to implement mOUD treatment programs. Currently, 19 jurisdictions provide mOUD in their jails and report data to the Governor's Office of Crime Prevention and Policy. Data collected in an eight month period in FY23 indicates that a total of 2,884 individuals who were assessed in detention centers received an OUD diagnosis. Ninety percent of all diagnoses were OUD with a co-occurring mental health disorder. According to a risk analysis of individuals with an OUD accessing health services in Maryland, a co-occurring diagnosis of a mental health disorder puts them at an 8 percent higher risk of a fatal overdose than individuals with an OUD without a mental health diagnosis. Maryland is working to expand access to care for individuals leaving incarceration, who are at a higher risk for overdose. In addition, MDH is establishing a set of targeted Medicaid services to certain incarcerated populations who are soon to be released from state prison or jail. Eligible people experiencing incarceration will receive services up to 90 days prior to release that consist of case management, mOUD, and a 30-day supply of prescribed medications upon release.

4. Continued Monitoring of Xylazine and Cocaine Related Opioid Overdoses

Xylazine's presence in the Maryland illicit drug supply was rare until 2019, and now is commonly detected among decedents in Maryland, especially in Baltimore City and Baltimore County. Between 2019 and 2021, Xylazine related deaths have increased nearly five times (458 percent) from 103 to 575, and more recently have shown a declining trend. Among the samples of drug paraphernalia tested from October 2021 through May 2024, xylazine was identified in one-third (33 percent) of all samples and of the samples that contained xylazine, 93 percent also contained fentanyl.

To date, CHRS has purchased and distributed over 80,000 xylazine test strips to people who use drugs across the state. Additionally, CHRS continues to manage the RAD program to support on site drug checking at 17 of the 27 syringe service programs (SSPs) across the state. MDH created an interagency Xylazine Work Group in 2021, composed of multidisciplinary professionals working in overdose surveillance, prevention and response efforts, which produced the Xylazine in Maryland Report. MDH is also conducting a project in collaboration with the University of Maryland Baltimore (UMB) to determine the prevalence of xylazine and nitazene exposure among hospital patients. Research in Maryland communities has demonstrated that Marylanders are being turned away from SUD treatment due to insufficient clinical capacity to treat severe wounds related to xylazine. In response, the Department has invested in wound care capacity building, including hiring a wound care certified nurse to provide clinical and non-clinical training and a physician consultant who will be drafting wound care clinical guidelines. MOOR has developed a xylazine resource webpage with resources for Marylanders to better understand the risks associated with xylazine exposure, including a public service announcement in both English and Spanish.

Stimulant involved overdose deaths have been steadily increasing since 2018. Maryland residents have seen a 21 percent increase in use between 2018 and 2022, while PBHS service users in Maryland have seen a 15 percent increase. This increase in use has caused the percentage of overdose deaths with stimulants present to increase from 38 to 43 percent.

HSCRC data suggests that cocaine use increases the risk of experiencing a fatal overdose death from any substance among individuals accessing health services. A risk analysis of the HSCRC data was conducted to assess risk of NFOD among all residents across Maryland who accessed health services from 2016 to 2022. Statewide, from 2016 to 2022, cocaine-involved NFOD increased the risk of an individual experiencing a subsequent fatal overdose by 35.96 times compared to the general population accessing health services. Additionally, a co-morbid diagnosis of cocaine dependency among individuals with OUD rendered them 2.33 times more likely to experience a fatal overdose than their OUD counterparts with no history of cocaine dependency.

5. Continue To Expand Public Awareness and Communication Efforts

The BHA Office of Public Awareness has dedicated staff to create and disseminate information regarding the availability of state resources, up to date information on the changing drug landscape, and offers messages of hope and encouragement regarding the ever changing opioid crisis, through a series of statewide public awareness campaigns. The use of public awareness campaigns is considered an evidence-informed practice and is encouraged and funded by the Substance Abuse and Mental Health Services Administration (SAMHSA). For the past nine years, the Office of Public Awareness has worked with BHA divisions, Public Health, MOOR, the Center of Harm Reduction Services, LBHAs, and stakeholders to collaborate on communication and messaging related to the opioid epidemic.

Current data from the OD Death data reports, partnerships and information from jurisdictions and other data sources are used to focus messaging to specific demographics and geographic locations. Current events and news are also used to target messaging to specific groups during trauma related events. Most campaigns are promoted on the StopOverdose.maryland.gov website and any interested parties are encouraged to use the web resources. OUD campaigns have included topics such as the dangers of misuse of prescription drugs, fentanyl, xylazine and heroin, how to administer and remember to carry naloxone, The Good Samaritan Law, stigma, 988 suicide and crisis lifeline, and more. These video, audio, digital, and print messages appear on multiple media platforms. All campaigns have a Spanish language component and are promoted on Spanish language platforms. The Office has worked closely with the Spanish Language publication "Latin Opinion" to promote 988 and OUD related messaging following the collapse of the Key Bridge and continues to do so. Since the beginning of the OUD related campaigns, BHA has received multiple international and national awards recognizing their work in this space.

Next Steps

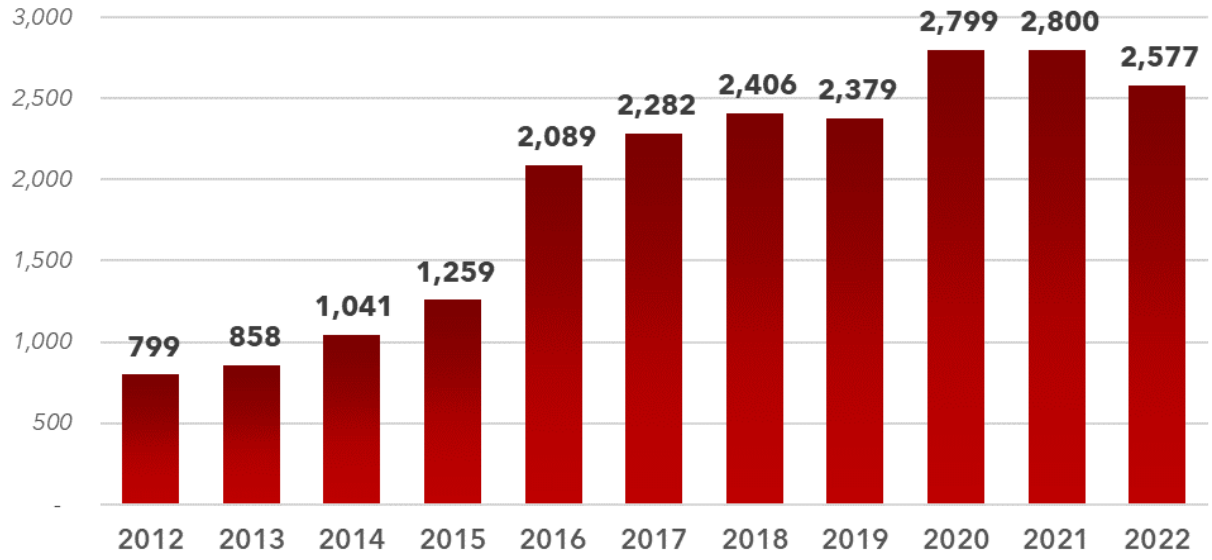
Maryland HB 922 has been in place since 2018 and is sunsetting in July 2024. Since the bill was not extended, this will be the last DORM report under the Maryland HB 922. The linked data resource established through the DORM initiative has been instrumental in identifying valuable insights into Opioid Overdose landscape in Maryland, including identification of priority populations, disparities in fatal and NFODs and gaps in essential resources and services. This linked data tool is an invaluable resource to inform state policy, target needed program development and guide funding and resource allocations decisions. The DORM data resource has been transitioned to a secure MDH server location and will continue to be updated and used to inform Maryland's Opioid Response efforts. Moving forward, this data resource will serve as a data and analysis hub for the Agency and used to support targeted research and data studies and analyses to inform program development efforts and policy direction.

II. OVERDOSE DEATHS IN MARYLAND

The data overview below provides a demographic profile of individuals who experienced a fatal OD in Maryland in recent years.

Preliminary data provided by VSA show that the number of unintentional drug-and-alcohol-related OD fatalities increased by 222.5 percent from 799 deaths in 2012 to 2,577 deaths in 2022. Fatal ODs increased by 17.6 percent between 2019 and 2020, following the onset of the coronavirus pandemic. This followed a 1.1 percent decrease in 2019, the first annual decrease in fatal ODs in over a decade.[1] Between 2021 and 2022 Maryland saw the first decline since the pandemic, equaling an 8.0 percent decrease.

Figure 1: Fatal Overdoses Involving All Substances (2012–2022)



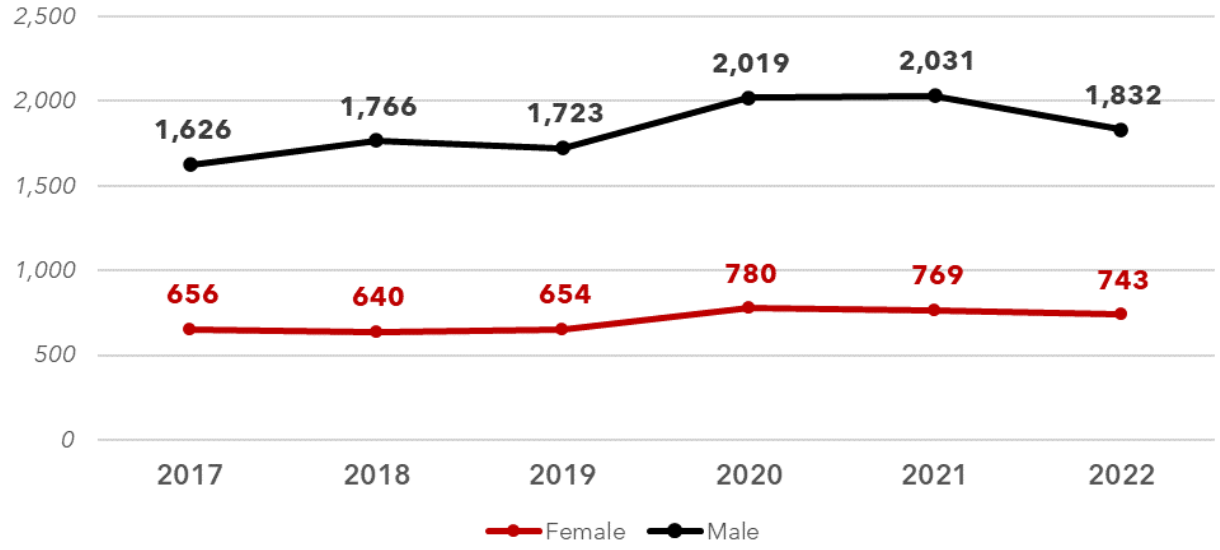
Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

[1] Maryland Department of Health, Vital Statistics Administration: Unintentional Intoxication Death Data, *April 2024*.

Gender

In 2022, 71.1 percent of OD decedents were male. This trend has been consistent in the last ten years; males have consistently accounted for more OD fatalities than females, peaking with a high of 73.4 percent of total fatal ODs in 2018. In contrast, fatal ODs in the last five years have increased faster among females than among males in Maryland. Between 2017 and 2022, fatal ODs among females grew by 13.3 percent while growing by 12.7 percent among males.[2]

Figure 2: Fatal Overdoses by Gender (2017–2022)



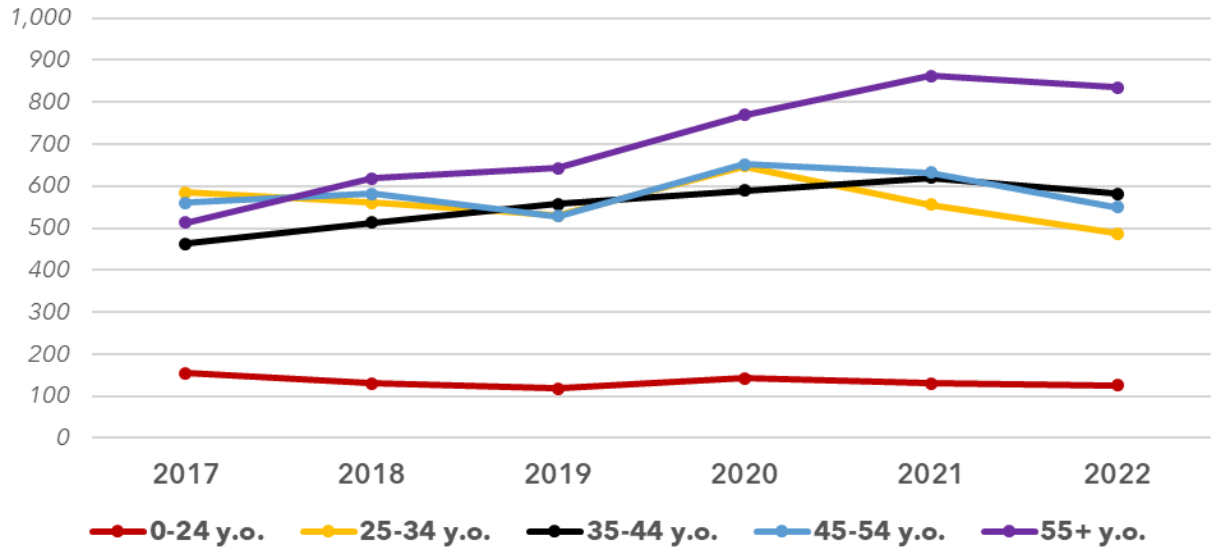
Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

[2] Ibid.

Age

In the last six years, fatal OD trends have varied across age groups in Maryland. For example, fatal ODs among people under 25 years of age have decreased by 18.7 percent while increasing by 62.6 percent among individuals over the age of 55.[3]

Figure 3: Fatal Overdoses by Age (2017–2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Table 1: Fatal Overdoses by Age (2017-2022)

Year	<25 Years Old	25-34 Years Old	35-44 Years Old	45-54 Years Old	55+ Years Old
2017	155	585	462	561	513
2018	131	561	513	582	618
2019	118	530	557	529	643
2020	143	647	589	651	769
2021	131	555	620	632	862
2022	126	487	581	549	834

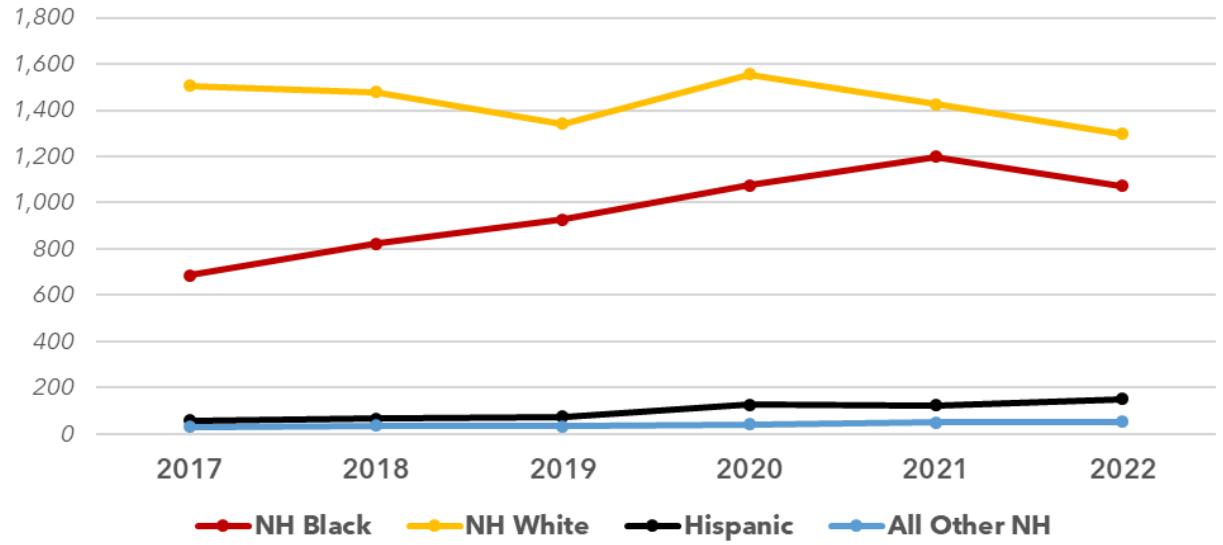
Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

[3] Ibid.

Race & Ethnicity

Between 2017 and 2022, the growth of OD fatalities among non-Hispanic (NH) Black individuals has outpaced those among non-Hispanic White individuals. During this time, the number of OD fatalities among non-Hispanic White individuals decreased by 13.8 percent (from 1,505 to 1,298) and increased by 56.0 percent (from 687 to 1,072) among non-Hispanic Black individuals.[4] Among Hispanic individuals OD fatalities more than doubled (157.6 percent) increasing from 59 to 152 during the same time frame.

Figure 4: Fatal Overdoses by Race/Ethnicity (2017–2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Table 2: Fatal Overdoses by Race/Ethnicity (2017-2022)

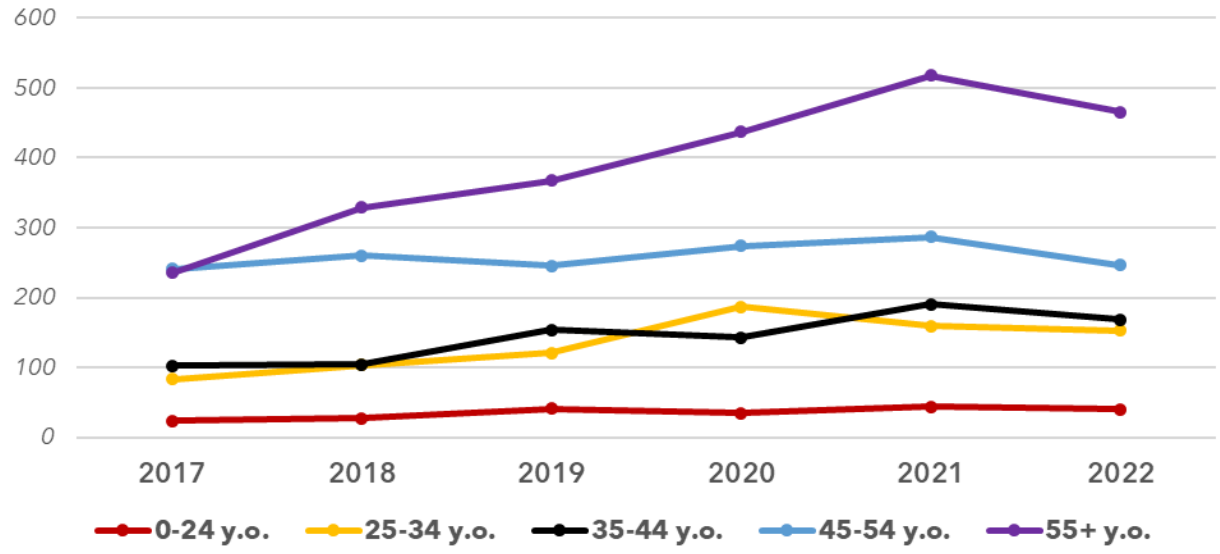
Year	NH Black	NH White	Hispanic	All Other NH
2017	687	1,505	59	31
2018	823	1,479	67	37
2019	928	1,342	75	34
2020	1,076	1,556	126	41
2021	1,198	1,427	124	51
2022	1,072	1,298	152	53

Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

[4] Ibid.

Non-Hispanic Black individuals above the age of 55 have been among the groups most impacted by fatal ODs in Maryland. Deaths among Non-Hispanic Black individuals aged 55 and older have increased by 97.9 percent since 2017 (from 235 to 465), whereas deaths for non-Hispanic White individuals aged 55 and older have increased by only 32.6 percent (from 267 to 354)

Figure 5: Fatal Overdoses Among Non-Hispanic Black Individuals by Age (2017–2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

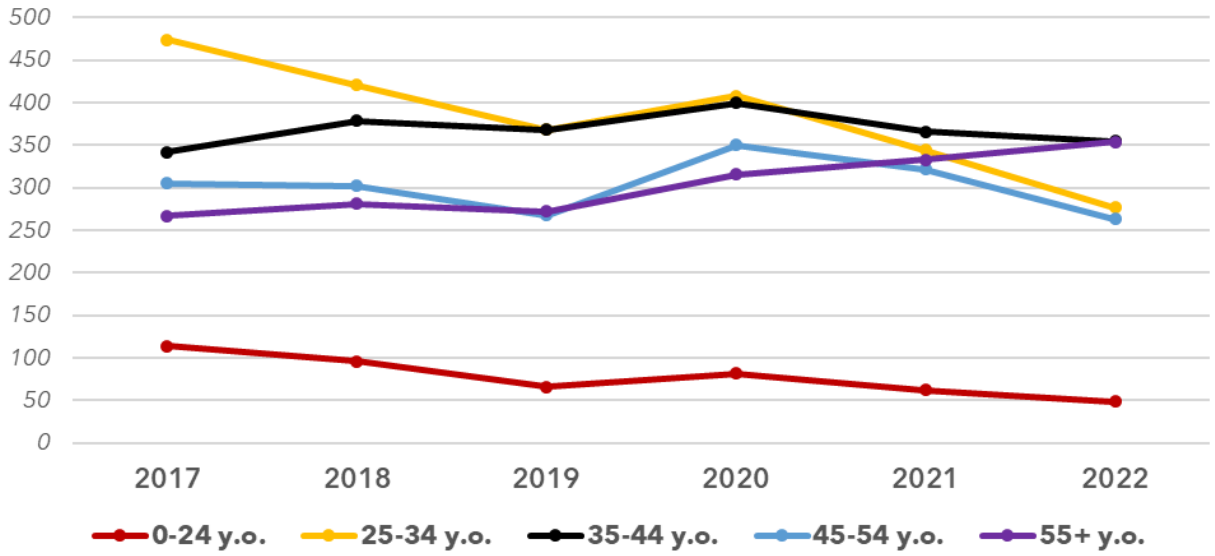
Table 3: Fatal Overdoses Among Non-Hispanic Black Individuals by Age (2017–2022)

Year	<25 Years Old	25-34 Years Old	35-44 Years Old	45-54 Years Old	55+ Years Old
2017	24	83	102	241	235
2018	27	103	104	260	329
2019	41	121	154	245	367
2020	35	187	143	274	437
2021	44	159	190	287	518
2022	40	153	168	246	465

Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Non-Hispanic White individuals saw decreases in three of the five age groups between 2017 and 2022. 35-44 year-olds increased slightly by 3.8 percent and individuals aged 55 and older saw the largest increase at 32.6 percent, which is one-third of the increase seen in this age group among non-Hispanic Black individuals.

Figure 6: Fatal Overdoses Among Non-Hispanic White Individuals by Age (2017–2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Table 4: Fatal Overdoses Among Non-Hispanic White Individuals by Age (2017–2022)

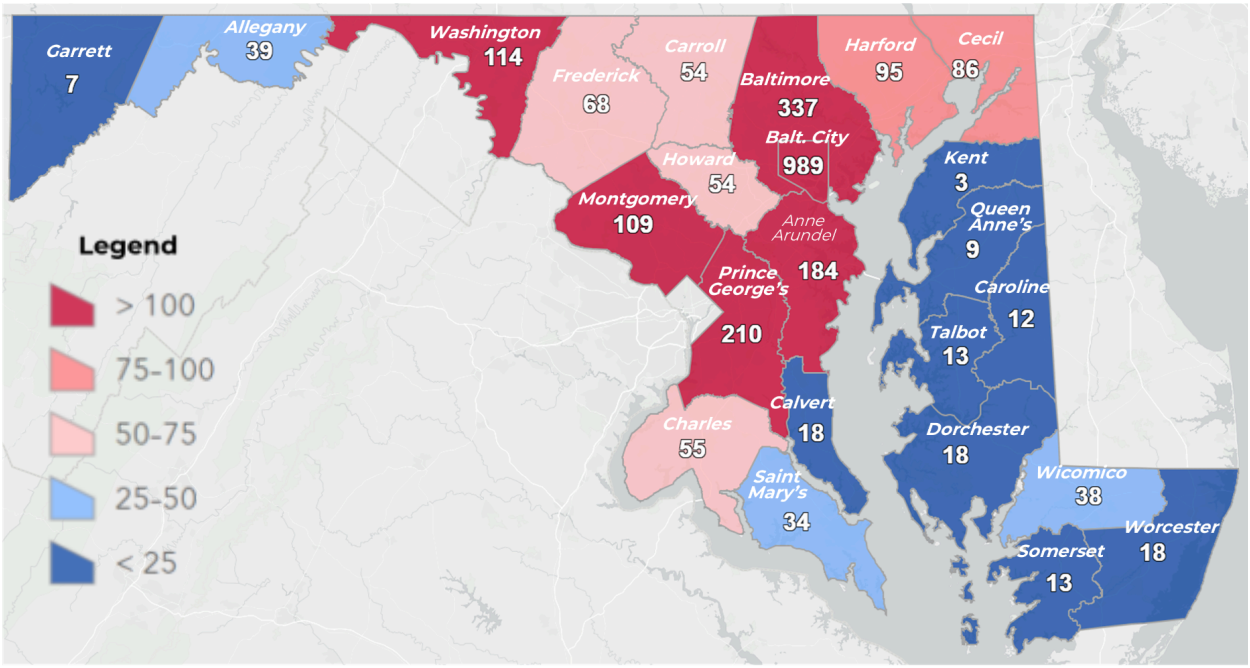
Year	<25 Years Old	25-34 Years Old	35-44 Years Old	45-54 Years Old	55+ Years Old
2017	114	474	342	305	267
2018	96	421	379	302	281
2019	66	368	368	268	272
2020	82	408	400	350	316
2021	62	344	366	322	333
2022	49	277	355	263	354

Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Geography

All intoxication overdose deaths in Maryland are largely concentrated in the central region of the state. In 2022, 58.6 percent of all OD deaths occurred in Baltimore City (38.4 percent; 989), Baltimore County (13.1 percent; 337), and Anne Arundel County (7.5 percent; 184).[5]

Map 1: Count of Fatal Overdoses by Jurisdiction (2022)

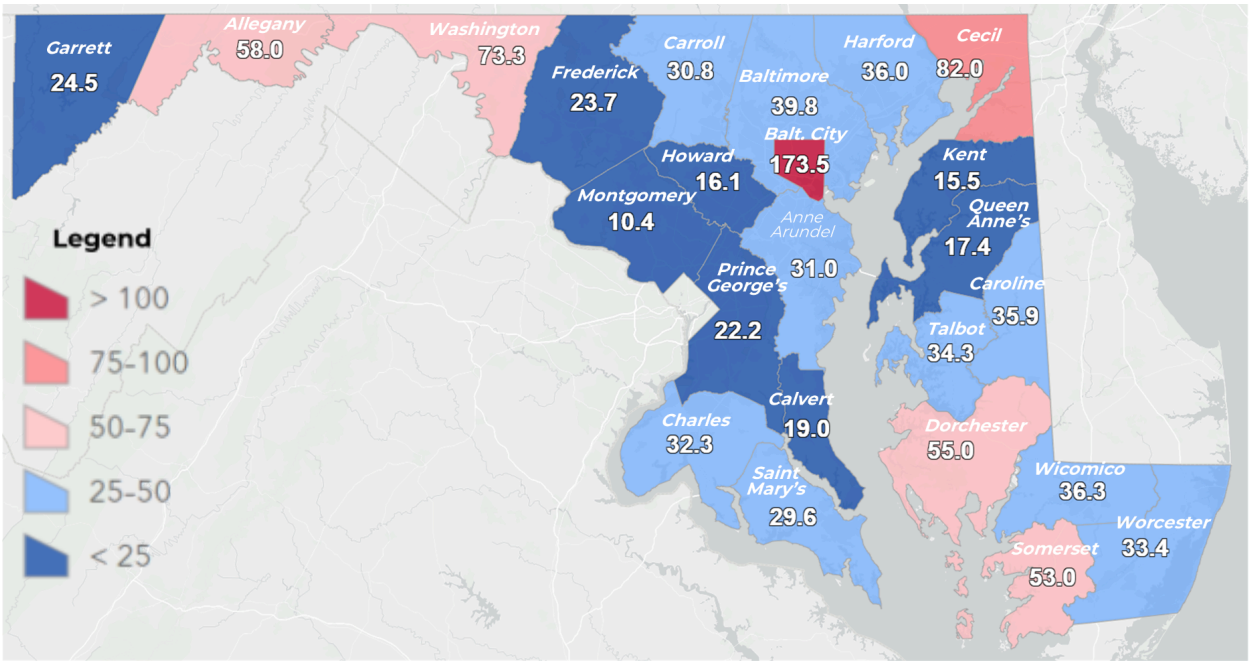


Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

[5] Ibid.

Overdose death rates show which communities are disproportionately affected by substance use. While a jurisdiction may have a high or low count of fatal overdose deaths, the overdose death rate takes the population size of the jurisdiction into account which can cause a high count to produce a low rate, and vice versa. The overall overdose rate for Maryland in 2022 is 41.8 deaths per 100,000 Maryland residents. As shown in Map 2, there are six jurisdictions with OD death rates above the state average, including: Baltimore City (173.5 per 100,000) with the highest rate, followed by Cecil (82.0), Washington (73.3), Allegany (58.0), Dorchester (55.0), and Somerset (53.0) Counties. The overdose death rate in Baltimore City is four times the State rate and two times higher than the rate in Cecil County, with the next highest rate.

Map 2: Fatal Overdose Rates by Jurisdiction per 100,000 Population (2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Educational Attainment And Other Social Determinants

According to data from the VSA, in 2022, 22.2 percent of OD decedents had less than a high school diploma or equivalent, and 60.8 percent had a high school diploma or equivalent.[6] 4.7 percent of people who died from an OD had an associate degree, 4.8 percent had a bachelor's degree, and 1.6 percent had a graduate degree.[7] Overdose deaths have increased between 2015 and 2022 most substantially in those who had less than a high school diploma (106.4 percent), followed by those who had a high school diploma or equivalent (89.8 percent), those with a graduate degree (77 percent), those with an associate's degree (75 percent), and ending with those who had a bachelor's degree (47 percent) with the lowest rate of increase. These findings indicate lower educational attainment may be associated with higher OD risk and higher educational attainment may be a protective factor against fatal OD.

[6] Statewide Unintentional Drug Overdose Reporting System (SUDORS) 2021.
[7] Ibid.

Since 2020 and the publication of Case and Deaton's seminal work on Deaths of Despair (DoD)[8], while there has been some research on the social determinants that contribute to DoD (i.e., fatalities related to drug overdoses, alcohol liver disease, and suicide), there is a lack of consensus on the topic. Beseran E. et al. (2022)[9], conducted a meta-analysis of 17 studies on social determinants associated with DoD and found that the primary drivers of DoD, include economic and income instability, lower socio-economic status, housing instability, living in a rural area, and occupation specific factors. Individuals from lower and middle income groups and with lower educational attainment are disproportionately impacted. While several studies have proposed that DoD is largely a problem for middle-aged, Non-Hispanic White individuals, other research has shown the Non-Hispanic Black and Hispanic communities are also disproportionately impacted.

Bystanders in Residential Settings

In 2022, 65.3 percent of people who died from an OD were found in a residence.[10] Of those who died in a residence, there was a bystander present in 54.2 percent of cases, 84.7 percent of which were family members or friends. Naloxone was administered in only 12.4 percent of all residential cases, which illustrates an opportunity to expand targeted naloxone distribution. This means 57.5 percent of fatal ODs occurred in a residence and did not receive naloxone.

of fatal overdoses occurred in residential settings.
Source: SUDORS

Among OD deaths that occurred in a residential setting in 2022 and in which naloxone was administered to the decedent, naloxone was administered by a first responder[11] in 46.3 percent of cases. In contrast, 54.4 percent of naloxone administrations were conducted by a first responder in 2019. This highlights a decreased percentage of naloxone administration by first responders (54.4 to 46.3 percent) in situations where there was a fatal OD in a residential setting, however there was an increase in bystander administration (50.6 to 61.0 percent) over first responder administration. This illustrates a positive trend of bystanders with Naloxone who were willing to administer. The administration rate of bystanders administering naloxone has been increasing from 8.5 percent in 2019 to 14.0 percent in 2022. This shows an increase of 5.5 percentage points over four years. Naloxone distribution, training, and de-stigmatization campaigns likely have had an impact on this statistic, getting more trained bystanders with access to Naloxone throughout Maryland communities. Even though this is a positively increasing trend, more training, innovative Naloxone distribution strategies, and targeted awareness and de-stigmatization campaigns are needed throughout Maryland communities to bring that number up from 14 percent.

[8] Case, A and Deaton, A. (2020) Deaths of Despair and the future of capitalism. Princeton University Press.
[9] Beseran, ., Pericas, J.M., Cash-Gibsons, L. Ventara-Cots, M., Pollack Porter, K.M., and Benarch, J., (2022). Deaths of despair: a scoping review of social determinants of drug overdose, alcohol-related liver disease and suicide. International Journal of Environmental Research and Public Health, 19(19) - 12395. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9566538/
[10] Residential settings include nursing home, long-term care facility, decedent's home, or another person's residence.
[11] First responder includes: EMS/fire; Law enforcement.

Medicaid Eligibility

A large majority (69.1 percent) of individuals who died from an overdose in 2022 were eligible for Medicaid in Maryland within the 12 months prior to their death.[12]

Among those who were eligible for Medicaid in the 12 months preceding their fatal overdose, 48.9 percent were White, 45.3 percent were Black, and 5.9 percent were other race/ethnicity or unknown. Additionally, 2.3 percent were 0-20 years of age, 34.0 percent were 21-39 years, 58.0 percent were 40-64 years, and 5.7 percent were 65 and older.

69.1% of overdose decedents were eligible for Medicaid within 12 months of their death.
Source: SUDORS

Summary of Overdose Deaths in Maryland

There were 2,577 OD-related fatalities in Maryland in 2022, an increase of 222.5 percent since 2012, according to preliminary data provided by the VSA. More than two-thirds of overdose descendants are male, however both males and females are increasing at similar rates. Overdose deaths decreased since 2017 in individuals aged 0-34 and 45-54 but increased in those aged 35-44 and 55 years and older. Overdose deaths are decreasing in Non-Hispanic Whites only, and increasing among non-Hispanic Blacks, and all other non-Hispanic races, with the most dramatic increases seen in the Hispanic population, despite overall low counts, comparatively. OD deaths among Hispanic youth and young adults aged 24 years and under have increased by 360 percent and deaths among Non-Hispanic Black individuals aged 55 and older have increased by 52.3 percent since 2019. These populations have been among the groups most impacted in recent years.

Geographically, the highest overdose death rates have been seen in Baltimore City and Cecil County, which are four and two times the state average rate, respectively. A comparison of overdose deaths by education level shows that lower educational attainment is associated with higher and increasing counts of overdose deaths. In 2022, 57.5 percent of all fatal ODs were in a residence and did not receive naloxone. More than two-thirds of individuals who had a fatal overdose in 2022 were eligible for Medicaid in Maryland within the 12 months preceding their deaths.

See Considerations and Limitations to Analysis section for more details.

[12] The Hilltop Institute. (2023, April 14). Medicaid Data for DORM Report. Baltimore, MD: UMBC.

III. OVERDOSE RISK FACTORS

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

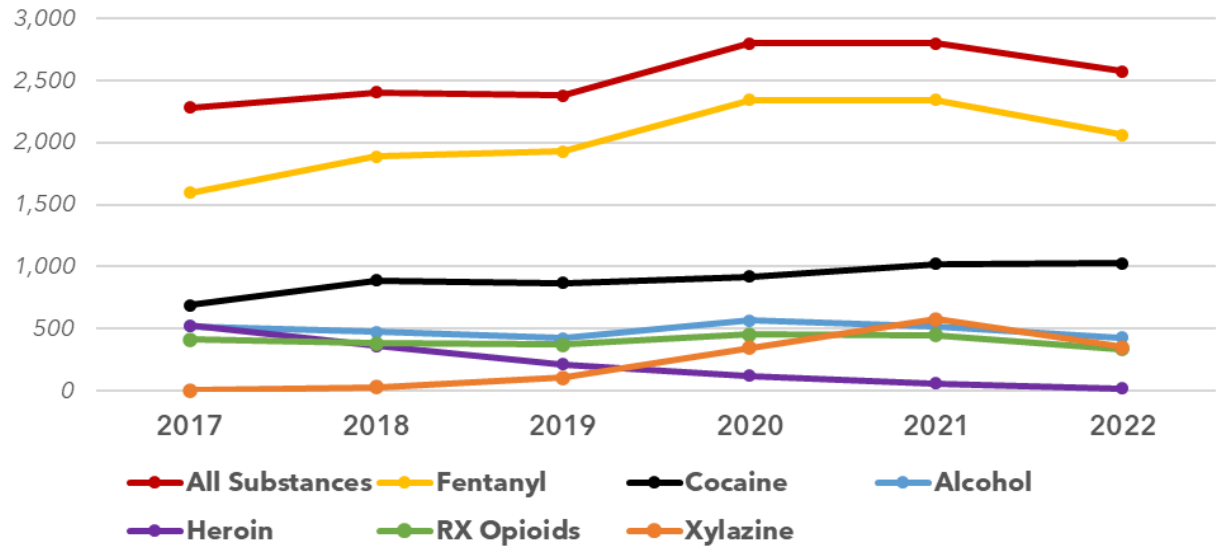
- Involvement with illicit drug markets (i.e., purchasing or usage of illicit drugs) characterized by inconsistency in drug potency and composition.
- Compulsive use of opioids, such as that associated with a clinical diagnosis of OUD, despite experiencing harm.
- Medical and behavioral health comorbidities,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

Drug Supply Characteristics

Illicitly manufactured fentanyl is the leading contributor to OD deaths in Maryland and across the country. In 2022, fentanyl was involved in 79.9 percent of all fatal ODs in Maryland. Fentanyl has largely displaced heroin in the illicit drug supply. Between 2017 and 2022, heroin-related fatal ODs decreased by 88.5 percent, and in 2022, heroin was involved in just 4.8 percent of all fatal ODs. Since 2018, cocaine has consistently been the second-most common substance involved in fatal ODs, following the rapid decline in heroin-related fatal ODs.[13] According to the CDC's National Vital Statistics System, drug overdose deaths caused by synthetic opioids such as fentanyl led to 74,829 deaths in December 2022 followed by cocaine-related deaths (27,921) and heroin-related deaths (5,958). Nationally, from 2017 to 2022, synthetic opioids such as fentanyl have led to the largest percentage of OD deaths followed by cocaine and heroin, mirroring trends in Maryland. As shown in Figure 7 , four substances showed declines in the frequency in Maryland in which they were present in overdose deaths (alcohol, heroin, RX opioids, and benzodiazepines), while five substances showed increases (fentanyl, cocaine, xylazine, methamphetamine, and phencyclidine).

[13] Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Figure 7: Overdose Deaths in Maryland by Select Substances (2017–2022)



Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Table 5: Overdose Deaths in Maryland by Select Substances (2017–2022)

Substance	2017	2018	2019	2020	2021	2022
All Substances	2,282	2,406	2,379	2,799	2,800	2,577
Fentanyl	1,594	1,888	1,927	2,342	2,344	2,060
Cocaine	691	891	869	921	1,021	1,025
Alcohol	517	472	423	566	517	426
Heroin	1,078	830	726	548	354	124
RX Opioids	413	379	369	453	447	334
Xylazine	*	25	103	344	575	352
Benzodiazepines	146	127	107	114	114	110
Methamphetamine	28	32	41	76	99	105
Phencyclidine	28	37	58	75	68	56

Source: Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.
Note: Most fatal overdoses involve the simultaneous use of more than one substance. The individual substance categories included here are not mutually exclusive (i.e., the sum total of deaths related to individual substance categories does not equal the total number of fatalities for a given time frame).
** Counts less than 11 are not able to be shown.*

HIDTA Drug Seizures

The market of illicit drugs is constantly evolving, and efforts to better understand the composition of illicit drugs can help inform OD-related mitigation efforts. Two ways in which Maryland can track the illicit drug supply are through drug-checking initiatives, such as the Rapid Analysis of Drugs (RAD) initiated in 2021, partnership between MDH's CHRS and the National Institute of Standards and Technology (NIST), and since 2017, through drug seizures analysis from law enforcement partners, such as the Washington/Baltimore High-Intensity Drug Trafficking Area (W/B HIDTA).

Data provided by W/B HIDTA show that the number of illicit drugs seized during HIDTA-funded law enforcement operations varied between 2020 and 2023. Baltimore city remains the source of supply for the state. Notably, large increases in the amount of seized illicit drugs were reported in 2021 across all drug categories except for prescription narcotics. However, seizures declined in all but two drug categories in 2022 and increased in all but three drug categories in 2023.

The amount of cocaine seized in 2021 was 429.4 percent more than the amount of cocaine seized during the prior year (increasing from 1,086 kg to 5,749 kg), before falling by 65.0 percent in 2022 (decreasing from 5,749 kg to 2,015 kg). Similarly, the amount of heroin that was seized increased by 119.6 percent in 2021, followed by a 90.4 percent decrease in 2022. The amount of synthetic hallucinogens & psychostimulants seized between 2020 and 2022 was not noteworthy, then increased substantially to the largest amount of drugs seized in any category at 4,381 kilograms.

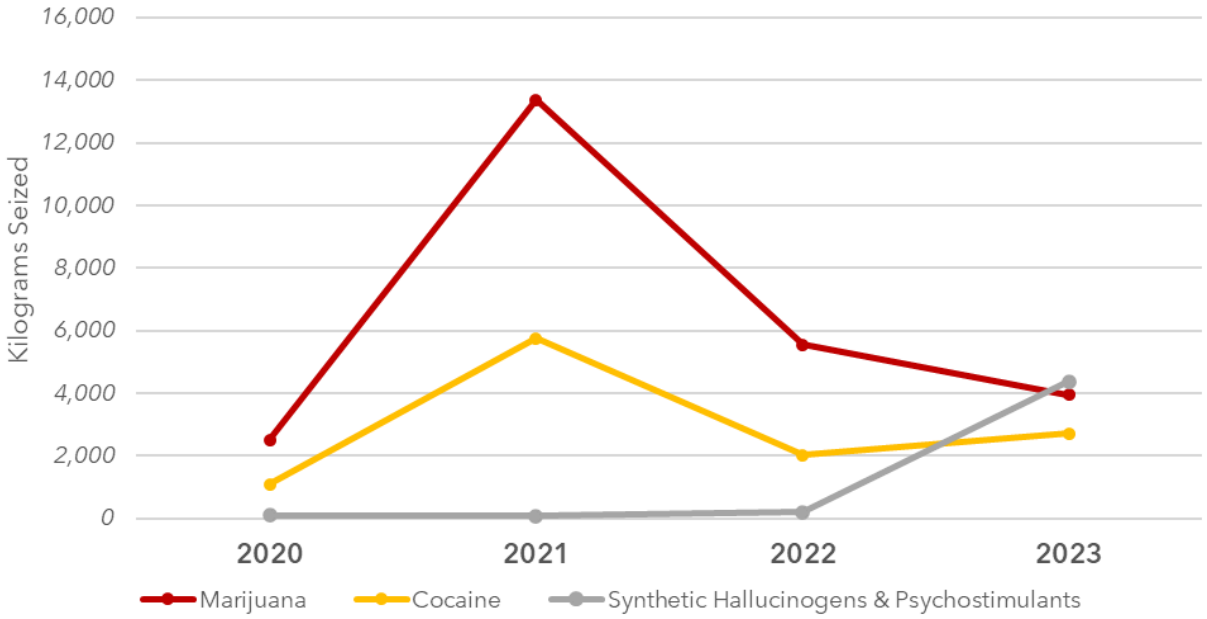
The amount of fentanyl and methamphetamine that was seized increased in both 2021 and 2022. The amount of fentanyl that was seized increased by 46.7 percent between 2020 and 2022 (from 77 kg to 113 kg), and the amount of methamphetamine that was seized increased by 75.9 percent during the same time frame (from 58 kg to 102 kg). The amount of methamphetamine seized has exhibited an increasing trend, increasing more than four times (436 percent)(from 58 kg to 253 kg), between 2020 and 2023.

Table 6: Kilograms of Illicit Drugs Seized by W/B HIDTA-Funded Law Enforcement Operations (2020–2023)

Substance	2020	2021	2022	2023
Cocaine	1,086	5,749	2,015	2,712
Methamphetamine	58	78	102	253
Heroin	51	112	40	8
Fentanyl	77	83	113	122
Cannabis	2,509	13,377	5,546	3,948
Synthetic Hallucinogens & Psychostimulants	93	72	199	4,381

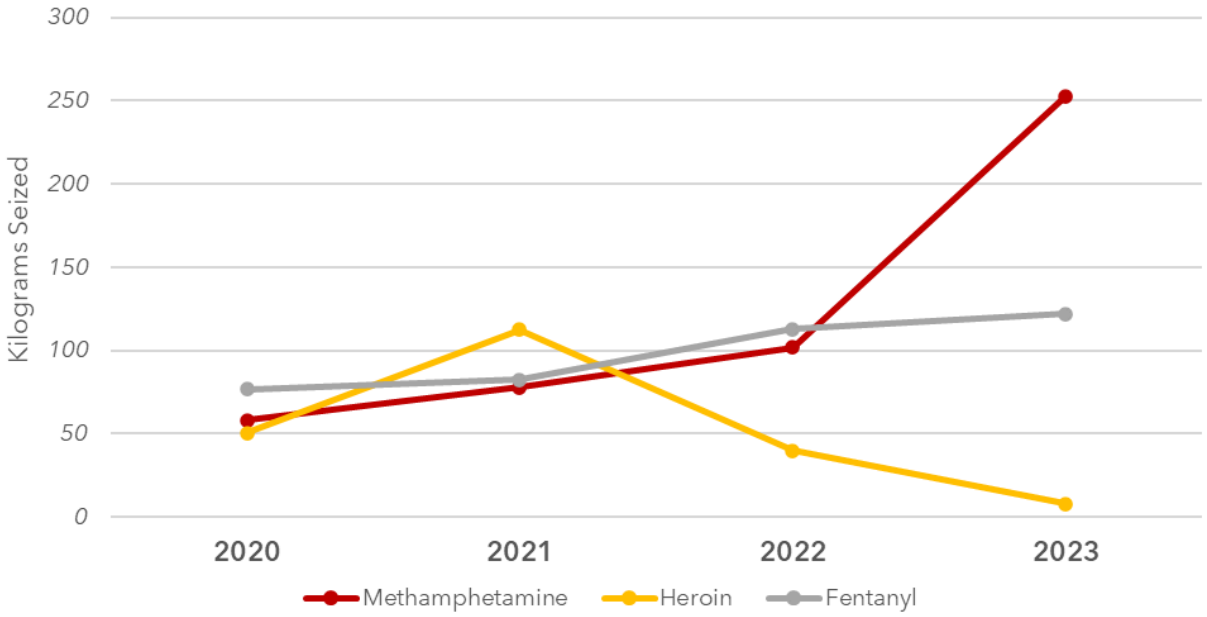
Source: Washington/Baltimore High Intensity Drug Trafficking Area, April 2024.

Figure 8: Kilograms of Illicit Drugs Seized by W/B HIDTA-Funded Law Enforcement Operations (2020–2023)



Source: Washington/Baltimore High Intensity Drug Trafficking Area, April 2024.

Figure 9: Kilograms of Illicit Drugs Seized by W/B HIDTA-Funded Law Enforcement Operations (2020–2023)



Source: Washington/Baltimore High Intensity Drug Trafficking Area, April 2024.

The Emergence of Xylazine

Xylazine's presence in the Maryland illicit drug supply was rare until 2019, and now is commonly detected among decedents in Maryland, especially in Baltimore City and Baltimore County. Xylazine also complicates overdose response efforts as a non-opioid sedative and contributes to increased frequency and severity of wounds among people who use drugs. Most decedents who test positive for xylazine had illicitly manufactured fentanyl (IMF) as a cause of death, which strongly suggests that xylazine is being found with IMF. The proportion of people dying of overdose who were xylazine-positive increased in early 2020 and peaked in early 2021. Seventeen percent of opioid overdose decedents in 2020 were xylazine positive, more than one-fourth (27.8 percent) of decedents in 2021 were xylazine-positive, and 14.99 percent of decedents in 2022 were xylazine-positive. From the peak in February 2021 through September 2023, there was a significant decrease in the number of unintentional xylazine-related deaths occurring in MD (p-value = 0.0011). For each passing month during this period, the number of xylazine-related deaths decreased by about 3.9 percent on average.

Information about xylazine in the drug supply from the RAD program was consistent with what was learned from overdose decedents. Specifically, among the samples of drug paraphernalia tested from October 2021 through May 2024, xylazine was identified in 33 percent of all samples. Among the samples that contained xylazine, 93 percent also contained fentanyl. Findings from the RAD program, Maryland State Police, and from preliminary overdose decedent data from the Statewide Unintentional Drug Overdose Reporting System (SUDORS) and VSA, the trend analysis provides early evidence that the proportion of overdose decedents who are xylazine-positive is no longer increasing. Although this is promising news, there were greater than 20 xylazine-related deaths per month throughout all of 2021 and 2022. Maryland is a long way from the January 2020 target of less than 5 percent of opioid overdose decedents being xylazine-positive, and continued investment in xylazine monitoring and overdose prevention and response efforts is necessary.

MDH has taken a proactive approach to implementing many of the priorities outlined in the Office of National Drug Control Policy's Fentanyl Adulterated or Associated with Xylazine Response Plan.

Deploying Testing in Community Settings & Targeting Testing to Those in Need

CHRS makes xylazine test strips available to 258 Overdose Response Programs (ORPs) through their centralized naloxone and test strip distribution model. To date, CHRS has purchased and distributed over 80,000 xylazine test strips to people who use drugs across the state. Additionally, CHRS continues to manage the RAD program to support on site drug checking at 17 of the 27 SSPs across the state. The SSPs are located around Maryland and CHRS maintains a map of all current locations. The initial RAD program report focused on xylazine was released at the end of 2023 and shared with interested parties statewide.

Epidemiological and System Enhancement, Coordination, and Development

MDH created an interagency Xylazine Work Group in 2021, composed of multidisciplinary professionals working in overdose surveillance, prevention and response efforts. The work group developed the Xylazine in Maryland report to provide critical information on xylazine, share data and make recommendations. Recommendations include building and maintaining infrastructure to respond to emerging drug threats, ongoing monitoring of xylazine in Maryland, disseminating information to stakeholders, and investigating factors underlying changes to the drug supply. The Overdose Data to Action program supports implementation of these recommendations, including expanding membership

of the original group and broadening the scope as the Emerging Drug Threats Work Group. The group meets bimonthly to monitor xylazine and examine any new drug trends across surveillance systems.

MDH is also conducting a project in collaboration with the University of Maryland Baltimore (UMB) to determine the prevalence of xylazine and nitazene exposure among hospital patients. UMB will be testing urine samples, collected for clinical purposes, for the presence of xylazine and nitazene and conducting chart reviews from patients who present to the ED at UMB to enhance understanding of exposure to xylazine among people who use drugs in Maryland. Project began in quarter four of 2023 and is estimated to be complete by quarter three of 2024.

Capacity Building Among First Responders and Other Service Providers

Qualitative research on wound care in Maryland communities has demonstrated that Marylanders are being turned away from SUD treatment due to insufficient clinical capacity to treat severe wounds related to xylazine. In response, the Department has invested in wound care capacity building, including hiring a wound care certified nurse to provide clinical and non-clinical training for healthcare professionals, harm reduction staff, and people who use drugs. CHRS also provides funding opportunities for local programs to expand wound care services. Lastly, CHRS worked with Johns Hopkins University to conduct qualitative interviews with people who use drugs and healthcare providers for a preliminary report: Key Problems and Recommendations along the Wound Care Continuum.

Educating the Public

Maryland's Office of Overdose Response (MOOR) has developed a xylazine resource webpage with resources for Marylanders to better understand the risks associated with xylazine exposure, including a public service announcement in both English and Spanish. The key messages are:

- Xylazine is in the Maryland illicit drug supply.
- Naloxone is still critical for overdose response, and breathing support where rescue breaths may be needed.
- Smoking is often safer than injecting.
- Do not use drugs alone. Call 988 if you are alone.
- Check your drugs with a Xylazine Test Strip or through RAD at a local SSP prior to use.

Rapid Analysis of Drugs Program

The Rapid Analysis of Drugs (RAD) program is a statewide drug-checking program that was launched in October 2021. The program uses de-identified drug paraphernalia samples (e.g., syringes, pipes, cookers, capsules, foil, baggies, etc.) provided voluntarily at SSPs across Maryland, which are then tested using Direct Analysis in Real-Time Mass Spectrometry (DART-MS) by NIST. RAD testing results are provided in near real-time, and testing results are used by participating SSPs to tailor harm-reduction information to participants. RAD data can also help public health officials and policymakers better under changing dynamics in the supply of illicit drugs, including information regarding novel substances and emerging trends.

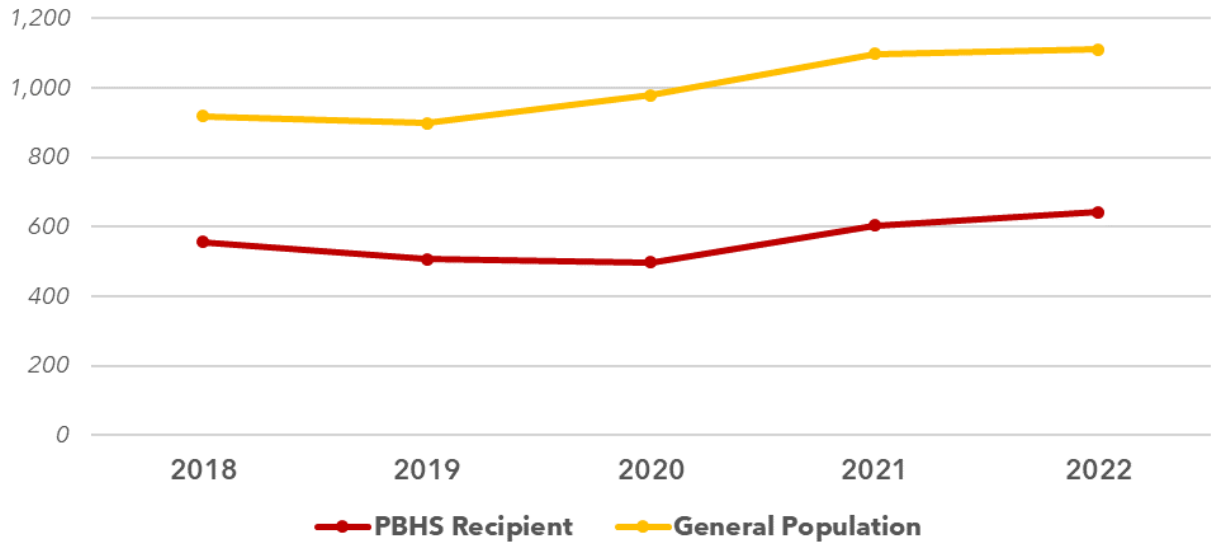
From July 1, 2020, through June 30, 2021, the RAD program analyzed 496 samples, 367 (74.0 percent) of which tested positive for an opioid and 364 (73.4 percent) tested positive for fentanyl. Between October 2021 and October 2023, RAD reported a total of 2,210 samples were analyzed and fentanyl was detected in nearly one-half (48 percent; 1,056) of the samples tested. Cocaine was the second most frequently detected substance, present in two-fifths of samples(39 percent; 860), followed by Xylazine that was detected in one-third (33 percent; 737) of the samples. Nearly two-thirds (63 percent; 665) of the samples that tested positive for fentanyl also contained xylazine.[14] RAD results during this time frame also revealed that many samples submitted by SSP participants contained more substances other than the substance that was intended for purchase.

[14] Rapid Analysis of Drugs Report. November 2023. Maryland Department of Health Center for Harm Reduction Services, Johns Hopkins Bloomberg School of Public Health.

Increasing Stimulant Use

Since 2018, stimulants have been increasingly involved in overdose mortalities in Maryland. Among all Maryland residents, stimulants were involved in 38 percent of overdose deaths in 2018, rising to 43 percent in 2022, representing a 21 percent increase in use. Among PBHS participants, stimulants were involved in 42 percent of OD deaths in 2018, rising to 45 percent in 2022, representing a 15 percent increase in use.

Figure 10: Stimulant Caused Overdose Deaths Among PBHS Participants and the General Population (2018-2022)



Source: Maryland Public Behavioral Health Service Claims, paid through January 31, 2024 and Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Table 7: Stimulant Caused Overdose Deaths Among PBHS Participants and the General Population (2018-2022)

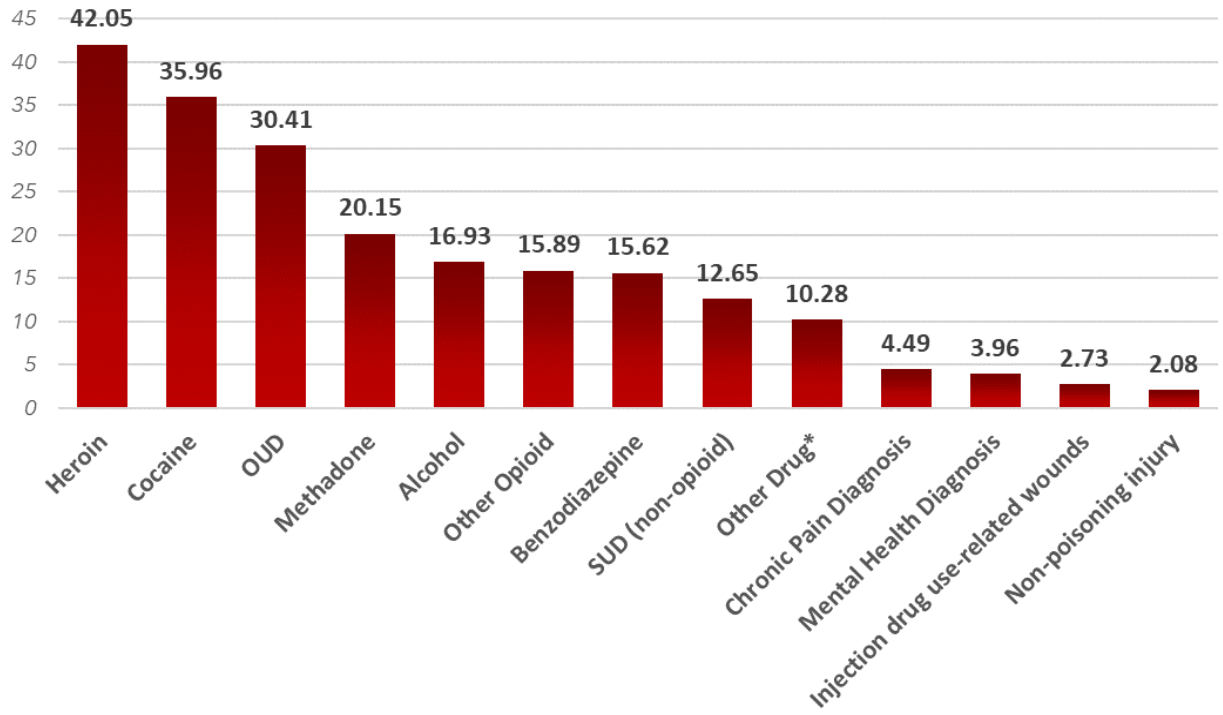
Year	Stimulant Involvement in All Overdose Deaths Among PBHS Recipients	Stimulant Involvement in All Overdose Deaths Among All Marylanders
2018	42%	38%
2019	38%	38%
2020	36%	35%
2021	41%	39%
2022	45%	43%

Source: Maryland Public Behavioral Health Service Claims, paid through January 31, 2024, and Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Comorbidities

Data show that between 2016 and 2022, OD decedents with mental health and substance use comorbidities were much more likely to experience fatal overdoses. According to data provided by the Health Services Cost Review Commission (HSCRC), individuals who experienced a heroin-related NFOD had 42.05 times and those who experienced an NFOD involving cocaine had 35.96 times the risk of experiencing a subsequent fatal OD involving any substance as compared to the general population accessing health services who did not experience a heroin-related or cocaine related OD during the study period. While the degree of risk associated with each diagnosis varied, every combination raised the overall risk of a fatal OD.

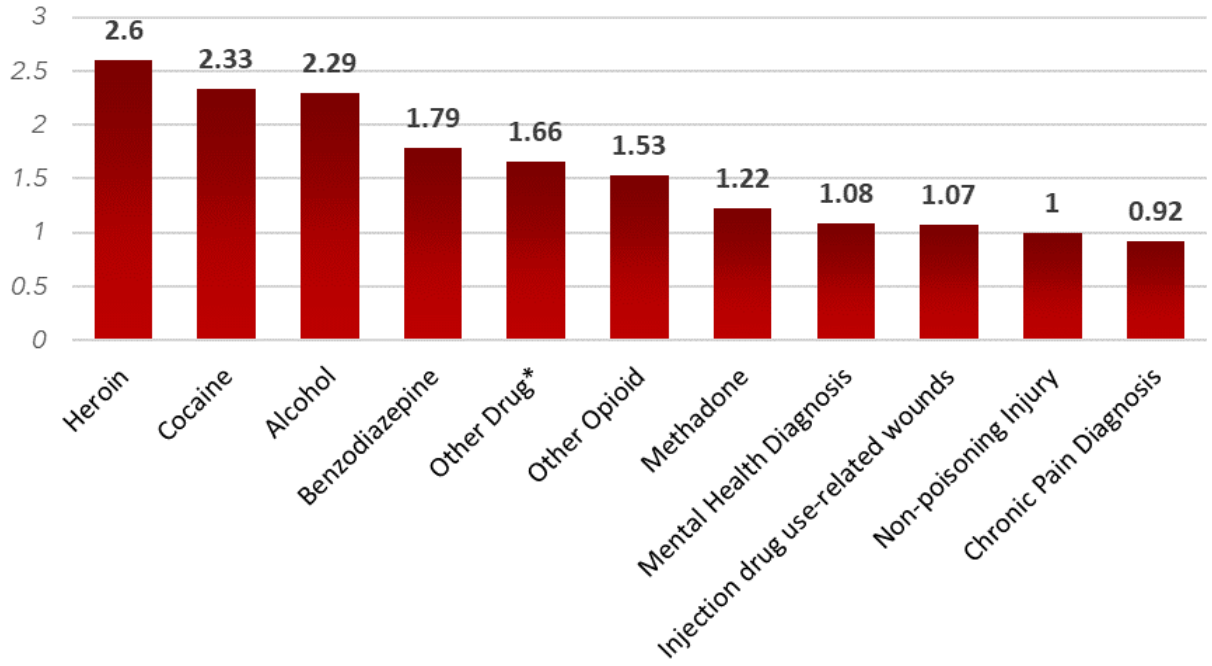
Figure 11: Relative Risk of Overdose Death Predicted by Previous Diagnosed Overdose and Related Conditions (2016-2022)



Source: Maryland Health Services Cost Review Commission, May 2024.

When comparing people with OUD, individuals who had an additional SUD related comorbidity were at higher risk for a fatal OD as compared to those who only had an OUD diagnosis. For example, individuals with diagnosed OUD who also had a diagnosis of cocaine dependency during the study period were 2.33 times more likely to experience a fatal OD than an individual with OUD and no history of cocaine dependency.

Figure 12: Relative Risk of Overdose Death Predicted by OUD Diagnosis and Previous Overdose (2016-2022)



Source: Maryland Health Services Cost Review Commission, May 2024.

Summary of Overdose Risk Factors

In 2022, fentanyl was involved in 79.9 percent of all fatal ODs. Fentanyl has largely displaced heroin in the illicit drug supply. Since 2018, cocaine has consistently been the second-most common substance involved in fatal ODs, following the rapid decline in heroin-related fatal ODs. Four substances showed declines between 2017 and 2022 in the frequency in which they were present in overdose deaths (alcohol, heroin, RX opioids, and benzodiazepines), while five substances showed increases (fentanyl, cocaine, xylazine, methamphetamine, and phencyclidine).

Two substances, xylazine and stimulants, have shown increases in presence in overdose deaths in recent years and have been identified as emerging public health threats. Xylazine's presence in the Maryland illicit drug supply was rare until 2019, and now is commonly-detected among decedents in Maryland, especially in Baltimore City and Baltimore County. Most decedents who test positive for xylazine had illicitly manufactured fentanyl (IMF) as a cause of death, which strongly suggests that xylazine is being found with IMF. Between 2021 and 2022, xylazine related overdose deaths began to decrease for the first time since its emergence into the drug supply. Among all Maryland residents, stimulants were involved in 38 percent of overdose deaths in 2018, rising to 43 percent in 2022.

According to data provided by the Baltimore/Washington HIDTA, the amount of fentanyl and methamphetamine that was seized by law enforcement increased substantially between 2020 and 2023. The amount of fentanyl seized increased by 59.1 percent between 2020 and 2023, and the amount of methamphetamine increased by more than four times (333.9 percent) during the same time frame. More recently, the amount of synthetic hallucinogens and psychostimulants seized in 2023 increased substantially from previous years to the largest amount of drugs seized in any category at 4,381 kilograms.

Data collected through SUDORS showed that at least 2.5 percent of OD decedents in 2022 were released from a prison, jail, or detention center in the 30 days prior to their death.

A relative risk analysis performed on the HSCRC Hospital Case-Mix data, shows that Individuals with OUD who had a co-occurring SUD or mental health related comorbidity were at substantially higher risk for a fatal OD as compared to those with only an OUD diagnosis. Consistent with the HSCRC findings, OD decedents who were engaged in PBHS services prior to their death, showed that individuals who received services for co-occurring SUD and mental health related conditions accounted for nearly two-thirds (64.5 percent) of all PBHS involved decedents and this group has increased at a faster rate than individuals with who received services for a SUD or mental health condition alone more than doubling since 2016.

See Considerations and Limitations to Analysis section for more details.

IV. SERVICE UTILIZATION

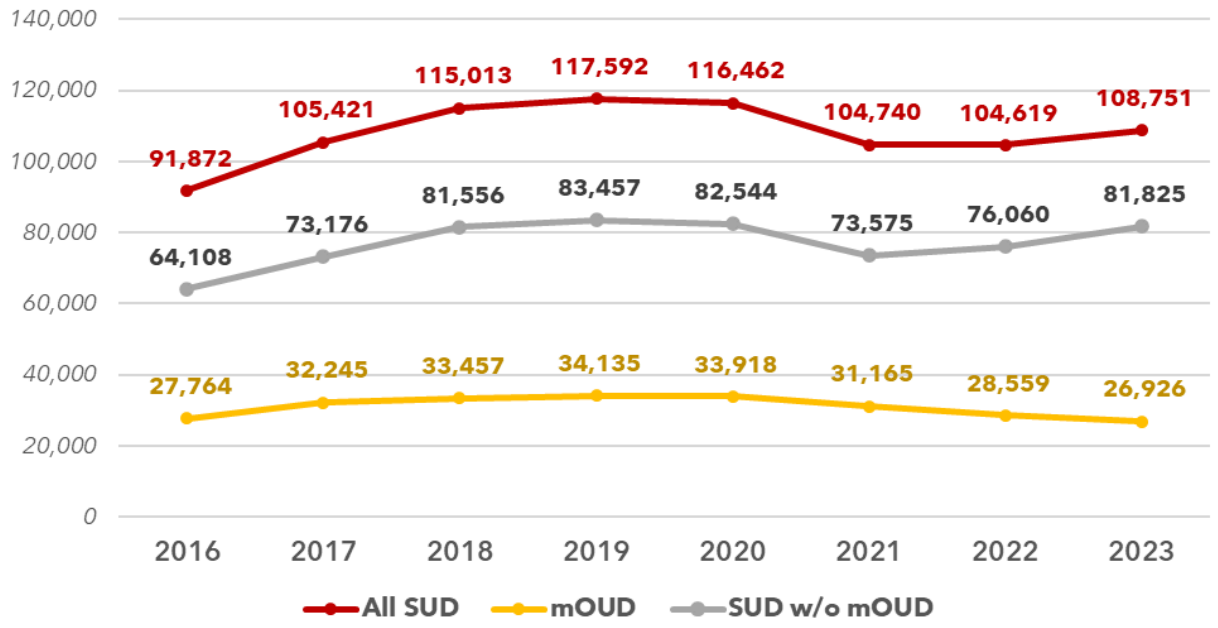
Service expansion for individuals who use drugs and have clinically diagnosed SUDs has grown in recent years. The following sections shown below provide data focused on healthcare service utilization for medications for OUD, other mental health and SUD services, targeted naloxone distribution, SSPs, non-behavioral health services, hospital characteristics, and service utilization by Medicaid participants.

PBHS Service Use Trends

Data from Maryland's PBHS, which provides publicly funded services for individuals who are enrolled in Medicaid or who are uninsured, shows the number of individuals who received any type of SUD service, excluding mOUD, in Maryland increased by 30.2 percent from fiscal years (FY) 2016 to 2019 before decreasing during the pandemic by 11.8 percent between FY2019 and FY2021. Since FY2021, SUD service use excluding mOUD has shown an increasing trend, increasing by 11.2 percent between FY2021 and FY2023. This brought the total number of people receiving PBHS SUD services, excluding mOUD, back near to the number that were receiving services in FY2018 (81,556 in FY2018 to 81,825 in FY2023).

The number of individuals who received mOUD through PBHS, including buprenorphine, methadone, and long-acting naltrexone, increased by 22.9 percent from FY2016 to FY2019 mOUD service use has trended down since FY2019, decreasing by 21.1 percent between FY2019 and FY2023.

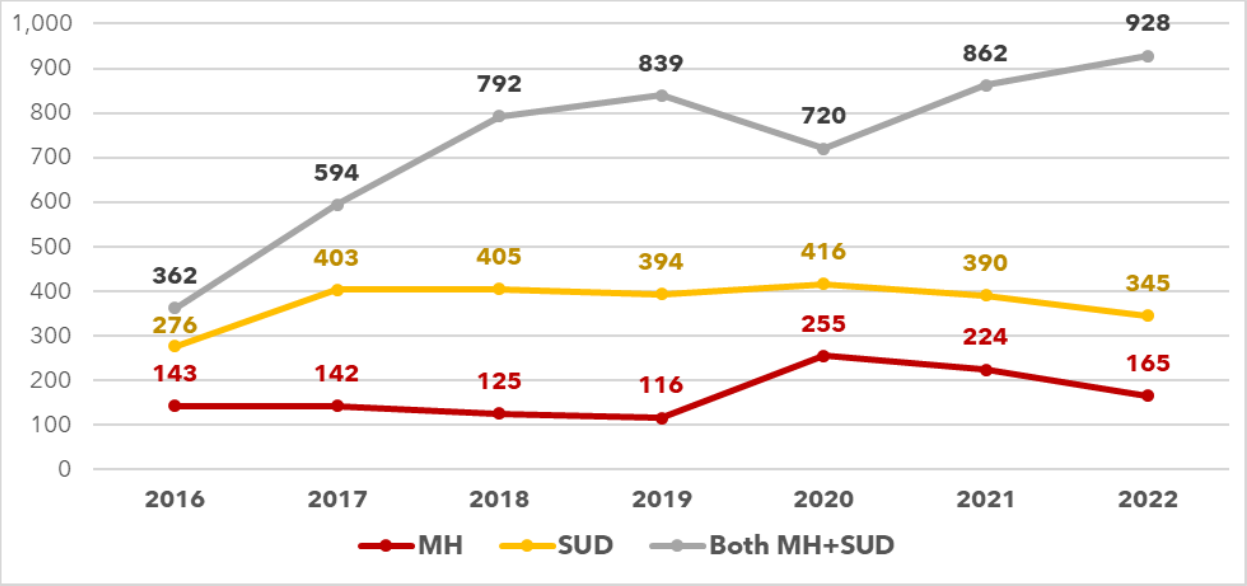
Figure 13: All SUD and mOUD PBHS Service Participants by Fiscal Year (2016-2023)



Source: Maryland Public Behavioral Health Service Claims, paid through January 31, 2024.
Note: Data for fiscal year 2023 is preliminary, as providers have until 12 months after the date of service to submit a claim for payment.
Note: Service utilization is analyzed based on a fiscal year from July to June as opposed to overdose data, which is presented as a calendar year

Among overdose descendants engaged in PBHS services, we see the frequency of death for individuals engaged in both mental health and SUD treatment services increasing by 156 percent overall since 2016 and increasing by 28.9 percent since 2020. Overdose deaths among those who used either mental health or SUD treatment services alone, have increased overall, 15.4 percent and 25.0 percent, respectively. However, these two services have been decreasing since 2020, 35.5 percent and 17.1 percent, respectively.

Figure 14: Overdose Decedents Engaged in PBHS Services by Service Type (2016-2022)

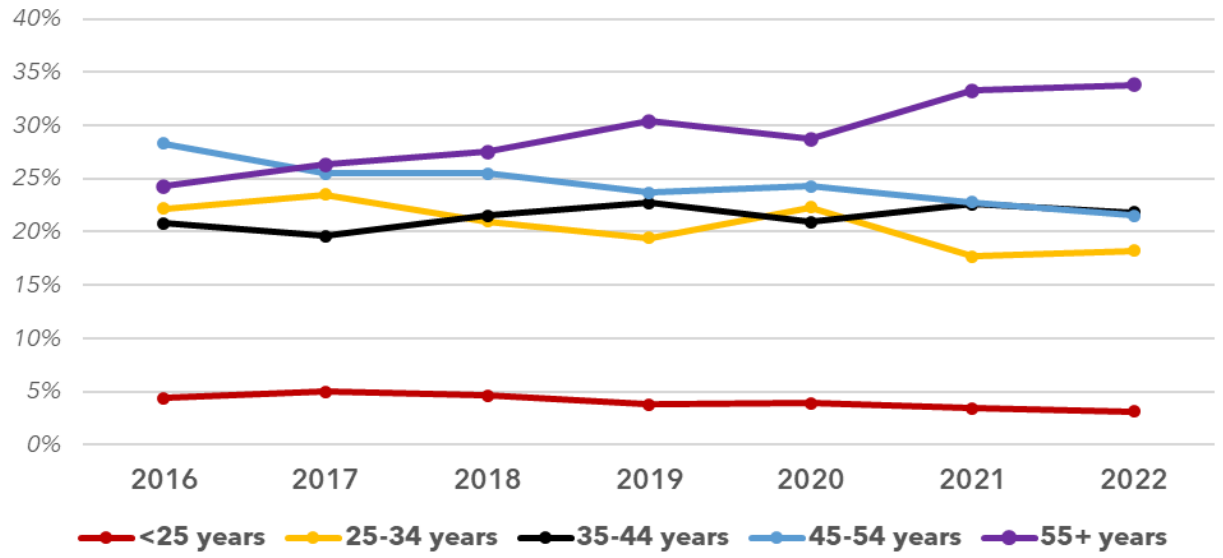


Source: Maryland Public Behavioral Health Service Claims, paid through January 31, 2024.

Prescription Drug Monitoring Program Trends

Trends involving fatal ODs among individuals who were dispensed controlled substances between 2016 and 2022 mirrored the trends seen in total fatal ODs during the same time frame. For example, between 2016 and 2022, the proportion of OD descendents over the age of 55 who were dispensed a controlled substance increased, while the proportion of OD between the ages of 25 and 34 who were dispensed a controlled substance decreased. The proportion of OD decedents under the age of 25 who were dispensed a controlled substance remained comparatively low throughout the time frame.[15]

Figure 15: Percentage of Overdose Decedents with a Controlled Substance Dispensed by Age (2016-2022)



Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

[15] BHA linked PDMP and OCME data.

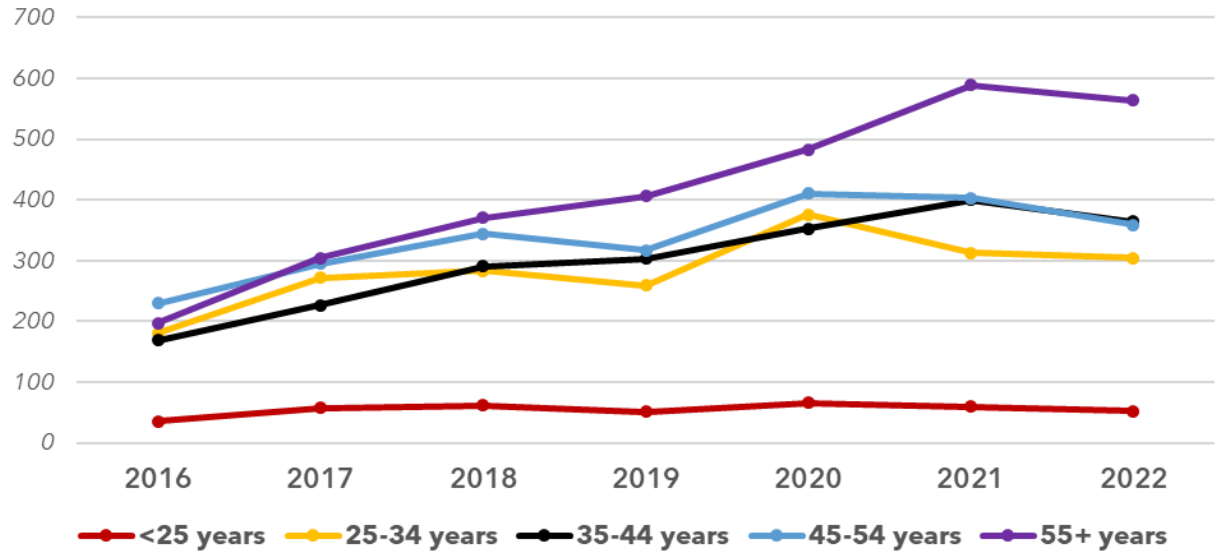
Table 8: Percentage of Overdose Decedents with a Controlled Substance Dispensed by Age (2016-2022)

Year	<25 years	25-34 years	35-44 years	45-54 years	55+ years
2016	4.4%	22.2%	20.8%	28.3%	24.3%
2017	5.0%	23.5%	19.6%	25.5%	26.3%
2018	4.6%	21.0%	21.5%	25.5%	27.5%
2019	3.8%	19.4%	22.7%	23.7%	30.4%
2020	3.9%	22.3%	20.9%	24.3%	28.7%
2021	3.4%	17.7%	22.6%	22.8%	33.3%
2022	3.1%	18.2%	21.8%	21.5%	33.8%

Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

Between 2016 and 2022, all age groups experienced increases in the number of OD decedents with a controlled substance dispensed. The largest increase was seen in individuals aged 55 and older who nearly tripled (186.3 percent), followed by individuals aged 35 to 44 years who saw a 115.4 percent increase. individuals aged 24 years and younger had the smallest increase of only 44.4 percent since 2016. In 2022, individuals aged 55 years and older accounted for most (34 percent) OD decedents with a controlled substance dispensed, followed by individuals aged 45-54 and 35-44 years of age (both 22 percent), 25-34 years of age (19 percent), and ending with those aged 24 years and younger (3 percent).

Figure 16: Count of Overdose Decedents with a Controlled Substance Dispensed by Age (2016-2022)



Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

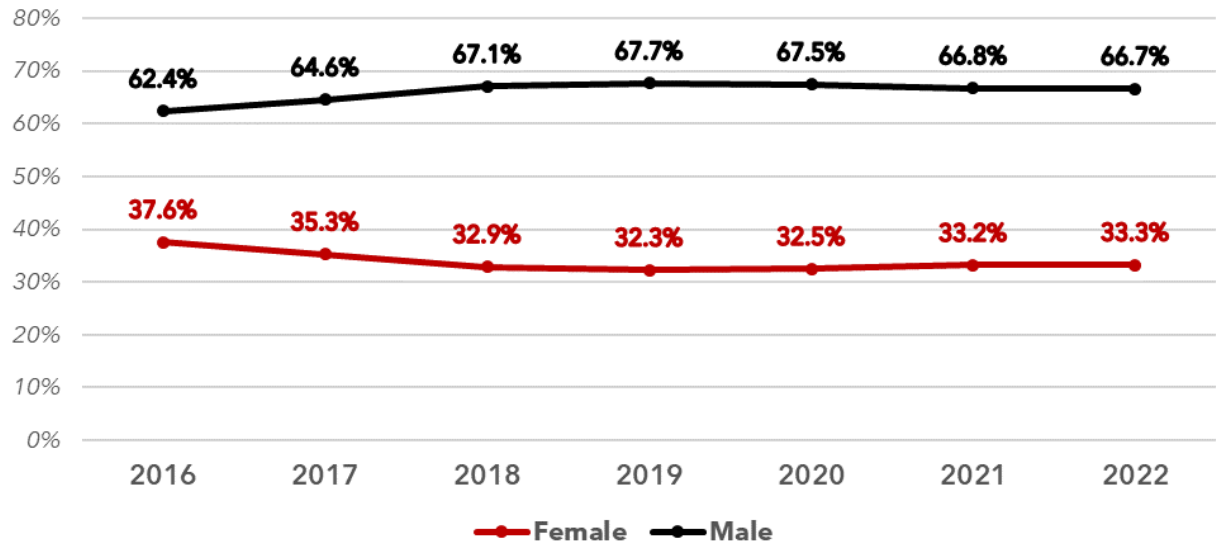
Table 9: Count of Overdose Decedents with a Controlled Substance Dispensed by Age (2016–2022)

Year	<25 years	25-34 years	35-44 years	45-54 years	55+ years
2016	36	180	169	230	197
2017	58	272	227	295	304
2018	62	282	291	345	371
2019	51	259	303	318	406
2020	66	376	353	410	485
2021	60	313	400	404	591
2022	52	304	364	359	564

Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

The number of male OD decedents dispensed a controlled substance increased from 62.4 percent in 2016 to 66.7 percent in 2022, while female decedents dispensed a controlled substance decreased from 37.6 percent in 2016 to 33.3 percent in 2022.[16]

Figure 17: Percentage of Overdose Decedents with a Controlled Substance Dispensed by Gender (2016–2022)

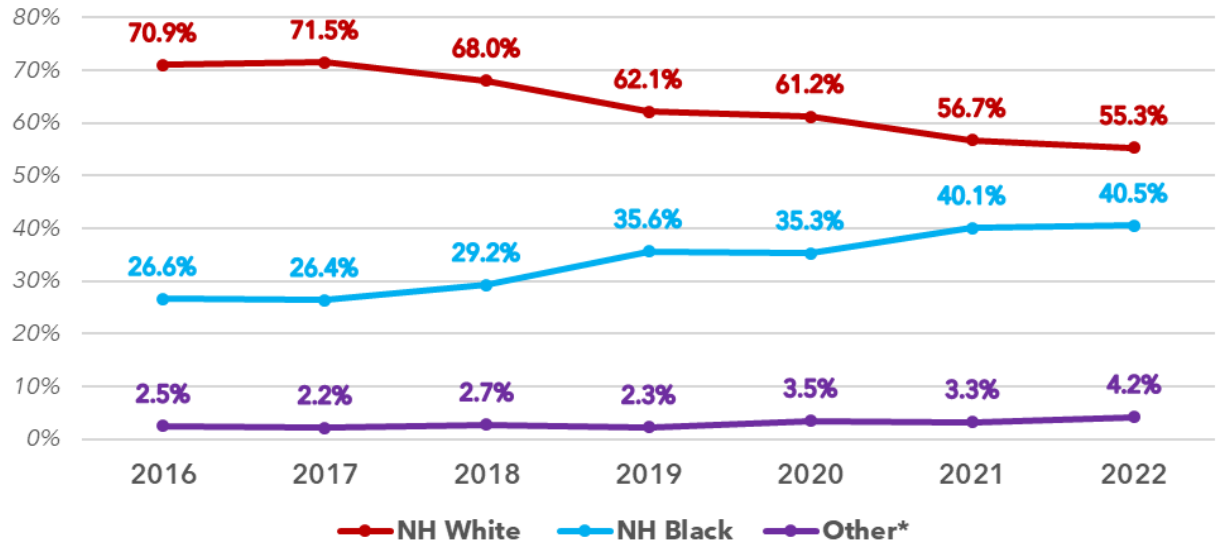


Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

[16] Ibid.

In 2022, non-Hispanic Black OD decedents with controlled substance dispense records in the PDMP made up 40.5 percent of all overall decedents with dispense records, while non-Hispanic White decedents made up 55.3 percent. Non-Hispanic White decedents with controlled substance dispense records experienced a 58.1 percent increase from 2016 to 2022 (576 to 911) while non-Hispanic Black decedents saw an increase of 218.5 percent (216 to 707) over the 7-year span. Similar to total fatal OD trends, OD fatalities among non-Hispanic White individuals who were dispensed a controlled substance decreased from 2016 to 2022, while OD fatalities among non-Hispanic Black individuals who received controlled substances increased.[17] Individuals identifying as Hispanic, Asian/Pacific Islander, American Indian/Native, or Multi-racial with a controlled substance dispense record accounted for no more than 5 percent of OD decedents in any year.

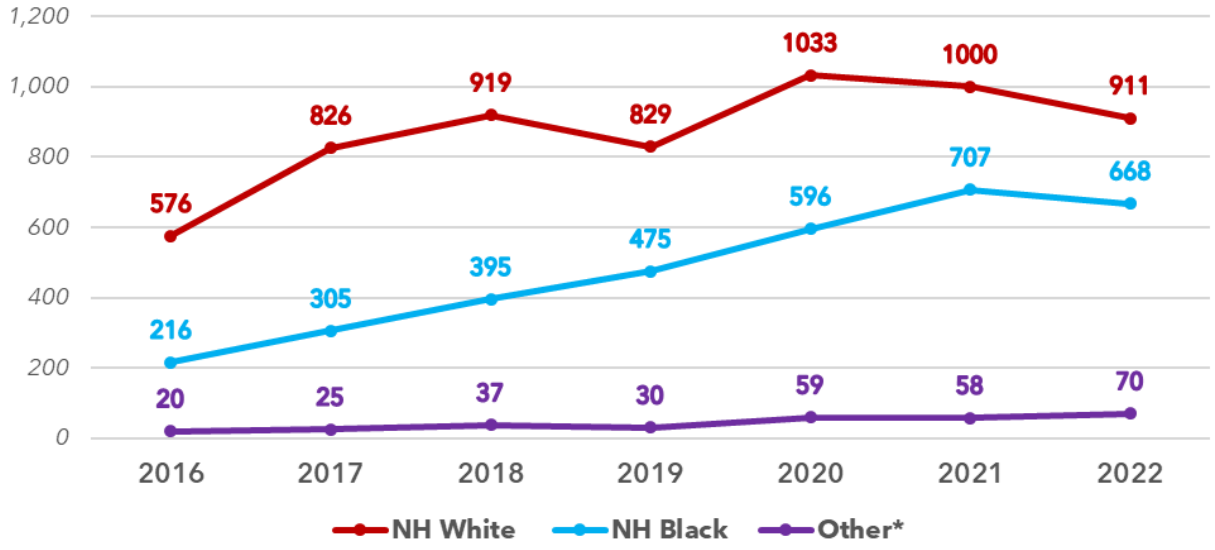
Figure 18: Percent of Overdose Decedents with a Controlled Substance Dispensed by Race (2016-2022)



Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.
*Note: *Other includes Hispanic, Asian/Pacific-Islander, American-Indian/American Native, and Multi-racial*

[17] Ibid.

Figure 19: Count of Overdose Decedents with a Controlled Substance Dispensed by Race (2016-2022)

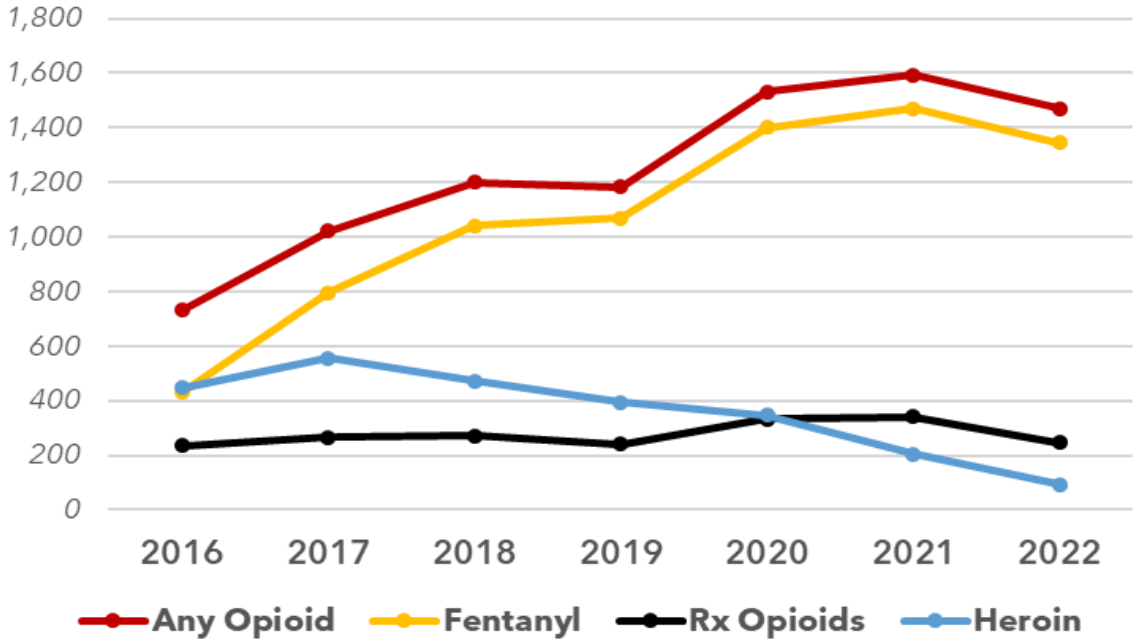


Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.
*Note: *Other includes Hispanic, Asian/Pacific-Islander, American-Indian/American Native, and Multi-racial*

Over the past seven years, heroin has decreased by 79.4 percent (from 447 to 92) in overall fatal ODs among those dispensed a controlled substance, while fentanyl has increased by 211.8 percent (from 431 to 1,344) in overall fatal ODs among those dispensed a controlled substance.

The highest number of OD deaths among decedents with a dispense record in the PDMP involve opioids, totaling 42.1 percent of deaths from 2016 to 2022 with fentanyl alone making up 36.4 percent of OD deaths among decedents with a dispense record from 2016 to 2022.[21] Since 2019, Fentanyl accounted for more than 90 percent of opioid-related OD deaths. OD deaths involving heroin among decedents with dispense records have steadily decreased from 2016 to 2022, making up only 2.9 percent (92 of 3,153) of OD deaths among decedents with a dispense record in 2022. Both opioid-related and fentanyl-related deaths among decedents with dispense records increased slightly from 2020 to 2022 by 4.2 and 3.9 percent respectively.

Figure 20: Substances Present in Overdoses Among Those with a Controlled Substance Dispensed (2016-2022)



Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

Table 10: Substances Present in Overdoses Among Those with a Controlled Substance Dispensed (2016-2022)

Year	Any Opioid	Fentanyl	Rx Opioids	Heroin
2016	732	431	236	447
2017	1,021	795	267	555
2018	1,201	1,040	273	471
2019	1,184	1,068	242	395
2020	1,531	1,399	334	347
2021	1,594	1,470	340	206
2022	1,470	1,344	247	92

Source: Prescription Drug Monitoring Program. Data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

Medicaid mOUD Trends

Table 11 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 2022. More than two-thirds (69.1 percent) of OD decedents in 2022 were eligible for Medicaid within 12 months prior to death and of those who were Medicaid eligible, nearly one-third (31.5 percent) received mOUD services. Buprenorphine treatment was consistently the most utilized type of mOUD among participants. The number of participants who received buprenorphine treatment increased by 10.0 percentage points between 2017 and 2022, increasing 4.9 percentage points between 2021 and 2022. Methadone treatment was the next most commonly utilized mOUD among participants but decreased by 7.5 percentage points across the evaluation period.[18] Naltrexone treatment was the least common type of mOUD alternating between increasing and decreasing percentage points over the evaluation period. Naltrexone started with a slight decrease of 0.8 percentage points in participants from 2017 to 2018 followed by a sudden increase in 2019 of 2.8 percentage points, a sharp decline in 2020 of 5 percentage points, a slight increase in 2021 of 0.9 percentage points, and ending with a decline of 2.4 percentage points. The percentage of participants receiving any MAT decreased from 36.0 percent in 2021 to 31.5 percent in 2022.

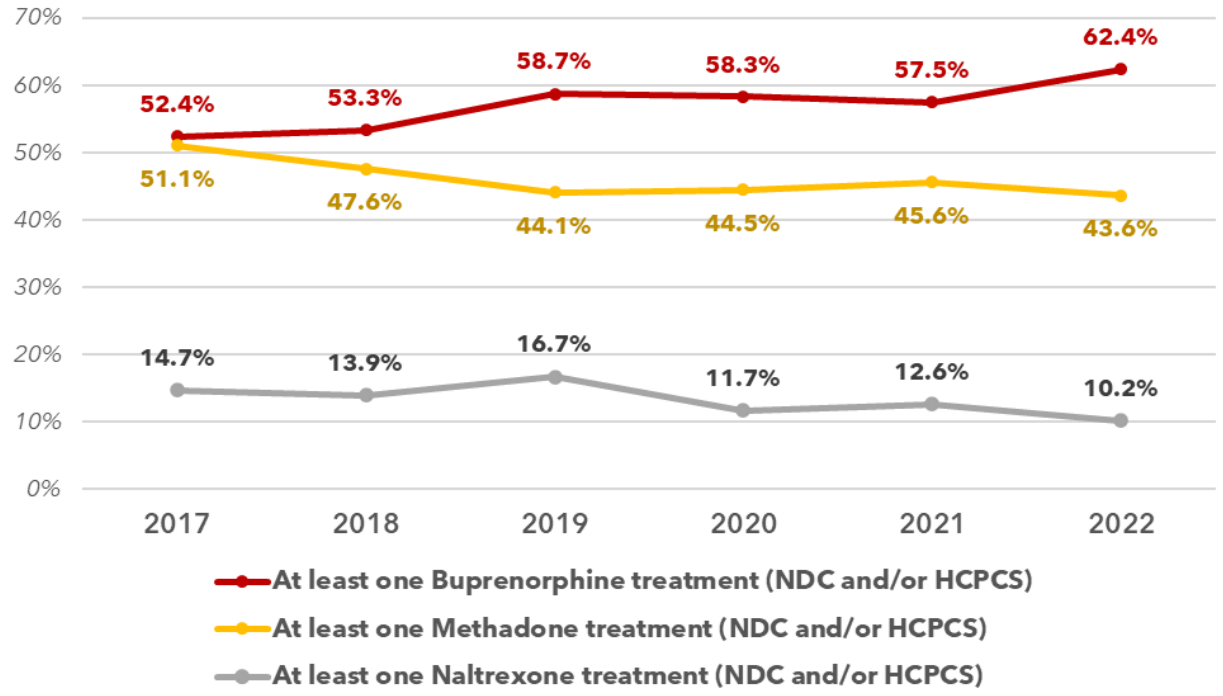
Table 11: Medicaid Participants Who Received mOUD within a Year of Their Fatal Overdose (2017–2022)

Event Type	Eligible Within One Year of Death					
	2017			2022		
	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	52.4%	2,921	325	62.4%	5,208
At least one methadone treatment	236	51.1%	5,720	227	43.6%	6,398
At least one Naltrexone treatment	68	14.7%	214	53	10.2%	202
Total	**462**	**-**	**8,855**	**521**	**-**	**11,808**

Source: The Hilltop Institute, Maryland Medicaid Administration, Maryland Vital Statistics Administration data through April 2024, and Maryland's Medicaid Management Information System (MMIS2).
** Participants may have received multiple types of MAT, this is an unduplicated total of participants.*

[18] The Hilltop Institute. (April 15, 2024). Medicaid Data for DORM Report. Baltimore, MD: UMBC.

Figure 21: Medicaid Participants Who Received mOUD Within a Year of Their Fatal Overdose (2017-2022)



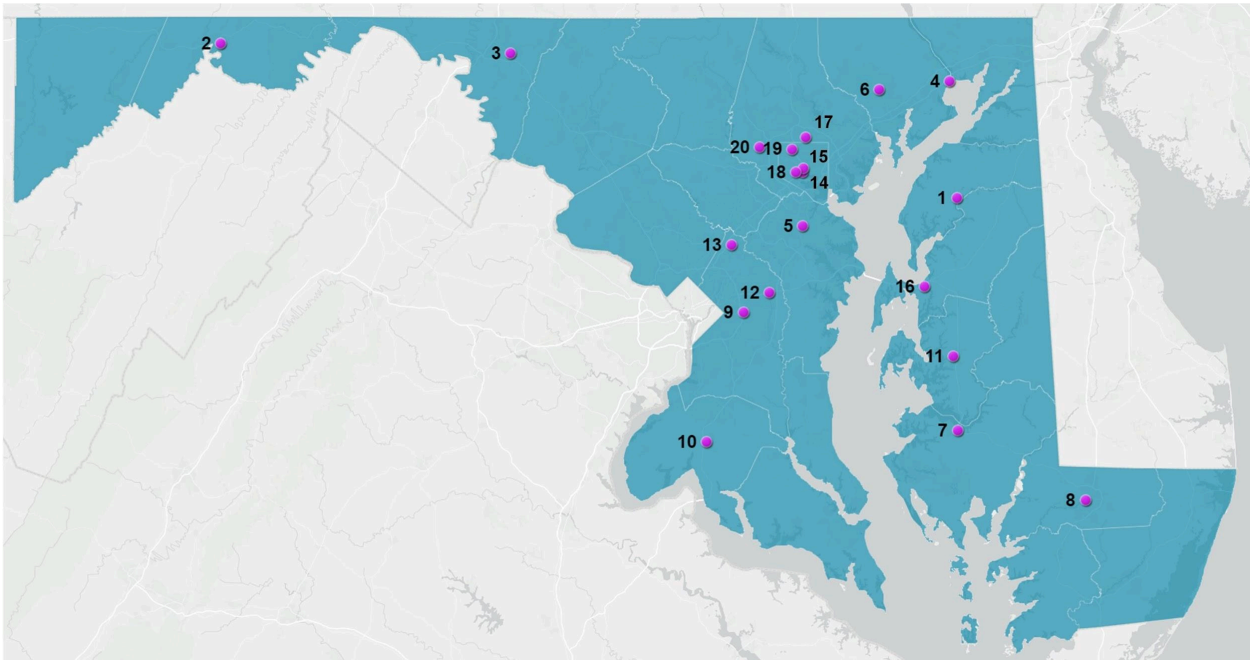
Source: The Hilltop Institute, Maryland Medicaid Administration, Maryland Vital Statistics Administration data through April 2024, and Maryland's Medicaid Management Information System (MMIS2).

Hospital-Level Data

The data presented in this section comes from the University of Maryland's Center for Substance Use, Addiction & Health Research's (CESAR) Maryland Emergency Department Drug Surveillance (MD-EDDS) system. In 2023, MD-EDDS received funding from Maryland's Office of Overdose Response (MOOR) to collaborate with 20 hospitals across the State to collect electronic health record (EHR) extracts for patients visiting each hospital's ED for a drug overdose. MD-EDDS also conducted expanded urine re-testing of approximately 100 specimens submitted by each of 14 hospitals. The EHR data presented in this report include the first results from the mandated statewide fentanyl testing initiated in October 2023 in compliance with the Josh Siems Act. The expanded EDDS urine re-testing provides the first information on xylazine exposures among hospital ED patients across the State.

Map 3 shows that the hospitals participating in MD-EDDS came from each region of the state. The following sections highlight key findings from the analyses of the EHR data, including the first hospital fentanyl test results since the implementation of the statewide testing mandate, and the expanded EDDS retesting of submitted specimens.

Map 3: Location of the 20 Hospitals Participating in MD-EDDS



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Table 12: Percentage of ED Drug Overdose Patients with Hospital Urine Drug Screen

Number	Hospital	City	EHRs Received for	% Tested in 2023
1	UM Shore Medical Center at Chestertown	Chestertown	2019-Sept. 2023	45
2	University of Pittsburgh Medical Center (UPMC) Western Maryland	Cumberland	2018-2023	43
3	Meritus Medical Center	Hagerstown	2019-June 2023	64
4	UM Harford Memorial Hospital	Havre De Grace	2020-2023	55
5	UM Baltimore Washington Medical Center	Glen Burnie	2016-2023	62
6	UM Upper Chesapeake Medical Center	Bel Air	2020-2023	51
7	UM Shore Medical Center at Cambridge	Cambridge	2022-2023	50
8	TidalHealth Peninsula Regional	Salisbury	2018-2023	31
9	UM Capital Region Medical Center	Largo	2021-2023	64
10	UM Charles Regional Health Center	La Plata	2019-2023	48
11	UM Shore Medical Center at Easton	Easton	2019-2023	49
12	UM Bowie Health Center	Bowie	2021-2023	39
13	UM Laurel Medical Center	Laurel	2021-2023	61
14	UM Medical Center	Baltimore	2016-2023	56
15	UM Medical Center, Midtown Campus	Baltimore	2016-2023	51
16	UM Shore Emergency Center at Queenstown	Queenstown	2019-2023	32
17	UM St. Joseph Medical Center	Baltimore	2016-2023	58
18	Grace Medical Center, LifeBridge Health	Baltimore	Partial 2021, 2023	XX
19	Sinai Hospital of Baltimore, LifeBridge Health	Baltimore	2018-2023	25
20	Northwest Hospital Center, LifeBridge Health	Baltimore County	2018-2023	48

Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Overview of Method and Findings from the Quarterly EHR Data

In 2023, the 20 MD-EDDS hospitals submitted two extracts from their EHRs for ED visits involving a drug overdose. MD-EDDS researchers analyzed the data to describe exposures to drugs included in standard hospital drug panels such as opiates, cocaine, amphetamine/methamphetamine and THC. Fentanyl was included for the first time for many of these hospitals starting in October 2023.

MD-EDDS includes ED visits for a drug overdose, defined as any ED visit involving a patient aged 18-90 who reported a complaint of "overdose" and/or had an International Classification of Disease (ICD) 10-CM T36-T50 initial encounter discharge diagnosis code of poisoning with accidental (unintentional), intentional self-harm, or undetermined intent. The EHR extracts include information on urine drug screen administration and urine drug screen results, where available, for each identified ED drug overdose visit, along with limited information about patient demographics, admission date, patient complaint(s) at admission, discharge diagnoses, and ICD-10-CM diagnosis codes.

Opiates, fentanyl, methadone, oxycodone, and buprenorphine are each identified by separate urine drug screens. The opiate screens are sensitive to natural opioids, such as morphine (typically a metabolite of heroin). Fentanyl is a semi-synthetic opioid and oxycodone is a synthetic opioid, so they are not detected by an opiate screen. This section presents cross-site analyses of the initial EHR information on fentanyl and trends in the percentage positive for cocaine, opiates, amphetamine/methamphetamine.

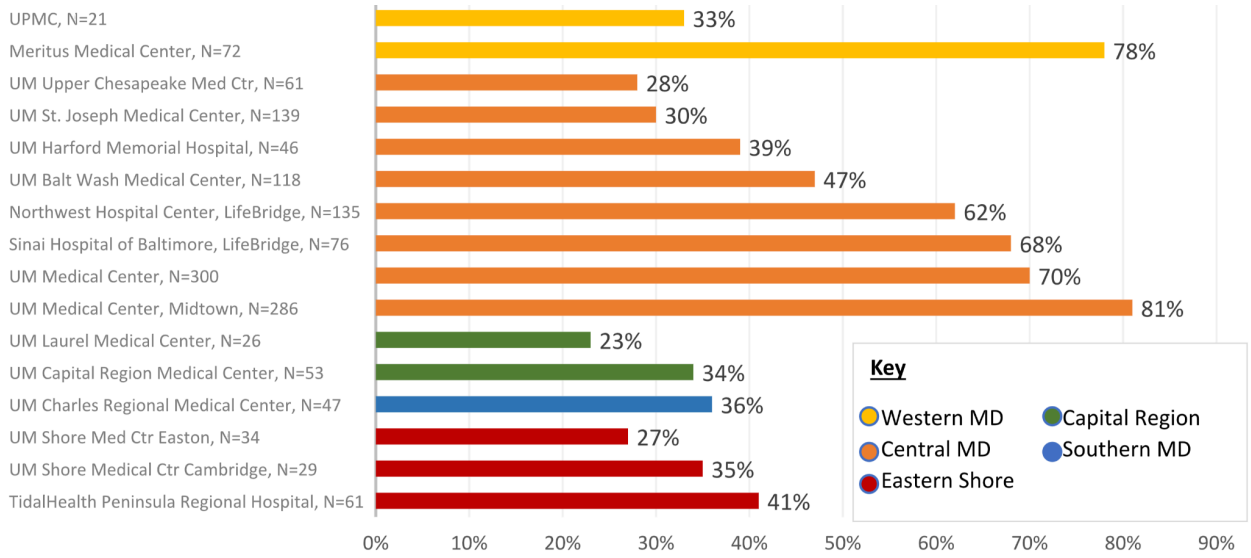
Doctors request urine drug screens for patients for a variety of reasons, and the drugs included in their screens often vary. The period for which drug screen results were submitted ranged from 1 to 8 years. In 2023, the percentage of overdose ED visits with a urine screen ranged from 25 percent to 64 percent; 15 hospitals tested 40 percent or more of their ED patients. The substances tested for can be found in Appendix C, Table 22.

Initial Hospital Urinalysis Results For Fentanyl

MD-EDDS results from 2022 were used by local advocates and legislators to pass the Josh Siems Act. This legislation required Maryland hospitals to add fentanyl to routine urine drug screens conducted as part of diagnostic procedures as of October 1, 2023. MD-EDDS has collected the first comprehensive testing results for fentanyl as part of the fourth quarter 2023 EHR data. To date, complete 2023 results have been received from all 20 MD-EDDS hospitals. Results are presented for only the hospitals that tested at least 20 patients for fentanyl. Data for four hospitals was excluded from the analyses presented here because of the low numbers of tests for fentanyl conducted. At 14 of the 16 hospitals, approximately the same number of patients were tested for fentanyl as for other drugs. One hospital (TidalHealth) tested slightly more patients for fentanyl than other drugs, and at one hospital (UPMC), considerably fewer patients were tested for fentanyl than other drugs.

Figure 22 shows the wide range of fentanyl positives reported. The percentage of specimens positive for fentanyl ranged from 81 percent in Baltimore City to 23 percent in Laurel in Prince George's County. In four hospitals, 68 percent or more of the specimens tested were positive for fentanyl. The lowest percentages positive were reported by hospitals in Harford, Prince George's, and Talbot counties and the highest in Baltimore City/County and Meritus Medical Center in Washington County.

Figure 22: Percentage of ED Overdose Patients Testing Positive for Fentanyl by Hospital (2023)



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

An analysis of the characteristics of the fentanyl positive drug overdose patients at the six hospitals with 20 or more visits positive for fentanyl in July-December 2023 (Appendix C; Table 23) shows that nearly three-quarters (73 percent) were male and 44 percent were aged 55 or older. Cocaine was the most frequent other drug detected in each of the hospitals. It was detected in nearly two-thirds of the fentanyl positive patients (65 percent).

Cross-Site Comparisons of Urinalysis Results In EHRS Show Decreasing Exposure To Opiates And Increasing Exposure To Stimulants

In 2023, 20 MD-EDDS hospitals provided a sufficient period of data (eighteen through Dec 2023, one through Sept. 2023, and one through June 2023) to assess trends in the percentage of ED overdose patients positive for THC, opiates, cocaine, and amphetamine/methamphetamine. In general, the Maryland trends reflected the national EDDS trends showing lower exposure to opiates like heroin and a growing exposure to stimulants among ED patients in 2022, and these trends continued in 2023. Further detailed hospital level testing results are included in Appendix C.

EDDS Expanded Re-testing Results

MD-EDDS staff worked with 14 hospitals to conduct a one-time collection of 100 specimens positive for any substance on the hospital's limited panel. Positive specimens were selected because our research has shown that specimens positive for emerging drugs such as fentanyl and xylazine also tend to test positive for more commonly detected drugs. Specimens were collected from consecutive, adult patients treated in the ED that had tested positive for at least one drug by the hospital laboratory. The 100 specimens were typically collected over a one- to three-month period beginning in September 2023. All specimens were tested for an expanded panel of approximately 200 substances by the MD-EDDS collaborating lab. Specimen collection and testing are expected to be completed by June 2024. Available results for 734 specimens from eight hospitals have been partially analyzed and appear in Table 13. Results for THC are not presented and were being processed at the time of this report. Additional retest results will be released on the MD-EDDS website as they become available.

Table 13 shows the variety of licit and illicit substances detected and how they varied across the state. Cocaine positives ranged from 15 percent to 50 percent of specimens tested and was the substance most frequently detected at two of the hospitals, UM Charles Regional (50 percent) in Southern Maryland and UM Shore Medical Center Cambridge (38 percent) on the Eastern Shore.

Non-fentanyl opioids were detected in 16 percent to 36 percent of specimens and were the most frequently detected substances at two hospitals, UM Capital Region in Prince George's County (35 percent) and TidalHealth (36 percent) on the Eastern Shore.

Fentanyl and xylazine were detected in the specimens from all eight hospitals included in Table 13. Fentanyl was detected in 9 percent to 22 percent. The most frequent analog of fentanyl detected was fentanyl/norfentanyl. Other fentanyl analogs detected include 4-ANPP, Acetylfentanyl, and *ortho*-Fluorofentanyl/*para*-Fluorofentanyl (p-FF). Xylazine, a substance often found in combination with fentanyl or other substances, was detected in 2 percent to 9 percent of these hospital positive specimens.

Other substances detected in specimens from all the hospitals include diphenhydramine (6-21 percent) and gabapentin (5-20 percent).

Table 13: MD-EDDS Expanded Re-Testing of Hospital Positive Specimens (2023-2024)

EDDS Retesting Found Positive for:	UM Baltimore Washington Medical Center (N=100) %	UM Harford Memorial (N=100) %	UM St. Joseph Medical Center (N=34) %	UM Charles Regional (N=100) %	UM Capital Region (N=100) %	UM Shore Medical Center Cambridge (N=100) %	UM Shore Medical Center Easton (N=100) %	TidalHealth (N=100) %
Marijuana	Pending	Pending	Pending	Pending	Pending	Pending	Pending	Pending
Cocaine[b]	19	23	15	50	18	38	24	30
Any Benzodiazepine	**34**	**37**	**38**	**37**	**34**	**27**	**33**	**34**
Any Non-Fentanyl Opioid	**19**	**16**	**(n=29) 28**	**17**	**35**	**25**	**28**	**36**
Morphine	13	7	12	14	13	15	11	28
Oxycodone	10	5	6	3	8	11	14	11
Oxymorphone	10	5	6	3	7	10	12	10
Hydromorphone	5	3	12	5	10	1	5	1
Hydrocodone	2		3	3	2	1	4	1
Codeine		2	6	7	3	5	9	4
Tramadol	1	3	6	2	5	4	4	1
6-Monoacetylmorphine (6-MAM)		1	3	1	2	3		
Any Fentanyl	18	9	(n=28) 14	11	13	16	8	22
Fentanyl / Norfentanyl	10	6	11	11	11	11	6	11
4-ANPP (Despropionyl fentanyl)	8	4		4		5		8
Acetylfentanyl/Acetyl Norfentanyl	4	3	4	3	3	6	3	6
ortho-Fluorofentanyl/ *para*-Fluorofentanyl (p-FF)[c]	1					3		5
Any Amphetamine	7	11	(n=31) 19	10	4	18	17	28
Amphetamine	5	10	18	10	3	12	12	12
Methamphetamine	1	2	4	1	1	7	9	17
Other Drugs								
Diphenhydramine	21	13	15	18	12	20	6	12
Gabapentin	16	20	12	20	5	13	10	18
Xylazine	5	5	6	4	2	8	6	9

Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.
Note: Drugs included in at least one hospital's routine drug screen are bolded. Not all hospitals test for codeine and oxycodone.
a.) Specimens were selected from consecutive emergency department patients aged 18 years or older that had undergone drug toxicology testing and tested positive for at least one drug on the hospital's drug panel. These specimens were not selected according to the eligibility criteria for selecting EHRs and represent a small time period. The results are therefore not directly comparable to this hospital's EHR findings.
b.) Includes cocaine (parent) and its major metabolites: Ecgonine methyl ester, Benzoylecgonine, and Cocaethylene. Cocaethylene forms when cocaine and ethanol are present together.
c.) These compounds have been combined, as currently it is not possible to distinguish between ortho-Fluorofentanyl and para-Fluorofentanyl through the laboratory testing.

Other (non-mOUD) Mental Health and SUD Services

Overdose Education and Naloxone Distribution in Maryland

CHRS promotes overdose education and ensures naloxone distribution statewide through its ORP. In operation since 2014, the program authorizes community-based organizations to become local ORPs and provides technical assistance to train them on the proper protocol for responding to an opioid overdose including the appropriate use of naloxone. Additionally, this program allows CHRS to equate the level of need for naloxone statewide with the aggregate demand for naloxone from state-authorized ORPs through CHRS's centralized naloxone purchasing system. Through a demand-based system, CHRS allows authorized ORPs to request naloxone for community-level distribution, funded by MDH. CHRS assesses ORP requests for reasonableness based on the entity's past requests, status of the ORP's existing inventory, Opioid Overdose Education and Naloxone Distribution (OEND) training data reported, compliance with program requirements, and other factors before approving the order.

In general, any community-based organization can apply to become an ORP and can learn more about the process on this MDH webpage. CHRS also requires entities receiving funds from its Advancing Cross-Cutting Engagement and Service Strategies for People Who Use Drugs (ACCESS) Grants program to become ORPs as these entities are funded to provide direct services to people who use drugs, this requirement significantly increases the likelihood that naloxone is reaching those individuals who are most likely to encounter an overdose. Additionally, the Maryland General Assembly passed the STOP Act of 2022 requiring homeless service programs, opioid treatment programs, intensive outpatient treatment programs, state and local correctional facilities, Department of Probation and Parole and hospitals to offer Food and Drug Administration (FDA) approved opioid overdose reversal drugs (OORD), free of charge, to individuals recently experiencing and opioid overdose or diagnosed with a SUD. The law also requires that MDH purchase and provide OORD to these entities. To help facilitate the implementation of this law, CHRS has worked with the aforementioned entities to enable them to become ORPs.

Naloxone Saturation

When evaluating the efficacy of OEND programs, the term "saturation" has been increasingly used as a public health goal with SAMHSA now requiring state State Opioid Response (SOR) grantees to develop naloxone saturation plans. Philosophically, saturation is defined in terms of the general goal of OEND programs to ensure that, at every opioid overdose event, naloxone is present, and witnesses are capable of using it effectively as part of life-saving overdose response. From the perspective of public health policy and program management, saturation may be more narrowly defined as "the point at which providing additional naloxone supplies to a community fails to further reduce overdose mortality rates."[19]

Historically, CHRS used a statistical model for naloxone saturation as a tool for projecting statewide naloxone needs and evaluating the reach and impact of OEND programs at the state and local levels. The model was derived from findings from Scotland's national "take-home naloxone" program targeting opioid users at high-risk for overdose, which indicated that health authorities should aim to distribute 9 to 20 times as many naloxone kits as there are opioid overdose deaths annually.[20] The ORP model

[19]Bennett, A. S., & Elliott, L. (2021). Naloxone's role in the national opioid crisis—past struggles, current efforts, and future opportunities. *Translational Research*, *234*, 43-57.

[20] Bird, S. M., Parmar, M. K., & Strang, J. (2015). Take-home naloxone to prevent fatalities from opiate-overdose: protocol for Scotland's public health policy evaluation, and a new measure to assess impact. *Drugs: education, prevention and policy*, *22*(1), 66-76.

multiplied annual state and jurisdictional overdose death totals by 20 to derive the saturation targets. A strength of this model has been its simplicity; however, weaknesses of the model include the inability to account for the probability of witnessing overdoses and use rates of existing community supply. Additionally, the use of statistical multipliers derived from research in another country, not subject to the widespread use of illicitly manufactured fentanyl present in Maryland which significantly increases fatal overdose risk further limits its utility. Maryland consistently met and oftentimes exceeded the saturation targets based on this historical modeling.

To demonstrate the required growth in naloxone demand over time due to the STOP Act, and to better reflect the evidence-based community distribution[21] of naloxone and its contribution to the reduction in overdose fatalities at a jurisdictional level in Maryland, naloxone distribution data is presented as a reflection of demand, total ORPs, and number of ORPs that are STOP Act mandated. As evidenced by the analysis, growth in naloxone demand within a jurisdiction is largely associated with a growth in ORPs, many of which are mandated by the STOP Act. The analysis also displays the percentage of the total naloxone distributed statewide by jurisdiction in 2023, demonstrating that most of naloxone is distributed in the jurisdictions with the highest rates of overdose.

Additionally, CHRS captures naloxone distribution by event setting and this data highlights that 27 percent of naloxone is distributed through street outreach, 17 percent is distributed at SSPs, 11 percent at community-based organizations and 8 percent is distributed at opioid treatment programs, all locations where there is a very high likelihood of encountering individuals who are likely to witness and overdose.

Table 14: Total Naloxone Doses Distributed by Event Setting (2022-2023)

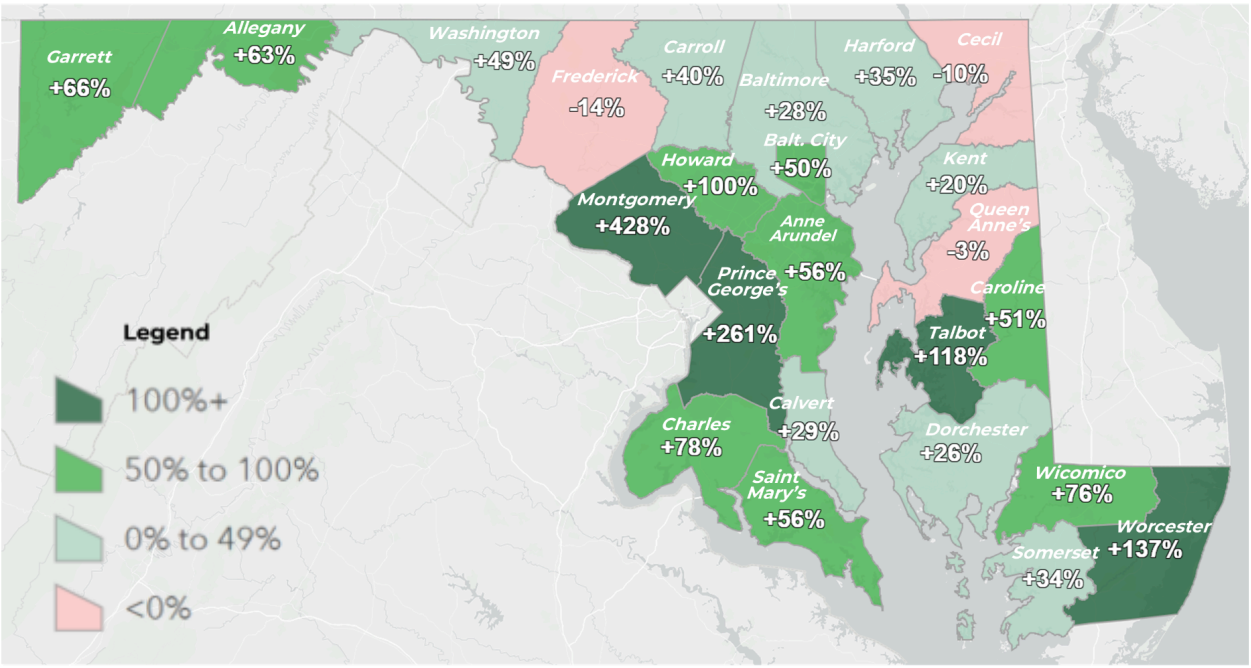
Event Setting	2022	2023	% of Total Doses (2023)
Street Outreach	87,103	106,111	26.9%
SSP	31,556	66,729	16.9%
Community Based Organization	33,268	42,113	10.7%
mOUD Provider (includes methadone and/or suboxone)	15,681	32,530	8.2%
Local Health Department	15,460	29,138	7.4%
Educational Institution	5,253	18,337	4.6%
Detention Center	4,136	10,580	2.7%
EMS Leave Behind	2,660	9,511	2.4%
Business	3,840	8,422	2.1%
Transitional Housing (Halfway Home, Recovery House)	3,487	8,126	2.1%

[21] Irvine, M. A., Oller, D., Boggis, J., Bishop, B., Coombs, D., Wheeler, E., ... & Green, T. C. (2022). Estimating naloxone need in the USA across fentanyl, heroin, and prescription opioid epidemics: a modeling study. The Lancet Public Health, 7(3), e210-e218.

Government Agency Staff	1,645	8,077	2.0%
Community Center	8,164	7,834	2.0%
Conference/Training for Other Events	2,150	6,170	1.6%
Hospital	1,845	5,513	1.4%
Law Enforcement	3,925	5,384	1.4%
Parole and Probation	1,736	4,502	1.1%
Mail-Order	3,592	3,276	0.8%
Intensive Outpatient	3,968	3,120	0.8%
Faith-Based Organization	1,779	3,018	0.8%
Online	2,601	2,979	0.8%
Urgent Care Center	2,710	2,570	0.7%
Emergency Department	237	2,069	0.5%
Non-Medication Substance Use Treatment Provider	2,627	2,026	0.5%
Library	0	1,286	0.3%
Primary Care Clinic	807	1,122	0.3%
Homeless Shelter	756	951	0.2%
EMS and/or Fire Personnel	882	902	0.2%
Vending Machine or Naloxone Box	0	844	0.2%
Re-Entry Services (Other)	122	662	0.2%
Participant Home	545	467	0.1%
Pharmacy	154	447	0.1%
Totals	**242,689**	**394,816**	**100.0%**

Source: MDH Center for Harm Reduction Services, June 2024.

Map 4: Naloxone Distribution Percent Change (2022-2023)



Source: MDH Center for Harm Reduction Services, June 2024.

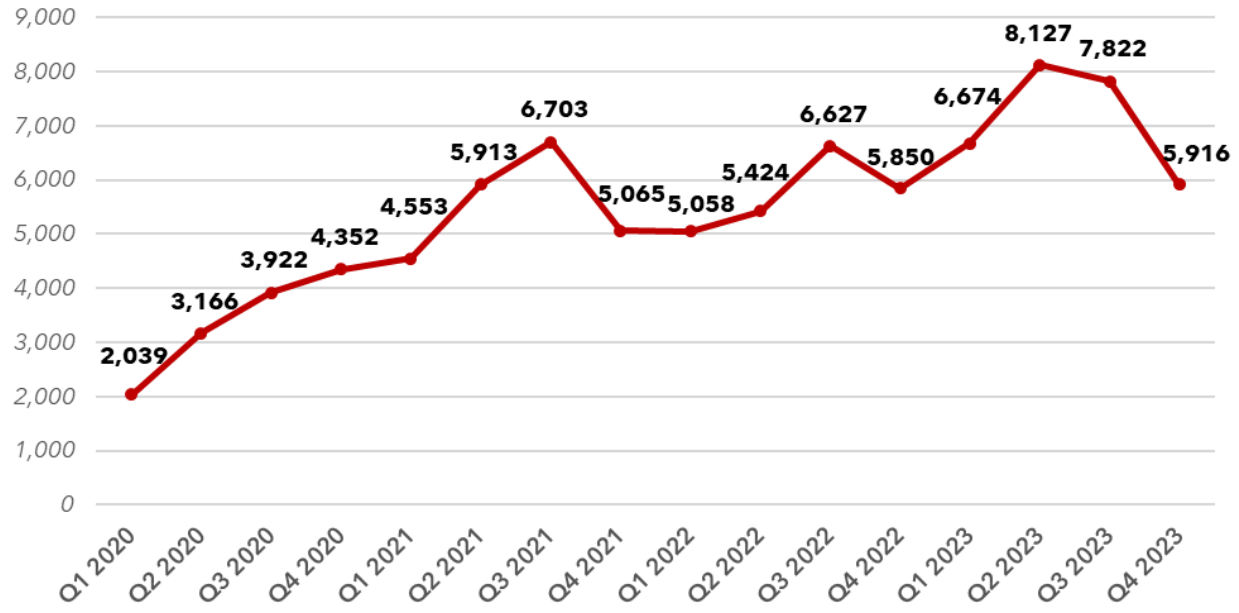
**Data as of 5/31/2024. Ship Points are addresses where ORPs receive shipments of naloxone from MDH CHRS. ORPs may have fewer ship points than jurisdictions they serve (e.g., an ORP may have all doses shipped to Baltimore City yet dispense in both Baltimore County and Baltimore City). An ORP may have multiple shipping locations in a single jurisdiction, and/or may have shipping locations in multiple jurisdictions. Therefore, the totals may add up to more than the total number of ORPs statewide or within a given jurisdiction. An ORP's ship point was counted in a given calendar year if the ORP was active at any point within the calendar year (e.g., initial authorization date on or before the last day of the calendar year and expiration date on or after the first day of the calendar year). An ORP's ship point was counted in a given jurisdiction based on the county in which the shipping location is physically located.*

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, OD education and naloxone distribution, wound care, and both testing and linkage to care for infectious disease. There were 25 approved SSPs in Maryland by the end of the 2023 calendar year, which is two more than last year.

In the calendar year 2023, 28,539 individuals were served by SSPs, 5,580 more than last year, with 8,099 new/registered participants, 1,112 more than last year. There were 54,579 linkages to care made for individuals engaged with SSPs in 2023, down 21.5 percent from last year. The continual number of encounters and services provided demonstrates the importance of these programs in serving people who use drugs with low-barrier services.

Figure 23: Individuals Served Through SSPs by Quarter (2020–2023)



Source: MDH Center for Harm Reduction Services, June 2024.

In 2023, most of SSP participants were White (61.8 percent) followed by Black and African American service users who accounted for 36.5 percent. These two racial groups made up the majority (98.3 percent) of service users. Males accounted for over half of all service users (55.7 percent) followed by Women (42.4 percent). These two groups accounted for 98.1 percent of service users and individuals with any other gender identity collectively represented just under one percent of service users. Individuals aged 35-44 years of age accounted for most of SSP service users, followed by 25-34 year olds, and 45-54 year olds.

Table 15: Number of Syringe Service Program Participants by Race/Ethnicity, Gender and Age (2023)

Number of Syringe Service Program Participants by Race/Ethnicity						
Black/ African American	**Hispanic/ Latino**	**White**	**Asian**	**Native Hawaiian/ Pacific Islander**	**American Indian/ Alaskan Native**	**Other**
9,368	295	15,872	54	41	67	547
36.5%	1.1%	61.8%	0.2%	0.2%	0.3%	2.1%
Number of Syringe Service Program Participants by Gender						
Man	**Woman**	**Gender Queer**	**Non-Binary**	**Transgender**	**Another Gender**	**Decline to Answer**
14,431	10,987	70	9	162	10	240
55.7%	42.4%	0.3%	0.03%	0.6%	0.04%	0.9%
Number of Syringe Service Program Participants by Age						
Under 18	**18-24**	**25-34**	**35-44**	**45-54**	**55+**	**Total**
98	1,029	6,639	8,123	5,243	4,679	25,811
.4%	4.0%	25.7%	31.5%	20.3%	18.1%	

Source: MDH Center for Harm Reduction Services, June 2024.

Hospital Characteristics

The Health Services Cost Review Commission (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 January 1, 2016 and December 30, 2022, over three million individuals received care through Maryland's hospital system with 99,907 individuals having an OD-related encounter (2.9 percent). In the same time frame, 11,326 individuals who died of overdose had accessed Maryland's hospital system in an inpatient or ED facility.

41.4 percent of the individuals who died from an OD with an HSCRC record between 2016 and 2022 had received care for an OD-related encounter at some point in the seven-year study period. Over one-quarter (25.9 percent) of individuals who died from an OD had a chronic pain diagnosis, as compared to 7.1 percent of non-OD decedents with HSCRC records. About one-fifth (22.0 percent) of non-OD decedents had a mental health diagnosis, while 52.9 percent of individuals with an HSCRC record who died from an OD had a mental health diagnosis. Less than half (46.5 percent) of people with an HSCRC record who died from an OD were previously diagnosed with OUD and 60.1 percent of people with an HSCRC record who died from an OD were previously diagnosed with a non-opioid SUD.

Table 16: HSCRC Encounters by Prior Diagnosis (2016–2022)

	Non-OD decedents with HSCRC records		OD decedents with HSCRC records		p value**
Total Individuals	3,390,394		11,326		
	N	**%**	**N**	**%**	
OD-related encounters, ever	99,907	2.9	4,692	41.4	<0.001
OD-related encounters, by substance…					
Heroin	19,911	0.6	2,467	21.8	<0.001
Methadone	3,034	0.1	214	1.9	<0.001
Other Opioid	40,745	1.2	1,901	16.8	<0.001
Alcohol	3,217	0.1	189	1.7	<0.001
Benzodiazepine	13,007	0.4	672	5.9	<0.001
Cocaine	6,323	0.2	794	7.0	<0.001
*Other Substance***	39,719	1.2	1,262	11.1	<0.001
OUD	89,382	2.6	5,271	46.5	<0.001
SUD (non-opioid)	354,591	10.5	6,803	60.1	<0.001
Non-poisoning Injury	1,287,317	38.0	6,355	56.1	<0.001
Chronic Pain Diagnosis	241,981	7.1	2,928	25.9	<0.001

Mental Health Diagnosis	745,955	22.0	5,993	52.9	<0.001
Injection SU-related wounds	417,482	12.3	3,146	27.8	<0.001

Source: Maryland Health Services Cost Review Commission, May 2024.
Health services encounters were compared between overdose decedents and non-overdose decedents with records captured within the HSCRC case mix data stream between 2016- 2022. Data analysis ran on May 13th 2024. Individuals identified as non-overdose decedents may either be alive or deceased due to means other than drug intoxication during the study period. Overdose-related encounters encapsulate any overdose encounter (overall or by substance) during the study period as a binary (0/1) count per individual. 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). Thus, the total of "Overdose-related encounters, by substance" will sum to a greater total than overall overdose-related encounters.
**Other drugs include amphetamine, barbiturates, non-opioid analgesics, and other drug poisonings.*
***Chi-squared test of independence was used to assess any associations between the predictor variables of various overdose types and related diagnoses and overdose death.*

Even though there was an increase in fatal ODs nearly every year, this data illustrates a downward trend among individuals with OUD, SUD, or mental health diagnoses who were not 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.

Table 17: HSCRC Encounters by Prior Diagnosis (2016–2022)

	2016		2017		2018		2019		2020		2021		2022	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Any service utilization	966	52.3	1004	50.0	1047	46.7	969	43.4	1091	41.5	1133	43.0	1072	44.7
Any OD-related services	336	34.8	339	33.8	347	33.1	316	32.6	342	31.3	326	28.8	297	27.7
OUD	354	36.6	358	35.7	364	34.8	357	36.8	359	32.9	379	33.5	332	31.0
SUD (non-opioid)	461	47.7	469	46.7	477	45.6	442	45.6	496	45.5	515	45.5	489	45.6
Non-poisoning Injury	268	27.7	265	26.4	299	28.6	308	31.8	311	28.5	326	28.8	318	29.7
Chronic Pain Diagnosis	161	16.7	140	13.9	164	15.7	143	14.8	162	14.8	163	14.4	179	16.7
Mental Health Diagnosis	382	39.5	407	40.5	438	41.8	405	41.8	447	41.0	422	37.2	401	37.4
Total deaths (N)	**1,848**		**2,008**		**2,241**		**2,235**		**2,629**		**2,632**		**2,398**	

Source: Maryland Health Services Cost Review Commission, May 2024.
Inpatient and emergency department health services utilization among MD resident drug intoxication decedents aged 15-90 during calendar year of death, 2016-2022. Data analysis ran on May 15th 2024. Decedents' service utilization and diagnoses are only counted here if they occurred during the same calendar year as their death. Decedents may have accessed services in previous years for overdose or other diagnoses, either during the study period or prior to 2016. Such service utilization is not captured here to maintain consistency across the years and avoid artificial inflation of service use in later years of the study period.
The denominator for (%) service utilization is "Total Deaths" in the year; otherwise, the (%) for subsequent care (e.g., any overdose-related services, opioid use disorder diagnosis, etc.) are calculated from the total (N) of "Any service utilization."

Service Utilization by Medicaid Participants

Table 18, below, presents the number and percentage of participants who had an ambulatory care visit, outpatient ED visit, or inpatient admission during the year before their fatal OD. Between 2017 and 2022, the majority of these individuals had an ambulatory care visit during the year of their fatal OD; the percentage with an ambulatory care visit rose from 59.4 percent in 2017 to 63.8 percent in 2020 and fell to 60.4 percent in 2022.[22]

60.4%

of overdose decedents eligible for Medicaid in 2022 received ambulatory care in the year of their death.

Source: The Hilltop Institute, Maryland Medicaid Administration

The percentages of participants with a fatal OD who had an outpatient ED visit and an inpatient admission, respectively, each experienced a decrease over the evaluation period with a slight increase in 2021 and then continuing the decline in 2022.[23]

Table 18: Service Utilization of Medicaid Participants (Any Period of Eligibility) before a Fatal Overdose (2017–2022)

Service Type	2017		2018		2019		2020		2021		2022	
	#	%	#	%	#	%	#	%	#	%	#	%
Ambulatory Care	822	59.4%	897	59.4%	901	62.0%	1,132	63.8%	1,107	61.9%	992	60.4%
Outpatient ED	677	48.9%	711	47.1%	674	46.4%	789	44.5%	804	44.9%	677	41.2%
Inpatient Admission	407	29.4%	411	27.2%	386	26.6%	440	24.8%	454	25.4%	403	24.5%
Total	**1,384**		**1,509**		**1,453**		**1,774**		**1,789**		**1,643**	

Source: The Hilltop Institute, Maryland Medicaid Administration, Maryland Vital Statistics Administration data through April 2024, and Maryland's Medicaid Management Information System (MMIS2).

[22] The Hilltop Institute. (2023, April 14). Medicaid Data for DORM Report. Baltimore, MD: UMBC.
[23] Ibid.

Table 19 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 5.3 percent in 2022, 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 1.3 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 OD death and for participants enrolled in Medicaid at the time of OD death are similar.[24]

Table 19: Number of Visits and Participants (Any Period of Eligibility) with an Inpatient Admission with a Diagnosis of Poisoning Before a Fatal Overdose (2017–2021)

Year of Fatal Overdose	Within Year of Death				Within 1 Day of Death			
	Visits	Users	Total Eligible	% of Total	Visits	Users	Total Eligible	% of Total
2017	149	121	1,413	8.6%	46	43	1,413	3.0%
2018	142	121	1,548	7.8%	50	47	1,548	3.0%
2019	151	118	1,513	7.8%	38	33	1,513	2.2%
2020	141	116	1,834	6.3%	35	34	1,834	1.9%
2021	133	112	1,795	6.2%	31	31	1,795	1.7%
2022	99	88	1,653	5.3%	22	21	1,653	1.3%

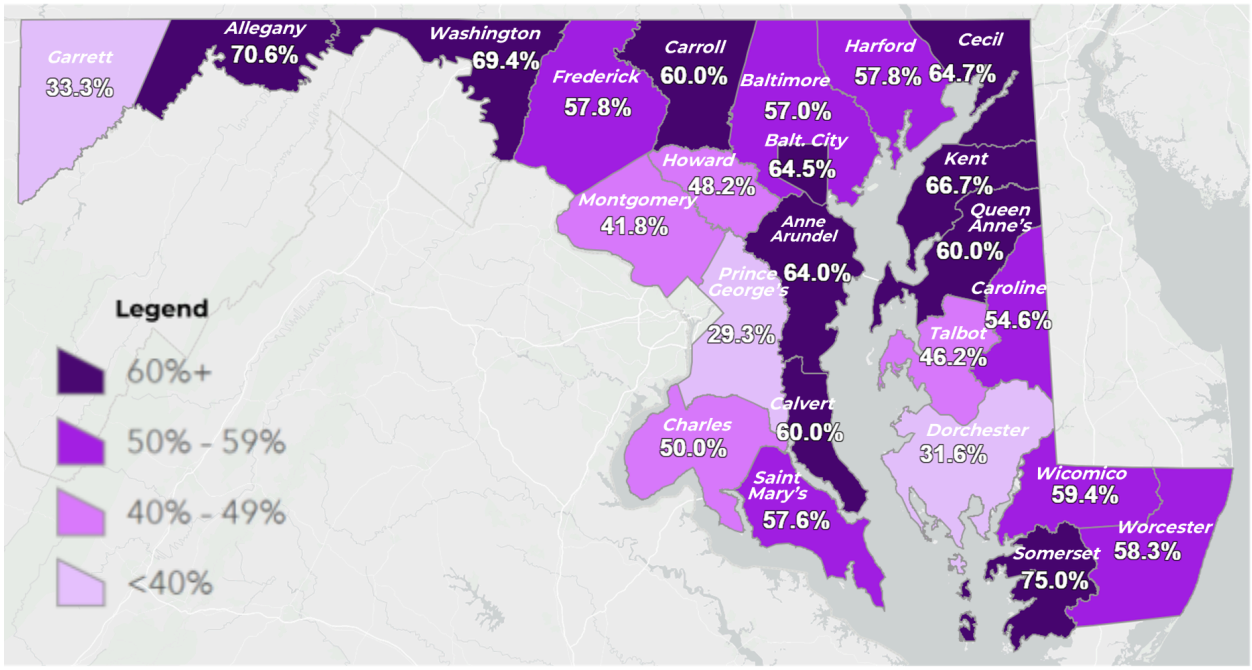
Source: The Hilltop Institute, Maryland Medicaid Administration, Maryland Vital Statistics Administration data through April 2024, and Maryland's Medicaid Management Information System (MMIS2).

[24] Ibid.

Service Utilization by PBHS Participants

The following seven jurisdictions had over 60 percent of their OD decedents engaged in PBHS services: Allegany County, Anne Arundel County, Baltimore City, Cecil County, Kent County, Somerset County and Washington County. The following three jurisdictions had less than 40 percent of their OD decedents engaged in PBHS services: Dorchester County, Garrett County, and Prince George's County. These three jurisdictions are among the seventeen counties in the state with a greater treatment need than capacity, as demonstrated in the 2021 Opioid Treatment Program Needs Assessment[25].

Map 5: Overdose Decedents Engaged in PBHS Services by Jurisdiction of Residence (2022)



Source: Maryland Public Behavioral Health Service Claims, paid through January 31, 2024, and Maryland Office of the Chief Medical Examiner, Vital Statistics Administration, April 2024.

Summary of Service Utilization

Review of Maryland's PBHS utilization shows the number of individuals who received mOUD services, including buprenorphine, methadone, and long-acting naltrexone, increased by 22.9 percent from 2016 to 2019 and subsequently decreased by 21.1 percent between 2019 and 2023. In contrast, other SUD services excluding mOUD decreased during the pandemic, however, have rebounded in FY 2022 and FY 2023 to close to pre-pandemic levels. In 2023, SUD treatment without mOUD (81,825) had over three times more service users compared to mOUD treatment counts (26,926). Service use for overdose decedents engaged in PBHS services increased between 2016 and 2022 for those who used both mental health and SUD services, but utilization decreased for those engaged in either service exclusively.

In 2022, only two age groups (35-44 years, and 55 and older) had an increase in the number of OD decedents who had been dispensed a controlled substance. Consistent with VSA intoxication death data,

[25] 2021 OTP Needs Assessment

individuals aged 55 years or older represented the majority of OD decedents with dispense records between 2016 to 2022, accounting for 29.8 percent of the overall decedents (2,914 of 9,751). In 2022, non-Hispanic Black OD decedents with controlled substance dispense records in the PDMP made up 40.5 percent of all decedents with dispense records, while non-Hispanic White decedents made up 55.3 percent. Over the past seven years, heroin has decreased by 79.4 percent (from 447 to 92) in overall fatal ODs among those dispensed a controlled substance, while fentanyl has increased three times (211.8 percent) (from 431 to 1,344) over this time period.

MD-EDDS results from 2022 were used by local advocates and legislators to pass the Josh Siems Act. This legislation required Maryland hospitals to add fentanyl to routine urine drug screens conducted as part of diagnostic procedures as of October 1, 2023. Cocaine was the most frequent other drug detected in each of the hospitals. It was detected in nearly two-thirds of the fentanyl positive patients (65%). MD-EDDS staff worked with 14 hospitals to conduct a one-time collection of 100 specimens positive for any substance on the hospital's limited panel. Fentanyl and xylazine were detected in the specimens from all eight hospitals included in Table 13. Fentanyl was detected in 9 percent to 22 percent. The most frequent analog of fentanyl detected was fentanyl/norfentanyl. Other fentanyl analogs detected include 4-ANPP, Acetylfentanyl, and *ortho*-Fluorofentanyl/*para*-Fluorofentanyl (p-FF). Xylazine, a substance often found in combination with fentanyl or other substances, was detected in 2 percent to 9 percent of these hospital positive specimens.

Between January 1, 2016 and December 30, 2022, over three million individuals received care through Maryland's hospital system, with 99,907 individuals having an OD-related encounter (2.9 percent). In the same time frame, 11,326 individuals who died of overdose had accessed Maryland's hospital system in an inpatient or ED facility with 41.4 percent having had received care for an OD-related encounter at some point. More than two-thirds (69.1 percent) of OD decedents in 2022 were eligible for Medicaid within 12 months prior to death and of those who were Medicaid eligible, nearly one-third (31.5 percent) received mOUD services. Buprenorphine treatment was consistently the most utilized type of mOUD among participants. In 2023, 394,816 doses of Naloxone were distributed throughout Maryland, a 62.7 percent increase from last year, and 28,539 individuals were served by SSPs with 8,099 new/registered participants and there were 54,579 linkages to care made for individuals engaged with SSPs in 2023.

Between 2017 and 2022, the majority of overdose decedents eligible for medicaid had an ambulatory care visit during the year of their fatal OD; the percentage with an ambulatory care visit rose from 59.4 percent in 2017 to 63.8 percent in 2020 and fell to 60.4 percent in 2022.

See Considerations and Limitations to Analysis section for more details.

V. CONSIDERATIONS AND LIMITATIONS TO ANALYSIS

Health Services Cost Review Commission

- The validity of matching individuals across disparate data sets is not wholly guaranteed and is limited by the availability and accuracy of the data contained within the informant data sources.
- Official substance and alcohol intoxication deaths are considered preliminary and subject to change until officially validated and released by VSA.
- Demographics and geographic residence were compared between OD decedents and non-OD decedents with inpatient and/or ED records captured within the HSCRC or OD death registry between 2016-2022.
    - Individuals identified as non-OD decedents may either be alive or deceased due to means other than substance intoxication during the study period.
- Encounters consist of any health services encounter captured in the HSCRC between 2016-2022.
- Small data sets have been suppressed to protect privacy.
- The total of "OD-related encounters, by substance" will sum to a greater total than overall OD-related encounters.
    - An individual may have had multiple ODs, by multiple substances but would only be counted once under "OD-related encounters, ever" and once per specified substance(s).
- Other substances include amphetamine, barbiturates, non-opioid analgesics, and other drug poisonings.

Prescription Drug Monitoring Program

- Data sets were linked in SQL Server on unique PatientID.
- Only the most recent dispense records were used from the PDMP data set to get patient-level data.
- The values in these tables represent the number of individuals who had a dispense record in the PDMP and a death record in the VSA OCME.
- All tables evaluate the OD decedents from 2016 to 2022 who also had dispense records in the PDMP.

Center for Harm Reduction Services

- Some active ORPs may be missing reports due to reporting lag.
- Kit/unit estimates assume 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.

Washington/Baltimore High-Intensity Drug Trafficking Area

- The samples in this report are not representative of all drugs seized in the entire state of Maryland.

Hilltop

- The data provided follow the Department's cell suppression guidelines (i.e., cells with 10 or fewer participants are suppressed to avoid potential identification of participants).
- Hilltop used OD deaths from the VSA to identify Medicaid participants who died of an OD.
    - 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 enrolled in Medicaid within a year of their death were included in the analysis.
        - "eligible/eligibility" and "enrolled/enrollment" are used interchangeably.
- Hilltop gathered all fee-for-service claims and managed care organization 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 from an OD may have died from a non-opioid-related substance.
- 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."
- Poisoning events were identified using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes selected by the Department.

Public Behavioral Health System

- Data is subject to change from delayed claims.
    - Outpatient services are generally not covered by Medicare.
- Sources of OD Deaths:
    - Office of the Chief Medical Examiner/VSA Database.
    - Unintentional intoxication OD Deaths Only.
- 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 laws and race had to be determined using Medicaid eligibility data that does not have race information in many records drastically increasing the amount of unknown race records from 2020 onwards.
- The decreases in the age group of 55 and over in 2020 are due to Medicare beginning to cover the service starting January 1, 2020.
- Mental health outpatient services are covered by Medicare, so any Medicare recipients will not be represented in mental health outpatient counts.
- PBHS sections of last year's report may not align with the 2022 report.
    - On January 1, 2000, a new provider (Optum) took over the duties of the Administrative Services Organization that included the adjudication and payment of claims.
    - A change in the reported number of people treated across multiple years took place due to retractions of claims previously approved, wrongfully rejected claims, and inconsistencies throughout the claims process.
    - PBHS sections of 2021's report were based on claims data that had not been cleaned and reprocessed, and because of the effects of the pandemic, some reductions in the numbers of people treated will appear in the current report.

Acknowledgments

MDH would like to acknowledge and thank the following partners for their contribution to the 2022 DORM report:

- Behavioral Health Administration (BHA)
- Maryland's Office of Overdose Response (MOOR)
- Chesapeake Regional Information Systems for our Patients (CRISP)
- Maryland Department of Health (MDH)
- Center for Harm Reduction Services (CHRS)
- Environmental Health Bureau
- Health Services Cost Review Commission (HSCRC)
- Overdose Data to Action Program (OD2A)
- Prescription Drug Monitoring Program (PDMP)
- Vital Statistics Administration (VSA)
- 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
- Emergency Department Drug Surveillance (EDDS)
- Center for Substance Use, Addiction & Health Research (CESAR)

Acronyms

- Advancing Cross-Cutting Engagement and Service Strategies for People Who Use Drugs (ACCESS)
- Behavioral Health Administration (BHA)
- Center for Harm Reduction Services (CHRS)
- Center for Substance Use, Addiction & Health Research (CESAR)
- Chesapeake Region Information System for our Patients (CRISP)
- Data-Informed OD Risk Mitigation (DORM)
- Direct Analysis in Real Time Mass Spectrometry (DART-MS)
- Emergency Department (ED)
- Electronic Health Record (EHR)
- Emergency Medical Services (EMS)
- Food and Drug Administration (FDA)
- Health Services Cost Review Commission (HSCRC)
- House Bill (HB)
- International Classification of Disease (ICD)
- Maryland Emergency Department Drug Surveillance (MD-EDDS)
- Maryland Department of Health (MDH)
- Maryland Total Human Services Integrated Network (MD THINK)
- Medication for Opioid Use Disorder (mOUD)
- Maryland's Office of Overdose Response (MOOR)
- National Institute of Standards and Technology (NIST)
- Non-Fatal Overdose (NFOD)
- Non-Hispanic (NH)
- Opioid Overdose Education and Naloxone Distribution (OEND)
- Opioid Overdose Reversal Drugs (OORD)
- Opioid Use Disorder (OUD)
- Overdose (OD)
- Overdose Response Program (ORP)
- Public Behavioral Health System (PBHS)
- Prescription Drug Monitoring Program (PDMP)
- 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 Center (UMMC)
- University of Pittsburgh Medical Center (UPMC)
- Vital Statistics Administration (VSA)
- Washington/Baltimore High-Intensity Drug Trafficking Area (W/B HIDTA)

VI. DATA SOURCES & CITATIONS

- Maryland Office of the Chief Medical Examiner, Vital Statistics Administration: fatal ODs in Maryland, fatal OD demographics.
- Statewide Unintentional Drug OD Reporting System (SUDORS): OD fatality circumstances and decedent characteristics.
- University of Maryland, Center for Substance Use, Addiction & Health Research (CESAR): Maryland Emergency Department Drug Surveillance (MD-EDDS) program. Hospital emergency department electronic health records and urinalysis.
- Analysis by the University of Maryland Systems Evaluation Center using OD Death data from the Vital Statistics Administration and Office of the Chief Medical Examiner and claims data from BHA and Optum.
- Rhonda R. Moody, Director of Data Insights, CRISP.
- The Hilltop Institute. (April 14, 2023). Medicaid Data for DORM Report. Baltimore, MD: UMBC. Medicaid claims.
- "Heroin, Fentanyl, Cocaine and Prescription Opioid Drug Trends in the State of Maryland 2020-2022"; Washington/Baltimore HIDTA Investigative Support Center; 2023. Drug seizure sample testing results.
- Russell E, Sisco E, Thomson A, et al. Rapid Analysis of Drugs: A Pilot Surveillance System to Detect Changes in the Illicit Drug Supply to Guide Timely Harm Reduction Responses — Eight Syringe Services Programs, Maryland, November 2021–August 2022. MMWR Morb Mortal Wkly Rep 2023; 72:458–462. DOI: http://dx.doi.org/10.15585/mmwr.mm7217a2.
- MDH Center for Harm Reduction Services: Participant date from Syringe Services Programs, Naloxone distribution through Maryland's Overdose Response Program (ORP).
- Health Services Cost Review Commission (HSCRC): service utilization at Maryland hospitals.
- Prescription Drug Monitoring Program: dispense records for controlled dangerous substances.
- MDH Behavioral Health Administration: Service utilization through the Public Behavioral Health System.

VII. APPENDIX A: HSCRC

Table 20: ICD-10 Codes Used to Define Hospital Based Predictors

Predictors	Diagnosis Codes
Any non-fatal overdose	*Includes all codes for non-fatal overdose defined by substance type below*
Non-fatal heroin overdose	ICD10: T401
Non-fatal methadone overdose	ICD10: T403*
Non-fatal other opioid overdose (includes prescription opioids, opium, or synthetic opioids)	ICD10: T400*, T402*, T404, T40601*, T40604*, T40691*, T40694*
Non-fatal alcohol overdose	ICD10: T510X1*, T510X4*, T511X1*, T511X4*, T512X1*, T512X4*, T513X1*, T513X4*, T518X1*, T518X4*, T520X1*, T520X4*, T521X1*, T521X4*, T5191*, T5194*
Non-fatal benzodiazepine overdose	ICD10: T424*
Non-fatal cocaine overdose	ICD10: T405*
Non-fatal other drug overdose (includes amphetamine, barbiturates, non-opioid analgesics, other drug poisoning)	ICD10: T390*-T394*, T398*, T399*, T423*, T4362*, T407X1*, T407X4*, T408X1*, T408X4*, T40901*, T40904*, T40991*, T40994*, T410X1*, T410X4*, T411X1*, T411X4*, T41201*, T41204*, T41291*, T41294*, T413X1*, T413X4*, T423X1*, T423X4*, T426X1*, T426X4*, T428X1*, T428X4*, T43011*, T43014*, T43021*, T43024*, T431X1*, T431X4*, T43201*, T43204*, T43211*, T43214*, T43221*, T43224*, T43291*, T43294*, T433X1*, *T433X4*, T434X1*, T434X4*, T43501*, T43504*, T43591*, T43594*, T43601*, T43604*, T43611*, T43614*, T43621*, T43624*, T43631*, T43634*,T43691* ,T43694*, T438X1*, T438X4*, T481X1*, T481X4*, T483X1*, T483X4*, T507X1*, T507X4*, T508X1*, T508X4*, T50901*, T50904*, T50991*, T50994*, T4141*, T4144*, T4271*, T4274*, T4391*, T4394*
Opioid use disorder (OUD)	ICD10: F11*
Other Substance Use Disorder (SUD)	ICD10: F10*, F12*-F16*, F18*F19*
Non-poisoning injury diagnosis	ICD10: S00-S99, T07-T34, T66-T76, T79
Chronic pain diagnosis	ICD10: G892, G8921, G8922, G8928, G8929, G894
Mental health diagnosis	ICD10: F20-F25, F28-F34, F39-F48, F60, F68, F69
Injection drug use-related wounds	ICD10: [Endocarditis] B376, I330, I39, I339, I340, I348, I350, I351, I352, I358, I359, I360, I368, I370, I378, I38, I39, I38; [Bacteremia or Sepsis] A409, A412, A4101, A4102, A411, A403, A414, A4150, A413, A4151, A4152, A4153, A4159, A4189, A419, I2690, I400, I76, R6521, R7881, R6510,

	A419, R6520, M8610,M8620, M86119, M86219, M86129, M86229, M86139, M86239, M86149, M86249, M86159, M86259, M86169, M86269, M86179, M86279, M8618, M8628, M8619, M8629, M8660, M86619, M86629, M86639, M86641, M86642, M86659, M86669, M86679, M8668, M8669, M869, M4630; [Wound botulism] A480, A4852, I96; [Necrotizing fasciitis] M726; [Cellulitis] L03019, L03029, L03019, L03039, L03049, L03029, L03039, K122, L03211, L03212, L03221, L03222, L03319, L03329, L03119, L03129, L03317, L03811, L03818, L03891, L03898, L0390, L0391, L03116, L03115, L03114, L03113; [Skin and soft tissue infections] G060,G061, G062, G09, K651, K6812, K6819, K630, K750, N10, L942, L988, M5402, M793, M793; [Open wounds] S41009A, S41109A, S51809A, S51009A, S61509A, S61409A, S61429A, S66929A, S61209A, S61229A, S61109A, S66529A, S71009A, S71109A, S76929A, S81109A, S81809A, S91009A, S91309A, S91329A, S96929A, S91109A; [Ulcers] L8990, L89009, L89209, L89309, L89509, L89819, L89899, L97909, L97109, L97209, L97309, L97509, L97809, L98419, L98429, L98499

Source: HSCRC

VIII. APPENDIX B: PDMP

Table 21: Overdose Decedents with Dispense Records in PDMP by Substance Listed as Cause of Death (2016-2022)

Year	Any Opioid	Fentanyl	Rx Opioids	Heroin
2016	39.65%	23.35%	12.78%	24.21%
2017	38.70%	30.14%	10.12%	21.04%
2018	40.23%	34.84%	9.15%	15.78%
2019	40.98%	36.97%	8.38%	13.67%
2020	42.40%	38.74%	9.25%	9.61%
2021	44.16%	40.72%	9.42%	5.71%
2022	46.62%	42.63%	7.83%	2.92%
Total	**42.12%**	**36.40%**	**9.35%**	**12.12%**

Source: Prescription Drug Monitoring Program data provided by CRISP, 2016 - 2022. Analysis completed in May 2024.

IX. APPENDIX C: EDDS

Table 22: Substances Tested in Urine Screens

Substance Category	Substance Name
Benzodiazepines	Benzodiazepines
Opioids	Fentanyl
	Methadone
	Opiates
	Oxycodone
Other Drugs	Barbiturates
Phencyclidine (PCP)	Phencyclidine (PCP)
Stimulants	Amphetamines
	Cocaine
Tetrahydrocannabinol (THC)	Tetrahydrocannabinol (THC)

Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Table 23: Characteristics of Fentanyl Positive Drug Overdose Patients at MD-EDDS Hospitals (July-December 2023)

Information Recorded in Hospital's EHRs	**UM Medical Center** (Baltimore, MD) (n=99) %	**UM Medical Center, Midtown Campus** (Baltimore, MD) (n=97) %	**UM Baltimore Washington Medical Center** (Glen Burnie, MD) (n=54) %	**Northwest Hospital, LifeBridge Health** (Randallstown, MD) (n=42) %	**TidalHealth Peninsula Regional** (Salisbury, MD) (n=25) %	**Sinai Hospital, LifeBridge Health** (Baltimore, MD) (n=21) %	**All Hospitals** (n=338) %
Sex							
Male	78%	72%	72%	74%	60%	76%	73%
Race							
White	27%	8%	68%	26%	64%	14%	30%
Black/African American	67%	92%	24%	72%	36%	81%	66%
Other	6%	0%	8%	2%	0%	5%	4%
Age							
18-24	2%	1%	4%	0%	8%	5%	2%
25-34	13%	16%	18%	19%	44%	14%	18%
35-44	16%	11%	33%	9%	32%	14%	18%
45-54	21%	13%	17%	29%	8%	14%	18%
55+	48%	59%	28%	43%	8%	53%	44%
Mean Age (Years)	**49.9**	**52.8**	**44.6**	**50.4**	**36.7**	**51.2**	**49.0**
Other Drugs Positive[b]							
Cocaine	68%	72%	59%	48%	(n=18) 72%	67%	(n=331) 65%
Benzodiazepines	49%	44%	41%	50%	(n=18) 33%	33%	(n=331) 44%
Marijuana	25%	17%	32%	24%	(n=18) 33%	29%	(n=331) 24%
Amphetamines	2%	5%	11%	5%	(n=18) 11%	5%	(n=331) 5%
Methadone	26%	27%	11%	17%	(n=18) 17%	19%	(n=331) 22%
Opiates	17%	19%	11%	33%	(n=18) 6%	24%	(n=331) 18%
Oxycodone	3%	3%	9%	(n=41) 5%	(n=18) 0%	14%	(n=330) 5%
Barbiturates	1%	2%	4%	0%	(n=18) 0%	(n=2) 0%	(n=312) 2%
PCP	0%	0%	4%	-	(n=18) 6%	-	(n=268) 1%
Mean Number of Other Drugs Positive (of 9)	**1.91**	**1.89**	**1.81**	**1.81**	**(n=18) 1.78**	**1.90**	**(n=331) 1.87**

Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

In 2023, 10 hospitals reported series lows in the percentage positive for opiates and 11 reported series highs in the percentage positive for cocaine (Table 24). Results for amphetamine/methamphetamine were more mixed: six hospitals reported series highs and three were near their series high. Seven hospitals reported series highs in the percentage positive for THC, and two hospitals were near a series high.

Figures 24-27 illustrate the range of percentage positive for each of these substances across the MD-EDDS hospitals. Table 24 presents the high and low ranges of patients in each of 18-19 hospital EDs that tested positive for each drug during the time periods provided, as well as the percentage positive in 2023. One-two hospitals were excluded from each of these analyses because they had very low positivity rates or too small a range of results to plot.

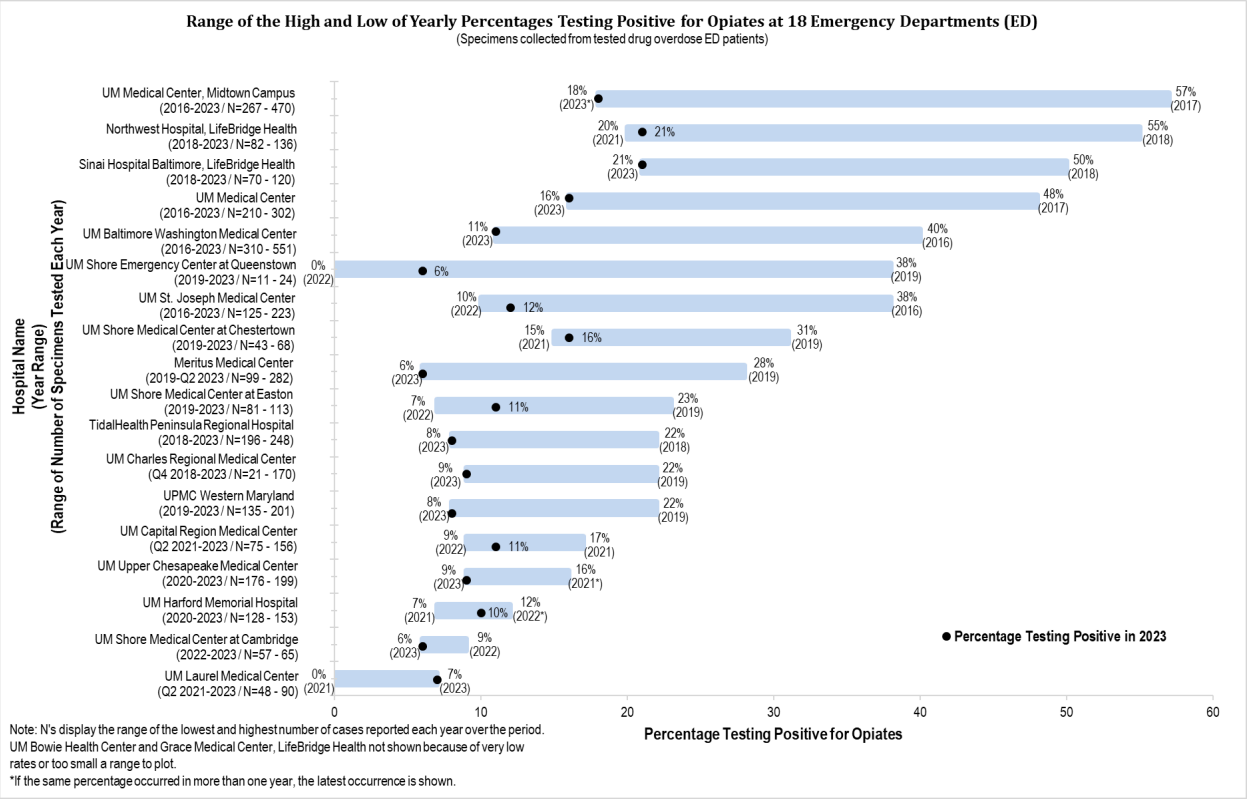
Table 24: MD-EDDS Hospitals with Yearly Series Highs and Lows for Four Drugs (2023)

Hospital, Region	Percentage Testing Positive in 2023 for: THC	Opiates	Amphetamine &/or Methamphetamine	Cocaine
Western Maryland				
Meritus Medical Center~	**H** (48%)	**L** (6%)		**H** (59%)
University of Pittsburgh Medical Center		**L** (8%)	**H** (21%)	**H** (26%)
Southern Maryland				
UM Charles Regional Medical Center	**H** (38%)	**L** (9%)	**H** (15%)	**H** (28%)
Central Maryland**				
UM Balt Wash Medical Center		**L** (11%)	**H** (9%)	**H** (30%)
UM Upper Chesapeake Med Ctr	**H** (41%)	**L** (9%)		
UM Harford Memorial Hospital				**H** (32%)
UM Medical Center		**L** (16%)		**H** (56%)
UM Medical Center, Midtown		**L** (18%)		**H** (60%)
UM St. Joseph Medical Center				**L** (17%)
Northwest Hospital Center, LifeBridge		**CL** (21%)	**L** (4%)	
Sinai Hospital of Baltimore, LifeBridge	**H** (45%)	**L** (21%)		**H** (54%)
Capital Region**				
UM Capital Region Medical Center	**H** (35%)			
UM Laurel Medical Center	**L** (33%)	**H** (7%)		**L** (15%)
Eastern Shore**				
UM Shore Med Ctr Chestertown~			**H** (13%)	
UM Shore Med Ctr Easton	**H** (43%)		**H** (14%)	**H** (35%)
UM Shore Emergency Ctr Queenstown				
UM Shore Medical Center Cambridge	**H** (52%)	**L** (6%)	**H** (8%)	**H** (51%)
TidalHealth Peninsula Regional Hospital		**L** (8%)		**H** (33%)

Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.
** Series highs/lows not calculated for two hospitals due to limited data availability and very low rates: UM Bowie Health Center and Grace Medical Center, LifeBridge.
~ data through June 2023; UM Chestertown data through Sept 2023, but Q4 data suppressed due to low number of tests conducted
C=within 2%

Figure 24 shows that in 2023, opiates reached a series low in 10 hospitals, including hospitals in four regions of the state and 5 of the 8 hospitals in central Maryland. The decline in opiate positives across Maryland reflects a decline in heroin use as fentanyl became widely available. 13 hospitals reported that 12 percent or fewer tested positive for opiates.

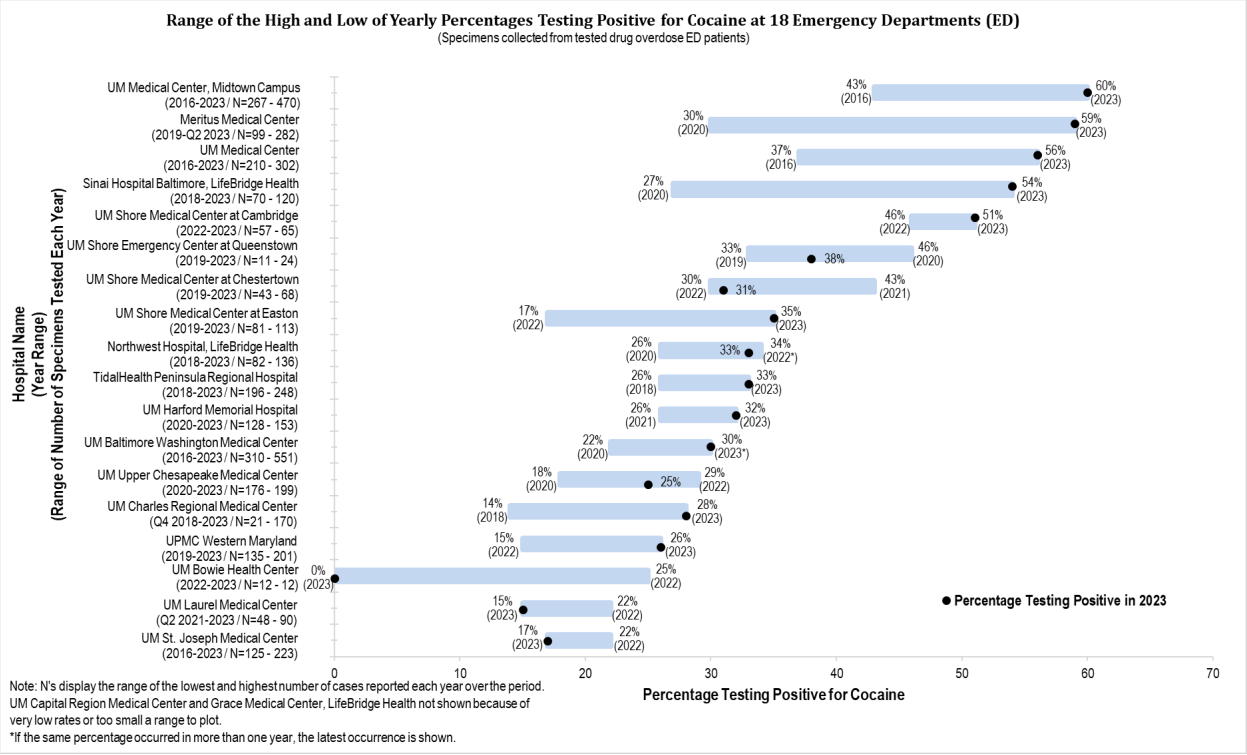
Figure 24: High and Low Yearly Percentages Testing Positive for Opiates at 18 EDs



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Figure 25 shows that cocaine reached a series high in 11 hospitals, including five in Central Maryland in 2023. However, two hospitals in the National Capital Region (UM Bowie and UM Laurel) and one in Central Maryland (UM St. Joseph) reported a series low. UPMC changed from a series low in 2022 to a series high in 2023. Five hospitals reported that more than half of their specimens tested positive for cocaine – three in Baltimore City (UMMC Midtown, UMMC, and Sinai Hospital), one on the Eastern Shore (UM Cambridge), and one in Western Maryland (Meritus Medical Center).

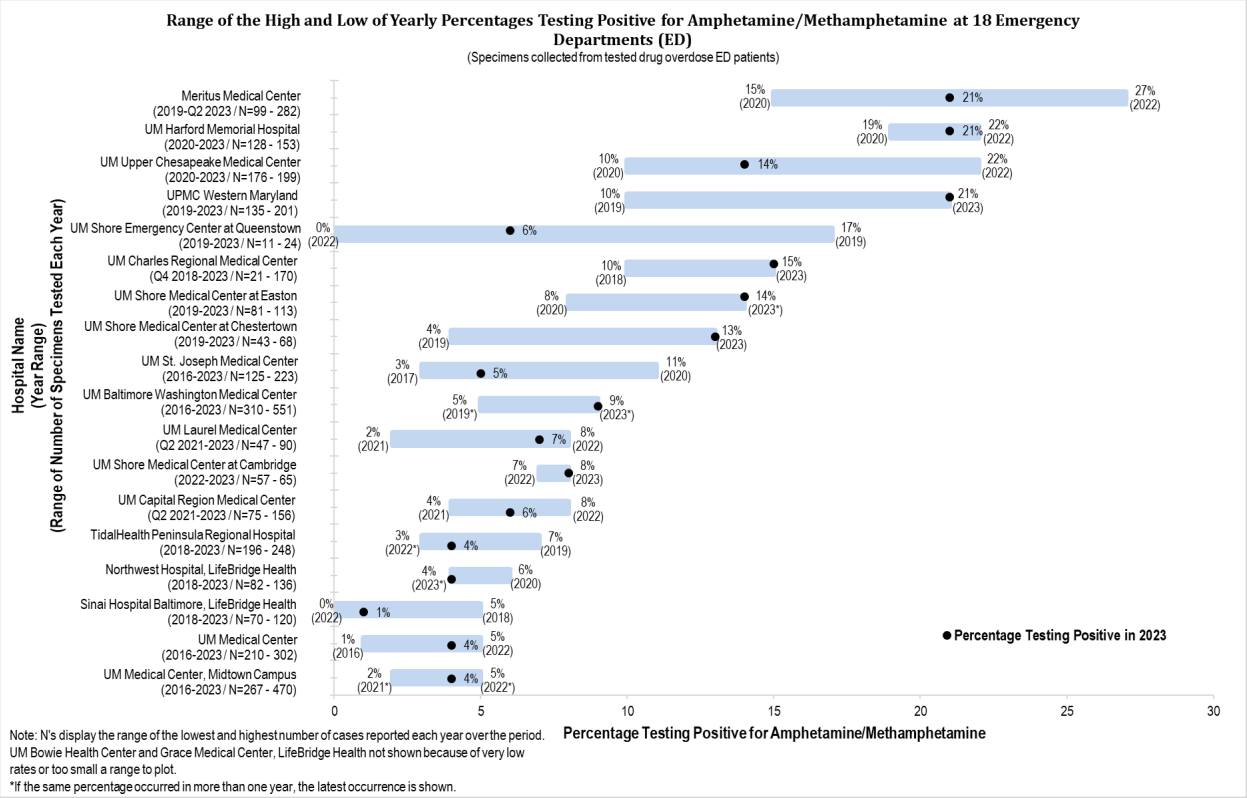
Figure 25: High and Low Yearly Percentages Testing Positive for Cocaine at 18 EDs



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Figure 26 shows that amphetamine/methamphetamine also reached series highs in six hospitals in 2023, which included hospitals in four regions of the State. The series high percentages positive for amphetamine/methamphetamine ranged from 8 percent to 21 percent.

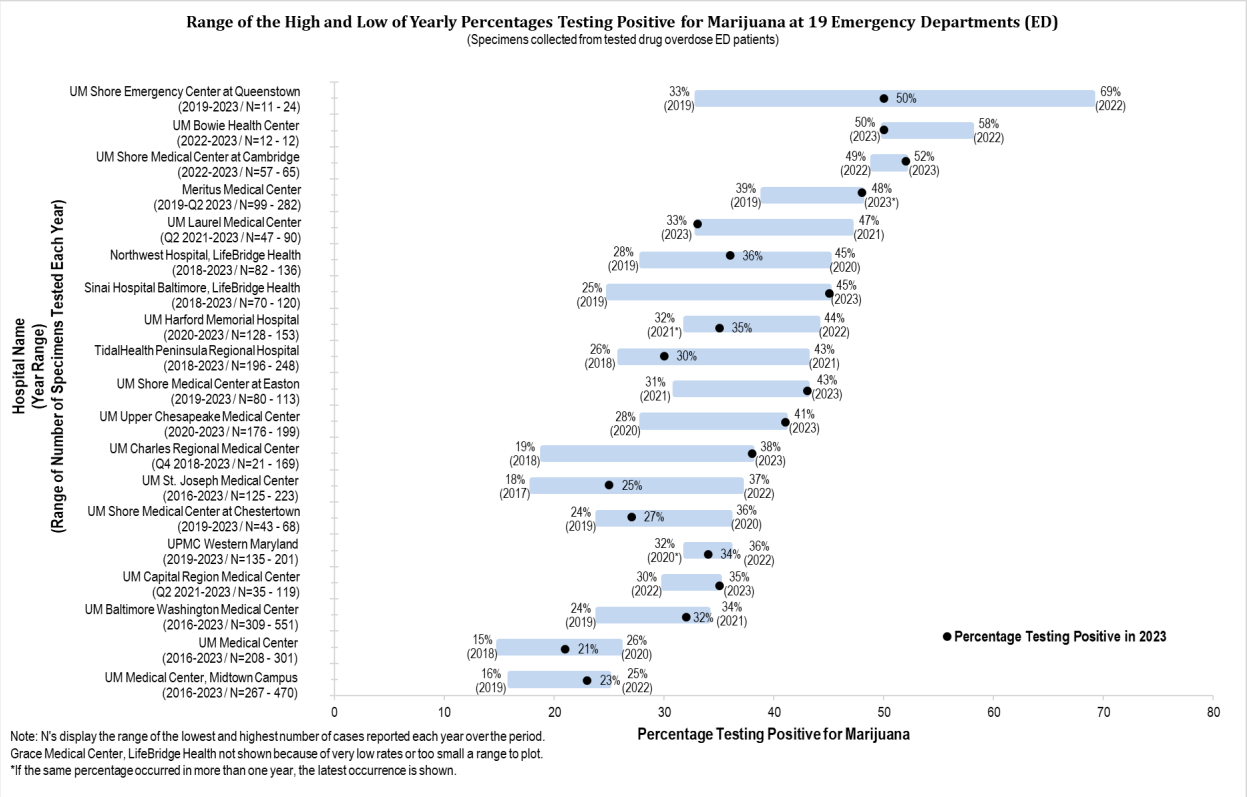
Figure 26: High and Low Yearly Percentages Testing Positive for Amphetamine/Methamphetamine at 18 EDs



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

Figure 27 shows that marijuana (THC) positives reached a series high in seven hospitals in 2023, with three other hospitals nearing a series high. 15 hospitals reported that 30 percent or more of the ED patients tested were positive for marijuana.

Figure 27: High and Low Yearly Percentages Testing Positive for Marijuana at 19 EDs



Source: Center for Substance Use, Addiction & Health Research: Emergency Department Drug Surveillance System, June 2024.

X. APPENDIX D: MEDICAID (PROVIDED BY HILLTOP)

Table 25: Medicaid Participants Who Received mOUD within a Year of Their Fatal Overdose (2017–2022)

Event Type	Eligible 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	52.4%	2,921	294	53.3%	5,637
At least one methadone treatment	236	51.1%	5,720	263	47.6%	6,884
At least one Naltrexone treatment	68	14.7%	214	77	13.9%	183
Total	**462**	**-**	**8,855**	**552**	**-**	**12,704**

Event Type	Eligible Within One Year of Death					
	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	58.3%	9,148
At least one methadone treatment	254	44.1%	6,408	293	44.5%	8,628
At least one Naltrexone treatment	96	16.7%	281	77	11.7%	254

Total	**576**	**-**	**12,257**	**659**	**-**	**18,025**

Event Type	Eligible Within One Year of Death					
	2021			2022		
	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	371	57.5%	7,592	325	62.4%	5,208
At least one methadone treatment	294	45.6%	9,073	227	43.6%	6,398
At least one Naltrexone treatment	81	12.6%	196	53	10.2%	202
Total	**649**	**-**	**16,861**	**521**	**-**	**11,808**

Source: The Hilltop Institute, Maryland Medicaid Administration, Maryland Vital Statistics Administration data through April 2024, and Maryland's Medicaid Management Information System (MMIS2).
** Participants may have received multiple types of MAT, this is an unduplicated total of participants.*