Data Brief: Opioid-Related Overdose Deaths among Massachusetts Residents

This report contains both confirmed and estimated data through September 30, 2023. Figure 1 shows the month-by-month estimates for fatal opioid-related overdose deaths for all intents from April 2022 to September 2023. Preliminary data for January through September 2023 shows that there were 1,309 confirmed opioid-related deaths, and DPH estimates that there will be an additional 369 to 448 deaths, totaling approximately 1,718 confirmed and estimated opioid-related overdose deaths. As a point of comparison, in the 12-month period ending September 2023, DPH estimates that there will be a total of 2,323 opioid-related overdose deaths, which is 8 fewer than the estimated total 2,331 for the 12-month period ending September 2022.

Figure 1. Opioid-Related Overdose Deaths, All Intents by Month Massachusetts Residents: April 2022- September 2023
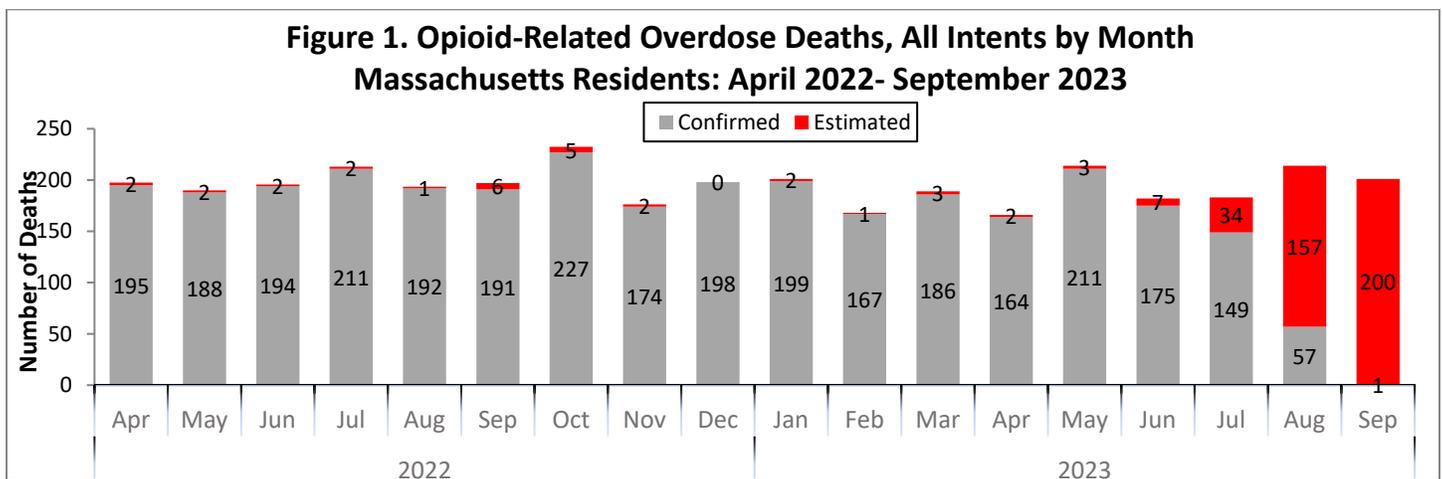
Figure 2 shows the trend in annual number of confirmed and estimated cases of opioid-related overdose deaths for all intents from 2000 to 2022. To obtain timelier estimates of the total number of opioid-related overdose deaths in Massachusetts - confirmed and estimated - DPH used predictive modeling techniques for all cases not yet finalized by the Office of the Chief Medical Examiner (OCME). Based on the data available as of October 19, 2023, there were 2,331 confirmed opioid-related overdose deaths in 2022 and DPH estimates that there will be an additional 18 to 38 deaths, totaling approximately 2,359 deaths once all cases are finalized. There were 60 more confirmed and estimated deaths in 2022 compared with 2021.

Figure 2. Opioid-Related Overdose Deaths, All Intents
Massachusetts Residents: 2000 - 2022

Legend: ■ Confirmed ■ Estimated

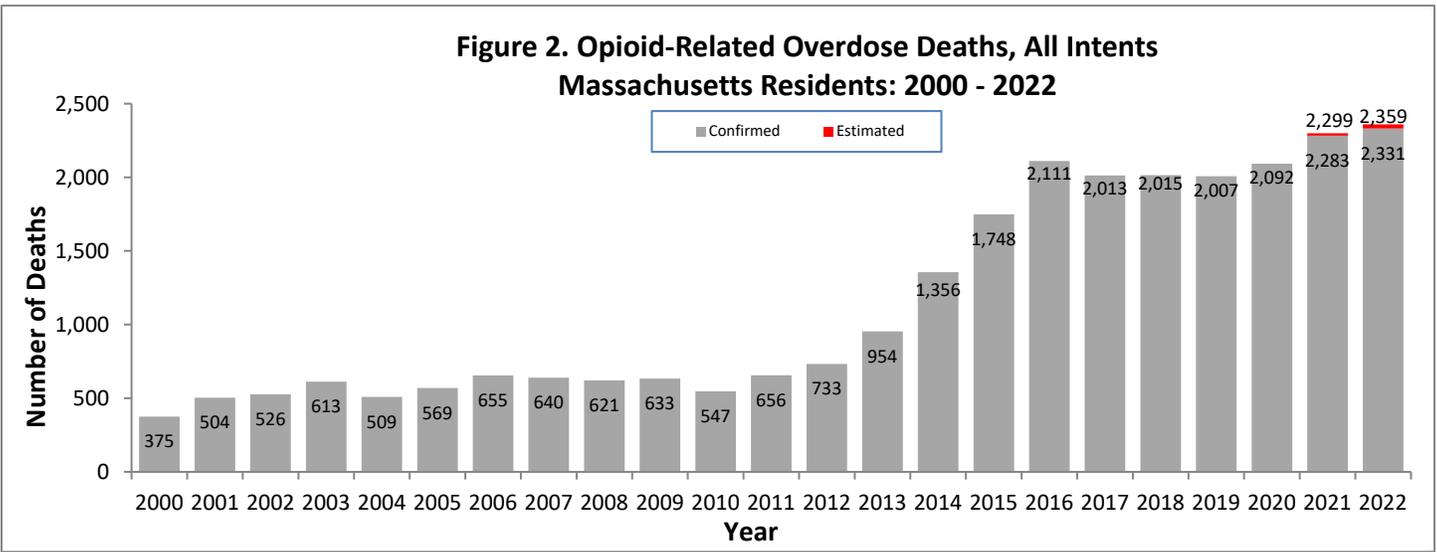| Year	Deaths
2000	375
2001	504
2002	526
2003	613
2004	509
2005	569
2006	655
2007	640
2008	621
2009	633
2010	547
2011	656
2012	733
2013	954
2014	1,356
2015	1,748
2016	2,111
2017	2,013
2018	2,015
2019	2,007
2020	2,092
2021	2,283 (Confirmed) / 2,299 (Estimated)
2022	2,331 (Confirmed) / 2,359 (Estimated)

Figure 3 shows that the 2022 opioid-related overdose death rate (33.6 per 100,000 people) is 9% higher than in 2016 (30.7 per 100,000 people) and is 3% higher than 2021 (32.7 per 100,000 people). Joinpoint analysis indicated that there was a statistically significant increase in opioid overdose death rates from 2012 to 2015 at a rate of 36% per year on average and a significant increase of 3% per year on average from 2015 to 2022.

Figure 3. Rate of Confirmed and Estimated Opioid-Related Overdose Deaths, All Intents
Massachusetts Residents: 2000 - 2022

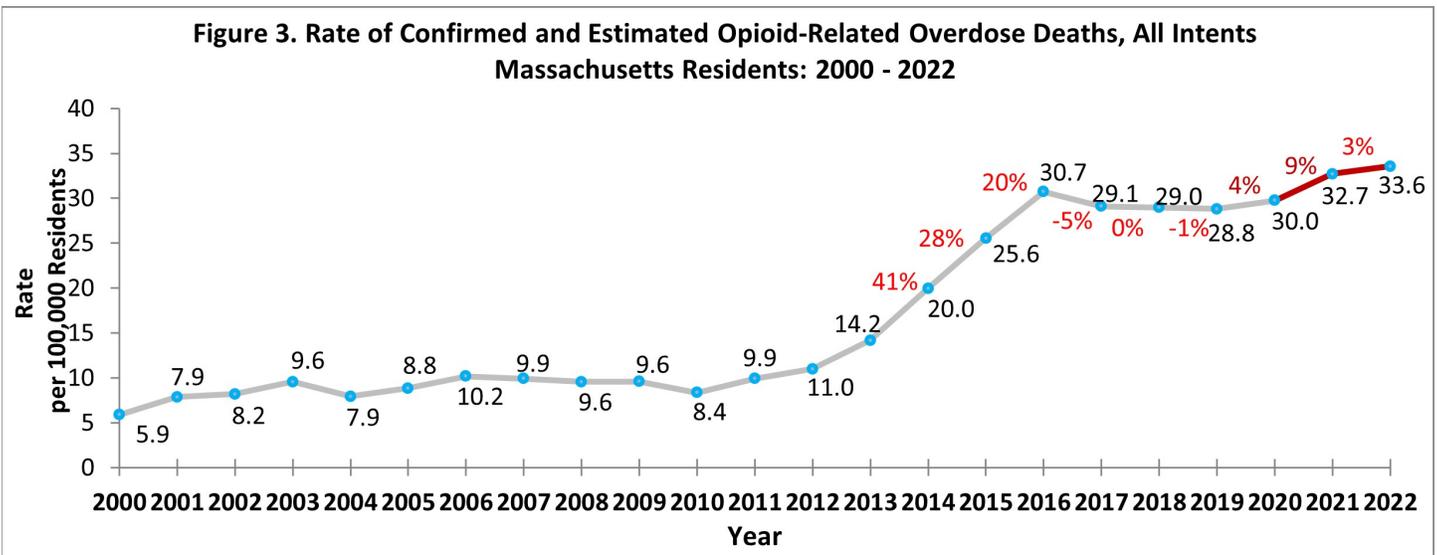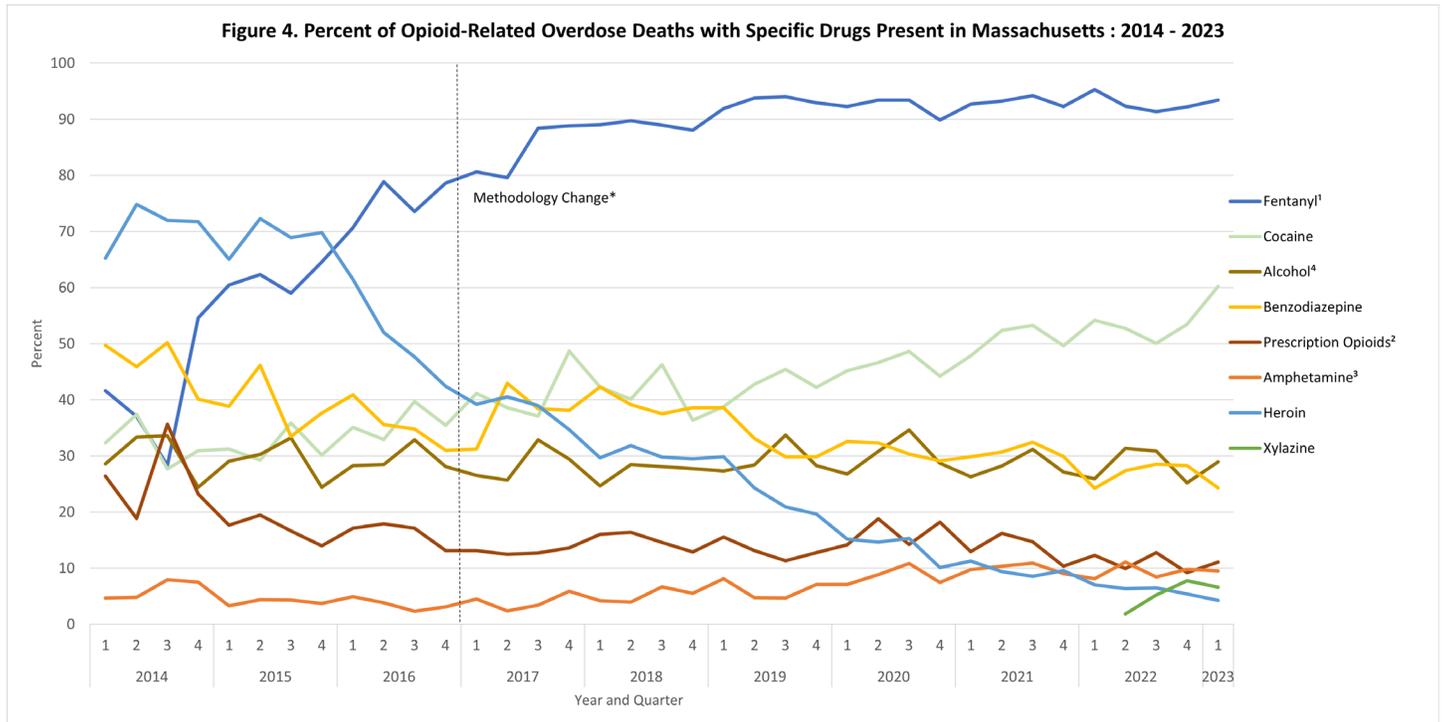| Year	Rate per 100,000 Residents	% change
2000	5.9	
2001	7.9	
2002	8.2	
2003	9.6	
2004	7.9	
2005	8.8	
2006	10.2	
2007	9.9	
2008	9.6	
2009	9.6	
2010	8.4	
2011	9.9	
2012	11.0	
2013	14.2	41%
2014	20.0	28%
2015	25.6	20%
2016	30.7	
2017	29.1	-5%
2018	29.0	0%
2019	28.8	-1%
2020	30.0	4%
2021	32.7	9%
2022	33.6	3%

Figure 4 shows that in 2022 there were 2,170 opioid-related overdose deaths where a toxicology screen was also available. Among these deaths, fentanyl was present in 93%, cocaine in 53%, alcohol in 28%, benzodiazepines in 27%, prescription opioids in 11%, amphetamines in 9%, heroin in 6%, and xylazine in 5%. In the first quarter of 2023, there were 515 opioid-related overdose deaths where a toxicology screen was also available. Among these deaths, fentanyl was present in 93%, cocaine in 60%, alcohol in 29%, benzodiazepines in 24%, amphetamines in 10%, prescription opioids in 11%, and heroin in 4%. Since June of 2022, xylazine was routinely reported among opioid-related overdose deaths. In the first quarter of 2023, xylazine was present in 7% of opioid-related overdose deaths. The results are shown in Figure 4. Fentanyl increased significantly by 12% per quarter on average from 2016 to 2018 and has continued to increase, although not significantly. Notably, the presence of stimulants in toxicology has increased since 2014: cocaine has increased at a rate of 6% per quarter on average from 2016, and amphetamines have increased about 20% per quarter on average since 2016. There was an increase in the presence of cocaine in these deaths in the last two quarters where data are available and the 60% in the first quarter of 2023 is an all-time high It's important to note that the data

cannot tell us whether the presence of cocaine and fentanyl together is due to purposeful co-use of fentanyl and cocaine or use of cocaine that is unknowingly contaminated with fentanyl. Heroin or likely heroin decreased by 22% per quarter on average between 2016 and 2019; and by 35% per quarter on average since 2019. The percentage of benzodiazepines has decreased per quarter on average from 2016 to date, although not significantly.

Figure 4. Percent of Opioid-Related Overdose Deaths with Specific Drugs Present in Massachusetts : 2014 - 2023

* Beginning with the November 2019 report, DPH began to use a new method to identify substances present in the toxicology data, which can only be applied from 2017 onward; this new method cannot be applied to the older data
1. This is most likely illicitly produced and sold, **not** prescription fentanyl
2. Prescription opioids include: hydrocodone, hydromorphone, oxycodone, oxymorphone, and tramadol
3. Beginning with the February 2020 report, amphetamine includes both amphetamine and methamphetamine; methamphetamine was previously excluded
4. Beginning with the February 2021 report, a category for alcohol was added
5. Beginning with the December 2022 report, a category for xylazine was added
**Please note that previous estimates may change slightly as DPH routinely receives updated toxicology data from the Office of the Chief Medical Examiner and the Massachusetts State Police.**

Fentanyl is a synthetic and highly potent opioid that is in the drug supply in Massachusetts. Most of the fentanyl in Massachusetts is due to illicitly produced fentanyl, not diverted pharmaceutical fentanyl. The drug supply is volatile with variable concentrations of active substances, which can increase the risk of toxicity and overdose.

While screening tests can be used to note the rate at which certain drugs are detected in toxicology reports, they are insufficient to determine the final cause of death without additional information. The cause of death is a clinical judgment made within the Office of the Chief Medical Examiner.

Starting with the June 2023 report, communities were classified according to the Massachusetts State Office of Rural Health's definition based on their population levels and proximity to urban areas. Towns classified as rural level 1 and rural level 2 are all rural communities, but towns in level 2 are less densely populated and more isolated from urban core areas. In 2022, rural level 2 communities had the highest age-adjusted opioid-related overdose death rate at 36.1 deaths per 100,000 residents (Figure 5). From 2011 to 2014, age-adjusted rates in rural level 2 communities rose by approximately 33% annually on average, while rural level 1 communities experienced a 26% annual increase on average

from 2011 to 2016. Over the same period, urban/suburban communities also saw a comparable 27% average annual increase in age-adjusted opioid-related overdose death rates.

Figure 5. Rate of Confirmed Opioid-Related Overdose Deaths by Rural Status, Massachusetts Residents: 2011 - 2022
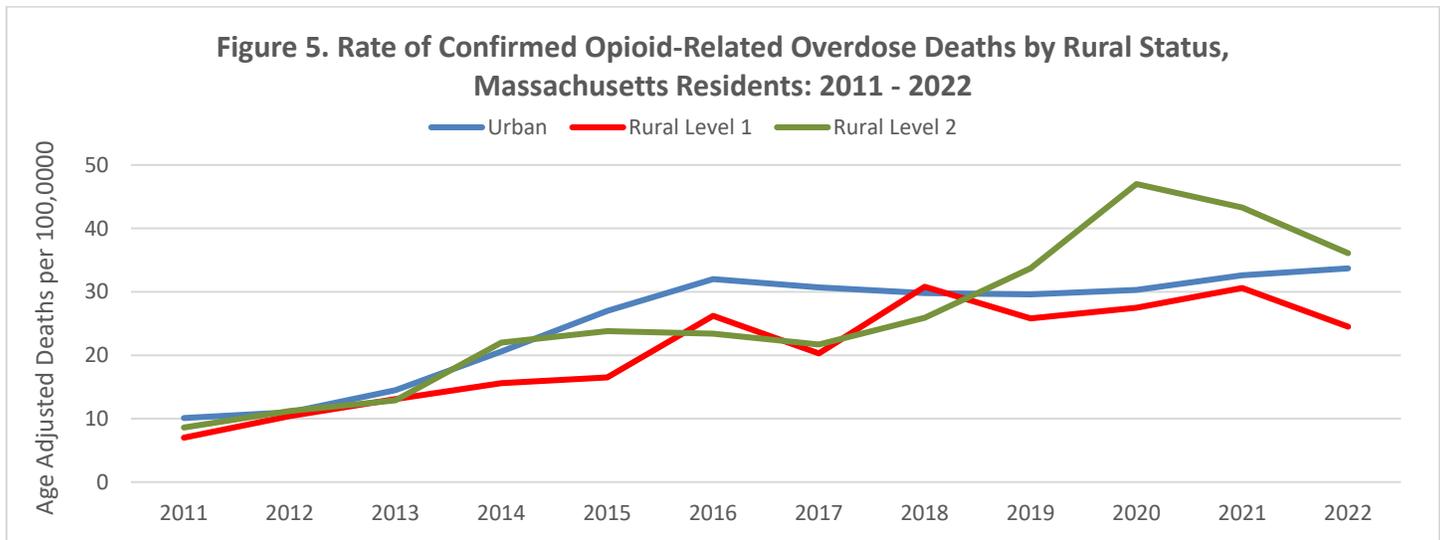
Note: For detailed information please refer to the companion data standard document and style guide located at: https://www.mass.gov/service-details/state-office-of-rural-health-rural-definition.

Rural towns are classified into two categories of rurality. Communities classified as rural level one (rural1) meet fewer rural criteria than Communities considered rural at level two (rural2).

- Communities in level two are less densely populated and more remote and isolated from urban core areas.
- Communities in level one and level two are both rural.
- Communities not in level one or two are considered urban.

Technical Notes

- Opioids include heroin, illicitly manufactured fentanyl, opioid-based prescription painkillers, and other unspecified opioids.
- Data for 2021-2023 deaths are preliminary and subject to updates.
- Beginning with the May 2017 report, DPH started reporting opioid-related overdose deaths for all intents, which includes unintentional/undetermined and suicide.
- Beginning with the August 2019 report, DPH updated the case definition used to identify opioid-related overdose deaths to match the CDC's case definition. The following International Classification of Disease (ICD-10) codes for mortality were selected from the underlying cause of death field to identify poisonings/overdoses: X40-X44, X60-X64, X85, and Y10-Y14. All multiple cause of death fields were then used to identify an opioid-related overdose death: T40.0, T40.1, T40.2, T40.3, T40.4, and T40.6.
- This report tracks opioid-related overdoses due to difficulties in identifying heroin and prescription opioids separately. The Department regularly reviews projections as more information becomes available. Information from the Office of the Chief Medical Examiner and the Massachusetts State Police are now incorporated into the predictive model. This additional information has improved the accuracy of the model that predicts the likelihood that the cause of death for any person was an opioid-related overdose. DPH applied this model to death records for which no official cause of death was listed by the OCME. The model includes information from the death certificate, Medical Examiner's notes, and the determination by the State Police of a suspected heroin death. DPH added this estimate to the number of confirmed cases to compute the total number of opioid-related overdoses. Should new information become available that changes the estimates to any significant degree, updates will be posted.

Sources

- Massachusetts Registry of Vital Records and Statistics, MDPH
- Massachusetts Office of the Chief Medical Examiner
- Massachusetts State Police
- Population Estimates 2000-2010: National Center for Health Statistics. Postcensal estimates of the resident population of the United States, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2000-2010).
- Population Estimates 2011-2019, version 2020, Massachusetts Department of Public Health, Bureau of Environmental Health. Version 2020 years 2018-2019 apply updates from U.S. Census Bureau's County Population by Characteristics, vintage 2020; all previous years apply updates from U.S. Census Bureau's County Population by Characteristics, vintage 2019 or earlier. These estimates were developed by the University of Massachusetts Donahue Institute (UMDI) in partnership with the Massachusetts Department of Public Health, Bureau of Environmental Health.

UMDI Interim 2020 Population Estimates by Age, Sex, Race, and Municipality, UMass Donahue Institute Population Estimates Program, March 1, 2022.