



Data Brief

Stimulants, health disparities, and the impact of the opioid epidemic on maternal health and high risk populations

Massachusetts Department of Public Health

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Background

In 2015, legislation responding to the opioid epidemic was passed and signed into law by Governor Charlie Baker and reauthorized in 2016. This law, referred to as Chapter 55, enabled the linkage and analysis of various data sets from agencies across state government. Led by the Massachusetts Department of Public Health (DPH), 29 groups from government, higher education, and the private sector provided information and expertise to advance Chapter 55 goals, establishing an unprecedented public-private partnership to maximize the use of administrative data to study a major public health crisis.

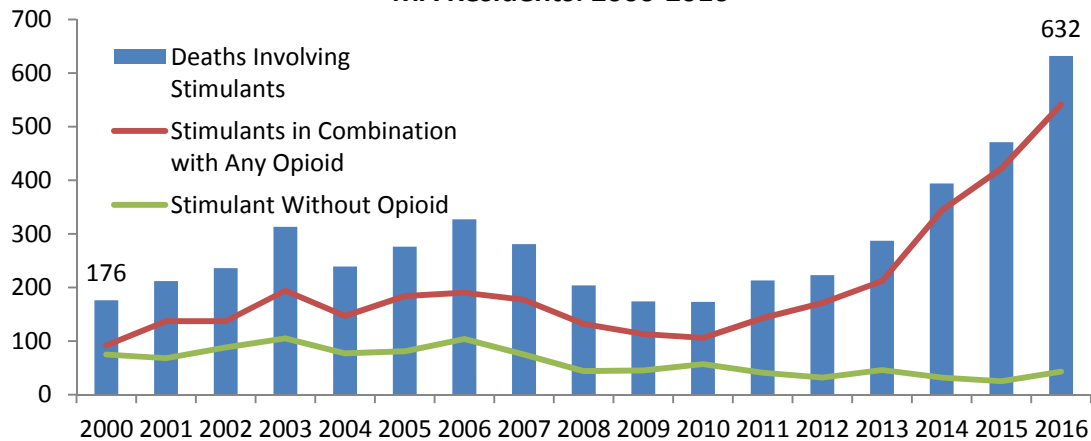
In 2017, a new statute [M.G.L.c. 111 s. 237](#) was promulgated to establish the **Public Health Data Warehouse** which authorizes the DPH Commissioner to continue the work of examining data and trends in fatal and nonfatal opioid overdoses and to address new public health topics over time.

This data brief contains highlights from the first set of analyses conducted under the Commissioner's 2017 authority as well as a special section on emerging trends related to stimulant overdoses. It focuses on health disparities and the impact of the opioid epidemic on maternal health and high risk populations. These analyses were conducted by academic researchers and public policy analysts in collaboration with DPH. Information about this public-private partnership can be found [here](#).

I. Stimulant-Related Overdose Deaths

Key Finding #1: Counts of deaths involving stimulants have increased 25% per year since 2010 and the majority of deaths involving stimulants also involve opioids. The count of deaths involving stimulants without opioids has declined by almost 7% per year since 2000.

**Figure 1: Count of Stimulant-Related Deaths
MA Residents: 2000-2016**

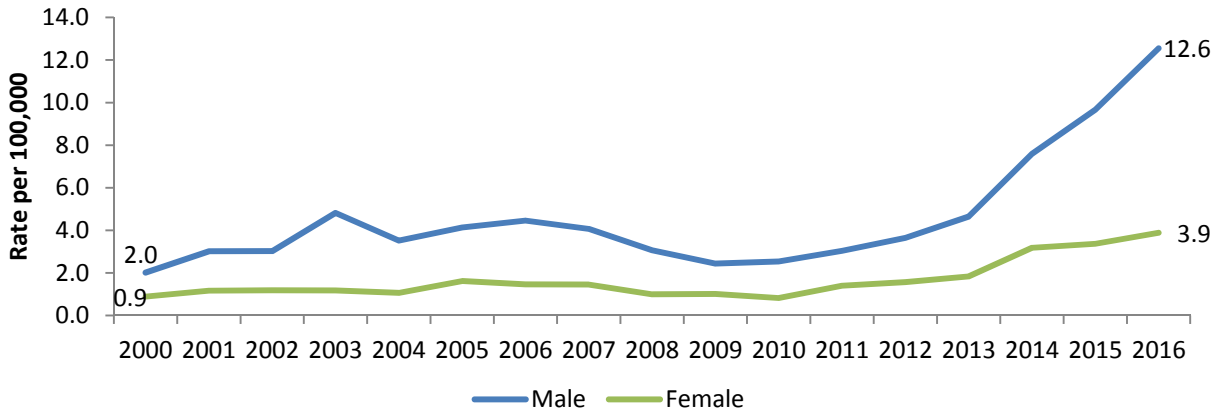


Note: These deaths may include substances in addition to stimulants or opioids
Source: MDPH Registry of Vital Records and Statistics

Why is this important? While stimulant related deaths have been increasing since 2010, this increase is closely linked to the opioid overdose epidemic. These data suggest that interventions that address stimulant use alone will not be sufficient to reduce stimulant related deaths.

Key Finding #2: The rate of overdose deaths involving stimulants and opioids is higher among males than females. The rate rose by 38% per year for males from 2011 to 2016 and by 30% per year from 2010-2016 for females.

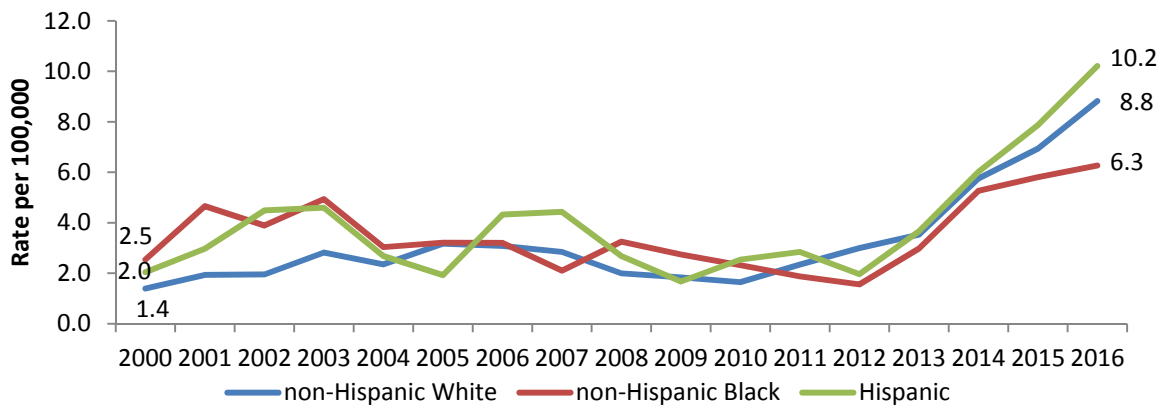
Figure 2: Rate of Stimulant-Related Overdose Deaths in Combination with Any Opioid by Gender, MA Residents: 2000-2016



Note: These deaths may include substances in addition to stimulants and opioids
 Source: MDPH Registry of Vital Records and Statistics

Key Finding #3: The rate of overdose deaths involving stimulants and opioids is currently highest among Hispanic residents (10.2 per 100,000). The rate among Hispanics increased by nearly 50% per year from 2012 to 2016. The rate among non-Hispanic whites increased a little over 30% per year from 2010-2015. While the annual rates were the lowest among non-Hispanic blacks, they also saw increased rates of nearly 40% per year from 2012-2016.

Figure 3: Rate of Stimulant-Related Overdose Deaths in Combination with Any Opioid by Race/Ethnicity, MA Residents: 2000-2016



Notes: These deaths may include substances in addition to stimulants and opioids
 Non-Hispanic Asian/Pacific Island and non-Hispanic Other are not displayed due to small counts
 Source: MDPH Registry of Vital Records and Statistics

Why is this Important? Understanding who is at greatest risk by gender and race/ethnicity over time allows us to best focus prevention programs and treatment resources to address population-specific needs.

II. Polysubstance Opioid Overdoses

Key Finding #1: Among opioid-related overdose deaths with toxicology results, 389 (17%) had only opioids in toxicology. Eight hundred and eight (36%) opioid-related deaths also had stimulants in toxicology and 1,047 (47%) had opioids and another substance that was not a stimulant. Among those with opioids and stimulants, the vast majority had only cocaine present in addition to the opioid. Among those with opioids and another substance other than a stimulant, 42% had multiple substances present in addition to the opioid.

Figure 4a: Opioid-related Deaths with Accompanying Toxicology: 2014-2015

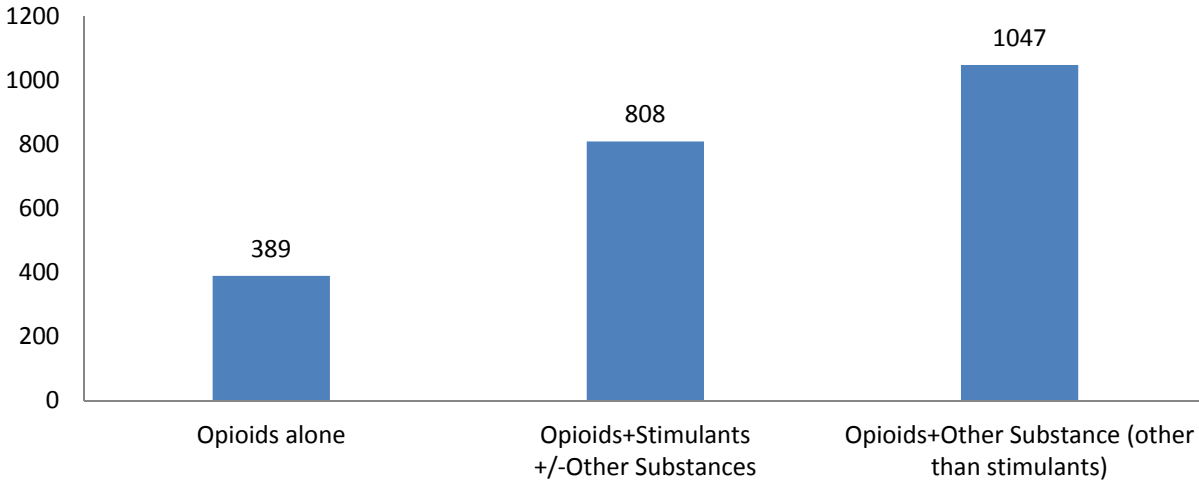
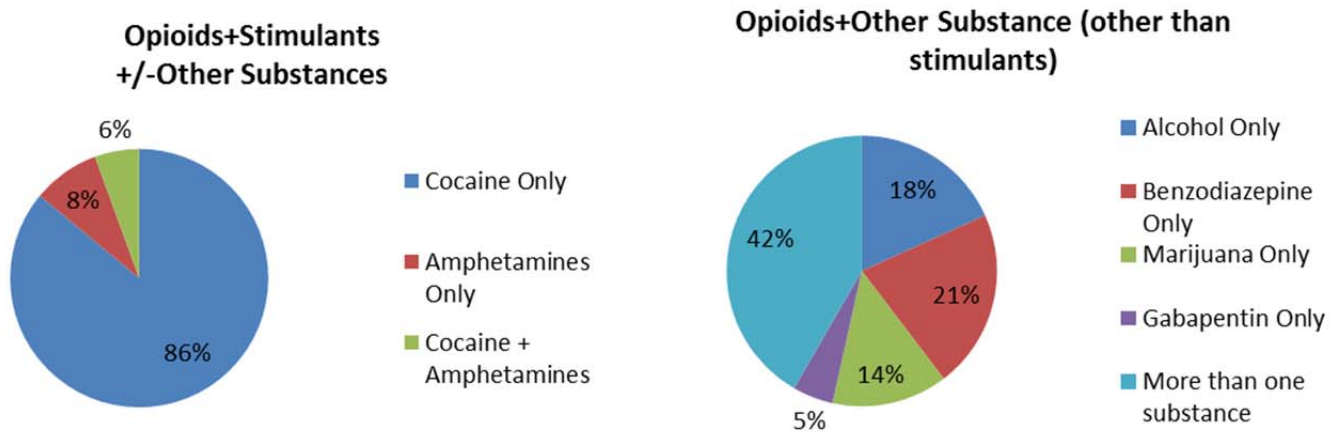


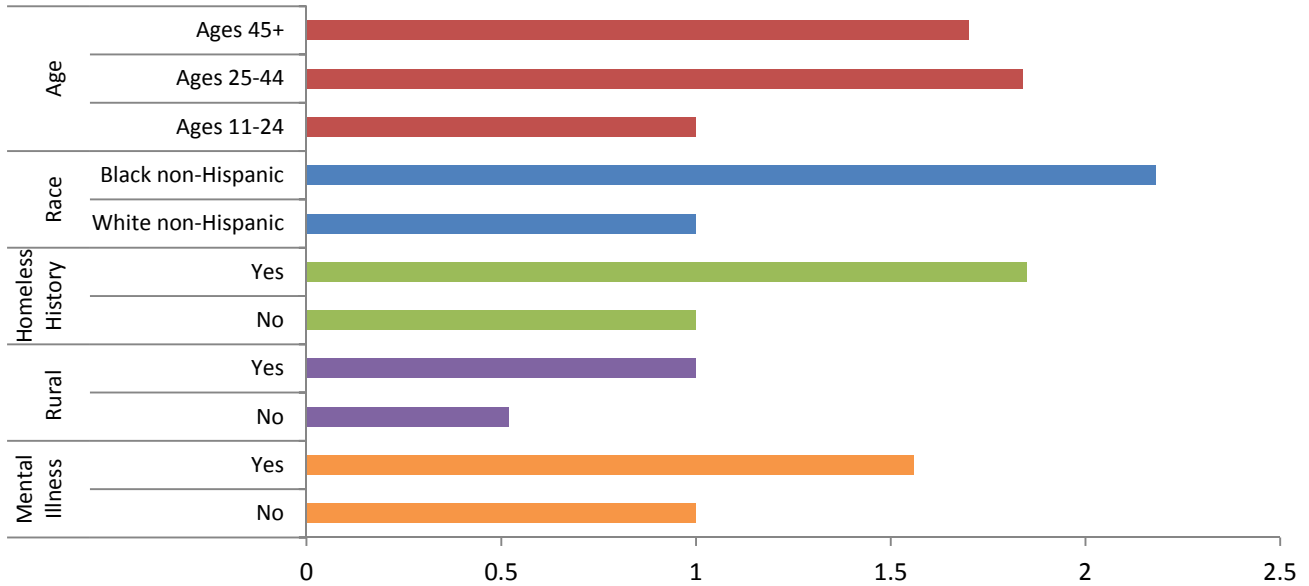
Figure 4b: Other Substance Found in Opioid-Related Overdose Deaths: 2014-2015



Why is this Important? Overdose prevention efforts should consider prevalent polysubstance use, including stimulants.

Key Finding #2: Older adults, persons in rural areas, and those with comorbid mental illness along with non-Hispanic black residents, and persons who experienced recent homelessness were more likely to have died with stimulants and opioids than opioids alone.

Figure 5: Odds of having both opioids and stimulants present in toxicology: 2014-2015



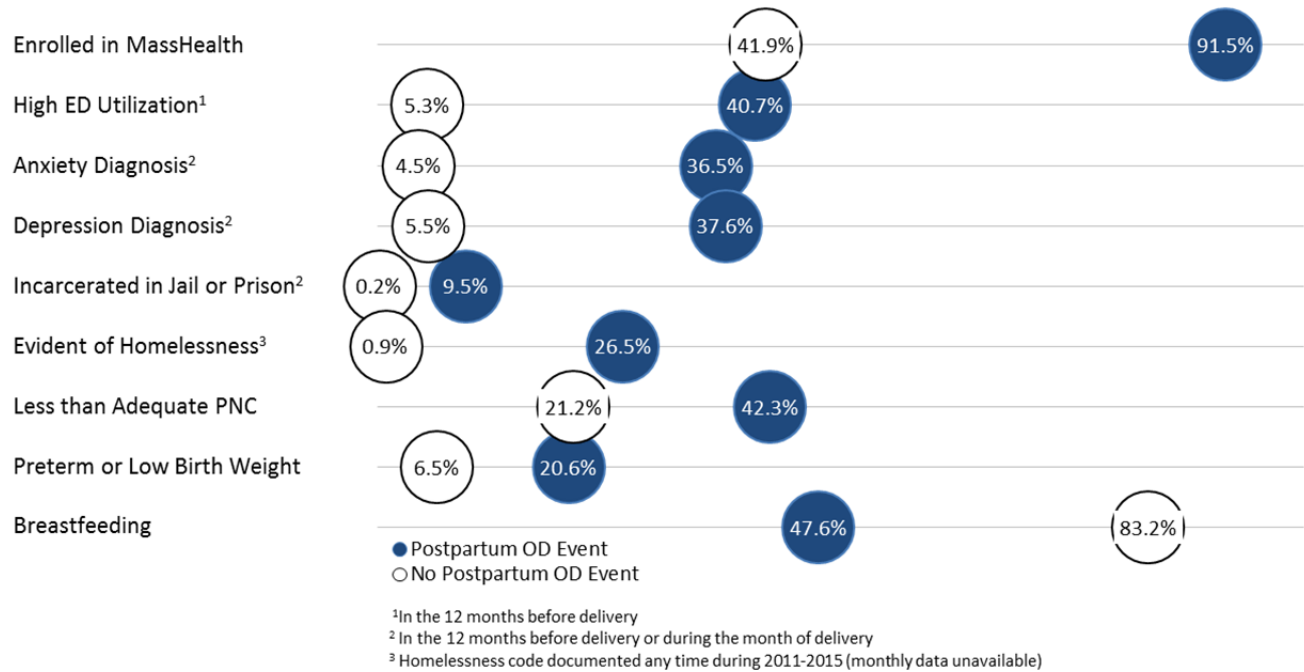
Note: Differences between Hispanic, Other non-Hispanic and White non-Hispanic were not statistically significant and are not shown here

Why is this Important? Overdose prevention efforts should consider prevalent polysubstance use, including stimulants. Novel treatment and prevention programs that are tailored to these high-risk populations should be developed.

III. Postpartum Opioid Overdoses

Key Finding #1: Women who had an opioid overdose within one year of delivering a baby also experience an increased number of risk factors during pregnancy and at delivery, and are more likely to be enrolled in MassHealth

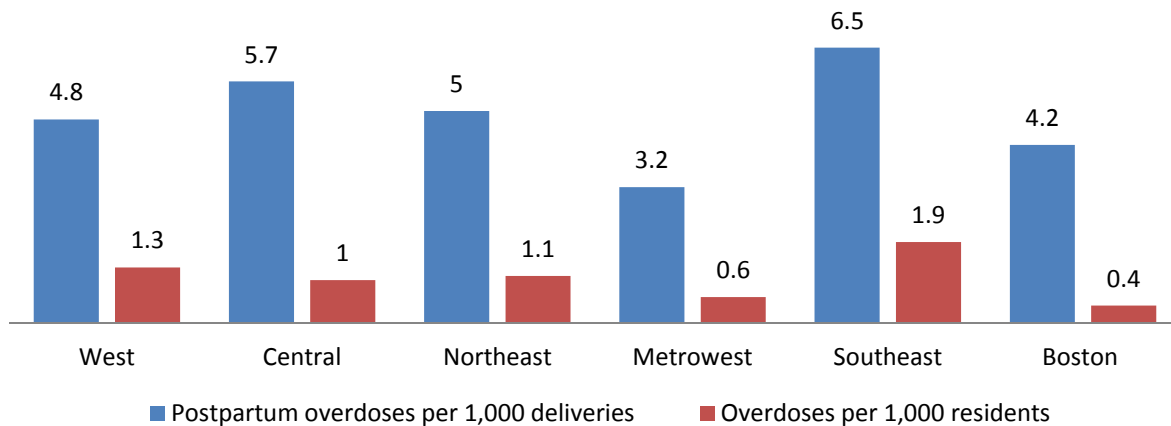
Figure 6: Maternal and Pregnancy Outcomes by Postpartum Opioid Overdose Status: January 1st, 2012- September 30th, 2014



Why is this Important? Evidenced-based interventions to support women and families in the postpartum period are needed and these findings about risk factors can be used to tailor prevention programs.

Key Finding #2: The Southeast region had the highest rate of overall and postpartum overdoses. The overall opioid overdose rates were higher than postpartum opioid overdose rates for all regions, as would be expected. The difference between the postpartum and overall overdose rates was the most pronounced for the Boston region, which had a postpartum overdose rate that was about one tenth the rate of opioid overdoses overall.

Figure 7: Comparing Postpartum and Overall Opioid Overdose Rates by EOHHS Region: January 1st, 2012- September 30th, 2014



Why is this Important? By reporting data at the regional or community level, communities can focus their interventions and direct resources to the areas of greatest need.

IV. Populations at Risk: Homeless Individuals

Key Finding # 1: Among individuals with a high-likelihood of homelessness, long-term residential treatment was associated with a 48% reduction in mortality, however only 25% of these individuals were served in a long-term residential facility.

Figure 8a: Adjusted Risk of Death for those Highly Likely to be Homeless by Residential Treatment Status: 2011-2015

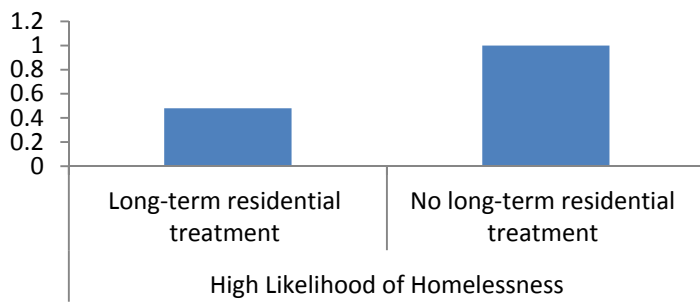
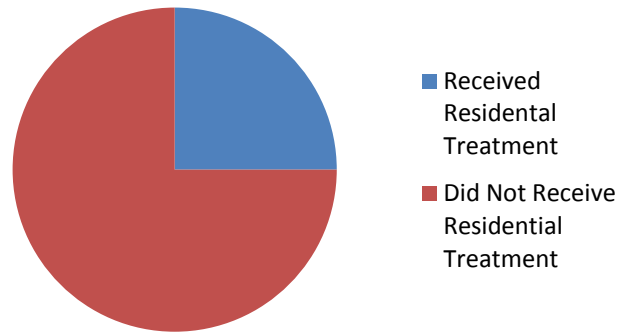


Figure 8b: Likelihood of Receiving Residential Treatment Among those Highly Likely to be Homeless: 2011-2015

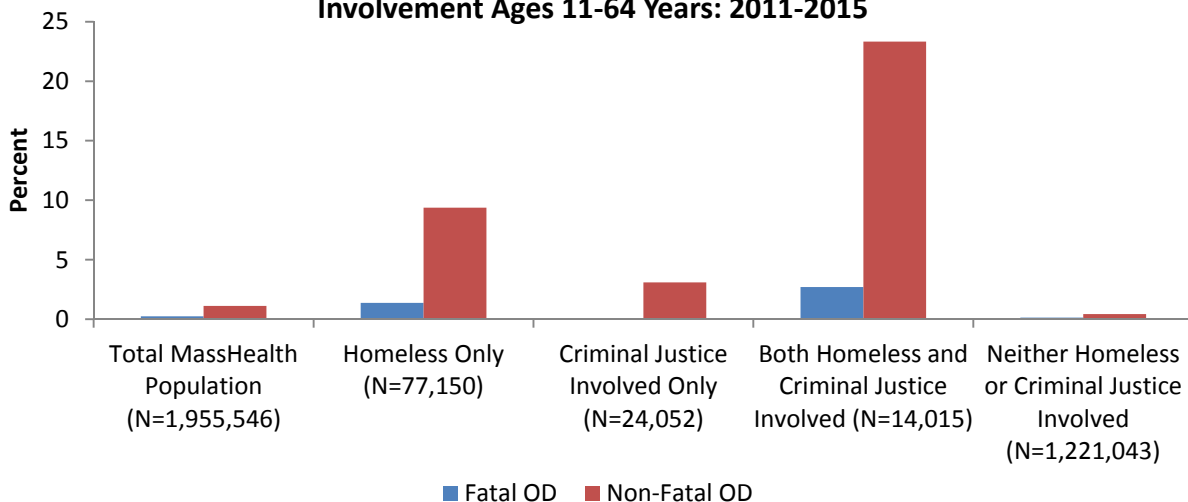


Why is this Important? These data suggest that increasing access to long-term residential services may be particularly effective for individuals experiencing homelessness.

V. Populations at Risk: Homeless and Criminal Justice Involved MassHealth Members

Key Finding #1: MassHealth members experiencing homelessness have significantly more non-fatal opioid overdoses than the general MassHealth population. For individuals who also have had prior engagement with the criminal justice system, the percent with non-fatal overdoses more than doubles.

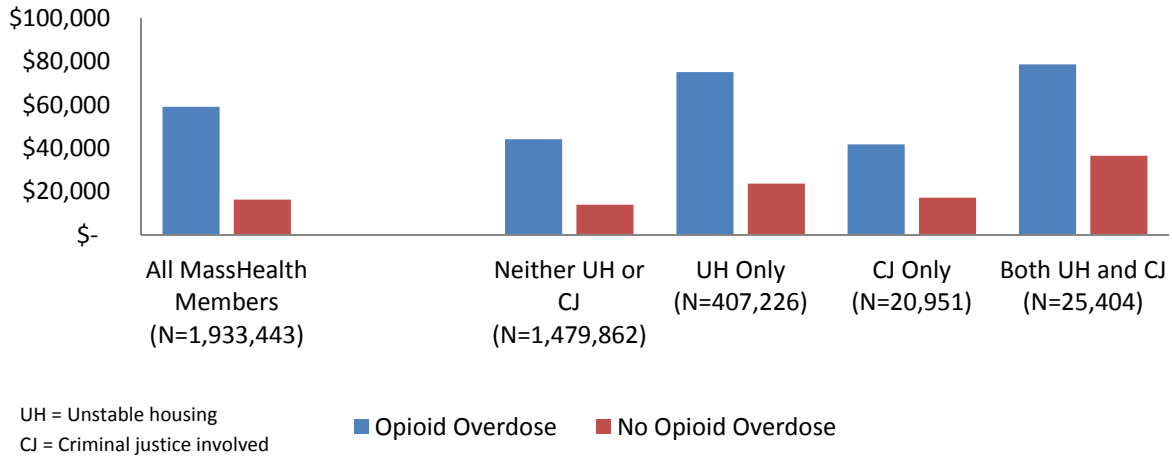
Figure 9: MassHealth Members: Fatal and Non-Fatal Opioid Overdoses among those Experiencing Homelessness and/or Criminal Justice Involvement Ages 11-64 Years: 2011-2015



Why is this Important? These findings can inform screening practices around housing stability and incarceration history to inform services and service referrals.

Key Finding #2: The 5-year average MassHealth payments were substantially higher among those who had an opioid overdose compared with those who did not. Payments were the highest for those experiencing an opioid overdose who also experienced unstable housing or were criminal justice involved.

Figure 10: Five-Year Average MassHealth Payments by Study Population and Opioid Overdose Status: 2011-2015

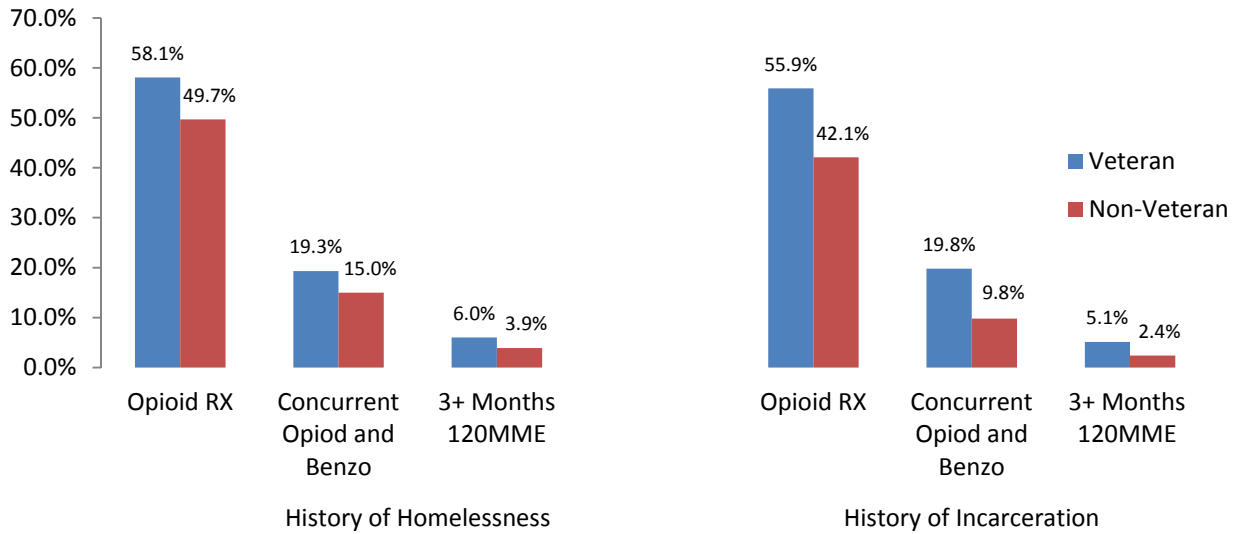


Why is this Important? Assessing service utilization before and after a non-fatal overdose may help to identify possible service opportunities to reduce opioid overdoses and improve outcomes among those members with an overdose by recognizing where these service opportunities might exist in the future.

VI. Populations at Risk: Veterans with a History of Homelessness or Incarceration

Key Finding #1: Veterans experiencing homelessness or incarceration had more access to prescribed opioids, simultaneous benzodiazepines and opioids prescriptions, and access to high dosage opioid prescriptions for an extended period than non-veterans who were homeless or incarcerated.

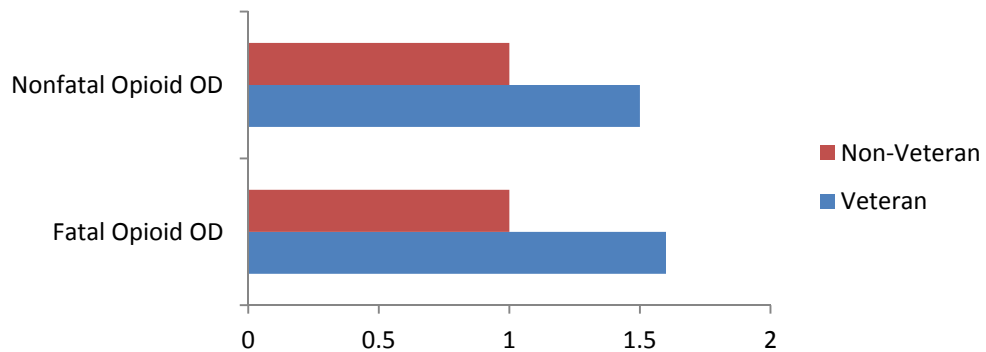
Figure 11: Opioid Prescribing Patterns: 2011-2015



Why is this Important? These findings suggest that the integration of initiatives focused on improving opioid prescribing in Veterans experiencing homelessness and incarceration to improve patient safety in these populations is warranted.

Key Finding #2: Among those with a history of homelessness and/or incarceration in Massachusetts, Veterans had a 50% increased risk of nonfatal opioid overdose and 60% increased risk of fatal opioid overdose.

Figure 12: Adjusted Risk of Non-fatal and Fatal Opioid Overdose as Modified by Veteran Status: 2011-2015

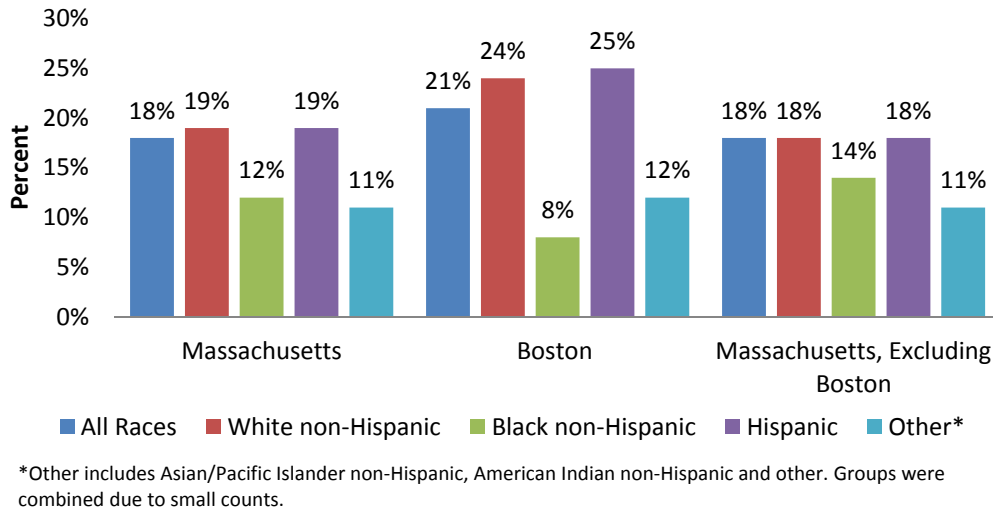


Why is this Important? Among already high-risk populations (those with a history of homelessness or incarceration) veteran’s status itself is associated with increased risk of fatal and nonfatal opioid overdose.

VII. Racial and Geographic Disparities

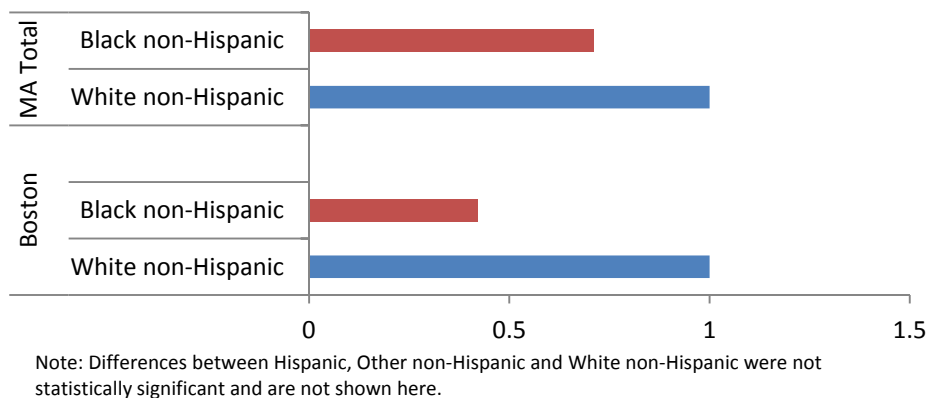
Key Finding #1: Black residents in Massachusetts, and in Boston specifically, were less likely to receive substance use treatment following hospital-related care for opioid overdose compared with White residents.

Figure 13: Percent of Hospital Patient Encounters for Opioid-related Overdose Resulting in Substance Misuse Treatment in 30 Days, by Race/Ethnicity and Location



Key Finding #2: The odds of receiving subsequent substance use treatment within 30 days following a hospital patient encounter for opioid overdose were 29% lower for Black residents throughout Massachusetts and 58% lower for Black residents of Boston than for Whites.

Figure 14: Odds of receiving subsequent substance use treatment within 30 days following a hospital patient encounter for opioid overdose: 2011-2015

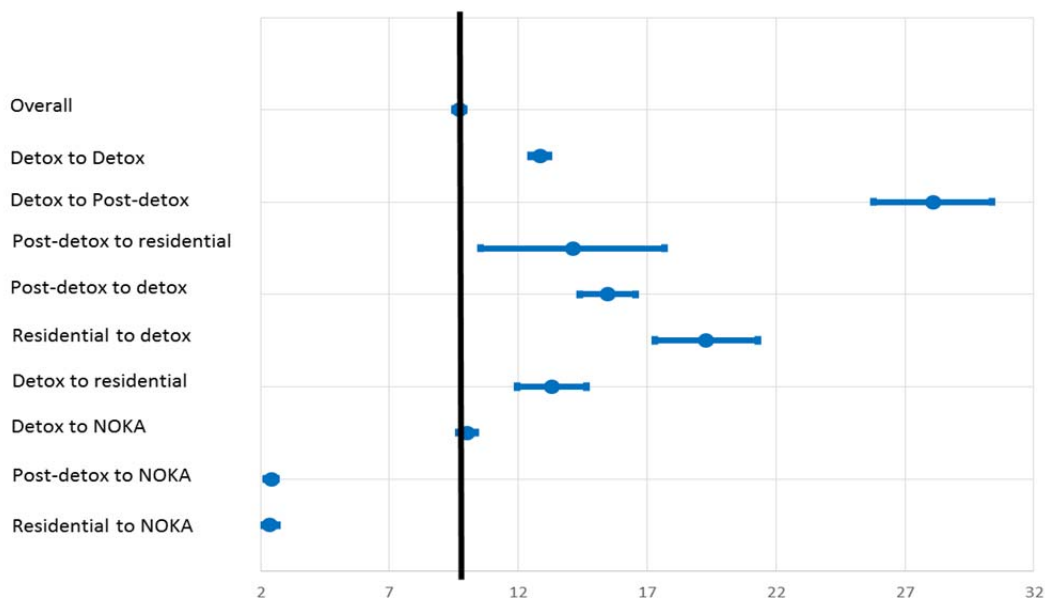


Why is this important? There are likely many known and unknown explanatory factors impacting treatment access rates and observed racial/ethnic and geographic differences, including differences in the social determinants of health, which may be independent of the hospital and treatment care systems. Given the substantial racial/ethnic inequities observed in this analysis, more conscious efforts need to be made to engage and offer treatment to individuals who experience treatment gaps.

VIII. The Inpatient Substance Use Disorder Treatment Cascade¹

Key Finding# 1: In the Massachusetts inpatient treatment cascade, 30% of the total person-time was spent in transitions back to inpatient detoxification following any treatment stage, and these periods leading to readmission represent periods of elevated overdose risk. The rate of overdose varies along the inpatient substance use disorder treatment cascade. The highest risk of overdose occurred in the transition period between detox treatment and post-detox, followed by the transition periods returning to detox following residential or post-detox treatment.

Figure 15: Overdose Rates Along the Cascade: 2011-2015



Legend: overdose rates stratified by the transition period along the treatment cascade. The black vertical line represents the overdose rate in the overall sample.
NOKA = no other known admissions.

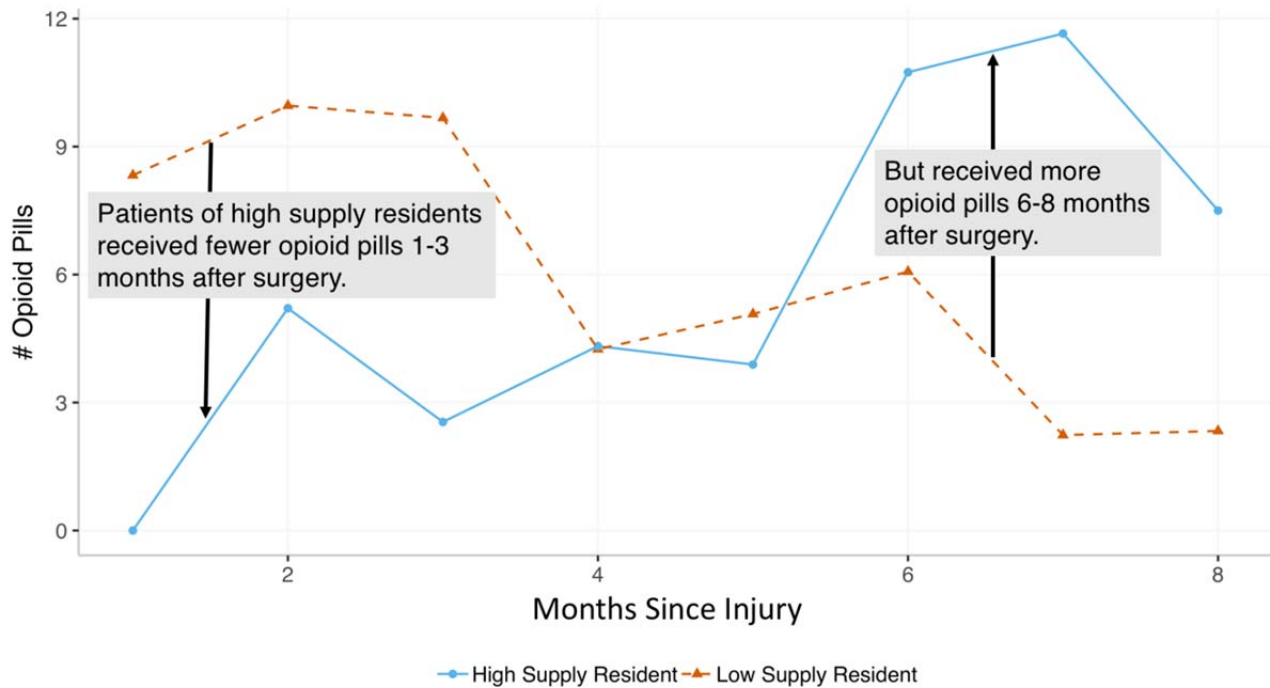
Why is this Important? The black vertical line represents the overall overdose rate. This figure highlights the comparatively high rates of overdose at various transition points, most notable in the period between detox and post-detox. These results suggest that interventions to reduce transition times and link individuals to subsequent care quickly may be beneficial, especially among those recently exiting detoxification.

¹ Inpatient treatment for substance use disorders has been standardized as a succession of steps from acute detoxification to long-term residential or “cascade”

IX. Post-Surgical Opioid Prescribing

Key Finding: Patients of high supply (those in the top 1/3 of opioid prescribing) and low supply (everyone else) medical residents² have comparable injuries and demographics, but the patients of “high supply residents” receive about 20 more opioid pills after their surgeries. The patients of high supply residents consequently have different patterns of opioid use in the months after surgery.

Figure 16: Average Number of Opioid Pills Received by Patients of High and Low Supply Medical Residents: 2011-2015



Why is this Important? The prescription quantity at discharge is crucial in determining the short-term need for re-prescription and the long-term risk of dependence for the patient. Policies that regulate the volume of opioid prescribed to the newly exposed may consequently be effective at reducing long-term dependence in a vulnerable population.

² Medical residents are qualified physicians who have passed their medical boards and who practice medicine under the direct or indirect supervision of a senior clinician

X. Appendix

The results in this Data Brief were drawn from analytic projects completed by partner organizations identified through DPH's Notice of Opportunity solicitations. These projects were conducted on behalf of DPH with guidance and technical assistance from DPH staff. No funds were awarded by the Department for these projects.

Postpartum Opioid Overdoses

University of Sydney: Tim Nielsen

Virginia Commonwealth University: Mishka Terplan

Massachusetts General Hospital: Sarah Wakeman, Amy Yule, Elise Tavares, Timothy Wilens, Davida Schiff

Louisiana State University Health Sciences Center: Pooja Mehta

Populations at Risk: Homeless Individuals

Boston Medical Center: Marc Larochelle, Alex Walley, Ryan Bernstein

Boston University: Tom Byrne

Populations at Risk: Homeless and Criminal Justice Involved MassHealth Members

UMASS Medical School: Judy Savageau, Melissa Brindisi, Parag Kunte, Enid Velez, Faye Miller, Laura Sefton

MassHealth: Stephanie Brown, Adam Stoler, Peg Harvey

Populations at Risk: Veterans with a History of Homelessness or Incarceration

Edith Nourse Rogers Memorial Veterans Hospital: Guneet Jasuja, David Smelson, Dan Berlowitz, Megan McCullough, Donald Miller

Boston University: Adam Rose, Tom Byrne

Racial and Geographic Disparities

Boston Public Health Commission: Dan Dooley, Amar Mehta, Johnna Murphy, Roy Wada

Northeastern University: John Griffith

Polysubstance Opioid Overdoses

Boston Medical Center: Joshua Barocas, Jianing Wang, Marc Larochelle, Benjamin Linas, Alexander Walley

Brown University: Brandon Marshall, Curt Beckwith

The Inpatient Substance Use Disorder Treatment Cascade

Boston Medical Center: Jake Morgan, Jianing Wang, Joshua Barocas, Alexander Walley, Benjamin Linas

Boston Public Health Commission: Jennifer Jaeger

Post-Surgical Opioid Prescribing

Harvard University: Matthew Basilico, Abhram Bhashyam, Emma Harrington, Michael McWilliams

Massachusetts General Hospital: Marilyn Heng