



# Massachusetts Department of Public Health Bureau of Infectious Disease and Laboratory Sciences

## Massachusetts HIV Epidemiologic Profile Statewide Report – Data as of 1/1/2024

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<https://www.mass.gov/lists/infectious-disease-data-reports-and-requests>

### HIV Data Dashboard

<https://www.mass.gov/info-details/hiv-data-dashboard>

### Slide sets for HIV Epidemiologic Profile Reports

<https://www.mass.gov/lists/hivaids-epidemiologic-profiles>

<sup>i</sup> Providers may use this number to report individuals newly diagnosed with a notifiable sexually transmitted infection, including HIV, or request partner services. Partner services is a free and confidential service for individuals recently diagnosed with a priority infection. The client-centered program offers counseling, linkage to other health and social services, anonymous notification of partners who were exposed and assistance with getting testing and treatment. For more information, see: <https://www.mass.gov/service-details/partner-services-program-information-for-healthcare-providers>

# TABLE OF CONTENTS

DESCRIPTION	PAGE
<a href="#"><u>List of Commonly Used Acronyms</u></a>	2
<a href="#"><u>Executive Summary</u></a>	3
<a href="#"><u>Epidemic at a Glance</u></a>	7
<a href="#"><u>Trends in HIV Infection Diagnoses over Time</u></a>	8
<a href="#"><u>Recent HIV Infection Diagnoses</u></a>	10
<a href="#"><u>Persons Living with HIV Infection</u></a>	13
<a href="#"><u>Mortality among Individuals with HIV</u></a>	16
<a href="#"><u>Trends in Deaths among Individuals with HIV</u></a>	19
<a href="#"><u>Geographic Distribution of HIV Infection</u></a>	21
<a href="#"><u>HIV Care Continuum – New Diagnoses</u></a>	24
<a href="#"><u>HIV Care Continuum – PLWH</u></a>	25
<a href="#"><u>Social Vulnerability Index</u></a>	27
<a href="#"><u>Technical Notes</u></a>	28

# LIST OF COMMONLY USED ACRONYMS

<b>AFAB</b>	Assigned Female at Birth
<b>AI/AN</b>	American Indian/Alaska Native
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>AMAB</b>	Assigned Male at Birth
<b>API</b>	Asian/Pacific Islander
<b>BIDLS</b>	Bureau of Infectious Disease and Laboratory Sciences
<b>DPH</b>	(Massachusetts) Department of Public Health
<b>HIV</b>	Human Immunodeficiency Virus
<b>HSR</b>	Health Service Region
<b>HTSX</b>	Heterosexual Sex
<b>IDU</b>	Injection Drug Use
<b>MSM</b>	Male-to-Male Sex, Men Who Have Sex with Men
<b>N</b>	Number
<b>N/A</b>	Not Applicable
<b>NH</b>	Non-Hispanic
<b>NIR</b>	No Identified Risk
<b>PLWH</b>	Persons (or Individuals) Living with HIV Infection
<b>Pres. HTSX</b>	Presumed Heterosexual Sex
<b>PR/USD</b>	Puerto Rico/United States Dependency
<b>PWID</b>	Persons Who Inject Drugs

# EXECUTIVE SUMMARY

## Impact of COVID-19 on HIV Surveillance Data

The coronavirus disease 2019 (COVID-19) pandemic had a large impact on the screening, treatment, and surveillance of other infectious diseases from 2020 to 2022. Nationally, the Centers for Disease Control and Prevention (CDC) observed significant declines in HIV testing (and diagnoses) during the COVID-19 pandemic that are likely attributed to interruptions in the availability of clinical services, patient hesitancy in accessing face-to-face clinical services, and shortages in HIV testing reagents/materials.<sup>i</sup> At time of publication, the full effect of the COVID-19 pandemic on case detection and reporting and efforts to control the spread of infectious disease in the Commonwealth has yet to be determined. As such, please interpret 2020 to 2022 HIV surveillance data presented in this report with caution.

## Epidemic at a Glance

- The number of persons living with HIV infection (PLWH) in Massachusetts increased by 11% from 21,346 in 2013 to 23,643 in 2022.<sup>ii</sup>
- After decreasing from 690 diagnoses in 2013 to approximately 640 diagnoses per year from 2014 to 2018 (five-year average = 637), the number of new HIV infection diagnoses declined to a ten-year low of 533 in 2019. In 2020, the number of new HIV infection diagnoses further declined to 435 and then remained at this lower level in 2021 and 2022, when there were 448 and 446 diagnoses, respectively. However, caution should be used in the interpretation of this decline and following stabilization due to the impact of COVID-19 on access to HIV testing and care services, and case surveillance activities.
- The number of deaths due to any cause among individuals reported with HIV infection increased by 30% from 276 in 2013 to 358 in 2022.
- Although there have been reductions in new cases, vulnerable and historically marginalized populations remain disproportionately impacted:
  - Men who have sex with men (MSM) continued to represent the largest proportion of new HIV infection diagnoses (37% overall and 52% among individuals assigned male at birth [AMAB] in 2020–2022).
  - Individuals with IDU exposure mode accounted for 35% of deaths among individuals with HIV in 2022 but only 15% of all PLWH.

## Trends in HIV Infection Diagnoses Over Time

- The number of individuals diagnosed with HIV infection has decreased over the past decade in Massachusetts, but disparities persist by sex at birth, exposure mode, race/ethnicity, place of birth, and age.
- Male-to-male sex (MSM) remained the predominant exposure mode from 2013 to 2022.
- The number of reported cases with injection drug use (IDU) as the primary exposure mode increased from a low of 31 in 2014 to a peak of 116 in 2017, and then decreased to 59 in 2019. The increase in 2017 was primarily due to an outbreak among persons who inject drugs (PWID) in the northeast part of the state between 2016 and 2018.<sup>iii</sup> Following a focused public health response, the number of HIV infection diagnoses attributed to IDU in the northeast has decreased. However, in early 2019, a new cluster of HIV infection was identified in Boston among PWID who were experiencing or had experienced recent homelessness, and the total statewide number of reported cases with IDU as the primary exposure increased to 81 in 2021. Following another focused public health response, the number of HIV infection diagnoses attributed to IDU decreased by 47% to 43 cases in 2022.

<sup>i</sup> Source: Centers for Disease Control and Prevention and Health Resources and Services Administration. *Integrated Guidance for Developing Epidemiologic Profiles: HIV Prevention and Ryan White HIV/AIDS Program Planning*. Atlanta, Georgia: Centers for Disease Control and Prevention; 2022.

<sup>ii</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>iii</sup> For more information, see: Charles Alpre et al. "Opioid Use Fueling HIV Transmission in an Urban Setting: An Outbreak of HIV Infection Among People Who Inject Drugs—Massachusetts, 2015–2018", *American Journal of Public Health* 110, no. 1 (January 1, 2020): pp. 37-44. <https://doi.org/10.2105/AJPH.2019.305366>

As of December 31, 2023, a total of 204 cases diagnosed since November 2018 have been investigated and identified as part of the Boston cluster. As it is an active cluster of concern, additional cases will continue to be investigated and added. Emerging trends among those newly diagnosed in the Boston cluster (N=23 cases diagnosed in 2022) include an increase in polysubstance and methamphetamine use.<sup>ii</sup>

- The distributions of individuals diagnosed with HIV infection by sex assigned at birth and exposure mode remained relatively stable, while distributions by race/ethnicity, age at diagnosis, and place of birth shifted from 2013 to 2021:
  - The proportion of HIV infection diagnoses among White (non-Hispanic) individuals decreased from 40% to 30%, while it increased from 27% to 34% among Black (non-Hispanic) individuals.
  - The proportion of HIV infection diagnoses among 30–39 year-olds increased from 20% to 35%, while it decreased from 26% to 17% among 40–49 year-olds and from 19% to 12% among 50–59 year-olds.
  - The proportion of HIV infection diagnoses among individuals born in the US decreased from 61% to 50%, while it increased from 34% to 46% among individuals born outside the US.

### Recent HIV Infection Diagnoses

- Those with no identified risk (NIR) comprised the second largest exposure mode group reported to the Massachusetts Department of Public Health (DPH), accounting for 26% of recent HIV infection diagnoses and consisting predominantly of individuals AMAB (69%), individuals born outside the US (58%), and Black (non-Hispanic) individuals (50%). Beginning in 2019, all new diagnoses of HIV infection were assigned to field epidemiologists for partner services, education, and linkage to HIV care. Please note that although field epidemiologists offer additional support in the collection of risk information as part of this process, some of the information doesn't meet the CDC-defined exposure mode categories. For example, risks occurring outside the US, such as transfusion/transplant risk (blood product), are not assigned as a primary exposure mode because it is not possible to verify the information internationally, so these cases would be assigned no identified risk. DPH will collect and maintain expanded risk information for local analyses and future use in case the CDC-defined exposure mode categories are updated.
- One in six (18%) individuals AFAB and diagnosed with HIV infection from 2020 to 2022 reported IDU as their primary exposure mode, compared to one in seven (14%) individuals AMAB.
- Black (non-Hispanic) and Hispanic/Latinx individuals were diagnosed with HIV infection during 2020–2022 at rates nine and four times that of White (non-Hispanic) individuals, respectively.
- During 2020 to 2022, 41% (N=550) of all individuals diagnosed with HIV infection were born outside the US. This proportion varied by race/ethnicity: 81% of Asian/Pacific Islander individuals diagnosed with HIV infection were born outside the US, compared to 63% of Black (non-Hispanic), 51% of Hispanic/Latinx, and 9% of White (non-Hispanic) individuals. An additional 11% of Hispanic/Latinx individuals diagnosed with HIV infection during this time period were born in Puerto Rico/US Dependencies.

### Persons Living with HIV Infection (PLWH)

- Challenges to achieving health equity in the prevention and care of HIV infection remain:
  - Racial/ethnic disparities persist among PLWH, and marked differences exist by exposure mode, current gender, place of birth, and geographic region of residence in the state.
  - MSM was the most frequently reported exposure mode, accounting for 40% of PLWH overall and 56% of individuals AMAB living with HIV infection.
  - While 12% of all Massachusetts residents live in the Boston HSR, it is the current residence of 27% of PLWH.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> For more information, see: Joint MDPH and BPHC Clinical Advisory: Increase in newly diagnosed HIV infections among persons who inject drugs in Boston, March 15, 2021, available at: <https://www.mass.gov/doc/joint-mdph-and-bphc-clinical-advisory-hiv-transmission-through-injection-drug-use-in-boston-march-15-2021/download>

## Mortality Among Individuals Reported with HIV

- Disparities in mortality among individuals reported with HIV paralleled those in diagnosis rates by sex assigned at birth and race/ethnicity but not exposure mode. Individuals with IDU exposure mode were over-represented among HIV-positive individuals who died. The leading causes of death among individuals reported with HIV infection with IDU and IDU/MSM exposure mode who died in 2021 (with a known cause) were external causes of injuries and poisonings (which includes opioid overdoses) which accounted for 31% (N=41/133) of deaths, cancer which accounted for 11% (N=15/133) of deaths, heart disease which accounted for 11% (N=15/133), and HIV which accounted for 9% (N=12/133) of deaths (*cause of death is not yet available for 2022 deaths among individuals with HIV as of 1/1/2024*).
- The average age at death among individuals reported with HIV increased by 5.6 years, from 54.1 years in 2013 to 59.7 years in 2022. For comparison, the average age at death of the general Massachusetts population remained between 75.1 and 76.8 from 2013 to 2022.
- Survival of individuals diagnosed with AIDS has increased over time. In the earliest cohort of AIDS diagnoses (1988–1992), estimated survival at five years after AIDS diagnosis was 21%, compared to 87% in the most recent cohort (2018–2022).

## Trends in Deaths Among Individuals Reported with HIV

- The proportion of deaths among individuals reported with HIV infection attributed to HIV-related causes decreased from 32% (N=76/238) in 2013 to 13% (N=44/329) in 2021. The leading non HIV-related causes of death among individuals reported with HIV infection who died in 2021 (with a known cause) were external causes of injuries<sup>ii</sup> and poisonings (which includes opioid overdoses) which accounted for 23% (N=75/329) of deaths, cancer which accounted for 16% (N=53/329) of deaths, heart disease which accounted for 12% (N=39/329) of deaths, and COVID-19 which accounted for 8% (N=27/329) of deaths (*cause of death was not yet available for 2022 deaths as of 1/1/2024*).

## Geographic Distribution of HIV Infection

- The cities and towns with the highest average annual rate of HIV infection diagnosis during 2020 to 2022 included Brockton (20.8 per 100,000), Boston (16.6), Malden (15.6), Chelsea (15.5), and Everett (14.3).<sup>iii</sup> Boston had the highest number of new HIV infection diagnoses from 2020–2022 (N=335), followed by Brockton (N=66), and Worcester (N=65).
- Suffolk County was selected as one of 48 counties nationally that is prioritized for funding in the U.S. Health and Human Services initiative “Ending the HIV Epidemic (EHE): A Plan for America”. Suffolk County had the highest average age-adjusted rate of HIV infection diagnosis during 2020 to 2022 among all Massachusetts counties at 14.3 per 100,000.

## The Massachusetts HIV Care Continuum

- Among 418 individuals newly diagnosed with HIV infection in 2021 (and alive in Massachusetts through 2022), 85% overall achieved viral suppression,<sup>iv</sup> increasing to 88% among those linked to care,<sup>v</sup> and to 92% among those retained in care<sup>vi</sup>. Viral suppression was lowest among individuals with MSM/IDU and IDU exposure modes (75% and 79%, respectively, compared to 83% to 89% among other exposure modes).

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> External causes of injuries includes intentional injuries (e.g., homicide and suicide), unintentional injuries (e.g., motor vehicle and non-transport related accidents), and injuries of undetermined intent.

<sup>iii</sup> Among cities that reported at least 12 HIV infections during 2020–2022.

<sup>iv</sup> “Virally Suppressed” is defined as having a VL <200 copies/mL for the most recent VL test drawn during the 12-month period after diagnosis.

<sup>v</sup> “Linked to Care” is defined as having ≥1 viral load (VL) or CD4 test result within 3 months of diagnosis.

<sup>vi</sup> “Retained in Care” is defined as having ≥2 VL or CD4 test results at least 3 months apart during the 12-month period after diagnosis.

- Among 22,455 persons living with HIV infection at the end of 2022 (and diagnosed through 2021), 63% were virally suppressed,<sup>vii</sup> 4% were not virally suppressed, and 33% did not have a viral load test done in 2022. Viral suppression increased to 90% among those engaged in care<sup>viii</sup> and to 94% among those retained in care. Please note that the rate of viral suppression may be underestimated as the total number of PLWH used to calculate these rates includes all individuals who have ever been diagnosed with HIV infection in Massachusetts, with no evidence of death or having moved out of the state or country. See the section, [\*\*Massachusetts HIV Care Continuum - PLWH\*\*](#) for more information.

<sup>vii</sup> "Virally Suppressed" is defined as having a VL <200 copies/mL for the most recent VL test drawn in 2022.

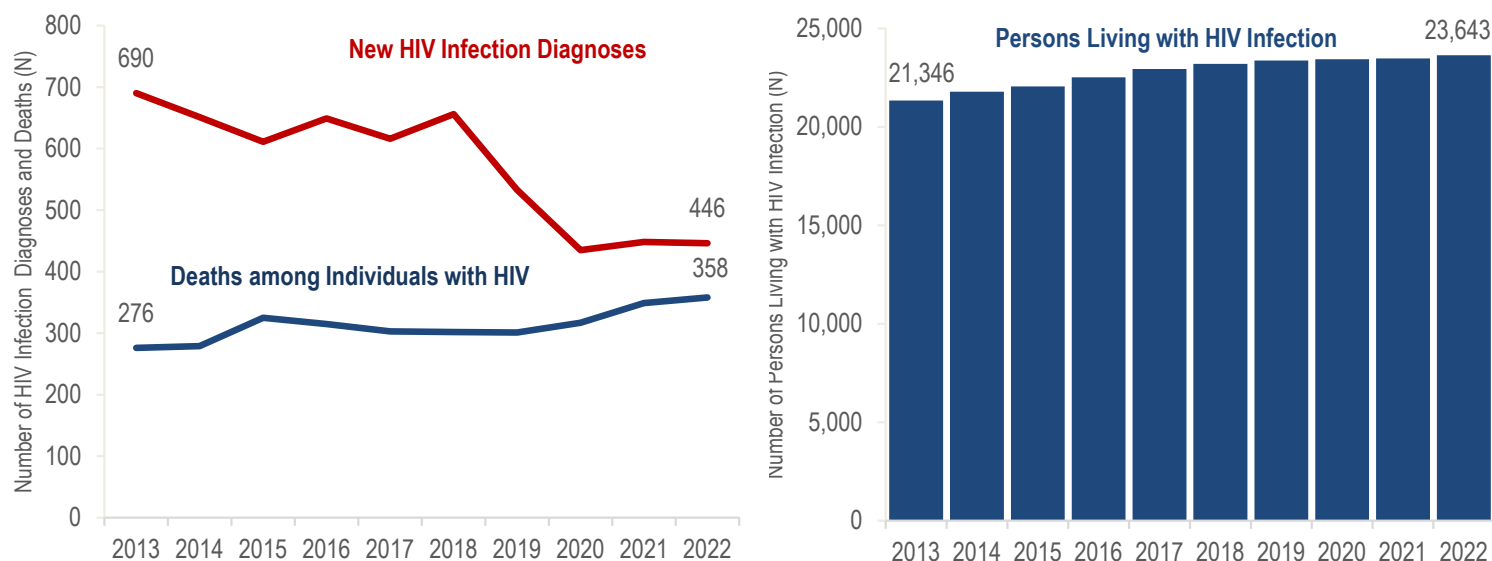
<sup>viii</sup> "Engaged in Care" is defined as having ≥1 VL or CD4 test result in 2022.

<sup>ix</sup> "Retained in Care" is defined as having ≥2 VL or CD4 test results at least 3 months apart in 2022.

# EPIDEMIC AT A GLANCE

The number of persons living with HIV infection (PLWH) in Massachusetts increased by 11% from 21,346 in 2013 to 23,643 in 2022.<sup>i</sup> After decreasing from 690 diagnoses in 2013 to approximately 640 diagnoses per year from 2014 to 2018 (five-year average = 637), the number of new HIV infection diagnoses declined to a ten-year low of 533 in 2019. In 2020, the number of new HIV infection diagnoses further declined to 435 and then remained at this lower level in 2021 and 2022, when there were 448 and 446 diagnoses, respectively. However, caution should be used in the interpretation of this decline and following stabilization due to the impact of COVID-19 on access to HIV testing and care services, and case surveillance activities. The number of deaths due to any cause among individuals reported with HIV infection increased by 30% from 276 in 2013 to 358 in 2022.

**FIGURE 1:** History of the HIV epidemic, Massachusetts 2013–2022



**N=446**

New HIV infection diagnoses in MA in 2022

**N=23,643**

Persons living with HIV infection in MA as of 12/31/2022

**N=358**

Deaths among individuals reported with HIV in MA in 2022

Men who have sex with men (MSM) continued to represent the largest proportion of new HIV infection diagnoses: 37% of all new HIV infection diagnoses in 2020–2022, and 52% among individuals assigned male at birth (AMAB).

During 2020–2022, the HIV infection diagnosis rates among Black (non-Hispanic) and Hispanic/Latinx individuals were nine and four times that of White (non-Hispanic) individuals, respectively.

Individuals with injection drug use (IDU) exposure mode accounted for 35% of deaths among individuals reported with HIV in 2022 but only 15% of all PLWH.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

# TRENDS IN HIV INFECTION DIAGNOSES OVER TIME

**FIGURE 2:** Trends in HIV infection diagnoses, Massachusetts 2013 – 2022

HIV Infection Diagnoses	2013	2022
<b>Total</b>	690	446
<b>Sex Assigned at Birth</b>		
Assigned Male Sex	515	326
Assigned Female Sex	175	120
<b>Race/Ethnicity</b>		
White NH	275	132
Black NH	186	153
Hispanic/Latinx	200	140
API	20	13
Other/Unknown	9	8
<b>Age Group (Years)</b>		
0-12	4	1
13-19	16	5
20-29	180	116
30-39	140	158
40-49	182	75
50-59	130	55
60-69	29	25
70+	9	11
<b>Exposure Mode</b>		
MSM	323	167
IDU	38	43
MSM/IDU	15	17
HTSX	57	23
Other <sup>ii</sup>	5	1
Pres. HTSX	94	61
NIR	158	134
<b>Place of Birth</b>		
US	418	223
PR/USD <sup>iii</sup>	34	16
Non-US	238	207
<b>Health Service Region</b>		
Boston	207	118
Central	46	33
Metro West	106	66
Northeast	126	84
Southeast	116	88
Western	80	44
Prisoner	9	13

## Overall

From 2013 to 2022,<sup>i</sup> the number of new HIV infection diagnoses decreased by 35%. Distribution by sex assigned at birth remained relatively stable, while distributions by race/ethnicity, age at diagnosis, exposure mode, and place of birth shifted.

## By Sex Assigned at Birth

HIV infection diagnoses show a larger decrease among individuals AMAB (by 37%, from 515 to 326) than AFAB (by 31%, from 175 to 120).

## By Race/Ethnicity

HIV infection diagnoses decreased within all racial/ethnic groups. The largest decrease was among White (non-Hispanic) individuals (by 52%, from 275 to 132), then Asian/Pacific Islander individuals (by 35%, from 20 to 13), Hispanic/Latinx individuals (by 30%, from 200 to 140), and Black (non-Hispanic) individuals (by 18%, from 186 to 153). The proportion of HIV infection diagnoses among White (non-Hispanic) individuals decreased from 40% to 30%, while it increased from 27% to 34% among Black (non-Hispanic) individuals.

## By Age at HIV Infection Diagnosis

HIV infection diagnoses decreased among 0–12 year-olds (from four to one), 13–19 year-olds (by 69%, from 16 to five), 20–29 year-olds (by 36%, from 180 to 116), 40–49 year-olds (by 59%, from 182 to 75), 50–59 year-olds (by 58%, from 130 to 55), and 60–69 year-olds (by 14%, from 29 to 25), but increased among 30–39 year-olds (by 13%, from 140 to 158) and 70+ year-olds (from nine to 11). The proportion of HIV infection diagnoses among 30–39 year-olds increased from 20% to 35%, while it decreased from 26% to 17% among 40–49 year-olds and from 19% to 12% among 50–59 year-olds.

## By Exposure Mode

HIV infection diagnoses decreased among individuals with heterosexual sex (by 60%, from 57 to 23), male-to-male sex (MSM) (by 48%, from 323 to 167), presumed heterosexual sex (by 35%, from 94 to 61), no identified risk (by 15%, from 158 to 134), and “other” exposure modes (from five to one). All diagnoses in the other category were related to pediatric exposures,<sup>ii</sup> with no confirmed clotting factor, transfusion, or transplant-related exposures in the ten-year time period. The number of reported cases with injection drug use (IDU) as the primary exposure mode increased by 37% from 59 in 2019 to 81 in 2021. This was primarily due to a cluster of HIV infection identified in early 2019 in Boston among PWID who were experiencing or had experienced recent homelessness. Following a focused public health response, the number of HIV infection diagnoses attributed to IDU decreased by 47% to 43 in 2022.<sup>iv</sup>

## By Place of Birth

HIV infection diagnoses decreased among individuals born in PR/USD (by 53%, from 34 to 16), individuals born in the US (by 47%, from 418 to 223), and individuals born outside the US (by 13% from 238 to 207). The proportion of HIV infection diagnoses among individuals born in the US decreased from 61% to 50%, while it increased from 34% to 46% among individuals born outside the US.

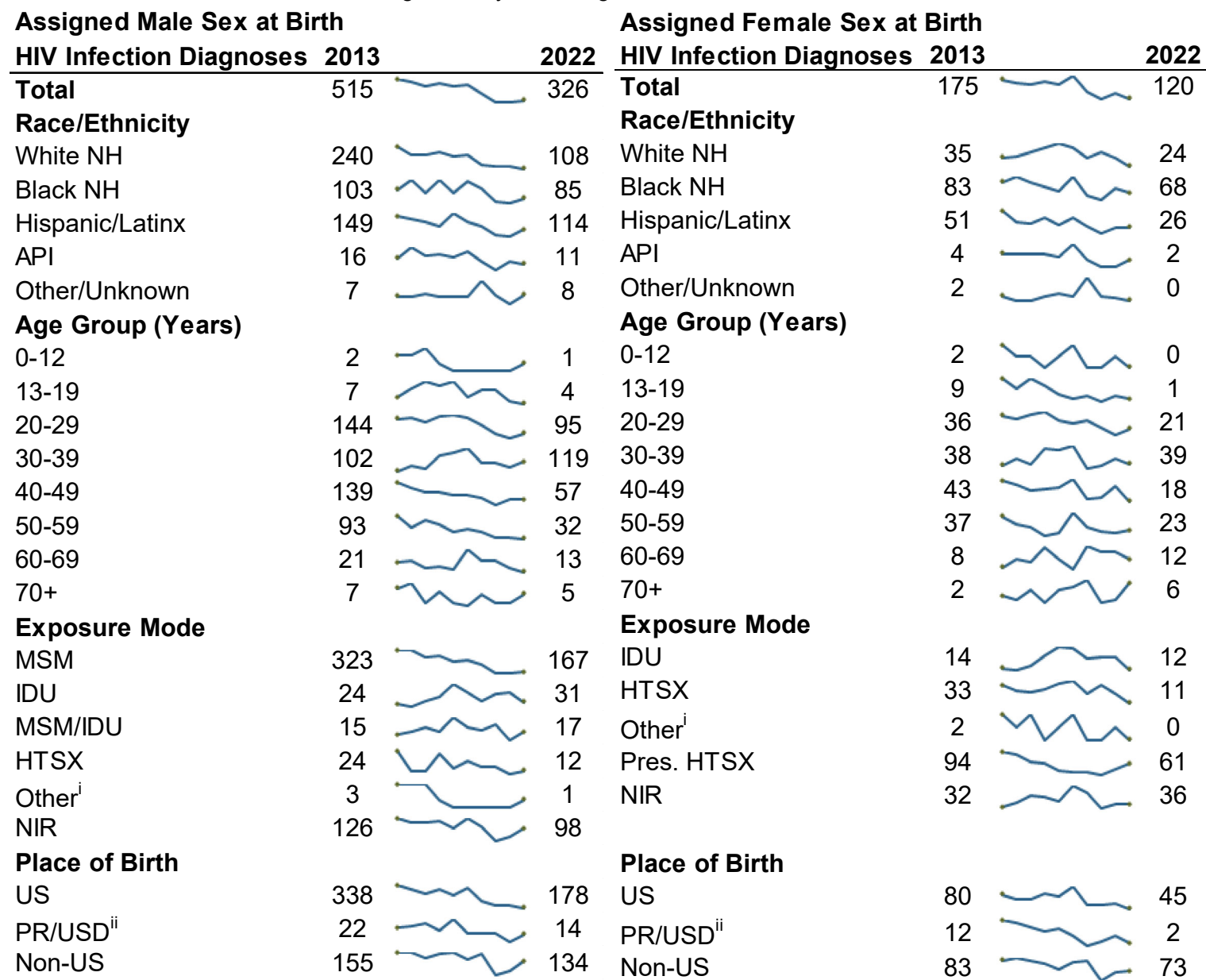
<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data.

<sup>ii</sup> All individuals diagnosed with HIV infection from 2013–2022 with other exposure mode were pediatric exposures. While the majority of pediatric exposures are confirmed perinatal exposures, this category also includes a small number of pediatric cases with insufficient documentation of maternal HIV status to confirm perinatal exposure

<sup>iii</sup> 99% of individuals diagnosed with HIV infection from 2013–2022 who were born in a US dependency were born in Puerto Rico

<sup>iv</sup> For more information, see: Joint MDPH and BPHC Clinical Advisory: Increase in newly diagnosed HIV infections among persons who inject drugs in Boston, March 15, 2021, available at: <https://www.mass.gov/doc/joint-mdph-and-bphc-clinical-advisory-hiv-transmission-through-injection-drug-use-in-boston-march-15-2021/download>

**FIGURE 3:** Trends in HIV infection diagnoses by sex assigned at birth, Massachusetts 2013 – 2022



### Race/Ethnicity by Sex Assigned at Birth

From 2013 to 2022,<sup>iii</sup> the number of HIV infection diagnoses decreased 55% among White (non-Hispanic) individuals assigned male at birth (AMAB), 23% among Hispanic/Latinx individuals AMAB, and 17% among Black (non-Hispanic) individuals AMAB. Among individuals assigned female at birth (AFAB), the number of diagnoses decreased 49% among Hispanic/Latinx individuals AFAB, 31% among White (non-Hispanic) individuals AFAB, and 18% among Black (non-Hispanic) individuals AFAB.

### Exposure Mode by Sex Assigned at Birth

The number of HIV infection diagnoses decreased among all exposure modes for individuals AMAB except for IDU and MSM/IDU, which increased by 29% and 13%, respectively. The number of diagnoses decreased among all exposure modes for individuals AFAB except for NIR, which increased by 13%.

### Place of Birth by Sex Assigned at Birth

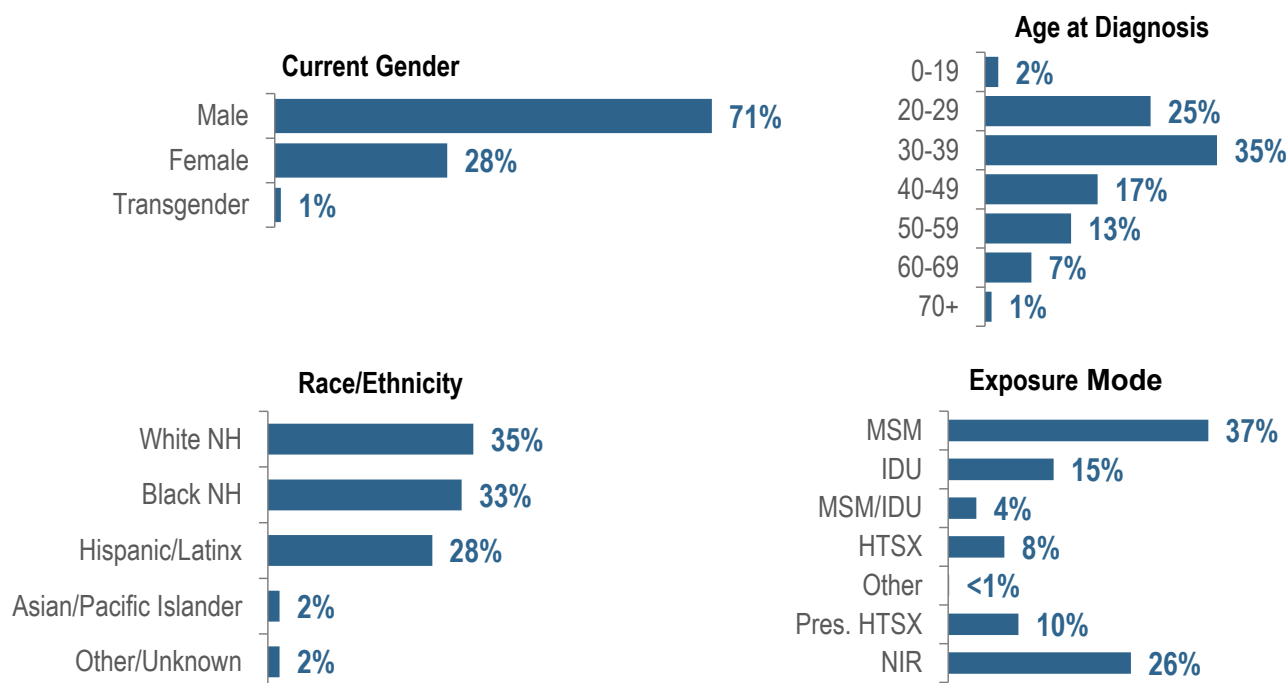
From 2013 to 2022, the number of HIV infection diagnoses among individuals AMAB and AFAB decreased for all categories of birthplace.

<sup>i</sup> All individuals diagnosed with HIV infection from 2013-2022 with other exposure mode were perinatal exposures  
<sup>ii</sup> 99% of individuals diagnosed with HIV infection from 2013–2022 who were born in a US dependency (USD) were born in Puerto Rico (PR)  
<sup>iii</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data.

# RECENT HIV INFECTION DIAGNOSES

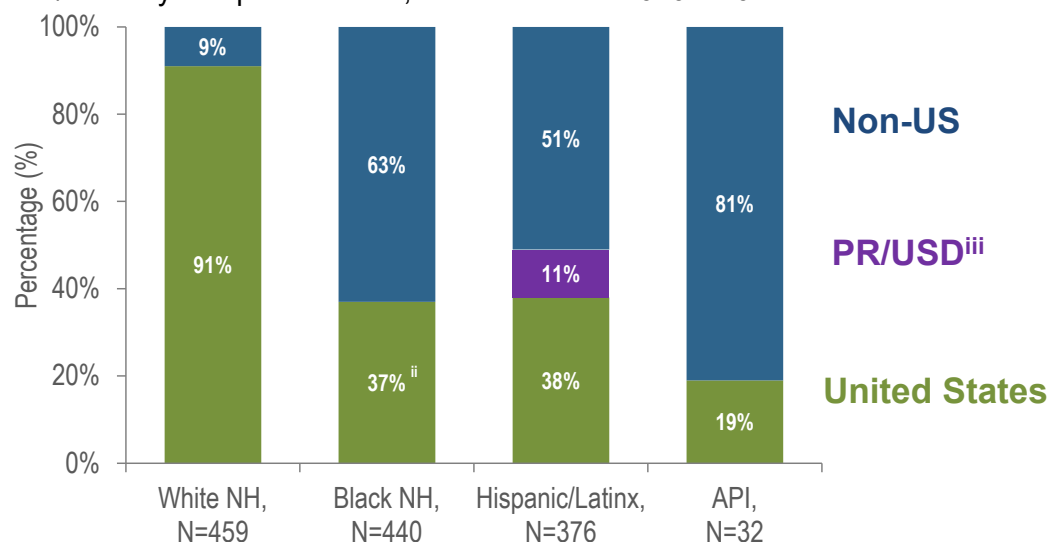
*Who is most at risk for HIV infection? Recent HIV infection diagnoses are the best available indicator for who is most at risk for HIV infection. Monitoring new diagnoses helps us to determine who is affected and inform effective prevention activities.*

**FIGURE 4.** Percentage of individuals diagnosed with HIV infection by current gender, age, race/ethnicity, and exposure mode, Massachusetts 2020 – 2022 (N=1,329)



The number of individuals diagnosed with HIV infection has decreased over the past decade in Massachusetts, but disparities persist by current gender, exposure mode, and race/ethnicity. Individuals newly diagnosed with HIV infection in Massachusetts during 2020–2022<sup>i</sup> were predominantly male (71%), young (25% 20–29 year-olds and 35% 30–39 year-olds), White (non-Hispanic) (35%) or Black (non-Hispanic) (33%), with an exposure mode of MSM (37%). While MSM was the leading exposure mode, a large percentage of new HIV infection diagnoses had no identified risk (26%).

**FIGURE 5.** Percentage of individuals diagnosed with HIV infection by race/ethnicity and place of birth, Massachusetts 2020 – 2022



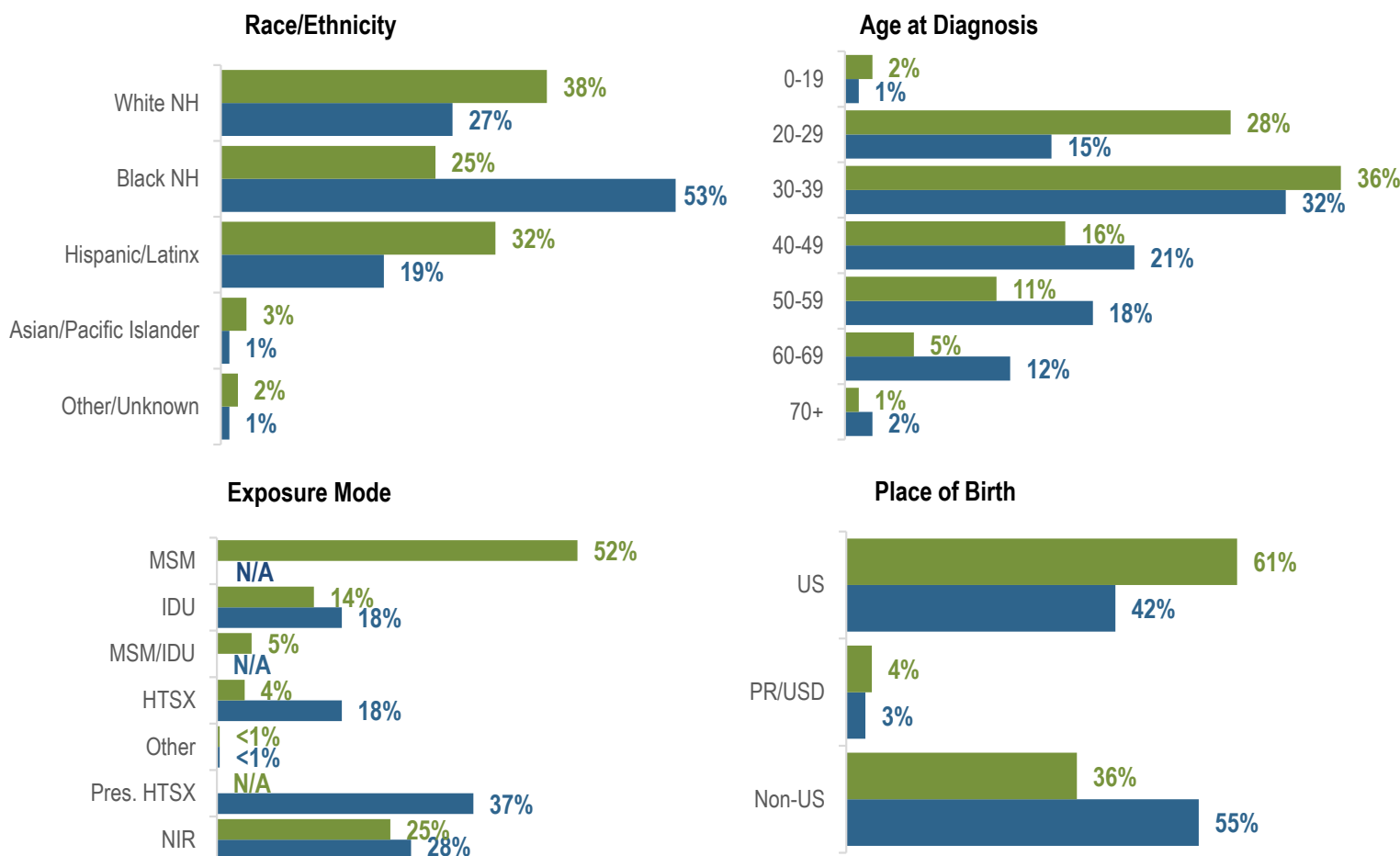
Eighty-one percent of Asian/Pacific Islander individuals diagnosed with HIV infection during 2020–2022 were born outside the US, compared to 63% of Black (non-Hispanic), 51% of Hispanic/Latinx, and 9% of White (non-Hispanic).

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> US born and Puerto Rico/USD categories are combined for Black non-Hispanic individuals due to small numbers to adhere to cell suppression rules.

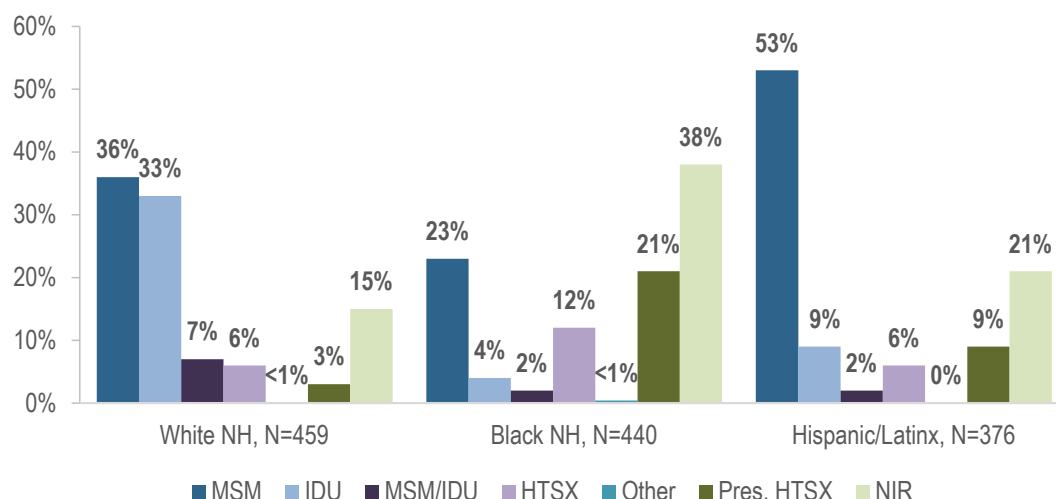
<sup>iii</sup> 96% of individuals diagnosed with HIV infection from 2020–2022 who were born in a US dependency (USD) were born in Puerto Rico (PR).

**FIGURE 6.** Percentage of individuals diagnosed with HIV infection by race/ethnicity, age, exposure mode, and place of birth by sex assigned at birth, Massachusetts 2020 – 2022<sup>i</sup> (AMAB, N=952; AFAB, N=377)



The distributions of new HIV infection diagnoses by race/ethnicity, age, exposure mode, and place of birth varied by sex assigned at birth: the largest proportion of individuals assigned male at birth (AMAB) was White (non-Hispanic) (38%), while the largest proportion of individuals assigned female at birth (AFAB) was Black (non-Hispanic) (53%). A larger proportion of individuals AMAB (28%) than AFAB (15%) was diagnosed between the ages of 20 and 29 years. MSM was the predominant exposure mode among individuals AMAB (52%), while presumed heterosexual sex was the predominant exposure mode among individuals AFAB. A larger proportion of individuals AFAB (55%) than AMAB (36%) was born outside the US.

**FIGURE 7.** Percentage of individuals diagnosed with HIV infection by exposure mode and race/ethnicity, Massachusetts 2020 – 2022

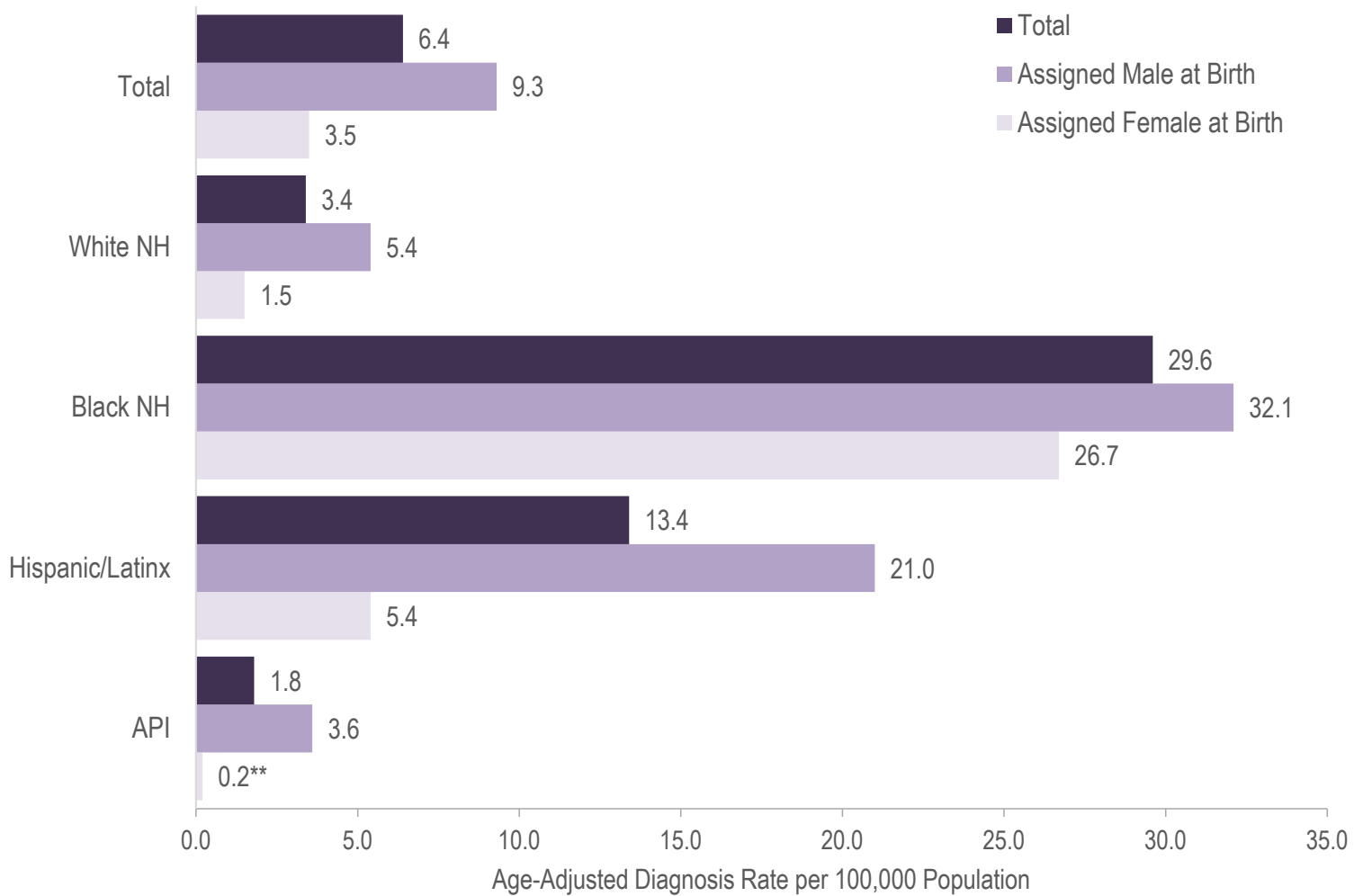


While the predominant exposure modes among individuals recently diagnosed with HIV infection were MSM (36%) and IDU (33%) among White (non-Hispanic) individuals and MSM (53%) among Hispanic/Latinx individuals, the largest proportion of Black (non-Hispanic) individuals was assigned no identified risk for exposure mode (38%). Of the Black NH individuals assigned NIR, 75% (N=126/169) were non-US born.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

*HIV does not affect all Massachusetts residents equally. One way to understand which populations are experiencing differential impacts is to compare rates of HIV diagnosis per 100,000 population.*

**FIGURE 8.** Average annual age-adjusted HIV diagnosis rates per 100,000 population\* by sex assigned at birth and race/ethnicity, Massachusetts 2020 – 2022 (N=1,329)



\*As of 1/1/2020, BIDLs calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model (Strate S, et al. Small Area Population Estimates for 2011 through 2020, report published Oct 2016). Note that rates and trends calculated using previous methods cannot be compared to these. All rates are age-adjusted using the 2000 US standard population.

\*\*Rates based on numerators <12 are marked with an asterisk (\*) and should be interpreted with caution.

In 2020 – 2022,<sup>i</sup> the average annual age-adjusted HIV diagnosis rate per 100,000 population of individuals assigned male at birth (AMAB) was three times that of individuals assigned female at birth (AFAB). There were large disparities in average annual age-adjusted HIV diagnosis rates for 2020 to 2022 by race/ethnicity. Compared to the rate among White (non-Hispanic) individuals, the rate among:

- Black (non-Hispanic) individuals was nine times greater, and
- Hispanic/Latinx individuals was four times greater.

With respect to differences based on race/ethnicity and sex assigned at birth, the average annual age-adjusted HIV diagnosis rate for 2020 to 2022 among:

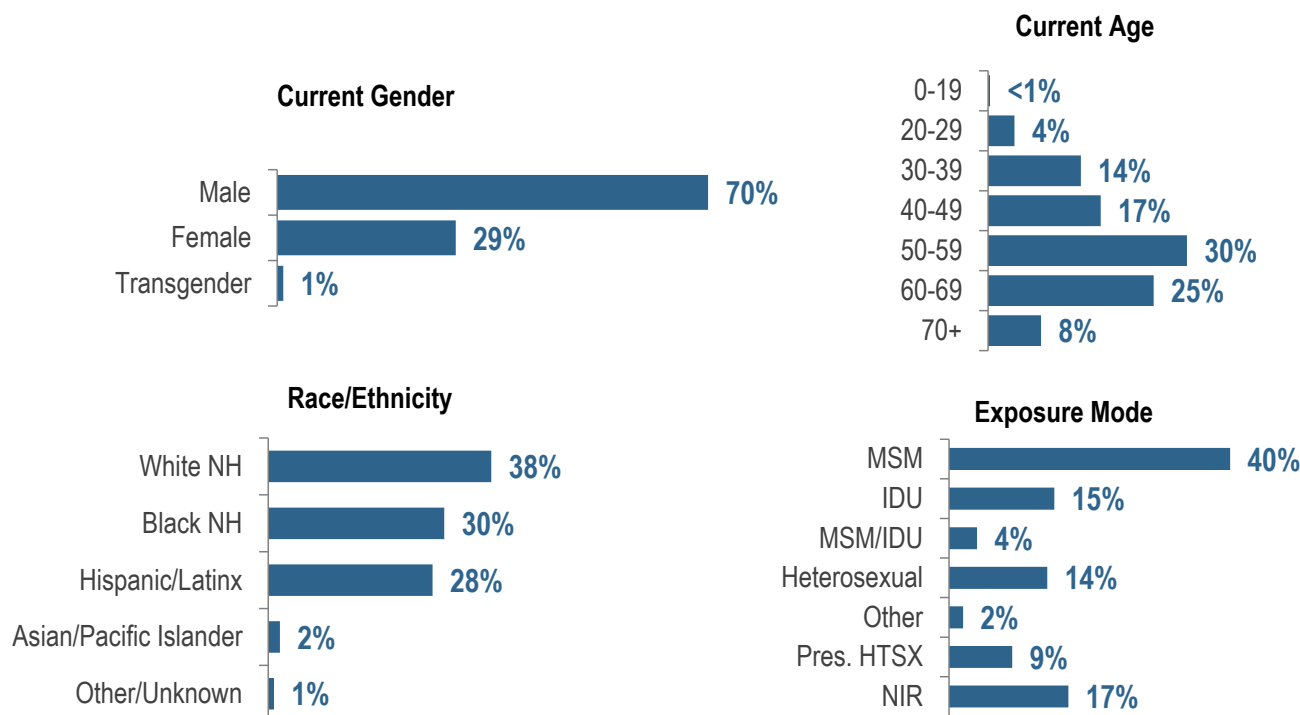
- Black (non-Hispanic) individuals assigned male at birth (AMAB), was six times that of White (non-Hispanic) individuals AMAB,
- Hispanic/Latinx individuals AMAB was four times that of White (non-Hispanic) individuals AMAB,
- Black (non-Hispanic) individuals assigned female at birth (AFAB) was 18 times that of White (non-Hispanic) individuals AFAB, and
- Hispanic/Latinx individuals AFAB was four times that of White (non-Hispanic) individuals AFAB.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

# PERSONS LIVING WITH HIV INFECTION

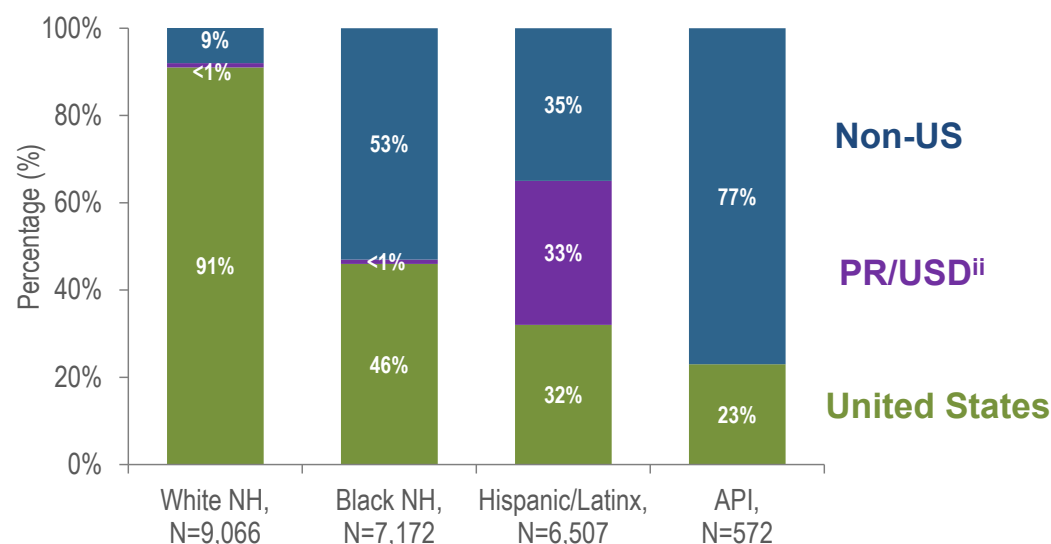
*Who is currently living with HIV infection? The number of persons living with HIV infection (PLWH) reflects the impact of HIV in Massachusetts.*

**FIGURE 9.** Percentage of PLWH by current gender, age, race/ethnicity, and exposure mode, Massachusetts 2022<sup>i</sup> (N=23,643)



Racial/ethnic disparities persist among PLWH, and marked differences exist by current gender, age, and exposure mode. PLWH in Massachusetts are predominantly male (70%), older (33% aged 60+ years), and White non-Hispanic (38%). Male-to-male sex was the most frequently reported exposure mode, at 40%.

**FIGURE 10.** Percentage of PLWH by race/ethnicity and place of birth, Massachusetts 2022



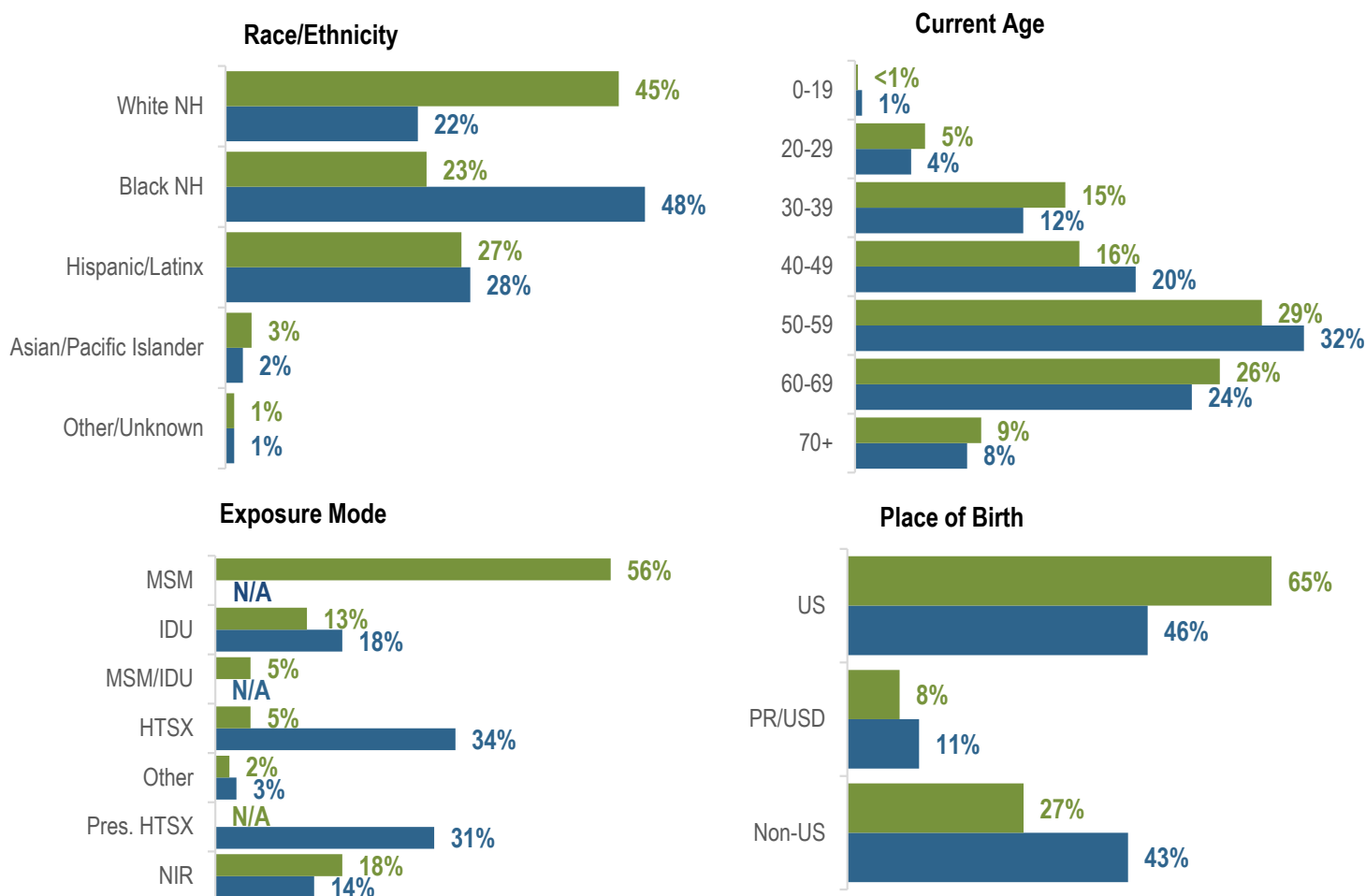
A total of 77% of Asian/Pacific Islander PLWH in Massachusetts in 2022 were born outside the US, compared to 53% of Black (non-Hispanic), 35% of Hispanic/Latinx, and 9% of White (non-Hispanic) PLWH.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> 98% of PLWH on 12/31/2022 who were born in a US dependency were born in Puerto Rico

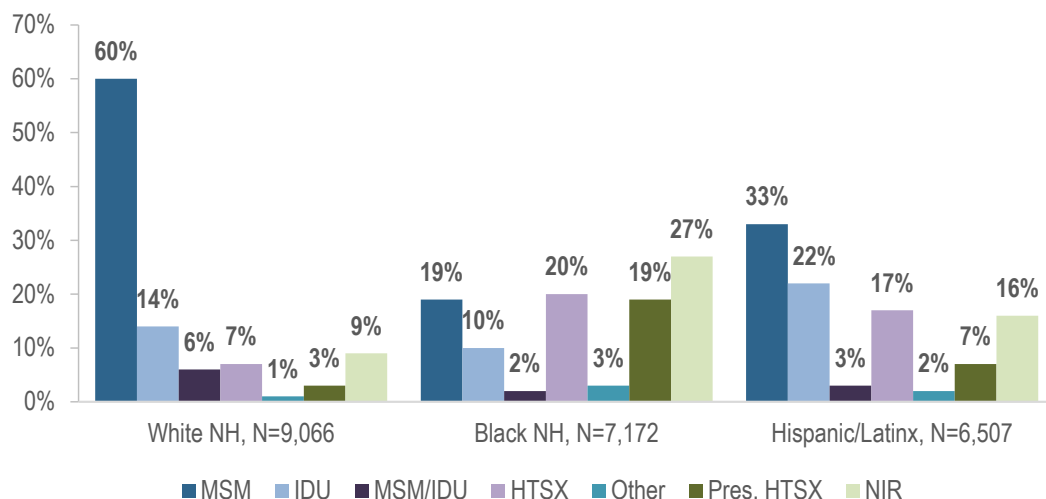
**FIGURE 11.** Percentage of persons living with HIV infection (PLWH) by race/ethnicity, age, exposure mode, and place of birth by sex assigned at birth, Massachusetts 2022<sup>i</sup>

(Assigned Male at Birth, N= 16,791; Assigned Female at Birth, N= 6,852)



The distributions of PLWH by race/ethnicity, exposure mode, and place of birth varied by sex assigned at birth: the largest proportion of individuals assigned male at birth (AMAB) living with HIV infection was White (non-Hispanic) (45%), while the largest proportion of individuals assigned female at birth (AFAB) was Black (non-Hispanic) (48%). MSM (56%) was the predominant exposure mode among individuals AMAB compared to heterosexual sex (34%) and presumed heterosexual sex (31%) among individuals AFAB. A larger proportion of individuals AFAB (43%) than AMAB (27%) was born outside the US.

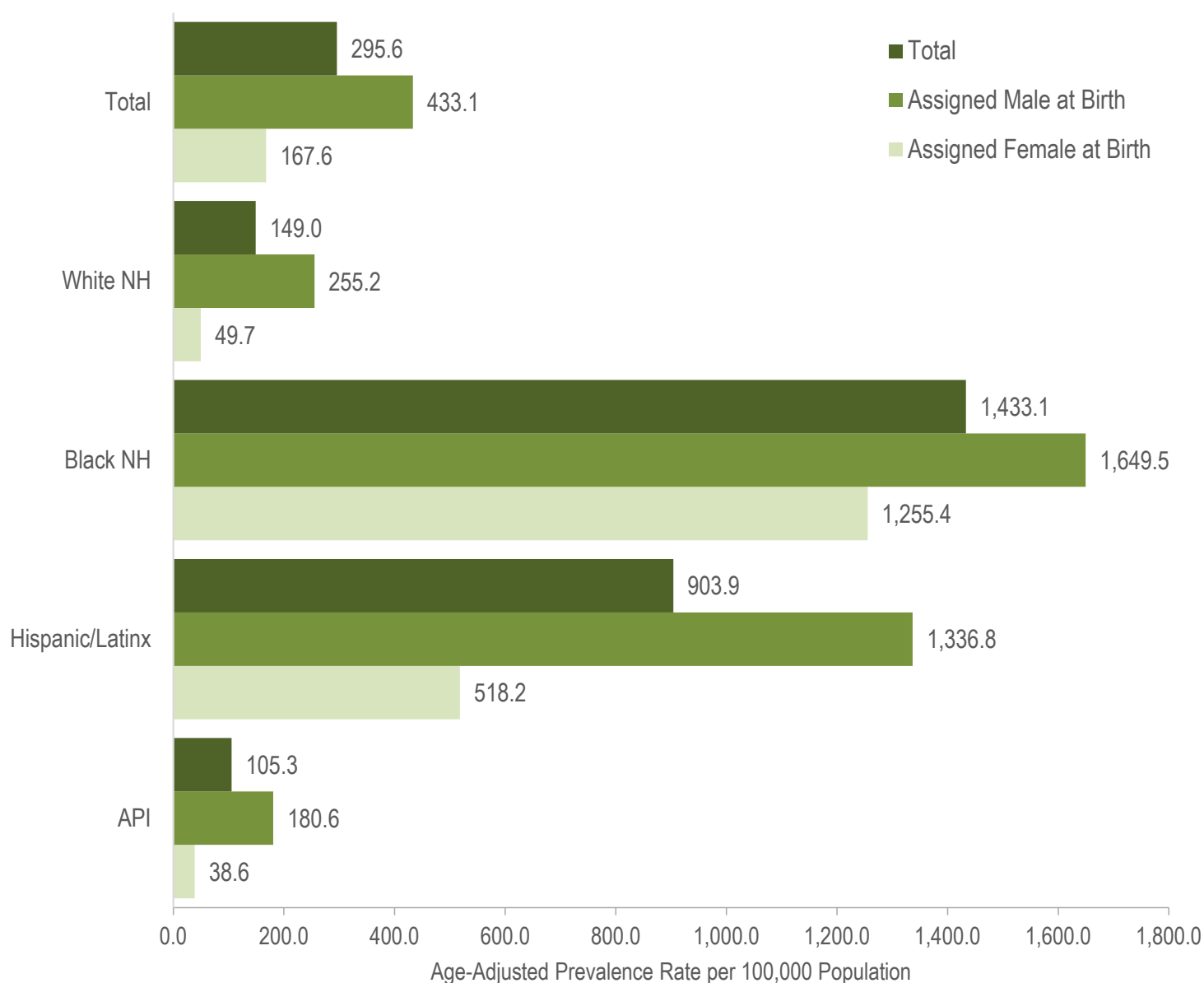
**FIGURE 12.** Percentage of PLWH by exposure mode and race/ethnicity, Massachusetts 2022



The predominant exposure mode among White (non-Hispanic) PLWH was MSM (60%). Among Black (non-Hispanic) PLWH, the largest proportion was reported with no identified risk (27%), followed by heterosexual sex (20%), presumed heterosexual sex (19%), and MSM (19%). Among Hispanic/Latinx PLWH, the largest proportion was MSM (33%), followed by IDU (22%).

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

**FIGURE 13.** Age-adjusted HIV prevalence rates per 100,000 population\* by sex assigned at birth and race/ethnicity, Massachusetts 2022 (N=23,643)



\* As of 1/1/2020, BIDLs calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model (Strate S, et al. Small Area Population Estimates for 2011 through 2020, report published Oct 2016). Note that rates and trends calculated using previous methods cannot be compared to these. All rates are age-adjusted using the 2000 US standard population.

In 2022,<sup>i</sup> the age-adjusted HIV prevalence rate per 100,000 population of individuals assigned male at birth (AMAB) was three times that of individuals assigned female at birth (AFAB). There were large disparities in age-adjusted prevalence rates by race/ethnicity. Compared to the rate among White (non-Hispanic) individuals, the rate among:

- Black (non-Hispanic) individuals was ten times greater, and
- Hispanic/Latinx individuals was six times greater.

With respect to differences based on race/ethnicity and sex assigned at birth, the age-adjusted HIV prevalence rate among:

- Black (non-Hispanic) individuals AMAB was six times that of White (non-Hispanic) individuals AMAB,
- Hispanic/Latinx individuals AMAB was five times that of White (non-Hispanic) individuals AMAB,
- Black (non-Hispanic) individuals AFAB was 25 times that of White (non-Hispanic) individuals AFAB, and
- Hispanic/Latinx individuals AFAB was 10 times that of White (non-Hispanic) individuals AFAB.

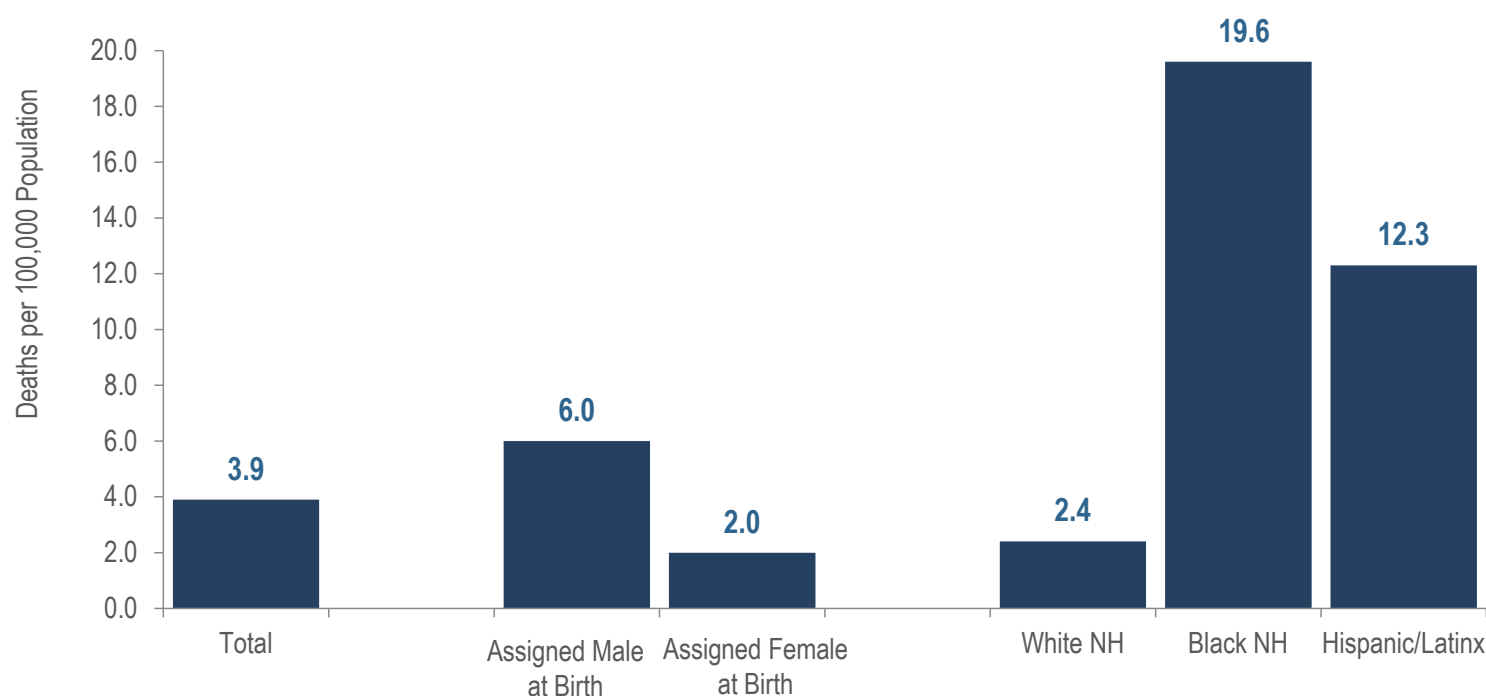
<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

# MORTALITY AMONG INDIVIDUALS WITH HIV

*Who is dying with HIV and how has this changed over time?*

In 2022,<sup>i</sup> 57 deaths among Massachusetts residents were attributed to HIV-related causes (generally, opportunistic illnesses, for a full list of stage-3 defining opportunistic illnesses, see: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6303a1.htm#Appendix>). Forty-four percent (N=25/57) of HIV-related deaths were among White (non-Hispanic) individuals, 32% (N=18/57) were among Hispanic/Latinx individuals, and 25% (N=14/57) were among Black (non-Hispanic) individuals. Hispanic/Latinx and White (non-Hispanic) Massachusetts residents died from HIV-related causes at younger ages (average age of death was 59.6 for both) compared to Black non-Hispanic residents (average age of death was 64.1 years).<sup>ii</sup>

**FIGURE 14.** Average annual age-adjusted death rates among individuals reported with HIV per 100,000 population\* by sex assigned at birth and race/ethnicity, Massachusetts 2020–2022 (Total number of deaths among individuals reported with HIV from 2020–2022=1,024)



\* As of 1/1/2020, BIDLs calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model (Strate S, et al. Small Area Population Estimates for 2011 through 2020, report published Oct 2016). Note that rates and trends calculated using previous methods cannot be compared to these. All rates are age-adjusted using the 2000 US standard population.

## Age-Adjusted Rates

In 2020 – 2022, the average annual age-adjusted death rate per 100,000 population for individuals assigned male at birth reported with HIV was three times that for individuals assigned female at birth. There were also large disparities in death rates by race/ethnicity: the rates among Black (non-Hispanic) individuals and Hispanic/Latinx individuals were eight and five times that of White (non-Hispanic) individuals, respectively.

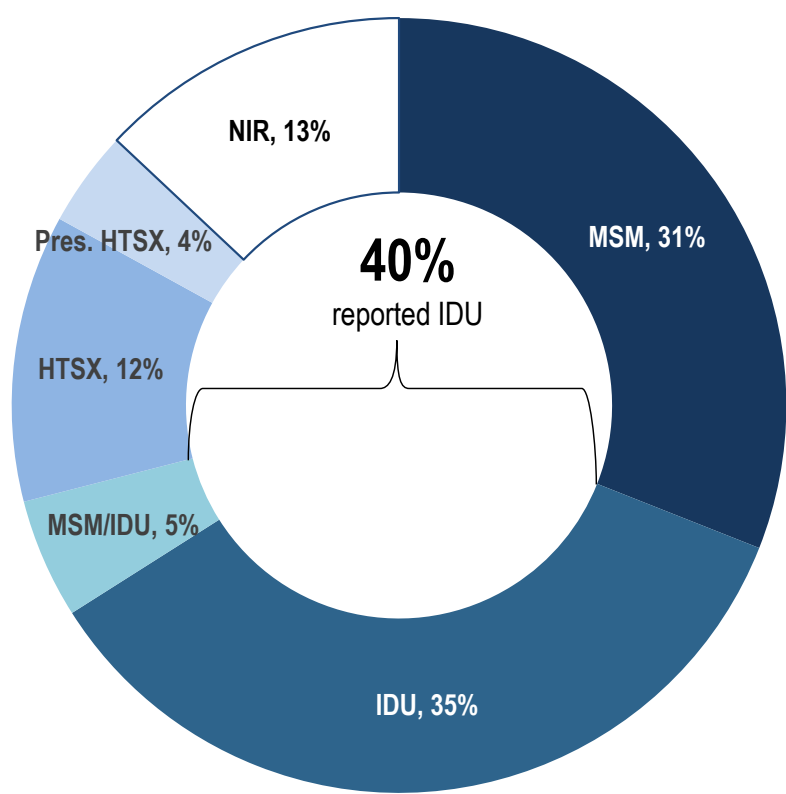
## Age at Death

The average age at death among individuals reported with HIV increased by 5.6 years, from 54.1 years in 2013 to 59.7 years in 2022. For comparison, the average age at death of the general Massachusetts population remained between 75.1 and 76.8 from 2013 to 2022.<sup>ii</sup>

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> Data Source for Massachusetts death data: Office of Population Health, Massachusetts Department of Public Health; Note: 2022 death data are preliminary

**FIGURE 15.** Deaths among individuals reported with HIV by exposure mode, Massachusetts 2022 (N=358)

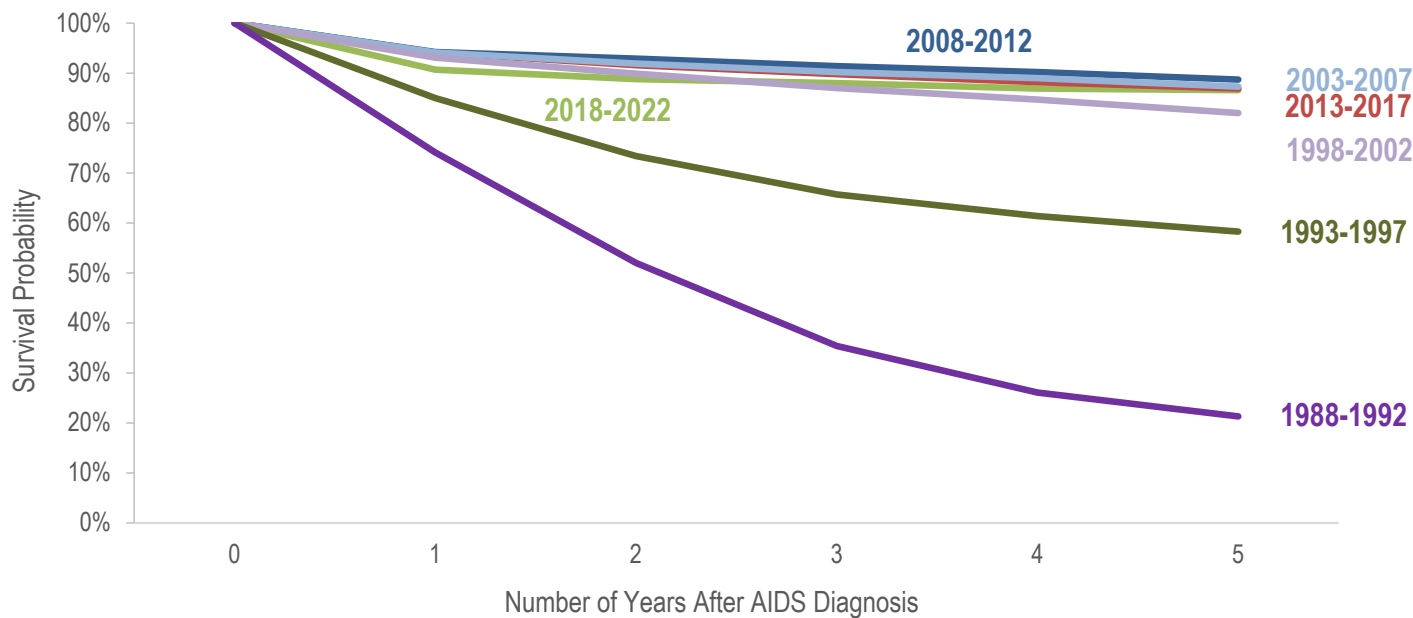


**Exposure Mode**

Individuals with IDU exposure mode accounted for the largest proportion of deaths among individuals reported with HIV. In 2022, 35% of deaths among individuals with HIV were reported with an exposure mode of IDU and an additional 5% were reported with an exposure mode of MSM/IDU, compared to 10% and 4%, respectively, of 2022 HIV infection diagnoses. The leading causes of death among individuals reported with HIV infection with IDU and IDU/MSM exposure mode who died in 2021 (with a known cause) were external causes of injuries and poisonings (which includes opioid overdoses) which accounted for 31% (N=41/133) of deaths, cancer which accounted for 11% (N=15/133) of deaths, heart disease which accounted for 11% (N=15/133), and HIV which accounted for 9% (N=12/133) of deaths (*cause of death is not yet available for 2022 deaths among individuals with HIV as of 1/1/2024*).

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data  
<sup>ii</sup> External causes of injuries includes intentional injuries (e.g., homicide and suicide), unintentional injuries (e.g., motor vehicle and non-transport related accidents), and injuries of undetermined intent.

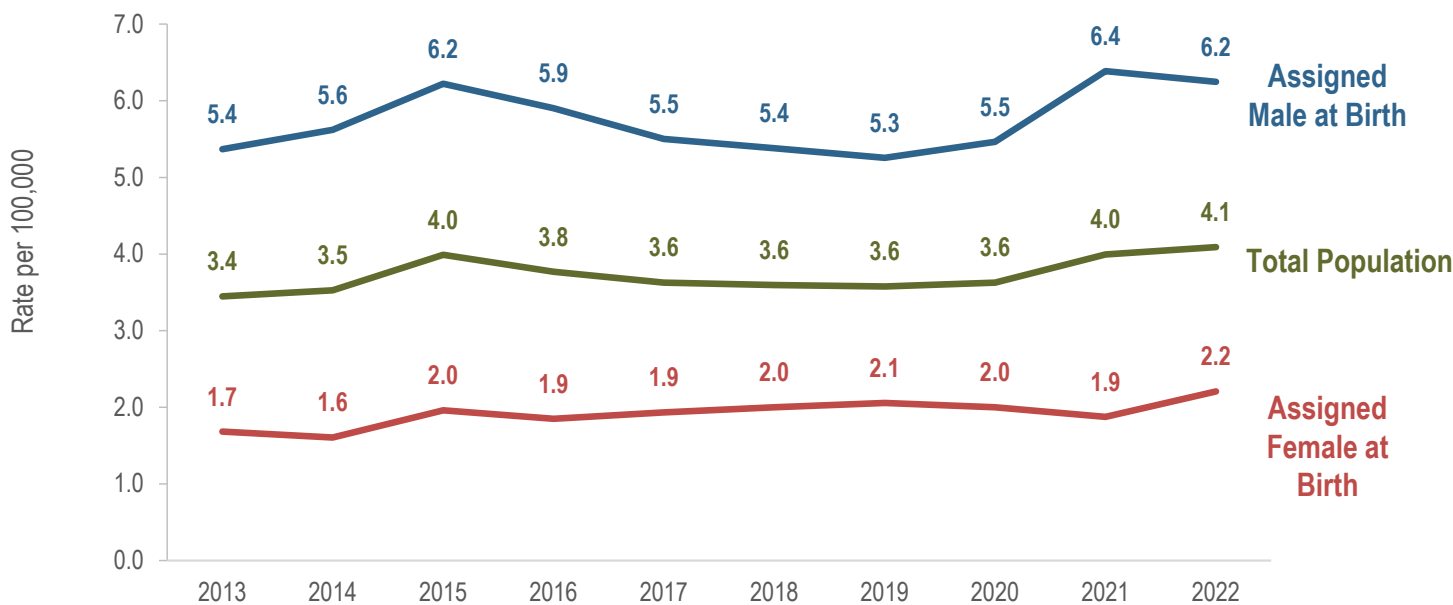
**FIGURE 16.** Five-year survival among individuals with AIDS by year of diagnosis, Massachusetts 1988–2022 (Total number of AIDS diagnoses from 1988–2022, N=24,464)



**Survival among individuals diagnosed with AIDS**

Survival of individuals diagnosed with AIDS has increased over time. In the earliest cohort of AIDS diagnoses (1988–1992), estimated survival at five years after AIDS diagnosis was 21%, compared to 87% in the most recent cohort (2018–2022).<sup>i</sup>

**FIGURE 17.** Age-adjusted rate of death per 100,000 population<sup>ii</sup> among individuals reported with HIV by sex assigned at birth, Massachusetts 2013–2022 (Total number of deaths among individuals reported with HIV from 2013–2022=3,125)



**Trends in Age-Adjusted Rates of Death**

Over the last 10 years of available data, the age-adjusted rate of death per 100,000 population of individuals assigned male at birth (AMAB) reported with HIV has remained 2.5 to 3.5 times that of individuals assigned female at birth (AFAB). In 2022, the age-adjusted rate of individuals AMAB (6.2 per 100,000) was 2.8 times the rate of individuals AFAB (2.2 per 100,000).

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> As of 1/1/2020, BIDLs calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model (Strate S, et al. Small Area Population Estimates for 2011 through 2020, report published Oct 2016). Note that rates and trends calculated using previous methods cannot be compared to these. All rates are age-adjusted using the 2000 US standard population.

# TRENDS IN DEATHS AMONG INDIVIDUALS WITH HIV

The leading non HIV-related causes of death among individuals reported with HIV infection who died in 2021 (with a known cause) were external causes of injuries<sup>i</sup> and poisonings (which includes opioid overdoses) which accounted for 23% (N=75/329) of deaths, cancer which accounted for 16% (N=53/329) of deaths, heart disease which accounted for 12% (N=39/329) of deaths, and COVID-19 which accounted for 8% (N=27/329) of deaths, and (cause of death was not yet available for 2022 deaths as of 1/1/2024).

**FIGURE 18.** Trends in all-cause deaths among individuals reported with HIV, Massachusetts 2013–2022

All-Cause Deaths	2013	2022
<b>Total</b>	276	358
<b>Sex Assigned at Birth</b>		
Assigned Male Sex	208	266
Assigned Female Sex	68	92
<b>Race/Ethnicity</b>		
White NH	130	166
Black NH	70	98
Hispanic/Latinx	73	87
API	2	2
Other/Unknown	1	5
<b>Age Group (Years)</b>		
0-12	0	0
13-19	0	0
20-29	5	4
30-39	10	22
40-49	63	38
50-59	121	104
60-69	70	122
70+	7	68
<b>Exposure Mode</b>		
MSM	66	110
IDU	117	127
MSM/IDU	15	17
HTSX	24	44
Other <sup>ii</sup>	4	0
Pres. HTSX	11	13
NIR	39	47
<b>Place of Birth</b>		
US	206	270
PR/USD <sup>iii</sup>	46	45
Non-US	24	43

## Overall

The number of deaths due to any cause among individuals reported with HIV infection increased by 30% from 276 in 2013 to 358 in 2022.<sup>iv</sup>

## By Sex Assigned at Birth

The annual number of deaths increased among individuals AFAB (by 35% from 68 to 92) and AMAB (by 28% from 208 to 266).

## By Race/Ethnicity

The annual number of deaths increased among Black (non-Hispanic) individuals (by 40% from 70 to 98), White (non-Hispanic) individuals (by 28% from 130 to 166), and Hispanic/Latinx individuals (by 19% from 73 to 87).

## By Age at Death

There was only one death among the youngest age groups (0–12 and 13–19) over the ten-year period and less than ten per year among the 20–29 year age group (except for 2019 when there were 12). Deaths decreased among the 40–49 year age group (by 40% from 63 to 38) and the 50–59 year age group (by 14% from 121 to 104). Deaths more than doubled among the 30–39 year age group (from 10 to 22), increased by 74% among the 60–69 year age group (from 70 to 122), and increased by nearly 10 times among the 70+ year age group (from 7 to 68).

## By Exposure Mode

Deaths increased among individuals with heterosexual (by 83%, from 24 to 44), male-to-male sex (by 67%, from 66 to 110), no identified risk (by 21%, from 39 to 47), and injection drug use (by 9% from 117 to 127) exposure modes. Deaths remained relatively stable among individuals with MSM/IDU, presumed heterosexual and other exposure modes.

## By Place of Birth

Deaths increased among individuals born outside the US (by 79%, from 24 to 43), and in the US (by 31%, from 206 to 270), and remained relatively stable among individuals born in Puerto Rico/US dependencies.

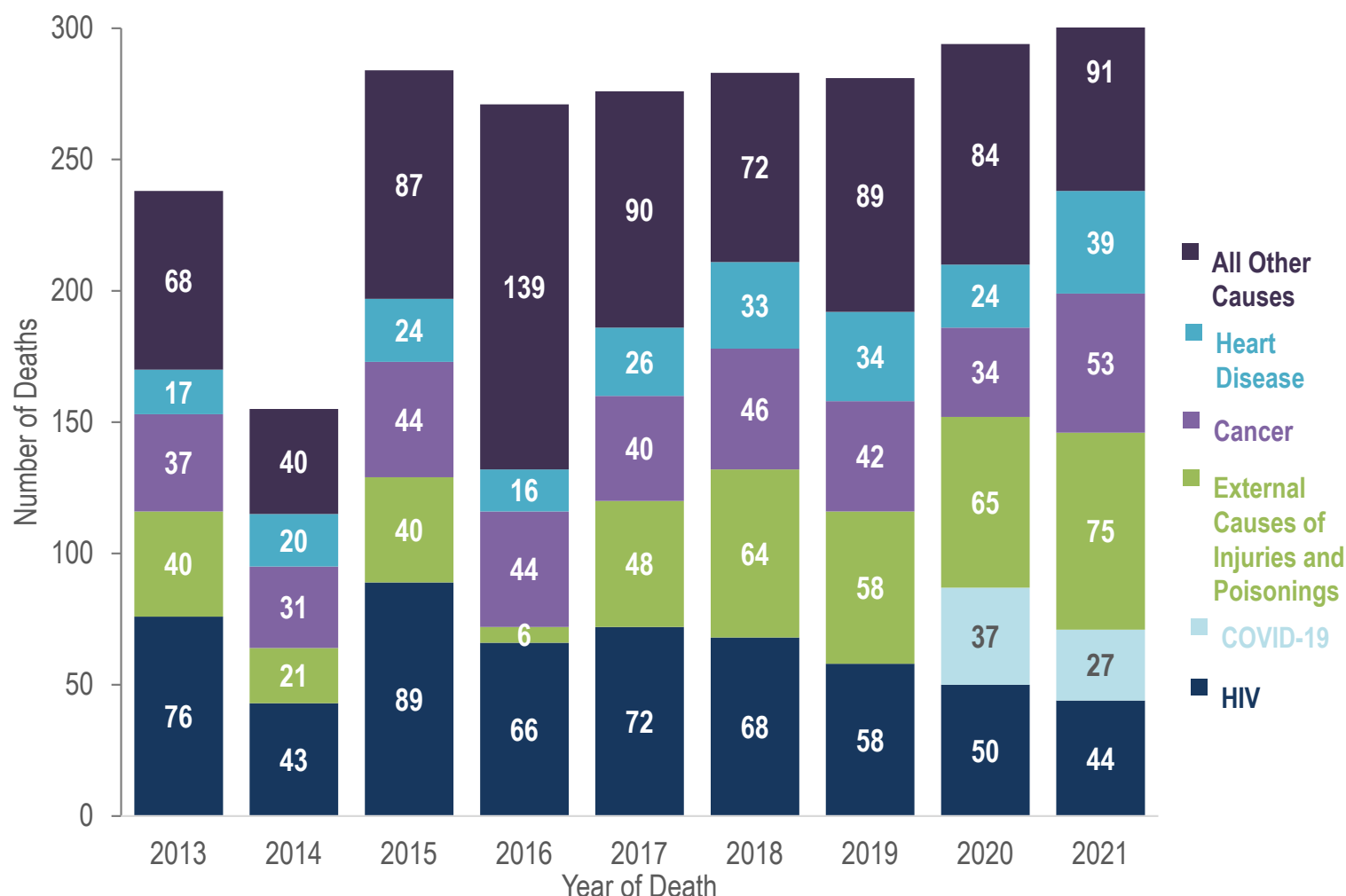
<sup>i</sup> External causes of injuries includes intentional injuries (e.g., homicide and suicide), unintentional injuries (e.g., motor vehicle and non-transport related accidents), and injuries of undetermined intent.

<sup>ii</sup> Other includes pediatric and clotting factor/transfusion/transplant-related exposures

<sup>iii</sup> Ninety-nine percent of individuals reported with HIV who died from 2013–2022 who were born in a US dependency (USD) were born in Puerto Rico (PR)

<sup>iv</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data.

**FIGURE 19.** Trends in causes of death among individuals reported with HIV infection, Massachusetts 2013–2021 (N=2,411)\*



\* Deaths among individuals reported with HIV infection with a missing cause of death are excluded from this analysis (2013–2021 N=356). Data are presented for the most recent nine-year period for which cause of death data was available.

### Trends in Causes of Death

The proportion of deaths among individuals reported with HIV infection attributed to HIV-related causes decreased from 32% (N=76/238) in 2013 to 13% (N=44/329) in 2021.<sup>i</sup>

In 2021, 23% (N=75/329) of deaths were attributable to external causes of injuries and poisonings,<sup>ii</sup> followed by cancer which accounted for 16% (N=53/329), HIV which accounted for 13% (N=44/329), and heart disease which accounted for 12% (N=39/329). While COVID-19 was the third leading cause of death among persons reported with HIV infection in 2020, it was the sixth leading cause of death in 2021, accounting for 8% (N=27/329) of deaths in that year. By comparison, the leading causes of death in 2021 among the general population of Massachusetts were cancer which accounted for 18% (N=12,466/68,158) of deaths, heart disease which accounted for 18% (N=11,954/68,158), COVID-19, which accounted for 7% (N=4,888/68,158), and unintentional injuries<sup>iii</sup> which accounted for 7% (N=4,636/63,158).<sup>iv</sup>

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

<sup>ii</sup> External causes of injuries includes intentional injuries (e.g., homicide and suicide), unintentional injuries (e.g., motor vehicle and non-transport related accidents), and injuries of undetermined intent.

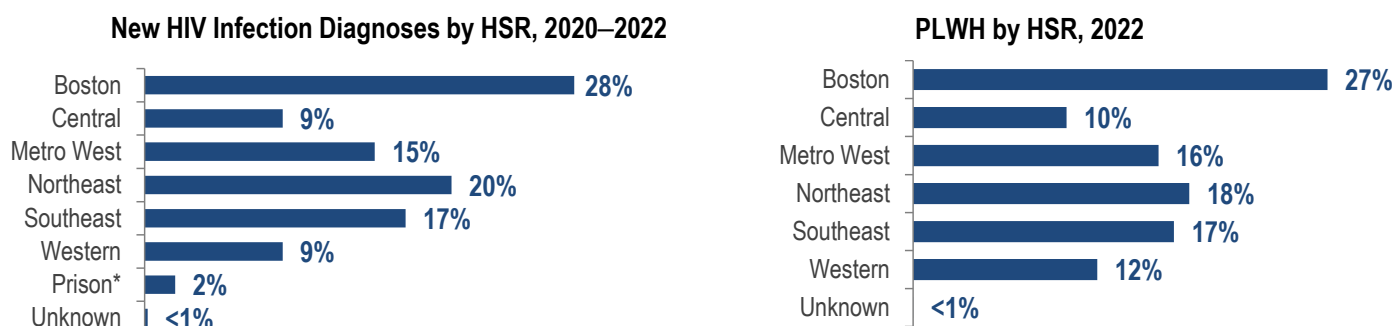
<sup>iii</sup> Unintentional injuries include injuries such as motor vehicle-related and other transportation related deaths, falls, fires, and drownings that were not intended to occur

<sup>iv</sup> Source: Massachusetts Department of Public Health, Office of Population Health. Massachusetts Deaths 2021; October 2023. available at: <https://www.mass.gov/doc/2021-death-report-pdf/download>

# GEOGRAPHIC DISTRIBUTION OF HIV INFECTION

*What is the geographic distribution of the HIV epidemic in Massachusetts?*

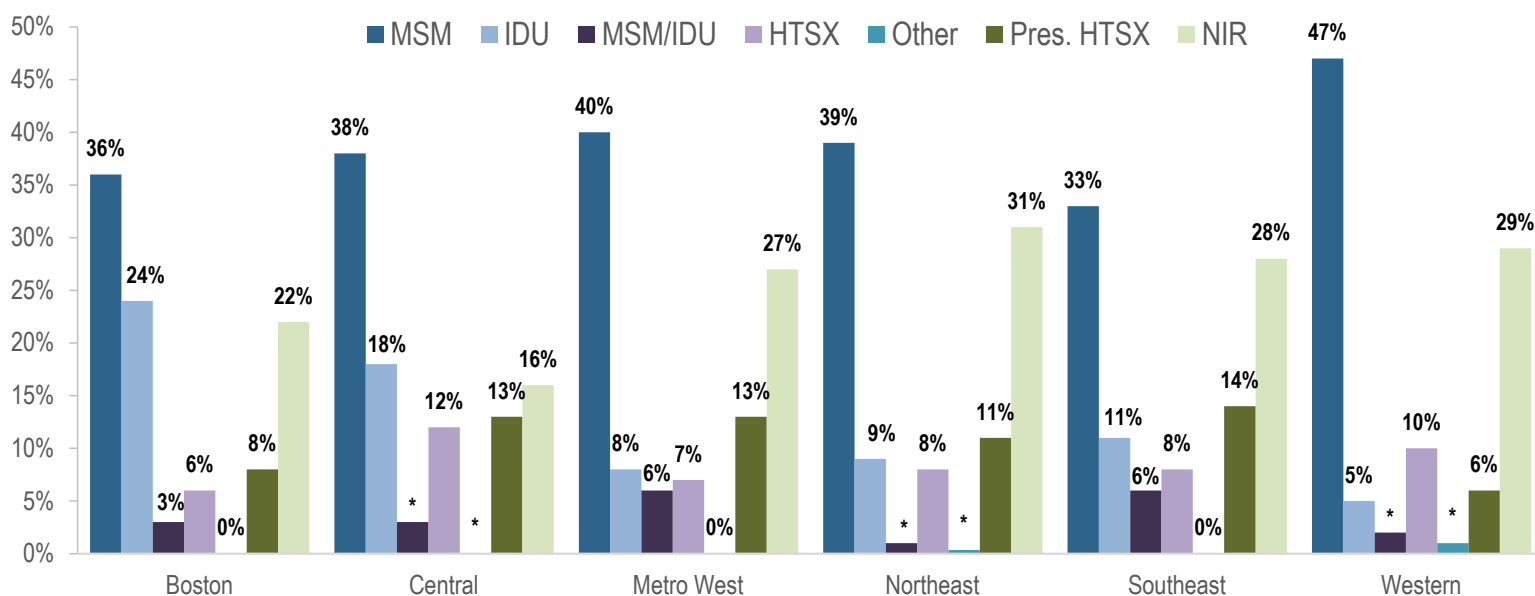
**FIGURE 20.** Percentage distributions of 2020–2022 HIV infection diagnoses (N=1,329) and 2022 persons living with HIV infection (PLWH, N=23,643) by Health Service Region (HSR), Massachusetts



\* HSRs are regions defined geographically to facilitate focused health service planning. While prisons are not an HSR, the prison population is presented separately in this analysis because of its unique service planning needs. The prisons category represents persons who were diagnosed with HIV infection while in a correctional facility. As these data do not reflect current incarceration status, the category is not included for persons living with HIV infection.

The greatest proportion of new HIV infection diagnoses in 2020 – 2022<sup>i</sup> was among residents of the Boston HSR (28%), followed by the Northeast HSR (20%), the Southeast HSR (17%), and the Metro West HSR (15%). Similar geographic distributions were observed for persons living with HIV infection (PLWH). The Boston HSR had the highest proportion of PLWH in 2021 (27%), followed by the Northeast HSR (18%), Southeast HSR (17%), and the Metro West HSR (16%).

**FIGURE 21.** Percentage distribution of HIV infection diagnoses by Health Service Region (HSR) and exposure mode, Massachusetts 2020–2022 (N=1,329)

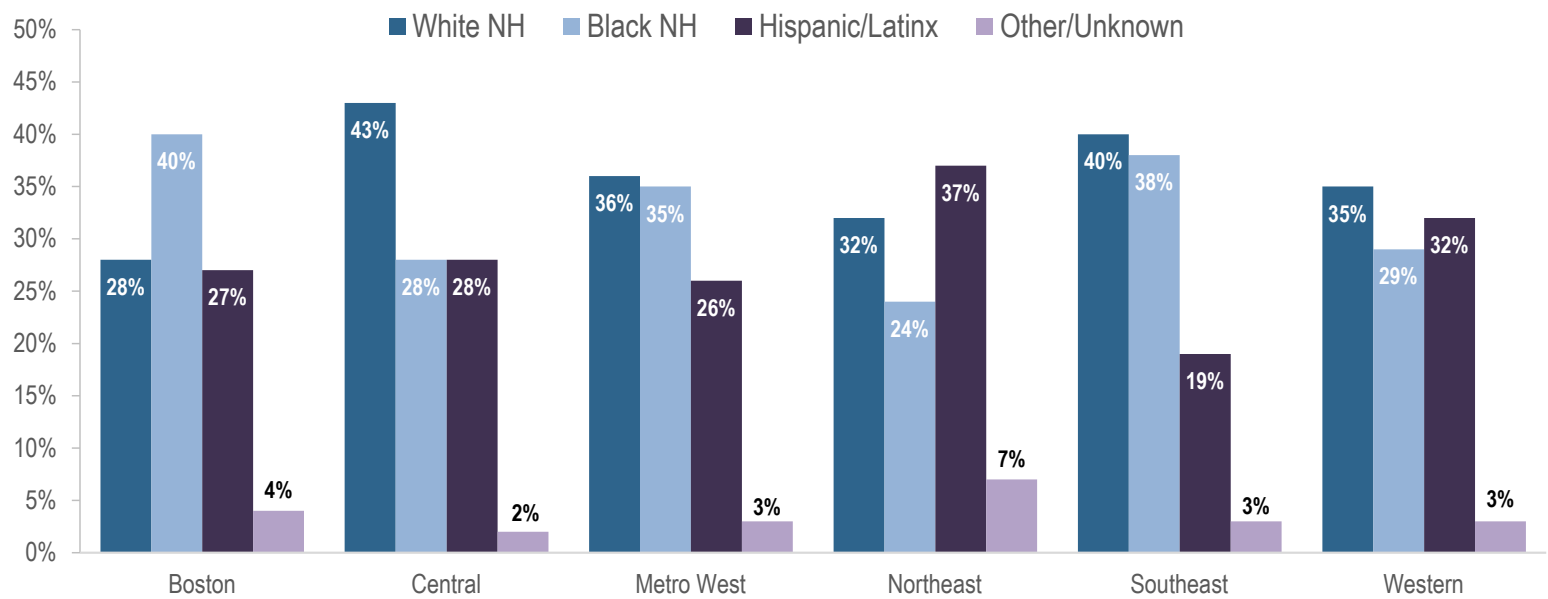


\* Values less than five are suppressed for populations less than 50,000 or for populations of unknown size

MSM was the most frequently reported exposure mode in all regions of Massachusetts for individuals diagnosed with HIV infection during 2020 to 2022, accounting for 47% of diagnoses in the Western HSR, 40% in the Metro West HSR, 39% in the Northeast HSR, 38% in the Central HSRs, 36% in the Boston HSR, and 33% in the Southeast HSR. The Boston HSR had the highest proportion of individuals with IDU exposure mode at 24%, followed by the Central HSR at 18%. IDU accounted for 5% to 11% of HIV infection diagnoses in the remaining regions.

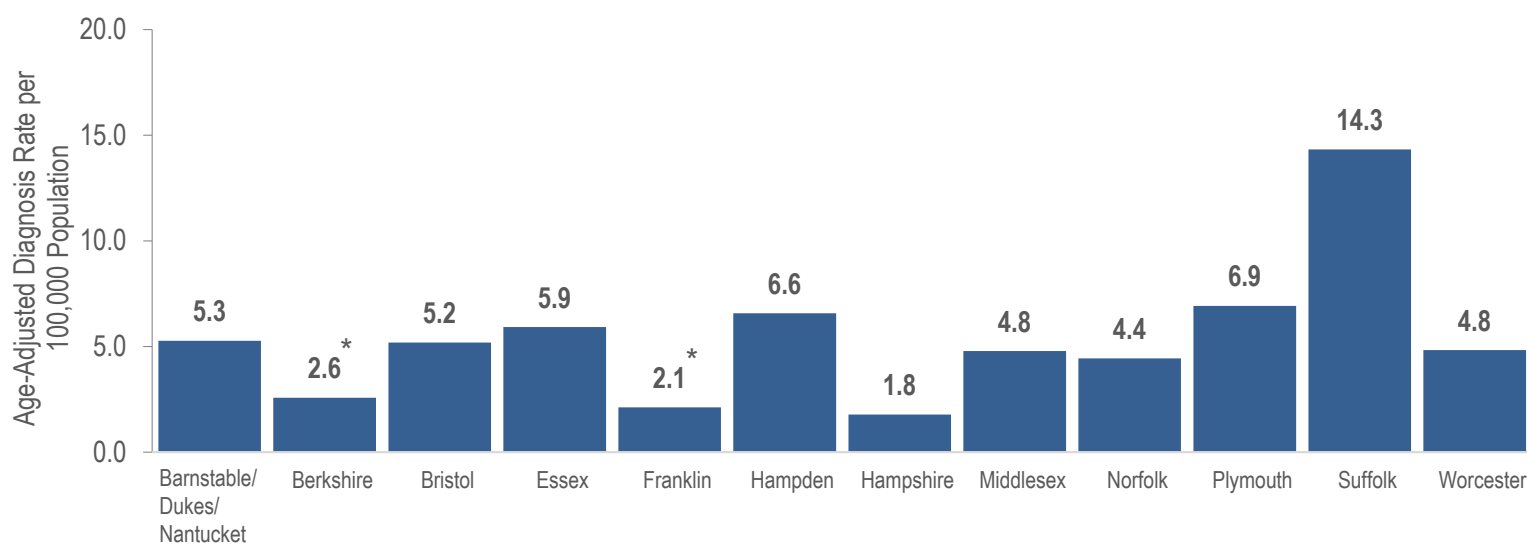
<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data.

**FIGURE 22.** Percentage distribution of HIV infection diagnoses by Health Service Region (HSR) and race/ethnicity, Massachusetts 2020–2022 (N=1,329)



The Central HSR had the highest proportion of recent HIV infection diagnoses (2020–2022<sup>i</sup>) among White (non-Hispanic) individuals at 43%, while the Boston HSR had the highest proportion among Black non-Hispanic individuals at 40%, and the Northeast HSR had the highest proportion among Hispanic/Latinx individuals at 37%.

**FIGURE 23.** Average annual age-adjusted rate of HIV infection diagnosis per 100,000 population by county, Massachusetts 2020–2022

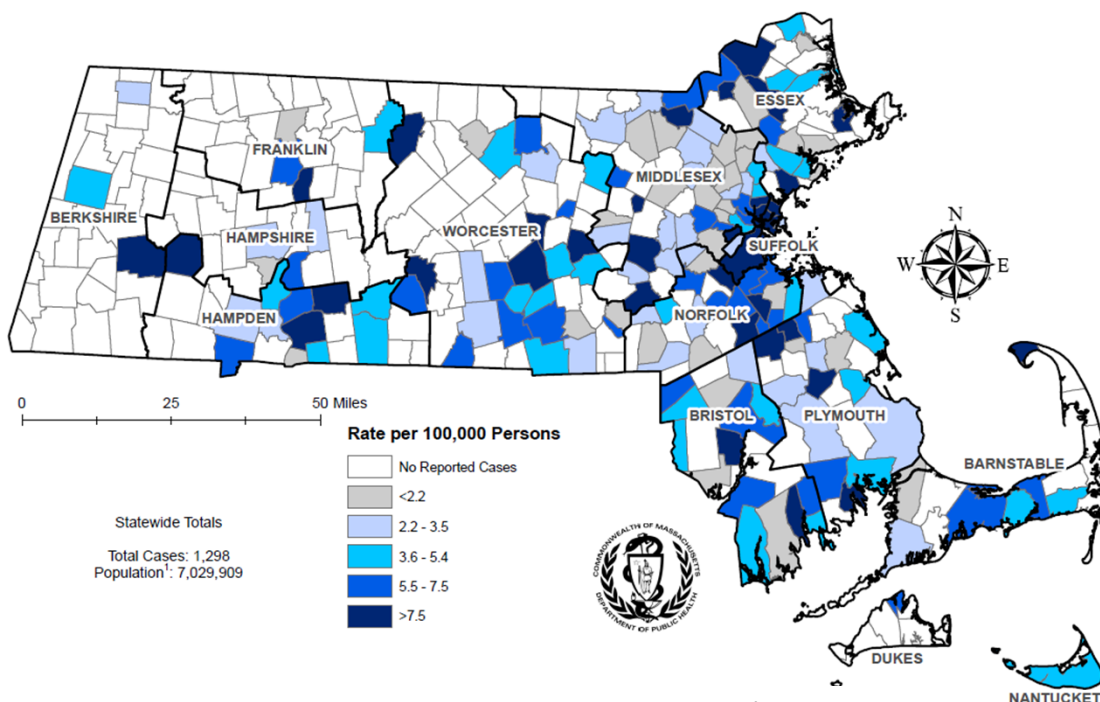


\*Rates based on numerators <12 are marked with an asterisk (\*) and should be interpreted with caution. Barnstable, Dukes, and Nantucket Counties are combined because of small numbers.

Recently, Suffolk County, in which Boston is the biggest city, was selected as one of 48 counties nationally that is prioritized for funding in the U.S. Department of Health and Human Services’ initiative “Ending the HIV Epidemic (EHE): A Plan for America”. This is a ten-year initiative beginning in 2020 to achieve a 75% reduction in new HIV infections in five years and at least a 90% reduction in ten years. For more information about EHE, see <https://www.hrsa.gov/ending-hiv-epidemic> and <https://jri.org/ending-the-hiv-epidemic-in-massachusetts> for the Suffolk County EHE Plan. Suffolk County had the highest average age-adjusted rate of HIV infection diagnosis during 2020 to 2022 among all Massachusetts counties at 14.3 per 100,000, as well as the highest prevalence rate of persons living with HIV infection in 2022 at 779.9 per 100,000.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data.

**FIGURE 24.** Average annual rate of HIV infection diagnosis per 100,000 population<sup>i</sup> by city/town, Massachusetts 2020–2022

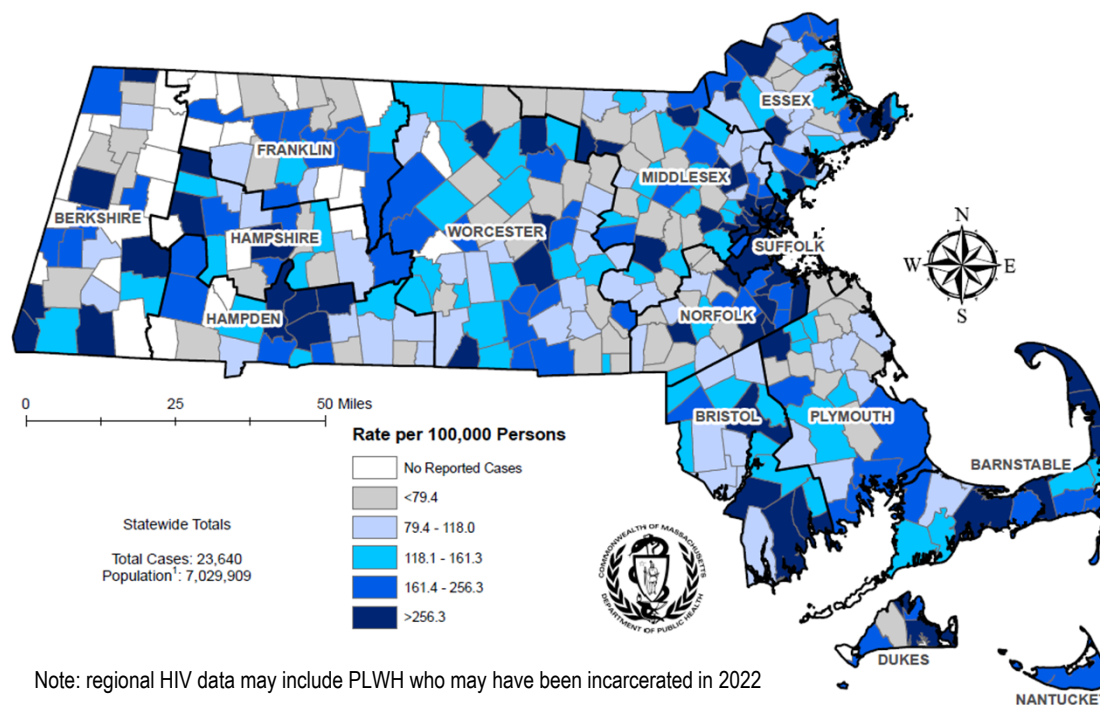


The cities and towns with the highest average annual rate of HIV infection diagnosis during 2020 to 2022<sup>ii</sup> included Brockton (20.8 per 100,000), Boston (16.6), Malden (15.6), Chelsea (15.5), and Everett (14.3).<sup>iii</sup> Boston had the highest number of new HIV infection diagnoses from 2020–2022 (N=335), followed by Brockton (N=66), and Worcester (N=65).

Note: regional HIV diagnosis data exclude individuals diagnosed in a correctional facility.

In early 2019, a new cluster of HIV infection was identified in Boston among PWID who were experiencing or had experienced recent homelessness. As of December 31, 2023, a total of 204 cases diagnosed since November 2018 have been investigated and identified as part of the Boston cluster. Emerging trends among those newly diagnosed in the Boston cluster (N=23 cases diagnosed in 2022) include an increase in polysubstance and methamphetamine use.<sup>iv</sup>

**FIGURE 25.** Prevalence rate of persons living with HIV infection (PLWH) per 100,000 population<sup>i</sup> by city/town, Massachusetts 2022



The cities and towns in Massachusetts with the highest prevalence rate of PLWH in 2022 included Provincetown (11,958.7 per 100,000), Boston (833.4), Springfield (832.4), Shirley (794.0), and Ayer (754.8).<sup>v</sup> Boston and Springfield had the highest numbers of PLWH in 2022, at 5,631 and 1,298, respectively.

Note: regional HIV data may include PLWH who may have been incarcerated in 2022

<sup>i</sup> As of 1/1/2020, BIDS calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model.

<sup>ii</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

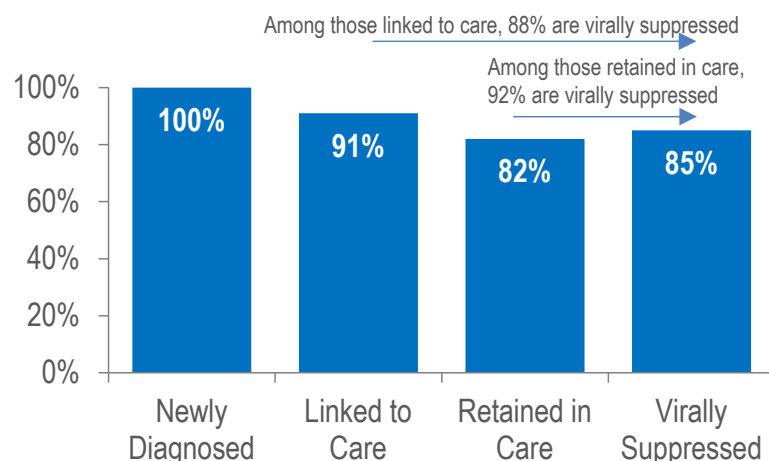
<sup>iii</sup> Among cities that reported at least 12 HIV infections during 2020–2022.

<sup>iv</sup> For more information, see: Joint MDPH and BPHC Clinical Advisory: Increase in newly diagnosed HIV infections among persons who inject drugs in Boston, March 15, 2021, available at: <https://www.mass.gov/doc/joint-mdph-and-bphc-clinical-advisory-hiv-transmission-through-injection-drug-use-in-boston-march-15-2021/download>

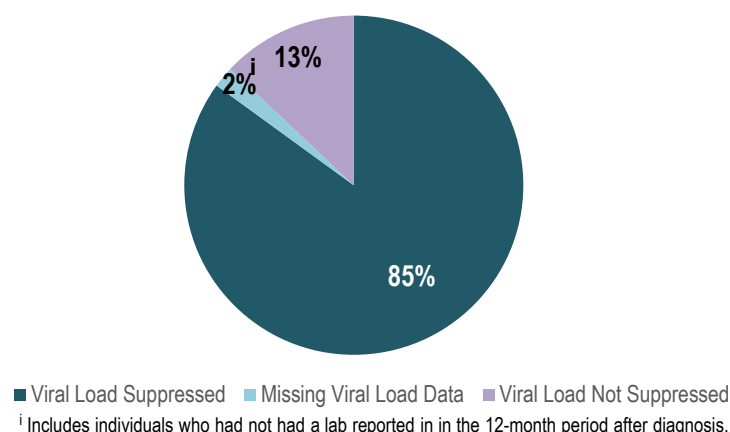
<sup>v</sup> Among cities that reported at least 50 PLWH as of 12/31/2022. Note: The rates of HIV prevalence for Provincetown, Shirley, and Ayer are high because of small population sizes (3,663, 7,431, and 8,479, respectively), as opposed to the number of cases (438, 59, and 64, respectively).

# HIV CARE CONTINUUM – NEWLY DIAGNOSED

**FIGURE 26.** Stages of HIV care among individuals newly diagnosed with HIV infection in Massachusetts, 2021 (N=418)

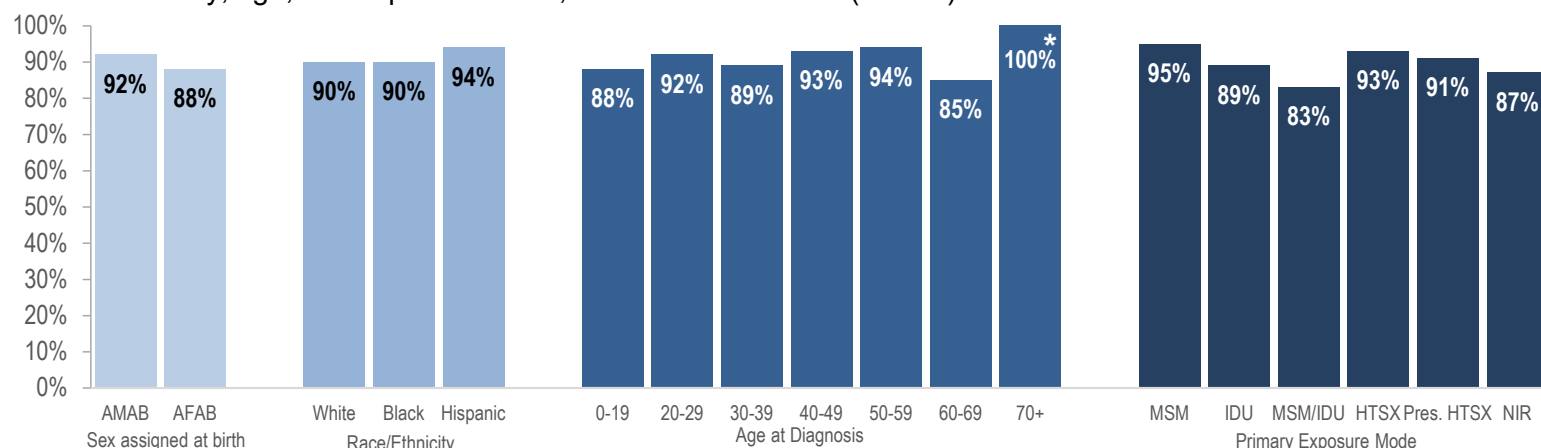


**FIGURE 27.** Viral load status among individuals newly diagnosed with HIV infection in Massachusetts, 2021 (N=418)

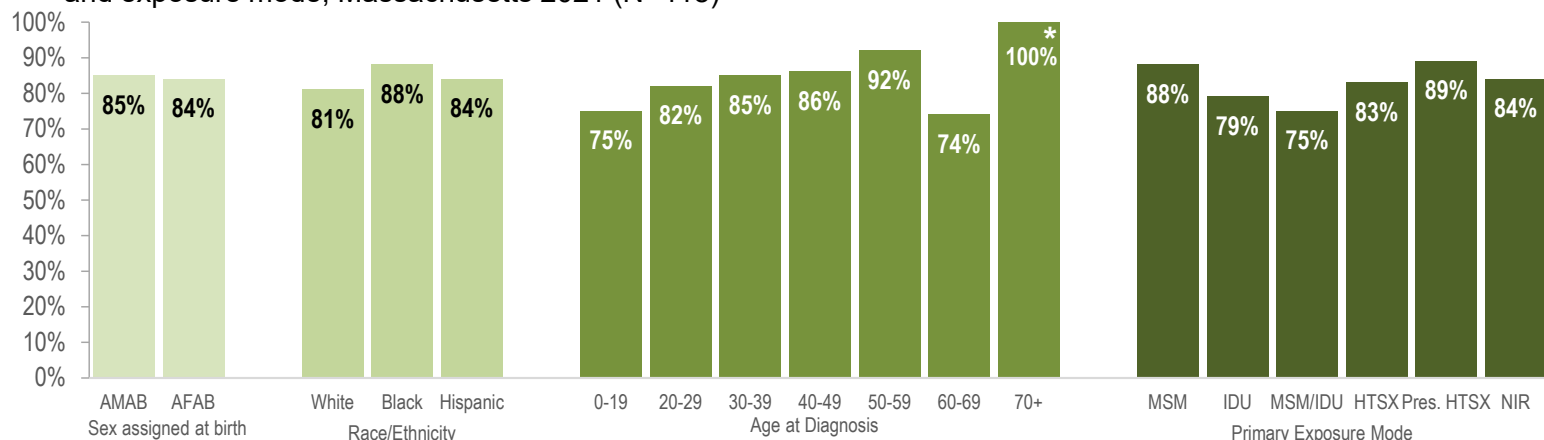


Among 418 individuals newly diagnosed with HIV infection in 2021 (and alive in Massachusetts through 2022), 85% were virally suppressed, 13% were not virally suppressed, and 2% did not have a viral load test in the year after diagnosis. Among those newly diagnosed individuals who were linked to care (N=381) and retained in care (N=343), rates of viral suppression were higher at 88% and 92%, respectively. Among individuals diagnosed with HIV infection in 2021, timely linkage to care differed by age and exposure mode. Viral suppression was lowest among individuals aged 60–69 years and under 19 years and with MSM/IDU and IDU exposure mode.

**FIGURE 28.** Linkage to care among individuals newly diagnosed with HIV infection by sex assigned at birth, race/ethnicity, age, and exposure mode, Massachusetts 2021 (N=418)



**FIGURE 29.** Viral suppression among individuals newly diagnosed with HIV infection by sex, race/ethnicity, age, and exposure mode, Massachusetts 2021 (N=418)

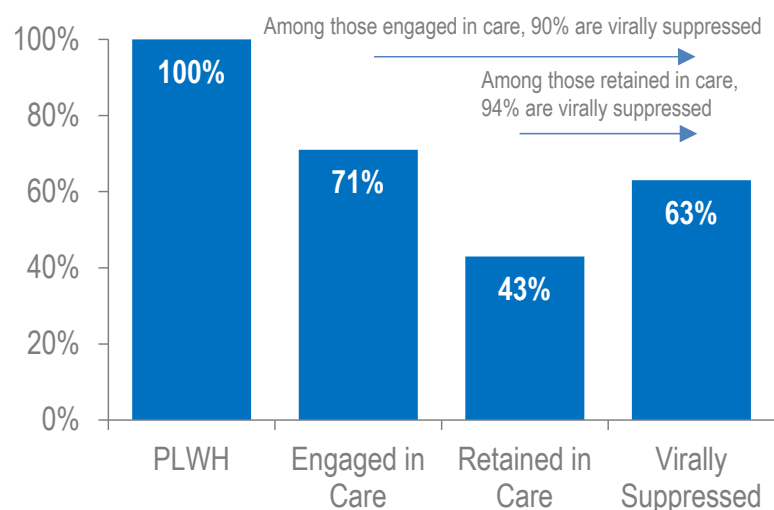


\* Percentages based on numerators ≤5 are marked with an asterisk (\*) and should be interpreted with caution

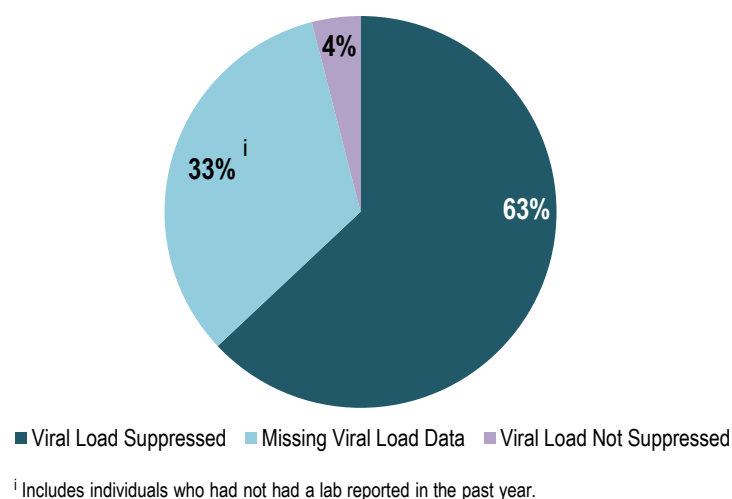
For definitions of the care continuum stages, see [technical note XI](#)

# HIV CARE CONTINUUM - PLWH

**FIGURE 30.** Stages of HIV care among persons living with HIV infection in Massachusetts, 2022 (N=22,455)

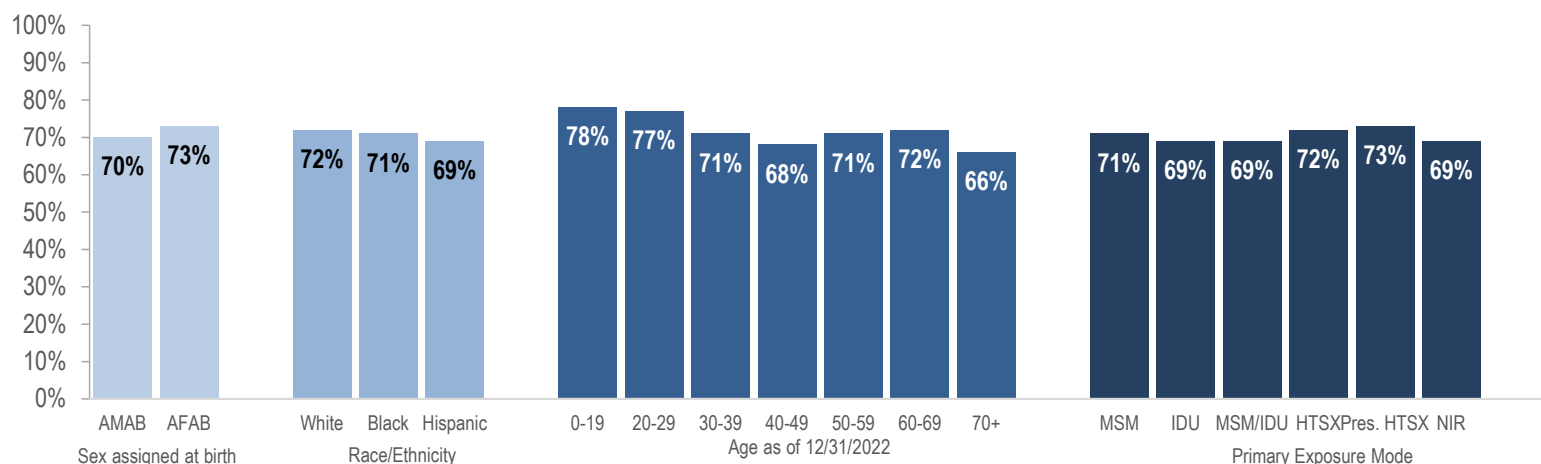


**FIGURE 31.** Viral load status among persons living with HIV infection in Massachusetts, 2022 (N=22,455)



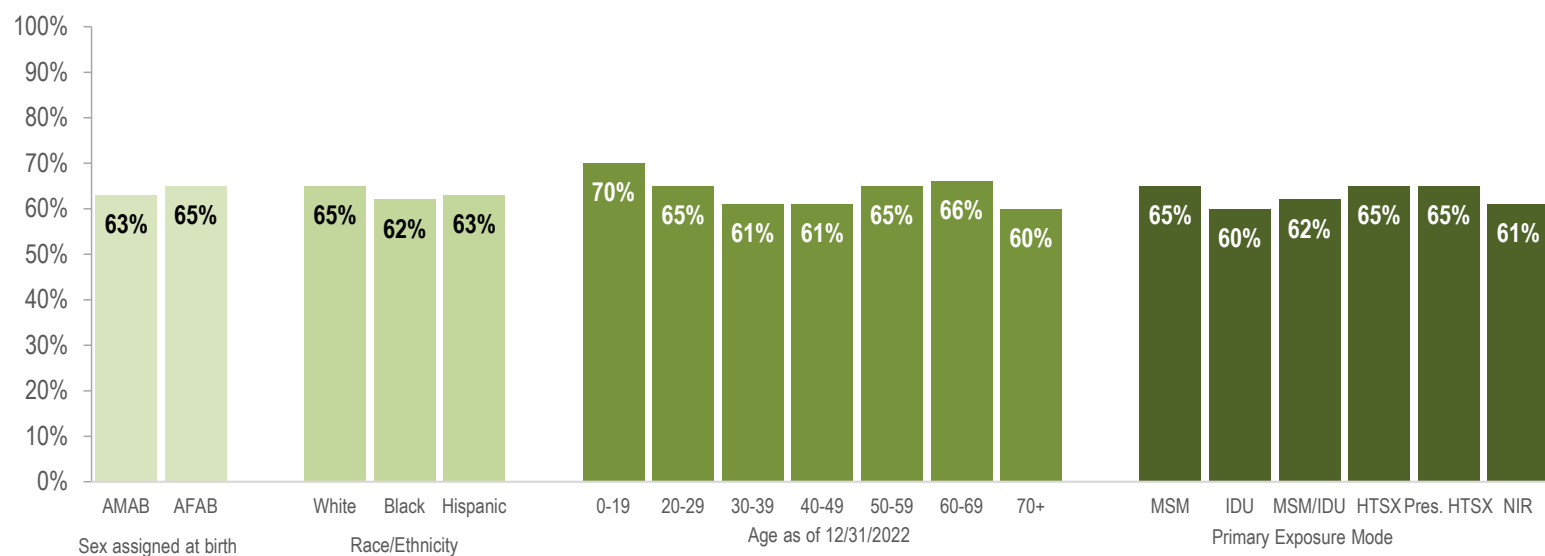
Among 22,455 persons living with HIV infection (PLWH) in Massachusetts at the end of 2022<sup>i</sup> (and diagnosed through 2021), 63% were virally suppressed, 4% were not virally suppressed, and 33% did not have a viral load test in 2022. Rates of care engagement and retention were lower in 2022 (71% and 43%, respectively), 2021 (72% and 45%, respectively) and 2020 (69% and 39%, respectively) than in 2019 (75% and 54% respectively), likely due to the effects of the COVID-19 pandemic. However, please note that the total number of PLWH used to calculate these rates includes all individuals who have ever been diagnosed with HIV infection in Massachusetts with no evidence of death or having moved out of the state or country. Quality assurance efforts are currently being conducted to update the number of PLWH used for this analysis. Among those PLWH who were engaged in care (N=15,849) and retained in care (N=9,677), rates of viral suppression were higher at 90% and 94%, respectively. In 2021, engagement in care and viral suppression among PLWH differed by age.

**FIGURE 32.** Engagement in care among persons living with HIV infection by sex assigned at birth, race/ethnicity, age, and exposure mode, Massachusetts 2022, (N=22,455)

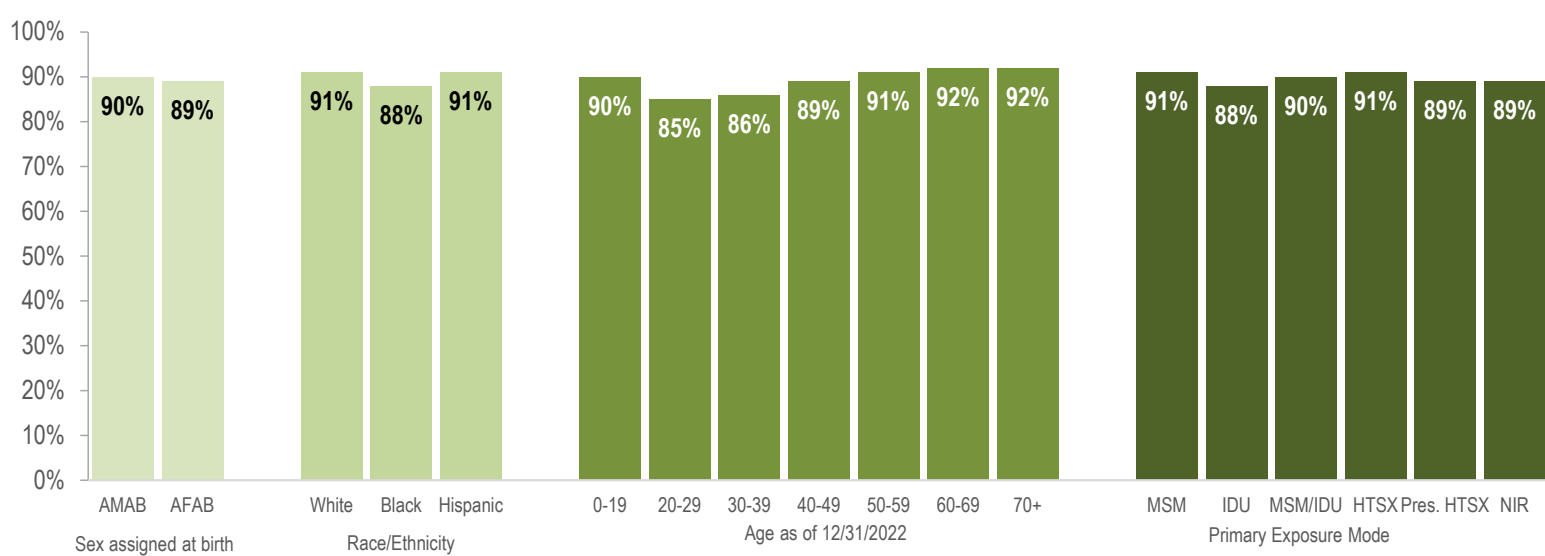


<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

**FIGURE 33.** Viral suppression among persons living with HIV infection by sex assigned at birth, race/ethnicity, age, and exposure mode, Massachusetts 2022 (N=22,455)



**FIGURE 34.** Viral suppression among persons living with HIV infection engaged in care by sex assigned at birth, race/ethnicity, age, and exposure mode, Massachusetts 2022 (N=15,849)



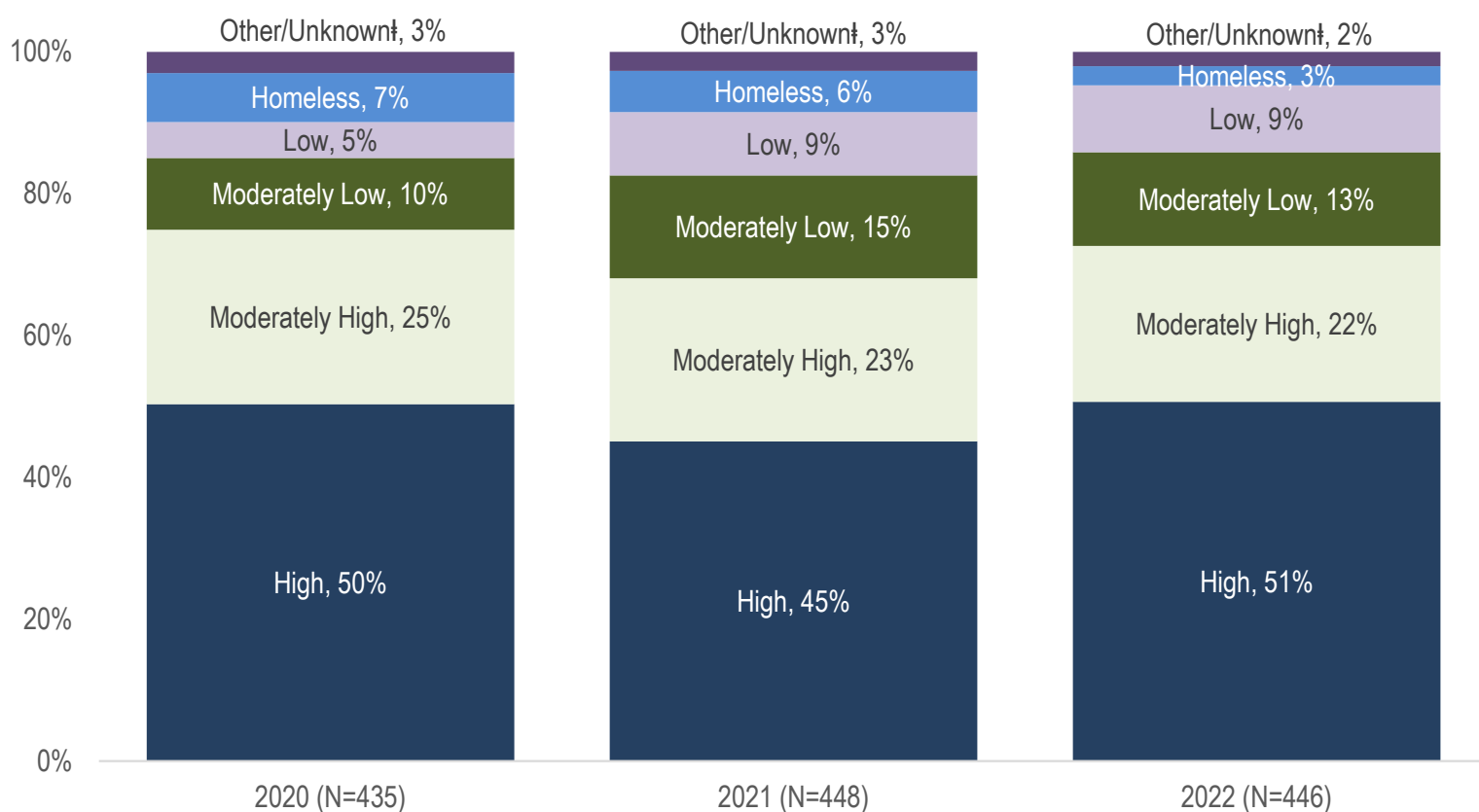
Among 15,849 persons living with HIV infection (PLWH) and engaged in care in Massachusetts at the end of 2022,<sup>i</sup> viral suppression did not differ substantially by sex assigned at birth, race/ethnicity, age or exposure mode.

<sup>i</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data. 26

# SOCIAL VULNERABILITY INDEX

The social vulnerability index (SVI)<sup>i</sup> is a tool to identify socially vulnerable communities that was created by CDC and the Agency for Toxic Substances and Disease Registry (ATSDR). The CDC/ATSDR SVI uses U.S. Census data to determine the social vulnerability of every census tract. The SVI ranks each tract on 16 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes: socioeconomic status, household characteristics, racial and ethnic minority status, and housing type/transportation. Each census tract receives a separate ranking for each of the four themes, as well as an overall ranking. Originally developed to incorporate social determinants of health into emergency response and recovery efforts for environmental and natural disasters, more recently, higher SVI has been linked to higher HIV diagnosis rates,<sup>ii</sup> COVID-19 mortality, and lower COVID-19 vaccination coverage.<sup>iii</sup>

**FIGURE 35.** HIV infection diagnoses by Social Vulnerability Index\*, Massachusetts 2020–2022



\* Census tract level overall SVI values for 2020 were obtained from CDC/Agency for Toxic Substance and Disease Registry (CDC/ATSDR) and assigned to all cases based on their street address at diagnosis. Values range from 0 to 1, with higher values implying greater social vulnerability. SVI rankings were grouped into quartiles (low, <0.25; mid low, 0.25 - <0.5; mid high, 0.5 - <0.75; high >0.75).

† Other/Unknown includes correctional facility addresses, P.O. Box addresses, hospital addresses and addresses that could not be geocoded

## Social Vulnerability Index

The majority of individuals recently diagnosed with HIV infection in Massachusetts were diagnosed in areas with high (51% in 2022) or moderately high (22% in 2022) social vulnerability.<sup>iv</sup>

<sup>i</sup> For more information, see: <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>

<sup>ii</sup> Gant, Z., Dailey, A., Hu, X. et al. A Census Tract–Level Examination of Diagnosed HIV Infection and Social Vulnerability among Black/African American, Hispanic/Latinx, and White Adults, 2018: United States. J. Racial and Ethnic Health Disparities (2022). <https://doi.org/10.1007/s40615-022-01456-7>

<sup>iii</sup> Dasgupta S, Bowen VB, Leidner A, et al. Association Between Social Vulnerability and a County's Risk for Becoming a COVID-19 Hotspot — United States, June 1–July 25, 2020. MMWR Morb Mortal Wkly Rep 2020;69:1535–1541. DOI: <http://dx.doi.org/10.15585/mmwr.mm6942a3>

<sup>iv</sup> Please consider the impact of the COVID-19 pandemic on infectious disease screening, treatment, and surveillance in the interpretation of 2020–2022 data

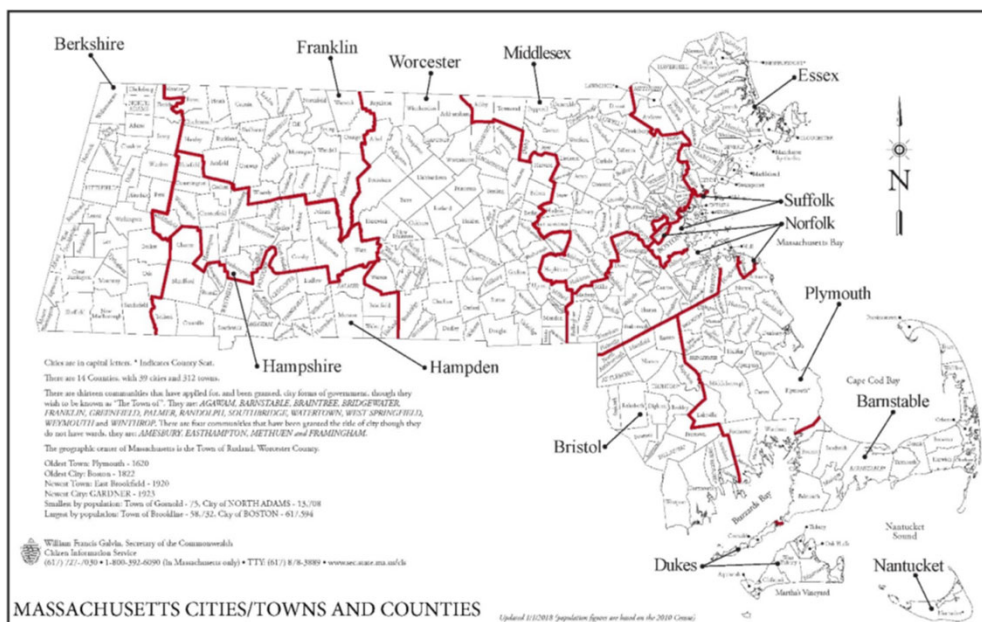
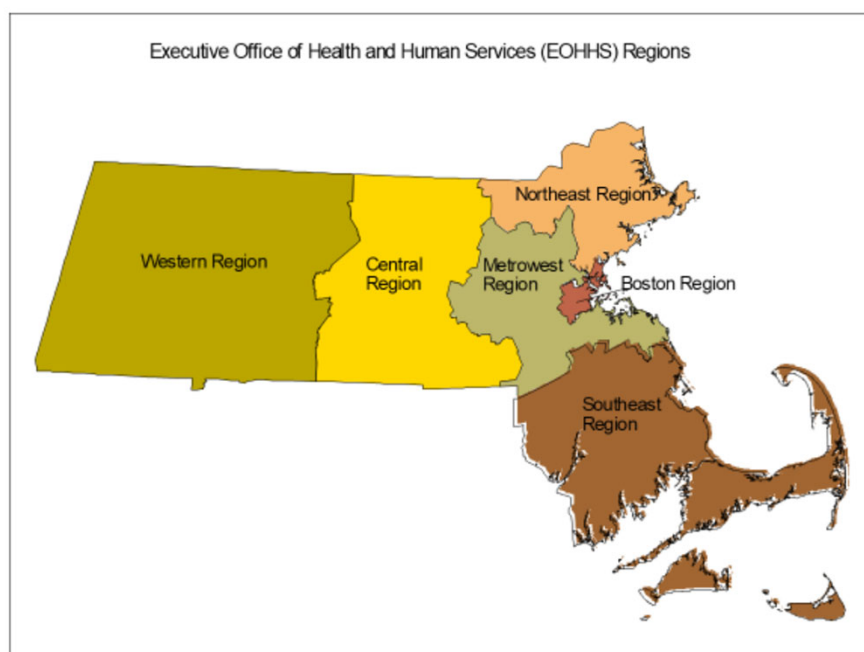
## I. Data source for all HIV case data:

Massachusetts Department of Public Health (MDPH) Bureau of Infectious Disease and Laboratory Sciences (BIDLS) HIV/AIDS Surveillance Program, data are current as of 1/1/2024 and may be subject to change.

## II. Individuals living with HIV infection by current residence:

As of January 1, 2018, the MDPH BIDLS HIV fact sheets, epidemiologic reports, and other HIV data presentations include all persons living with HIV infection (PLWH) who are currently residing in Massachusetts. These prevalent cases include those who may have been first diagnosed in another state. Reports of incidence or new HIV infection diagnoses will continue to include only individuals who are first diagnosed in Massachusetts. Please note that HIV fact sheets, data reports, and presentations published from 2011 to 2017 include only cases that were first diagnosed in Massachusetts. BIDLS service planning continues to ensure responsive services to the entire population living with HIV infection in Massachusetts, regardless of place of diagnosis.

## III. Configuration of Health Service Regions (HSR), Cities/Towns, and Counties



#### **IV. Background on HIV reporting system**

Massachusetts Department of Public Health (MDPH) regulations started requiring healthcare providers to submit case report forms, with demographic and risk information, on individuals diagnosed with AIDS in 1983, and with HIV infection in 1999. Existing cases of HIV infection diagnosed through 1998 were also to be reported by the end of 1999. When comparing HIV infection diagnosed before 1999 to HIV infection diagnosed after 1999, users should consider the differences in HIV reporting requirements for these two time periods. Since HIV was not reported at diagnosis prior to 1999 and clinical providers were given a relatively short time frame within which to report all prevalent HIV cases, the pre-1999 data may be less complete than data reported after 1999. Additionally, pre-1999 HIV infection diagnoses do not include individuals who were diagnosed with HIV infection and who died before 1999 without being reported with AIDS, nor do they include individuals who were no longer receiving HIV-related health care in Massachusetts at the point when HIV (non-AIDS) reporting became mandatory.

Beginning in 2019, all new diagnoses of HIV infection were assigned to field epidemiologists for partner services to ensure disease education/comprehension and assist with linkage to HIV care. As a part of this process, field epidemiologists helped to collect pertinent epidemiological, demographic, and risk information of the individual.

#### **V. Data limitations**

While trends in new HIV infection diagnoses are the best indicator of those who are most at risk of HIV infection, HIV surveillance reflects only incident diagnoses among individuals who are in care and not the actual incidence of new infections. Individuals may be living with HIV infection for many years prior to being tested and seeking care, at which point the case is considered a “diagnosis” and reported to the MDPH Bureau of Infectious Disease and Laboratory Sciences. In the most recent years of data presented, delays may occur in the reporting of a case to MDPH after it is diagnosed. Although Massachusetts regulations require providers to submit HIV case reports in a timely fashion, some 2022 HIV infection diagnoses will be reported to the surveillance program after the release of this report. Thus, the 2022 data presented in this report may change slightly. Previous analyses of Massachusetts HIV case data have suggested that the distribution of HIV infection diagnoses by race/ethnicity, sex assigned at birth and exposure mode for cases reported more than 6 months after diagnosis was not substantially different than the distribution of HIV infection diagnoses reported within 6 months. Caution should be exercised when considering changes in HIV infection diagnosis trends for 2022.

#### **VI. Deaths among individuals reported with HIV**

The death data presented in this report include all deaths among individuals diagnosed and reported with HIV in Massachusetts to present a full description of trends in mortality among this population. This includes deaths from non-HIV related causes such as drug overdoses, suicides, motor vehicle accidents and other causes. Therefore, the total number of annual deaths reported here will vary from the number of HIV-related deaths reported in *Massachusetts Deaths* by the Massachusetts Department of Public Health, Office of Population Health (available at <https://www.mass.gov/lists/death-data>). The death data reported here are considered complete through 2022. Data on deaths occurring in Massachusetts are from matches with the Massachusetts Registry of Vital Records and Statistics and from provider reports. Data on deaths occurring outside of Massachusetts are from matches with the Social Security Death Master File.

## VII. HIV primary exposure mode definitions

The HIV primary exposure mode indicates the most probable risk behavior associated with HIV infection. Assignment of primary exposure mode is done in accordance with Centers for Disease Control and Prevention (CDC) guidelines when multiple exposure modes are reported. Although the reported primary exposure mode is the most likely mode of transmission, there is always the possibility that it is not the actual mode of transmission. Following is a description of the exposure mode categories:

- **MSM (Male-to-Male Sex):** Includes all individuals assigned male at birth who report any sexual contact with other individuals that identify as male. Please note that in accordance with CDC guidelines, this category is defined by an individual's assigned sex at birth and not an individual's current gender identity.
  - **Sex with Men:** This exposure mode category is used by the Bureau of Infectious Disease and Laboratory Sciences (BIDLS) to categorize sexual risk in transgender women reporting sex with men only. For the purposes of official reporting in the MA HIV/AIDS Surveillance System and to CDC, exposure mode for transgender women is based on sex assigned at birth, and therefore would be reported as male-to-male sex.
- **IDU (Injection Drug Use):** Cases among persons who report injection drug use.
- **MSM/IDU:** Includes all individuals assigned male at birth who report both sexual contact with other individuals that identify as male and injection drug use.
  - **Sex with Men/IDU:** This exposure mode category is used by BIDLS to categorize sexual risk in transgender women reporting both sex with men and injection drug use. For the purposes of official reporting in the MA HIV/AIDS Surveillance System and to CDC, exposure mode for transgender women is based on sex assigned at birth, and therefore would be reported as MSM/IDU.
- **Heterosexual Sex:** Cases among persons who report heterosexual sex with a person with, or at increased risk for, HIV infection (e.g., a PWID). The sub-categories for this mode of transmission are listed below.
  - Heterosexual Sex w/ a person who injects drugs
  - Heterosexual Sex w/ a person w/ HIV infection
  - Heterosexual Sex w/ bisexual male
  - Other Heterosexual Sex: includes all other sub-categories of heterosexual risk, such as heterosexual contact with a person infected through a blood transfusion.
- **Other:** Cases among persons with other known exposure modes, including receipt of clotting factor, receipt of transfusion or transplant, and mother-to-child transmission through pregnancy, childbirth, or breastfeeding (perinatal transmission).
- **Presumed Heterosexual:** The presumed heterosexual risk category is used by BIDLS exclusively for individuals assigned female at birth to identify HIV exposure mode when sex with individuals that identify as male was the only reported risk factor, there was no evidence of current or past injection drug use (IDU), and behavioral risk and HIV status information about sexual partners that identify as male was unknown. The rationale for the application of the presumed heterosexual risk category to individuals assigned female at birth only has been addressed in the MDPH Office of HIV/AIDS report "Intersecting Risks: HIV Infection among Heterosexual Women and Men in Massachusetts" (2010).
- **NIR (No Identified Risk):** Cases among persons with no reported history of exposure to HIV through any of the listed exposure categories. Follow-up is conducted to determine risk for those cases that are initially reported without a risk identified. Includes cases among individuals assigned male at birth who were previously categorized in Massachusetts as Presumed Heterosexual.

### **VIII. Cell suppression methodology:**

Values one through four are suppressed for denominator populations less than 50,000 or for unknown population sizes. Additional values of zero and greater than or equal to five may be suppressed to prevent back calculation. Values less than five are not suppressed for unknown health service region or for compound categories (categories containing two or more subcategories, such as 'other/undetermined' race/ethnicity or 'other' exposure modes, which includes pediatric, blood, and blood product exposure modes), because the exact count of each subcategory cannot be determined.

### **IX. Population estimates used for rate calculations**

As of 1/1/2020, BIDLs calculates rates per 100,000 population using denominators estimated by the University of Massachusetts Donahue Institute using a modified Hamilton-Perry model. 2020 population estimates were used for single-year rates; for pooled year rates (i.e., 2019-2021), the 2020 population estimates were multiplied by three. For more information, see: Strate S, et al. Small Area Population Estimates for 2011 through 2020, report published Oct 2016, and <http://www.donahue.umassp.edu/business-groups/economic-public-policy-research/massachusetts-population-estimates-program>. Note that rates and trends calculated using previous methods cannot be compared to these.

### **X. Explanation of age-adjusted rates**

A rate of a disease per 100,000 population is a useful way to compare groups with substantially different population sizes rather than relying on the raw number of cases. For example, the number of individuals living with HIV infection (PLWH) on December 31, 2023 who are Hispanic/Latinx is 6,507, whereas the number of individuals living with HIV infection who are White (non-Hispanic) is 9,066. Although the number of individuals living with HIV infection who are Hispanic/Latinx in Massachusetts is smaller than the number of individuals living with HIV infection who are White (non-Hispanic), we also need to consider that there are far fewer individuals of Hispanic/Latinx heritage living in Massachusetts than White (non-Hispanic) individuals. Hispanic/Latinx individuals represent 12% of the Massachusetts population compared to White (non-Hispanic) individuals who represent 71% of the population. If HIV had the same impact on the Hispanic/Latinx population of the state as on the White (non-Hispanic) population, then there should be six times as many cases in White (non-Hispanic) individuals, but there are less than twice as many. By calculating a rate which takes into consideration the differences in the population size, it is evident that the number of individuals living with HIV infection for every 100,000 Hispanic/Latinx individuals in Massachusetts is much higher than the rate for every 100,000 White (non-Hispanic) individuals. This is called a "crude rate" and is calculated by dividing the number of individuals living with HIV infection by the population of interest (the total number of Hispanic/Latinx individuals in Massachusetts, for example) and multiplying by 100,000. (See example below.)

Example: Calculation of crude HIV prevalence rate for White (non-Hispanic) individuals, Massachusetts (187.6 per 100,000)

**Crude HIV prevalence rate  
for White (non-Hispanic)  
individuals**

$$\begin{aligned} &= [\text{number of White (non-Hispanic) individuals living} \\ &\quad \text{with HIV infection} \div \text{population size of White (non-} \\ &\quad \text{Hispanic) individuals}] \times 100,000 \\ &= (9,066 / 4,832,394.52) \times 100,000 \\ &= (0.001876) \times 100,000 \\ &= 187.6 \end{aligned}$$

However, sometimes, in addition to the population size being different, the age composition of the populations is different. In Massachusetts, the Black (non-Hispanic) and Hispanic/Latinx populations are on average younger than White (non-Hispanic) population (medians: 29.7 years and 24.5 years vs. 38.8 years, respectively). Therefore, it is necessary to age-adjust the HIV prevalence rate to get a true comparison of the impact of the disease across racial/ethnic groups without an effect from the differences in age composition. Age-adjustment of rates minimizes the distortion created by differences in age composition. Age-adjusted rates are calculated by weighting the age-specific rates for a given population by the age distribution of a standard population. The weighted age-specific rates are then summed to produce the adjusted rate for all ages combined.

**XI. HIV Care Continuum Indicator Definitions:**

- HIV care continuum among individuals newly diagnosed with HIV infection in Massachusetts: “Newly Diagnosed” includes individuals diagnosed in 2021, alive through 12/31/2022, and living in Massachusetts based on last known address. “Linked to Care” is defined as having  $\geq 1$  viral load (VL) or CD4 test result within 3 months of diagnosis. “Retained in Care” is defined as having  $\geq 2$  VL or CD4 test results at least 3 months apart during the 12-month period after diagnosis. “Virally Suppressed” is defined as having a VL  $< 200$  copies/mL for the most recent VL test drawn during the 12-month period after diagnosis.
- HIV care continuum among persons living with HIV infection (PLWH) in Massachusetts: “PLWH” refers to individuals diagnosed through 2021, alive through 12/31/2022, and living in Massachusetts based on last known address. “Engaged in Care” is defined as having  $\geq 1$  VL or CD4 test result in 2022. “Retained in Care” is defined as having  $\geq 2$  VL or CD4 test results at least 3 months apart in 2022. “Virally Suppressed” is defined as having a VL  $< 200$  copies/mL for the most recent VL test drawn in 2022.