

# HIV in the city of Milwaukee

Supplement to the HIV Surveillance Annual Report, 2018

Diagnosis trends, new diagnoses, and prevalence through December 31, 2018



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# Summary

This report describes HIV diagnosis trends, people newly diagnosed with HIV infection during 2018, and the population living with HIV in Milwaukee, Wisconsin, as of December 31, 2018.

HIV surveillance data provide important information for planning HIV prevention and care services. Prevention services focus primarily on new diagnosis trends and the geographic and demographic distribution of new cases. Care and treatment services consider the total population of people living with HIV in the state (that is, prevalent cases), regardless of when or where they were first diagnosed.

## HIV Diagnosis Trends

Over the past 10 years, the number and rate of new HIV diagnoses have declined. Milwaukee has a relatively low diagnosis rate compared to cities of similar size and demographics. During 2013-2018:

- Young men and people of color were disproportionately affected by HIV.
- Male-male sexual contact was the most commonly reported risk factor for HIV exposure.

## New Diagnoses, 2018

During 2018, 109 people were newly diagnosed with HIV infection in Milwaukee.

- Seven of the ZIP codes in Milwaukee made up 60% of the new HIV diagnoses.
- A disproportionate number of new HIV diagnoses were young men of color.
- Male-male sexual contact was the most commonly reported risk factor.
- About 87% of cases were linked to care services within three months of diagnosis.

## Prevalence

A total of 2,898 people known to be living with HIV resided in Milwaukee at the end of 2018. An estimated 511 additional people may be living with HIV in Milwaukee but are not currently aware of their diagnosis. The estimated HIV prevalence was 3,400 people when those who were not aware of their diagnosis were taken into account.

- In 2018, 49 people living with HIV moved into Milwaukee.
- Over half of people living with HIV reside in seven of the Milwaukee ZIP codes.
- Prevalent cases tend to be older than new diagnoses.
- Two out of three people living with HIV were virally suppressed during 2018.

# HIV Diagnosis Trends

## Number and Rate of New Diagnoses

### Number of New Diagnoses

Since 1982, 5,077 Milwaukee residents were diagnosed with HIV infection. HIV diagnoses rose rapidly during the 1980s, peaking during 1990 at 305 new diagnoses, and then declining steeply until the early 2000s (Figure 1).

During 2009-2018, the number of diagnoses ranged from a low of 109 (2018) to a high of 136 (2010), with an average of 115 new HIV diagnoses per year.

FIGURE 1

**Over the past 10 years, the number of new HIV diagnoses reported each year in Milwaukee has slowly declined.**

Number of new HIV diagnoses, Milwaukee 1982-2018

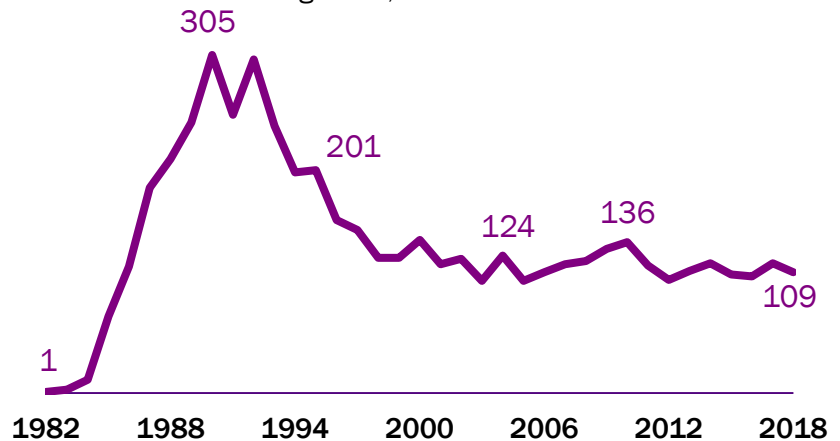
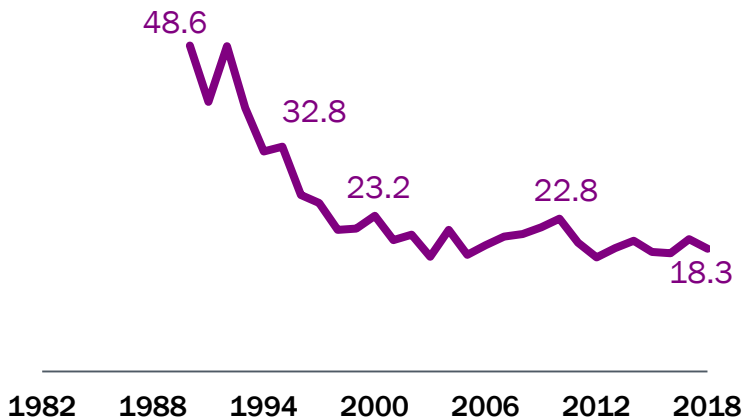


FIGURE 2

**The HIV diagnoses rate in Milwaukee has slowly declined over the past 10 years.**

Rate of new HIV diagnoses per 100,000 people by year, Milwaukee, 1989-2018



### New Diagnosis Rate

During 1990, 48.6 new HIV cases were diagnosed per 100,000 Milwaukee residents (Figure 2). The new diagnosis rate declined to 18.3 per 100,000 people by 2018.

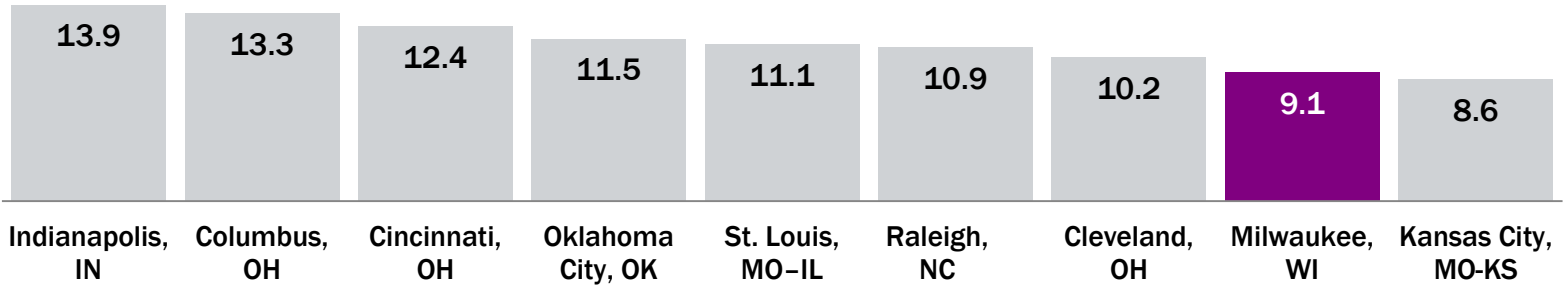
During 2009-2018, the annual diagnosis rate ranged from a low of 17.0 per 100,000 people (2012) to a high of 22.8 per 100,000 people (2010), with an average of 19.2 new HIV diagnoses per 100,000 people.

Figure 3 shows that Milwaukee’s HIV diagnosis rate is lower compared to other metropolitan statistical areas (MSA) of similar size, demographics, and economic factors.

FIGURE 3

**Milwaukee has a lower HIV diagnosis rate than most metropolitan statistical areas with similar demographics.**

Estimated number of HIV diagnoses per 100,000 people by metropolitan area, 2017



## Demographics

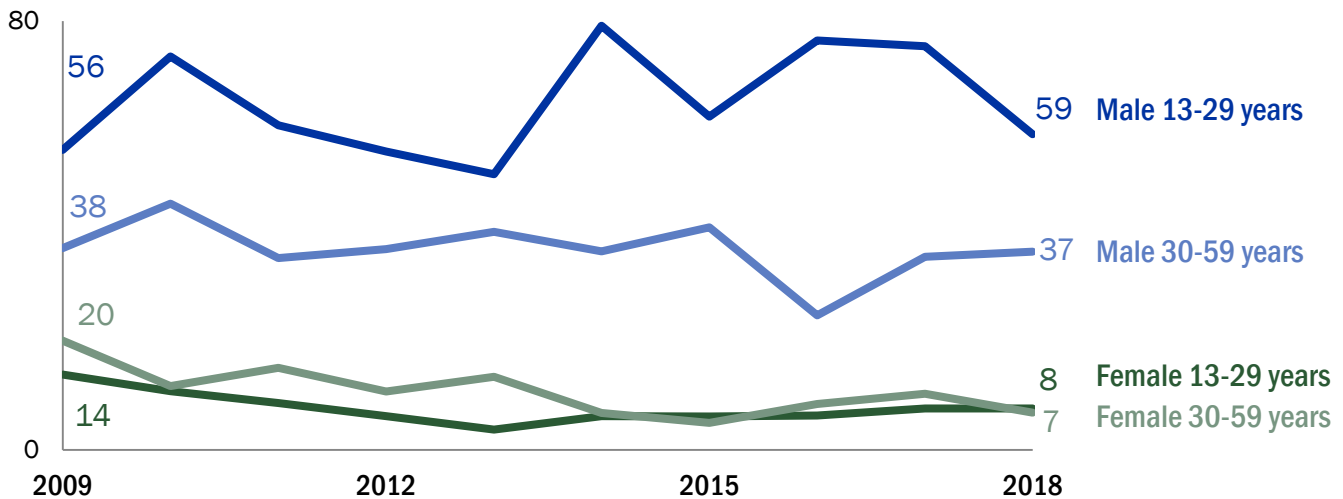
### Age and Gender at Diagnosis

During 2009-2018, the HIV diagnosis rate increased from 56.0 to 58.9 per 100,000 people among young men, and declined among older men and among women in both age groups (Figure 4).

FIGURE 4

**Young men have the highest HIV diagnosis rate in Milwaukee.**

Number of HIV diagnoses per 100,000 people by gender and age\* at diagnosis, Milwaukee, 2009-2018



\* Diagnosis rates among males and females ages 60 and older are unreliable due to small numbers.

## Race and Ethnicity

HIV **disproportionately** affects people of color in Milwaukee. The percentage of new HIV diagnoses affecting people of color rose from 33% in 1983 to 88% during 2018 (Figure 5). During 2018, racial and ethnic minorities made up 64% of Milwaukee’s population, but comprised 88% of new HIV diagnoses.

This health inequity is **not** due to innate biologic factors—race or ethnicity alone does not make someone more or less susceptible to HIV. Many social and economic factors—the social determinants of health—affect populations of color to a larger extent than white populations in Milwaukee, putting people of color at greater risk for acquiring HIV.

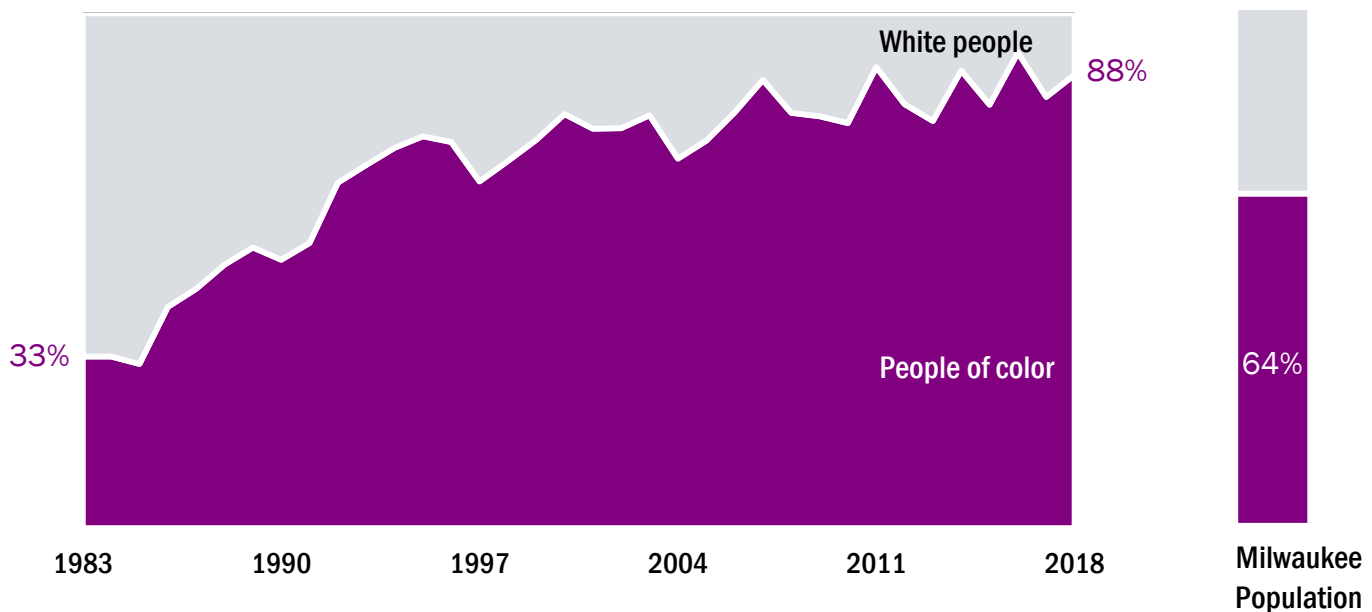
People can be at increased risk of acquiring HIV due to social determinants of health that increase the chance of HIV exposure and reduce access to prevention services, such as:

- Poverty
- Limited access to health care
- Lack of education
- Stigma
- Homelessness
- Racism

FIGURE 5

**The percentage of new HIV diagnoses among people of color is disproportionate to Milwaukee’s racial and ethnic composition.**

Percentage of new HIV diagnoses among white people and people of color, Milwaukee, 1983-2018



This disparity is more pronounced among men (Appendix-Table A1). During 2009-2018, women of all racial or ethnic groups have had lower annual HIV diagnosis rates compared to men.

## People who are Transgender

People who are transgender have a gender identity that does not conform to their sex assigned at birth. This includes people who self-identify as transgender women, transgender men, and other gender nonconforming identities. A person who is transgender may have the anatomy of their sex at birth, the other sex, or a combination.

Gender identity and sexual orientation are separate, distinct concepts, with gender identity referring to an individual's sense of themselves and sexual orientation referring to an individual's attractions and partnering.

Transgender people are at high risk of HIV infection due to stigma, discrimination, social rejection and exclusion, violence, and barriers faced in health care settings, such as lack of provider knowledge on transgender people's unique needs.<sup>1</sup>

Since 1982, 51 transgender individuals have been diagnosed with HIV in Milwaukee (five transgender men and 46 transgender women). While collection of self-reported gender identity has improved over time, the number of diagnoses among transgender individuals in Milwaukee may be underreported.

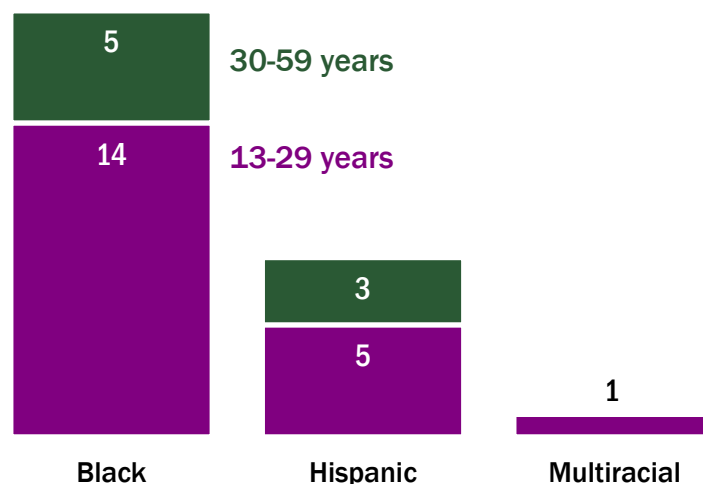
Of the 51 HIV diagnoses among transgender individuals, 28 occurred between 2009 and 2018 (Figure 6).

- All were from a racial or ethnic minority group.
- A majority of the individuals were under age 30 (71%).
- Nearly 90% of recent diagnoses were attributed to sexual contact (24 of 28) or both sexual contact and injection drug use (1 of 28).

FIGURE 6

**Two out of three of the transgender people diagnosed with HIV in the last 10 years were young people of color.**

Number of HIV diagnoses among transgender people by age at diagnosis and race and ethnicity, Milwaukee, 2009-2018



<sup>1</sup> Centers for Disease Control and Prevention. HIV Among Transgender People. <https://www.cdc.gov/hiv/group/gender/transgender/>. Published April 2017.

## Transmission Category

### Adult Transmission Risks

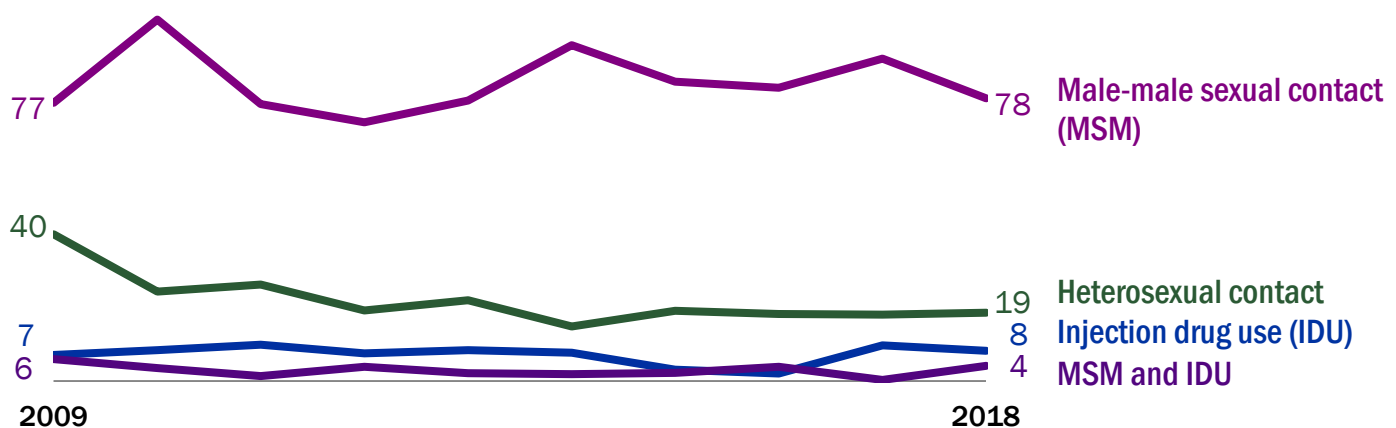
Some people newly diagnosed with HIV do not know for certain how they were exposed or do not choose to share their risk factors for HIV exposure with their doctor. A statistical method called imputation is used to estimate the probable transmission category for people with an unknown transmission category (see Technical Notes).

During 2009-2018, the estimated number of diagnoses attributed to male-male sexual contact and injection drug use were stable and the number attributed to heterosexual contact declined (Figure 7).

FIGURE 7

### Male-male sexual contact is the most common HIV transmission risk.

New HIV diagnoses by estimated transmission category\*, Milwaukee, 2009-2018



\*Data have been statistically adjusted to account for those with unknown transmission category.

## Late Diagnosis

A late diagnosis occurs when a person living with HIV progresses to Stage 3 (AIDS) within one year of receiving their initial diagnosis. Without treatment, progression to Stage 3 typically occurs eight to 10 years after HIV was acquired. Stage 3 status is clinically defined by having a very low CD4 white blood cell count or a Stage 3-defining opportunistic infection. Early diagnosis and access to HIV care can prevent progression to Stage 3 so that people living with HIV have longer and healthier lives.

The percentage of new HIV diagnoses that had progressed to Stage 3 by the time they were first identified declined from 25% in 2013 to 12% in 2017 (Figure 9). This decline may be partially due to a change in the case definition for Stage 3 diagnosis during 2014. The new Stage 3 case definition excludes people who have evidence of recent HIV infection, such as a negative HIV test within six months prior to diagnosis.



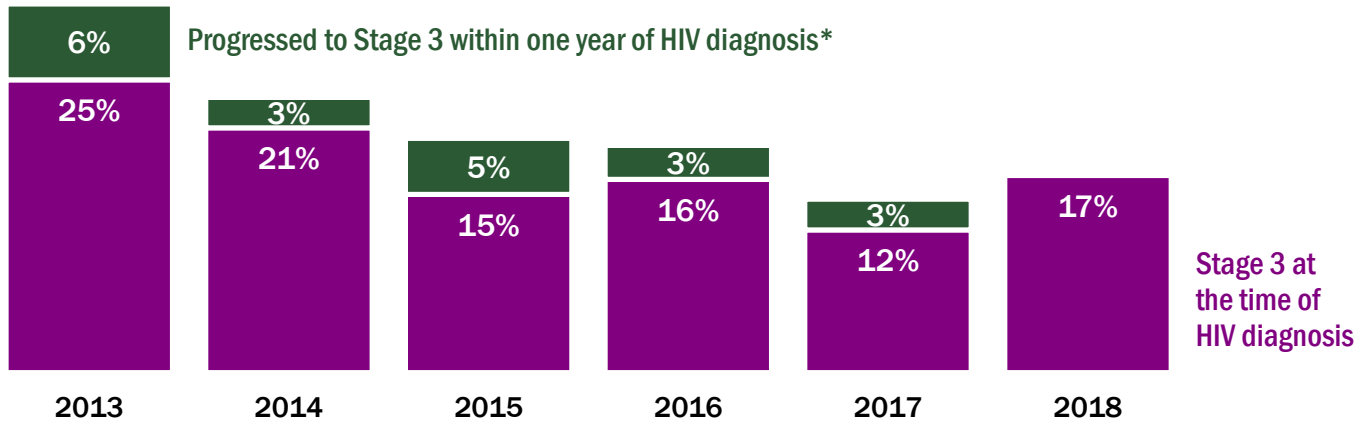
Late diagnoses were no longer in decline when 2018 data on late diagnoses (17%) were included.

The total percentage of people that had progressed to Stage 3 within one year of HIV diagnosis (including being first diagnosed during Stage 3) declined from 31% in 2013 to 15% in 2017.

FIGURE 8

**The percentage of people who had progressed to Stage 3 at the time of diagnosis fluctuated during 2015-2018.**

Percentage of new diagnoses who progressed to Stage 3 within one year of diagnosis, Milwaukee, 2013-2018



\*Those diagnosed with HIV during 2018 have not had one full year to evaluate progression to Stage 3 and have been excluded.

Of people who received a late HIV diagnosis during 2013-2017:

- The majority (78%) were male.
- Nearly three quarters (71%) were over age 30 at the time of diagnosis.
- Over half (58%) were black, 18% were white, and 20% were Hispanic.
- Approximately 51% had a transmission category of male-male sexual contact and 6% had a transmission category of injection drug use.

# New Diagnoses, 2018

## Number of New HIV Diagnoses

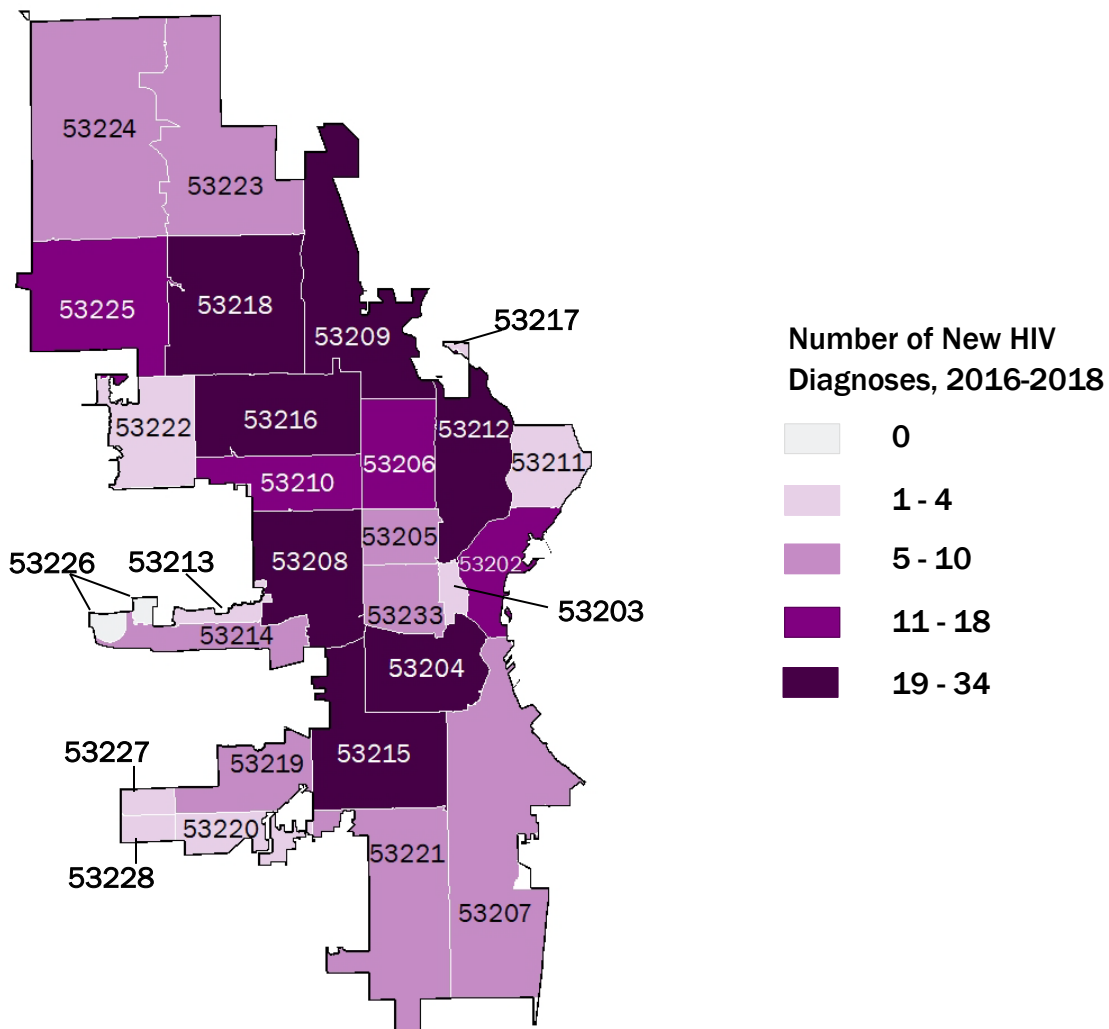
New HIV diagnoses are Milwaukee residents who received their first HIV diagnosis during the current reporting period. During 2018, 109 Milwaukee residents were newly diagnosed with HIV infection, or 18.3 new diagnoses per 100,000 Milwaukee residents.

During 2016-2018, new HIV diagnoses were reported among residents from 27 Milwaukee zip codes. The majority of new HIV cases were diagnosed in seven zip codes: 53209 (34), 53208 and 53218 (31 each), 53204 and 53216 (26 each), and 53212 and 53215 (24 each; Figure 9, Appendix-Table A2).

FIGURE 9

### The majority of new HIV cases were identified in seven ZIP codes.

Geographic distribution of new HIV diagnoses, Milwaukee, 2016-2018



## Recent and Acute Infections

Recent HIV infections are those diagnosed during the six months after HIV was acquired, as evidenced by a documented or self-reported negative HIV test during this period (see Technical Notes). Acute HIV infections are those diagnosed during the two to four weeks after HIV exposure.

People in the acute stage of infection have a high viral load (that is, a large number of viruses in the blood) and are more able to transmit HIV to others due to high levels of virus in the body. Rapid linkage of people with acute infections to partner services ensures that exposed partners receive timely HIV testing.

During 2018, 23 people received a recent or acute HIV diagnosis in Milwaukee. Of these 23 people, seven people were considered acute diagnoses based on laboratory testing algorithms or presence of acute symptoms.

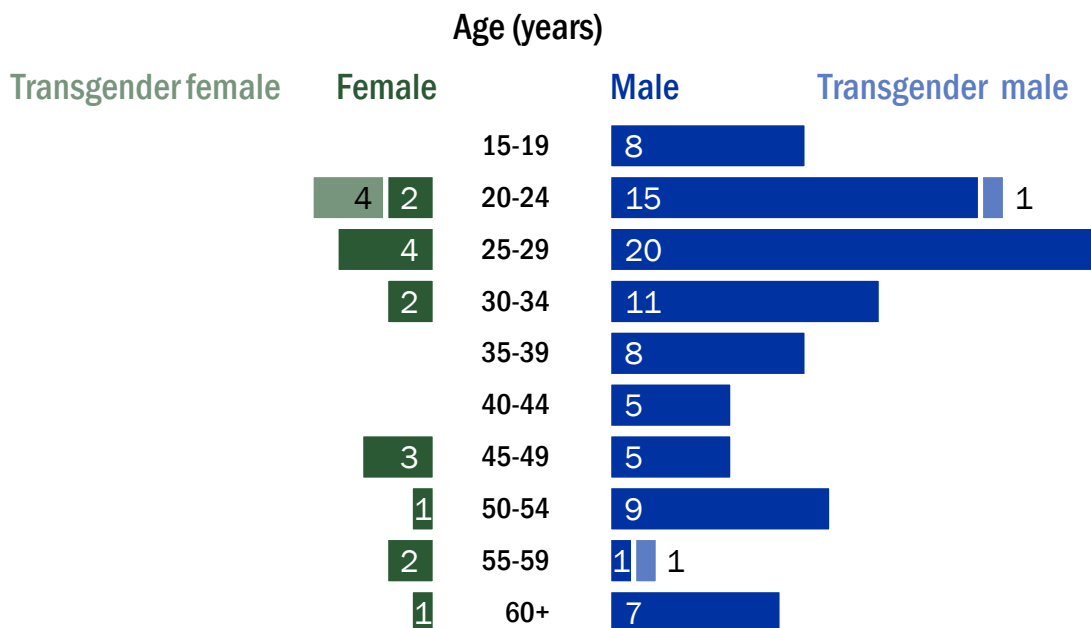
## Demographics

During 2018, 89 men, 15 women, and five transgender individuals were diagnosed with HIV in Milwaukee (Figure 10, Appendix-Table A3).

FIGURE 10

**Approximately 1 out of 3 new HIV diagnoses during 2018 were among young men under 30.**

Number of HIV diagnoses by age and gender, Milwaukee, 2018



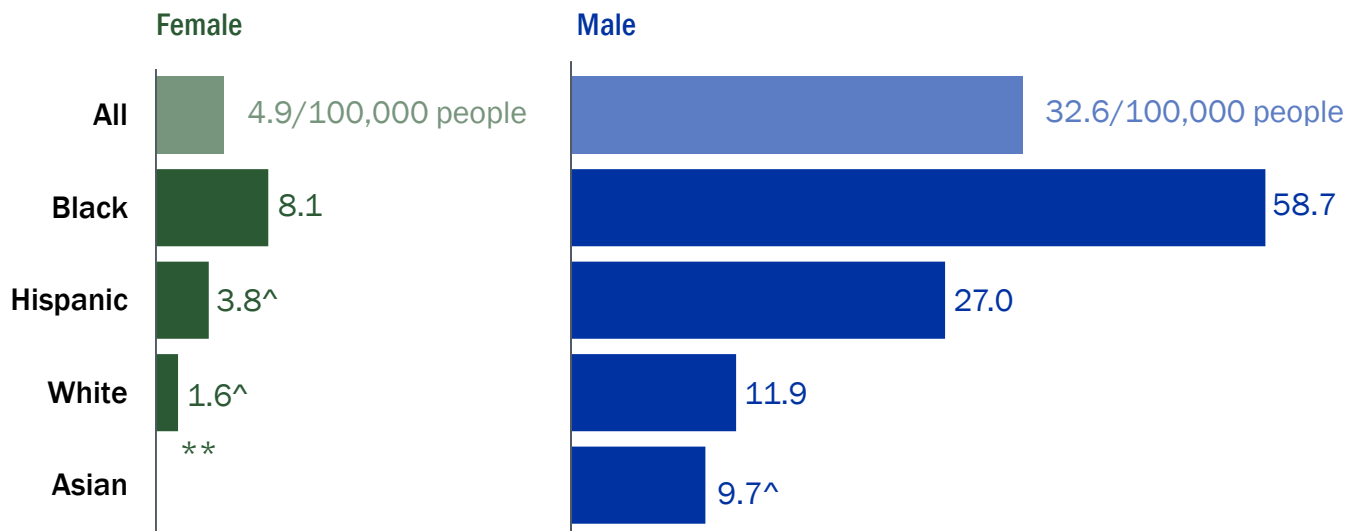
The median age at diagnosis was 30, with a range of 16-74. During 2018, newly diagnosed men and women had the same median age at diagnosis (30).

During 2016-2018 (years have been combined due to the small numbers for some racial/ethnic groups), the new HIV diagnosis rate was higher for men and was higher among black and Hispanic people compared to other race or ethnicity groups (Figure 11).

FIGURE 11

**Black men were diagnosed with HIV at higher rate than other groups.**

Number of new HIV diagnoses per 100,000 people by gender\* and race or ethnicity, Milwaukee, 2016-2018



\* 14 transgender persons diagnosed during 2014-2018 are excluded from these rates as population denominators are not available to calculate rates.  
 \*\*Rates based on counts less than five have been suppressed.  
<sup>^</sup> Rate is unreliable due to a count less than 12.

## Transmission Category

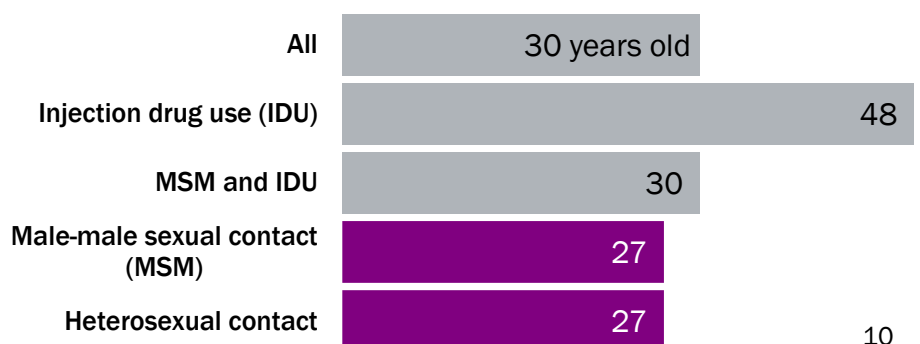
### Age

Transmission categories are determined by what people disclose about behaviors that might lead to HIV exposure. People who reported sexual contact as a possible route of exposure to HIV tended to be younger (Figure 12).

FIGURE 12

**People at risk of HIV exposure through sexual contact tended to be younger at diagnosis than those at risk from injection drug use.**

Median age at HIV diagnosis by transmission category, Milwaukee, 2018



Within the male-male sexual contact transmission category, black and Hispanic men tended to be younger at diagnosis compared to white men (Figure 13).

**Gender**

Seven out of 10 new diagnoses were attributed to an estimated transmission category of male-male sexual contact (Figure 14). The remainder was attributed to heterosexual contact (17%), injection drug use (8%), or both male-male sexual contact and injection drug use (4%).

Among transgender individuals, seven out of eight diagnoses were attributed to sexual contact and one to injection drug use.

FIGURE 13

**Of men who have sex with men, black and Hispanic men were younger at diagnosis than white men.**

Median age at HIV diagnosis by race and ethnicity for those reporting male-male sexual contact, Milwaukee, 2018

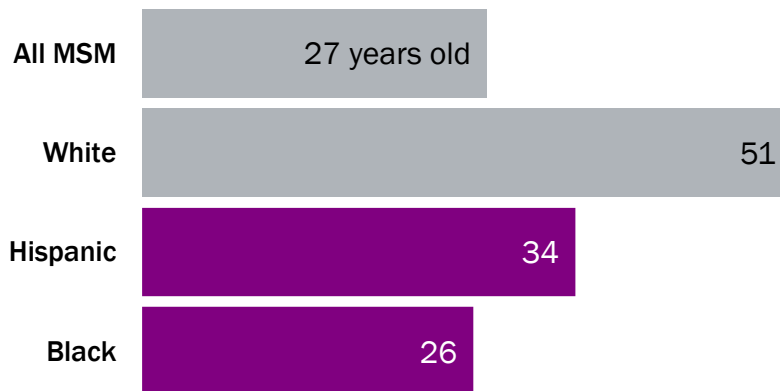
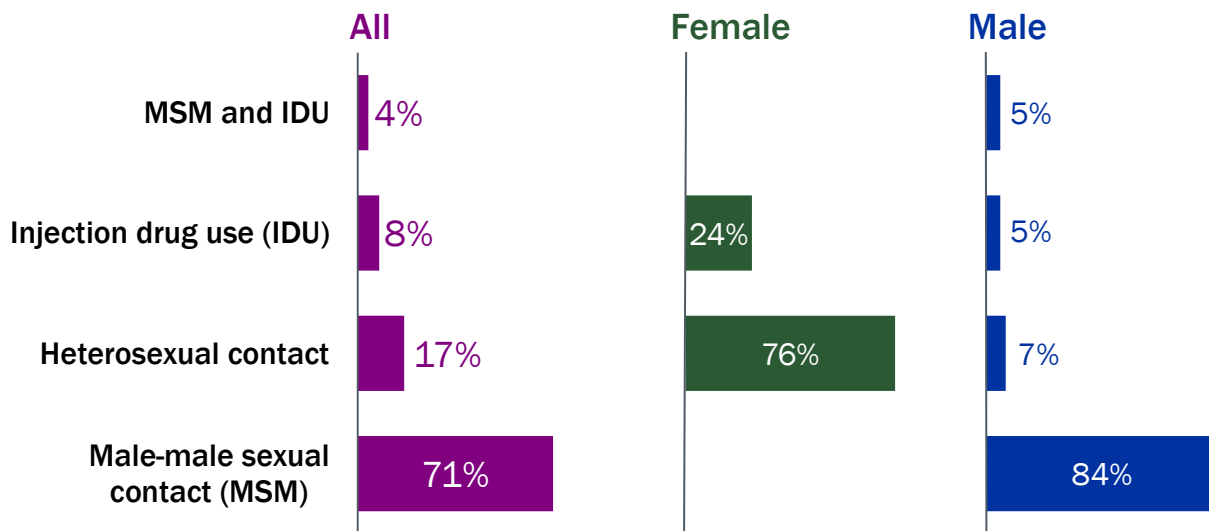


FIGURE 14

**Seven out of 10 new HIV diagnoses were attributed to male-male sexual contact.**

Percentage of HIV diagnoses by gender and estimated transmission category\*, Milwaukee, 2018



\*Data have been statistically adjusted to account for those with unknown transmission category.

During 2018, there were two diagnoses with a reported transmission category of injection drug use and three with a reported transmission category of male-male sexual contact and injection drug use. The number of diagnoses attributed to injection drug use was lower during 2018 compared to the previous year (eight injection drug use, zero male-male sexual contact and injection drug use).

## Facility at Diagnosis

HIV testing occurs in a variety of settings, including publicly funded test sites and private medical clinics. Counseling, testing, and referral (CTR) sites in the city of Milwaukee are funded by the Division of Public Health. These CTR sites include community-based organizations and the city health department.

During 2018, the most common settings for HIV diagnoses were outpatient clinics (39%); community-based organizations (22%); and health departments and blood or plasma centers (both 10%; Figure 15).

FIGURE 15

### Diagnosis by Facility

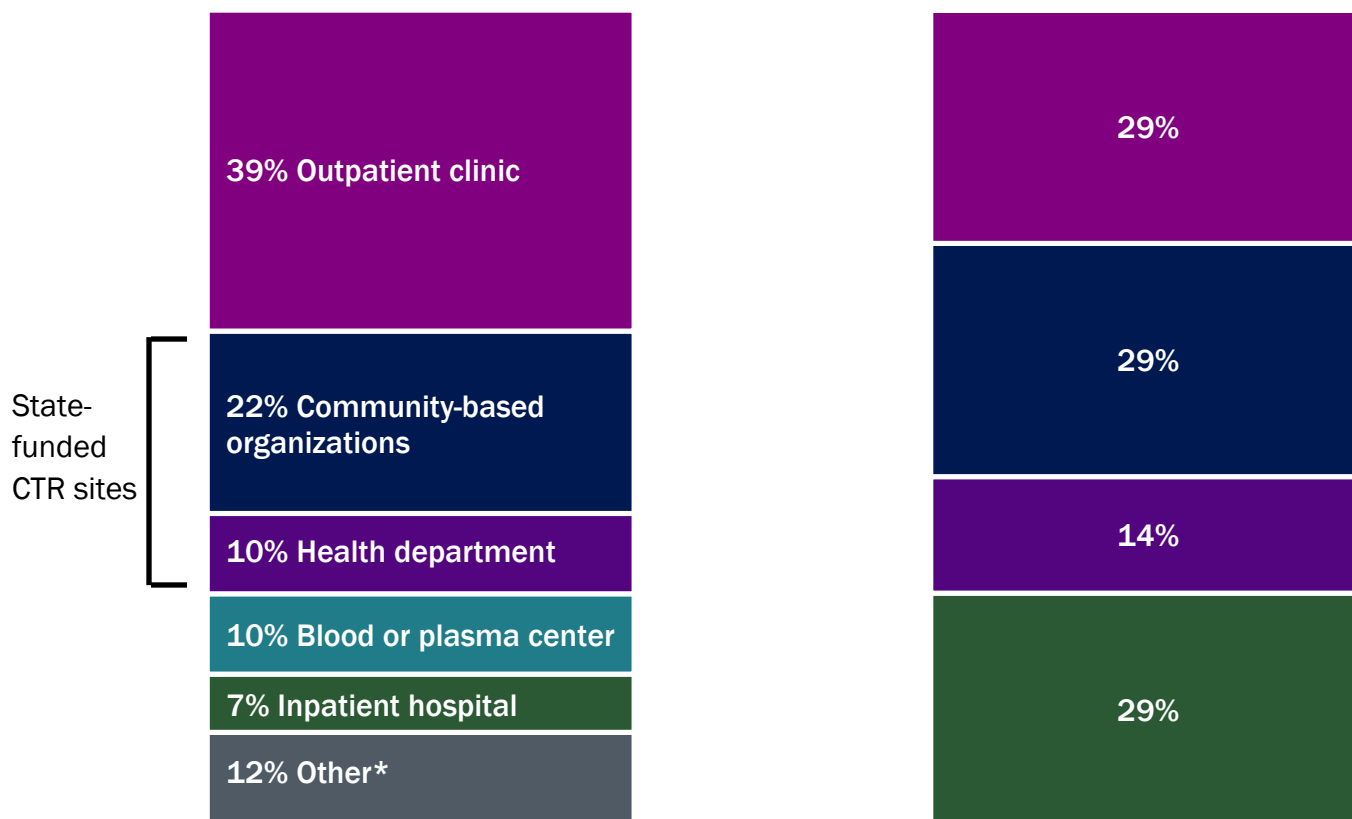
Percent of new HIV diagnoses by facility and percent of acute HIV diagnoses by facility, Milwaukee, 2018

#### All new HIV diagnoses (109 people)

Four out of 10 people were newly diagnosed with HIV infection at **outpatient clinics** during 2018.

#### Acute HIV diagnoses (7 people)

Acute HIV cases were most commonly diagnosed at **state-funded CTR sites (43%)**.

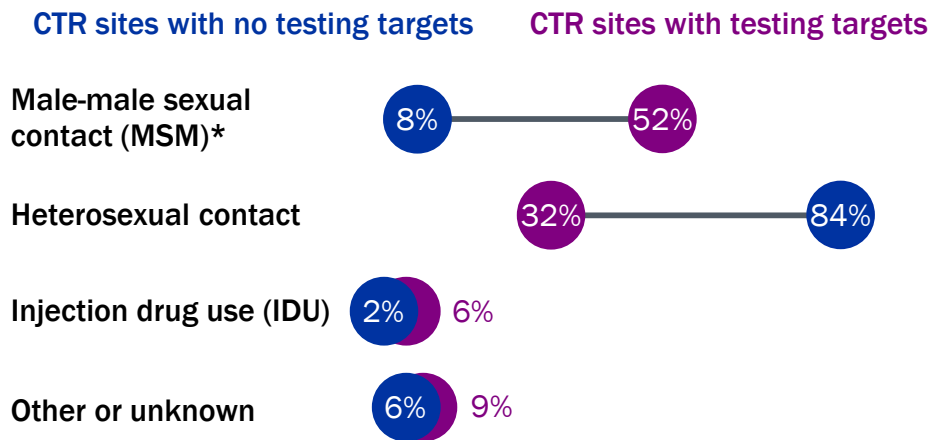


\* Other includes diagnoses at a family planning clinic (3%), corrections (3%), emergency room or urgent care (2%), HIV care clinic (1%), or other facility types (4%).

FIGURE 16

**CTR sites with testing targets provided more HIV tests to people with reported MSM and IDU risk.**

Percent of CTR HIV test by exposure type and CTR type, Milwaukee, 2018



\*Also includes those with reported risk of MSM and IDU

tested a higher percentage of people with reported male-male sexual contact (which also includes those with reported risk of male-male sexual contact and injection drug use) and injection drug use compared to the sites without testing targets (Figure 16). The sites without testing targets primarily tested people with reported heterosexual risk (84%).

The overall positivity rate in Milwaukee—the number of new HIV diagnoses divided by the total number of HIV tests for each year—is higher among men who have sex with men (summarized here as MSM including MSM/IDU). Specifically, the positivity rate was highest among black MSM followed by Hispanic MSM.

Among black MSM, the number of HIV tests conducted by CTR sites in Milwaukee has fluctuated around a median of 1,217 tests per year during 2014-2018. The overall positivity rates ranged from 1.1% to 2.9% during this time period with a median of 1.3% (Figure 17).

**Counseling, Testing, and Referral (CTR) Sites**

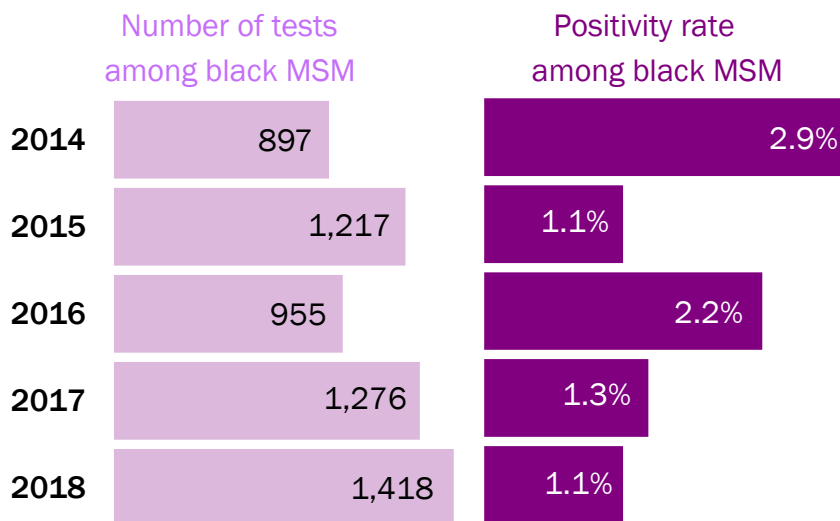
The Wisconsin HIV CTR Program is designed to serve those individuals at increased risk for HIV because they comprise the majority of reported cases of HIV in Wisconsin—men who have sex with men, men who have sex with men and inject drugs, and people who inject drugs among other groups. During 2018, one out of three diagnoses occurred at CTR sites (Figure 15).

Depending on the funding source, some testing sites have testing targets. Those sites with targets

FIGURE 17

**Among black MSM, the number of HIV tests conducted by CTR sites has fluctuated during 2014-2018.**

Number of CTR HIV tests among black MSM, Milwaukee, 2018



## Linkage to Care

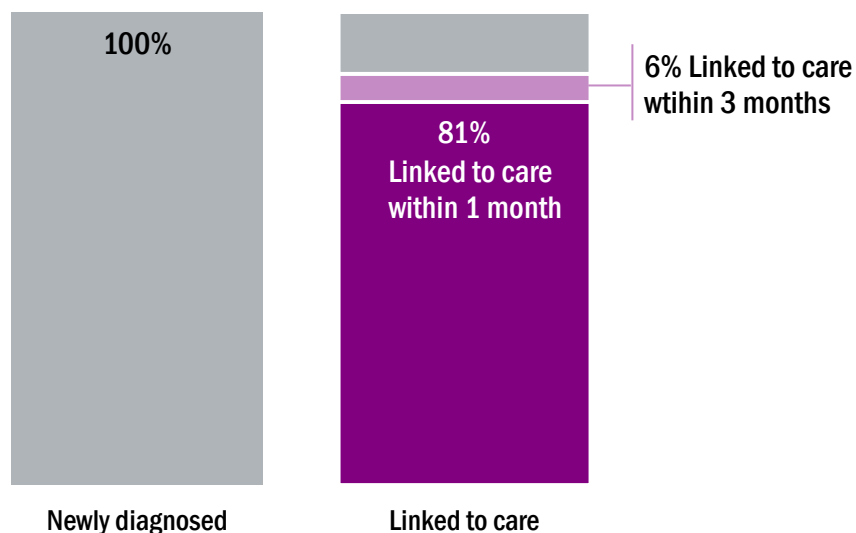
Timely linkage to care can help people living with HIV have healthier lives and prevent further HIV transmission. Access to medications that reduce the amount of virus in the body can lower the risk of transmitting HIV by sexual contact.

The HIV care continuum is used at state, regional, and local levels to measure and monitor engagement in care and health outcomes for people living with HIV (Appendix-Figure A1). A portion of the care continuum specifically measures timely linkage to care (Figure 18).

FIGURE 18

### Most people newly diagnosed with HIV are linked to care services **within one month** of diagnosis.

HIV Care Continuum\* - Linkage to Care, Milwaukee, 2018



\*Reflects laboratory data received through April 25, 2019.



# Prevalence

## Number of People Living with HIV

### Observed Prevalence

Prevalence is the total number of people living with HIV in Milwaukee at the end of the reporting period. Prevalent HIV cases are defined as people living with HIV who:

- Currently live in Milwaukee according to surveillance and address records.
- Are alive as of the end of the reporting period.

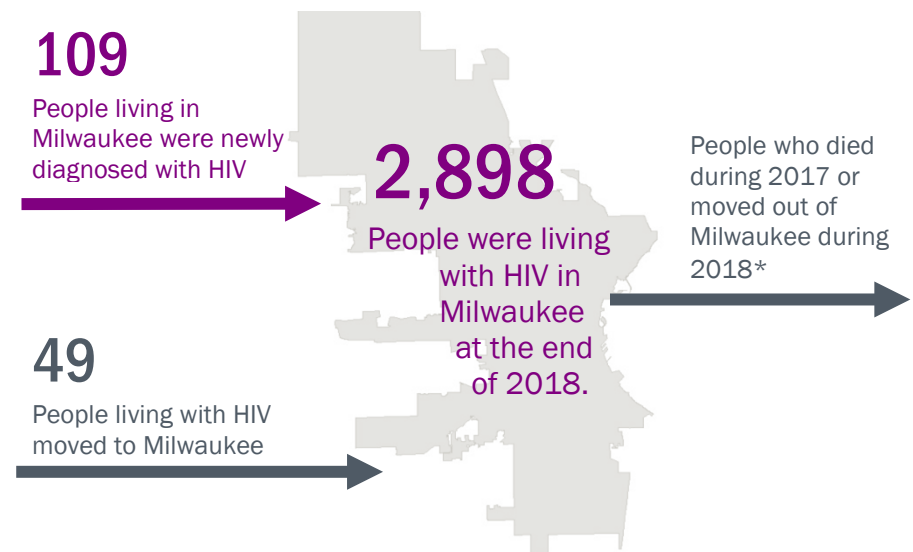
Prevalence fluctuates due to new diagnoses, migration, and deaths.

At the end of 2018, 2,898 people living with HIV resided in Milwaukee.

FIGURE 19

### The number of people living with HIV in Milwaukee in 2018 remains the same from 2017.

Flow of people living with HIV into and out of Milwaukee, 2018



\* Specific breakdown of the number of persons who died and moved to another city or state are not available at the city-level; see statewide report for summary of people living with HIV during 2018.

### People who are Unaware of HIV Diagnosis

Not everyone living with HIV is aware of their diagnosis. The estimated prevalence of HIV in Milwaukee that includes those unaware of their status is approximately 3,400 people.

The most recent CDC estimate<sup>2</sup> suggests that nationally, 15% of people (about one out of six) living with HIV are unaware of their status. Given CDC's estimate, the observed prevalence likely underestimates the total population of people living with HIV in Milwaukee by approximately 510 people who are not aware of their HIV diagnosis.

<sup>2</sup> Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas—2015. *HIV Surveillance Supplemental Report* 2017;22 (No. 2). <https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-supplemental-report-vol-22-2.pdf>. Published July 2017. Accessed February 2018.

According to the CDC, awareness of HIV infection status may be substantially lower for younger people and slightly lower for some racial and ethnic minorities due to barriers to getting tested (Appendix-Table A4). This understanding can guide prioritization of services to populations with the highest need for HIV testing.

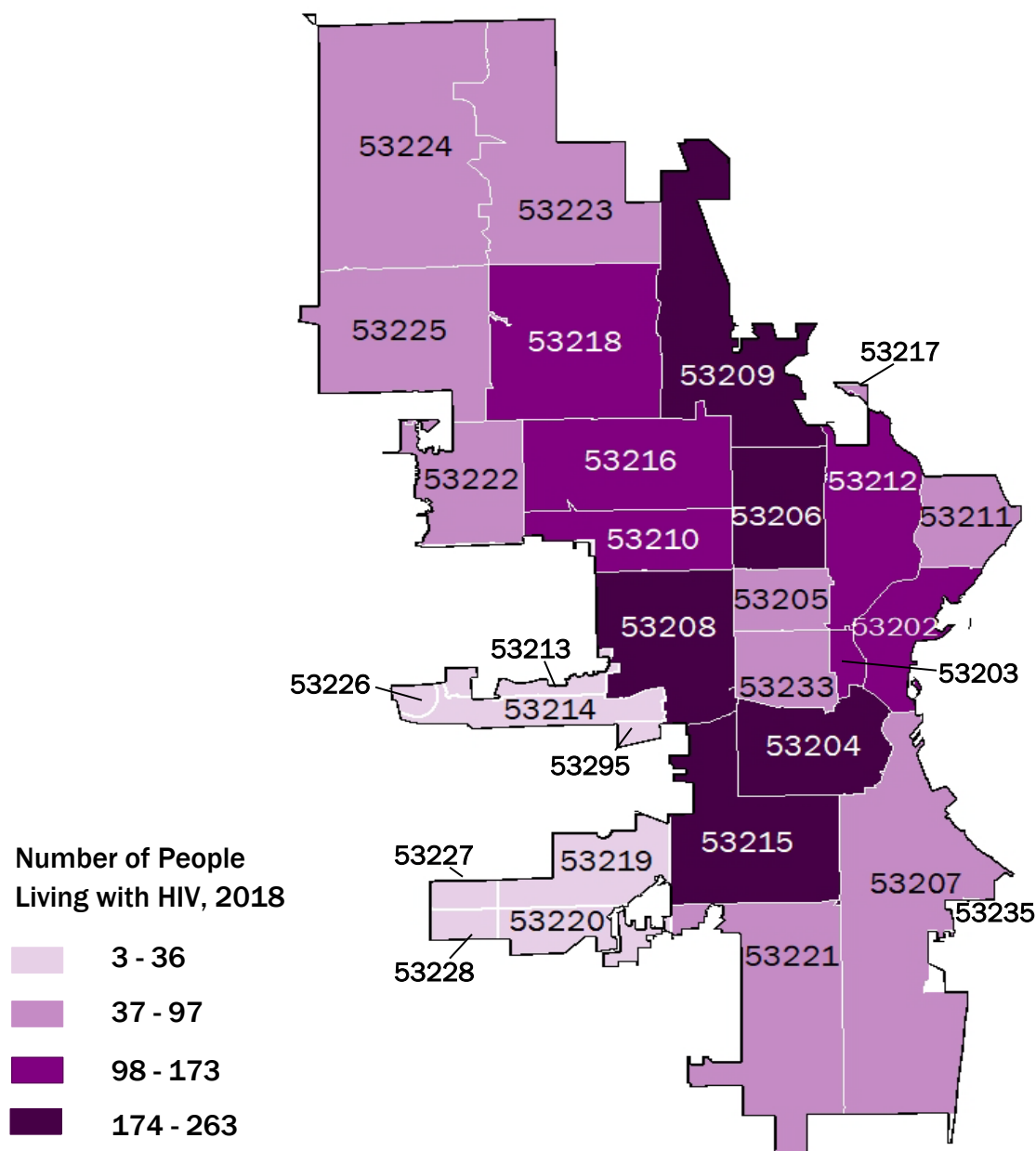
### Geographic Distribution of People Living with HIV

Four out of 10 individuals living with HIV in Milwaukee currently reside in five ZIP codes: 53208 (9%), 53204 and 53215 (8% each), and 53209 and 53206 (7% each; Figure 20).

FIGURE 20

#### The majority of people living with HIV live in the **central** part of the city.

Geographic distribution of people living with HIV in Milwaukee, 2018



## Migration

New HIV reports are Milwaukee residents living with HIV who were identified to public health for the first time during the reporting period. These include both new diagnoses and people who were diagnosed in another state prior to moving to Milwaukee.

Of the 158 new HIV reports received during 2018, 49 (31%) were previously diagnosed in another state or country prior to moving to Milwaukee. People living with HIV who moved to Milwaukee during 2018 tended to be slightly younger and a slightly higher percentage were Hispanic compared to new HIV diagnoses in Milwaukee (Appendix-Table A3).

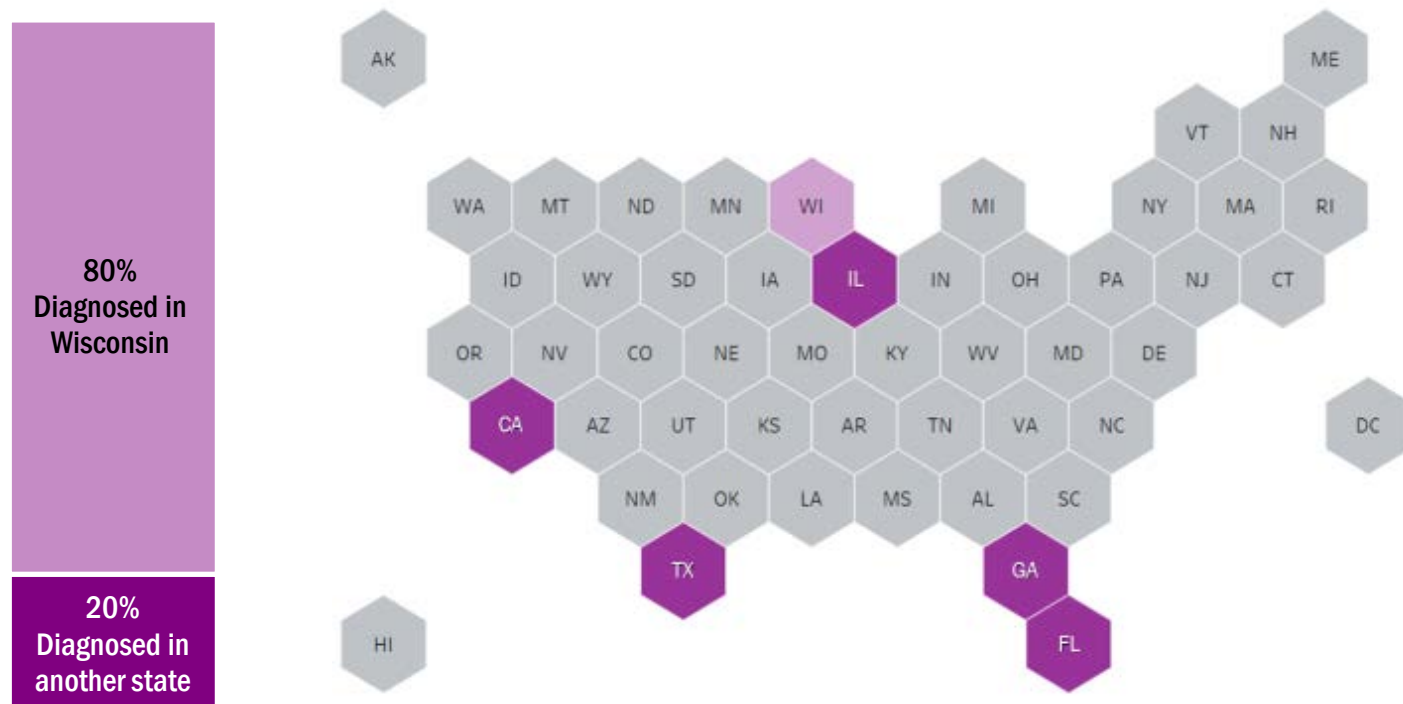
Approximately four out of five (80%) of the 2,898 people living with HIV in Milwaukee during 2018 were diagnosed in the state. The remaining 579 people (20%) were diagnosed in:

- Illinois (149)
- California (34)
- Georgia (33)
- Texas (32)
- Florida (27)
- Another state (304)
- A foreign country (60)

FIGURE 21

### Most people living with HIV in Wisconsin were diagnosed in Wisconsin or in Illinois, California, Florida, Minnesota, or Texas.

Diagnosis location of people living with HIV in Wisconsin during 2018



## Demographics

Of people living with HIV in Milwaukee during 2018:

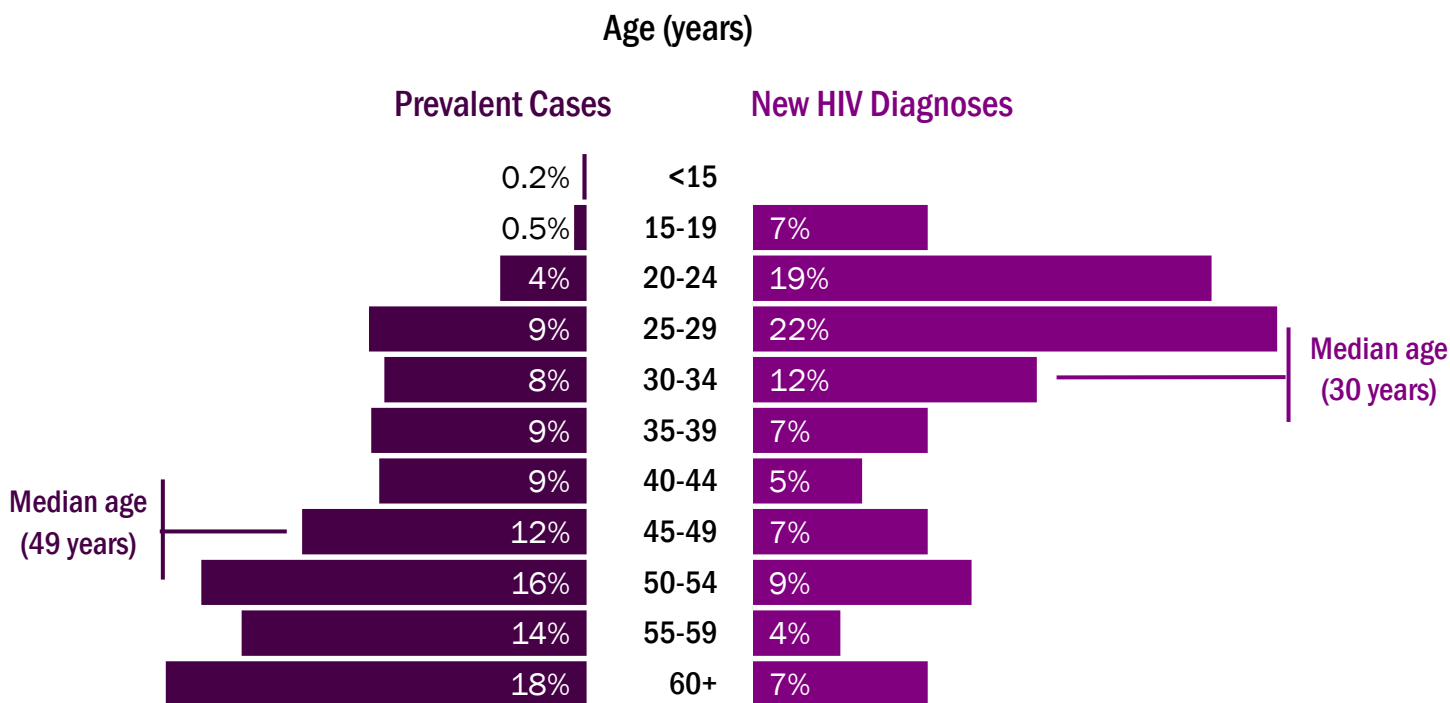
- The majority (78%) are male.
- The majority are over age 30 (87%) and almost half (48%) are over age 50.
- Three out of five (60%) are black, 21% are white, and 16% are Hispanic.
- Nearly two-thirds (62%) had a transmission category of male-male sexual contact, 22% had a transmission category of heterosexual contact, and 16% had a transmission category of injection drug use or both injection drug use and male-male sexual contact.

People living with HIV are living longer and healthier lives. This has resulted in a shift in the average age of prevalent cases compared to those being newly diagnosed. Services for people living with HIV need to address health conditions associated with aging in addition to HIV, while prevention efforts need to target younger age groups.

FIGURE 22

### The population of all people living with HIV in Milwaukee tends to be older than people newly diagnosed with HIV infection during 2018.

Age distribution of people currently living with HIV in Milwaukee (prevalent cases) compared to age at diagnosis for people newly diagnosed during 2018



## Retention in Care

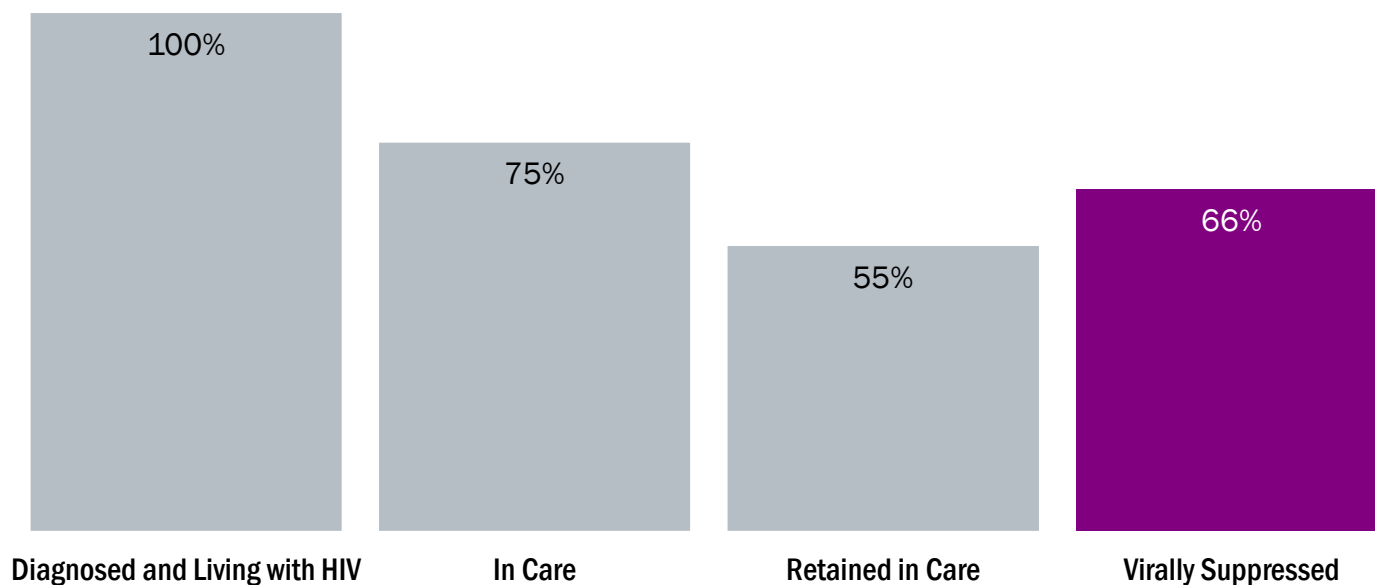
Access to HIV care and medications that reduce the amount of virus in the body (that is, the viral load) benefit both the health of people living with HIV and HIV prevention efforts. Individuals with a viral load that cannot be detected by standard laboratory diagnostic testing (that is, are virally suppressed) have a negligible risk of transmitting HIV through sexual contact.

The HIV care continuum is used at state, regional, and local levels to measure and monitor HIV engagement in care and health outcomes (Appendix-Figure A1). A portion of the care continuum specifically measures engagement in care and successful attainment of viral suppression (Figure 23).

FIGURE 23

**Two out of 3 people living with HIV in Milwaukee were virally suppressed during 2018.**

HIV Care Continuum\* - Retention and Care Outcomes, Milwaukee, 2018



\*Reflects laboratory data received through April 25, 2019

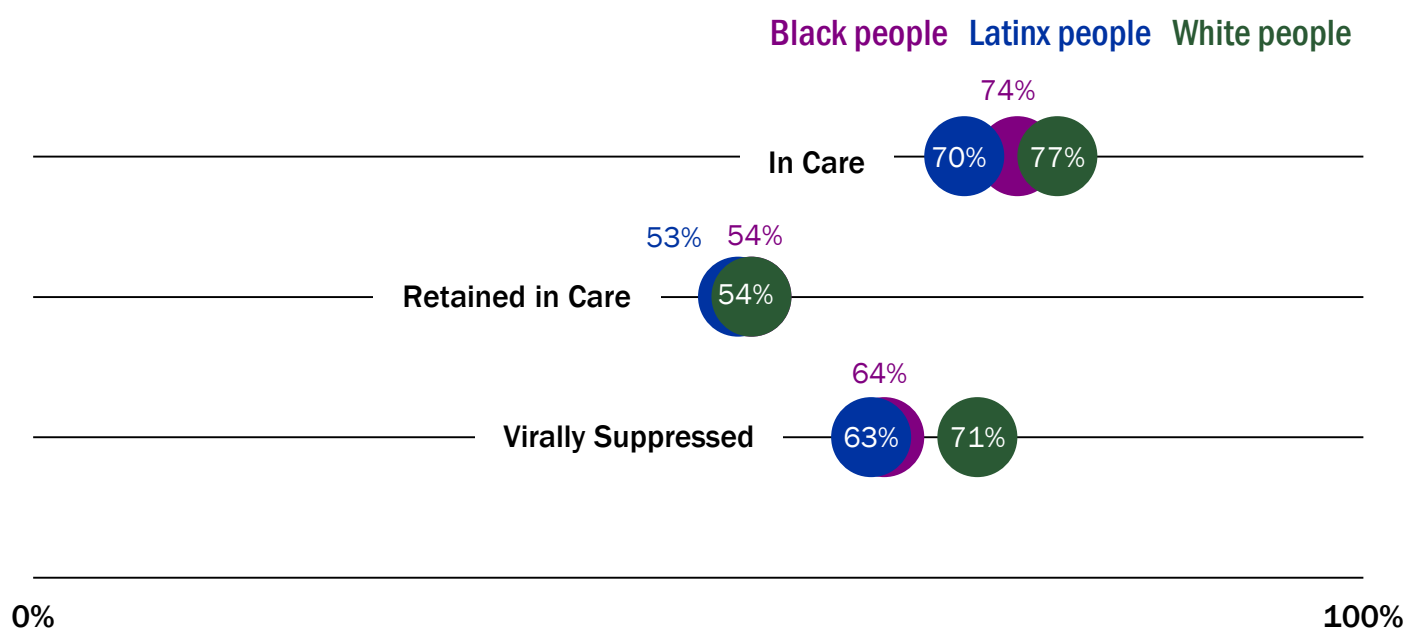
People living with HIV in Milwaukee are more likely than their non-Milwaukee counterparts (those living in Wisconsin outside Milwaukee city limits) to be in care during 2018. This may be due to greater access to care in an urban environment or to the high proportion of health care providers receiving Ryan White funding in the Milwaukee area.

Similar to national data, there are disparities in HIV care by race and ethnicity in Milwaukee. Hispanic and black people are less likely than white people to meet the desired outcomes across the care continuum with the exception of timely linkage to care. Black people were also the least likely of the three racial/ethnic groups to be virally suppressed among those tested, suggesting differences in prescribing habits or unique adherence issues.

FIGURE 24

### The percentages of people in care, retained in care, and virally suppressed are more similar among people of all races/ethnicities over age 30.

HIV Care Continuum\* - Retention and Care Outcomes by age and race and ethnicity, Milwaukee, 2018



The overall trends by race and ethnicity mostly held true for adults ages 30 and older (Figure 24). The differences between white and black people and white and Hispanic people is statistically significant for those that are virally suppressed. The difference between white people in care and Hispanic people in care is also a statistically significant difference. Some of the overall trends are different for younger individuals, ages 13-29. For example, younger individuals were equally likely to be in care and retained in care, regardless of race or ethnicity, although these differences are not statistically significant.

# Technical Notes

## Background

This report was prepared by the Wisconsin HIV Program. Wisconsin statutes require health care providers and laboratories to report confirmed or suspected HIV cases. Data in this report are compiled from laboratory results and report forms completed by health care providers. Risk information is self-reported by patients.

HIV reporting in Milwaukee is estimated to capture 99% of diagnosed individuals, but completeness of reporting may vary by geographic region, transmission category, and demographic group. Data reported here are based on the information available as of April 25, 2019. Results are provisional and subject to change as additional information becomes available.

## New Diagnoses

New HIV diagnoses are included in the annual report if they meet all of the following criteria:

- The person was diagnosed with HIV during the year of analysis.
- The person was a resident of the city of Milwaukee at the time of diagnosis.
- Wisconsin is the earliest state of verifiable report. People who report being first diagnosed with HIV in another country, but whose diagnosis cannot be definitively documented, are included as new diagnoses. These practices conform to CDC's guidelines for residency assignment.

## Prevalence

### Observed Prevalence

People living with HIV are included in the observed prevalence if they meet the following criteria:

- The person was confirmed to be living with HIV.
- The person was presumed to be alive at the end of the analysis year.
- The last known address available for the person is a Milwaukee address.

Because of delays in reporting deaths to local and national databases, the number of people presumed alive should be considered provisional. Due to periodic data cleaning, prevalence may decrease as individuals thought to be living with HIV in Milwaukee are found to be deceased or living elsewhere.

## Estimated Prevalence

The estimated prevalence is a measure that takes into account that a proportion of individuals who are living with HIV are not aware of their diagnosis. The calculation consists of:

- Number of people known to be living with HIV
- Estimated proportion of people living with HIV who are unaware

The estimated prevalence is calculated as:

$$\frac{\textit{Number known to be living with HIV}}{\textit{Proportion unaware}}$$

## Rates

In this report, rates are defined as the number of cases per 100,000 people, except if noted otherwise. Population denominators used to calculate rates are from the Milwaukee Interactive Statistics on Health website (<https://www.dhs.wisconsin.gov/wish/index.htm>).

Rates published by the CDC for Wisconsin, Milwaukee, and Madison cannot be compared to those prepared by the Division of Public Health and local health departments because they may use different data sources.

## Demographic Variables

### Age

For new diagnoses, age refers to the age at the time of HIV diagnosis. For people living with HIV, age refers to the age on December 31 of the year of analysis.

### Gender

Consistent with the Council of State and Territorial Epidemiologists' position statement on transgender HIV surveillance,<sup>3</sup> this report uses gender identity rather than sex at birth.

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<sup>3</sup> Council of State and Territorial Epidemiologists. Transgender HIV Surveillance. 17-ID-06. <http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/2017PS/2017PSFinal/17-ID-06.pdf>. Accessed May 10, 2019.



Gender is determined based on information in surveillance records. Individuals are counted as transgender for this report if they identified as transgender on an HIV report or laboratory document, or if there was a mismatch in birth sex and the sex or gender reported on any of the previously mentioned documents.

During 2018, transgender gender identity was not further verified; therefore, some individuals may be mistakenly counted as a transgender person in this report if sex or gender was incorrectly reported on any document or if data entry errors occurred. When information is available, surveillance staff may confirm gender identity when collecting report information from medical providers and public health officials.

## Residency

People who meet the definition of newly diagnosed (see *New Diagnoses* section above) are assigned to the county of residence listed on the HIV report form when first diagnosed and reported with HIV.

People who meet the prevalence definition (see *Prevalence* section above) are assigned to the county of their last known address.

## Vital Status

Information about deaths is obtained from the Wisconsin Vital Records Office, the National Death Index, and the Social Security Death Master File. Deaths described in this report include only those that occurred in Wisconsin among people living with HIV. Deaths are described as being due to HIV, or caused by HIV, if HIV was listed as the underlying cause of death on the death certificate. Deaths are described as being due to other causes if HIV was not listed as the underlying cause of death. However, HIV may have been listed as one of the 19 possible contributing causes of death.

# Transmission Category

## Observed Transmission Category

*Transmission category* is the term that summarizes a person's possible HIV risk factors; the summary category results from selecting, from a hierarchical order of probability, the single risk factor most likely to have been responsible for transmission. For surveillance purposes, a diagnosis of HIV is counted only once in the hierarchy of transmission categories. Persons with more than one reported risk factor for HIV are classified in the transmission category listed first in the hierarchy. The exception is men who had sexual contact with other men and injected drugs; this group makes up a separate transmission category. Transmission categories are defined as follows:

- Male-male sexual contact includes men who have ever had sexual contact with other men and men who have ever had sexual contact with both men and women.
- Heterosexual contact includes persons who have ever had heterosexual contact with a person known to have, or to be at high risk for, HIV (for example, someone who injects drugs). The heterosexual contact category excludes men who have ever had sexual contact with both men and women.

- Injection drug use includes persons who have ever reported injecting drugs.
- Unknown includes people without a risk factor listed in the hierarchy of transmission categories. People may have an unknown transmission category because they did not identify risk behaviors, identified risk behaviors not part of the transmission hierarchy, died before they could be interviewed, or were lost to follow-up and could not be interviewed.
- The category "Other" is used to group less common transmission categories, including people with hemophilia, people who were exposed to HIV through a blood transfusion or tissue/organ transplant, and other pediatric transmission categories.
- Perinatal transmission refers to HIV transmitted during the perinatal period, which spans from 22–28 weeks of gestation to seven days after birth. This category is also used for children presumed to be exposed during breastfeeding.
- Sexual contact includes transgender persons exposed to HIV through sexual contact.

### Imputed Transmission Category

Some people diagnosed with HIV are reported in Milwaukee with insufficient risk information to assign a transmission category. Multiple imputation is a statistical method in which the known transmission categories of individuals with similar demographic characteristics are used to estimate the most plausible values for those with unknown transmission category (See Box 1).

Counts estimated by imputed transmission category are reported rounded to the nearest whole number of people but are still considered to be estimates, not counts. Imputed transmission categories may change as new information becomes available. This method conforms to the CDC’s method of addressing people with unknown transmission category.

#### Box 1: Multiple Imputation Example

Assume 30 women ages 45-64 were diagnosed with HIV. Eighteen of these women had diagnoses attributed to heterosexual contact, nine of them had diagnoses attributed to injection drug use, and three had unknown transmission categories. The 27 known transmission categories will be applied to the three people with unknown transmission category. Each person with an unknown transmission category would be assigned 67% heterosexual contact and 33% injection drug use. When summed, a total of two people with unknown transmission risk are estimated to have heterosexual contact risk and one person an injection drug use risk.



## HIV Stage at Diagnosis

### Recent and Acute HIV Diagnosis

Recent HIV is defined as having been diagnosed during the six months after HIV was acquired. Recent HIV is suspected when a newly diagnosed individual reports a negative test within the previous six months, or when the initial viral load test is high.

Acute HIV is defined as having been diagnosed with HIV in the two to four weeks after HIV was acquired. This time period immediately after acquiring HIV is characterized by high viral load, undetectable HIV-1 antibodies, and presence of viral nucleic acids (that is, RNA) or p24 antigen.

### Late (Stage 3) HIV Diagnosis

In this report, an HIV case is any person with laboratory-confirmed HIV infection. This includes HIV and Stage 3 HIV (AIDS) diagnosis. People diagnosed with Stage 3 HIV infection include only those that meet the CDC's Stage 3 HIV surveillance definition.

According to the CDC, late diagnosis occurs among individuals who progress to Stage 3 HIV (AIDS) within one year of receiving their initial HIV diagnosis, including those progressed to Stage 3 by the time they are first diagnosed with HIV. Stage 3 HIV typically occurs eight to 10 years after acquiring HIV in the absence of treatment, and is clinically defined by a very low CD4 count or a Stage 3-defining opportunistic infection.

During 2014, the Stage 3 surveillance definition changed to exclude individuals with a Stage 3-defining CD4 count (<200 cells/mL) if a negative HIV test in the previous six months has been documented. Instead, the low CD4 count may reflect recently acquired HIV. Individuals may be incorrectly classified as having progressed to Stage 3 if recent negative tests are not documented. Collection of recent negative tests has improved over time.

## Statistical Significance

Statements about statistical significance are sometimes made when looking at a change over time or when comparing groups. Tests of statistical significance determine whether the observed trend or difference is due to chance or is a true pattern. Linear regression on rolling three-year averages was used to assess trends over time and chi-squared analysis was used to assess differences between groups. Statements about increasing or decreasing trends or differences between groups are only made if the pattern is statistically significant.

# Appendix

TABLE A1

Number of new HIV diagnoses per 100,000 people by year of diagnosis, gender, and race or ethnicity, Milwaukee, 2009-2018

Year	Male			Female		
	Black	White	Hispanic	Black	White	Hispanic
2009	51.0	20.8	18.3**	19.9	*	*
2010	65.8	21.8	14.7**	12.6	4.3**	*
2011	57.7	9.2**	22.3	12.7	*	9.8**
2012	43.7	13.9	28.5	10.9	*	*
2013	46.9	18.6	26.4	10.2	*	*
2014	63.4	12.1	32.7	6.3**	*	9.4**
2015	55.4	16.8	21.2	6.3**	*	*
2016	59.7	5.7**	20.8	9.6	*	*
2017	56.9	15.2	28.9	10.2	*	*
2018	54.0	9.5**	33.3	7.9**	*	*

\* Rates based on counts less than five have been suppressed.

\*\* Rates are statistically unreliable due to counts less than 12.

TABLE A2

Geographic distribution of new HIV diagnoses by zip code of diagnosis, Milwaukee, 2016-2018

Zip Code of Residence	Number	Percent of Cases
53209	34	10.3%
53208	31	9.4%
53218	31	9.4%
53204	26	7.9%
53216	26	7.9%
53212	24	7.3%
53215	24	7.3%
53206	18	5.4%
53210	17	5.1%
53202	15	4.5%
53225	14	4.2%
53233	10	3.0%
53224	9	2.7%
53214	7	2.1%
53221	7	2.1%
53205	6	1.8%
53207	6	1.8%
53219	6	1.8%
53223	6	1.8%
53222	4	1.2%
53211	3	0.9%
53228	2	0.6%
53203	1	0.3%
53213	1	0.3%
53217	1	0.3%
53220	1	0.3%
53227	1	0.3%
53226	0	0.0%
<b>TOTAL</b>	<b>331</b>	<b>100%</b>

TABLE A3

Comparison of new HIV reports by location of diagnosis, Milwaukee, 2018

	Diagnosis Location	
	Milwaukee Number (%)	Migration into Milwaukee Number (%)
<b>Total</b>	109 (100%)	49 (100%)
<b>Current Gender</b>		
Male	89 (82%)	39 (80%)
Female	15 (14%)	7 (14%)
Transgender	5 (5%)	3 (6%)
<b>Median Age (Range)</b>	30 (16-74)	28 (0-52)
<b>Race/Ethnicity</b>		
Asian	2 (2%)	1 (2%)
Black	71 (65%)	23 (47%)
Hispanic	21 (19%)	12 (24%)
White	13 (12%)	10 (20%)
Multiracial	2 (2%)	3 (6%)
<b>Transmission Category</b>		
Male-Male Sexual Contact (MSM)	59 (54%)	29 (59%)
Injection Drug Use (IDU)	2 (2%)	4 (8%)
MSM and IDU	3 (3%)	5 (10%)
Heterosexual Contact	5 (5%)	3 (6%)
Perinatal Exposure	0 (0%)	1 (2%)
Unknown	40 (37%)	7 (14%)

TABLE A4

## Observed and Estimated Prevalence of People Living with HIV in Milwaukee, 2018

	United States Estimated % Unaware*	Milwaukee		
		Observed Prevalence	Estimated # Unaware**	Estimated Prevalence
<b>Total</b>	15.0%	2,898	511	3,409
<b>Age</b>				
13-24 years	44.4%	125	100	225
25-34 years	29.1%	511	210	721
35-44 years	15.5%	514	94	608
45-54 years	9.0%	815	81	896
55-64 years	7.1%	757	58	815
65 years	6.3%	176	12	188
<b>Race and Ethnicity</b>				
White	12.3%	611	86	697
Black	15.7%	1,742	324	2,066
Hispanic or Latino	16.9%	450	92	542
Multiracial	15.6%	49	9	58
Asian	19.6%	34	8	42
American Indian	18.5%	10	2	12
<b>Transmission Category</b>				
Male-Male Sexual Contact (MSM)	17.3%	1,786	374	2,160
Heterosexual Contact	15.7%	626	117	743
Injection Drug Use (IDU)	6.4%	316	22	338
MSM and IDU	7.4%	142	11	153

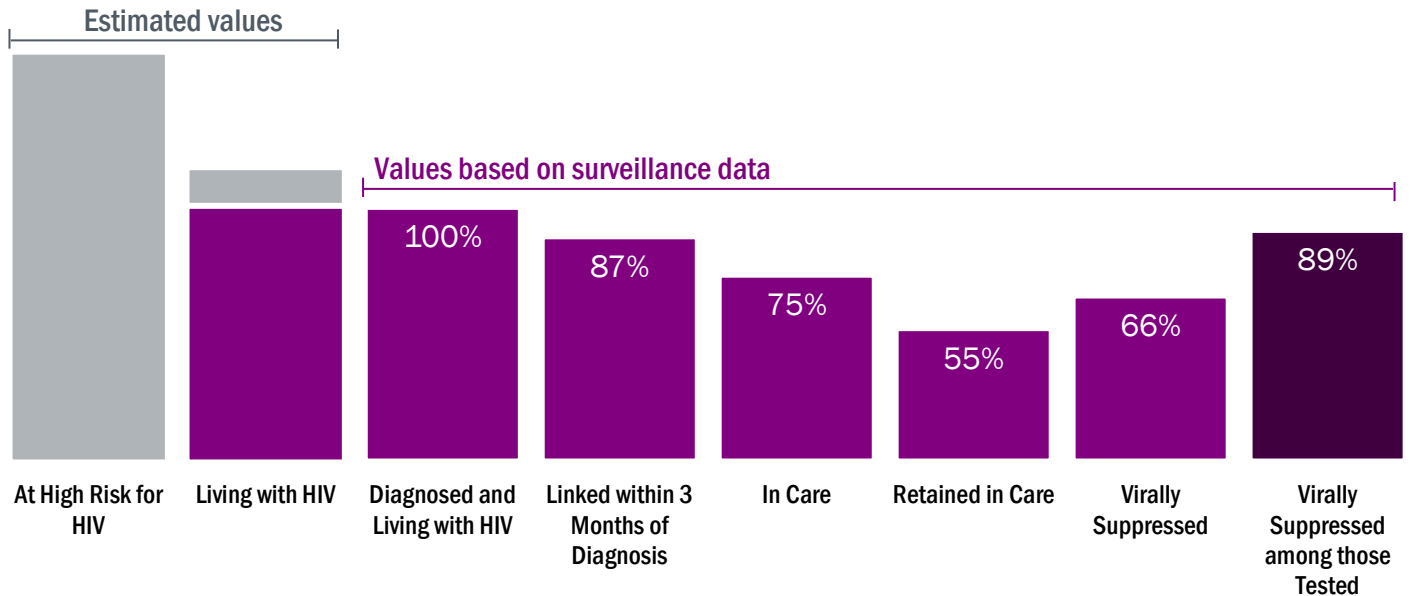
\* Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas—2015. HIV Surveillance Supplemental Report 2017;22 (No. 2). <https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-supplemental-report-vol-22-2.pdf>. Published July 2017. Accessed February 2018.

\*\* Details about calculation of estimated unaware and estimated prevalence can be found in the Technical Notes.

FIGURE A1

## The majority of people living with HIV who are engaged in care are virally suppressed.

HIV Care Continuum\*, Milwaukee, 2018



\*Reflects laboratory data received through April 25, 2019

### Estimated Values

**At High Risk for HIV:** People at higher risk for HIV include those with factors such as condomless male-to-male sex without pre-exposure prophylaxis (PrEP), sharing injection drug-use equipment, and heterosexual sexual contact with a person living with HIV or at risk of acquiring HIV. The size of this population is not known. These risk behaviors occur in the context of social determinants of health, such as poverty, unequal access to health care, lack of education, stigma, homelessness, and racism.

**Living with HIV:** CDC estimates that 15% of individuals living with HIV in the U.S. are unaware of their status. This bar shows both those aware and diagnosed (purple) and those unaware of their HIV diagnosis (gray).

### Values Based on Surveillance Data

**Diagnosed and Living with HIV:** All individuals reported living with HIV in Milwaukee by the end of 2017 that were still alive and living in Milwaukee by the end of 2018 (2,825 people).

**Linked within Three Months of Diagnosis:** Of 109 people diagnosed with HIV in Milwaukee during 2018, 87% (95 people) were linked to care within three months of diagnosis. Four out of five (88/109 people or 81%) newly diagnosed individuals were linked to care within the one month target described in the most recent National HIV/AIDS Strategy.<sup>4</sup>

<sup>4</sup>White House Office of National AIDS Policy. National HIV/AIDS Strategy for the United States: Updated to 2020. <https://files.hiv.gov/s3fs-public/nhas-update.pdf>. Published July 2015. Accessed May 2019.



**In Care:** Of 2,825 individuals diagnosed and living with HIV in Milwaukee during 2018, 75% had at least one medical visit that included one or more laboratory test that was available in the HIV surveillance system as evidence of receiving care.

**Retained in Care:** Of 2,825 individuals diagnosed and living with HIV in Milwaukee during 2018, 55% had laboratory test results that suggested two or more medical visits occurred at least three months apart during the reporting period. This criterion for retention in care may underestimate the number of people who are routinely receiving HIV care, as people who have been treated for many years or who are uninsured may receive care once a year or less and may still be adherent to care and attaining viral suppression.

**Virally Suppressed:** Of 2,825 people living with HIV in Milwaukee, 66% had viral loads (a test that documents the number of virus copies in the blood) that were less than 200 copies/mL, indicating attainment of viral suppression. Individuals whose last viral load test was prior to 2018 or who did not have a viral load test recorded were considered to have unsuppressed viral loads.

**Virally Suppressed among those Tested:** Of 2,098 people who had a viral load test during 2018, 89% were virally suppressed at their last measurement. This suggests that most individuals receiving some medical care are achieving viral suppression. Viral suppression improves the health of the person living with HIV and also prevents them from transmitting HIV sexually to partners.

## **For more information, contact:**

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