



# Intersecting Risks: HIV Infection Among Heterosexual Women and Men in Massachusetts



Fourth in a Series of Reports on the Status of  
the HIV/AIDS Epidemic in Massachusetts

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## Executive Summary

The majority of individuals in Massachusetts identify as heterosexual or engage primarily in heterosexual behaviors, yet the risk for HIV infection specifically among heterosexuals in recent years has been largely overlooked in HIV prevention messages and targeted campaigns. Untangling the dynamics of heterosexual risk for HIV infection is complicated by the fact that heterosexual behavior is so common and so varied, and does not necessarily occur in isolation of other HIV risk behaviors. Heterosexual sex is often the context in which individuals with a range of risk histories and life experiences may intersect.

Epidemiologic data on new HIV diagnoses are categorized by discrete, mutually exclusive exposure modes—for example males who have sex with males (MSM), injection drug use (IDU), and heterosexual sex (HET). These exposures are also organized into a hierarchy determined by the Centers of Disease Control and Prevention (CDC) that assigns a level of risk for HIV acquisition associated with each exposure. In this system, heterosexual exposures are ranked at a lower risk level than either MSM or IDU, so that heterosexual sex is not explicitly identified as an HIV risk factor in state and national analyses if either of the other two exposures is reported.

This rigid structure implies that risk experience is equal within each exposure mode category, and that individuals do not engage in more than one type of risk behavior across exposure modes. Furthermore, individuals are only included in the heterosexual exposure mode category if they report that a sex partner is either HIV-positive or at high risk for HIV infection. If heterosexual exposure is reported in the absence of partner risk information, then these cases are reported in an alternative category of presumed heterosexual, which further dilutes the official contribution of heterosexual exposure to the state HIV/AIDS epidemic.

The hierarchy also assumes that penile-vaginal intercourse is the primary sexual behavior among heterosexual females and males in assigning a lower risk ranking, yet a recent study in Massachusetts revealed that 43% of heterosexual females and males have engaged in unprotected anal intercourse in the last 12 months—a behavior that is considered centrally responsible for driving high rates of HIV infection among gay and bisexual males. Unprotected vaginal intercourse and

heterosexual sex in the context of substance use were also commonly reported—behavioral risks likely to further drive risk for HIV infection. An effective response to the HIV/AIDS epidemic must consider the role of heterosexual exposures in the context of other social and behavioral risks.

This report examines recent HIV diagnoses among females and males in Massachusetts between 2006 and 2008, and highlights some of the following questions and concerns about heterosexual risk, including the potential for underreporting of heterosexual HIV infection in state HIV/AIDS surveillance data:

- HIV is increasingly a sexually transmitted infection, particularly as other exposure modes such as injection drug use and perinatal transmission are less common.
- Risk behaviors among heterosexuals are not limited to oral and vaginal intercourse—anal intercourse and unprotected sex in the context of substance use may be important factors in heterosexual HIV transmission.
- Females are more likely than males to have acquired HIV heterosexually, yet tailored HIV prevention programming for heterosexual females may be insufficient.
- There is a disparate impact of heterosexual HIV infection across racial and ethnic groups, but the reasons for this are not immediately apparent.
- A significant portion of heterosexually-exposed females and males lack complete information on the HIV status or risk experience of their sexual partners, which leads to gaps in the reporting of heterosexual exposure and may skew the accuracy of state data.
- Non-U.S. born females and males are more likely to be reported in a heterosexual exposure mode category, yet it is not clear if HIV risk is driven by factors experienced in their home country or after arrival to the U.S.
- Information on sexual risk factors is often not completed on the submitted HIV/AIDS Case Report Form, and medical providers may require additional guidance and training to collect sexual risk information in a culturally competent manner.
- A change in state HIV/AIDS incidence reporting is critical to more accurately reflect the role of heterosexual exposure as a risk for HIV infection in newly diagnosed females and males.

## Introduction

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HIV/AIDS has been characterized in many frames over the past thirty years—as a human rights issue, a political issue, and a public health crisis—but at its most fundamental level HIV is a sexually transmitted infection (STI). This is particularly the case today, as other HIV exposure modes such as blood transfusion, perinatal HIV transmission, and injection drug use are less common, and new cases of HIV infection are increasingly driven by sexual risk for both females and males.

As a “sexual majority,” individuals at risk through heterosexual sex are not considered to be disproportionately impacted by HIV/AIDS, particularly compared to populations such as males who have sex with males (MSM) or injection drug users (IDU); yet HIV/AIDS exacts a profound toll on heterosexual females and males. In the United States heterosexual HIV transmission accounts for 31% of new HIV infections each year, and an estimated 2.1% of heterosexuals living in high poverty, urban areas are HIV positive.<sup>1</sup> A recent analysis of Massachusetts data from the Centers for Disease Control and Prevention (CDC)-sponsored National HIV Behavioral Surveillance System (NHBS) showed that 5.7% of high-risk heterosexuals<sup>2</sup> in the study were HIV positive. This is more than nine times higher than the national HIV infection prevalence of 0.6%, and similar to HIV prevalence rates in some developing nations.<sup>3</sup>

Our ability to fully understand the scope of the HIV epidemic is further complicated by the standard method of reporting HIV surveillance data by a single exposure mode category according to a CDC-defined hierarchy of risk. The only exception to the designation of a single exposure mode is for MSM who also report IDU and are reported as an MSM/IDU exposure. Using the current method of reporting, the heterosexual exposure mode category accounts for only 10% of all new infections in Massachusetts between 2006 and 2008. However when heterosexual behaviors are accounted for across other exposure mode categories, it becomes apparent that the current data classification system may underestimate the true impact of heterosexual behavior on HIV/AIDS case rates among females and males.

1 CDC press release: New Study in Low-Income Heterosexuals in America's Inner Cities Reveals High HIV Rates; July 19 2010; <http://www.cdc.gov/nchhstp/newsroom/povertyandhivpressrelease.html>; <http://www.cdc.gov/hiv/resources/factsheets/us.htm>

2 A high risk heterosexual is defined an individual who reports sex with a different gender partner/s who are HIV-positive or at high risk for HIV infection. A high risk sexual partner includes an IDU or for females only a man who has sex with other men.

3 Joint United Nations Program on HIV/AIDS (UNAIDS): July 2008. 2008 Report in the global HIV/AIDS epidemic; Adult (15-49). HIV prevalence percent by country, 1990-2007. [http://data.unaids.org/pub/GlobalReport/2008/20080813\\_gr08\\_prev1549\\_1990\\_2007\\_en.xls](http://data.unaids.org/pub/GlobalReport/2008/20080813_gr08_prev1549_1990_2007_en.xls)

## How is Information Collected on Heterosexual HIV Infection in Massachusetts?



In order to ensure prevention services are responsive to trends in the local epidemic, and that the scope of services is sufficient to meet the needs of at-risk individuals and populations, the Massachusetts Department of Public Health (MDPH) relies on accurate and timely HIV/AIDS surveillance data. The primary mechanism to collect data on new HIV infections is through the HIV/AIDS Case Report Form completed by medical providers. A new case of HIV or AIDS may be reported to the MDPH HIV/AIDS Surveillance Program with multiple risks or more accurately exposure modes indicated on an HIV/AIDS Case Report Form. While all exposure modes reported on a case report form are entered into the HIV/AIDS surveillance database, only one exposure mode category is assigned to each individual according to a CDC-designated hierarchy of risk.<sup>4</sup>

The hierarchy of risk is as follows:

- 1) MSM (male sex with a male)
- 2) IDU (injection drug use)
- 3) MSM/IDU (male sex with male and injection drug use)
- 4) High risk heterosexual (sex with a different gender person known to have HIV or to be at high risk for HIV infection)
- 5) Other (includes receipt of blood products and perinatal exposure)
- 6) NIR (no identified risk factor)

The intent of the hierarchy is to provide a framework to identify the most likely mode of exposure that led to HIV infection for each reported case.<sup>5</sup> This helps to inform the investment of prevention resources and guides state planning. Historically, this approach to data analysis has revealed significant disparities for MSM and IDU—the highest risk exposure mode categories in the CDC hierarchy—and has prioritized and catalyzed effective HIV prevention efforts for these populations both in Massachusetts and across the country.

In order to be reported in the heterosexual exposure mode category, individuals must report sex with one or more different gender partners, and confirm that a sex partner is HIV positive or at high risk for HIV infection. To confirm that a partner is at

high risk for HIV infection an individual must report that a sexual partner is an injection drug user, a male who has sex with males (females only), or a blood factor or transfusion recipient. This level of partner information is not required for MSM or IDU, as a report of a single episode of the behaviors alone is sufficient.

In the case of heterosexual exposure some individuals simply may not know the risk history of their sex partners; or due to a range of social and cultural factors may elect not to disclose those details to a medical provider. If heterosexual individuals who are newly diagnosed HIV-positive cannot confirm the HIV status or the risk status of their sex partners, then those cases are categorized by CDC in the no identified risk (NIR) exposure mode category, and as a result heterosexual exposure in particular may be underreported nationally.

In an effort to better represent the dynamics of heterosexual risk in Massachusetts, the state HIV/AIDS Surveillance Program uses an additional heterosexual exposure mode category for HIV incidence and AIDS diagnoses data, presumed heterosexual. Presumed heterosexual is the HIV exposure mode category for persons who report heterosexual sex without corresponding HIV risk information about sex partners. This category presents an alternative to uniform reporting of heterosexuals without adequate partner information to the no identified risk (NIR) category, and aims to more accurately describe the level of heterosexual risk for HIV infection among females and males in Massachusetts.

It is important to note that the assignment to the presumed heterosexual category does not reflect any judgment by a reporting provider about whether or not an individual engages in heterosexual behaviors; rather it reflects a lack of complete information about the risk status of sex partners to support the likelihood of heterosexual HIV transmission. If newly diagnosed persons report only heterosexual sex and chose not to disclose other risk behaviors to reporting clinicians, such as MSM or IDU exposure, this incomplete information may skew the accuracy of state data across exposure mode categories.

<sup>4</sup> The only exception is men who report MSM (male sex with male) and IDU (injection drug use).

<sup>5</sup> <http://www.cdc.gov/hiv/topics/surveillance/basic.htm>

## How Common is Heterosexual HIV Exposure?

The likelihood of heterosexual exposures in state HIV/AIDS data is partially masked by hierarchical exposure categories. It is well documented for example that the majority of individuals who report injection drug use also engage in sex with different gender partners,<sup>6</sup> yet only MSM who also report IDU are assigned to a dual exposure mode category (MSM/IDU) since both behaviors carry equivalently high risk. There is not a parallel category for heterosexual females and males who also report injection drug use. Instead these HIV cases are reported exclusively in the IDU exposure mode, based on a hierarchy of risk, irrespective of the frequency or duration of drug injection behaviors. For example, an HIV-positive female may report multiple, high-risk male sexual partners over many years, and only one episode of injection drug use in her lifetime. Despite the number of sexual partners or self-reported high level of sexual risk, that one episode of drug injection will result in an assignment of the case to the IDU exposure mode category only. For females in particular, there is likely a significant intersection between IDU and heterosexual HIV risk.

A similar pattern exists in the MSM exposure mode. Newly diagnosed males who report sex with other males in their lifetime are automatically assigned to the MSM exposure mode category, even if they also report sex with females. This may mask the frequency of sex with females among MSM, and the risk faced by heterosexual females who may not be aware that their male partners also have sex with other males. National and state data from various studies indicate that between 12% and 39% of MSM also reported sex with a female partner in the last year, yet these males may not disclose current or historic MSM behaviors to their female sex partners.<sup>7</sup> For females who are unaware of or unable to confirm the risk status of their male partners, they are assigned in state data to the presumed heterosexual category. The intersection between MSM and heterosexual exposure modes may further drive heterosexual HIV acquisition risk for females. There is also limited data on men who have sex with both females and males, and the extent to which they may experience higher levels of risk with female or male sexual partners.

## What do we Know about the Risk of Heterosexual HIV Infection?

Heterosexual exposure falls lower than other risk categories on the CDC risk hierarchy for both females and males. This is based on a few important considerations. The background prevalence of HIV among heterosexual populations is lower than in populations of MSM or IDU,<sup>8</sup> and therefore any given episode of sexual exposure is less likely to result in HIV infection between heterosexual individuals. For heterosexual males in particular, the likelihood of HIV infection from insertive vaginal intercourse alone is biologically less probable given the lower concentration of HIV in vaginal fluids compared to semen, and the limited entry points in the male anatomy for those fluids to reach the blood stream. This is not the case for heterosexual females who are generally the receptive sexual partner<sup>9</sup> and for whom HIV infection through heterosexual contact is more likely and more common than for males.

However, the placement of heterosexual HIV infection in the CDC hierarchy does not take into account the type of sex acts

in which females and males engage. There is a presumption that heterosexual sex is limited to receptive or insertive vaginal intercourse, and that the level of risk associated with heterosexual exposures is uniform. This is not the case, as the level of risk for HIV transmission associated with heterosexual sex may be modified by factors such as engaging in anal intercourse, presence of sexually transmitted infections, frequency of condom use, number of sexual partners, and substance use during sex—all of which are documented to increase the sexual risk of HIV transmission for both females and males.<sup>10</sup>

Data from the CDC-sponsored National HIV Behavioral Surveillance System (NHBS) administered between 2006 and 2007 in Massachusetts, provides important information about sexual risk experienced by heterosexual females and males residing in low income, urban areas of the state. In a survey of 422 heterosexual females and males, 89% of respondents reported sexual intercourse

6 Mimiaga MJ, Reisner SL, Cranston K, Isenberg D, Bright D, Daffin G, Bland S, Driscoll MA, Vanderwarker R, Vega B, Mayer KH. Sexual mixing patterns and partner characteristics of black MSM in Massachusetts at increased risk for HIV infection and transmission. *J Urban Health*. 2009 Jul;86(4):602-23. Epub 2009 May 23.

7 Massachusetts Department of Public Health, Office of HIV/AIDS (2004). National HIV Behavioral Surveillance System (NHBS), MSM1 Cycle, 2004-2005; Fenway Community Health Center (2007), Black MSM Study (unpublished data) 2007.

8 Centers for Disease Control and Prevention. HIV Prevalence Trends in Selected Populations in the United States: Results from National Serosurveillance, 1993–1997. Atlanta: Centers for Disease Control and Prevention; 2001:1–51.

9 There is an exception in the case of transgender females and males.

10 Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect* 1999; 75:3-17.

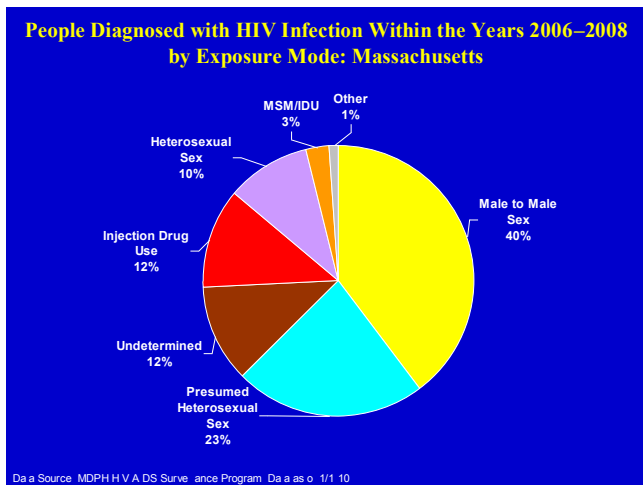
without a condom in the last 12 months. More than one-quarter of respondents (28%) also reported substance use during their last episode of sexual intercourse, which is documented to increase the likelihood of higher risk sexual practices including lower rates of condom use.<sup>11</sup>

Perhaps most striking from the NHBS data is that 43% of heterosexual respondents reported unprotected anal intercourse in the last 12 months—48% of males and 39% of females.<sup>12</sup> Anal

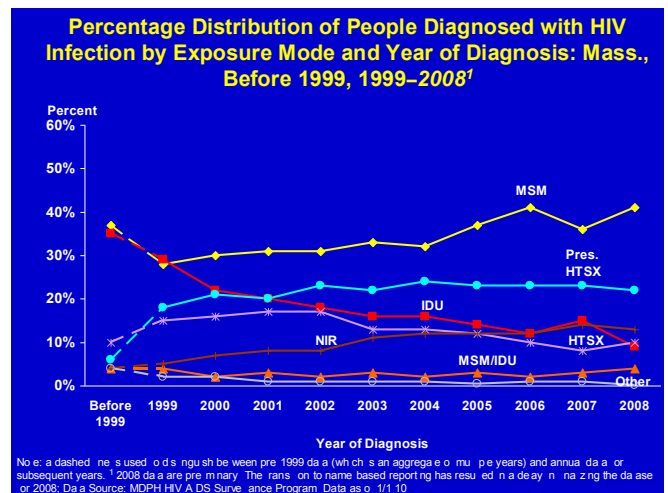
intercourse is a highly efficient mechanism for HIV transmission due to the vulnerability of anal tissue to viral infection, and the likelihood of anal tears and bleeding during intercourse. Elevated risk applies to both the receptive and insertive partner. This is one reason why MSM experience such disproportionate risk for HIV acquisition; yet messages about anal sex and risk for infection are largely absent from HIV prevention messages tailored to heterosexual populations.

## Measuring Heterosexual Risk

Understanding the impact of HIV risk in heterosexual populations across gender, race/ethnicity, country of origin, exposure mode, and a range of socio-demographic characteristics presents challenges and raises important questions about how to construct HIV prevention messages and interventions directed to heterosexual females and males. Foremost among these challenges is the utilization of two distinct exposure mode categories to report heterosexual exposures in state HIV/AIDS surveillance data—heterosexual and presumed heterosexual exposure.



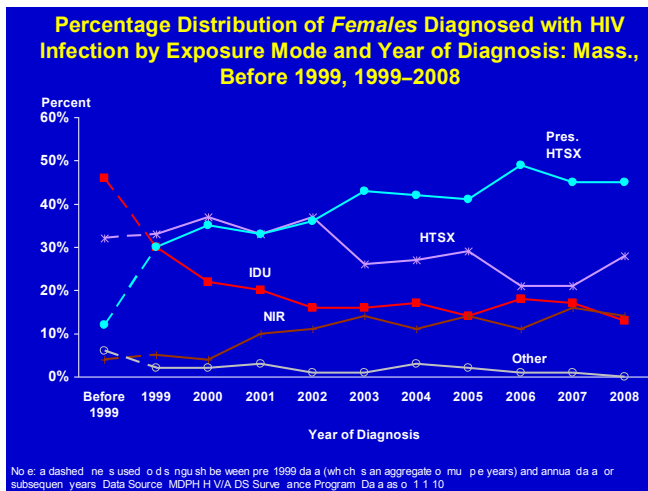
The relative distribution by exposure mode for people recently diagnosed with HIV infection between 2006 and 2008 (n=1964) is described above. Male-to-male sex and presumed heterosexual sex were the leading reported exposure modes at 40% and 23%, respectively. Presumed heterosexual is the second most prevalent HIV exposure mode among newly diagnosed individuals in Massachusetts, while heterosexual exposure represents 10% of new diagnoses between 2006 and 2008.



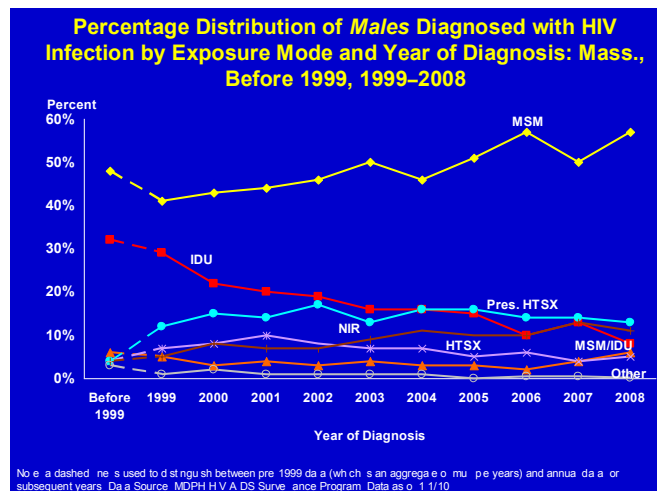
The relative proportions of each reported exposure mode have changed over time. From 1999 to 2008, the proportion of people exposed to HIV through injection drug use (IDU) declined from 29% to 10%. During the same time period the proportion exposed through presumed heterosexual sex changed slightly from 17% to 21%. While other exposure modes (perinatal transmission and blood/blood products combined) accounted for only 2% of exposures in 1999, the category represented less than one percent of exposures in 2008.

11 Anderson JE, Wilson R, Doll L., Jones TS, Barker P. Condom use and HIV risk behaviors among U.S. adults: data from a national survey. *Fam. Plann. Perspect.* 1999 Jan-Feb; 31(1):24-8.

12 Massachusetts Department of Public Health, Office of HIV/AIDS (2007). National HIV Behavioral Surveillance System (NHBS), HET1 cycle, Boston, MA. Unpublished data.



The figure above shows the relative proportion of HIV infection diagnoses by exposure mode in females over time. Here the trend in the proportion of females reported in the presumed heterosexual exposure category is particularly apparent. From 1999 to 2008 the proportion of females exposed through presumed heterosexual sex increased from 30% to 45%. At the same time, the proportion of females exposed through injection drug use decreased from 30% to 13%. In the past ten years, heterosexual sex and presumed heterosexual sex have remained the predominant modes of exposure among females; combined they have accounted for over 60% of female exposures annually. The growing impact of presumed heterosexual HIV exposure among females without a corresponding increase in the proportion of cases in a heterosexual or presumed heterosexual exposure mode among males prompts the question—what are the risk behaviors of the sexual partners of heterosexual/presumed heterosexual HIV infected females?



The graph above displays trends in new HIV diagnoses by exposure mode category for males. The predominant mode of exposure among males remains MSM, and is increasing as a proportion of all HIV diagnoses in recent years. The proportion of new HIV infections attributed to IDU has declined among males in the past ten years, as it has among females. The data on newly diagnosed males indicate that heterosexual exposure is less common among males compared to other exposure modes. The only exposure modes that explicitly identify males as engaging in heterosexual behavior are the heterosexual and presumed heterosexual exposure mode categories. However, many males who inject drugs also engage in sex with females, and some portion of MSM also have sex with females.<sup>13</sup> As previously mentioned in this report, national and state research estimate 12% to 39% of MSM reported sex with one or more female partners in the last 12 months.<sup>14</sup> Since some MSM and male IDU also have sex with females, this may explain the comparatively high level of risk females experience from heterosexual and presumed heterosexual exposure modes.

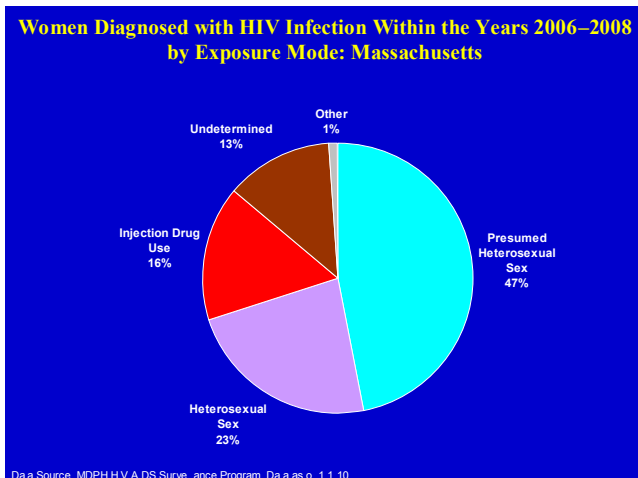
13 Massachusetts Department of Public Health, Office of HIV/AIDS (2004). National HIV Behavioral Surveillance System (NHBS), MSM1 Cycle, Boston, MA 2004-2005.

14 Johnson CV, Mimiaga MJ, Reisner SL, Tetu AM, Cranston K, Bertrand T, Novak DS, Mayer KH. Health care access and sexually transmitted infection screening frequency among at-risk Massachusetts men who have sex with men. *Am J Public Health*. 2009 Apr;99 Suppl 1:S187-92. Epub 2009 Feb 12.

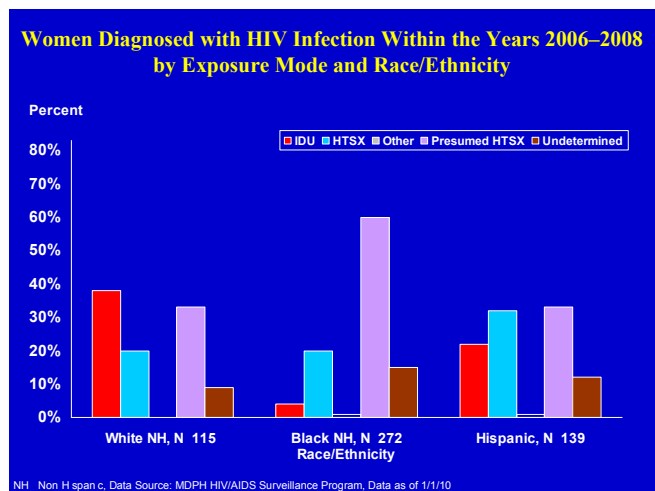


## Heterosexual Females

Females account for 29% of all Massachusetts residents living with HIV/AIDS and 28% of new diagnoses between 2006 and 2008. Today, HIV infection among females is overwhelmingly driven by heterosexual risk. This is not surprising given that there are fewer possible modes of HIV exposure among females (IDU, presumed heterosexual, heterosexual, and other) than among males (MSM, IDU, MSM/IDU, presumed heterosexual, heterosexual, and other). Additionally, reported cases of HIV transmission via injection drug use has been dramatically lower in recent years for both females and males in Massachusetts. As IDU has declined as a proportion of all new HIV infections among females, heterosexual transmission has emerged as the primary mode of HIV infection.



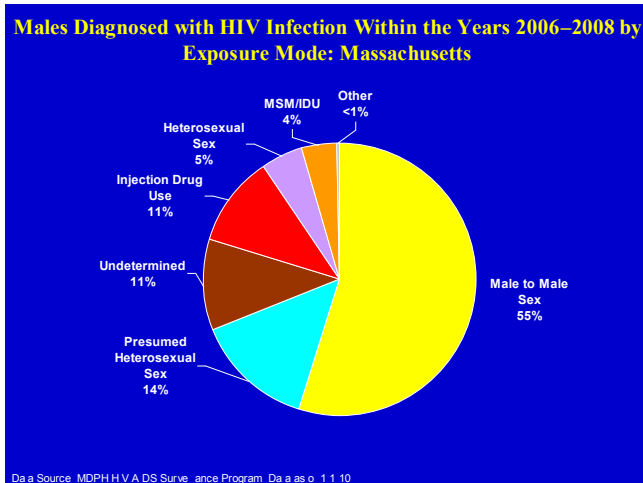
As shown above, the leading exposure modes among females are presumed heterosexual at 47% and heterosexual sex at 23% of new HIV infections between 2006 and 2008. This means that among newly diagnosed females, a total of 70% reported only heterosexual sex as a possible HIV exposure mode to their medical providers, yet the majority of these females did not report adequate information about the HIV status or risk status of their male sexual partners to the reporting medical provider to be reported in the heterosexual exposure mode category.



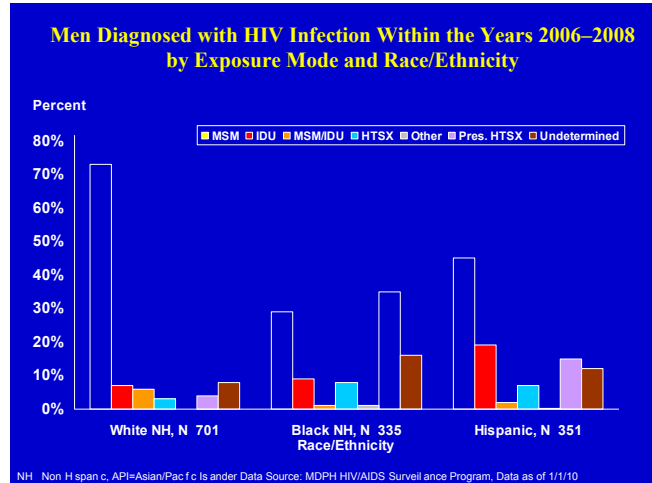
Data on new HIV diagnoses for females by race/ethnicity reveals a greater proportion of HIV infections linked to the presumed heterosexual category for Black non-Hispanic females. In this group over 80% of newly diagnosed Black females are reported with a heterosexual or presumed heterosexual exposure mode. For Hispanic females the proportions of presumed heterosexual and heterosexual mode of exposure are only one percentage point apart at 33% and 32% respectively, for a total of 65% of Hispanic females reported in a heterosexual exposure mode category. It is only among White non-Hispanic females that IDU is a more common exposure mode than either heterosexual or presumed heterosexual exposure; however presumed heterosexual and heterosexual exposure modes combined still account for over fifty percent of new diagnoses in this group.



## Heterosexual Males



The majority of persons living with and newly diagnosed with HIV infection in Massachusetts and in the country are males. Between 2006 and 2008, 72% of newly diagnosed infections were among males in Massachusetts. The disparate impact of HIV in males is driven in part by the high proportion of infections that are attributable to MSM behaviors, as well as the greater prevalence of IDU among males compared to females.<sup>15</sup> While it is established that gay and bisexual males face a disproportionate risk for HIV infection due to the efficiency of HIV transmission through anal intercourse, as well as the higher background HIV prevalence in the population of MSM, it is not well defined what is driving HIV risk for heterosexual males. Between 2006 and 2008, 5% of HIV diagnoses among males were reported in the heterosexual exposure mode category and an additional 14% reported in the presumed heterosexual exposure mode category.

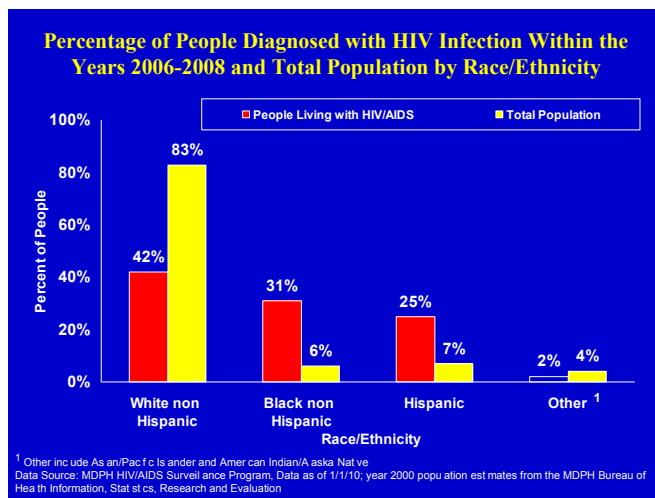


As with females, race/ethnicity also seems to play a role in heterosexual HIV risk for newly diagnosed males. The overwhelming majority of White non-Hispanic males recently diagnosed with HIV infection is reported with an MSM exposure mode category (73%), while a total of only 7% are reported with a heterosexual or presumed heterosexual exposure mode combined. Hispanic males also have MSM as the leading reported exposure mode at 45%, followed by a relatively higher proportion of IDU exposure at 19%, and an additional 15% reported in the presumed heterosexual exposure mode category. On the contrary the most commonly reported exposure mode among Black non-Hispanic males is presumed heterosexual at more than one-third or 35% of all new diagnoses, followed by MSM at 29%. Black NH males are the only racial/ethnic group in the state for which MSM is not the leading HIV exposure mode among males.

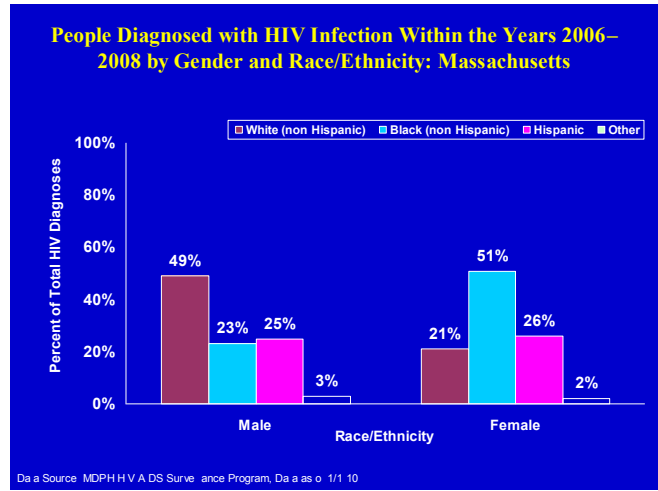
<sup>15</sup> 68% of male vs. 32% of female admissions to state funded substance abuse services in Massachusetts in FY 2008 reported needle use in the past year; 3.3% of male vs. 1.6% of female YRBS respondents in 2007 reported ever using a needle to inject drugs. MDPH Bureau of Substance Abuse Services, Office of Data Analytics and Decision Support; Massachusetts Department of Elementary and Secondary Education, Youth Risk Behavior Survey

## Racial and Ethnic Disparities in the Heterosexual HIV Epidemic

The heterosexual HIV epidemic is intertwined with disparities related to race and ethnicity—as described earlier in this report, and has been addressed in detail in previous reports released by the Office of HIV/AIDS.<sup>16</sup> Not only are Black and Hispanic individuals more likely to acquire HIV infection, they are more likely than non-Hispanic White residents to be reported in the heterosexual and presumed heterosexual exposure mode categories. Racial and ethnic disparities in HIV/AIDS burden are a serious public health problem; they are particularly acute among females, and deeply relevant to an assessment of the heterosexual HIV epidemic in Massachusetts.

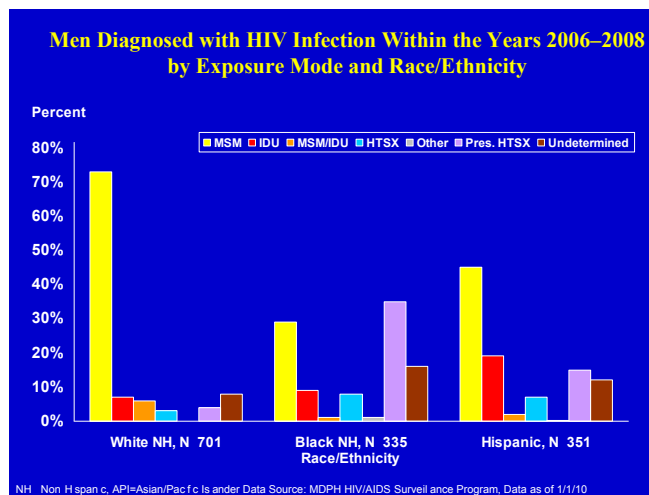
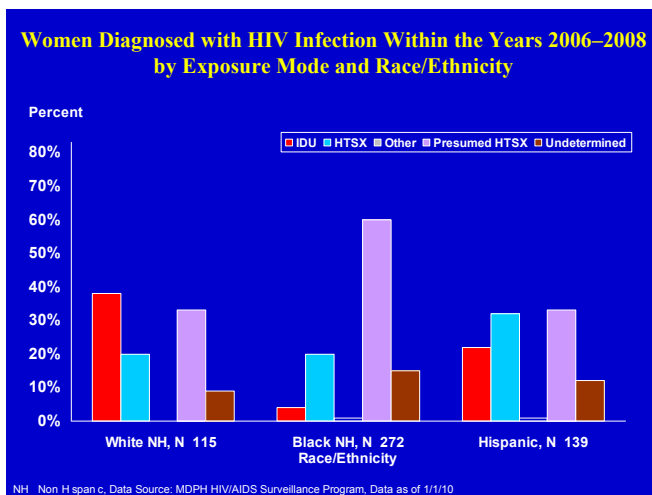


Black non-Hispanic individuals account for 6% of Massachusetts residents, yet they comprise 31% of persons recently diagnosed with HIV infection. Similarly, Hispanic residents account for 7% of the state population and 25% of people recently diagnosed with HIV.



The figure above shows new HIV diagnoses data for males (n=1,427) and females (n=537) between 2006 and 2008. While just under half (49%) of all new HIV diagnoses between 2006 and 2008 in males were among White non-Hispanics, the majority (79%) of new diagnoses among females were in Black or Hispanic females. The following graphs explore the interplay between race/ethnicity, gender and exposure mode, and reveal the importance of heterosexual exposure in new HIV infections among racial and ethnic minority populations.

16 See Massachusetts Department of Public Health, Office of HIV/AIDS: An Added Burden: The Impact of the HIV/AIDS Epidemic on Communities of Color in Massachusetts (2007); and Concurrent Dilemmas: Lateness of HIV/AIDS care as a challenge to both prevention and treatment (2009).

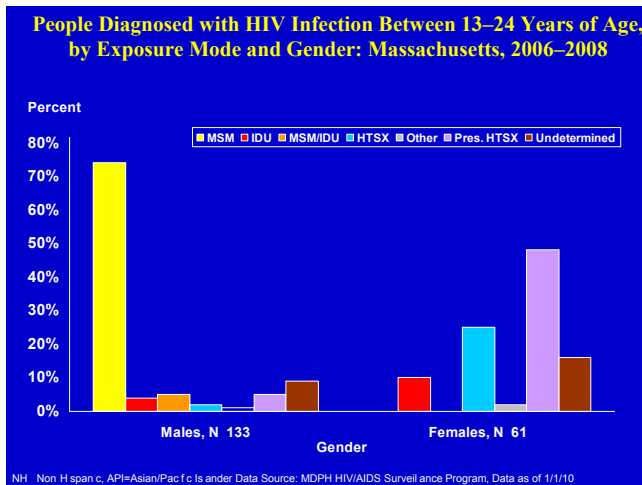


A comparison of the two graphs above explores the interaction of race/ethnicity, gender, and exposure mode. Only among Black non-Hispanic males does the presumed heterosexual exposure mode category account for a greater proportion of new HIV infections than MSM exposure mode. In fact, presumed heterosexual is the most commonly reported exposure category for Black males between 2006 and 2008. This trend is even more pronounced for non-Hispanic Black females—during this time period 60% of newly diagnosed Black females were reported in a

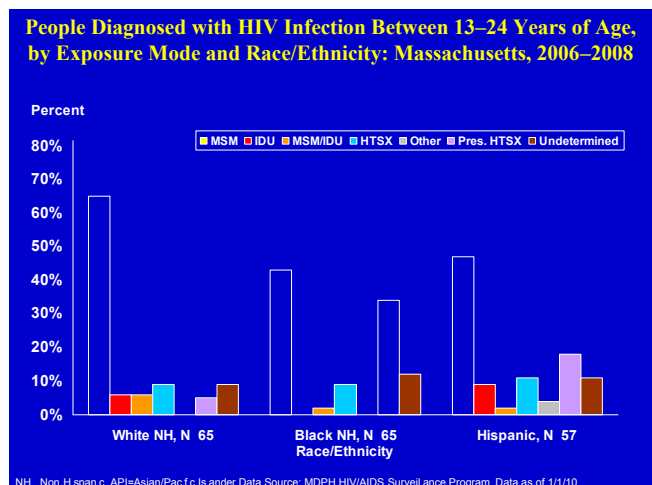
presumed heterosexual exposure mode category, and accounted for the majority of new HIV infections in Black females. For Black females and males the presumed heterosexual exposure mode is of central importance, and may be a particular area where intersecting risks drive new infections. Heterosexual exposure among all newly diagnosed males remains consistently low at between 5% and 9% of new diagnoses, and perhaps represents the true proportion of heterosexual infection among males.



## Heterosexual HIV Infection in Adolescents and Young Adults



Presumed heterosexual exposure is also a significant factor in HIV transmission among young adults and adolescents aged 13–24 years. When examining new diagnoses in this group between 2006 and 2008 by gender and exposure mode, nearly three-quarters (74%) of new diagnoses in young males is reported in the MSM exposure mode, whereas for young females, nearly half (48%) of new diagnoses were reported in the presumed heterosexual exposure mode category and an additional 25% of young females were reported in the heterosexual exposure mode—for a total of 73% of all new infections among young adult and adolescent females attributed to one of the heterosexual exposure modes. Adolescence and young adulthood in particular may be a time when developing sexual identity and sexual experimentation may lead to intersecting risks in the context of heterosexual exposure among young females and males.



When viewed through the lens of race/ethnicity, the significance of the presumed heterosexual exposure mode category is even more pronounced among Black non-Hispanic young adults and adolescents. More than one-third of new infections in this age group or 34% were reported in the presumed heterosexual category, which is comparable to the proportion of new infections reported in the MSM exposure mode category. In this case, Black adolescents/young adults aged 13–24 years experience a similar impact of presumed heterosexual exposure as Black adults, which may indicate a more pervasive set of issues influencing risks for Black individuals generally.

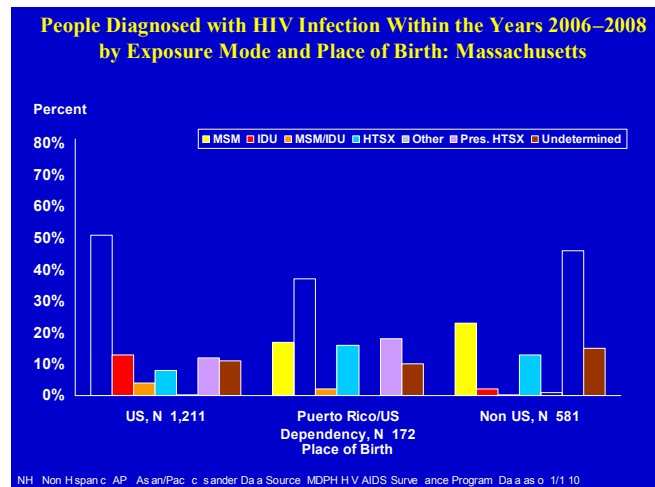
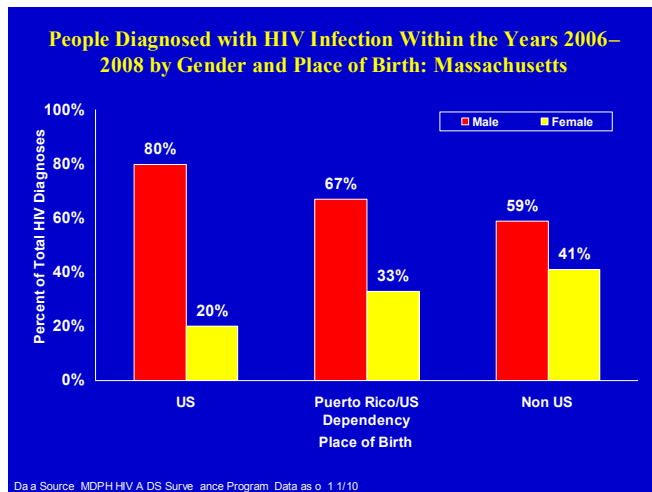


## Heterosexual HIV Infection in Non-U.S. Born Populations

Massachusetts has become a home for many non-U.S. born individuals who travel to the Commonwealth as visitors, immigrants or refugees. Many non-U.S. born residents have lived in the state for years or even decades, while others may be more recent arrivals. HIV has a disproportionate impact in non-U.S. born populations and there is some level of overlap between disparities impacting non-U.S. born individuals and those that are apparent for racial and ethnic minority populations; and these extend to disparities related to heterosexual risk.<sup>17</sup>

The impact of HIV/AIDS in non-U.S. born populations may be a result of individuals who are already living with HIV/AIDS when they immigrate to the U.S., or there may be factors that increase risk for non-U.S. born individuals to acquire HIV infection after their arrival. The Massachusetts HIV/AIDS Surveillance Program collects detailed information regarding country of birth on the HIV/AIDS Case Report Form, but for the purposes of aggregate data presentation, individuals are described as U.S.-born, non-U.S. born, or born in Puerto Rico or another U.S. dependency.

In other parts of the world, where HIV is endemic and background HIV/AIDS prevalence rates are higher, heterosexual HIV infection is well established. Similarly, non-U.S. born females and males who reside in Massachusetts have a much closer proportional representation among newly diagnosed cases. When compared to females in other place of birth categories, females comprise 41% of new HIV diagnoses among non-U.S. born individuals between 2006 and 2008; in contrast 33% of newly diagnosed individuals born in Puerto Rico or another U.S. Dependency were females, while only 20% of all U.S. born new diagnoses were among females. These differences underscore the importance of heterosexual HIV infection in non-U.S. born populations, and raises questions about the dynamics of heterosexual risk by place of birth.

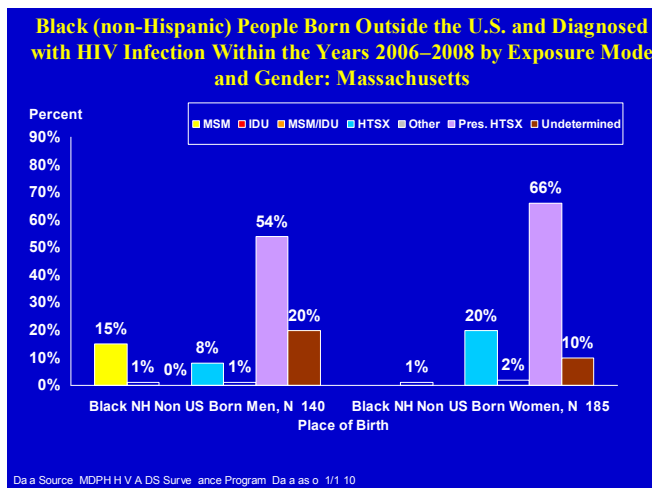


The chart above illustrates the distribution of new HIV diagnoses across exposure mode by place of birth for U.S., Puerto Rico or U.S. dependency, and non-U.S. born individuals. What is most striking about this figure is the magnitude of difference between each of these distributions. In fact, viewed through this lens, Massachusetts seems to have three very unique HIV epidemics within our state borders—a U.S. born epidemic that is predominantly MSM, a non-U.S. born epidemic that is predominantly presumed heterosexual, and a Puerto Rico/U.S. dependency epidemic that is predominantly IDU. The importance of the presumed heterosexual exposure mode category for non-U.S. born individuals is particularly pronounced.

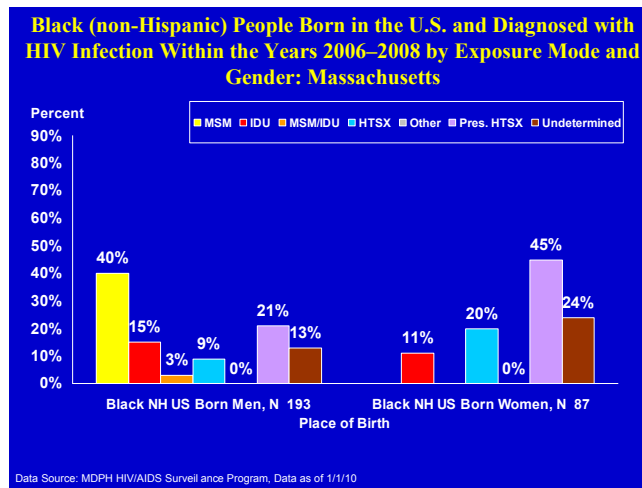
17 Johnson AS, Hu X, Dean HD. Epidemiologic differences between native-born and foreign-born black people diagnosed with HIV infection in 33 U.S. states, 2001-2007. Public Health Rep. 2010 Jul-Aug;125 Suppl 4:61-9.



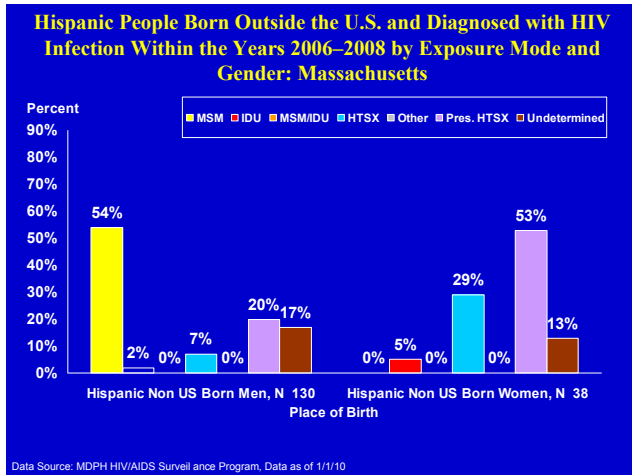
## A Closer Look—Heterosexual Infection in Racial and Ethnic Minorities Who are also Non-U.S. Born



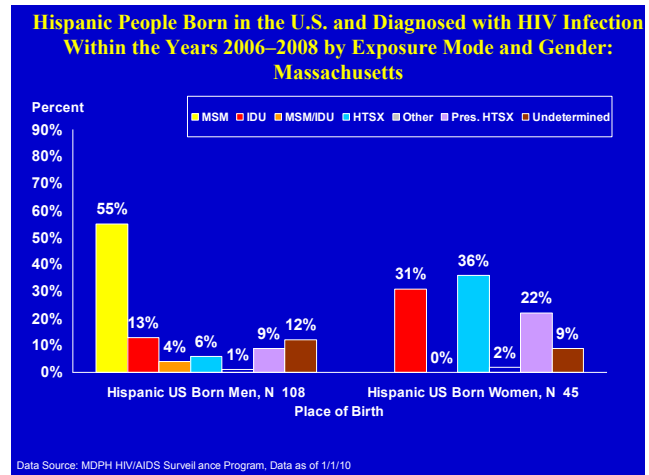
As shown in the figure above, the proportion of new HIV diagnoses categorized as presumed heterosexual or heterosexual accounts for over half of all new infections among Black females and males born outside the U.S. between 2006 and 2008. For Black non-U.S. born females, the vast majority or 86% of new diagnoses were reported with presumed heterosexual or heterosexual exposure mode, and for non-U.S. born Black males 54% were reported in the presumed heterosexual exposure mode category, with an additional 8% reported in the heterosexual exposure mode category. Black non-U.S. born males are reported with the highest proportion of presumed heterosexual HIV exposure mode compared to any other group of males between 2006 and 2008. This level of presumed heterosexual exposure among Black males is comparatively high and inconsistent with what is known about the level heterosexual HIV risk faced by males generally.



In comparison, the figure above illustrates HIV exposure modes by gender and exposure mode for Black non-Hispanic females and males born in the U.S. The leading exposure mode for U.S. born Black females continues to be the presumed heterosexual exposure mode at 45% of new diagnoses between 2006 and 2008, and an additional 20% reported in the heterosexual exposure mode category. For U.S.-born Black males, MSM is the leading exposure mode while the proportion reported in the presumed heterosexual exposure mode category is 21%; less than half the proportion reported by their non-U.S. born Black counterparts. Nine percent of U.S. born Black males is reported in the heterosexual exposure mode category, which is almost identical to non-U.S. born Black males at 8%.



The impact of the presumed heterosexual exposure mode also extends to non-U.S. born Hispanic females and males—with 53% of non-U.S. born Hispanic females and 20% of non-U.S. born Hispanic males reported in this exposure mode category. Additionally 29% of non-U.S. born Hispanic females is reported in a heterosexual exposure mode category for a total of 82% of non-U.S. born Hispanic females reported in one of the two heterosexual exposure mode categories—comparable to the proportion observed in non-U.S. born Black females. MSM exposure mode remains the leading exposure mode for non-U.S. born Hispanic males at 54% of new HIV diagnoses between 2006 and 2008.

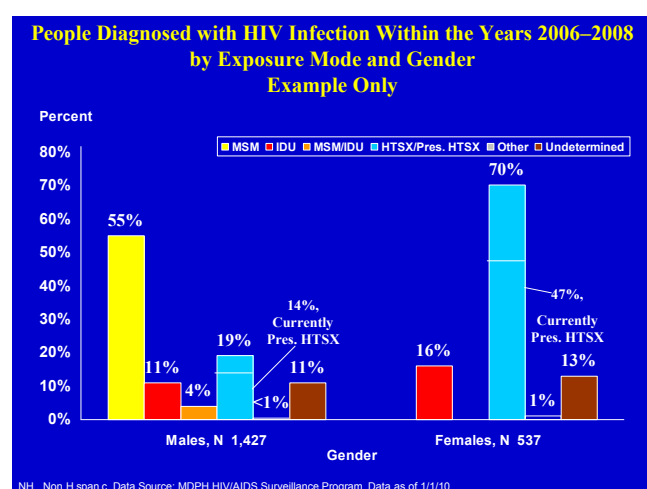


It is only among U.S.-born Hispanic females that heterosexual exposure with a partner of known HIV risk or status is the leading exposure mode at 36% of all new infections between 2006 and 2008. An additional 22% of U.S.-born Hispanic females are reported in a presumed heterosexual exposure mode category, for a total of 58% of U.S. born Hispanic females reported in one of the heterosexual exposure mode categories. It is unclear to what extent the 31% of U.S.-born Hispanic females reported in the IDU exposure mode category may also have experienced heterosexual risk, since those cases are reported exclusively as IDU irrespective of the duration or frequency of drug injection behaviors. For U.S.-born Hispanic males, MSM remains a leading exposure mode at 55% of all new diagnoses between 2006 and 2008; with 9% reported in the presumed heterosexual exposure category, and an additional 6% in the heterosexual exposure mode category.



## Clarifying Heterosexual Risk—Exploring a Revised Presentation for HIV/AIDS Data in Massachusetts

There is an opportunity to reexamine state HIV/AIDS surveillance data through a new lens for females and males reported in the heterosexual or presumed heterosexual exposure mode categories. The goal is to consider different perspectives on state data about heterosexual HIV exposure that point to new areas of inquiry and may inform programmatic responses. There are two potential data presentation options before us, and each one frames a slightly different set of research, program, and policy directions.

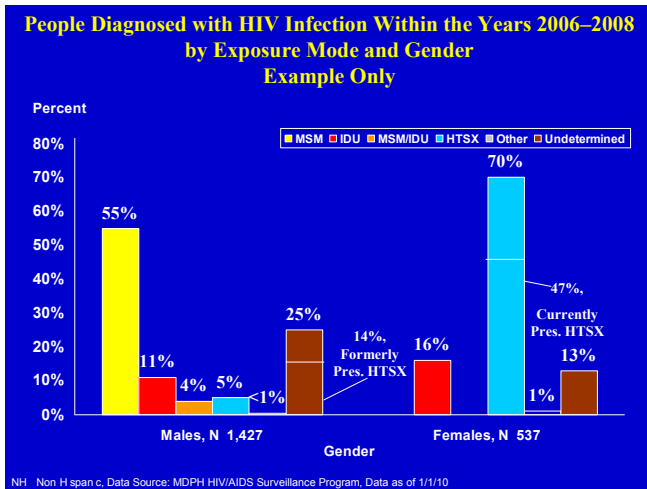


In the figure above the data for the heterosexual and presumed heterosexual exposure mode categories have been merged for both females and males. Whereas the merged heterosexual exposure mode category remains far less common for males at 19% of all new HIV infections compared to the MSM exposure mode category at 55%, in this new presentation heterosexual exposure would exceed the proportion of IDU exposure for males newly diagnosed with HIV between 2006 and 2008. Analyses in earlier sections of this report have already confirmed that the majority of presumed heterosexual males merged into this new category are racial/ethnic minority and non-U.S. born males. For females, the importance of heterosexual exposure as a primary driver of new HIV infections is pronounced and would account for 70% of new infections among all females. The majority of these females are also Black or Hispanic and non-U.S. born.

Yet there are substantial risks in uniformly merging the heterosexual categories for males. Heterosexual exposure among males is consistently reported at between 5% and 9% of new infections across racial/ethnic groups and place of birth, and this is likely an accurate reflection of heterosexual risk for males. Given the lower biologic probability of heterosexual HIV infection for males, the re-categorization of all presumed heterosexual males does not make intuitive sense. The presumed heterosexual category was created and intended to capture females' heterosexual risk when partner information was limited. Females who present with HIV infection and report heterosexual exposure were in fact most likely infected through sex with males. The only alternative is undisclosed IDU, blood transfusion, or perinatal infection—all of which have been declining over the years as previously highlighted.

For males reported in the presumed heterosexual exposure category, there is typically evidence of current or historic sex with females, and no evidence of MSM or IDU. Yet there is no way to determine if males were provided an opportunity to share other HIV risk information, whether a reporting medical provider appropriately engaged newly diagnosed males in risk assessment conversations, or whether males elected not to disclose certain risk behaviors due to perceived stigma, cultural norms, social pressures, or other factors. In fact, we have very little information about males assigned to the presumed heterosexual category, and rather than attempt to force an exposure construct intended for females on newly diagnosed males, these males are more accurately reported in the no identified risk exposure mode category.





A second option, therefore is to report all presumed heterosexual males in the no identified risk (NIR) exposure mode category, while maintaining a merged heterosexual exposure mode category for females. This approach increases the proportion of males reported in the NIR exposure mode category from 11% to 25% or one-quarter of all newly diagnosed males between 2006 and 2008. As described earlier in this report, the majority of males shifted into the NIR category in this scenario are non-Hispanic Black and Hispanic males.

This data presentation highlights the profound lack of information regarding HIV risk faced by males in the NIR exposure mode category, particularly males of color. The appropriate reassignment of presumed heterosexual males to the NIR category allows for more explicit attention to this knowledge gap, and demands further research into social, behavioral, and environmental factors that may influence risks for HIV infection among these males. In future MDPH epidemiologic reports and fact sheets the Bureau of Infectious Disease will adopt the reporting practice of assigning males who report heterosexual exposure with a female partner of unknown risk or HIV status to the NIR exposure mode category. The presumed heterosexual exposure mode category for males will be discontinued. Distinct presumed heterosexual and heterosexual exposure mode categories will be maintained for females.

## Recommendations to Address the Heterosexual HIV Epidemic in Massachusetts

The risk for HIV infection among heterosexual females and males is complex and is rooted in a range of social and behavioral factors. There are also disparities within the heterosexual epidemic in Massachusetts related to race/ethnicity, and country of birth; yet the causal mechanisms that link these demographic characteristics to heterosexual HIV risk are not immediately clear. The influence of poverty in risk for HIV infection is apparent, but the causal dynamics are not clearly established; and while there has been increased attention in recent years to social determinants of health, structural interventions to address HIV infection in Massachusetts remain largely untested. A number of questions about heterosexual HIV infection in Massachusetts demand further analysis and exploration:

- How does poverty impact risk environments and behaviors in ways that increase vulnerability to HIV infection for heterosexual females and males?
  - What effect do data collection and reporting practices have on the interpretation of HIV risk for heterosexual females and males?
  - Why does the proportion of females and males reported in the presumed heterosexual exposure mode category vary so significantly by race/ethnicity?
  - Why are a greater proportion of individuals who are Black or non-U.S. born reported in the presumed heterosexual exposure mode category?
  - Are some newly diagnosed individuals more likely than others to know the risk status of their sexual partners, and to report that information to a medical provider?
  - What is the impact of perceived stigma on the accuracy of data collected on the HIV/AIDS Case Report Form related to risk experience and exposure mode?
- Intensify HIV prevention services prioritizing heterosexual females and males in low-income, urban areas of Massachusetts with documented high incidence and prevalence of HIV infection.
  - Design prevention programming for females and males to support communication with sexual partners about risk, to learn about the risk status of sexual partners, and to make informed decisions that promote sexual health.
  - Develop prevention programming that recognizes the spectrum of behavioral risks faced by heterosexual females and males, including engagement in unprotected anal and vaginal intercourse, and sexual intercourse in the context of substance use.
  - Create innovative prevention programs that engage males who have sex with males who also have sex with females, and address HIV risk reduction strategies with female and male sexual partners.
  - Explore potential reasons for the disproportionate representation of racial/ethnic minority and non-U.S. born individuals in the presumed heterosexual exposure mode category.
  - Revise state epidemiologic data presentations to report presumed heterosexual males in the no identified risk (NIR) exposure mode category, and design research to better understand HIV risk faced by males who have sex with females.
  - Explore factors that may increase heterosexual HIV risk for non-U.S. born females and males.
  - Design research to better understand the true risks of individuals reported in the presumed heterosexual and no identified risk categories.
  - Collect information on the scope of risks faced by transgender females and males who may also identify as heterosexual.
  - Educate and train medical providers to ask their patients sexual risk information in a culturally sensitive manner to more accurately identify HIV exposure mode for newly diagnosed females and males.
  - Analyze state data on new HIV diagnoses to explore the intersection between multiple modes of exposure among females and males, notably IDU and heterosexual exposure modes, and MSM and heterosexual exposure modes.
  - Expand programming that promotes sexual health among females and males, including enhanced communication strategies, and negotiation of safer sex practices such as condom use.

This report has raised many questions, explored a range of data points, and identified multiple socio-demographic factors that must be considered to achieve a deeper understanding of the heterosexual HIV epidemic in Massachusetts. Some important action steps that emerge from this report include the following:

- Identify social and environmental factors that influence heterosexual risk for females and males, and design programs that respond to social determinants of health.
- Design and deliver tailored HIV prevention programming for at-risk heterosexual individuals and couples.
- Integrate HIV prevention services into systems where at-risk heterosexual populations access health services, such as primary care, substance use treatment, immigrant/refugee health programs, and family planning.

**Massachusetts Department of Public Health  
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Office of HIV/AIDS**

