Estimates of New HIV Infections in the United States, 2006–2009

In August 2011, the Centers for Disease Control and Prevention released new estimates of the annual number of new HIV infections (HIV incidence) in the United States. The estimates, for 2006 through 2009, are the first multi-year estimates using CDC's national HIV incidence surveillance methodology, which is based on direct measurement of new HIV infections using a laboratory test (the BED HIV-1 Capture Enzyme Immunoassay) that can classify new diagnoses as either recent or long-standing HIV infections. The estimates were published online in the scientific journal *PLoS ONE* (http://dx.plos.org/10.1371/journal.pone.0017502).

The new estimates suggest that overall HIV incidence in the United States has been relatively stable at approximately 50,000 annual infections between 2006 and 2009. Each year, the largest number of new HIV infections was among white men who have sex with men (MSM)* followed closely by black MSM. Hispanic MSM and black women were also heavily affected. Over the four year period, new HIV infections appear to be relatively stable among all populations except young MSM. The overall increase among young MSM was driven by a 48 percent increase in HIV infections among young black MSM during the four-year time period.

In addition to providing the first estimates for 2007, 2008 and 2009, CDC has updated its earlier estimate of HIV incidence for 2006 (previously 56,300). The new, lower estimate reflects refined research methods and more data available due to reporting delays. While these HIV incidence estimates are based on the best data currently available, CDC will continue to refine estimates over time as improvements in methods or additional data are available.

Announced in July 2010, the National HIV/AIDS Strategy calls for prioritizing prevention efforts in the populations where HIV is most heavily concentrated — gay and bisexual men of all races and ethnicities, African Americans and Hispanics/Latinos — and for alleviating racial and ethnic disparities. To achieve the strategy's goals, CDC is implementing "High-Impact Prevention," a new approach designed to maximize available HIV prevention resources and have the greatest impact on the U.S. HIV epidemic.

Figure 1: Estimated New HIV Infections in the U.S., 2009, for the Most-Affected Subpopulations
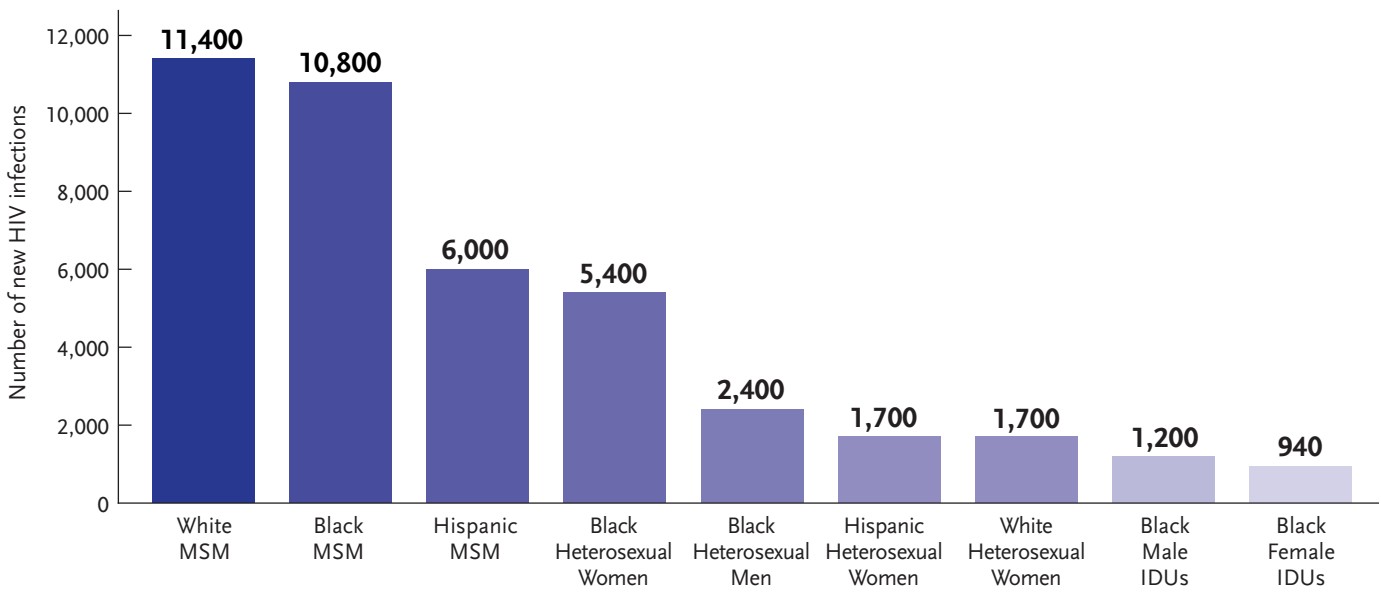
*The term men who have sex with men is used in CDC surveillance systems because it indicates the behaviors that transmit HIV infection, rather than how individuals self-identify in terms of their sexuality.

Implications of New Estimates

CDC's new estimates underscore two key HIV prevention challenges that require urgent action:

▶ **The current level of HIV incidence in the United States is likely not sustainable.** Prevention efforts in recent years have successfully averted significant increases in new HIV infections, despite the growing number of people living with HIV and AIDS who are able to transmit the virus. However, an analysis by CDC and Johns Hopkins University researchers indicates that the growing population of people with HIV and AIDS will lead to significant increases in new HIV infections if current prevention efforts are not intensified. The study emphasizes the importance of ensuring that everyone with HIV knows their status and helping HIV-infected individuals avoid transmission to others.[1]

▶ **The increasing number of new HIV infections among young, black gay and bisexual men** underscores the importance of reaching young MSM with effective HIV prevention programs, and developing new programs that specifically address the needs of young, black gay and bisexual men. In addition, public health and community leaders can help reduce the stigma that too often surrounds HIV. This includes encouraging frank discussions about HIV and the factors that can contribute to the spread of the disease, such as unsafe sexual or drug-using behaviors, homophobia, higher rates of STDs and lower awareness of HIV status.

Key Findings: A Closer Look

Data Suggest Overall HIV Incidence Relatively Stable

CDC estimates that there were 48,600 (Confidence Interval [CI]: 42,400–54,700) new HIV infections in the United States in 2006, 56,000 (CI: 49,100–62,900) in 2007, 47,800 (CI: 41,800–53,800) in 2008 and 48,100 (CI: 42,200–54,000) in 2009.

The new estimates update CDC's original HIV incidence estimate for 2006 (previously 56,300 [CI: 48,200–64,500]). The new lower estimate reflects refined statistical modeling and the addition of data now available due to reporting delays (see Methods box below for additional information). CDC will continue to add new data and improve its research methods over time. As a result, HIV incidence estimates may continue to be refined in the future.

Methods for Estimating National HIV Incidence

CDC's latest estimates come from an HIV incidence surveillance methodology that is based on an approach known as STARHS (Serologic Testing Algorithm for Recent HIV Seroconversion). STARHS uses a special test (the BED HIV-1 Capture Enzyme Immunoassay) that classifies newly diagnosed infections as either long-standing or recent (occurring within approximately the past five months).

Before this surveillance methodology was developed, HIV diagnosis data provided the best indication of recent trends in key populations. However, diagnosis data does not indicate when an individual was actually infected, because infection can occur many years before a diagnosis. By applying the STARHS technology to new HIV diagnoses in 16 states and two cities, CDC identified the number of new diagnoses in a given year that represented new infections. Using a complex statistical model, these data were extrapolated to the general population to provide national estimates of HIV incidence based on direct measurement.

The new estimates represent the first multi-year estimates from this new HIV incidence surveillance methodology. CDC refined the previous statistical model to re-estimate HIV incidence for 2006, and provide the first estimates for 2007, 2008 and 2009. The updated model:

▶ Revises the way in which HIV diagnosis data are adjusted due to reporting delays

▶ Provides a more accurate way of estimating the probability that an infection would be detected when it is recent

▶ Provides a more sophisticated process for determining transmission category data when that information is missing

▶ Uses more recent data that allowed recalculation of the recency period of STARHS, which resulted in a revised period of time in which an HIV infection is considered to be recent

By Route of Transmission: Gay and Bisexual Men Most Affected; Sharp Increases in HIV among Young Black MSM

Figure 2: Estimated New HIV Infections, 2009, by Transmission Category

61% MSM
27% Heterosexual
3% MSM-IDU
9% IDU
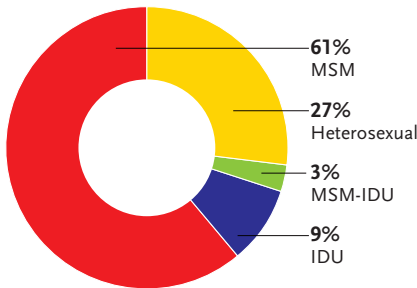
Men Who Have Sex with Men

Gay and bisexual men and other men who have sex with men remain the population most heavily affected by HIV in the United States. CDC estimates MSM represent approximately 2 percent of the U.S. population,[2] but accounted for the majority of all new HIV infections annually from 2006 to 2009 — 56 percent in 2006 (27,000), 58 percent in 2007 (32,300), 56 percent in 2008 (26,900) and 61 percent in 2009 (29,300).

In 2009, white MSM represented the largest number of new HIV infections (11,400) in the United States, followed closely by black MSM (10,800) and Hispanic MSM (6,000).
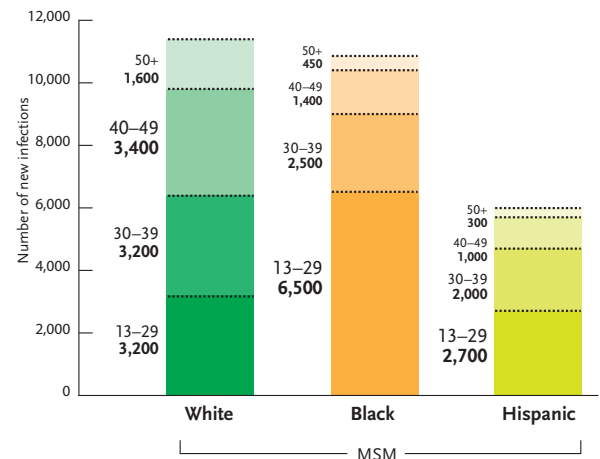
MSM accounted for 86 percent of new infections among white men, 73 percent of new infections among black men and 81 percent of new infections among Hispanic men.

Young MSM (aged 13–29) are particularly affected, collectively representing more than one quarter of all new HIV infections nationally (27 percent; 12,900 in 2009).
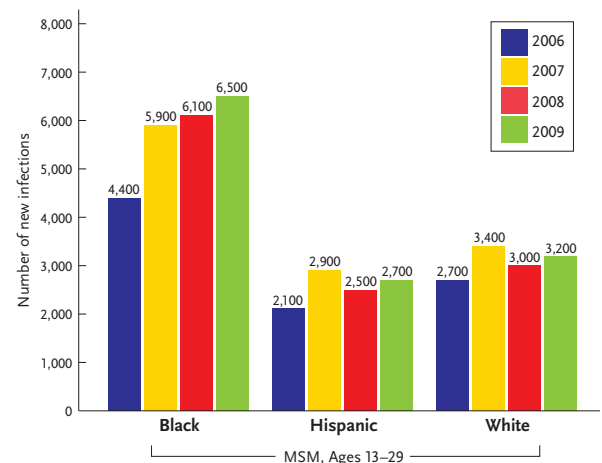
By race and risk group, young, black MSM is the only population in the United States to experience a statistically significant increase in new HIV infections from 2006 through 2009. While HIV incidence was relatively stable among MSM overall, new HIV infections among black MSM aged 13 to 29 increased 48 percent during the four-year time period — from 4,400 HIV infections in 2006 to 6,500 infections in 2009. In 2009, new infections among black MSM aged 13 to 29 (6,500) exceeded new infections among white MSM aged 13 to 29 and 30 to 39 combined (6,400). (See figure 3)

Although the analysis did not examine the factors that may be driving this trend, other studies suggest a range of possible factors, including: higher proportions of young, black MSM unaware of their infection than MSM of other racial/ethnic groups; stigma of HIV and homosexuality, which can hinder utilization of HIV prevention services; limited access to health care, HIV testing and treatment; and higher rates of some STDs (e.g., syphilis) which can facilitate HIV transmission. Young, black gay and bisexual men are also more likely to have older sexual partners (among whom HIV prevalence is high), compared to MSM of other racial/ethnic groups, and may underestimate their personal risk for HIV.

Figure 3: Estimated Number of New HIV Infections among Men Who Have Sex with Men (MSM), 2009, by Race/Ethnicity and Age[†]


White:
50+ **1,600**
40–49 **3,400**
30–39 **3,200**
13–29 **3,200**

Black:
50+ **450**
40–49 **1,400**
30–39 **2,500**
13–29 **6,500**

Hispanic:
50+ **300**
40–49 **1,000**
30–39 **2,000**
13–29 **2,700**

Number of new infections — MSM

Figure 4: Estimated Number of New HIV Infections among Men Who Have Sex with Men (MSM), Ages 13–29, 2006–2009, by Race/Ethnicity

Legend: 2006, 2007, 2008, 2009

Black: 4,400 / 5,900 / 6,100 / 6,500
Hispanic: 2,100 / 2,900 / 2,500 / 2,700
White: 2,700 / 3,400 / 3,000 / 3,200
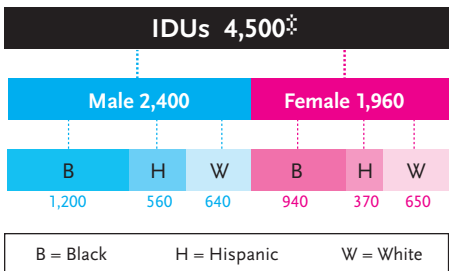
Number of new infections — MSM, Ages 13–29

[†]The estimate for each age range within a race/ethnicity group was calculated independently from the overall estimate for that group. Therefore, the sum of the estimates by age range may not equal CDC's official incidence estimate for a race/ethnicity group.

Figure 5: Estimated New HIV Infections among Heterosexuals, 2009, by Gender and Race/Ethnicity

Heterosexuals 12,900‡		

Male 3,590	Female 8,800	

B	H	W	B	H	W
2,400	640	550	5,400	1,700	1,700
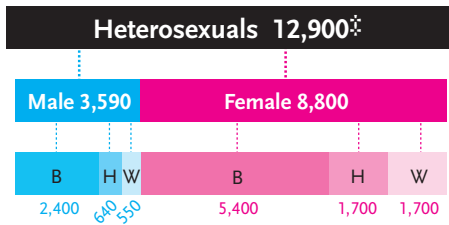
Figure 6: Estimated New HIV Infections among Injection Drug Users (IDUs), 2009, by Gender and Race/Ethnicity

IDUs 4,500‡		

Male 2,400	Female 1,960

B	H	W	B	H	W
1,200	560	640	940	370	650

B = Black	H = Hispanic	W = White

Heterosexuals

Heterosexuals accounted for 27 percent (12,900) of estimated new HIV infections in 2009. There was no statistically significant change in HIV incidence overall among heterosexuals between 2006 and 2009 (14,300 in 2006, 15,700 in 2007 and 14,500 in 2008).

More than two-thirds of those infected through heterosexual sex were women (68 percent), with black women most heavily affected.

Injection Drug Users

Injection drug users (IDUs) represented 9 percent (4,500) of estimated new HIV infections in 2009. Black men and black women accounted for the greatest numbers of new infections among IDUs (1,200 and 940 in 2009, respectively; see "By Race/Ethnicity" below). There was no statistically significant change in HIV incidence overall among IDUs between 2006 and 2009 (5,300 in 2006, 5,900 in 2007 and 5,100 in 2008).

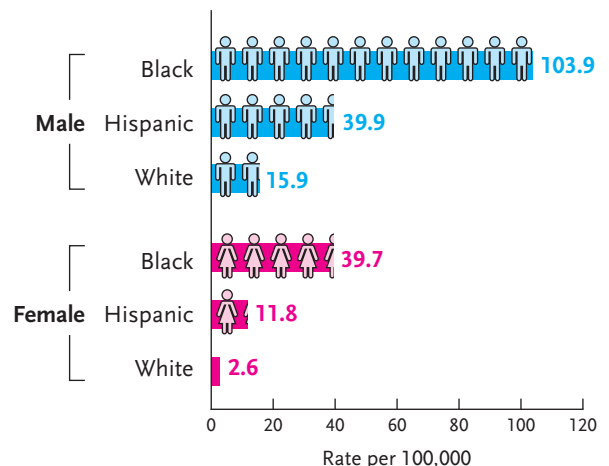## By Race/Ethnicity: African Americans Hardest Hit by HIV; Latinos Disproportionately Affected

Blacks

Overall: CDC's new estimates show that blacks bear the greatest burden of HIV. While blacks represent approximately 14 percent of the total U.S. population, blacks accounted for 44 percent (21,200) of all new HIV infections in 2009. The HIV infection rate among blacks in 2009 was almost eight times as high as that of whites (69.9 v. 9.1 per 100,000). There was no statistically significant change in overall HIV incidence from 2006 to 2009 among blacks (21,200 in 2006, 23,400 in 2007 and 21,900 in 2008).

Black Men: Black men represented almost one-third (31 percent) of all new HIV infections in the U.S. in 2009 (14,800), and accounted for 70 percent of new HIV infections among blacks. The infection rate among black men was the highest of any group by race and sex — more than six times that of white men (103.9 v. 15.9 per 100,000). The vast majority of infections were among MSM (see "By Route of Transmission" on page 3).

Figure 7: Estimated Rate of New HIV Infections, 2009, by Gender and Race/Ethnicity

		Rate per 100,000
Male	Black	103.9
	Hispanic	39.9
	White	15.9
Female	Black	39.7
	Hispanic	11.8
	White	2.6

Black Women: Black women are more affected by HIV than women of other races, accounting for 57 percent of all new HIV infections among women in 2009. The HIV infection rate among black women was 15 times that of white women (39.7 v. 2.6 per 100,000). Most black women (85 percent) were infected through heterosexual sex.

Hispanics

Overall: Hispanics represent approximately 16 percent of the total U.S. population, but accounted for 20 percent (9,400) of all new HIV infections in 2009. The HIV infection rate among Hispanics in 2009 was three times as high as that of whites (26.4 v. 9.1 per 100,000). Overall, there was no statistically significant change in HIV incidence from 2006 to 2009 among Hispanics (9,000 in 2006, 11,200 in 2007 and 9,000 in 2008).

Hispanic Men: Hispanic men accounted for 79 percent of new HIV infections among Hispanics in 2009 (7,400). The HIV infection rate among Hispanic men in 2009 was almost three times that of white men (39.9 v. 15.9 per 100,000). The vast majority of infections were among MSM (see "By Route of Transmission" on page 3).

Hispanic Women: The HIV infection rate among Hispanic women in 2009 was more than four times that of white women (11.8 v. 2.6 per 100,000). Most Hispanic women (82 percent) were infected through heterosexual sex.

Whites

Overall: Whites accounted for 32 percent (15,600) of all new HIV infections in 2009. The overall HIV infection rate among whites in 2009 (9.1 per 100,000) was substantially lower than that of most other racial/ethnic groups. There was no statistically significant change in HIV incidence from 2006 to 2009 among whites (16,600 in 2006, 18,900 in 2007 and 14,800 in 2008). White men accounted for 85 percent of new HIV infections among whites in 2009 (13,300), the vast majority of whom were MSM (see "By Route of Transmission" on page 3).

Other Racial/Ethnic Groups

Overall: The new estimates show that Asians accounted for 2 percent of new HIV infections (940) in 2009. American Indians/Alaska Natives (260), Native Hawaiians/Other Pacific Islanders (160), and individuals identifying as multiple races (520) each accounted for 1 percent or less of HIV incidence in 2009. There was no statistically significant change in HIV incidence from 2006 to 2009 among any of these racial/ethnic groups. Given the relatively small number of HIV infections in these populations, it was not possible to develop reliable estimates for these groups by route of transmission or gender.

Factors Contributing to Disparities

Research shows that racial disparities in health are often a marker of a range of broader social and economic challenges. For HIV, these include:

▶ Greater overall prevalence of HIV in these communities, and the fact that African Americans are more likely to select sex partners of the same race, increase an individual's risk of infection with every sexual encounter

▶ Higher rates of poverty in some communities of color, which can limit access to health care, HIV testing and medications that can lower levels of HIV in the blood and help prevent transmission

▶ Higher rates of undiagnosed/untreated STDs, which can increase the risk of both acquiring and transmitting HIV

▶ Stigma and homophobia, which may prevent many individuals from seeking testing, prevention and treatment services

▶ Higher rates of incarceration, which disrupt social and sexual networks in the broader community

▶ Power imbalances within sexual relationships for many women of color, which can make it difficult to negotiate consistent condom use

It is important that people who experience these circumstances understand that these factors may place them at greater risk for HIV and take steps to protect themselves. These include correct and consistent condom use, HIV and STD testing and limiting or reducing their number of sexual partners.

HIV Prevention Guided by National HIV/AIDS Strategy and New CDC Approach

The National HIV/AIDS Strategy, released in July 2010, guides the nation's response to the U.S. HIV/AIDS crisis. To help achieve the goals of the national strategy and ensure that HIV prevention efforts are having the greatest impact, CDC is pursuing "High-Impact Prevention," a new approach designed to maximize every prevention dollar by:

▶ Identifying the right combinations of cost-effective HIV prevention interventions

▶ Targeting them to the populations at greatest risk

▶ Implementing them on a large enough scale to significantly reduce new HIV infections in the United States

HIV: Protect Yourself

Be smart about HIV. Here's what you can do to reduce your risk of infection:

Get the facts — Arm yourself with basic information: Are you at risk? How is HIV spread? How can you protect yourself?

Take control — You have the facts; now protect yourself and your loved ones. Effective strategies for reducing HIV risk include:

▶ **Abstinence:** The most reliable way to avoid infection is to abstain from sex (i.e., anal, vaginal or oral).

▶ **Mutual monogamy:** Mutual monogamy means that you agree to be sexually active with only one person, who has agreed to be sexually active only with you. Being in a long-term mutually monogamous relationship with an uninfected partner is one of the most reliable ways to avoid HIV infection.

▶ **Reduced number of sex partners:** Reducing your number of sex partners can decrease your risk for HIV. It is still important that you get tested for HIV, and share your test results with your partner.

▶ **Condoms:** Correct and consistent use of the male latex condom is highly effective in reducing HIV transmission. Use a condom every time you have anal, vaginal or oral sex.

Additionally, HIV can be transmitted by injecting illicit drugs (drugs not prescribed by your doctor) through needles, syringes and other works if they are contaminated with the blood of someone who has the virus. It is vital that individuals who inject drugs use only clean needles, syringes and other works — and never share them.

Put yourself to the test — Knowing your HIV status is a critical step toward stopping HIV transmission, because if you know you are infected, you can take steps to protect your partners. Also, if you are infected, the sooner you find out, the sooner you can receive life-extending treatment. In fact, CDC recommends that everyone between the ages of 13 and 64 be tested for HIV. Because other STDs can play a role in the acquisition of HIV, knowing whether you are infected with an STD is critical for reducing your risk for HIV infection.

Call 1-800-CDC-INFO or visit www.hivtest.org to find HIV and STD testing locations near you.

Start talking — Talk to everyone you know about HIV — friends and family, coworkers and neighbors, at work and at places of worship. Have ongoing and open discussions with your partners about HIV testing and risk behaviors. Talking openly about HIV can reduce the stigma that keeps too many from seeking the testing, prevention and treatment services, and support they need.

HIV doesn't have to become part of your life. Each of us can and must be part of the solution.

HIV/AIDS Information and Resources

▶ General information about HIV/AIDS: **www.cdc.gov/HIV**

▶ HIV/AIDS news: **www.cdc.gov/nchhstp/newsroom**

▶ Act Against AIDS campaign: **www.actagainstaids.org**

▶ National HIV/AIDS Strategy: **www.whitehouse.gov/administration/eop/onap/nhas**

References

1 Hall HI et al. *J Acquir Immune Defic Syndr.* 2010 Oct 1;55(2):271-6.

2 Purcell DW et al. National STD Prevention Conference 2010.