

HIV Behavioral Surveillance in the Denver Metro Area

Understanding HIV Risk and
Prevention Behaviors Among
Heterosexuals at Increased
Risk for HIV Infection



Colorado Department
of Public Health
and Environment

**DENVER
HEALTH**



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Dear Neighbors,

For the first time since the beginning of the HIV/AIDS epidemic, an AIDS-free generation is within our reach. In Denver, the number of new HIV infections has been steadily declining over the past several years. This is an encouraging trend.

As more and more people are tested for HIV and those who are infected are treated, we will get closer and closer to zero new infections. Treatment not only prevents the spread of the virus, but it also gives a person who has the virus the ability to live a long and healthy life.

This report provides a comprehensive assessment of HIV risk behaviors and HIV prevention utilization of some of our citizens. By identifying those most likely to be at risk for HIV, prevention and testing efforts can be maximized by focusing on those at highest risk.

Over the past three decades, far too many lives have been lost to AIDS. I lost my own brother to AIDS in 1996. Things have changed since then, and the end of the AIDS epidemic is now truly in sight. I urge each of you to get tested and encourage your family and friends to get tested.

Respectfully,

A handwritten signature in blue ink, appearing to be "Michael B. Hancock", written over a circular stamp or seal.

Michael B. Hancock
Mayor

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EXECUTIVE SUMMARY

In alignment with the National HIV/AIDS Strategy, Denver Public Health (DPH) is committed to reducing the number of new HIV infections, improving health outcomes for people living with HIV, and reducing HIV-related health disparities. As part of the National HIV Behavioral Surveillance (NHBS) system, DPH has compiled behavioral surveillance data since 2004 for three populations most at risk for HIV infection: gay, bisexual, and other men who have sex with men (collectively referred to as MSM), persons who inject drugs (referred to as IDU), and heterosexuals at increased risk for HIV infection (HET).

In collaboration with the Centers for Disease Control and Prevention (CDC) and the Colorado Department of Public Health and Environment (CDPHE), DPH uses NHBS data to monitor HIV prevalence, HIV-related risk behaviors, HIV testing, and use of HIV prevention services and strategies in the Denver metro area.

In Denver, new cases of HIV infection have steadily decreased since 2005. However, the number of those living with HIV/AIDS is at an all-time high. Our goal is to identify and offer testing to those most at risk for HIV in order to increase awareness of infection status. In addition, identifying those unaware of their HIV infection helps prevent future HIV transmission.

In this report, we highlight findings from three cycles of data collection within the HET community in the Denver metro area from 2007, 2010, and 2013. We identify the following trends in risk behavior among heterosexuals at increased risk for HIV:

- In each cycle, more than half of males and females report having had multiple sex partners over the past 12 months. In 2013, this was true for 59.1% of males and 54.2% of females. Most do not use condoms with any partner (main or casual). Condomless sex was reported by 89.0% of males and 90.7% of females in 2013.
- Alcohol consumption is common. One in five (20.6%) HET characterized themselves as heavy drinkers in 2013, while 56.5% of males and 48.5% of females had at least one binge drinking episode in the past 30 days.



- A majority of HET (61.7%) have used non-injection drugs in the past 12 months, with marijuana being the most commonly used drug, followed by powdered and crack cocaine, and OxyContin.

To examine patterns of risk, HIV negative HET were placed into four risk groups (greatest, high, moderate, and low) based on the number of risk behaviors they reported engaging in during the 12-month period prior to participating in the survey. Risk behaviors included:

- Multiple sex partners: males with four or more partners, females with three or more partners
- Exchange partner (i.e., exchanging sex with a partner for money or drugs)
- Condomless anal sex with any partner type (i.e., main, casual, or exchange)
- Condomless vaginal sex with casual or exchange partners
- Non-injection drug use, other than marijuana
- Binge drinking during the past 30 days
- Diagnosed with a sexually transmitted infection

Across all cycles, the number of risk behaviors reported by HET respondents ranged from 0 to 7, with an overall mean of 2.01 reported risk behaviors (median = 2.0). The mean number of risk behaviors decreased from 2.09 in 2007, to 2.03 in 2010, to 1.86 in 2013.

Additionally, the proportion of HET in the greatest risk group decreased from 21.7% in 2007 to 15.1% in 2013 while the percent of participants in the low risk group increased from 42.3% in 2007 to 45.3% in 2013. Nonetheless, in 2013 more than half (54.7%) of HET respondents reported engaging in at least one or more behaviors that put them at risk for HIV.

The CDC recommends that all persons at high risk for HIV be tested at least annually. We note the following trends related to HIV testing among high risk heterosexuals:

- In 2013, less than one quarter (22.4%) of HET participants reported that they had been tested for HIV in the last year.
- Most HET reported visiting a health care provider in the past 12 months (72.5% in 2013), but only a quarter (28.0%) were offered an HIV test at their last visit.

In response, key parts of our strategy include:

- Increasing opportunities for testing to enable those with HIV to know their status and link to appropriate HIV medical care.
- Encouraging HET to assess their risk based on the seven risk behaviors outlined above and seek HIV testing as needed.
- Educating providers about the need to engage in conversations about HIV with their patients and to offer testing when appropriate.





Vision for the National HIV/AIDS Strategy

The United States will become a place where new HIV infections are rare and when they do occur, every person, regardless of age, gender, race/ethnicity, sexual orientation, gender identity, or socio-economic circumstance, will have unfettered access to high quality, life-extending care, free from stigma and discrimination.

In July 2015, the White House released an updated National HIV/AIDS Strategy (updated to 2020);¹ a comprehensive roadmap for responding to the HIV/AIDS epidemic in a broad-reaching and coordinated manner. The updated Strategy has four goals:

1. Reducing new HIV infections.
2. Increasing access to care and improving health outcomes for people living with HIV.
3. Reducing HIV-related health disparities and health inequities.
4. Achieving a more coordinated national response to the HIV epidemic.

Denver Public Health (DPH) is committed to addressing these goals through surveillance activities and by providing outreach, testing, and care services to residents living in the Denver community. A first step toward slowing the spread of HIV and improving the health of people living with HIV is to understand trends in risk behaviors, HIV testing, HIV prevalence, and patterns of care-seeking among those most at risk for infection.

NHBS data are used to provide a behavioral context for trends in HIV surveillance data. Through systematic surveillance in groups at increased risk for HIV infection, NHBS is critical for monitoring the impact of the National HIV/AIDS Strategy, which focuses on decreasing HIV incidence, improving linkage to care, and reducing disparities.⁴

As of December 2014, 12,968 Coloradans were living with HIV, with 367 individuals newly diagnosed with HIV in that year. Three-quarters (75%) of these individuals reside in the Denver metropolitan area (Adams, Arapahoe, Denver, Douglas, and Jefferson counties). Among all risk categories reported for HIV transmission, heterosexual contact is a growing risk category in Colorado, increasing by 15.8% from 2009 to 2013.²

Women are at particular risk for HIV infection due to high risk heterosexual contact. In Colorado, over half (56.8%) of women newly diagnosed with HIV became infected as a result of heterosexual contact.³ Furthermore, women of color are disproportionately affected with HIV.

To monitor trends in HIV-related risk behaviors, the Centers for Disease Control and Prevention (CDC) funds the National HIV Behavioral Surveillance (NHBS) system. NHBS was established in 2003 and is conducted in 20 sites across the United States, including the Denver metropolitan area. NHBS monitors risk behaviors and access to prevention services among three populations at high risk for HIV: gay, bisexual, and other men who have sex with men (collectively referred to as MSM), persons who inject drugs (referred to as IDU), and heterosexuals at increased risk for HIV infection (HET). Jurisdictions participating in NHBS conduct surveillance activities within these three populations on an annual rotating basis. In Denver, NHBS is locally known as REACH (Risk Education Aimed at Community Health).

The Colorado Department of Public Health and Environment (CDPHE), the state health department, receives funding from CDC to participate in NHBS and contracts with DPH, the local health department for the City and County of Denver, to conduct NHBS in the Denver metro area. Before each cycle, DPH conducts formative research to learn more about the characteristics of the target population, identify potential barriers to recruitment and participation, in addition to garnering

community support. Participants in each cycle complete a standardized, anonymous questionnaire regarding HIV-related risk behaviors, HIV testing, and the use of HIV prevention services.

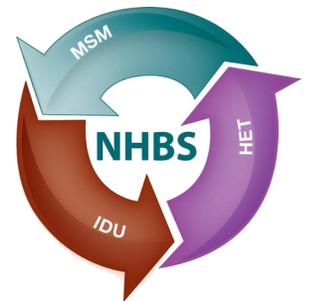
Since 2007, HIV testing has been offered to all NHBS participants. DPH uses data from NHBS to guide prevention, HIV counseling, and testing services in the Denver metro area. Across the United States, CDC uses NHBS data to track behavioral trends and better understand patterns in HIV surveillance data.

By providing information on the following topics, NHBS offers a perspective on how risk behaviors are changing over time as well as whether at-risk populations are utilizing HIV prevention services:

- The prevalence and trends in sexual and drug-use risk behaviors
- The prevalence of, and trends in, HIV testing
- The exposure to, and use of, prevention services
- The impact of prevention services on behavior
- Missed opportunities for prevention
- The prevalence of, and trends in, HIV positivity
- Behaviors associated with HIV status

Across the country, approximately one in four (27%) of the estimated HIV infections diagnosed in 2011 were attributed to heterosexual contact. Moreover, heterosexual sex is the most common route of HIV infection for women. Groups at particular risk include those with low socio-economic status (SES), particularly Black and Hispanic/Latina women.⁵ Enabling high risk heterosexuals to gain access to HIV testing and HIV prevention services represents a critical intervention opportunity to further reduce HIV prevalence and incidence.

DPH relies on NHBS as the primary source of data for monitoring behaviors among populations at risk for HIV infection in Denver, including HET. By examining NHBS behavioral data and HIV test results, DPH can describe HIV-related trends among HET, including patterns in HIV risk and testing behaviors and gaps in prevention efforts.



Heterosexual sex is the second most common route of transmission of HIV in the United States and the primary route of transmission for women. The high level of HIV infection observed in NHBS among low-SES heterosexuals [those with low socio-economic status] living in metropolitan statistical areas [MSAs] with high AIDS prevalence is a serious public health concern. Efforts to 1) reduce stigma and make HIV testing accessible, affordable, and culturally acceptable; 2) improve linkage to HIV care and treatment; and 3) implement interventions that address behavioral and structural factors that place low-SES heterosexuals at higher risk for contracting HIV infection could lead to reductions in HIV incidence and health inequities to achieve the goals of the National HIV/AIDS Strategy.⁶

METHODS

The DPH team implemented NHBS among HET living in the Denver metro area at three points in time: 2007, 2010, and 2013. NHBS cycles among MSM occurred in 2004-05, 2008, and 2011, and IDU cycles took place in 2006, 2009, and 2012. Data collected in these cycles allow DPH to monitor each at-risk population for trends in HIV risk behaviors, HIV testing, HIV prevalence, unrecognized HIV infection, and participation in prevention programs.

NHBS participants are not asked to disclose any personally identifying information other than their date of birth and zip code. To be eligible for NHBS, participants must be at least 18 years of age, live within the targeted MSA, be able to complete the survey in either English or Spanish, and be able to provide consent to participate in the survey. Those who previously completed an NHBS survey in a particular cycle are not eligible to do so again in that same cycle. In addition to these basic NHBS eligibility criteria, participation in the NHBS-HET cycle is limited to men and women aged 60 and under who have engaged in vaginal or anal sex with an opposite-sex partner in the 12 months before the interview.

The 2007 cycle of NHBS among HET was considered a pilot, with half of participating sites using respondent-driven sampling (RDS) to recruit participants (as used in the NHBS-IDU cycles) and the other half of sites using venue-based time-space sampling (as used in the NHBS-MSM cycles). Ultimately, RDS was chosen as the recruitment method for the NHBS-HET cycles. Sampling focused on persons of low-SES (i.e., income at or below the federal poverty level or no more than a high school education). The decision to focus sampling on persons of low-SES was based on results from the 2007 pilot cycle which indicated that heterosexual adults of low-SES were more likely than those of high-SES to be infected with HIV. In the pilot cycle,

the age eligibility criterion was limited to those between the ages of 18 and 50. In later cycles, the upper limit of the age criterion was raised to 60.

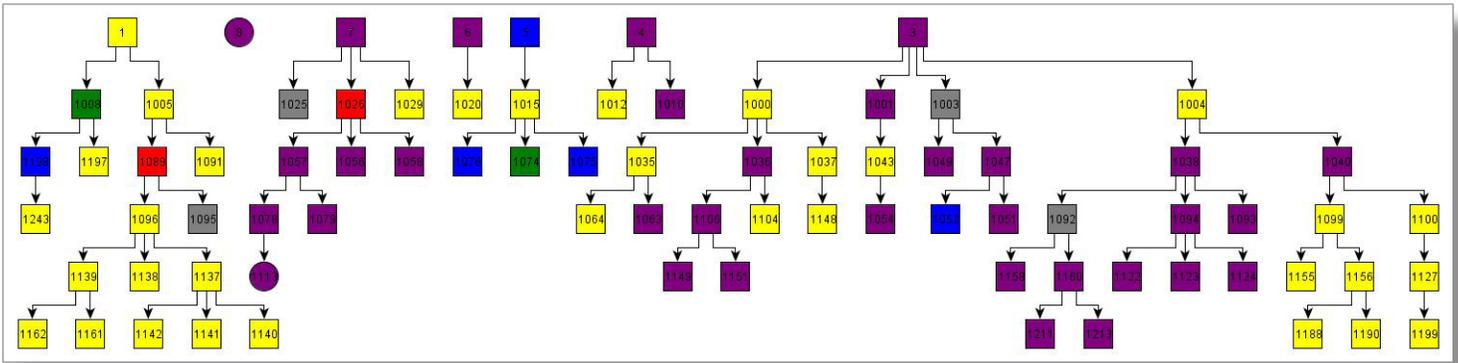
Using a standardized questionnaire designed by the CDC, trained interviewers conducted face-to-face interviews using a hand-held computer. All participants were offered a free, anonymous HIV test, the results of which were linked to the individual's survey responses. HIV testing was conducted in all three cycles. In 2007 and 2010, DPH utilized oral fluid specimens for HIV testing. In 2007, non-rapid testing was conducted in the field using the OraSure® HIV-1 Oral Specimen Collection Device and the same oral specimen was used for HIV-1 Western Blot confirmatory testing by the CDPHE laboratory. In 2010, rapid testing was conducted in the field using the OraQuick ADVANCE® Rapid HIV 1/2 Antibody Test and Western Blot confirmatory testing was performed by the CDPHE laboratory. In 2013, DPH utilized blood specimens for rapid and confirmatory HIV testing. Rapid testing was conducted in the field using the Clearview® COMPLETE HIV 1/2 Antibody Test and Western Blot confirmatory testing on dried blood spots was performed by the CDPHE laboratory.

Sampling Method

Participants were recruited using RDS, a peer-referral sampling methodology.⁷ In RDS, initial “seed” participants are identified through key stakeholders and are recruited for participation. During the HET cycles, seeds were intentionally recruited from census tracts identified as having high rates of poverty, where at least 25% of residents live below the established federal poverty threshold. In addition, persons who had ever injected drugs were not recruited as seed participants.



Figure 1: Example of Respondent-Driven Sampling Recruitment Chains



After their recruitment and participation, seeds were then asked to recruit persons from their networks using referral coupons; those persons in turn were asked to recruit persons from their networks, and so on (Figure 1). Each eligible participant was allowed to refer up to five persons from their network. Participants were instructed to recruit someone they knew who lived in the Denver area and had not already done the survey that year.

RDS employs a dual incentive structure; thus, participants were compensated for their participation in the survey and HIV testing, in addition to being compensated a smaller amount for each eligible person they successfully recruited.

Data Collection

Verbal informed consent was obtained from eligible participants. HIV testing was offered in all cycles, with testing consent documented separately from survey consent. Information provided in the consent process included a brief description of the study purpose, the HIV test process, and the incentives for completing the survey and the HIV test.

The survey included questions related to demographic characteristics, HIV testing experiences, sexual and drug

use behaviors, other health conditions such as hepatitis and sexually transmitted infections (STIs), and use of HIV prevention services. Those completing the survey received a \$25 gift card for their participation. Participants who consented to HIV testing received an HIV test, counseling, and an additional \$25 incentive. Participants who recruited others were paid \$10 for each eligible person they recruited who completed the survey.

Participants

Table 1 presents the number of eligible HET participants with complete records for each HET cycle. Inclusion in the analysis for this report is limited to participants who 1) were eligible for and consented to the interview and 2) reported low-SES. Moreover, to focus the analysis on those at risk for acquiring HIV infection through heterosexual sex, all analyses excluded data from participants who reported male-male sex or injection drug use in the past 12 months prior to the survey. Across the three cycles, data from a total of 1,694 participants are included in this report (668 in 2007, 525 in 2010, and 501 in 2013) [Table 1].

Table 1. Number of Individuals Approached, Screened, and Included in Report Analyses

	HET1 [2007]	HET2 [2010]	HET3 [2013]
Number of seed participants	2	6	11
Screened	1,122	625	677
Eligibility screener: vaginal or anal sex with an opposite-sex partner in the past 12 months	1,047	622	608
Documented consent to survey	909	624	585
Documented consent to HIV testing	892	620	582
Low-SES and no recent history of MSM or IDU	674	529	506
Complete records included in analysis	668	525	501

In this analysis, we compiled survey data and HIV test results from the three HET cycles into a single data file to allow comparisons across the three points in time. Not all important variables could be aligned across the three cycles because some questions were not asked in each cycle and other questions were asked in a manner that could not be reconciled across all cycles. For example, participants surveyed in 2007 and 2010 were asked a variety of sex-related questions about their reported main, casual, and exchange sex partners. Questions about exchange behaviors were asked only for reported exchange partners and not for any other type of partners that might have been reported. In 2013, participants were asked questions about their main and casual sex partners; however, they were also given the opportunity to report on exchange behaviors with all types of partner. For more information on the alignment of data across the three cycles, contact Denver Public Health.

The purpose of the current report is to provide key stakeholders with information on how risk behaviors and HIV prevalence changed over time in the HET population. We utilized chi-square analyses to test whether risk behaviors changed across the three cycles when indicated throughout the report.

To assess risk and testing experiences among persons at risk for acquiring HIV infection through heterosexual sex, analyses excluded participants who were not low-SES, those who reported ever having tested positive for HIV, and those who reported recent [i.e., in the 12 months before the interview] male-male sex or injection drug use. Participant demographics across the three NHBS-HET cycles are described in Table 2.

- Across the three cycles, female HET represent more than half of those surveyed. The proportions for 2007, 2010, and 2013 are 64.4%, 58.3%, and 52.3% respectively.
- HET surveyed in each of the three years tend to be evenly split across all age groups. In 2007, nearly half [43.7%] of the respondents were between the ages of 18 and 29 years. In subsequent years, HET were recruited from all eligible age groups with slight under representation among those between 30 and 39 years of age.
- Proportionally, the majority of those surveyed are persons of color, with only one in ten respondents being white, non-Hispanic [9.3% in 2007, 9.3% in 2010, and 10.0% in 2013].

Table 2. Participant Demographics

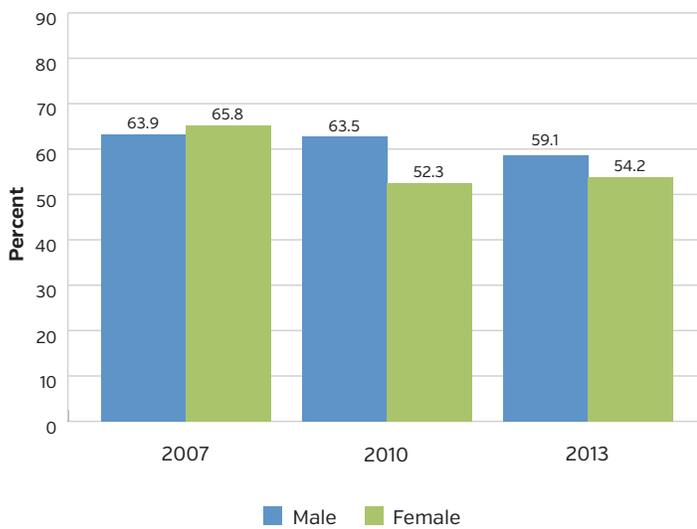
Characteristic	2007 [N = 668]		2010 [N = 525]		2013 [N = 501]	
	N	%	N	%	N	%
Gender						
Male	238	35.6	219	41.7	239	47.7
Female	430	64.4	306	58.3	262	52.3
Age						
18-29	292	43.7	144	27.4	138	27.5
30-39	152	22.8	104	19.8	93	18.6
40-49	216	32.3	146	27.8	127	25.4
50+	8	1.2	131	25.0	143	28.5
Race/Ethnicity						
Black, Non-Hispanic	349	52.2	204	38.9	132	26.3
Hispanic	229	34.3	210	40.0	283	56.5
White, Non-Hispanic	62	9.3	49	9.3	50	10.0

Note: For the 2007 cycle, the range for age eligibility was 18 to 50 years. For the 2010 and 2013 cycles, the range was 18 to 60 years.

Sexual Behaviors

According to the CDC, having a greater number of sexual partners increases the risk that a sexual partner might be infected with HIV or have a viral load that has not been suppressed.⁸ Across the three survey administrations, a majority of HET reported having multiple sex partners of the opposite sex during the past 12 months (Figure 2).

Figure 2. Percent That Engaged in Vaginal or Anal Sex With More Than One Opposite-Sex Partner During the Past 12 Months



HET participants were asked if they had exchanged money or drugs for sex during the past 12 months. In 2007 and 2010, this question was only asked if the respondent indicated that they had an exchange partner, while in 2013, respondents could report on patterns of exchange for any and all types of partners. Hence, the trends shown in Figure 3 are not strictly comparable. Across all three waves, the rates of exchange sex with their last partner for both males and females are relatively low. The proportion of males reporting exchange sex ranged from 3.8% in 2007 to 5.0% in 2013, although this increase may be an artifact of how the question format changed over time. Females reporting exchange sex remained similarly low over the three survey administrations [3.5% in 2007, 2.6% in 2010, and 3.8% in 2013].

Figure 3. Percent Reporting That Last Partner Was Exchange Partner



The 2007 pilot HET cycle included a one-time supplemental partner study which aimed to collect information from heterosexual minority women and their male sex partner(s) to better understand the male partners' risk behaviors and the accuracy of the women's perceptions of these risk behaviors. Female NHBS-HET1 participants were eligible to participate in the partner study if they were Black or Hispanic/Latina, had a male sex partner in the past three months, and were willing to recruit one or two recent male sex partners who were at least 18 years of age. For more information about the partner study, contact Denver Public Health.

Condom Use

According to the CDC, consistent condom use during sexual intercourse is a highly effective way to reduce the chance of becoming infected with HIV.⁹ HET participants were asked about their use of condoms as well as the number and type of sex partners. Sex partners were characterized as either main or casual. A main partner was someone to whom the HET participant felt most committed, for example a boyfriend or girlfriend, a husband or wife, a significant other, or life partner.

Figure 4. Percent Reporting Condomless Sex in Past 12 Months Among Males

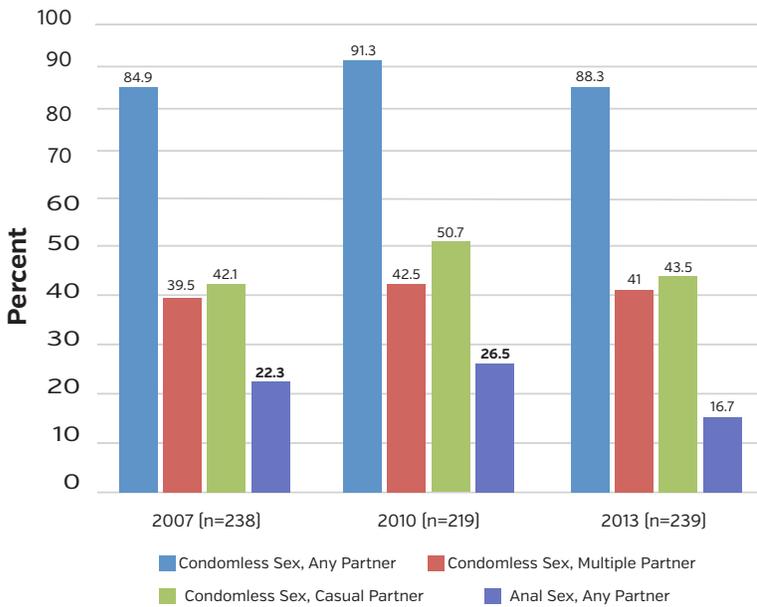
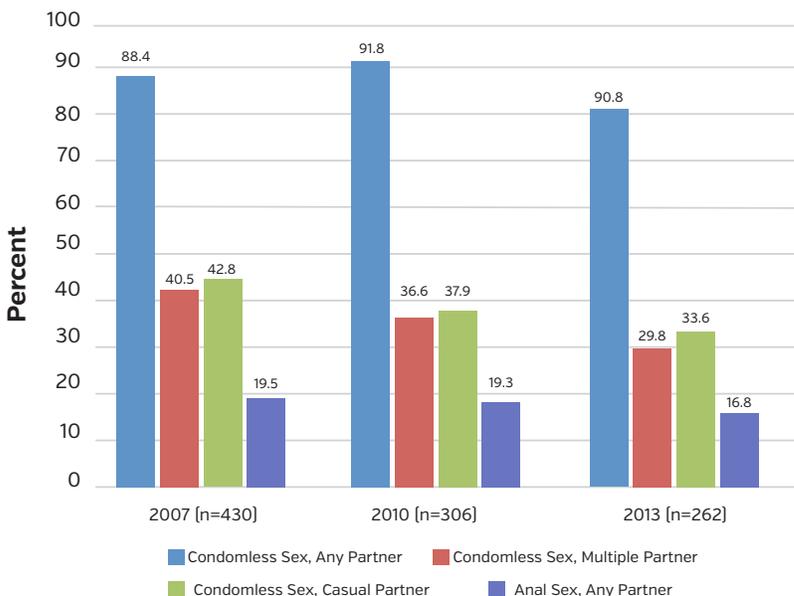


Figure 5. Percent Reporting Condomless Sex in Past 12 Months Among Females



Casual partners, by comparison, were those to whom the participant did not feel committed, whom the participants did not know well, or with whom the participant engaged in sex in exchange for drugs or money.

Condomless sex was reported by the vast majority of HET participants, regardless of gender (Figures 4 and 5). Condomless sex is riskier under certain conditions including sex with multiple sexual partners, sex with a casual partner, and anal sex. Among these three types of riskier condomless sex, condomless sex with a casual partner or with multiple partners was reported by more participants than condomless anal sex. Males were slightly more likely than females to report condomless sex with multiple partners. Similarly, males were more likely than females to report condomless sex with a casual partner. A quarter or fewer HET participants reported engaging in condomless anal sex, with females somewhat less likely to report condomless anal sex than men.



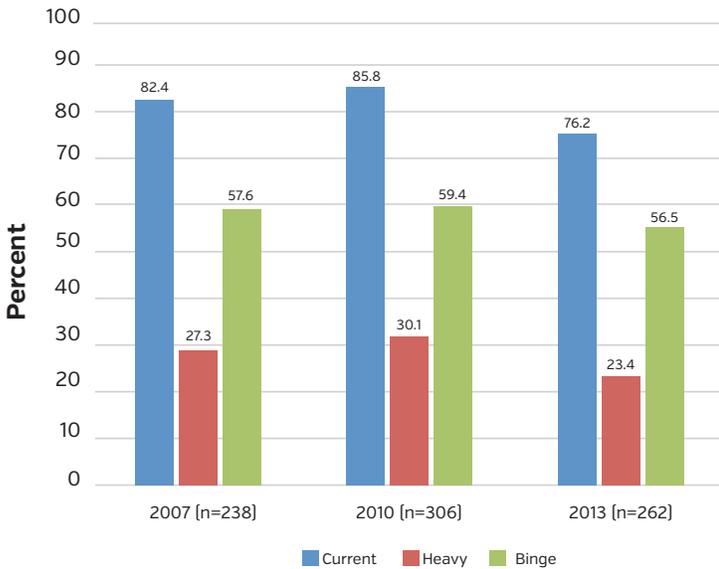
Alcohol Use

Alcohol use has been shown to increase risky sexual behaviors and to decrease adherence to HIV medications.¹⁰ As part of NHBS, HET participants were asked about their alcohol use in the past 30 days. Current drinkers were defined as those having at least one alcoholic drink in the past 30 days. Heavy drinkers were defined as those who drank on average more than two drinks (males) or more than one drink (females) per day in the past 30 days. Binge drinking entailed the consumption of five or more drinks in one sitting for males and four or more drinks in one sitting for females. HET participants were asked if they had had at least one binge episode in the past 30 days.

Alcohol consumption is very common among HET males (Figure 6), with most defining themselves as current drinkers [82.4% in 2007, 85.8% in 2010, and 76.2% in 2013]. A quarter characterized themselves as heavy drinkers [27.3% in 2007, 30.1% in 2010, and 23.4% in 2013] and more than half engaged in binge drinking [57.6% in 2007, 59.4% in 2010, and 56.5% in 2013].

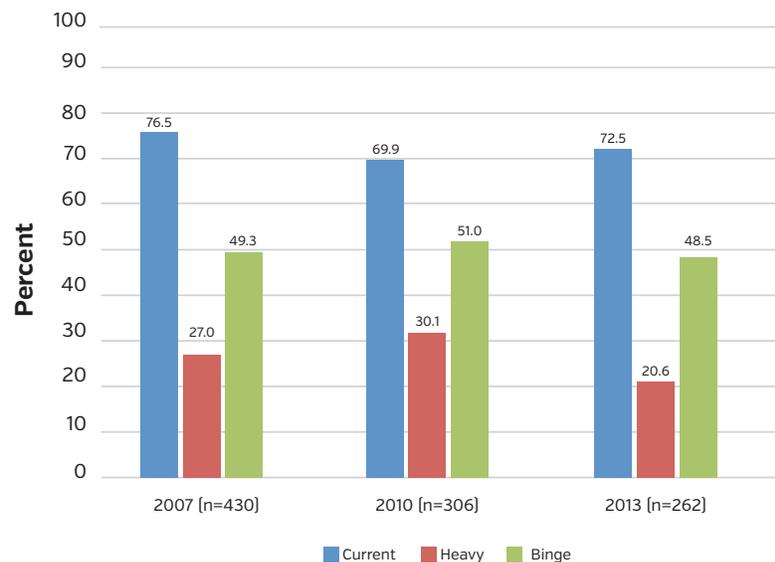


Figure 6. Alcohol Use During the Past 30 Days Among Males



Patterns of alcohol consumption were similar for HET females (Figure 7). Three out of four reported that they were current drinkers [76.5% in 2007, 69.9% in 2010, and 72.5% in 2013]. A quarter described their drinking as heavy [27.0% in 2007, 30.1% in 2010, and 20.6% in 2013] and close to half reported having had binge drinking episodes during the past 30 days [49.3% in 2007, 51.0% in 2010, and 48.5% in 2013].

Figure 7. Alcohol Use During the Past 30 Days Among Females



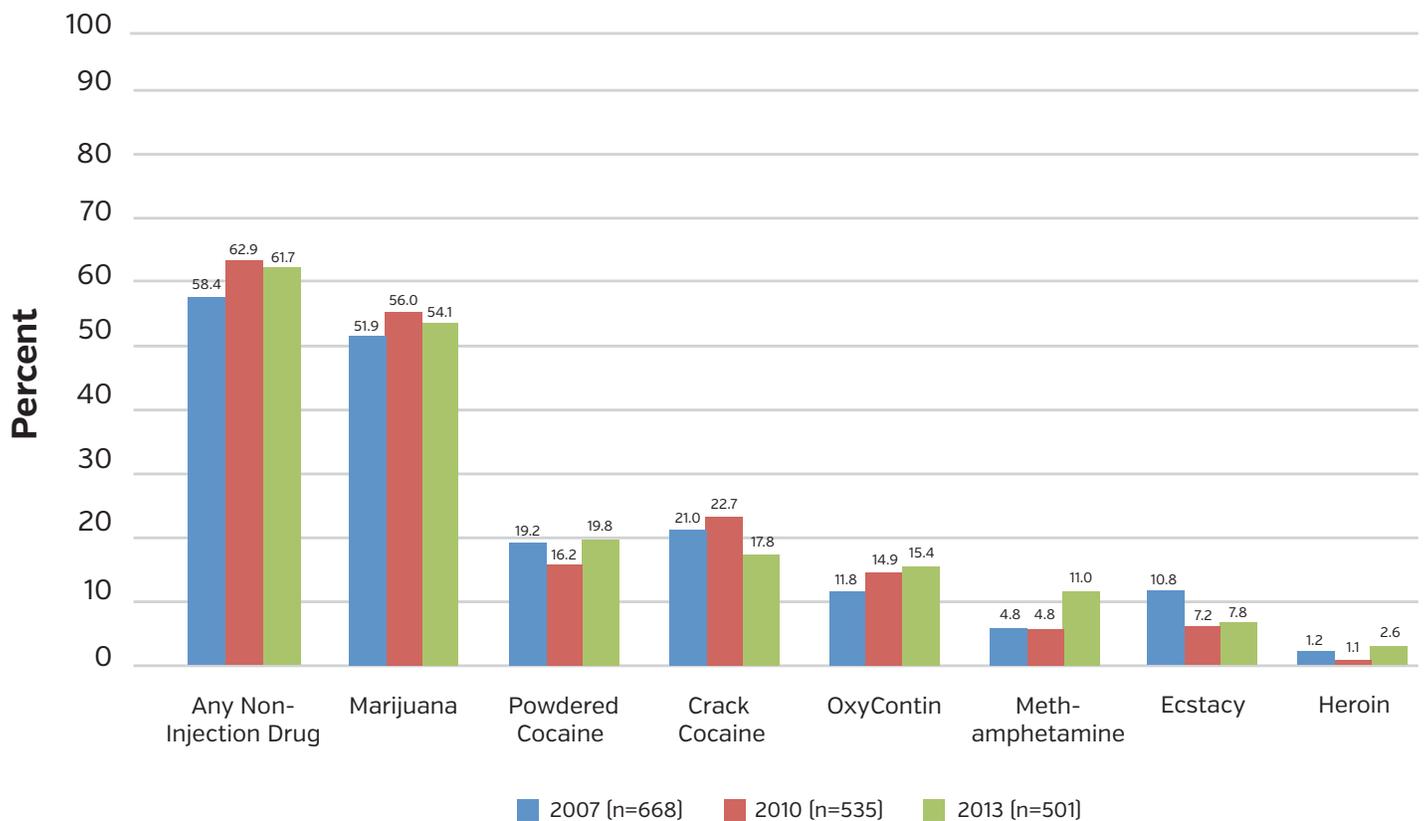
Non-Injection Drug Use

Across the United States, HET respondents are most likely to report using marijuana [51%], followed by crack cocaine [15%], powdered cocaine [12%], painkillers [11%], and ecstasy [11%].¹¹

Drug use in general has been found to be associated with multiple negative health outcomes including an increased risk for HIV infection.¹² A majority of HET participants report using non-injection drugs (Figure 8). Similar to national trends, marijuana is the most commonly used drug [51.9% in 2007, 56.0% in 2010, and 54.1% in 2013].¹³ Cocaine is the next most commonly reported drug, consumed either in powdered form [19.2% in 2007, 16.2% in 2010, and 19.8% in 2013] or as crack cocaine [21.0% in 2007, 22.7% in 2010, and 17.8% in 2013].

OxyContin use increased over the three cycles [11.8% in 2007, 14.9% in 2010, and 15.4% in 2013]. While the use of methamphetamine had been low in 2007 [4.8%] and 2010 [4.8%], usage more than doubled to 11.0% in 2013. Ecstasy use was 10.8% in 2007, 7.2% in 2010, and 7.8% in 2013. One to two percent of HET participants reported using heroin in the past 12 months [1.2% in 2007, 1.1% in 2010, and 2.6% in 2013].

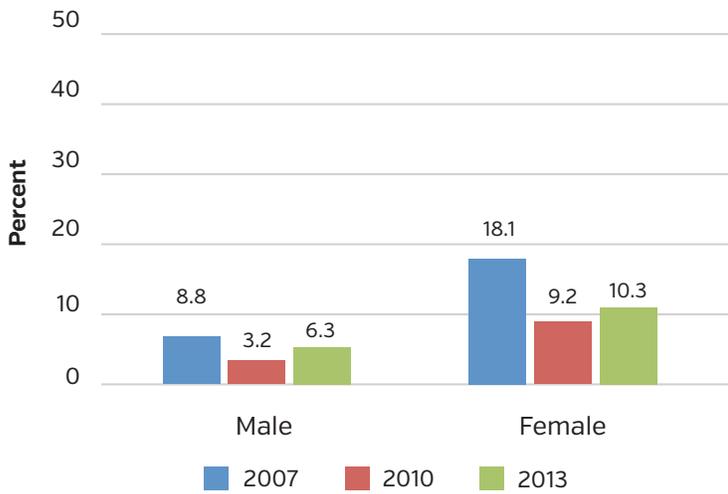
Figure 8. Percent of Non-Injection Drug Use in the Past 12 Months



Sexually Transmitted Infection Diagnosis

STI diagnoses are more common among HET women as compared with men (Figure 9). Women's self-reported STI diagnoses in the past 12 months ranged from 18.1% in 2007, to 9.2% in 2010, to 10.3% in 2013. The comparable proportions of men with a self-reported positive STI diagnosis were 8.8% in 2007, 3.2% in 2010, and 6.3% in 2013.

Figure 9. Percent of Males and Females Reporting STI Diagnoses in the Past 12 Months



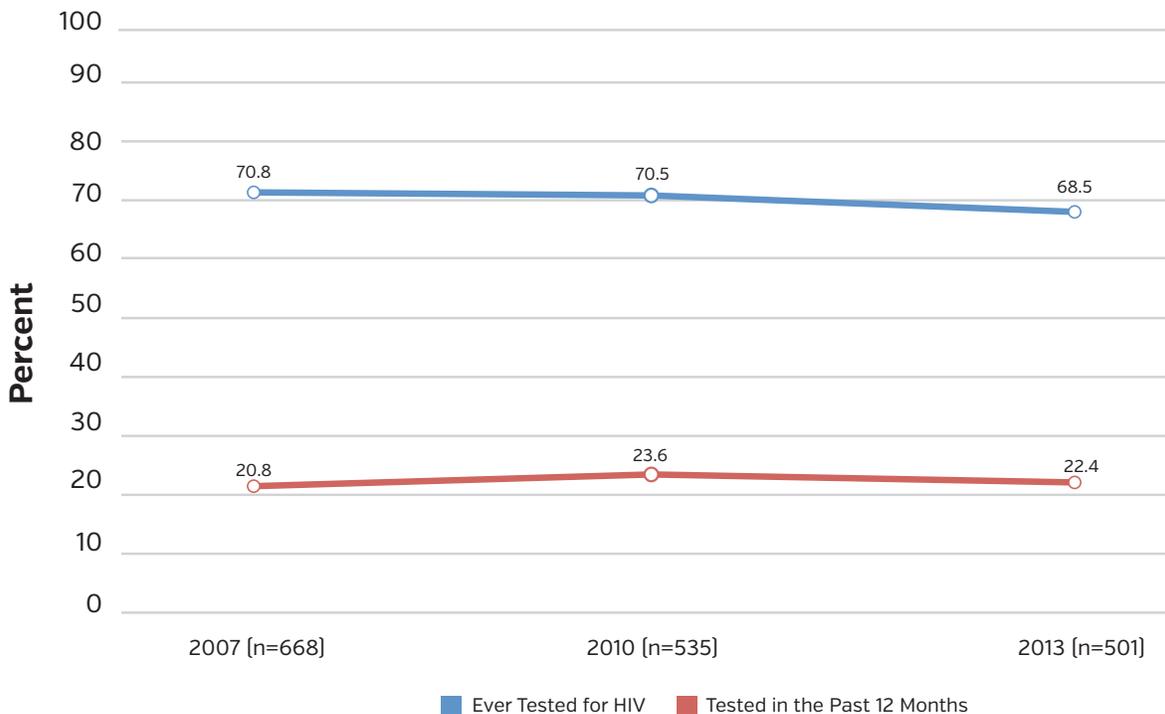
HIV Testing

The CDC recommends that all persons at high risk for HIV be tested at least annually.¹⁴ Persons deemed to be at high risk include those seeking treatment for an STI, persons who exchange sex for drugs or money, sex partners of IDUs, MSM, or HIV-infected persons, as well as those who have had a new sex partner since their last HIV test.

In all three cycles, at least two out of three HET survey respondents report having ever been tested for HIV (Figure 10). However, less than a quarter report having had an HIV test during the past 12 months in 2013. Whereas 20.8% had an HIV test in the past 12 months in 2007, this was true for 23.6% in 2010 and 22.4% in 2013.



Figure 10. Percent of HET Tested for HIV by Year



HIV Prevalence

In 2013, the overall HIV prevalence among heterosexuals based on NHBS data from 20 cities was 1.7% for males and 2.5% for females for an overall prevalence of 2.1%.¹⁵ In Denver, HIV prevalence in 2013 was lower with only 0.5% of NHBS-HET participants being HIV-positive.

- In 2007, of the 651 HET participants tested for HIV, four tested HIV-positive, for an overall HIV prevalence rate of 0.6%. Among the four who were identified as being infected, three were previously unaware of their infection (Figure 11).
- In 2010, of the 512 HET participants tested for HIV, six tested HIV-positive, for an overall HIV prevalence of 0.8%. Of those who tested positive, only one participant was unaware of their HIV infection.

- In 2013, of the 498 HET participants tested for HIV, four tested HIV-positive, for an overall HIV prevalence of 0.8%. Among those who tested positive, all were aware of their HIV infection.

Overall, the number of newly diagnosed cases of HIV infection has declined substantially in the Denver metropolitan area, from a high of 238 cases in 2005 to 117 cases in 2013.

Figure 11. Number of People with Self-Reported or Unrecognized HIV Infection Among HET by Year

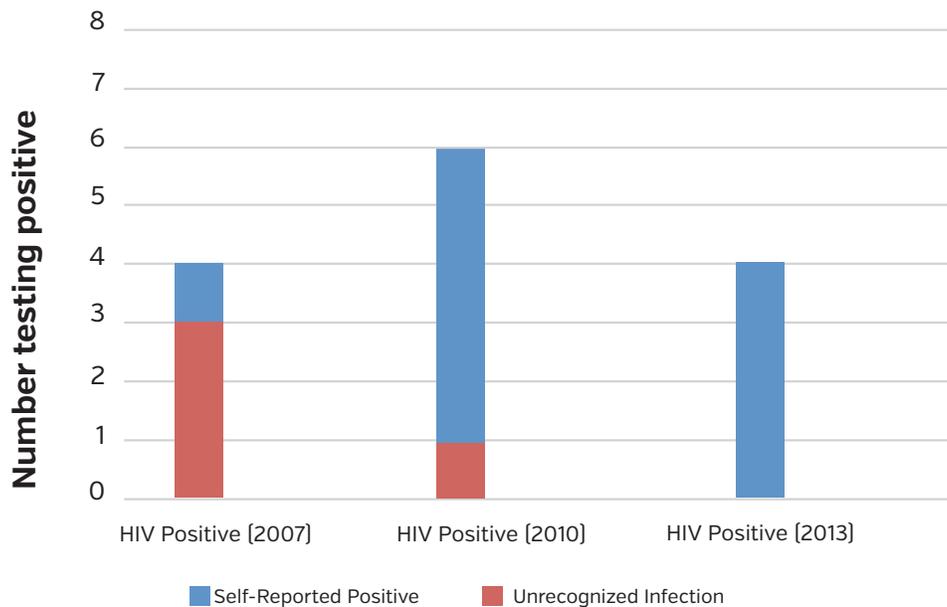
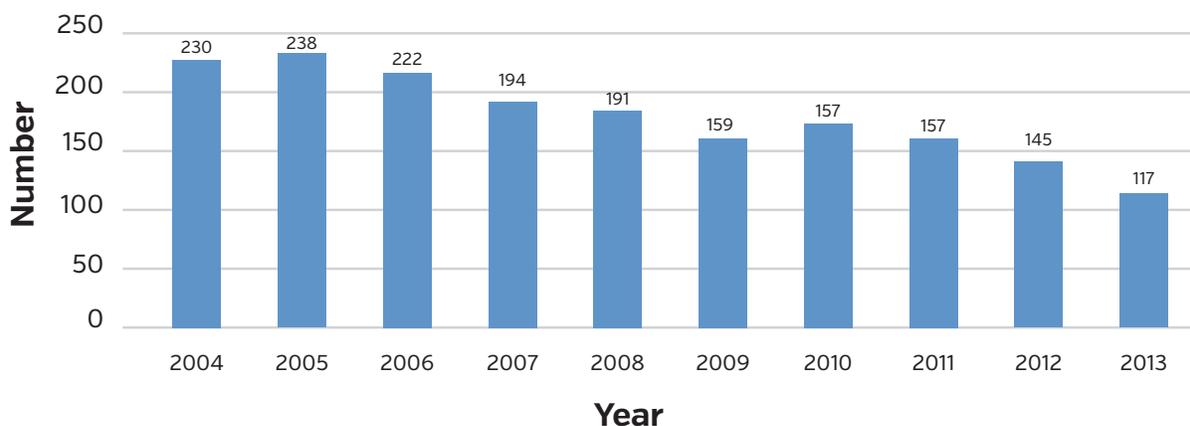


Figure 12. Number of New Diagnoses of HIV Infection by Year for Denver County Residents



SOCIAL DETERMINANTS AND PREVENTION BEHAVIORS

Socioeconomic Characteristics

Social determinants, including housing, employment, education, and income influence risk behavior patterns as well as access to health care for those at risk for HIV infection.¹⁶ As detailed earlier, HET participants were purposefully recruited to include only individuals with low-SES, defined as having income at/or below the federal poverty level or as having no more than a high school education.

Examining the social risk characteristics among HET participants in the three cycles allows the DPH team to tailor prevention strategies that address the changing needs of the HET population (Table 7).

- Close to half of HET respondents have never married and were not cohabitating [53.1% in 2007, 43.6% in 2010, and 44.1% in 2013].

- Across the three cycles, more than three out of four HET participants had a high school degree or less. In 2007, 78.2% of HET had some high school education or less or had graduated high school or obtained a GED, compared with 78.1% in 2010, and 80.8% in 2013.
- The majority of HET participating in the NHBS survey reported income levels of less than \$20,000 [85.3% in 2007, 88.0% in 2010, and 83.6% in 2013].
- Homelessness in the past 12 months was consistently high among HET participants. Nearly one in three were either currently homeless at the time of the interview or had been homeless in the past year [31.8% in 2007, 38.1% in 2010, and 28.2% in 2013].

Table 7. Education and Socioeconomic Characteristics

Characteristic	2007 (N = 668)		2010 (N = 525)		2013 (N = 501)	
	N	%	N	%	N	%
Marital Status						
Married or cohabitating	154	23.1	135	25.7	123	24.6
Formerly married, not cohabitating	159	23.8	161	30.7	157	31.1
Never married, not cohabitating	355	53.1	229	43.6	221	44.1
Highest Level of Education Completed						
Some high school or less	227	34.0	180	34.3	197	39.3
High school graduate or GED	295	44.2	230	43.8	208	41.5
Some college or more	146	21.8	115	21.9	96	19.2
Annual Income*						
\$0 - \$4,999	209	31.8	189	36.0	133	26.5
\$5,000 - \$9,999	161	24.5	134	25.5	123	24.6
\$10,000 - \$19,999	191	29.0	139	26.5	163	32.5
\$20,000 or more	97	14.7	63	12.0	82	16.4
Homeless						
Currently homeless	102	15.3	115	21.9	91	18.2
Homeless in the past 12 months, but not currently	110	16.5	85	16.2	53	10.0
Not homeless in the past 12 months	456	68.2	325	61.9	71.3	19.2

*Ten respondents in cycle 1 did not report an income.



Health Care Access

Having access to a regular source of health care is an important determinant of maintaining good health. A majority of HET respondents report having health insurance and proportionally high numbers had seen a provider in the past 12 months. Among those seeking care, only half were offered an HIV test at their last visit (Table 8).

- Since 2007, the number of HET participants reporting health insurance increased, with the greatest increase observed between 2010 and 2013, following the implementation of the Affordable Care Act.

- Participants were only asked about whether they have a regular source of medical care in 2013. In this year, 80.2% reported that they had a provider they regularly visited for health care services.
- Despite their use of health services, less than half of participants were offered an HIV test at their last visit. Providers offered HIV testing to 39.5% of HET in 2007, 35.2% in 2010, and 28.0% in 2013.

Less than half of HET surveyed reported ever receiving drug or alcohol treatment (Table 9). Of those that reported ever participating in a drug or alcohol treatment program, 25.1% attended one in the last 12 months in 2013. This was also true for 33.0% of HET in 2007 and 31.0% in 2010.

Table 8. Health Care Access and HIV Testing

Characteristic	2007 (N = 668)		2010 (N = 525)		2013 (N = 501)	
	N	%	N	%	N	%
Have health insurance	328	49.1	283	53.9	310	61.9
Have a regular source of medical care	---	---	---	---	402	80.2
Visited health care provider in last 12 months	473	70.8	384	73.1	363	72.5
Health care provider offered HIV test at last visit*	186	39.5	135	35.2	100	28.0

*Only those who visited a health care provider in the last 12 months were included in the calculation of the percentage of individuals who were offered an HIV test by their provider.

Table 9. Participation in Drug and Alcohol Treatment

Characteristic	2007 (N = 668)		2010 (N = 525)		2013 (N = 501)	
	N	%	N	%	N	%
Ever participated in drug or alcohol treatment	224	33.5	213	40.6	211	42.1
Participated in drug or alcohol treatment in the last 12 months*	74	33.0	66	31.0	53	25.1

*Only those who reported ever having participated in a drug or alcohol treatment program were included in the percent calculations.

SPECIAL FOCUS: RISK PATTERNS AMONG HETEROSEXUALS AT INCREASED RISK FOR HIV

Persons who engage in risky behaviors are at greater risk for HIV infection. In this section of the report, we highlight NHBS survey results for HET whose behavior is considered at highest risk, yet who were not currently infected with HIV or did not know their HIV status at the time of the interview. We compiled data from the three cycles of the survey to categorize HIV-negative individuals based on the number of risk behaviors they engaged in during the 12-month period prior to participating in the survey, with the following behaviors considered:

- Multiple sex partners: males with four or more partners, females with three or more partners
- Exchange partner (i.e., exchanging sex with a partner for money or drugs)
- Condomless anal sex with any partner type (i.e., main, casual, or exchange)
- Condomless vaginal sex with casual or exchange partners
- Non-injection drug use, other than marijuana
- Binge drinking during the past 30 days
- Diagnosed with a sexually transmitted infection

Across all cycles, the number of risk behaviors reported ranged from 0 to 7,¹⁷ with an overall mean of 2.01 risk behaviors (median = 2.0). The mean number of reported risk behaviors decreased significantly across the three cycles [2.09 in 2007, 2.03 in 2010, and 1.86 in 2013; $F[2, 1,681] = 3.40, p < 0.05$].

Using data related to the risk behaviors outlined, HET participants were grouped into four risk categories based upon the number of risk behaviors they reported. Groups were defined as follows:

- Low risk: zero or one risk behavior in the past 12 months
- Moderate risk: two risk behaviors in the past 12 months
- High risk: three risk behaviors in the past 12 months
- Greatest risk: four or more risk behaviors in the past 12 months

The proportion of HET in the greatest risk group decreased from 2007 to 2013 while the percent of participants in the low risk group increased (Table 10).

- From 2007 through 2013, the proportion of HET in the greatest risk group decreased from 21.7% to 15.1%, a 30.4% overall decrease.
- The proportion of participants in the high risk group was roughly the same in 2013 [15.5%] as it was in 2007 [15.6%].
- The proportion of HET in the moderate risk group increased from 20.4% in 2007 to 24.1% in 2013.
- Similarly, the proportion of HET categorized as having low risk increased from 42.3% in 2007 to 45.3% in 2013.

Table 10. Number and Percent of HET in Each Risk Category

	2007 (N = 667)		2010 (N = 520)		2013 (N = 497)	
	N	%	N	%	N	%
Low Risk	282	42.3	221	42.5	225	45.3
Moderate Risk	136	20.4	104	20.0	120	24.1
High Risk	104	15.6	99	19.0	77	15.5
Greatest Risk	145	21.7	96	18.5	75	15.1

Participant Demographics Among HET at Greatest Risk

Table 11 displays the demographic characteristics of participants in the greatest risk group across the three HET cycles. Table 12 profiles HET in the greatest risk group in terms of their education, socioeconomic status and likelihood of being homeless.

Table 11. Participant Demographics for HIV-Negative HET at Greatest Risk

Characteristic	2007 (N = 145)		2010 (N = 96)		2013 (N = 75)	
	N	%	N	%	N	%
Gender						
Male	49	33.8	43	44.8	43	57.3
Female	96	66.2	53	55.2	32	42.7
Age						
18-29	60	41.4	29	30.2	21	28.0
30-39	36	24.8	19	19.8	14	18.7
40-49	48	33.1	26	27.1	23	30.7
50+	1	0.7	22	22.9	17	22.7
Race/Ethnicity						
Black, Non-Hispanic	66	45.5	37	38.5	22	29.3
Hispanic	58	40.0	40	41.7	39	52.0
White, Non-Hispanic	14	9.7	10	10.4	8	10.7
Other/Multiple Races	7	4.8	9	9.4	6	8.0

Note: For the 2007 cycle, the range for age eligibility was 18 to 50 years. For the 2010 and 2013 cycles, the range was 18 to 60 years.

Table 12. Participant Education and Socioeconomic Status for HIV-Negative HET at Greatest Risk

Characteristic	2007 (N = 145)		2010 (N = 96)		2013 (N = 75)	
	N	%	N	%	N	%
Marital Status						
Married or cohabitating	23	15.9	11	11.5	6	8.0
Formerly married, not cohabitating	39	26.9	33	34.4	34	45.3
Never married, not cohabitating	83	57.2	52	54.2	35	46.7
Highest Level of Education Completed						
Some high school or less	59	40.7	31	32.3	28	37.3
High school graduate or GED	56	38.6	43	44.8	28	37.3
Some college or more	30	20.7	22	22.9	19	25.3
Annual Income (\$)						
\$0 - \$4,999	51	35.2	40	41.7	27	36.0
\$5,000 - \$9,999	40	27.6	29	30.2	15	20.0
\$10,000 - \$19,999	39	26.9	21	21.9	24	32.0
\$20,000 or more	15	10.3	6	6.3	9	12.0
Homeless						
Currently homeless	29	20.0	30	31.3	23	30.7
Homeless in the past 12 months, but not currently	40	27.6	22	22.9	15	20.0
Not homeless in the past 12 months	76	52.4	44	45.8	37	49.3

HIV Testing Among HET at Greatest Risk

To examine patterns in HIV testing, data were collapsed across all three cycles. There was little variation in HIV testing behaviors across the four risk category groups (Figure 13). However, participants at high and greatest risk were more likely than those at low to moderate risk to report ever having been tested for HIV.

- One quarter of participants at greatest risk reported never having an HIV test [25.1%], while another third of these participants reported not having an HIV test in the past two years [36.5%].

- Across all risk groups, 62.7% of participants reported either not ever having an HIV test or they had not been tested within the past two years.

Figure 14 shows the proportion of HIV negative HET who reported no HIV test in the past 12 months by risk category.

Figure 13. Testing Frequency for HIV-Negative HET Collapsed Across Years

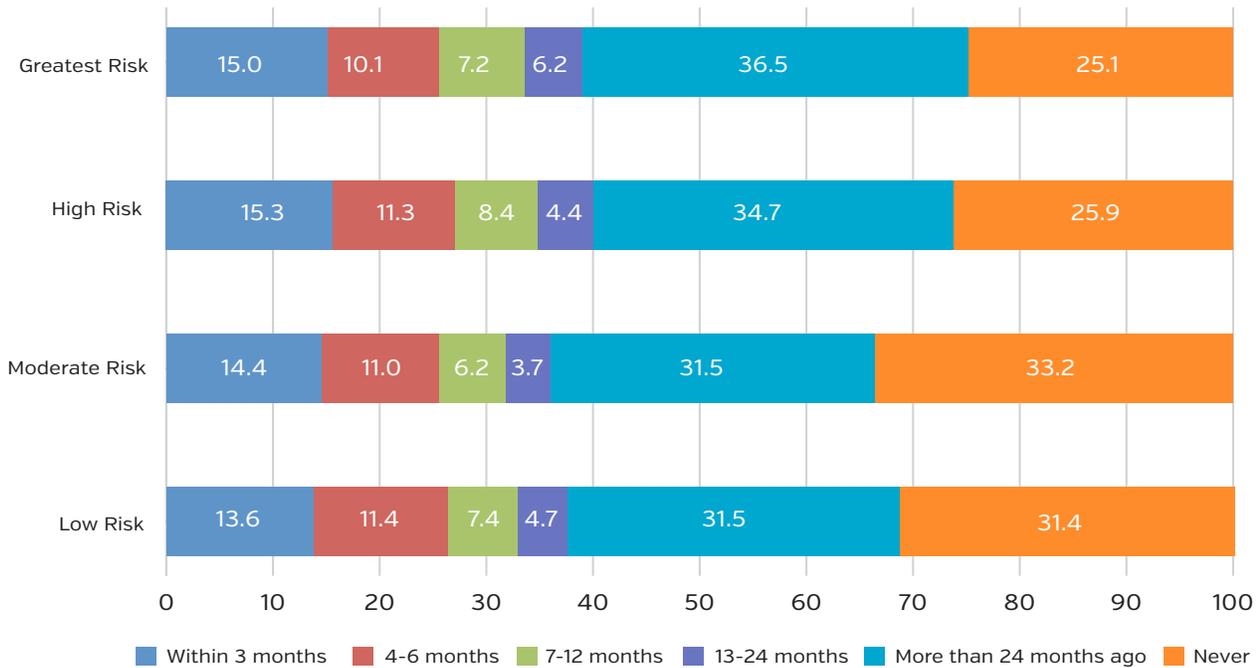
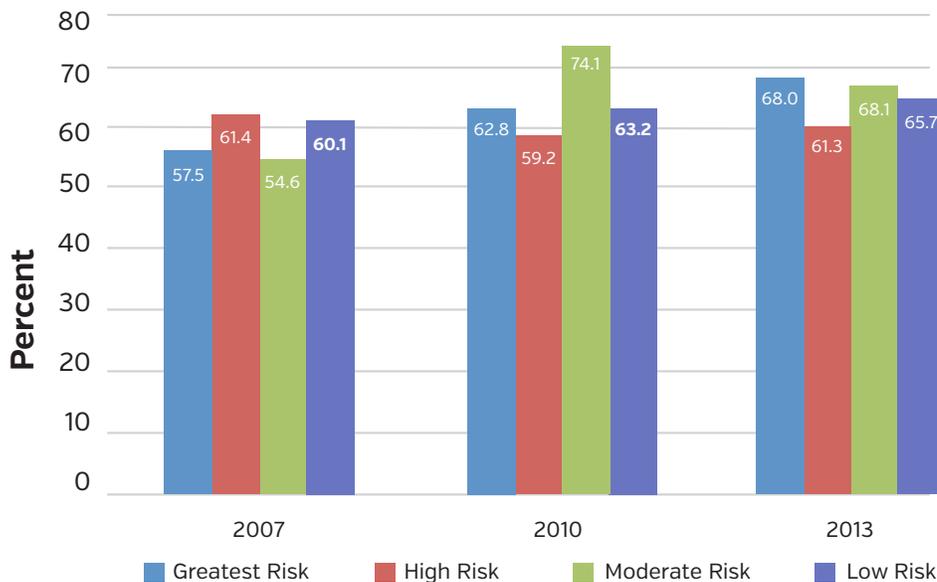


Figure 14. Percent of HIV-Negative HET Who Reported No HIV Test in Past 12 Months



CONCLUSIONS

Limitations

NHBS data collection activities for the HET cycles employ a respondent-driven sampling (RDS) process by which a small number of initial participants, or “seeds,” complete the NHBS survey and are then asked to recruit up to five members from their network to participate. Seeds were initially identified through interviews with key stakeholders who then received up to five “coupons” to distribute to other members in their network. While this process provides a perspective on risk behaviors, HIV testing patterns, and HIV prevalence among HET who participate, the results only pertain to those who can be reached. It is unknown to what extent these results apply to HET who are not connected to the “seed” networks. It should be noted that the RDS sampling methodology allows for weighting the data estimates. However, the current report contains unweighted data.

Similar to any interview process, the NHBS survey results can be influenced by the participants' willingness to report on behaviors considered to be socially undesirable. Finally, changes in the survey instrument over time may have had an impact on the results that were obtained.

Major Findings

DPH will use findings from this report to identify opportunities to improve HIV prevention, testing, outreach, and care services, particularly among HET who are engaged in high risk behaviors. Though patterns of risk behavior among HET appear to be declining, substantial numbers of HET continue to put themselves at risk by having multiple sex partners and not using condoms.

- In 2013, 59.1% of HET males and 54.2% of HET females reported having multiple sex partners. Condomless sex was reported by 88.3% of HET males and 90.8% of HET females in this same year.
- Heavy drinking was reported by one in five HET males (23.4%) and females (20.6%) in 2013, while 56.5% of males and 48.5% of females had had at least one binge drinking episode in the past 30 days in the same year.
- In 2013, a majority of HET (61.7%) used non-injection drugs in the past 12 months, with marijuana being the most commonly used drug, followed by crack cocaine, powdered cocaine, and OxyContin.



In 2010, the White House issued a National HIV/AIDS Strategy for the United States. The strategy reflects many of the approaches CDC believes will make the greatest difference in reducing HIV, such as intensifying prevention for individuals with HIV and those at highest risk of becoming infected with HIV, and targeting resources to the interventions and areas where we can have the greatest impact. The strategy was updated in 2015 to also include a goal of achieving a more coordinated response to the HIV epidemic.¹⁸

HIV prevalence among NHBS-HET is lower in Denver when compared to the rest of the country. The overall HIV prevalence among heterosexuals based on NHBS data from 20 cities was 2.1% in 2013.¹⁹ By comparison, HIV prevalence among all HET respondents in the Denver MSA was 0.5% in 2013."Social determinants of health are also important to be considered:

- In line with the eligibility requirements for participation in the HET cycles of NHBS, more than half of HET respondents had incomes less than \$10,000 [56.3% in 2007, 61.5% in 2010, and 51.1% in 2013].
- Homelessness in the past 12 months was consistently high among HET participants. Nearly one in three participants were either currently homeless at the time of the interview or had been homeless in the past year [31.8% in 2007, 38.1% in 2010, and 28.2% in 2013].

Nonetheless, risk behavior patterns among HET underscore the importance of annual testing and access to a regular source of care.

- Most HET have visited a health care provider in the past 12 months [70.8% in 2007, 73.1% in 2010, and 72.5% in 2013].
- Despite their use of health services, less than half of participants were offered an HIV test at their last visit [39.5% in 2007, 35.2% in 2010, and 28.0% in 2013.]
- One out of three HET participants reported ever receiving drug or alcohol treatment, with similar proportions in 2007 [33.5%], 2010 [40.6%], and 2013 [42.1%]. Of those that reported ever participating in a drug or alcohol treatment program, 25.1% attended one in the last 12 months in 2013.

Key Takeaways

- Among heterosexuals at increased risk for HIV (HET), the proportion who report vaginal or anal sex with multiple partners and who have condomless sex continues to be high.
- HET in the Denver area report other behaviors that put them at risk for HIV such as heavy drinking and non-injection drug use.
- Fewer than one in four HET participants report having had an HIV test in the last year. In addition, while most HET have visited a health care provider in the past 12 months, only a quarter were offered an HIV test at their last visit.
- Since 2007, the number of HET participants reporting health insurance increased, with the greatest increase observed between 2010 and 2013, following the implementation of the Affordable Care Act.

- ¹ The White House [2015] The National HIV/AIDS Strategy. <https://www.whitehouse.gov/administration/eop/onap/nhas>. Accessed 5/31/16
- ² Colorado Department of Public Health and Environment [2014] Colorado HIV Surveillance; Semi-Quarterly Report, 4th Quarter. https://drive.google.com/folderview?id=0B8iOd1Qz6sAXcHNNWllram1veUU&usp=drive_web. Accessed 5/31/16.
- ³ Colorado Department of Public Health and Environment [2015] HIV & AIDS in Colorado. https://drive.google.com/folderview?id=0B8iOd1Qz6sAXeGpTdndCLTIYeGc&usp=drive_web. Accessed 5/31/16.
- ⁴ Centers for Disease Control and Prevention, National HIV Behavioral Surveillance (NHBS). www.cdc.gov/hiv/statistics/systems/nhbs. Accessed 5/31/16
- ⁵ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 21 US Cities, 2010., MMWR: 20149; 63[14].
- ⁶ Isa J. Miles, ScD; Binh C. Le, MD; Cyprian Wejnert, PhD; Alexandra Oster, MD; Elizabeth DiNenno, PhD; Gabriela Paz-Bailey, MD, PhD. HIV Infection Among Heterosexuals at Increased Risk. MMWR. 2013;62[10]:183-188. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6210a2.htm>. Accessed 5/31/16.
- ⁷ Heckathorn, D. Respondent-driven sampling: A new approach to the study of hidden populations. *Social Problems*, 1997; 44[2]: 174-99.
- ⁸ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 21 US Cities, 2010., MMWR: 2014; 63[14]:10.
- ⁹ Centers for Disease Control and Prevention. HIV Transmission Risk. <http://www.cdc.gov/condomeffectiveness/brief.html#Consistent2>. Accessed 5/31/16
- ¹⁰ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 21 US Cities, 2010., MMWR: 2014; 63[14]:11.
- ¹¹ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 21 US Cities, 2010., MMWR: 2014; 63[14]:11.
- ¹² Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 21 US Cities, 2010., MMWR: 2014; 63[14]:9.
- ¹³ Voters approved the legalization of recreational marijuana for persons 21 years and older in November 2012 and the first recreational sales began in January 2014.
- ¹⁴ Branson, BM, HH Handsfield, MA Lampe, RS Janssen, AW Taylor, SB Lyss, JE Clark [2006] Revised HIV testing recommendations for adults, adolescents, and pregnant women in health-care settings. *Morbidity and Mortality Weekly*, September 22, 2006 / 55[RR14];1-17 <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm>. Accessed 7/26/16.
- ¹⁵ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 20 US Cities, 2013.HIV Surveillance Report: Special Report, Number 13 http://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-HSSR_NHBS_HET_2013.pdf. Accessed 5/31/16.
- ¹⁶ Centers for Disease Control and Prevention [2010] Establishing a Holistic Framework to Reduce Inequities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; October 2010.
- ¹⁷ Some respondents did not answer all the questions that contributed to the risk score, however the maximum number of items missing was three.
- ¹⁸ Centers for Disease Control and Prevention. National HIV/AIDS Strategy. <http://www.cdc.gov/hiv/policies/nhas.html>. Accessed 4/7/16.
- ¹⁹ Centers for Disease Control and Prevention, HIV Risk, Prevention and Testing Behaviors among Heterosexuals at Increased Risk for HIV, National HIV Behavior Surveillance System, 20 US Cities, 2013.HIV



For more information:
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