



# DENVER SUBSTANCE USE PROFILE: NATIONAL HIV BEHAVIORAL SURVEILLANCE, 2005-2016

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**Denver Public Health**  
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## Contents

Denver Public Health .....	1
<i>Report Prepared By Emery Shekiro</i> .....	1
BACKGROUND.....	3
Substance Use Metrics.....	3
Alcohol Use .....	3
Non-Injection Drug Use.....	3
Injection Drug Use.....	4
Drug or Alcohol Treatment Program .....	4
Data Analysis Methodology .....	4
MEN WHO HAVE SEX WITH MEN (MSM).....	5
Demographics .....	5
Alcohol Use .....	6
Non-Injection Drug Use.....	6
Injection Drug Use.....	7
Drug or Alcohol Treatment Program .....	7
PERSONS WHO INJECT DRUGS (IDU) .....	8
Demographics .....	8
Alcohol Use .....	9
Non-Injection Drug Use.....	9
Injection Drug Use.....	10
Drug or Alcohol Treatment Program .....	10
HETEROSEXUALS AT INCREASED RISK FOR HIV (HET).....	11
Demographics .....	11
Alcohol Use .....	12
Non-Injection Drug Use.....	12
Injection Drug Use.....	13
Drug or Alcohol Treatment .....	13
Limitations .....	14
Major Findings .....	14

## BACKGROUND

The National HIV Behavioral Surveillance (NHBS) System - initiated in 2003 - conducts annual, rotating cycles among three populations at risk for HIV: gay, bisexual, and other men who have sex with men (referred to as the MSM cycle), persons who inject drugs (referred to as the IDU cycle), and heterosexuals at increased risk for HIV infection (referred to as the HET cycle). NHBS monitors HIV risk behaviors (e.g. risky sex and drug use), HIV testing behaviors, use of prevention services, and HIV prevalence. General eligibility criteria for survey participation include:  $\geq 18$  years of age, resident of the Denver metropolitan statistical area (MSA), not previously surveyed in current cycle, and population-specific criteria (detailed in each population specific section of this report). Data presented were collected in the Denver metropolitan area between 2005 and 2016. In this report, trends in substance use over four rounds of NHBS data collection among the three different NHBS populations are highlighted. This epidemiologic profile presents descriptive statistics to depict the prevalence of substance use among each high risk population and the percentage of the sample reporting specific drug use. Monitoring these NHBS data is a useful way of assessing drug use behaviors over time and identifying prevention opportunities in the community.

**Table 1. NHBS Rounds, Cycles, and Years Conducted**

Round	Cycles Implemented	Years Conducted
1	MSM, IDU, HET	2003-2007
2	MSM, IDU, HET	2008-2010
3	MSM, IDU, HET	2011-2013
4	MSM, IDU, HET	2014-2016

Content source: Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention

## Substance Use Metrics

### Alcohol Use

Questions related to alcohol use captured information about participants' past year alcohol use, current alcohol use, frequency of use (heavy use), and quantity of use (binge use). **Binge use** in the past 30 days was defined as four or more drinks in one sitting if the participant identified as female or five or more drinks in one sitting if the participant identified as male. **Heavy use** was defined as drinking on average more than two drinks [males] or more than one drink [females] per day in the past 30 days. **Current use** was defined as any alcohol use in past 30 day period.

### Non-Injection Drug Use

Non-injection drug use (NIDU) questions capture information about ever use of non-injection drugs, current use, frequency of use, and drugs most frequently used. Non-injection drugs asked about in this survey include: marijuana, methamphetamine (meth), crack cocaine, powder cocaine, downers (benzos),



pain killers, ecstasy, and heroin. **Past year use** of non-injection drugs was defined as any NIDU within the past 12 months.

### **Injection Drug Use**

Questions focused on ever use of injection drugs, current use of injection drugs, frequency of use, and injection drug of choice. Injection drugs asked about in this survey include: speedball (heroin and cocaine together), heroin, powder cocaine, crack cocaine, meth, and painkillers. **Past year use** of injection drugs was defined as any IDU within the past 12 months. The HET cycle only captures information related to ever use of injection drugs.

### **Drug or Alcohol Treatment Program**

Participants reported past 12 month and ever participation in drug or alcohol treatment programs such as out-patient, in-patient, residential, detox, methadone treatment, or 12-step programs.

### **Data Analysis Methodology**

In this analysis, survey data from four rounds of NHBS data collection were compiled and a single data file was created for each population to allow comparisons across the four points in time. Not all questions were able to be analyzed over all four years due to changes in how questions are asked or complete omission of questions. For example, the first cycle of MSM in 2005 did not ask questions about alcohol. However, the following three MSM cycles (2008, 2011, 2014) asked questions about alcohol use so trends can only be observed for the three cycles. Descriptive statistics are used to describe the changes in proportions over time. The Cochran Armitage exact test for proportions was used to determine the significance of changes over time between data points.

## MEN WHO HAVE SEX WITH MEN (MSM)

Data for the MSM population were collected in 2005 (MSM1), 2008 (MSM2), 2011 (MSM3), and 2014 (MSM4). Participants were recruited using venue-based, time-space sampling. Participants were eligible if they met the [NHBS general eligibility criteria](#), had oral or anal sex with another man in the past year, had been born male, and self-identified as male. Across the four cycles, data from a total of 2,460 MSM participants are included in this section [843 in 2005, 543 in 2008, 546 in 2011, and 528 in 2014; Table 2].

### Demographics

The demographic characteristics of MSM participants, described in Table 1, have become more diverse over time. The majority of respondents in the past four cycles were white, non-Hispanic, and identified as homosexual. Throughout each of the four cycles participants seem to be evenly split among age groups. In recent years, the proportion of young MSM (18-29 years of age) surveyed has increased from 23.3% in 2005 to 31.7% in 2014.

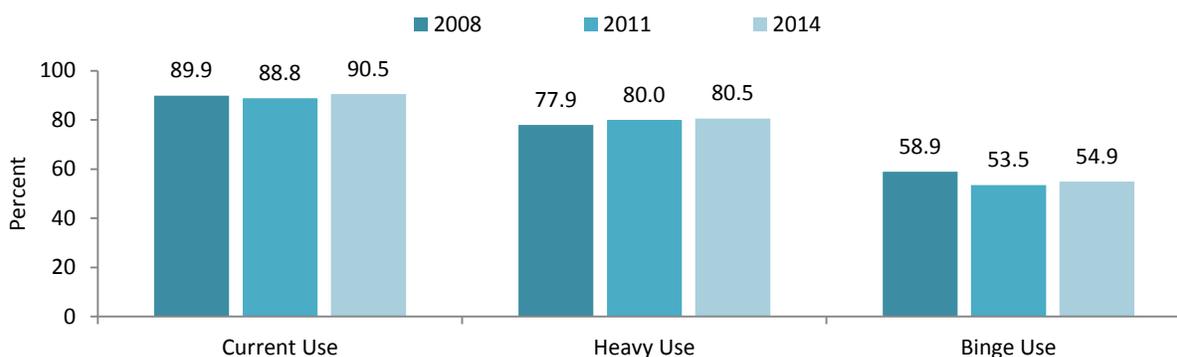
**Table 2. Demographic Characteristics of NHBS-MSM Respondents**

	2005 [N = 843] n (%)	2008 [N = 543] n (%)	2011 [N = 546] n (%)	2014 [N = 528] n (%)
<b>Characteristic</b>				
<b>Race/Ethnicity</b>				
Black, Non-Hispanic	45 (5.3)	22 (4.1)	59 (10.8)	22 (4.2)
Hispanic	162 (19.2)	149 (27.4)	146 (26.7)	111 (21.0)
White, Non-Hispanic	548 (65.0)	335 (61.7)	298 (54.6)	337 (63.8)
Other/Multiple Races	88 (10.4)	37 (6.8)	43 (7.9)	58 (11.0)
<b>Age</b>				
18-29	196 (23.3)	166 (30.6)	196 (35.9)	167 (31.7)
30-39	281 (33.3)	152 (28.0)	148 (27.1)	129 (24.5)
40-49	247 (29.3)	127 (23.4)	117 (21.4)	97 (18.4)
50+	119 (14.1)	98 (18.1)	85 (15.6)	134 (25.4)
<b>Sexual Preference</b>				
Heterosexual	2 (0.2)	1 (0.2)	1 (0.2)	3 (0.6)
Homosexual	768 (91.1)	480 (88.4)	481 (88.1)	465 (88.1)
Bisexual	69 (8.2)	62 (11.4)	63 (11.5)	60 (11.4)
Other	4 (0.5)	---	---	---

## Alcohol Use

The percentage of MSM participants who have used alcohol in the past year has remained flat over time with about 90% of MSM reporting alcohol use. This pattern is also true for past 30 day (current) alcohol use [see Figure 1]. Over the past three MSM cycles, the majority of MSM participants characterized themselves as heavy drinkers [77.9% in 2008, 80.0% in 2011, and 80.5% in 2014] and more than half engaged in binge drinking [58.9% in 2008, 53.5% in 2011, and 54.9% in 2014].

**Figure 1. Trends in Alcohol Use among NHBS-MSM Participants**



## Non-Injection Drug Use

There is an increasing trend in the proportion of MSM who used non-injection drugs in the past year ( $p < .0001$ ) [see Table 3]. In 2005, 45.2% of participants had reported any non-injection drug use within the past year, compared to 2014 when 62.7% of participants reported any non-injection drug use. Over the past four MSM cycles there were significant increases in the use of the following substances: marijuana, powdered cocaine, pain killers, and poppers. The greatest increases were seen among use of poppers which increased 112% from 2005 to 2014, with the number of reported users increasing from one out of ten to three out of ten ( $p < .0001$ ). In the most recent cycle (MSM4), the top five non-injection drugs of abuse included: Marijuana, poppers, powdered cocaine, ecstasy, and meth.

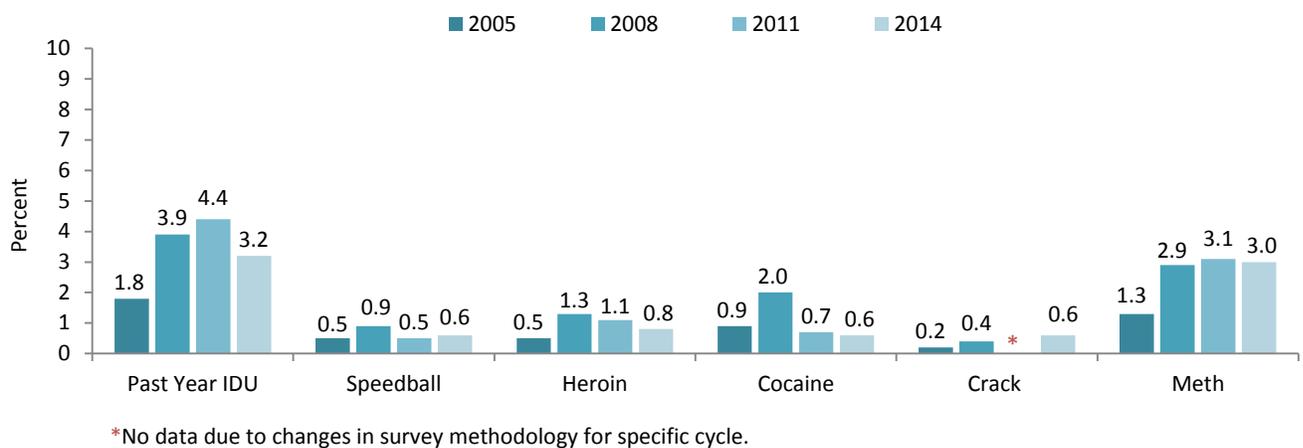
**Table 3. Trends in Non-Injection Drug Use among NHBS-MSM**

	2005 [N = 843] n (%)	2008 [N = 543] n (%)	2011 [N = 546] n (%)	2014 [N = 528] n (%)	P-value
Past Year Non-Injection Drug Use	381 (45.2)	277 (51.0)	290 (53.1)	331 (62.7)	<.0001
Marijuana	306 (36.3)	206 (37.9)	244 (44.7)	285 (54.0)	<.0001
Powdered Cocaine	144 (17.1)	109 (20.1)	107 (19.6)	118 (22.3)	0.02
Crack Cocaine	32 (3.8)	48 (8.8)	30 (5.5)	28 (5.3)	0.38
Heroin	4 (0.5)	8 (1.5)	5 (0.9)	5 (0.9)	0.46
Pain Killers	51 (6.0)	41 (7.6)	61 (11.2)	56 (10.6)	0.0003
Meth	88 (10.4)	62 (11.4)	43 (7.9)	45 (8.5)	0.09
Ecstasy	77 (9.1)	74 (13.6)	65 (11.9)	66 (12.5)	0.07
Poppers	112 (13.3)	100 (18.4)	108 (19.8)	149 (28.2)	<.0001

## Injection Drug Use

Less than 5% of participants reported injection drug use [1.8% in 2005, 3.9% in 2008, 4.4% in 2011, and 3.2% in 2014]. Overall, the percentage of participants who used injection drugs within the past year has remained flat over the past four MSM cycles. Shown in Figure 2, past year injection drug use changed marginally from 1.8% in 2005, to its highest prevalence of 4.4% in 2011, and down to 3.2% in 2014. The primary injection drug of use in the MSM population has remained meth, with the majority of MSM who inject drugs reporting the injection of meth.

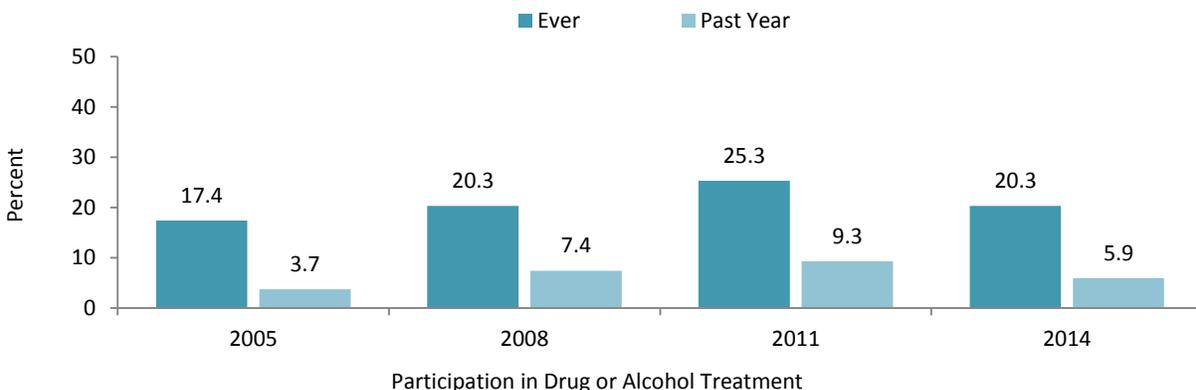
**Figure 2. Trends in Injection Drug Use among NHBS-MSM Participants**



## Drug or Alcohol Treatment Program

About 20% of MSM NHBS respondents reported ever participating in a drug or alcohol treatment program, while less than 10% reported participating in treatment during the past year [See Figure 3].

**Figure 3. Trends in NHBS-MSM Participation in Drug or Alcohol Treatment Programs**



## PERSONS WHO INJECT DRUGS (IDU)

Data for the IDU population were collected in 2006 (IDU1), 2009 (IDU2), 2012 (IDU3), and 2015 (IDU4). Participants are recruited using respondent driven sampling. Participants were eligible if they met the [NHBS general eligibility criteria](#) and reported injecting drugs without a prescription in the past year. Across the four cycles, data from a total of 2,070 IDU participants are included in this section [519 in 2006, 432 in 2009, 516 in 2012, and 603 in 2015; Table 4].

### Demographics

The demographic characteristics of IDU participants, described in Table 4, have changed minimally over the four IDU cycles. Participants surveyed are primarily white, non-Hispanic males who identify as heterosexual. Across the IDU cycles, males represent nearly three-quarters of the surveyed population. IDU participants tend to be older with nearly two out of three being 40 years or older.

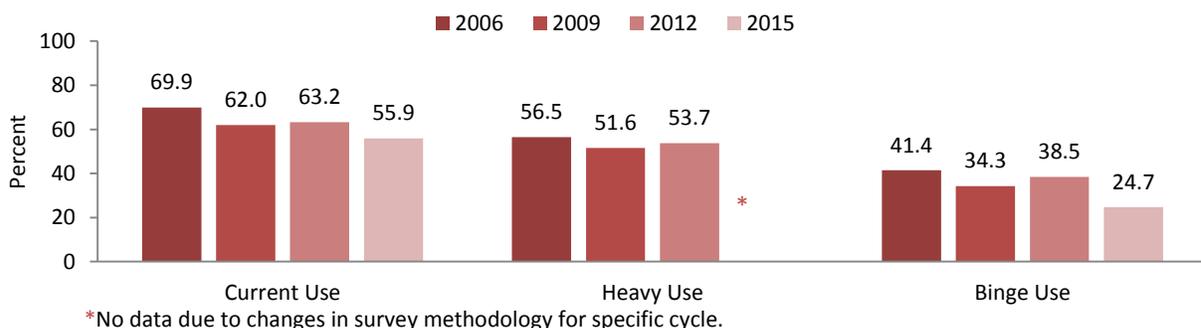
**Table 4. Demographic Characteristics of NHBS-IDU Respondents**

	2006 [N = 519] n (%)	2009 [N = 432] n (%)	2012 [N = 516] n (%)	2015 [N = 603] n (%)
<b>Characteristic</b>				
<b>Gender</b>				
Male	371 (71.5)	297 (68.8)	393 (76.2)	427 (70.8)
Female	148 (28.5)	134 (31.0)	123 (23.8)	174 (28.9)
Transgender	0 (0.0)	1 (0.2)	0 (0.0)	3 (0.5)
<b>Race</b>				
Black, non-Hispanic	77 (14.8)	56 (13.0)	62 (12.0)	35 (5.8)
Hispanic	145 (27.9)	116 (26.9)	150 (29.1)	152 (25.2)
White, non-Hispanic	251 (48.4)	221 (51.2)	265 (51.4)	351 (58.2)
Other	46 (8.9)	39 (9.0)	39 (7.6)	68 (11.3)
<b>Age</b>				
18-29	86 (16.6)	67 (15.5)	82 (15.9)	133 (22.1)
30-39	102 (19.7)	89 (20.6)	122 (23.6)	163 (27.0)
40-49	188 (36.2)	113 (26.2)	148 (28.7)	146 (24.2)
50+	143 (27.6)	163 (37.7)	164 (31.8)	161 (26.7)
<b>Sexual Preference</b>				
Heterosexual	465 (89.6)	390 (90.3)	430 (83.3)	497 (82.4)
Homosexual	12 (2.3)	12 (2.8)	30 (5.8)	33 (5.5)
Bisexual	39 (7.5)	29 (6.7)	56 (10.9)	72 (11.9)
Other	0 (0.0)	0 (0.0)	0 (0.0)	4 (0.7)

## Alcohol Use

The majority of IDU participants reported alcohol use in the past year. This trend has remained flat over time with 81.1% in 2006, 74.8% in 2009, and 77.3% in 2012. Past 30 day alcohol use significantly decreased over time, decreasing from nearly 70.0% of IDU in 2006 to 55.9% of IDU in 2015 ( $p < .0001$ ). While more than half of IDU participants characterized themselves as heavy drinkers [56.5% in 2006, 51.6% in 2009, and 53.7% in 2012] and more than a quarter of participants reported engaging in binge drinking [41.4% in 2006, 34.3% in 2009, 38.5% in 2012, and 24.7% in 2015].

**Figure 4. Trends in Alcohol Use among NHBS-IDU Participants**



## Non-Injection Drug Use

The majority of IDU participants reported using non-injection drugs within the past year; trends in non-injection drug use have remained flat overtime (see Table 5). Over the four cycles, there were significant increases in reported use of meth ( $p < .0001$ ) and ecstasy ( $p < .0001$ ). The greatest increase was seen among reported use of meth, which increased by 78% from 2006 to 2015 [35.8% in 2006, 8.1% in 2009, 40.5% in 2012, and 63.7% in 2015]. There were significant decreases in the reported use of crack cocaine ( $p < .0001$ ) and powdered cocaine ( $p < .0001$ ); Crack cocaine use decreased by nearly 50% from 53.6% in 2006 to 28.4% in 2015, and powdered cocaine use decreased by 20% from 47.4% in 2006 to 37.5% in 2015. The most commonly reported non-injection drug was marijuana with more than 60% of the population reporting marijuana use across all four cycles.

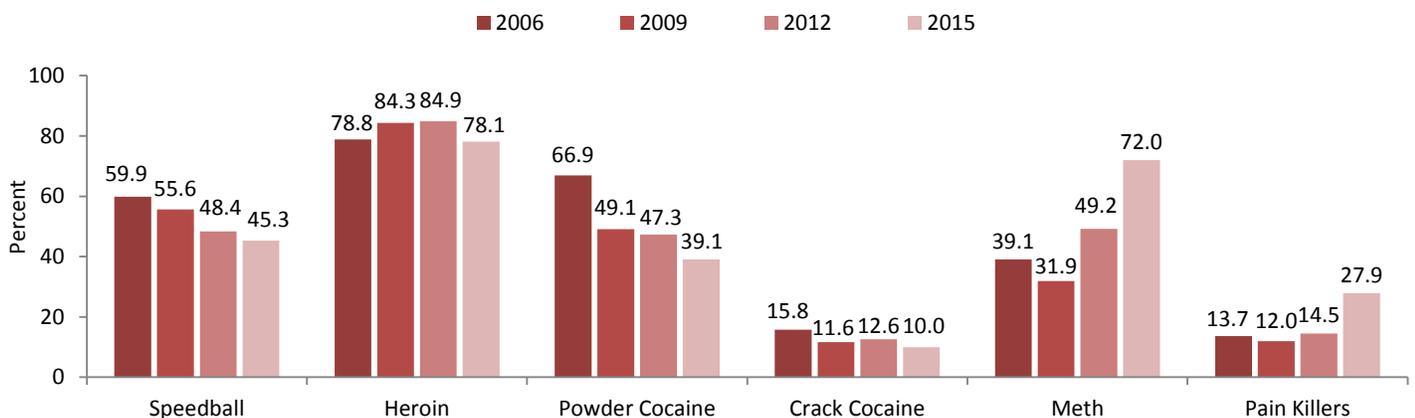
**Table 5. Trends in Non-Injection Drug Use among NHBS-IDU Population**

	2006 [N = 519] n (%)	2009 [N = 432] n (%)	2012 [N = 516] n (%)	2015 [N = 603] n (%)	P-value
Past Year Non-Injection Drug Use	430 (82.9)	---	409 (79.3)	510 (84.6)	0.41
Marijuana	334 (64.4)	256 (59.3)	333 (64.5)	414 (68.7)	0.0613
Powdered Cocaine	246 (47.4)	168 (38.9)	194 (37.6)	226 (37.5)	0.0008
Crack Cocaine	278 (53.6)	196 (45.4)	210 (40.7)	171 (28.4)	<.0001
Heroin	101 (19.5)	142 (32.9)	162 (31.4)	229 (38.0)	<.0001
Pain Killers	233 (44.9)	188 (43.5)	229 (44.4)	279 (46.3)	0.65
Meth	186 (35.8)	125 (28.9)	209 (40.5)	384 (63.7)	<.0001
Ecstasy	36 (6.9)	41 (9.5)	79 (15.3)	91 (15.1)	<.0001
Downers	206 (39.7)	175 (40.5)	200 (38.8)	279 (46.3)	0.12

## Injection Drug Use

The drug most frequently reported as injected among IDU participants was heroin with about 80% of the population reporting use in the past year [78.8% in 2006, 84.3% in 2009, 84.9% in 2012, and 78.1% in 2015]. There were significant decreases in the percentage of IDU participants who reported injecting speedballs ( $p<.0001$ ), powder cocaine ( $p<.0001$ ), and crack cocaine ( $p=.007$ ). There were significant increases in the percentage of participants who reported injecting meth ( $p<.0001$ ), or pain killers ( $p<.0001$ ). Reported injection of pain killers increased by 104% [13.7% in 2006, 12.0% in 2009, 14.5% in 2012, and 27.9% in 2015].

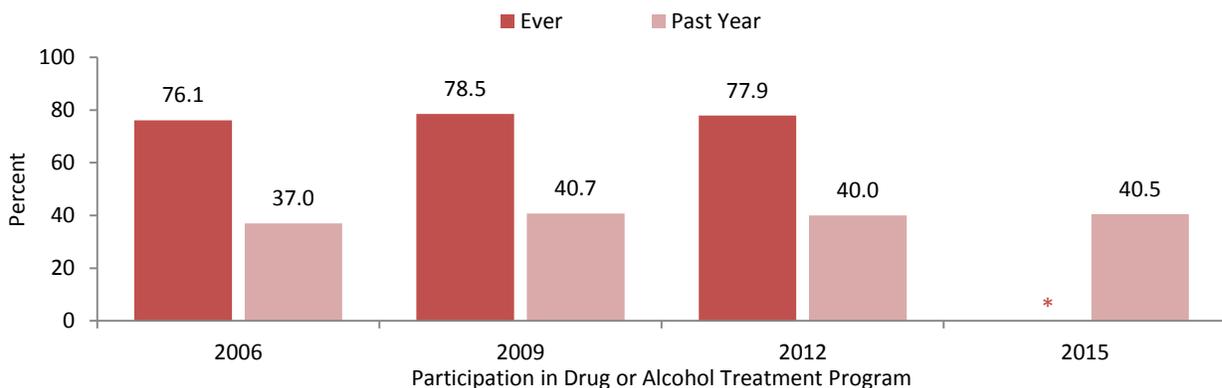
**Figure 5. Trends in Injection Drug Use among NHBS-IDU Participants**



## Drug or Alcohol Treatment Program

The use of drug or alcohol treatment programs can be clearly seen in **Figure 6**. Data from participants in the first three IDU cycles show that the majority (80%) of the population reported ever participating in a drug or alcohol treatment program. While about 40% of IDU respondents reported participating in treatment in the past year.

**Figure 6. Trends in NHBS-IDU Participation in Drug or Alcohol Treatment Program**



\*No data due to changes in survey methodology for specific cycle.

## HETEROSEXUALS AT INCREASED RISK FOR HIV (HET)

Data for the HET populations were collected in 2007 (HET1), 2010 (HET2), 2013 (HET3), and 2016 (HET4). Participants are recruited using respondent driven sampling. Participants were eligible if they met the [NHBS general eligibility criteria](#), reported vaginal or anal sex with an opposite sex partner in past year, and self-identified as male or female. Across the four cycles, data from a total of 2,313 HET participants are included in this section [885 in 2007, 522 in 2010, 499 in 2013, and 407 in 2016; Table 6].

### Demographics

The demographics characteristics of HET participants, described in Table 6, have become more diverse overtime due to targeted sampling of specific race ethnicities. Across the four cycles, females represent more than half of those surveyed; the proportions for 2007, 2010, 2013, and 2016 are 61.5%, 58.8%, 51.9% and 63.6%, respectively. Throughout each of the four cycles, participants seem to be evenly split among age groups. In the past four cycles, the majority of those surveyed are persons of color, with nearly 80% of the population being Hispanic or black, non-Hispanic.

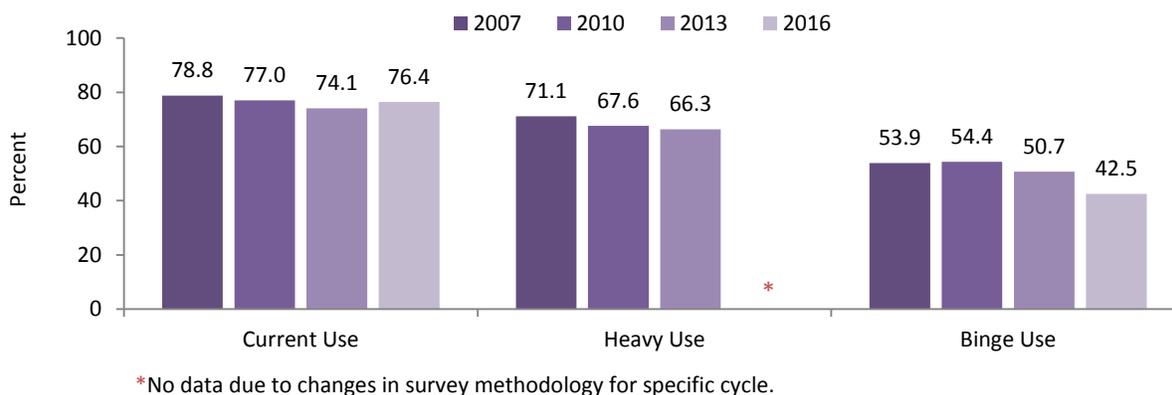
**Table 6. Demographic Characteristics of NHBS-HET Respondents**

	2007 [N = 885] n (%)	2010 [N = 522] n (%)	2013 [N = 499] n (%)	2016 [N = 407] n (%)
<b>Characteristic</b>				
<b>Gender</b>				
Male	341 (38.5)	215 (41.2)	240 (48.1)	148 (36.4)
Female	544 (61.47)	307 (58.8)	259 (51.9)	259 (63.6)
<b>Race</b>				
Hispanic	283 (32.1)	208 (39.8)	283 (56.7)	259 (63.6)
Black, Non-Hispanic	425 (48.0)	205 (39.3)	127 (25.5)	116 (28.5)
White, Non-Hispanic	127 (14.4)	48 (9.2)	52 (10.4)	17 (4.2)
Other, Non-Hispanic	50 (5.7)	61 (11.7)	37 (7.4)	15 (3.7)
<b>Age Group</b>				
18-29	359 (40.6)	145 (27.8)	135(27.1)	110 (27.0)
30-39	208 (23.5)	107 (20.5)	97 (19.4)	81 (19.9)
40-49	300 (33.9)	147 (28.2)	129 (25.9)	87 (21.4)
50+	18 (2.0)	123 (23.6)	138 (27.7)	129 (31.7)
<b>Sexual Preference</b>				
Heterosexual	772 (87.4)	462 (88.5)	460 (92.2)	365 (89.7)
Homosexual	2 (0.2)	6 (1.1)	1 (0.2)	3 (0.7)
Bisexual	107 (12.1)	54 (10.3)	38 (7.6)	39 (9.6)

## Alcohol Use

The majority (90%) of HET participants reported alcohol use in the past year. This trend is also true for past 30 day alcohol use, where nearly 80% of HET participants reported current alcohol use [see Figure 7]. Binge alcohol use among HET has remained high among all four cycles [30.8% in 2007, 54.4% in 2010, 50.7% in 2013, and 42.5% in 2016]. More than half of HET participants characterized themselves as heavy drinkers and nearly half of the population reported engaging in binge drinking.

**Figure 7. Trends in Alcohol use among NHBS-HET Participants**



## Non-Injection Drug Use

More than half of HET participants reported non-injection drug use in the past year (see Table 7). Over the past four cycles, there were significant decreases in the proportion of HET participants reporting use of crack cocaine ( $p < .0001$ ), heroin ( $p < .004$ ), and ecstasy ( $p < .0001$ ). Among all HET cycles about half of participants reported marijuana use.

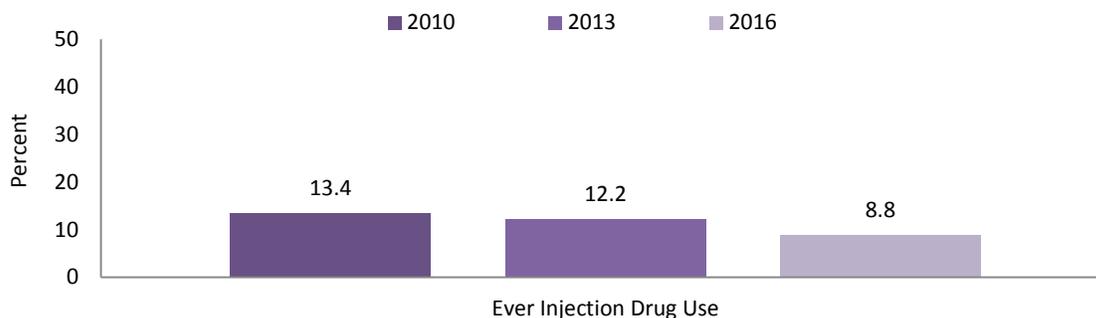
**Table 7. Trends in Non-Injection Drug Use among NHBS-HET Participants**

	2007 [N = 885] n (%)	2010 [N = 522] n (%)	2013 [N = 499] n (%)	2016 [N = 407] n (%)	P-value
Past Year Non-Injection Drug Use	546 (61.8)	329 (63.0)	309 (61.9)	239 (58.7)	0.38
Marijuana	485 (54.8)	293 (56.1)	271 (54.3)	209 (51.4)	0.3
Powdered Cocaine	200 (22.6)	85 (16.3)	99 (19.8)	83 (20.4)	0.357
Crack Cocaine	226 (25.5)	118 (22.6)	88 (17.6)	46 (11.3)	<.0001
Heroin	40 (4.5)	5 (1.0)	13 (2.6)	6 (1.5)	0.0036
Pain Killers	135 (15.3)	78 (14.9)	77 (15.4)	57 (14.0)	0.717
Meth	82 (9.3)	26 (5.0)	54 (10.8)	29 (7.1)	0.79
Ecstasy	106 (12.0)	38 (7.3)	37 (7.4)	22 (5.4)	<.0001
Downers	76 (8.6)	28 (5.4)	33 (6.6)	25 (6.1)	0.12

## Injection Drug Use

Over 90% of HET participants reported not using injection drugs, with the proportion of HET reporting injection drug use decreasing from 13.4% in 2010 to 8.8% in 2016.

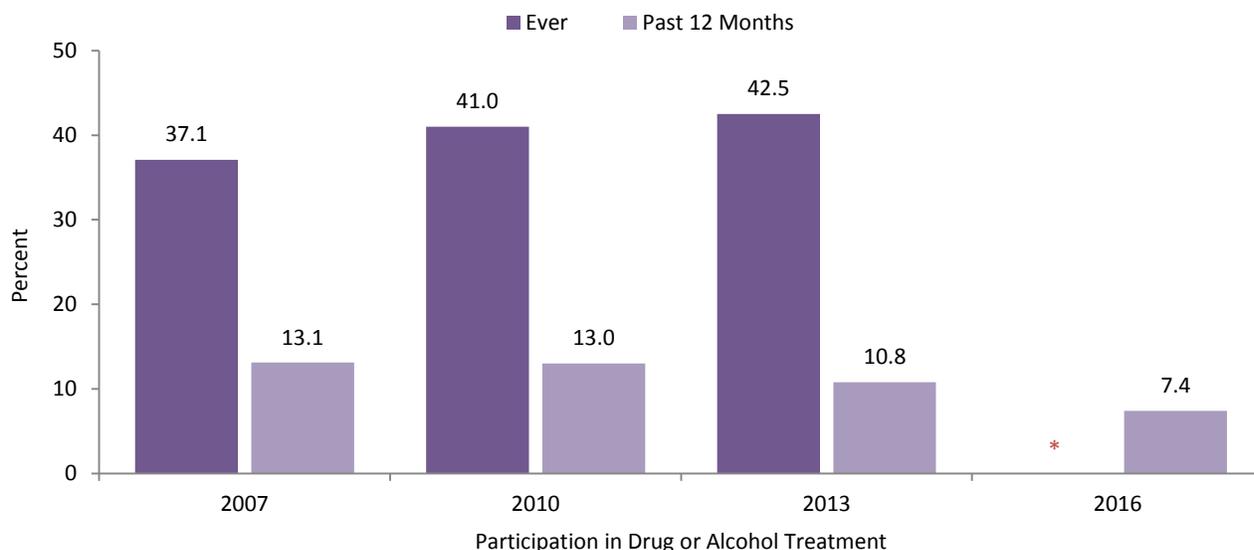
**Figure 8. Trends in Injection Drug Use among NHBS-HET Population**



## Drug or Alcohol Treatment

About 40% of the HET population reported participating in a drug or alcohol treatment program, while approximately 10% of the population reported participation in a treatment program in the past year.

**Figure 9. Trends in NHBS-HET Participation in Drug or Alcohol Treatment Program**



\*No data due to changes in survey methodology for specific cycle.

## Limitations

When reviewing this report there are a few limitations to keep in mind. The NHBS system uses respondent driven and venue-based sampling methods. While these sampling methods are efficient in recruiting participants, they are not necessarily comparable. In addition, by definition, the populations are distinct populations and also not necessarily comparable. The NHBS samples may also not be representative of the underlying population and, therefore, not generalizable. Similar to any interview process, NHBS survey results can be influenced by the participants' willingness to report on behaviors considered socially undesirable. Finally, changes in the survey instruments over time may have had an impact on the results obtained.

## Major Findings

Findings from this report can be used to identify opportunities to improve substance misuse and abuse prevention in the community.

- Trends in heavy drinking have remained relatively high across all three NHBS populations.
  - In 2014, 80.5% of MSM reported heavy alcohol use [77.9% in 2008, 80.0% 2011, and 80.5% in 2014].
  - In 2012, 53.7% of IDU reported heavy alcohol use [56.5% in 2006, 52.0% in 2009, and 53.7% in 2012].
  - In 2013, 66.3% of HET reported heavy alcohol use [71.1% in 2007, 68.0% in 2010, and 66.3% 2013].
- Significant increase in methamphetamine use across MSM and IDU populations.
  - In 2014, 3.0% of MSM reported injection methamphetamine use; 3.2% reported any injection drug use.
  - Reported non-Injection Methamphetamine use increased substantially over the four IDU cycles [35.8% in 2006, 8.1% in 2009, 40.5% in 2012, and 63.7% in 2015].
  - Reported IDU methamphetamine injection drug use increased by over 80% [39.1% in 2006, 31.9 in 2009, 49.2% in 2012, and 72.1% in 2015].
- Decreasing trends in crack cocaine and powder cocaine use among all the IDU and HET populations.
  - Reported non-injection crack cocaine use significant decreased ( $p < .0001$ ) from 2007 to 2016 among the HET population.
  - Reported non-injection crack cocaine ( $p < .001$ ) and powdered cocaine ( $p < .0001$ ) use significantly decreased from 2006 to 2015 among the IDU population.
  - Reported injection crack cocaine ( $p < .01$ ) and powdered cocaine ( $p < .0001$ ) use significantly decreased from 2006 to 2015 among the IDU population.