HIV Behavioral Surveillance in the Denver Metro Area

UNDERSTANDING HIV RISK & PREVENTION BEHAVIORS Among Persons Who Inject Drugs

Colorado Department of Public Health and Environment

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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,

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 System (NHBS), 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 (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 risk, and HIV-related prevention behaviors in populations heavily affected by HIV.

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 IDU community in the Denver metro area from 2006, 2009 and 2012. We identify the following trends in IDU risk behavior:

- Relatively high proportions of IDU report using a non-sterile needle or syringe, although this practice has fluctuated from 73.0% in 2006, to 80.0% in 2009, to 64.5% in 2012.
- In 2012, one out of three (35.5%) IDU indicated that they had shared a need or syringe after someone else had used it, compared to 39.9% in 2006 and 40.9% in 2009.
- More than half (55%) of IDU surveyed used a cooker, water, or cotton after someone else in 2012, compared to 52.6% in 2006 and 58.4% in 2009.
- Nearly one third (31.6%) of IDU reported using drugs that had been divided with a used needle or syringe in 2012, compared to 29.5% in 2006 and 36.7% in 2009.

Syringe exchange programs appear to be having an impact on the availability of sterile needles. Syringe exchange programs were not legal in Denver until February 2012. Whereas only 16.2% of IDU were able to receive free new sterile syringes in 2006, by 2012, this number had increased to 39.5%. Of those who had received sterile syringes in 2012, 82.4% reported that they had done so through a syringe exchange program.

The CDC recommends that all persons at high risk for HIV be tested at least annually, including IDU. The CDC also recommends that IDU be tested for the hepatitis C virus at least once a year. We note the following trends related to testing:

- Whereas 62.2% of IDU had an HIV test in the past 12 months in 2006, in 2012 the proportion tested in the most recent year declined to 45.7%.
- Similarly, only 38.0% of those surveyed in 2012 indicated that they had had a hepatitis C test in the past 12 months.

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 2010, the White House released the National HIV/AIDS Strategy,[1] a comprehensive roadmap for responding to the HIV/AIDS epidemic in a broad-reaching and coordinated manner. The Strategy has three 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.

Denver Public Health (DPH) is committed to addressing these goals through surveillance and by providing outreach, testing, and care services to residents living in the Denver metropolitan community. A first step towards 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.

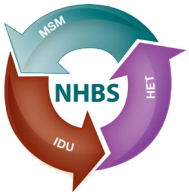
As of December 2013, 12,623 Coloradans were living with HIV, with 302 individuals newly diagnosed in that year. Three-quarters (75%) of these individuals reside in the Denver metropolitan area (Adams, Arapahoe, Denver, Douglas, and Jefferson counties). Of those newly diagnosed with HIV in Colorado, approximately 3% of infections among males and 8% of infections among females are attributed to injection drug use.

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.[2]

To monitor HIV trends, the Centers for Disease Control and Prevention (CDC) funds the National HIV Behavioral Surveillance (NHBS) system. NHBS was established in 2003 and is now 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 (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 populations at risk for HIV and to inform data collection. 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 also been offered to all survey participants. DPH uses information 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 groups at risk are utilizing 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, the incidence of HIV among IDU has declined by 80% since the late 1980s.[4] Nonetheless, the CDC has reported that 9% of new HIV infections in the United States in 2009 occurred among IDU.[5] As noted by the CDC, the combination of declining HIV prevalence and high-risk behavior among IDU represent a critical intervention opportunity to further reduce HIV prevalence and incidence.

According to the Colorado Department of Public Health and Environment, the proportion of those with HIV/AIDS that attribute their infection to injection drug use alone has always been lower in Colorado relative to many other states. Colorado's HIV incidence rate among IDU is 8% compared to approximately 19% nationwide.[6]

In 2005, NHBS provided the first national estimates of certain HIV-associated behaviors among IDU in metropolitan areas with high HIV/AIDS prevalence.[3]

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

The DPH team implemented NHBS among IDU living in the Denver metro area at three points in time: 2006, 2009 and 2012. NHBS cycles among MSM occurred in 2004-05, 2008 and 2011, and HET cycles took place in 2007, 2010 and 2013. 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.

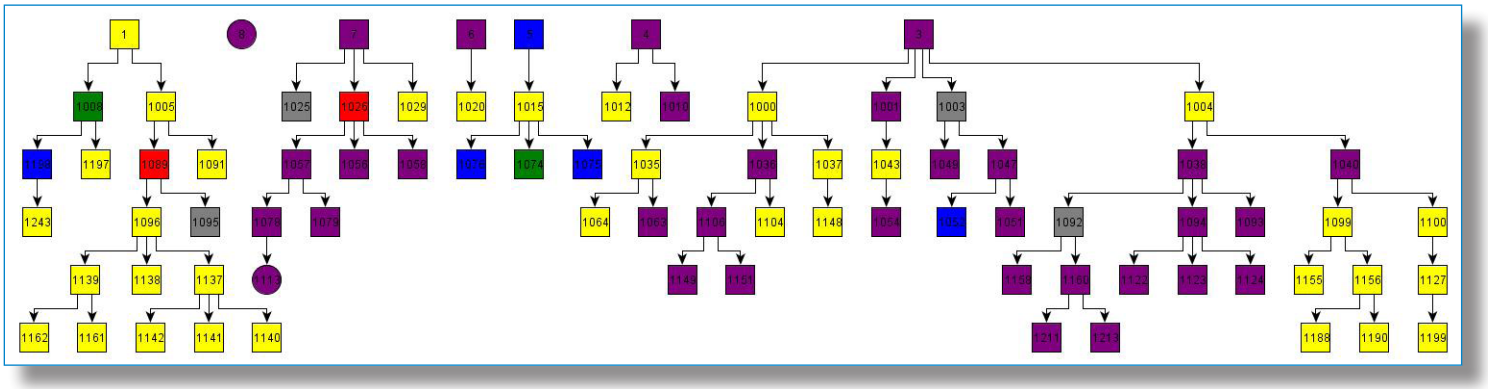
NHBS participants are not asked to disclose any personally identifying information other than their birth date and zip code. To be eligible for NHBS-IDU cycles, participants must be at least 18 years of age, live within the targeted metropolitan area, have injected drugs that were not prescribed to them in the past 12 months, 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 are not eligible to do so again in that cycle.

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. In 2009, DPH utilized oral fluid specimens for rapid and confirmatory HIV testing. Rapid testing was conducted in the field using the OraQuick ADVANCE® Rapid HIV 1/2 Antibody Test and confirmatory testing with Western Blot was performed by the CDPHE laboratory. In 2012, 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 confirmatory testing with Western Blot on dried blood spots was performed by the CDPHE laboratory.

Sampling Method

Participants were recruited using respondent-driven sampling (RDS), a peer-referral sampling methodology.[7] In RDS, initial "seed"participants are identified through key stakeholders and are recruited for participation. Seeds are then asked to recruit persons from their networks using referral coupons, who in turn recruit persons from their networks, and so on. Each eligible participant was allowed to refer up to five persons from their network. Participants were instructed to recruit someone they knew who injects drugs and who they had seen in the past 30 days. RDS employs a dual incentive structure; thus, participants were compensated for their participation in addition to being compensated a smaller amount for each eligible person they successfully recruited. See Figure 1 for an example of recruitment chains generated through RDS.

Figure 1: Example of Respondent Driven Sampling Recruitment Chains



Data Collection

Verbal informed consent was obtained from eligible participants. HIV testing was offered in 2009 and 2012, with testing consent documented separately from study consent. Information provided in the consent process included a brief description of the survey purpose, the HIV testing 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, 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. The survey and HIV testing process took approximately one hour. Participants who recruited others were paid $10 for each eligible IDU they recruited who participated.

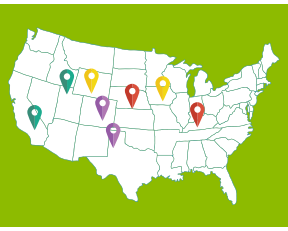
Participants

Table 1 presents the number of eligible IDU participants with complete records for each IDU cycle. Across the three cycles, data from a total of 1,465 participants are included in this report: 519 from IDU1 in 2006, 430 from IDU2 in 2009 and 516 from IDU3 in 2012.

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

	IDU1 (2006)	IDU2 (2009)	IDU3 (2012)
Number of seed participants	16	10	12
Screened	612	555	614
Reported injection drug use in past 12 months	564	524	586
Documented consent to survey	*	434	516
Documented consent to HIV testing	---	431	515
Complete records included in analysis	519	430	516

**During IDU1, informed consent was not obtained due to NHBS being considered public health surveillance and not research.*



IDU in the United States continue to engage in sexual and drug-use behaviors that increase their risk for HIV infection. The large percentage of participants in this study who reported engaging in both unprotected sex and receptive sharing of syringes supports the need for HIV prevention programs to address both injection and sex-related risk behaviors among IDU.[8]

In this analysis, we compiled survey data and HIV test results from the three IDU cycles into a single data file to allow comparisons across the three points in time. Many questions and their formats changed across the three cycles. For example, participants surveyed in 2006 were asked which drugs they typically injected with the option of selecting multiple drugs. In 2009 and 2012, participants answered the same question but were required to select a single drug that they usually injected. In the final merged file, a single "usual" drug injected was determined for the first cycle using an algorithm based on all of the participant's responses and the frequency of those responses in subsequent years.

Thus, we accepted some loss of data in exchange for the substantial benefit of being able to examine trends in behavior over 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 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 IDU population. We utilized chi-square analyses to test whether risk behaviors changed across the three cycles when indicated throughout the report. We then examined patterns in HIV prevalence according to race/ethnicity and age groupings.

Participant demographics across the three NHBS IDU cycles are described in Table 2.

- Across the three cycles, male IDU represent roughly three-quarters of those surveyed. The proportions for 2006, 2009, and 2012 are 71.5%, 68.6% and 76.2%, respectively.
- IDU surveyed in each of the three years tend to be older with nearly two out of three being 40 years or older (63.8% in 2006, 63.4% in 2009 and 60.4% in 2012).
- Proportionally half of those surveyed are persons of color (51.4% in 2006, 48.6% in 2009 and 48.1% in 2012).

Table 2. Participant Demographics

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
Characteristic	n	%	n	%	n	%
Gender						
Male	371	71.5	295	68.6	393	76.2
Female	148	28.5	134	31.2	123	23.8
Age						
18-29	86	16.6	68	15.8	82	15.9
30-39	102	19.7	89	20.7	122	23.6
40-49	188	36.2	112	26.0	148	28.7
50+	143	27.6	161	37.4	164	31.7
Race/Ethnicity						
Black, Non-Hispanic/Latino	77	14.8	56	13.0	62	12.0
Hispanic	145	27.9	114	26.5	150	29.1
White, Non-Hispanic/Latino	251	48.4	221	51.4	265	51.4
Other/Multiple Races	45	8.7	37	8.6	37	7.1

Risk Behaviors

- Across all three survey cycles, IDU continue to report engaging in behaviors that put them at risk for HIV infection (see Table 3). Relatively high proportions of IDU report using a non-sterile needle or syringe, although this practice has fluctuated from 73.0% in 2006, to 80.0% in 2009, to 64.5% in 2012.
- In 2012, one out of three (35.5%) IDU indicated that they had shared a need or syringe after someone else had used it, compared to 39.9% in 2006 and 40.9% in 2009.
- More than half (55.0%) of IDU surveyed used a cooker, water, or cotton after someone else in 2012, compared to 52.6% in 2006 and 58.4% in 2009.
- Nearly one third (31.6%) of IDU reported using drugs that had been divided with a used syringe in 2012, compared to 29.5% in 2006 and 36.7% in 2009.

While proportionally fewer IDU are sharing needles, works, or divided drugs, those who are sharing are putting themselves more at risk by sharing with more partners.

The risks of sharing non-sterile needles and works (e.g., cookers, cotton and/or water) are greater if the individual shares with more than one person. From 2009 to 2012, the percentage of respondents who reported two or more needle sharing partners increased from 24.7% to 34.6%. Over the same period, IDU who shared their works with two or more IDU increased from 30.7% to 35.5% while those who divided drugs with two or more injection partners also increased, from 19.8% in 2009 to 21.5% in 2012.

Table 3. HIV-related Risk Behaviors Over the Past 12 Months

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
Characteristic	n	%	n	%	n	%
In the last 12 months, ever used a non-sterile needle or syringe	379	73.0	344	80.0	333	64.5
In the last 12 months, ever used a needle or syringe after someone else	207	39.9	176	40.9	183	35.5
In the last 12 months, ever used cooker, water, or cotton after someone else	273	52.6	251	58.4	284	55.0
In the last 12 months, ever used drugs divided with used syringe	153	29.5	158	36.7	163	31.6

Availability of Sterile Needles

For harm reduction, those who inject drugs should use a new, sterile needle or syringe for each injection. To support this harm reduction principle, syringe exchange programs (SEPs) provide free sterile syringes and collect used syringes from IDU to reduce transmission of blood borne pathogens, including HIV, hepatitis B virus, and hepatitis C virus (HCV).[9]

The impact of syringe exchange programs can be clearly seen in Table 4. Whereas only 16.2% of IDU were able to receive free new sterile needles in 2006, by 2012, this number had increased to 39.5%. Of those who had received sterile needles in 2012, 82.4% reported that they had done so through a syringe exchange program, a substantial increase from the 11.7% who had accessed such a program in 2006.

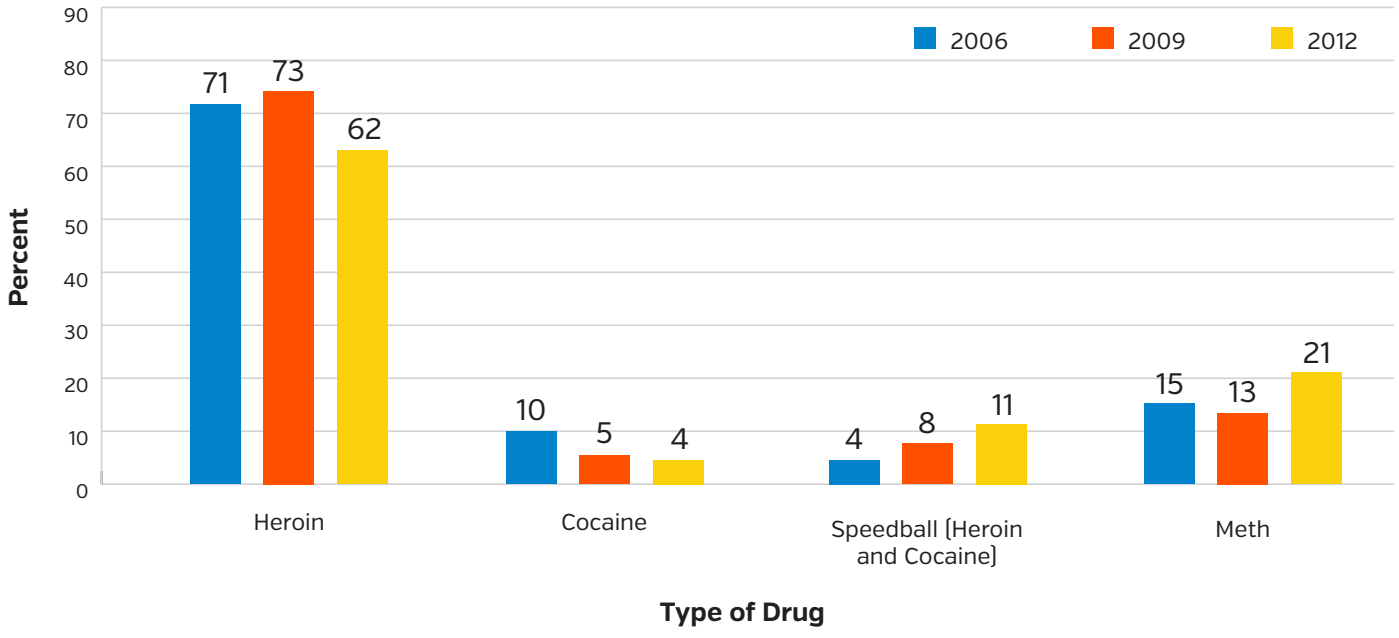
Table 4. Access to Sterile Syringes

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
	n	%	n	%	n	%
Got free new sterile needles in past 12 months	84	16.2	64	14.9	204	39.5
Needle source: needle or syringe exchange program*	9	11.7	47	73.4	168	82.4

**Only asked of respondents indicating having received new sterile needles in last 12 months. All other locations showed no significant change across the waves.*

Across all participating NHBS sites in 2009, the most commonly injected drugs were heroin (90%), speedball (heroin and cocaine combined) (58%), and cocaine (49%). Large percentages of participants reported sharing needles (35%), sharing other injection equipment (58%) and sharing needles to divide drugs (35%).[10] See Figure 1 for injection drug use for Denver NHBS sites.[11]

Figure 2. Most Frequently Injected Drug Over Past 12 Months



HIV Prevalence

In both 2009 and 2012, the number of IDU participants who agreed to be tested for HIV was high (427 in 2009 and 515 in 2012). Patterns of HIV prevalence show an increase from 4.7% in 2009 to 6.0% in 2012. Whereas in 2009, 30.0% of IDU who tested positive as a result of their NHBS participation had been previously unaware of their HIV infection, in 2012 this was true for 13% of those tested (See Figure 3).

- In 2009, of the 427 IDU tested for HIV, 20 tested HIV-positive, resulting in an overall HIV prevalence of 4.7%. Of those 20 who tested positive, 6 (30%) were unaware of their HIV infection.
- In 2012, of the 515 IDU tested for HIV, 31 tested HIV-positive for an overall HIV prevalence of 6.0%. Among the 31 IDU testing positive, four (13.3%) of those were unaware of their HIV infection.

Overall, the number of newly diagnosed cases of HIV infection has declined substantially in the Denver metro area. Figure 4 displays the number of newly diagnosed cases of HIV in Denver residents between 2004 and 2013.

Figure 3. HIV Prevalence and Unrecognized Infection, 2009 and 2012

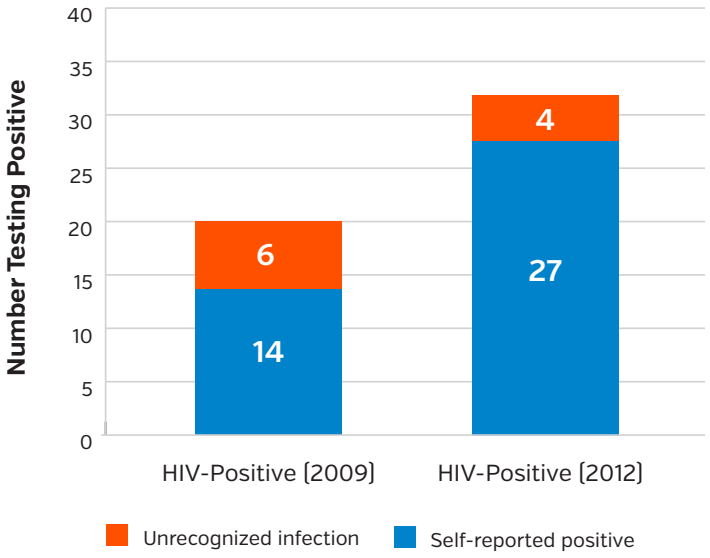
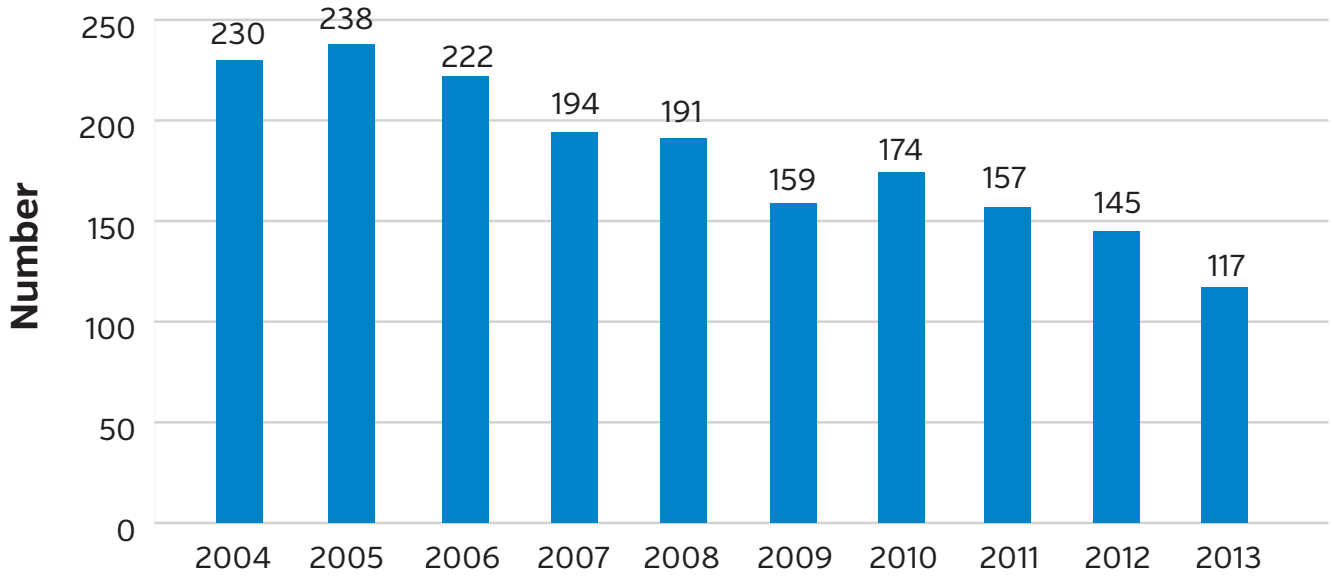


Figure 4. Number of New Diagnoses of HIV Infection by Year for Denver County Residents



HIV Prevalence by Race

Among all IDU groups, non-white IDU (7.2%) had the highest prevalence of HIV in 2012 (See Table 5). By contrast, the HIV prevalence for white IDU (4.9%) in 2012 is lower than the average for all IDU (6.0%).

- HIV prevalence among non-white IDU increased from 5.3% in 2009 to 7.2% in 2012. Among the 208 non-white IDU tested in 2009, 11 tested positive for an HIV prevalence of 5.3%. In 2012, 250 non-white IDU were tested, of whom 18 were determined to be positive for HIV. HIV prevalence for non-white IDU was 7.2% in 2012, 20% higher than the overall IDU prevalence of 6.0%
- Between 2009 and 2012, HIV prevalence for white IDU increased from 4.1% to 4.9%. In 2009, 219 white IDU received an HIV test, with 9 (4.1%) testing positive. By comparison, in 2012, of the 265 white IDU tested, 13 (4.9%) were found to be positive. This represents an increase of 19.5% from 2009. Overall, HIV prevalence for white IDU in 2012 was 18.3% lower than the HIV prevalence rate for all IDU in this year.

HIV Prevalence by Race and Age

Among all IDU groups, HIV prevalence was highest in the 30-39 age group for whites at 7.2% and highest in the 40-49 year age group for non-whites at 13.9% in 2012. By comparison in 2009, HIV prevalence was highest among older IDU groups for both racial/ethnic groups. In this year, the highest HIV prevalence was found among 40-49 year olds for whites at 5.4% and those 50 years and older for non-white IDU at 6.6%.

According to the Colorado Department of Public Health and Environment, African-Americans continue to be disproportionately affected by the HIV/AIDS epidemic and represent 14% of persons living with HIV/AIDS while comprising only 4% of Colorado's population.[12]

- Among white IDU in the 30-39 age group, 83 were tested in 2012 and 6 tested positive. HIV prevalence among 30-39 year old IDU doubled from 3.5% to 7.2% between 2009 and 2012.
- By comparison, white IDU in the 40-49 year old age group had the highest prevalence at 5.4% in 2009. HIV prevalence in this age group was relatively stable in 2012 at 5.8%.
- Among non-white IDU, 79 IDU in the 40-49 year age group were tested with 11 (13.9%) testing positive, compared to 7.2% for the overall non-white IDU group.
- In 2009, the highest HIV prevalence was found among non-white IDU over 50 years of age. Of the 106 tested, 7 (6.6%) tested positive. This is compared to 5.3% for all non-white IDU in 2009.

Table 5. HIV Prevalence by Race/Ethnicity and Age, 2009 and 2012

	White				Non-White			
	2009		2012		2009		2012	
Characteristic[14]	N/# Tested	%	N/# Tested	%	N/# Tested	%	N/# Tested	%
Age								
18-29	2/52	3.8	2/60	3.3	0/16	0.0	0/22	0.0
30-39	2/57	3.5	6/83	7.2	1/32	3.1	4/39	10.3
40-49	3/56	5.4	4/69	5.8	3/54	5.6	11/79	13.9
50+	2/54	3.7	1/53	1.9	7/106	6.6	3/110	2.7
Total	9/219	4.1	13/265	4.9	11/208	5.3	18/250	7.2

HIV and HCV Testing

The CDC recommends that all persons at high risk for HIV be tested at least annually. In all three cycles, high proportions of IDU report having ever been tested for HIV: 91.1% (2006), 87.0% (2009) and 89.3% (2012). Less than half of IDU, however, report having had an HIV test during the past 12 months in 2012. Whereas 62.2% had had an HIV test in the past 12 months in 2006, in 2012 the proportion tested in the most recent year had declined to 45.7% (See Figure 5).

By sharing needles and drug preparation equipment, IDU are at risk for other blood borne infections such as HCV. The prevalence of HCV infection among IDU survey participants is high. Across all three surveys, close to half of IDU report having been told they had HCV by a health care professional (see Table 6): 51.3% (2006), 49.8% (2009) and 46.9% (2012).

Testing patterns for HCV are similar to those reported for HIV. Almost all IDU report having ever been tested for HCV: 82.5% (2006), 79.8% (2009) and 87.8% (2012). Nonetheless, in 2012 only 38.0% indicated that they had had an HCV test in the past 12 months.

Figure 5. Percent of IDU Reporting Being Tested for HIV by Year

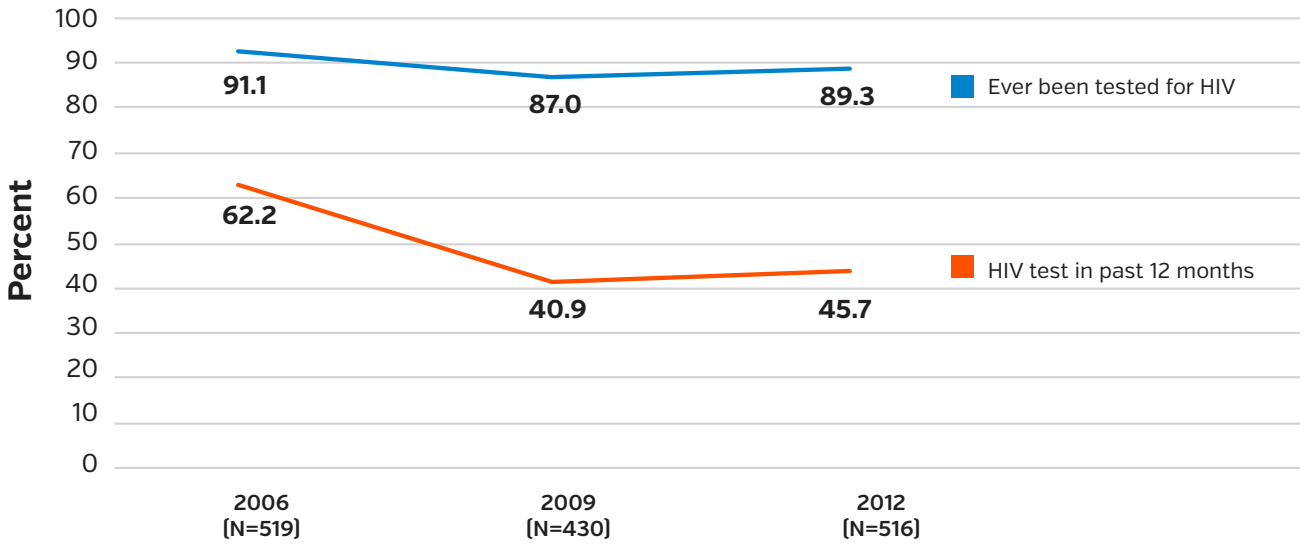


Table 6. HCV Testing and Infection Among Persons Who Inject Drugs

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
	n	%	n	%	n	%
Ever been told had hepatitis by a healthcare professional	281	54.1	241	56.0	264	51.2
Type of Hepatitis – Hepatitis C	266	51.3	214	49.8	242	46.9
Ever been tested for HCV	428	82.5	343	79.8	453	87.8
HCV test in past 12 months	---	---	---	---	196	38.0

In 2009, participants were offered a standard HCV antibody test as part of NHBS. A total of 395 survey participants provided a blood specimen to test for HCV antibody. Of these, 289 (73.2%) were HCV antibody positive.[13]

SYRINGE EXCHANGE PROGRAMS

Syringe exchange programs have operated outside of legal protection in the Denver area since 2008. Underground Syringe Exchange of Denver operated a volunteer program promoting needle exchange and syringe cleanup while Hep C Connection sponsored syringe drop-off locations. In 2010, then Governor Bill Ritter signed a bill with bipartisan support that allowed Colorado-based organizations to distribute sterile syringes. Two organizations, the Denver Colorado AIDS Project and the Harm Reduction Action Center, were granted certificates to operate in Denver in 2012 (See Table 7). More recent legislation in 2013 exempted exchange participants from drug paraphernalia laws.

In 2012, IDU participants were asked additional questions developed by DPH related to their use of syringe exchange services. While syringe exchange was the most commonly reported service, IDU also reported receiving other risk prevention resources from syringe exchange programs including cookers/cotton, condoms, access to risk reduction classes and vein care. HIV testing was also provided as were referrals for HCV testing and Hepatitis A and B vaccinations (See Table 8).

When asked about their motivation to access sterile syringes, nearly half of IDU cited an interest in preventing HIV (38.1%) or HCV (4.0%). Equally motivating were personal health reasons such as avoiding the pain of a dull needle (23.8%), protecting veins (12.5%) and avoiding abscesses (8.6%).

Table 7. Syringe Exchange Program Visits

*Among Participants Who Reported Going to a Local Syringe Exchange Program in the Past 12 Months**

	2012 (N=187)	
	n	%
Denver Colorado AIDS Project	16	8.5
Harm Reduction Action Center	157	84.0
Underground Syringe Exchange	5	2.7
Boulder Syringe Exchange	4	2.1
Other	13	7.0

** Participants could select more than one option*

Table 8. Syringe Exchange Program Services

*Among Participants Who Reported Going to a Local Syringe Exchange Program in the Past 12 Months**

	2012 (N=187)	
	n	%
Exchanged syringes	172	92.0
Got cookers or cotton	132	70.1
Got condoms	83	44.4
Risk reduction classes	48	25.7
Vein care	36	19.3
HIV testing	23	12.3
HCV testing	22	11.8
Risk reduction counseling	37	19.8
Received naloxone	9	4.8
Referrals for vaccinations	6	3.2

** Participants could select more than one option*

SOCIAL DETERMINANTS AND PREVENTION BEHAVIORS

Previous research has shown that 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.[14] Examining the social risk characteristics among IDU participants in the three cycles allows the DPH team to tailor prevention strategies that address the changing needs of the IDU population (See Table 9).

- Across the three survey cycles, two thirds of IDU participants had a high school degree or less. In 2006, 73.4% of IDU had either graduated from high school or had had some high school education, compared with 69.3% in 2009 and 62.8% in 2012.
- High proportions of IDU participating in the NHBS survey reported income levels of less than $20,000. This was true for 89.6% of participants in 2006, 83.0% in 2009 and 73.6% in 2012.
- Nearly half of survey participants were unemployed. In 2009, 44.2% reported being unemployed while 42.2% reported being unemployed in 2012.
- Homelessness in the past 12 months was consistently high among IDU participants. Nearly three out of four (73.4%) IDU were homeless in 2006, 61.9% in 2009, and 70.2% in 2012.

Table 9. Education and Socioeconomic Characteristics

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
Characteristic	n	%	n	%	n	%
Education						
Some high school or less	171	32.9	117	27.2	125	24.2
High school graduate	210	40.5	181	42.1	199	38.6
Some college or more	138	26.6	132	30.7	192	37.2
Annual Income						
≤ $19,999	465	89.6	357	83.0	380	73.6
$20,000-$49,000	44	8.5	64	14.9	82	15.9
≥ $50,000	10	1.9	8	1.9	25	4.8
Missing	0	0.0	1	0.2	29	5.6
Currently unemployed	---	---	190	44.2	218	42.2
Homelessness						
Currently homeless	284	54.7	187	43.5	286	55.4
Homeless in past 12 months	381	73.4	266	61.9	362	70.2

Health Care Access

Having access to a regular source of health care is an important determinant of maintaining good health. Less than half of IDU participants report having health insurance, yet 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 (See Table 10).

- Collectively, fewer than half of IDU participants reported having health insurance. This was true for 37.2% in 2006, 45.6% in 2009 and 53.7% in 2012.
- Participants were only asked about whether they had a regular source of medical care in 2012. In this year, three quarters (78.7%) reported that they had a provider they regularly used for health care services.
- Most IDU have visited a health care provider in the past 12 months: 74.0% in 2006, 75.1% in 2009 and 79.3% in 2012.
- Despite their utilization of health services, not all participants were offered an HIV test at their last healthcare visit. Providers offered HIV testing to 63.6% of IDU in 2006, 41.2% in 2009 and 47.2% in 2012.

Three out of four IDU surveyed reported ever receiving drug or alcohol treatment (See Table 10), with similar proportions in 2006 (75.1%), 2009 (79.1%) and 2012 (77.9%). Of those that reported ever participating in a drug or alcohol treatment program, only 40.1% attended one in the last 12 months in 2012. This was also true for 37.0% of IDU in 2006 and 40.9% in 2009. Finally, in 2012, one third (35.7%) of participants indicated that they had been in drug treatment only in the last 12 months (See Table 11).

Table 10. Health Care Access and HIV Testing

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
Characteristic	n	%	n	%	n	%
Have Health Insurance	193	37.2	196	45.6	277	53.7
Have a regular source of medical care	---	---	---	---	406	78.7
Visited health care provider in last 12 months	384	74.0	323	75.1	409	79.3
Health care provider offered HIV test*	243	63.6	133	41.2	193	47.2

**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 11. Participation in Drug and Alcohol Treatment

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
Characteristic	n	%	n	%	n	%
Ever participated in drug or alcohol treatment	395	75.1	340	79.1	402	77.9
Participated in drug or alcohol treatment in the last 12 months	192	37.0	176	40.9	207	40.1
Drug treatment only in the last 12 months	---	---	---	---	184	35.7

Injection Partners

Sharing needles and drug paraphernalia are primary risk factors for HIV transmission among IDU. As shown in Table 12, nearly two out of three IDU report having injection partners: 66.5% in 2006, 63.5% in 2009 and 58.9% in 2012. While most commonly injection partners are friends or acquaintances, over a quarter of them are also reported to be sex partners: 46.7% (2006), 28.9% (2009) and 28.5% (2012).

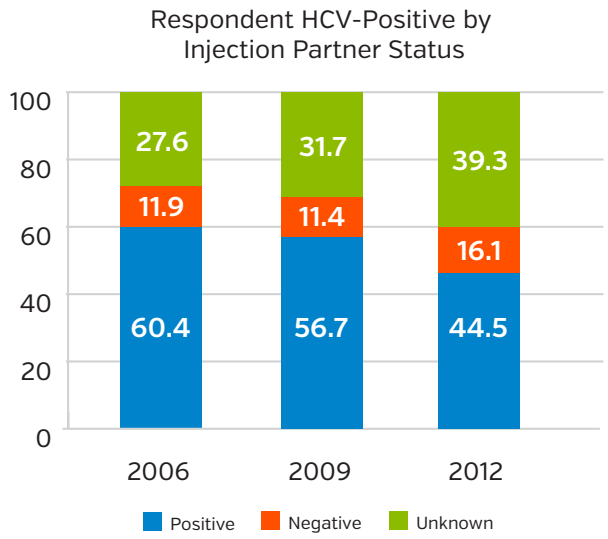
Of particular importance in terms of HIV and HCV prevention is whether IDU are aware of the infection status of their injection partners. For example, IDU who know they are HCV-positive might be more likely to select injection partners who are also HCV-positive, a practice referred to as sero-sorting. The proportions of HCV-positive participants who reported that their last injection partner was also HCV-positive were 60.4% in 2006, 56.7% in 2009 and 44.5% in 2012 [Figure 7, first panel]. Among participants who reported being HCV-negative or did not know their infection status, more than half reported that they did not know the HCV infection status of their last injection partner, thereby putting themselves at risk of infection [See Figure 7, second panel].

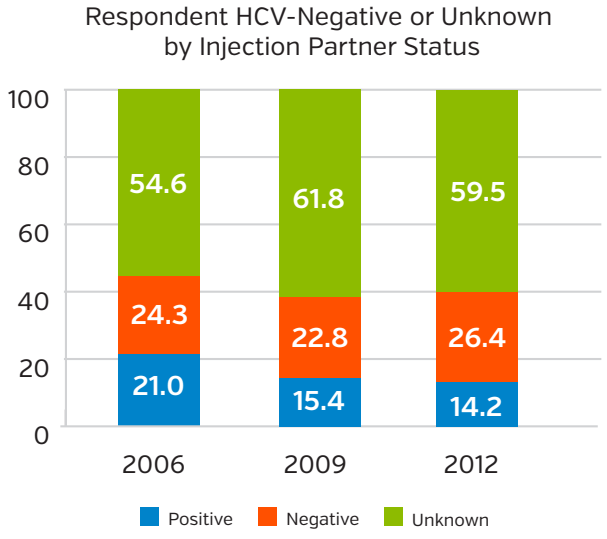
In 2012, only half of IDU were aware of their last injection partner's HIV status (49.5%) or if they had been tested for HCV (51.1%).

Table 12. Injection Partners and HIV/HCV Status

	2006 (N = 519)		2009 (N = 430)		2012 (N = 516)	
	n	%	n	%	n	%
Reported an injection partner	345	66.5	273	63.5	304	58.9
Partner Type:						
Sex partner	161	46.7	79	28.9	87	28.5
Friend or acquaintance	154	44.6	160	58.6	189	62.0
Other	30	8.7	34	12.5	29	9.6
Knew last injection partner's HIV status	218	65.5	157	58.1	151	49.5
Knew if last injection partner had been tested for HCV[15]	214	65.8	156	60.9	156	51.1

Figure 6. Participant Sero-sorting Based on HCV Infection Status





Sexual Partners

IDU can also be at risk for HIV through unprotected sexual activity. Table 13 highlights risk behaviors for IDU who reported that the last time they had had sex it was as an exchange for money, drugs, or other valuables.[16] IDU in this category were found to be significantly more likely to have been homeless in the past 12 months, to be non-White and to be a man who had sex with another man in the past 12 months.

IDU who engaged in sexual exchange were also more likely to be unemployed, to have used non-sterile syringes and to have never been tested for HIV.

Table 13. Risk Factors: Last Sex Partner Was Exchange Partner, 2012

	2012 (N = 419)				
	Exchange Partner		No Exchange Partner		Signficance
	n	%	n	%	
Homeless in past 12 months	67	87.0	233	68.1	<.01
Non-white	50	64.9	154	45.0	<.01
MSM past 12 months	21	27.3	36	10.5	<.01
Unemployed	44	57.1	150	43.9	<.05
Used non-sterile needle	54	70.1	215	62.9	NS
Never tested for HIV	14	18.2	36	10.6	NS

Only those who reported having sex in the last 12 months were included in the analysis of risk factors by sex partner type.

Limitations

NHBS data collection activities for the IDU 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 who are also IDU to participate. Seeds were initially identified through interviews with key stakeholders who received up to five "coupons" to distribute to other IDU in their network. While this process provides a perspective on risk behaviors, HIV testing patterns and HIV prevalence among IDU who participate, the results only pertain to those who can be reached. It is unknown to what extent these results apply to IDU who are not connected to the "seed" networks. It should be noted that the 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 IDU who are engaged in high risk behaviors. Though patterns of risk behavior among IDU appear to be declining, substantial numbers of IDU continue to put themselves at risk by using non-sterile syringes and by sharing syringes and works.

- Across all three survey cycles, IDU continue to report engaging in behaviors that put them at risk for HIV infection (see Table 3). Relatively high proportions of IDU report using a non-sterile needle or syringe, although this practice has fluctuated from 73.0% in 2006, to 80.0% in 2009, to 64.5% in 2012.
- In 2012, one out of three (35.5%) IDU indicated that they had shared a need or syringe after someone else had used it, compared to 39.9% in 2006 and 40.9% in 2009.
- More than half (55.0%) of IDU surveyed used a cooker, water, or cotton after someone else in 2012, compared to 52.6% in 2006 and 58.4% in 2009.

- Nearly one third (31.6%) of IDU reported using drugs that had been divided with a used syringe in 2012, compared to 29.5% in 2006 and 36.7% in 2009.

HIV prevalence among NHBS IDU participants appears to have increased from 4.7% in 2009 to 6.0% in 2012, highlighting the importance of annual testing and access to a regular source of care.

- Most IDU have visited a health care provider in the past 12 months; 74.0% in 2006, 75.1% in 2009 and 79.3% in 2012.
- Despite their utilization of health services, not all participants were offered an HIV test at their last healthcare visit.

Three out of four IDU surveyed reported ever receiving drug or alcohol treatment, with similar proportions in 2006 (75.1%), 2009 (79.1%) and 2012 (77.9%). Of those that reported ever participating in a drug or alcohol treatment program, only 40.1 % attended one in the last 12 months in 2012. This was also true for 37.0% of IDU in 2006 and 40.9% in 2009. Finally, in 2012, one third (35.7%) of IDU participants indicated that they had been in drug treatment only in the last 12 months.

Social determinants are also important factors to consider when examining risk behaviors and health outcomes:

- Nearly half of survey participants were unemployed. In 2009, 44.2% reported being unemployed while 42.2% reported being unemployed in 2012.
- Homelessness in the past 12 months was consistently high among IDU participants. Nearly three out of four (73.4%) IDU were homeless in 2006, 61.9% in 2009, and 70.2% in 2012.

Key Takeaways

- Among persons who inject drugs in the Denver metro area, risk behaviors appear to be decreasing. Specifically, fewer IDU are reporting using non-sterile syringes or needles, dividing drugs with a used syringe or needle, and using cookers, water or cotton after someone else.
- Syringe exchange programs appear to be having an impact on the availability of sterile syringes in the Denver metro area. Syringe exchange programs can be an effective component of a comprehensive strategy to prevent HIV and other blood-borne infectious diseases in communities that adopt them.
- Despite decreasing risk behaviors and better access to sterile syringes, HIV prevalence may be increasing among IDU (4.7% in 2009 to 6.0% in 2012). There is a need to increase HIV testing opportunities for persons who inject drugs and refocus prevention efforts.

END NOTES

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[8] Centers for Disease Control and Prevention HIV Infection and Risk, Prevention, and Testing Behaviors Among Injecting Drug Users – National HIV Behavioral Surveillance System, 20 U.S. Cities, 2009. MMWR: 63(ss06);1-51.

[9] Centers for Disease Control and Prevention. Syringe exchange programs – United States, 2008. MMWR: 59(45): 1488-1491.

[10] Centers for Disease Control and Prevention HIV Infection and Risk, Prevention, and Testing Behaviors Among Injecting Drug Users – National HIV Behavioral Surveillance System, 20 U.S. Cities, 2009. MMWR: 63(ss06);1-51.

[11] Change across cycles should be interpreted cautiously. In IDU2 and IDU3, respondents were asked which drug they usually injected with the requirement that only one could be selected. In IDU1, multiple drugs could be selected as the drug that was usually injected. Frequency of drug selection in IDU2 and IDU3 guided the selection of usual drug for IDU1. For example, since heroin was the most frequently selected drug in IDU2 and IDU3, if an individual selected heroin in IDU1, then heroin was selected as their usual drug injected even if they selected other drugs. If the individual selected methamphetamine (2nd most common drug in IDU2 and IDU3), but not heroin then methamphetamine was listed as the usual drug injected even if other drugs were selected. It is possible that this method of determining usual drug injected may have increased the frequency of heroin or cocaine as the usual drug in IDU1 and decreased the frequency of other drugs, particularly speedballs.

[12] Al-Tayyib, A, Thiede, H, Burt, R, and Koester, S (2009) Unmet healthcare needs and hepatitis C infection among persons who inject drugs in Denver and Seattle, 2009. Prevention Science, 2014 Jun 27 (Epub ahead of print).

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[14] 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.

[15] Knowledge of partner's HIV status and HCV status were asked differently on the questionnaire. Participants were asked if they knew their injection partner's HIV status; those that responded "yes" were then asked to report their injection partner's status. For HCV, participants were asked if they knew if their injection partner had been tested for hepatitis C; those that answered "yes" were then asked to report the result of the HCV test.

[16] Due to changes in the way these questions were asked in each of the NHBS surveys, information regarding IDU engaging in sexual exchanges is presented only for 2012.

For more information:

DenverPublicHealth.org/NHBS