# hiv/aids

# 2014 EPIDEMIOLOGY REPORT

WASHINGTON STATE • SEATTLE & KING COUNTY

# Washington State/Seattle-King County HIV/AIDS Epidemiology Report

## Credits

This 83rd edition of the HIV/AIDS Epidemiology Report includes data available through the end of June 2014. This report is produced jointly by Public Health – Seattle & King County and the Infectious Disease Assessment Unit, Washington State Department of Health. It is funded partly by a Centers for Disease Control and Prevention cooperative agreement for HIV/AIDS surveillance. We thank the medical providers caring for people with HIV/AIDS and the clinics and patients participating in epidemiologic projects. Their cooperation with public health department HIV/AIDS control efforts permits the collection of data included in this report which are used for further prevention and planning efforts. We also wish to acknowledge the outstanding assistance of our staff, including Christy Johnson, Rachel Patrick, Michelle Perry, Ariel VanZandt (disease investigation); Sandy Hitchcock (data entry and quality assurance); Shirley Zhang and Leslie Pringle (data management); Teal Bell, Amy Bennett, Richard Burt, Katelynne Gardner Toren, Jen Reuer and Christina Thibault (epidemiologists); and especially Jake Ketchum for desktop publishing this report.

**HIV/AIDS Epidemiology Report Co-Editors:**

**HIV/AIDS Epidemiology Program**
*Susan Buskin, PhD, MPH, Senior Epidemiologist*
*PHSKC HIV/AIDS Epidemiology*

*Michael Hanrahan, Education& Prevention Services*
*PHSKC HIV/STD Program*
*401 5th Avenue, Suite 1250, Seattle, WA 98104*
*206-263-2000*

**Infectious Disease Assessment Unit**
*Tom Jaenicke, MPH, MBA, MES*
*Section Manager/Senior Epidemiologist*
*Washington State Department of Health*
*PO Box 47838, Olympia, WA 98504-7838*

## Contributors to this Issue

**Public Health – Seattle & King County**
- Susan Buskin, PhD, MPH
- Amy Bennett, MPH
- Richard Burt, PhD
- Katelynne Gardner Toren, MPH
- Julia Hood, MPH
- David Katz, PhD, MPH
- Courtney Moreno
- Carrie Shriver, MSW
- Christina Thibault, MPH
- Hanne Thiede, DVM, MPH
- Eva Wong, PhD

**Snohomish Health District**
- Jessica Burt, MPH

**University of Washington**
- Matthew Golden, MD, MPH
- Marielle Goyette, MPH Student
- Jeffrey Schouten, MD
- Janine Maenza, MD
- Michael Louella

**Virginia Mason**
- David Aboulafia, MD
- Leila Ponce, CCRP

**Washington State Department of Health**
- Richard Aleshire, MSW
- Jason Carr, MPH

## HIV/AIDS Reporting Requirements

Detailed requirements for reporting of communicable diseases including HIV/AIDS are described in the Washington Administrative Code (WAC), section 246-101 (http://apps.leg.wa.gov/WAC/default.aspx?cite=246-101).

**Washington health care providers** are required to report all HIV infections, regardless of the date of the patient's initial diagnosis, to the health department. Providers are also required to report new diagnoses of AIDS in a person previously diagnosed with HIV infection. Local health department officials forward case reports to the Department of Health. Names are never sent to the federal government.

**Laboratories** are required to report evidence of HIV infection (i.e., positive western blot assays, p24 antigen detection, viral culture, and nucleic acid detection), all HIV viral load tests (detectable or not), and all CD4 counts in the setting of HIV infection. If the laboratory cannot distinguish tests, such as CD4 counts, done due to HIV versus other diseases (such as cancer), the CD4 counts should be reported and the health department will investigate. However, laboratory reporting does not relieve health care providers of their duty to report, as most of the critical information necessary for surveillance and follow-up is not available to laboratories.

For further information about HIV/AIDS reporting requirements, please call your local health department or the Washington State Department of Health at 888-367-5555. In King County, call 206-263-2000.

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HIV/AIDS Epidemiology publications are online at:
www.kingcounty.gov/healthservices/health/communicable/hiv/epi.aspx.

Alternative formats provided upon request.
To be included on the mailing list or for address corrections,
please call 206-263-2000.

# HIV/AIDS Epidemiology and Surveillance News

# Executive Summary

The 2014 HIV/AIDS Epidemiology Report (83rd issue) is the first explicitly produced as an annual report with data included through the end of June 2014. We have also added key definitions of terms frequently used in this report, following this executive summary.

**HIV reporting:** Reporting requirements for HIV are summarized on page ii. Although HIV case reports may be initiated by laboratories and completed by health department staff, we appreciate medical providers submitting case reports directly. Case report forms are available on-line or by calling (888) 367-5555 (State) or (206) 263-2000 (King County). To ensure correct and timely data, reporting of progressions to AIDS, deaths and diagnoses of potential public health significance (unusual strains) are also appreciated.

**HIV & AIDS data:** This section of tables and figures has been substantially modified to add data comparable to the Washington State Department of Health semiannual state report, available at http://www.doh.wa.gov/DataandStatisticalReports/DiseasesandChronicConditions/HIVAIDSData/SurveillanceReports. For the second time we also summarize data from the most recent three cycles of the National HIV Behavioral Surveillance project.

**Washington State Care Cascade:** The importance and creation of the local care cascades are discussed here.

**Monitoring the goals of the National Strategy for HIV/AIDS and the King County HIV care cascade:** Estimates of King County data suggest about 68% of local PLWHA are virologically suppressed (this compares to fewer than one quarter of U.S. residents from national estimates of virologic suppression). In 2013, we estimated at least 95% of CD4 and viral load tests conducted for King County residents were reported to the HIV/AIDS surveillance program in King County.

**Completeness of HIV/AIDS lab reported data from 2009-2013 in King County, WA:** Much of the data in this report and especially the care cascade are predicated on complete and timely reporting of HIV-related laboratory results. During the summer of 2014 we were fortunate to have an Epidemiology Scholar conduct an evaluation of the completeness of lab reporting in King County.

**Update on HIV incidence Surveillance in King County and Washington State:** We looked at 1) the number of newly-HIV-diagnosed individuals as a proxy for newly-transmitted infections and 2) the results of the HIV incidence surveillance project and found similar estimates of HIV incidence for the state and King County 2008 through 2012.

**Trends from the Seattle Pride Survey, 2009-2014:** During the summer of 2014, we administered the sixth annual Gay Pride survey at the Gay Pride parade and other venues as well. This article focuses on trends among Pride participants, especially 1) impact of the Affordable Care Act, including coverage of health insurance and 2) HIV prevention innovations, especially pre exposure prophylaxis, or PrEP.

**Highlights from the 2013 Seattle area National HIV Behavioral Surveillance (NHBS): NHBS survey of persons at increased risk of heterosexually transmitted HIV infection:** NHBS is an increasingly useful national surveillance system wherein key populations at risk for HIV are surveyed every three years in the most heavily impacted metropolitan areas. Although heterosexuals do not comprise a large proportion of local individuals with HIV, it is still important to monitor HIV risk in this group. The NHBS project was highly successful in interviewing a cohort of heterosexuals with a high level of sexual risk, a high level of substance use, and an HIV prevalence of 0.8%.

**Prenatal HIV screening in King County and Washington State.** We analyzed data from the Pregnancy Risk Assessment Monitoring System (PRAMS) 2004 to 2011 and saw that women reported declining levels of HIV testing in both King County and Washington State.

**Updated men who have sex with men (MSM) and people who inject drugs (PWID) population estimates for King County.** Epidemiologists and other subject matter experts periodically meet to determine what are the best population sizes to use in calculating denominators for HIV diagnosis rates. In late 2013, we addressed both MSM and PWID and this report describes the methods used to create population estimates, as well as what the actual numeric estimates are.

**PrEP: Pre-exposure Prophylaxis:** Washington Department of Health launched a PrEP drug assistance program in 2014, described in this article. King and Snohomish counties have lists of medical providers willing to screen for, prescribe, and monitor PrEP. A survey of the King County providers indicates a median of eight patients prescribed PrEP and describes some PrEP-related practices.

**Update on antiretroviral drug resistance and HIV subtype surveillance in King County:** This update includes information on the coverage of genotype test surveillance, the proportion of individuals with B and other subtypes, and trends in primary and overall drug resistance in King County. Note this is the first time we have shared overall drug resistance trends, we typically exclude acquired

## Executive Summary, continued

resistance from our analyses. Data on resistance to integrase inhibitors is also included, despite scant data available.

**STD Report:** Quarterly case counts of sexually transmitted diseases among MSM and other populations are presented in this report. Also included are, for MSM at the Seattle STD clinic, the median inter-test intervals (time between last and a current HIV test) and percent who have never tested for HIV.

**Medical Monitoring Project (MMP) 2009-2011:** Key results from MMP are presented, including that, locally, 90% of in-care PLWHA are receiving antiretrovirals and 79% have achieved viral suppression. However 12% reported sero-discordant unprotected sex; and poverty, substance use, and other co-morbidities are not uncommon.

**Latent Reservoirs in HIV: New information and new studies from the UW Primary Infection Clinic and the UW AIDS Clinical Trials Unit:** Two ongoing studies targeting HIV reservoirs are described in this article. Both studies aim to contribute to HIV viral eradication.

**The AIDS Malignancy Clinical Trials Consortium (AMC):** This is a new section for this report, and one we hope will continue, describing all of the open AMC trials in Seattle.

**University of Washington AIDS Clinical Trials Unit (ACTU) current studies:** A summary of the enrollment criteria, goals and procedures for all currently enrolling studies is presented here.

## Definitions

**AIDS:** Acquired Immune Deficiency Syndrome. This is the advanced stage of HIV infection and is defined by a specific immune system deficiency in CD4+ lymphocyte cells (<200 per µL) and/or the diagnosis of specific opportunistic illnesses. In the absence of antiretroviral therapy, AIDS had a median onset of about 8 – 10 years after HIV infection.

**CD4 Count:** The number of a specific type of white blood cell, also called T-helper cells. The CD4 count is measured per µL (also called $mm^3$ – a very small drop equivalent to 2 ten-thousandths of a teaspoon) of plasma or blood. CD4 count provides a good indication of a patient's stage of HIV illness. CD4 counts between 500 and 1,500 indicate normal immune function, CD4 < 200 indicates severe immunosuppression.

**Cumulative Cases:** The total number of HIV cases ever reported, as of a specific point in time. Cumulative cases include both people who are living and deceased.

**Deaths:** Deaths are counted among people diagnosed with HIV whether or not they are caused by HIV or AIDS.

**Estimated new HIV infections**: Estimated new infections are people recently infected with HIV whether they are diagnosed and reported or not. New infections are usually estimated by new diagnoses.

**Estimated people living with HIV/AIDS:** Estimated cases include people infected with HIV whether they are diagnosed and reported or not.

**Exposure Category:** The manner in which a case was most likely to have been infected by HIV, based on reported risk behaviors. Categories are arranged in a hierarchy. A case can only be assigned to one exposure category at any given time. The highest category in the hierarchy are men who have sex with men (MSM, described as male-male sex) and who inject drugs (PWID, described as Injection drug users, or IDU). Following MSM-IDU are MSM, IDU, heterosexual contact, blood product exposure, perinatal exposure, and other/unknown. Heterosexual contact historically was limited to individuals whose heterosexual partner had a known HIV infection or a known HIV risk (including PWID and bisexual men). We now also include heterosexual women who deny being PWID.

**Foreign-born:** This term is used to describe people born outside the United States. U.S. birthplace includes US territories unless otherwise specified.

**Gender:** A person's sex at birth, either male or female.

**HIV:** Human Immunodeficiency Virus. This is the virus that causes AIDS.

**HIV Diagnosis Date:** The earliest documented date when a person was diagnosed with HIV, with or without AIDS.

**Living with HIV/AIDS:** People diagnosed with HIV and reported to the health department who are presumed living in King County or Washington State at a specific point in time. A living HIV case can also be described as a prevalent HIV case.

**New HIV Case:** People newly diagnosed with HIV, with or without AIDS.

**Viral Load:** This is the amount of HIV viral copies circulating within a person's blood stream. It is measured per milliliter of plasma (a milliliter or mL is about one fifth of a teaspoon). Plasma is blood with the red and white cells removed. Viral load is a good indication of whether a person is receiving effective treatment for HIV disease. Most individuals receiving antiretrovirals have viral loads below the limit of detection, or about < 40 copies per mL. In early and late untreated HIV infection, viral load can be in the millions.

**Virological Suppression:** Viral load < 200 copies/mL.

## HIV/AIDS Data in King County and Washington

**Table 1. Surveillance of reported HIV/AIDS cases, based on residence at time of HIV/AIDS diagnosis, cumulative case counts, deaths, and people living with HIV/AIDS reported as of 6/30/2014 -King County, Washington State, and United States**

| | | HIV* | AIDS | Total |
|---|---|---|---|---|
| **King County** | New cases diagnosed 2013 | 262 | 141 | 334 |
| | Cumulative Cases | 3,902 | 8,693 | 12,595 |
| | Cumulative Deaths | 321 | 4,772 | 5,093 |
| | Persons Living (prevalent cases) | 3,581 | 3,921 | **7,502** |
| **Other Counties** | New cases diagnosed 2013 | 210 | 89 | 244 |
| | Cumulative Cases | 2,302 | 5,301 | 7,603 |
| | Cumulative Deaths | 245 | 2,731 | 2,976 |
| | Persons Living (prevalent cases) | 2,057 | 2,570 | **4,627** |
| **Washington State** | New cases diagnosed 2013 | 472 | 230 | 578 |
| | Cumulative Cases | 6,204 | 13,994 | 20,198 |
| | Cumulative Deaths | 566 | 7,503 | 8,069 |
| | Persons Living (prevalent cases) | 5,638 | 6,491 | **12,129** |
| **United States** | Annual cases from 2012 report | 48,000 | 27,928 | N/A |
| | Cumulative Deaths | N/A | 648,459 | N/A |
| | Persons Living (prevalent cases) | N/A | 494,602 | 963,600 |

*HIV includes individuals diagnosed with AIDS the same year as HIV; 69 in King County and 124 in WA state

**A note about in-migrants and out-migrants**: Historically, HIV/AIDS surveillance has been based on geographical location at the time of HIV or AIDS diagnoses. Migrations were assumed to either be negligible or in migration and out migration were assumed to be roughly equal. HIV/AIDS surveillance increasingly focuses on the status of individuals currently living in a jurisdiction, rather than those diagnosed in the jurisdiction. Thus current residents, rather than those diagnosed locally are our focus for the section "Monitoring the goals of the National Strategy for HIV/AIDS and the HIV care cascade" starting on page 23 and also in the article about the care cascade starting on page 17 of this issue. **Figures 1** and **2** in this section also present data that take migration in to account. The Table above, as well as the remaining tables and figures are explicit about the demographic cohort they are based on, e.g., "based on residence at the time of HIV/AIDS diagnosis", or they refer only to newly or recently diagnosed cases among King County or Washington residents, or they refer to National HIV Behavioral Surveillance participants.

**Table 2. Newly diagnosed King County HIV cases, 2008-2013[1]**

| | | 2008 N | 2009 N | 2010 N | 2011 N | 2012 N | 2013 N | 2008-2013 N (col %) | Annual rate[2] | Percent late[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total** | | **313** | **303** | **322** | **273** | **288** | **262** | **1761 (100%)** | **15.2** | **31%** |
| Gender | Male | 268 | 267 | 287 | 240 | 239 | 221 | 1522 (86%) | 26.5 | 31% |
| | Female | 45 | 36 | 35 | 33 | 49 | 41 | 239 (14%) | 4.1 | 33% |
| Age in years | <13 | <5 | <5 | <5 | <5 | <5 | <5 | 18 (1%) | 0.9 | 7% |
| | 13-24 | 45 | 41 | 48 | 42 | 42 | 33 | 251 (14%) | 17.0 | 17% |
| | 25-34 | 101 | 89 | 105 | 87 | 98 | 75 | 555 (31%) | 29.6 | 27% |
| | 35-44 | 86 | 78 | 89 | 67 | 82 | 83 | 485 (28%) | 27.5 | 34% |
| | 45-54 | 53 | 67 | 59 | 48 | 42 | 50 | 319 (18%) | 18.5 | 39% |
| | 55+ | 26 | 24 | 20 | 26 | 20 | 17 | 133 (8%) | 5.0 | 50% |
| Race / Ethnicity | White | 166 | 178 | 200 | 150 | 168 | 133 | 995 (57%) | 13.3 | 27% |
| | Black | 66 | 57 | 39 | 56 | 58 | 59 | 335 (19%) | 47.9 | 37% |
| | Latino | 49 | 45 | 53 | 44 | 31 | 40 | 262 (15%) | 25.2 | 34% |
| | Asian | 20 | 13 | 15 | 16 | 19 | 15 | 98 (6%) | 5.8 | 42% |
| | Pacific Islander | <5 | <5 | <5 | <5 | <5 | 5 | 10 (1%) | 11.6 | 80% |
| | American Indian/ AK Native | <5 | <5 | <5 | <5 | <5 | <5 | 9 (1%) | 11.6 | 50% |
| | Multiple | 11 | 8 | 10 | 5 | 11 | 7 | 52 (3%) | 11.1 | 29% |
| HIV risk: Males | Male-male sex (MSM) | 192 | 202 | 235 | 178 | 171 | 163 | 1141 (65%) | -- | 26% |
| | Injection drug use (IDU) | 6 | 7 | 7 | 6 | 7 | <5 | 37 (2%) | -- | 45% |
| | MSM-IDU | 16 | 21 | 20 | 28 | 25 | 18 | 128 (7%) | -- | 26% |
| | Heterosexual | 9 | 5 | 5 | <5 | <5 | <5 | 27 (2%) | -- | 74% |
| | Pediatric | <5 | <5 | <5 | <5 | <5 | <5 | 7 (<1%) | -- | 20% |
| | No reported risk | 44 | 32 | 20 | 23 | 33 | 30 | 182 (10%) | -- | 54% |
| Females | IDU | <5 | 5 | 6 | <5 | 5 | <5 | 23 (1%) | -- | 18% |
| | Heterosexual[4] | 31 | 23 | 22 | 14 | 17 | 14 | 121 (7%) | -- | 40% |
| | Blood exposure[5] | <5 | <5 | <5 | <5 | <5 | <5 | 1 (<1%) | -- | -- |
| | Pediatric | <5 | <5 | <5 | <5 | <5 | <5 | 9 (1%) | -- | 22% |
| | No reported risk | 9 | 4 | 6 | 15 | 25 | 26 | 85 (5%) | -- | 29% |

1. Data are reported as of June 30th 2014. For the comparable table including all of Washington State, please see Table 1 in the Washington State HIV Surveillance Semiannual Report available at: http://www.doh.wa.gov/Portals/1/Documents/Pubs/150-030-HIVSurveillanceSemiannualReport2-2013.pdf
2. Rates are averaged annual rates for the 6 years per 100,000 residents based on midpoint (2010 and 2011) US census data and American Community Survey data. The first two age categories are shifted to 0 – 14 and 15 – 24 (instead of 0-13 and 14-24) due to availability of census data.
3. Late diagnosis is defined as AIDS within one year of HIV diagnosis and this is limited to individuals diagnosed 2008 through 2012 to allow a full year after HIV diagnosis for AIDS to be diagnosed..
4. Heterosexual cases include presumed heterosexual women who deny injection drug use.
5. Blood exposure includes transfusions, clotting factor, and organ recipient.--Designates rates or data are not available or cell sizes are too small to present .

**TABLE 3. Newly Diagnosed King County HIV Cases by foreign-born status, 2008-2013[1]**

| | Race/ethnicity | Male | Age > 34 years | MSM (including MSM-IDU) | Heterosexual | Late HIV diagnosis[2] | Total N (col %) |
|---|---|---|---|---|---|---|---|
| **U.S. Born[3]** | White | 95% | 54% | 88% | 3% | 27% | 882 (73) |
| | Black | 80% | 44% | 64% | 18% | 30% | 154 (13) |
| | Latino | 92% | 40% | 80% | 6% | 28% | 87 (7) |
| | Asian | 88% | 56% | 88% | <1% | 29% | 16 (1) |
| | Pacific Islander | 100% | 38% | 100% | -- | 80% | 8 (1) |
| | American Indian/ AK Native | 67% | 78% | 56% | 11% | 50% | 9 (1) |
| | Multiple | 96% | 33% | 87% | 2% | 25% | 46 (4) |
| | Total | 92% | 51% | 84% | 5% | 28% | 1202 (100) |
| **Foreign-born[3]** | White | 89% | 61% | 72% | 5% | 35% | 64 (13) |
| | Black | 39% | 61% | 6% | 32% | 43% | 175 (36) |
| | Latino | 90% | 53% | 66% | 10% | 37% | 163 (34) |
| | Asian | 83% | 61% | 43% | 11% | 49% | 76 (16) |
| | Pacific Islander | 100% | -- | 100% | -- | -- | 1 (<1) |
| | American Indian/ AK Native | -- | -- | -- | -- | -- | -- |
| | Multiple | 33% | 100 | 33% | 67% | 67% | 3 (1) |
| | Total | 70% | 58 | 41% | 18% | 42% | 483 (100%) |

1. For the comparable table including all of Washington State, please see Table 2 in the Washington State HIV Surveillance Semiannual Report available at: http://www.doh.wa.gov/Portals/1/Documents/Pubs/150-030-HIVSurveillanceSemiannualReport2-2013.pdf.

2. Late diagnosis is defined as AIDS within one year of HIV diagnosis and this is limited to individuals diagnosed 2008 through 2012 to allow a full year after diagnosis for AIDS to be diagnosed.

3. Individuals with unknown place of birth are excluded (N=76) -- designates data are unavailable or numbers are too small to report

**Table 4. AIDS diagnoses (recent and cumulative) and deaths among King County residents[1]**

| | | Recent AIDS cases 2008-2013 | | | Cumulative AIDS Cases 1982-2013 | | Cumulative deaths | |
|---|---|---|---|---|---|---|---|---|
| | | N | % | Rate | N | % | N | % |
| **Total** | | **999** | **100%** | **8.6** | **8693** | **100%** | **4772** | **100%** |
| Gender | Male | 862 | 86% | 15.0 | 8,036 | 92% | 4,530 | 95% |
| | Female | 137 | 14% | 2.4 | 657 | 8% | 242 | 5% |
| Age in years[2] | <13 | 1 | <1% | <0.1 | 17 | <1% | 9 | <1% |
| | 13-24 | 50 | 5% | 3.4 | 235 | 3% | 87 | 2% |
| | 25-34 | 244 | 24% | 13.0 | 2,808 | 32% | 1,593 | 33% |
| | 35-44 | 314 | 31% | 17.8 | 3,561 | 41% | 1,949 | 41% |
| | 45-54 | 270 | 27% | 15.7 | 1,558 | 18% | 817 | 17% |
| | 55+ | 120 | 12% | 4.5 | 514 | 6% | 317 | 7% |
| Race / Ethnicity | White | 525 | 53% | 6.9 | 6,260 | 72% | 3,780 | 79% |
| | Black | 222 | 22% | 31.5 | 1,202 | 14% | 498 | 10% |
| | Latino | 140 | 14% | 13.5 | 738 | 8% | 270 | 6% |
| | Asian | 57 | 6% | 3.3 | 198 | 2% | 66 | 1% |
| | Pacific Islander | 9 | 1% | 10.5 | 25 | <1% | 11 | <1% |
| | American Indian/ AK Native | 4 | <1% | 5.2 | 103 | 1% | 61 | 1% |
| | Multiple | 42 | 4% | 9.0 | 167 | 2% | 86 | 2% |
| HIV risk: Males*** | Male-male sex (MSM) | 561 | 56% | -- | 6,090 | 70% | 3,517 | 74% |
| | Injection drug use (IDU) | 44 | 4% | -- | 362 | 4% | 223 | 5% |
| | MSM-IDU | 98 | 10% | -- | 930 | 11% | 537 | 11% |
| | Heterosexual | 35 | 4% | -- | 186 | 2% | 50 | 1% |
| | Blood exposure[4] | 0 | -- | -- | 65 | 1% | 52 | 1% |
| | Pediatric | 2 | <1% | -- | 7 | <1% | 4 | <1% |
| | No reported risk/ Other risk | 122 | 12% | -- | 396 | 5% | 147 | 3% |
| Females[3] | IDU | 18 | 2% | -- | 158 | 2% | 95 | 2% |
| | Heterosexual | 82 | 8% | -- | 408 | 5% | 115 | 2% |
| | Blood exposure or transfusion[4] | 1 | <1% | -- | 23 | <1% | 16 | <1% |
| | Pediatric | 3 | <1% | -- | 11 | <1% | 4 | <1% |
| | No reported risk | 33 | 3% | -- | 57 | 1% | 12 | <1% |

1. For the comparable table including all of Washington State, please see Table 11 in the Washington State HIV Surveillance Semiannual Report available at: http://www.doh.wa.gov/Portals/1/Documents/Pubs/150-030-HIVSurveillanceSemiannualReport2-2013.pdf.
2. Age at AIDS diagnosis.
3. Excludes one individual with a risk not included in these categories.
4. Blood exposure includes transfusions, clotting factor, and organ recipient .

**Table 5. Cumulative HIV/AIDS case counts based on residence at diagnosis and deaths by resident county at diagnosis - reported as of 06/30/2014 - Washington State**

| | Cumulative | Deaths | | Presumed Living | | | |
|---|---|---|---|---|---|---|---|
| | Cases | N | %[1] | HIV | AIDS | Total | Total %[2] |
| Adams | 7 | 1 | 14% | 0 | 6 | 6 | 0.0% |
| Asotin | 27 | 10 | 37% | 7 | 10 | 17 | 0.1% |
| Benton | 168 | 48 | 29% | 53 | 67 | 120 | 1.0% |
| Chelan | 86 | 31 | 36% | 26 | 29 | 55 | 0.5% |
| Clallam | 92 | 46 | 50% | 20 | 26 | 46 | 0.4% |
| Clark | 809 | 288 | 36% | 241 | 280 | 521 | 4.3% |
| Columbia | 7 | 4 | 57% | 0 | 3 | 3 | 0.0% |
| Cowlitz | 168 | 72 | 43% | 51 | 45 | 96 | 0.8% |
| Douglas | 11 | 2 | 18% | 3 | 6 | 9 | 0.1% |
| Ferry | 7 | 6 | 86% | 0 | 1 | 1 | 0.0% |
| Franklin | 91 | 23 | 25% | 27 | 41 | 68 | 0.6% |
| Garfield | 1 | 1 | 100% | 0 | 0 | 0 | 0.0% |
| Grant | 63 | 23 | 37% | 15 | 25 | 40 | 0.3% |
| Grays Harbor | 103 | 42 | 41% | 21 | 40 | 61 | 0.5% |
| Island | 95 | 44 | 46% | 24 | 27 | 51 | 0.4% |
| Jefferson | 44 | 21 | 48% | 9 | 14 | 23 | 0.2% |
| King | 12,595 | 5,093 | 40% | 3581 | 3,921 | 7,502 | 61.9% |
| Kitsap | 351 | 147 | 42% | 90 | 114 | 204 | 1.7% |
| Kittitas | 29 | 11 | 38% | 4 | 14 | 18 | 0.1% |
| Klickitat | 18 | 8 | 44% | 6 | 4 | 10 | 0.1% |
| Lewis | 66 | 31 | 47% | 11 | 24 | 35 | 0.3% |
| Lincoln | 4 | 2 | 50% | 0 | 2 | 2 | 0.0% |
| Mason | 144 | 38 | 26% | 45 | 61 | 106 | 0.9% |
| Okanogan | 45 | 16 | 36% | 11 | 18 | 29 | 0.2% |
| Pacific | 38 | 14 | 37% | 14 | 10 | 24 | 0.2% |
| Pend Orielle | 10 | 7 | 70% | 0 | 3 | 3 | 0.0% |
| Pierce | 1,876 | 758 | 40% | 567 | 551 | 1,118 | 9.2% |
| San Juan | 36 | 13 | 36% | 8 | 15 | 23 | 0.2% |
| Skagit | 121 | 49 | 40% | 34 | 38 | 72 | 0.6% |
| Skamania | 9 | 7 | 78% | 1 | 1 | 2 | 0.0% |
| Snohomish | 1,203 | 437 | 36% | 319 | 447 | 766 | 6.3% |
| Spokane | 852 | 378 | 44% | 202 | 272 | 474 | 3.9% |
| Stevens | 29 | 18 | 62% | 7 | 4 | 11 | 0.1% |
| Thurston | 317 | 117 | 37% | 81 | 119 | 200 | 1.6% |
| Wahkiakum | 4 | 0 | 0% | 2 | 2 | 4 | 0.0% |
| Walla Walla | 71 | 35 | 49% | 8 | 28 | 36 | 0.3% |
| Whatcom | 266 | 109 | 41% | 67 | 90 | 157 | 1.3% |
| Whitman | 23 | 4 | 17% | 5 | 14 | 19 | 0.2% |
| Yakima | 312 | 115 | 37% | 78 | 119 | 197 | 1.6% |
| **Total** | **20,198** | **8,069** | **40%** | **5,638** | **6,491** | **12,129** | **100%** |

1. Percent of county cases who have died (row %).
2. Percent of total presumed living cases in Washington State (column %).

**Table 6. Demographic characteristics of people presumed living with HIV/AIDS based on local residence at diagnosis - reported as of 06/30/2014 - King County, other Washington Counties, and All Washington State**

| | King County | | Other Counties | | Washington State | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **Sex** | | | | | | |
| Male | 6,695 | 89% | 3,738 | 81% | 10,433 | 86% |
| Female | 807 | 11% | 889 | 19% | 1,696 | 14% |
| **Age Group at diagnosis of HIV** | | | | | | |
| Under 13 years | 46 | 1% | 64 | 1% | 110 | 1% |
| 13-19 years | 137 | 2% | 133 | 3% | 270 | 2% |
| 20-29 years | 2,215 | 30% | 1,392 | 30% | 3,607 | 30% |
| 30-39 years | 3,054 | 41% | 1,590 | 34% | 4,644 | 38% |
| 40-49 years | 1,509 | 20% | 990 | 21% | 2,499 | 21% |
| 50-59 years | 452 | 6% | 351 | 8% | 803 | 7% |
| 60 years and over | 89 | 1% | 107 | 2% | 196 | 2% |
| **Current Age as of 06/30/2014** | | | | | | |
| Under 13 years | 15 | <1% | 27 | 1% | 42 | <1% |
| 13-19 years | 21 | <1% | 24 | 1% | 45 | <1% |
| 20-29 years | 424 | 6% | 342 | 7% | 766 | 6% |
| 30-39 years | 1,227 | 16% | 819 | 18% | 2,046 | 17% |
| 40-49 years | 2,448 | 33% | 1,406 | 30% | 3,854 | 32% |
| 50-59 years | 2,387 | 32% | 1,383 | 30% | 3,770 | 31% |
| 60 years and over | 980 | 13% | 626 | 14% | 1,606 | 13% |
| **Race/Ethnicity[1]** | | | | | | |
| White | 4,879 | 65% | 3,065 | 66% | 7,944 | 65% |
| Black | 1,283 | 17% | 603 | 13% | 1,886 | 16% |
| Hispanic | 845 | 11% | 618 | 13% | 1,463 | 12% |
| Asian & Pacific Islander | 277 | 4% | 164 | 4% | 441 | 4% |
| *Asian* | 254 | 3% | 134 | 3% | 388 | 3% |
| *Native Hawaiian & Other PI* | 23 | <1% | 30 | 1% | 49 | <1% |
| Native American or Alaskan Native | 72 | 1% | 88 | 2% | 160 | 1% |
| Multiple Race | 146 | 2% | 78 | 2% | 224 | 2% |
| Unknown Race | 0 | 0% | 11 | <1% | 11 | <1% |
| **HIV Exposure Category** | | | | | | |
| Male-male sex | 5,145 | 69% | 2,357 | 51% | 7,502 | 62% |
| Injection drug use (IDU) | 317 | 4% | 478 | 10% | 795 | 7% |
| IDU & male-male sex | 683 | 9% | 390 | 8% | 1,073 | 9% |
| Heterosexual contact[2] | 709 | 9% | 790 | 17% | 1,499 | 12% |
| Blood product exposure | 28 | 0% | 31 | 1% | 59 | 0% |
| Perinatal exposure | 37 | 0% | 50 | 1% | 87 | 1% |
| Other/Undetermined[3] | 583 | 8% | 531 | 11% | 1,114 | 9% |
| **Total** | **7,502** | **100%** | **4,627** | **100%** | **12,129** | **100%** |

1. All race and ethnicity categories are mutually exclusive; Asian, Native Hawaiian, and Pacific islanders were grouped due to small cell sizes.
2. Includes presumed heterosexual cases (females who deny injection drug use but have had sexual intercourse with a man whose HIV status or HIV risk behaviors are unknown).
3. Undetermined mode of exposure includes cases with incomplete information, and heterosexual contact where the heterosexual partner(s) are not known to be HIV-infected, IDU, or bisexual male. One King/WA case was probably infected through occupational exposure.

**Table 7a. People presumed living with HIV/AIDS by gender, race or ethnicity, and HIV exposure category - based on local residence at diagnosis reported as of 06/30/2014 - King County**

| | White[1] | | Black[1] | | Hispanic | | Asian & PI[1,2] | | Native Am/AN[1,3] | | Total[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HIV Exposure Category** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** |
| **Male** | | | | | | | | | | | | |
| Male-male sex | 3,836 | 79% | 449 | 35% | 570 | 67% | 171 | 62% | 28 | 39% | 5,145 | 69% |
| Injection drug use (IDU) | 106 | 2% | 52 | 4% | 34 | 4% | 7 | 3% | 4 | 6% | 210 | 3% |
| IDU & male-male sex | 521 | 11% | 48 | 4% | 63 | 7% | 8 | 3% | 17 | 24% | 683 | 9% |
| Heterosexual contact | 44 | 1% | 107 | 8% | 28 | 3% | 5 | 2% | 0 | 0% | 185 | 2% |
| Blood product exposure | 14 | 0% | 3 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 17 | 0% |
| Perinatal exposure | 2 | 0% | 9 | 1% | 0 | 0% | 2 | 1% | 0 | 0% | 14 | 0% |
| Undetermined/other | 117 | 2% | 189 | 15% | 79 | 9% | 48 | 17% | 3 | 4% | 441 | 6% |
| **Male Subtotal** | **4,640** | **95%** | **857** | **67%** | **774** | **92%** | **241** | **87%** | **52** | **72%** | **6,695** | **89%** |
| **Female** | | | | | | | | | | | | |
| Injection drug use (IDU) | 60 | 1% | 29 | 2% | 5 | 1% | 0 | 0% | 8 | 11% | 107 | 1% |
| Heterosexual contact[5] | 153 | 3% | 280 | 22% | 49 | 6% | 24 | 9% | 11 | 15% | 524 | 7% |
| Blood product exposure | 3 | <1% | 8 | 1% | 0 | 0% | 0 | 0% | 0 | 0% | 11 | <1% |
| Perinatal exposure | 3 | <1% | 16 | 1% | 2 | <1% | 2 | 1% | 0 | 0% | 23 | <1% |
| Undetermined/other | 20 | <1% | 93 | 7% | 15 | 2% | 10 | 4% | 1 | 1% | 142 | 2% |
| **Female Subtotal** | **239** | **5%** | **426** | **33%** | **71** | **8%** | **36** | **13%** | **20** | **28%** | **807** | **11%** |
| **Total** | **4,879** | **100%** | **1,283** | **100%** | **845** | **100%** | **277** | **100%** | **72** | **100%** | **7,502** | **100%** |

**Table 7b. People presumed living with HIV/AIDS by gender, race or ethnicity, and HIV exposure category - reported as of 06/30/2014 - Washington State**

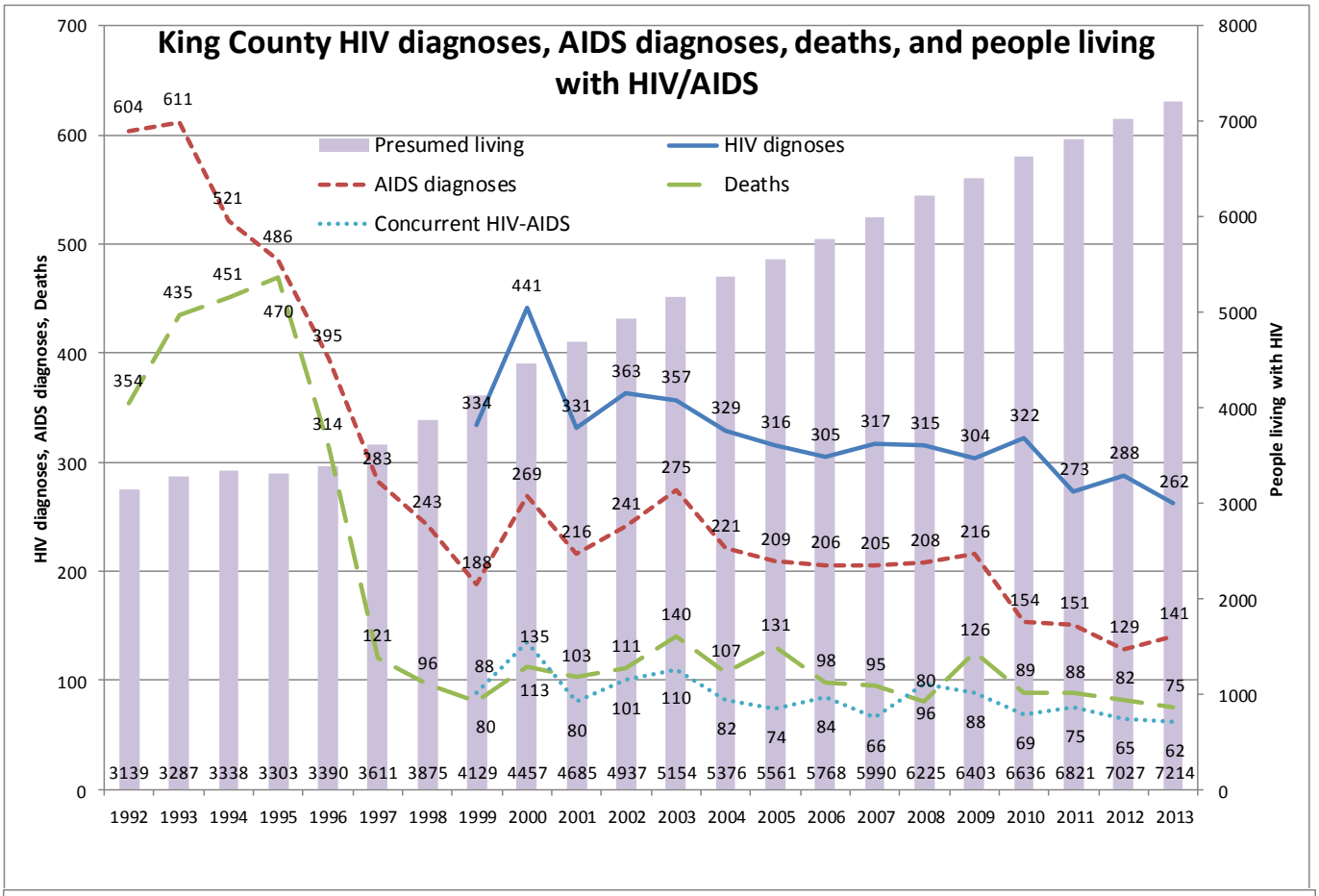
| | White[1] | | Black[1] | | Hispanic | | Asian & PI[1,2] | | Native Am/AN[1,3] | | Total[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HIV Exposure Category** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** |
| **Male** | | | | | | | | | | | | |
| Male-male sex | 5,583 | 70% | 637 | 34% | 848 | 58% | 240 | 54% | 56 | 35% | 7,502 | 62% |
| Injection drug use (IDU) | 322 | 4% | 91 | 5% | 71 | 5% | 9 | 2% | 14 | 9% | 518 | 4% |
| IDU & male-male sex | 829 | 10% | 69 | 4% | 101 | 7% | 10 | 2% | 24 | 15% | 1,073 | 9% |
| Heterosexual contact | 130 | 2% | 163 | 9% | 74 | 5% | 14 | 3% | 7 | 4% | 392 | 3% |
| Blood product exposure | 36 | <1% | 3 | <1% | 2 | <1% | 0 | 0% | 0 | 0% | 41 | <1% |
| Perinatal exposure | 9 | <1% | 24 | 1% | 2 | <1% | 2 | <1% | 1 | 1% | 40 | <1% |
| Undetermined/other | 327 | 4% | 267 | 14% | 178 | 12% | 76 | 17% | 7 | 4% | 867 | 7% |
| **Male Subtotal** | **7,236** | **91%** | **1,254** | **66%** | **1,276** | **87%** | **351** | **80%** | **109** | **68%** | **10,433** | **86%** |
| **Female** | | | | | | | | | | | | |
| Injection drug use (IDU) | 179 | 2% | 54 | 3% | 19 | 1% | 3 | 1% | 15 | 9% | 277 | 2% |
| Heterosexual contact[5] | 453 | 6% | 408 | 22% | 136 | 9% | 62 | 14% | 32 | 20% | 1,107 | 9% |
| Blood product exposure | 5 | <1% | 9 | 0% | 1 | <1% | 3 | 1% | 0 | 0% | 18 | <1% |
| Perinatal exposure | 10 | <1% | 28 | 1% | 5 | <1% | 4 | 1% | 0 | 0% | 47 | <1% |
| Undetermined/other | 61 | 1% | 133 | 7% | 26 | 2% | 18 | 4% | 4 | 3% | 247 | 2% |
| **Female Subtotal** | **708** | **9%** | **632** | **34%** | **187** | **13%** | **90** | **20%** | **51** | **32%** | **1,696** | **14%** |
| **Total** | **7,944** | **100%** | **1,886** | **100%** | **1,463** | **100%** | **441** | **100%** | **160** | **100%** | **12,129** | **100%** |

1. And not Hispanic. All race and ethnicity categories are mutually exclusive.
2. Due to small cell sizes, data have been combined for Asians, Native Hawaiians, and other Pacific Islanders.
3. Native American or Alaskan Native.
4. Totals include 146 King County and 224 Washington State persons classified as multiple race, and 11 Washington State persons with missing race.
5. Includes presumed heterosexual cases (females who deny injection drug use but have had sexual intercourse with a man whose HIV status and HIV risk behaviors are unknown).

**Table 8. People presumed living with HIV/AIDS by race or ethnicity and place of birth - based on local residence at time of diagnosis and reported as of 06/30/2014 - King County and Washington State**

| | King County | | | | Washington State | | | |
|---|---|---|---|---|---|---|---|---|
| | U.S.-born | | Foreign-born | | U.S.-born | | Foreign-born | |
| Race / Ethnicity | N | % | N | % | N | % | N | % |
| White, non-Hispanic | 4,501 | 77% | 157 | 12% | 7,319 | 78% | 205 | 10% |
| Black, non-Hispanic | 725 | 12% | 531 | 39% | 1,125 | 12% | 697 | 35% |
| *Male Black, non-Hispanic* | 578 | | 258 | | 875 | | 330 | |
| *Female Black, non-Hispanic* | 147 | | 273 | | 250 | | 367 | |
| Hispanic | 329 | 6% | 458 | 34% | 520 | 6% | 802 | 40% |
| Asian & PI, non-Hispanic | 72 | 1% | 186 | 14% | 114 | 1% | 288 | 14% |
| Native American, non-Hispanic | 65 | 1% | 4 | 0% | 150 | 2% | 4 | 0% |
| Multiple or unknown race, non-Hispanic | 128 | 2% | 12 | 1% | 192 | 2% | 17 | 1% |
| **TOTAL** | **5,820** | **81%** | **1,348** | **19%** | **9,420** | **82%** | **2,013** | **18%** |

1. Table 8 does not include 334 King County and 687 Washington cases missing place of birth information.


King County HIV diagnoses, AIDS diagnoses, deaths, and people living with HIV/AIDS
Presumed living
HIV dignoses
AIDS diagnoses
Deaths
Concurrent HIV-AIDS
HIV diagnoses, AIDS diagnoses, Deaths
People living with HIV
604 611 521 486 395 314 283 243 188 269 216 241 275 221 209 206 205 208 216 154 151 129 141
354 435 451 470 121 96 88 135 80 113 103 80 111 101 140 110 107 82 131 74 98 84 95 66 80 96 126 88 89 69 88 75 82 65 75 62
3139 3287 3338 3303 3390 3611 3875 4129 4457 4685 4937 5154 5376 5561 5768 5990 6225 6403 6636 6821 7027 7214
334 441 331 363 357 329 316 305 317 315 304 322 273 288 262
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

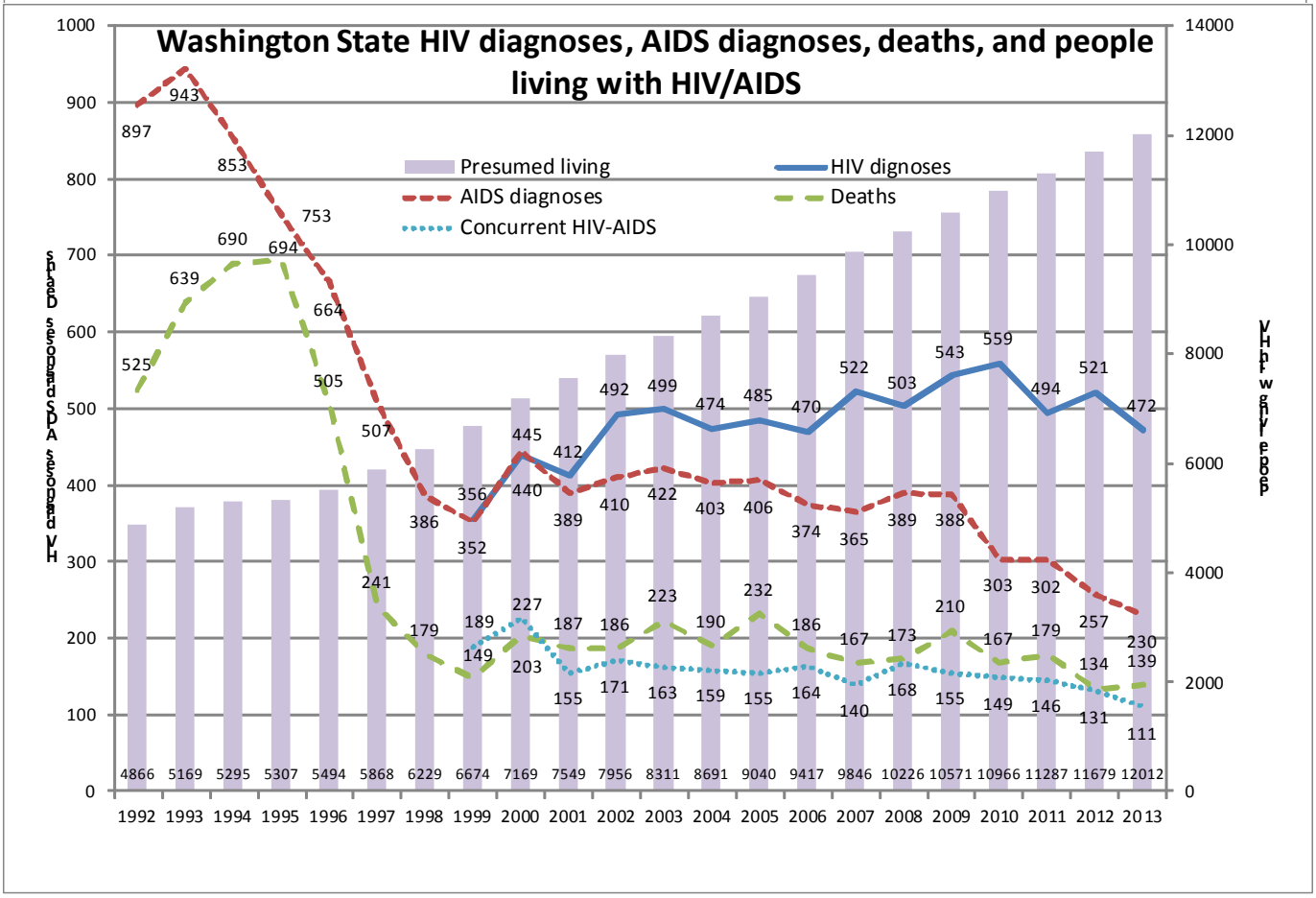

Washington State HIV diagnoses, AIDS diagnoses, deaths, and people living with HIV/AIDS
Presumed living
HIV dignoses
AIDS diagnoses
Deaths
Concurrent HIV-AIDS
897 943 853 753 664 505 507 386 352 440 389 410 422 403 406 374 365 389 388 303 302 257 230
525 639 690 694 241 179 189 227 149 203 187 186 155 171 223 163 190 159 232 155 186 164 167 140 173 168 210 155 167 149 179 146 134 131 139 111
4866 5169 5295 5307 5494 5868 6229 6674 7169 7549 7956 8311 8691 9040 9417 9846 10226 10571 10966 11287 11679 12012
356 445 412 492 499 474 485 470 522 503 543 559 494 521 472
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

**Table 9. Demographic characteristics of King County residents diagnosed 1982-2013 and reported through 06/30/2014, by date of diagnosis**

| | 1982-2004 | | 2005-2007 | | 2008-2010 | | 2011-2013[1] | | Trend[2] |
|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | 2005-2013 |
| **TOTAL** | **9,731** | **100%** | **969** | **100%** | **961** | **100%** | **838** | **100%** | |
| **HIV Exposure Category** | | | | | | | | | |
| Male-Male Sex (MSM) | 7,044 | 75% | 591 | 70% | 636 | 75% | 519 | 76% | up |
| Injection drug use (IDU) | 565 | 6% | 41 | 5% | 38 | 5% | 28 | 4% | |
| MSM-IDU | 1,027 | 11% | 104 | 12% | 62 | 7% | 74 | 11% | down |
| Heterosexual contact[3] | 625 | 7% | 108 | 13% | 100 | 12% | 53 | 8% | down |
| Blood product exposure | 98 | <1% | 1 | <1% | 1 | <1% | 0 | 0% | |
| Perinatal exposure | 29 | <1% | 1 | <1% | 6 | 1% | 9 | 1% | up |
| *SUBTOTAL- known risk* | *9,388* | | *846* | | *843* | | *683* | | |
| Undetermined/other[4] | 343 | 4% | 123 | 13% | 118 | 12% | 155 | 18% | |
| **Sex & Race/Ethnicity[5]** | | | | | | | | | |
| **Male** | *9,029* | *93%* | *855* | *88%* | *840* | *87%* | *713* | *85%* | |
| White Male | 6,983 | 72% | 529 | 55% | 520 | 54% | 436 | 52% | |
| Black Male | 978 | 10% | 130 | 13% | 102 | 11% | 102 | 12% | |
| Hispanic Male | 673 | 7% | 125 | 13% | 135 | 14% | 106 | 13% | |
| Other Male | 395 | 4% | 71 | 7% | 83 | 9% | 69 | 8% | |
| **Female** | *702* | *7%* | *114* | *12%* | *121* | *13%* | *125* | *15%* | |
| White Female | 298 | 3% | 30 | 3% | 33 | 3% | 23 | 3% | |
| Black Female | 284 | 3% | 63 | 7% | 67 | 7% | 74 | 9% | |
| Hispanic Female | 51 | 1% | 7 | 1% | 14 | 1% | 12 | 1% | |
| Other Female | 69 | 1% | 14 | 1% | 7 | 1% | 16 | 2% | |
| **Race/Ethnicity[5]** | | | | | | | | | |
| White | 7,281 | 75% | 559 | 58% | 553 | 58% | 459 | 55% | |
| Black | 1,262 | 13% | 193 | 20% | 169 | 18% | 176 | 21% | |
| Hispanic | 724 | 7% | 132 | 14% | 149 | 16% | 118 | 14% | |
| Asian & Pacific Islander | 187 | 2% | 53 | 5% | 52 | 5% | 58 | 7% | |
| Native American or Alaskan Native | 119 | 1% | 8 | 1% | 7 | 1% | 3 | 0% | |
| Multiple Race | 158 | 2% | 24 | 2% | 31 | 3% | 24 | 3% | |
| *SUBTOTAL- known race & ethnicity* | *9,731* | *100%* | *969* | *100%* | *961* | *100%* | *838* | *100%* | |
| Unknown Race | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | |
| **Place of Birth** | | | | | | | | | |
| Born in U.S. or Territories | 8,588 | 90% | 695 | 76% | 696 | 74% | 533 | 68% | down |
| Born outside U.S. | 916 | 10% | 217 | 24% | 241 | 26% | 252 | 32% | up |
| *SUBTOTAL- known birthplace* | 9,504 | *100%* | 912 | *100%* | 937 | *100%* | 785 | *100%* | |
| Birthplace unknown | 227 | 2% | 57 | 6% | 24 | 2% | 53 | 6% | |
| **Age at diagnosis of HIV** | | | | | | | | | |
| 0-19 years | 159 | 2% | 12 | 1% | 33 | 3% | 22 | 3% | up |
| 20-29 years | 2,554 | 26% | 244 | 25% | 262 | 27% | 228 | 27% | |
| 30-39 years | 4,340 | 45% | 356 | 37% | 291 | 30% | 265 | 32% | down |
| 40-49 years | 2,014 | 21% | 248 | 26% | 229 | 24% | 190 | 23% | |
| 50-59 years | 544 | 6% | 79 | 8% | 119 | 12% | 106 | 13% | up |
| 60+ years | 120 | 1% | 30 | 3% | 27 | 3% | 27 | 3% | |
| **Residence** | | | | | | | | | |
| Seattle residence | 8,249 | 85% | 711 | 73% | 677 | 70% | 575 | 69% | |
| King Co. residence outside Seattle | 1,482 | 15% | 258 | 27% | 284 | 30% | 263 | 31% | |

1. Due to delays in reporting, data from recent years are incomplete.
2. Chi-square statistical trends in proportions ($p < .05$) were calculated for cases with known characteristics for the periods 2005-07, 2008-10, and 2011-13.
3. Includes presumed heterosexual cases (females who deny injection drug use but have sex with men not known to be HIV-infected). Blank rows had no statistically significant trend.
4. Includes persons for whom exposure information is incomplete (due to death, refusal to be interviewed, or loss to follow-up), persons exposed to HIV through their occupation, and patients whose mode of exposure remains undetermined.
5. All race and ethnicity categories are mutually exclusive; Asian, Native Hawaiian, & other Pacific Islanders were grouped due to small cell sizes.

**Table 10. Demographic characteristics of Washington State residents diagnosed 1982-2013 and reported through 06/30/2014, by date of HIV diagnosis.**

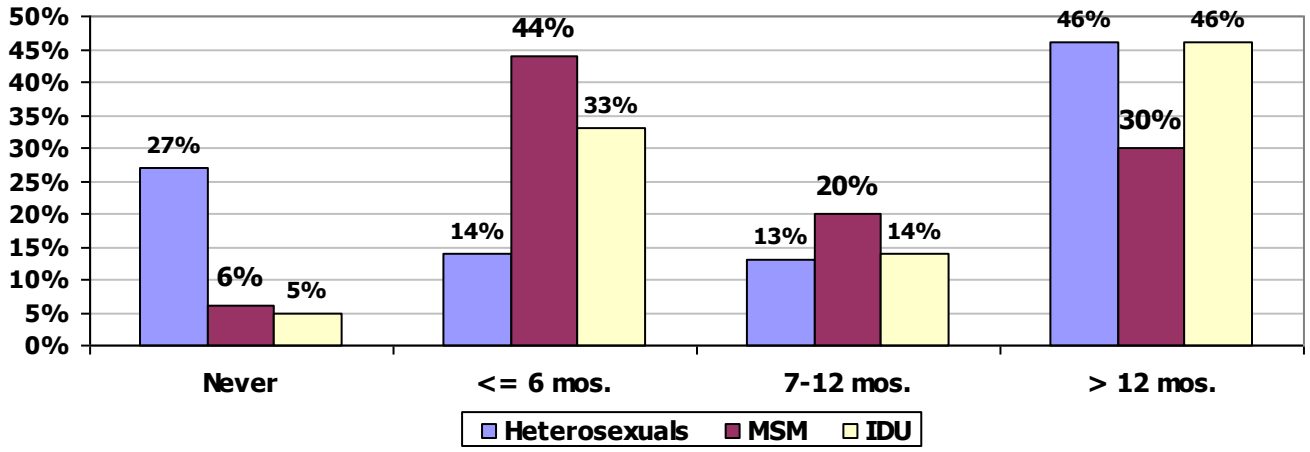
| | 1982-2004 | | 2005-2007 | | 2008-2010 | | 2011-2013[1] | | Trend[2] |
|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | 2005-2013 |
| **TOTAL** | **15,149** | **100%** | **1,760** | **100%** | **1,670** | **100%** | **1,498** | **100%** | |
| **HIV Exposure Category** | | | | | | | | | |
| Male-Male Sex (MSM) | 9,897 | 68% | 974 | 64% | 980 | 69% | 860 | 72% | up |
| Injection drug use (IDU) | 1,374 | 10% | 120 | 8% | 88 | 6% | 73 | 6% | |
| MSM-IDU | 1,564 | 11% | 164 | 11% | 104 | 7% | 124 | 10% | down |
| Heterosexual contact[3] | 1,338 | 9% | 249 | 16% | 230 | 16% | 118 | 10% | down |
| Blood product exposure | 221 | 2% | 3 | <1% | 1 | <1% | 0 | 0% | |
| Perinatal exposure | 64 | <1% | 4 | <1% | 22 | 2% | 14 | 1% | up |
| *SUBTOTAL- known risk* | *14,458* | *100%* | *1,514* | *100%* | *1,425* | *100%* | *1,189* | *100%* | |
| Undetermined/other[4] | 691 | 5% | 226 | 13% | 245 | 15% | 309 | 21% | |
| **Sex & Race/Ethnicity[5]** | | | | | | | | | |
| **Male** | 13,579 | *90%* | *1,476* | *84%* | *1,414* | *85%* | *1,264* | *84%* | |
| White Male | 10,572 | 70% | 960 | 55% | 841 | 50% | 763 | 51% | down |
| Black Male | 1,351 | 9% | 197 | 11% | 178 | 11% | 173 | 12% | |
| Hispanic Male | 1,053 | 7% | 204 | 12% | 255 | 15% | 201 | 13% | up |
| Other Male | 603 | 4% | 115 | 7% | 140 | 8% | 127 | 8% | |
| **Female** | *1,570* | *10%* | *264* | *15%* | *256* | *15%* | *234* | *16%* | |
| White Female | 814 | 5% | 106 | 6% | 95 | 6% | 69 | 5% | |
| Black Female | 445 | 3% | 100 | 6% | 102 | 6% | 107 | 7% | |
| Hispanic Female | 146 | 1% | 32 | 2% | 35 | 2% | 23 | 2% | |
| Other Female | 165 | 1% | 26 | 1% | 24 | 1% | 35 | 2% | |
| **Race/Ethnicity[5]** | | | | | | | | | |
| White | 11,386 | 75% | 1,066 | 61% | 936 | 56% | 832 | 56% | down |
| Black | 1,796 | 12% | 297 | 17% | 280 | 17% | 280 | 19% | |
| Hispanic | 1,199 | 8% | 236 | 14% | 290 | 17% | 224 | 15% | up |
| Asian & Pacific Islander | 280 | 2% | 78 | 4% | 83 | 5% | 102 | 7% | up |
| Native American or Alaskan Native | 226 | 1% | 21 | 1% | 27 | 2% | 16 | 1% | |
| Multiple Race | 250 | 2% | 42 | 2% | 54 | 3% | 44 | 3% | |
| *SUBTOTAL- known race & ethnicity* | *15,137* | *100%* | *1,740* | *100%* | *1,670* | *100%* | *1,498* | *100%* | |
| Unknown Race | 12 | <1% | 0 | 0% | 0 | 0% | 0 | 0% | |
| **Place of Birth** | | | | | | | | | |
| Born in U.S. or Territories | 13,434 | 91% | 1,298 | 80% | 1,188 | 75% | 936 | 71% | down |
| Born outside U.S. | 1,328 | 9% | 326 | 20% | 388 | 25% | 375 | 29% | up |
| *SUBTOTAL- known birthplace* | *14,762* | *100%* | *1,624* | *100%* | *1,576* | *100%* | *1,311* | *100%* | |
| Birthplace unknown | 387 | 3% | 116 | 7% | 94 | 6% | 187 | 12% | |
| **Age at diagnosis of HIV** | | | | | | | | | |
| 0-19 years | 317 | 2% | 42 | 2% | 61 | 4% | 57 | 4% | |
| 20-29 years | 4,063 | 27% | 433 | 25% | 449 | 27% | 399 | 27% | |
| 30-39 years | 6,454 | 43% | 565 | 32% | 495 | 30% | 449 | 30% | |
| 40-49 years | 3,148 | 21% | 463 | 26% | 388 | 23% | 334 | 22% | down |
| 50-59 years | 906 | 6% | 183 | 10% | 205 | 12% | 195 | 13% | |
| 60+ years | 261 | 2% | 54 | 3% | 72 | 4% | 64 | 4% | |

1. Due to delays in reporting, data from recent years are incomplete.
2. Chi-square statistical trends in proportions ($p < .05$) were calculated for cases with known characteristics for the periods 2005-07, 2008-10, and 2011-13.
3. Includes presumed heterosexual cases (females who deny injection drug use but have sex with men not known to be HIV-infected). Blank rows had no statistically significant trend.
4. Includes persons for whom exposure information is incomplete (due to death, refusal to be interviewed, or loss to follow-up), patients still under investigation, patients whose only risk was heterosexual contact and where the risk of the sexual partner(s) was (were) undetermined, persons exposed to HIV through their occupation, and patients whose mode of exposure remains undetermined.
5. All race and ethnicity categories are mutually exclusive; Asian, Native Hawaiian, & other Pacific Islanders were grouped due to small cell sizes.

**Table 11. Characteristics and HIV prevalence among participants in Seattle area National HIV Behavioral Surveys, 2011-2013**

| | | 2011 Men who have sex with men (MSM) | | 2012 Injection Drug Users (IDU) | | 2013 Heterosexuals | |
|---|---|---|---|---|---|---|---|
| **Total N** | | 360 | | 688 | | 401 | |
| **HIV seropositive** | | 19% (66/343) | | 8% (57/686) | | 1% (3/401) | |
| **MSM/IDU HIV positive** | | 45% (9/20) | | 39% (25/65) | | n/a | |
| **HIV + unaware of status** | | 18% (12/66) | | 11% (6/57) | | 33% (1/3) | |
| | | **Total** | **% HIV+** | **Total** | **% HIV+** | **Total** | **% HIV+** |
| **Age (years)** | 18–29 | 38% | 9% | 15% | 3% | 25% | 0% |
| | 30–39 | 27% | 18% | 25% | 9% | 20% | 2.5% |
| | 40–49 | 22% | 31% | 27% | 12% | 29% | 0.9% |
| | 50+ | 13% | 34% | 33% | 7% | 26% | 0% |
| **Gender** | Male | 100% | 19% | 64% | 9% | 62% | 0.4% |
| | Female | - | - | 36% | 6% | 38% | 1.3% |
| **Race/ethnicity** | White, non-Hispanic | 62% | 19% | 57% | 7% | 16% | 0% |
| | Black, non-Hispanic | 10% | 36% | 17% | 9% | 64% | 1.2% |
| | Hispanic | 13% | 13% | 9% | 6% | 6% | 0% |
| | Other race | 6% | 9% | 4% | 18% | 5% | 0% |
| | Multiracial | 8% | 13% | 12% | 13% | 10% | 0% |
| **Previous 12 months** | | | | | | | |
| **Number of sex partners:** | 0 | - | - | 16% | 7% | - | - |
| | 1 | 22% | 19% | 36% | 4% | 18% | 1.4% |
| | 2 - 4 | 29% | 17% | 30% | 11% | 37% | 0% |
| | 5 - 9 | 23% | 18% | 8% | 7% | 18% | 1.4% |
| | 10+ | 27% | 23% | 9% | 16% | 27% | 0.9% |
| **Male-male sex** | | 100% | 19% | 10% | 39% | n/a | - |
| **STD diagnosis** | | 11% | 32% | 5% | 25% | 8% | 0% |
| **Popper use** | | 30% | 32% | - | - | n/a | - |
| **Amphetamine use (non-injection)** | | 16% | 39% | 45% | 10% | 8% | 0% |
| **Amphetamine injection (any)** | | 5% | 50% | 43% | 15% | n/a | - |
| **Injection drug use** | | 6% | 45% | 100% | 8% | n/a | - |
| **Drug most frequently injected** | | Among MSM-IDU | | | | | - |
| | Heroin | 10% | 50% | 85% | 5% | n/a | - |
| | Speedball | 0% | 0% | 5% | 3% | n/a | - |
| | Cocaine | 0% | 0% | 1% | 22% | n/a | - |
| | Amphetamine | 90% | 56% | 9% | 41% | n/a | - |
| **Receptive needle sharing** | | 4% | 100% | 33% | 5% | n/a | - |

**Figure 3. HIV testing history (time since last HIV test) among heterosexuals, men who have sex with men (MSM), and injection drug users (IDU) Seattle-area National HIV Behavioral Surveys 2011-2013**



# Describing Washington State's HIV care continuum and how it relates to the national continuum

**Introduction**

In keeping with the National HIV/AIDS Strategy, the Washington State Department of Health (DOH) is dedicated to assuring that all people living with HIV are diagnosed; linked to consistent, optimal HIV medical care; and receive the full benefits of antiretroviral treatment, including viral suppression. To this end, all HIV-positive individuals are considered the top priority from both an HIV prevention and care perspective. In order to monitor progress and assure these goals are met, DOH recently developed a statewide HIV care continuum (**Figure 1**). Also referred to as the HIV care cascade, this "dash board" model is used to show both the number and proportion of people living with HIV disease (PLWH) who are engaged at each stage of HIV care.

**Comparing State and National HIV Care Continuums**

Washington's care continuum was developed by DOH, and debuted at a July 2014 meeting of the state's HIV Planning Steering Group. Its design is similar to that which is being used by both the U.S. Centers for Disease Control and Prevention, as well as the White House Office of National AIDS Policy (**Figure 2**). Both figures display the number of people known to be diagnosed and living with HIV disease. In addition, both display important care and treatment-related milestones, such as the percent of PLWH linked to care, and the percent with a suppressed viral load. While the two continuums are largely similar, the Washington model does contain some important differences. For example, lacking a reliable method, Washington opted not to include an estimate of the number of PLWH who have been prescribed antiretroviral therapy (ART). Also, although children ages 12 and under make up less than 1% of all PLWH in Washington, DOH chose to include them in its continuum whereas the national continuum focuses on just adolescents and adults (either way, the statistics would likely remain about the same). A detailed comparison of the labels and definitions used in each continuum is provided in Table 1.

**Describing Washington's HIV Care Continuum**

Moving from left to right, the first bar in Washington's continuum describes the total, estimated number of PLWH in 2013 (labeled 'HIV Infected'). Often referred to as true prevalence, this number describes all HIV-positive individuals residing in Washington, including those who have not been diagnosed. The estimate was developed via collaboration between DOH and the University of Washington's Center for AIDS Research. A team led by Dr. Martina Morris modified a mathematical model originally developed by Dr. Ian Fellows (personal communication with Dr. Morris). The model uses surveillance data (reported cases) to back-calculate estimates of both HIV incidence and the percent of prevalent cases that remain undiagnosed (the undiagnosed fraction). From these intermediate steps, an estimate of HIV prevalence can be derived. Within both the state and national continuum, this estimate is frequently used as the denominator when calculating the percent of all PLWH who have reached each stage of HIV care with one exception: linkage to care among newly diagnosed cases. With approximately 14,000 people infected, the scale of Washington's HIV epidemic is considered moderate compared to other U.S. states and territories.

The second bar in Washington's continuum describes the reported number of people who were both diagnosed with HIV and presumed living in Washington as of year-end 2013 (labeled 'HIV Diagnosed'). This includes individuals who were diagnosed outside Washington and moved here later. HIV diagnosis represents the first stage of HIV care; this is crucial because effective care and treatment cannot begin until a person receives an HIV diagnosis. This measure provides a way of monitoring both the number of people who have been diagnosed, as well as the degree to which diagnosed cases reported to the state's HIV surveillance system represent the entire HIV epidemic in Washington. Roughly one in ten PLWH in Washington remains undiagnosed.

CDC recommends that all people diagnosed with HIV disease receive HIV medical care and initiate treatment as soon as possible. Once a person has been diagnosed, the next stage he or she must reach is to be connected to an HIV medical provider. The third (or middle) bar of Washington's continuum focuses on the number and proportion of cases newly diagnosed in 2013 that were linked to a healthcare provider within 90 days of HIV diagnosis (labeled "Linked to Care"). Here, a successful linkage is represented by the report to the state or local health department of a CD4+ T-lymphocyte (CD4) or viral load (VL) test result within the time period of interest; comprehensive reporting of HIV-related test results has been mandatory in Washington since 2006. It is not possible for us to know about initial linkage to care among all diagnosed PLWH since some were diagnosed either out-of-state or many years ago. Hence, evidence for whether

linkage occurred may not be available or relevant to the current status of PLWH. Although room for improvement exists, with at least 88% of new cases linked to care in 2013, it appears that most newly diagnosed cases in Washington are successfully reaching this stage of HIV care in a timely manner.

In order to remain healthy, people with HIV need to obtain regular HIV medical care throughout their lifetimes. The fourth bar of Washington's continuum describes engagement in HIV care among PLWH in 2013 (labeled "In HIV Care during Last 12 Months"). Evidence for engagement is again based on the report of any CD4 or VL test between January and December of 2013, among PLWH residing in Washington as of year-end 2013. Nationwide, experts continue to debate the subject as to which population-level indicator should be used to monitor engagement or retention in care among PLWH. For the time being, Washington is using the indicator which we feel is the easiest to both calculate and explain. However, a more in-depth evaluation of this issue is provided later in this article. In 2013, at least 79% of reported PLWH in Washington completed an HIV care visit. Although comparable data from other states remain limited, it appears Washington has achieved among the highest levels of HIV care engagement nationwide.

Labeled "Suppressed VL", the fifth and final bar in Washington's continuum describes the number of PLWH whose last VL result in 2013 was at or below 200 copies per milliliter. DOH considers viral suppression to be the primary prevention- or care-related goal among all people living with HIV. By taking antiretroviral therapy, patients can significantly reduce the amount of HIV virus in their bodies. Achieving viral suppression both improves individual health and greatly reduces the risk of transmitting the virus to a partner. Compared to other states, Washington appears to be performing among the best in this category. However, with roughly one-third of prevalent cases still not virally suppressed, more work remains to be done.

Across the continuum, the extent to which Washington seems to be performing better than other parts of the U.S. should be interpreted with caution. It is unknown to what extent this success reflects differences in the underlying population of Washington, differences in the health and prevention services available to state residents, and/or an earlier and more comprehensive investment in investigating and updating residency and vital status information of individuals who may have otherwise been assumed to have fallen out of care. As the quality and completeness of national HIV surveillance data continue to improve, we expect the stark differences we are seeing right now between the Washington continuum and the national continuum will become progressively smaller.

**Evaluating Levels of Care Engagement, and How They Relate to Viral Suppression**

As mentioned earlier, DOH chose to include a different measure of HIV care engagement in the Washington continuum compared to the national continuum ("In Care during Last 12 Months" vs. "Retention in Care", respectively). Likewise, DOH omitted the measure "Prescribed ART", an estimate based on survey data which often aren't available until 2-3 years after they have been collected in Washington. Both decisions were made in an effort to enhance the simplicity, clarity, and reliability of the Washington continuum. However, experts across the country continue to debate which definitions of care engagement/ retention are the most useful, and under what circumstances. Hence, engagement-related indicators used within the Washington continuum could change in the future.

Researchers at the CDC recently completed a study in which they evaluated the degree to which different levels of engagement are associated with viral suppression. The study applied different definitions of engagement which are recommended by agencies within the U.S. Department of Health and Human Services (HHS) as well as the Institute of Medicine. The study focused on people diagnosed by year end 2010, using data from 19 jurisdictions within the National HIV Surveillance System. Here are the definitions they used:

- **Any care**: ≥1 CD4 or VL test during a calendar year
- **Retained in continuous care**: ≥2 CD4 or VL tests performed ≥3 months apart during a calendar year
- **Retained in care, HHS Core Indicator**: ≥ 1 CD4 or VL test in each 6-month (half year) period across a 24-month evaluation period, with a minimum of 60 days between the first test date in the prior 6-month period and the last test date in the subsequent 6-month period
- **Viral suppression**: a VL result of ≤ 200 copies/ mL, based on the most recent VL test reported within the evaluation period

The results of this study confirmed that more frequent visits to a medical provider do increase the likelihood of viral suppression. Of the 338,959 PLWH residing in the 19 areas in 2010, individuals who were retained in continuous care were 50% more likely to be virally suppressed compared to people engaged in some care (any care) but not retained in care. However, the researchers observed that more stringent standards of

engagement can greatly reduce the proportion of all PLWH who meet the inclusion criteria, potentially causing the results to be less generalizable. Further, anecdotal evidence based on local practice patterns are favoring less frequent laboratory monitoring for individuals with stable viral suppression; these individuals may be mistakenly excluded from more stringent measures of care engagement. Finally, some definitions are more complex than others, which could make them both harder to calculate and more difficult for stakeholders to interpret.

Given how relevant these findings are to the development of Washington's care continuum, DOH conducted a similar evaluation applying the same definitions, but focusing on state residents diagnosed with HIV by year-end 2013 (**Table 2**).

The findings were similar to the national study, suggesting greater frequency of care visits does lead to better suppression. However, the degree of difference in viral suppression among individuals with varying levels of engagement was not as great in Washington compared to the national report (16% vs. 26%, respectively).

**Conclusions**

By completing a state-level care continuum, DOH has taken an important step towards monitoring our progress in ending the HIV epidemic in Washington. Compared to the nation as whole, Washington has accomplished a great deal, assuring that a substantial proportion of PLWH are receiving the ongoing medical care and treatment they need. Nevertheless, a close examination suggests that significant gaps in engagement and retention remain. For example, approximately 41% of estimated PLWH are not virally suppressed: that amounts to more than 5,000 people in need of better HIV care. More analysis is needed to determine which specific groups contribute more vs. less to specific milestones within the continuum, and direct public health strategies accordingly.

Since helping all PLWH navigate the HIV care continuum is a shared responsibility of Federal, state, and local public health jurisdictions, adopting similar measurement standards and definitions across agencies and organizations is important. DOH acknowledges the need to achieve comparability as much as possible, and will continue to evaluate which measures of HIV care engagement and retention are most useful to our stakeholders.

***Contributed by Jason Carr***

**Figure 1. HIV Care Continuum, Washington State, 2013**

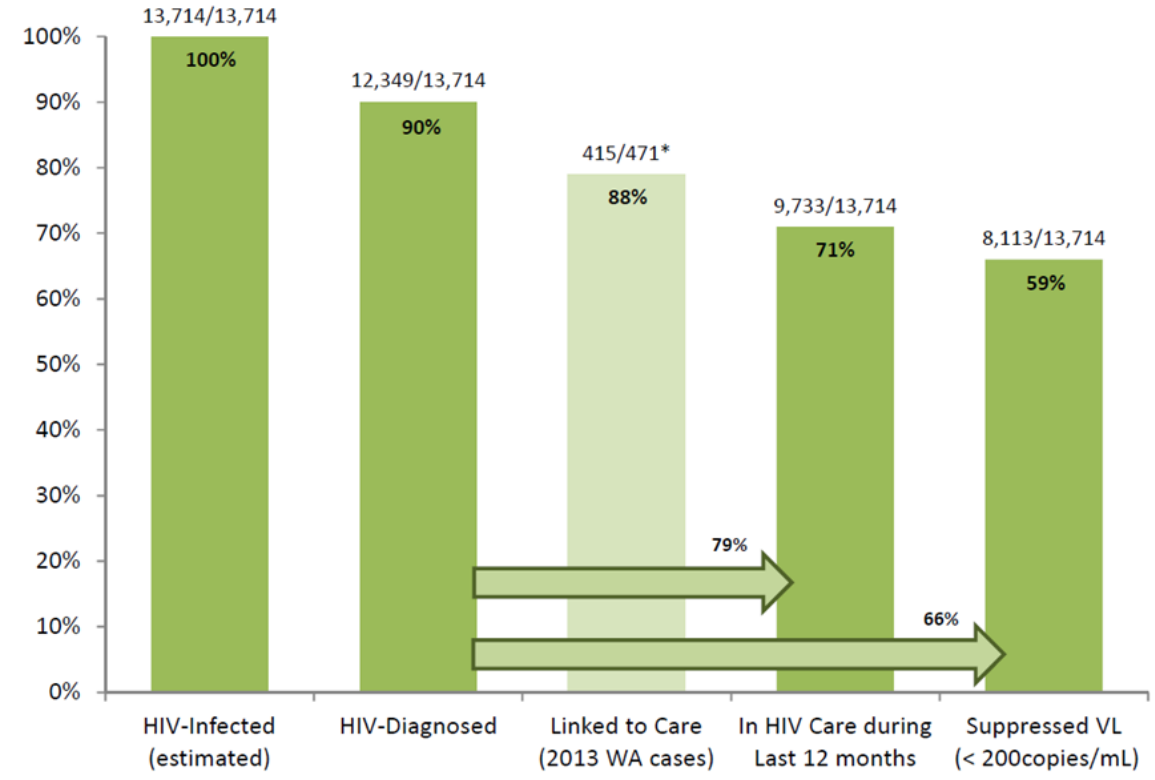



Figure based on surveillance data reported to the WA State Department of Health by June 30, 2014

*Based on 2013 cases diagnosed in WA due to inability to know initial linkage for all persons living with HIV in Washington

Washington State Department of Health

**Figure 2. National HIV Care Continuum, 2012[1]**

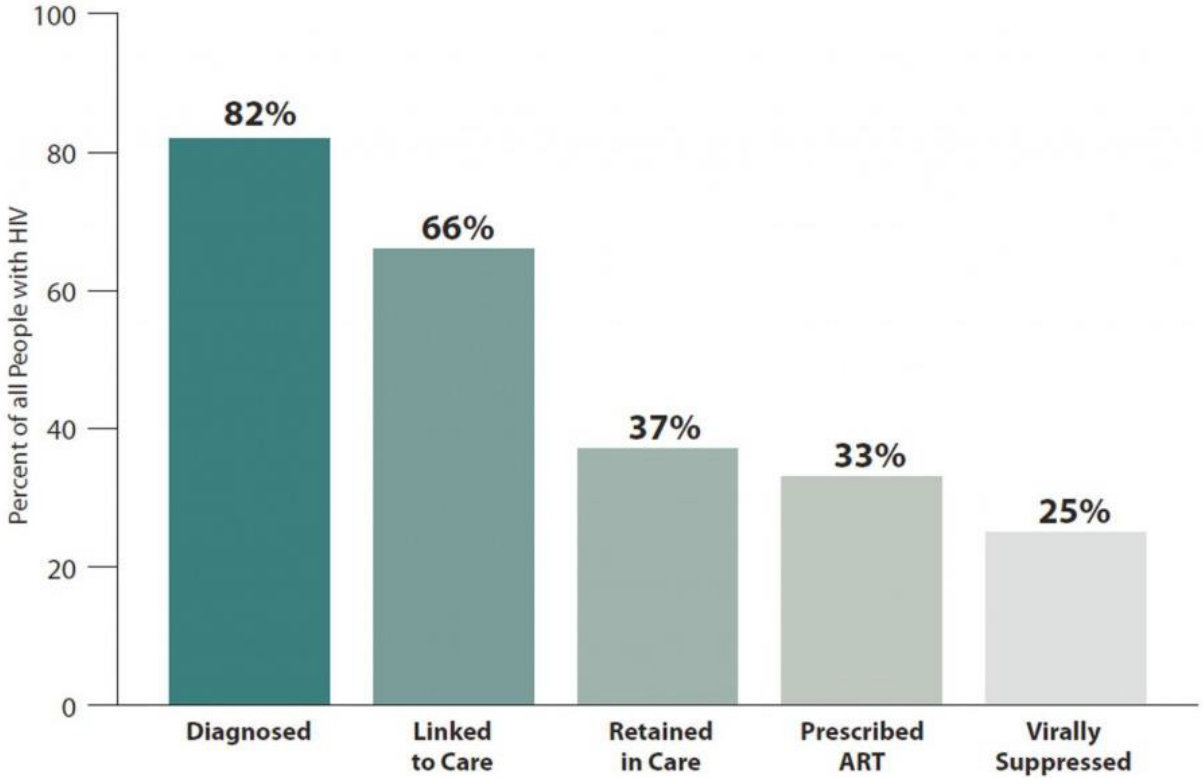


**Table 1. Comparing terms and definitions used in State and National HIV Care Continuums**

| Washington State Continuum | | National Continuum | | Comments |
|---|---|---|---|---|
| Label | Definition | Label | Definition | |
| HIV Infected | The estimated number of people (all ages) living with HIV disease in Washington State in 2013. This includes people who have not been diagnosed. | People Living with HIV (PLWH; not shown) | The estimated number of people (ages 13 and older) living with HIV disease in the United States in 2009. This includes people who have not been diagnosed. | The national care continuum **does not** display this estimate, but it is used as the denominator for several other indicators. The Washington estimate focuses on the year 2013; 4 years more recent than the national estimate. The Washington estimate is not restricted by age, whereas the national estimate is limited to adults and adolescents. |
| HIV Diagnosed | The reported number of people (all ages) who had been diagnosed and were living with HIV disease in Washington State in 2013. | Diagnosed | The reported number of people (ages 13 and older) who had been diagnosed and were living with HIV disease in the United States in 2009. | Both measures are basically calculated in the same way, other than differences in age and time period. |
| Linked to Care | Among people newly diagnosed with HIV disease in 2013, the number who were linked to medical care within 3 months of diagnosis. | Linked to Care | Among people newly diagnosed with HIV disease 2009, the number who were linked to medical care within 3 months of diagnosis. | Both measures are basically calculated in the same way, other than differences in age and time period. |
| In HIV Care during Last 12 Months | Among people living with HIV disease in 2013, the number who received any HIV medical care (based on ≥ 1 CD4 or VL tests performed in 2013). | Retained in Care | Among people diagnosed by year end 2008 and living with HIV in 2009, the number who were retained in ongoing medical care (based on ≥2 CD4 or VL tests performed in 2009). | The national measure represents a higher standard for retention in care compared to the Washington indicator. Given recent research linking ongoing medical care with increased viral suppression, Washington is considering adopting a similar retention measure for future versions of its continuum. |
| No equivalent | n/a | Prescribed ART | This is an estimate of the number of PLWH who have been prescribed ART, based on data collected by CDC's Medical Monitoring Project, a national survey of PLWH who are in care. | CDC recommends all PLWH begin reatment as early as possible. However, lacking a timely and reliable way to measure the prescription of ART among all PLWH, Washington opted not to include this measure in its statewide continuum. |
| Suppressed VL | Among people living with HIV disease in 2013, the number who have a suppressed VL (based on last reported test). | Virally Suppressed | Among people diagnosed by year end 2008 and living with HIV in 2009, the number who have a suppressed VL (based on last reported VL test). | The national measure excludes people newly diagnosed within the year of interest, while the Washington measure includes all PLWH. Otherwise, both measures are basically calculated in a similar manner. |

**Table 2. Viral suppression among people with different levels of engagement in HIV medical care, Washington State**

| | Total | | Virally suppressed | |
|---|---|---|---|---|
| | No. | column % | No. | row % |
| People living with HIV in 2013 who were diagnosed by year end 2012 | 11,834 | 100% | 7963 | 67% |
| Received any HIV medical care | 9,362 | 79% | 7963 | 85% |
| Engaged but not retained | 2,513 | 21% | 1907 | 76% |
| Retained in continuous care (CDC/NHAS measure) | 6,849 | 58% | 6056 | 88% |
| | Total | | Virally suppressed | |
| | No. | column % | No. | row % |
| People living with HIV in 2013 who were diagnosed by year-end 2011 | 11,305 | 100% | 8027 | 71% |
| Retained in continuous care (HHS/HRSA core indicator) | 4,518 | 38% | 4105 | 91% |

HIV surveillance data reported to the Washington State Department of Health as of October 31, 2014

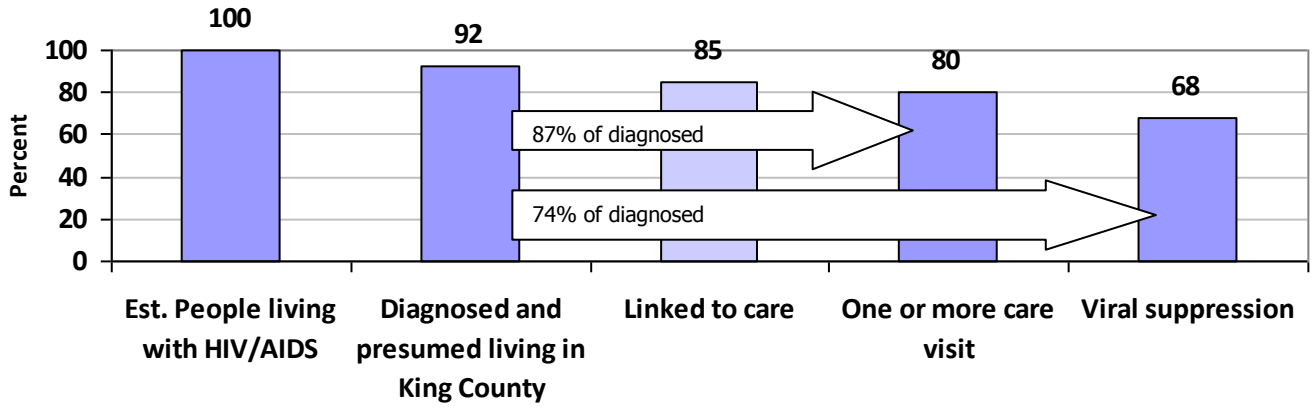
**References**


1. White House Office of National AIDS Policy. The National HIV/AIDS Strategy for the United States. Improving Outcomes: Accelerating Progress along the HIV Care Continuum. December 2013. http://www.whitehouse.gov/sites/default/files/onap_nhas_improving_outcomes_dec_2013.pdf.
2. AIDS.gov website supported by U.S. Department of Health and Human Services. http://aids.gov/federal-resources/policies/care-continuum/. Last revised December 2013.
3. Centers for Disease Control and Prevention. CDC Fact Sheet. HIV in the United States: The Stages of Care. July 2012. http://www.cdc.gov/hiv/pdf/research_mmp_stagesofcare.pdf.
4. Centers for Disease Control and Prevention. Monitoring Selected National HIV Prevention and Care Objectives by Using HIV Surveillance Data—United States and 6 Dependent Areas—2012. HIV Surveillance Supplemental Report 2014; 19 (3). http://www.cdc.gov/hiv/pdf/surveillance_report_vol_19_no_3.pdf. Published November 2014.
5. Hall HI, et al. Differences in Human Immunodeficientcy Virus Care and Treatment among Subpopulations in the United States. JAMA Intern Med. 2013; 173: 1337-1344. Published online June 17, 2013.
6. Mahle Gray K, et al. Jurisdiction Level Difference in HIV Diagnosis, Retention in Care, and Viral Suppression in the United States. JAIDS. 2014; 65: 129-132.
7. Cohen SM, et al. HIV Viral Suppression among Persons with Varying Levels of Engagement in HIV Medical Care, 19 U.S. Jurisdictions. JAIDS. 2014; 65: 519-527.

## Monitoring the goals of the National Strategy for HIV/AIDS and the King County HIV care cascade

The U.S. National HIV/AIDS Strategy (NHAS)[1] has three goals: 1) reducing new HIV infections; 2) increasing access to care and improving health outcomes; and 3) reducing HIV-related disparities. In this section we address each of these outcomes and also have a focus on the HIV care cascade, the sequential steps from HIV diagnosis to linkage to care, engagement in care, and viral suppression.

**Figure 1. HIV Care Continuum, King County, 2013**




| | Estimated people living with HIV/ AIDS[1] | Diagnosed and presumed living in King County[2] | Linked to care 2013[3] | One or more care visit[4] | Viral suppression[5] |
|---|---|---|---|---|---|
| Number people | 7158 | 6585 | 260/283 | 5729 | 4903 |

1. Percent undiagnosed was calculated as 6% among MSM for King County; prior estimate of 15% was used for non-MSM resulting in an estimate of 7.3% overall, rounded up to 8%. Estimated people living with HIV/AIDS is calculated by dividing diagnosed King County residents by .92.
2. Diagnosed cases are those presumed living in King County as of the end of 2013.
3. Linked to care 2013 is not a subset of earlier data (hence different color) and is based on the percent diagnosed in 2013 with a CD4 or viral load test within 3 months of diagnosis. The percent linked in the figure is the percent of diagnosed cases in 2013 who linked (92%) times 0.92 to account for undiagnosed cases.
4. One or more care visit was based on one or more reported laboratory result (CD4, viral load, genotype).
5. Viral suppression is defined as the most recent viral load test result in 2013 less than 200 copies.

Figure 1 presents the HIV care cascade for King County, WA. Public Health estimates that 68% of all people living with HIV (PLWHA) in the county – including 74% of all persons with diagnosed HIV infection – are virally suppressed. (Viral suppression is defined here to mean a viral load of <200 copies/mL.) The Centers for Disease Control and Prevention estimates that only 25% of PLWHA in the U.S., including 30% of persons with diagnosed HIV infection, are virally suppressed.[2]

## HIV infection & diagnosis: reducing HIV by increasing HIV testing and earlier diagnoses and treatment for individuals at highest risk of HIV

**Figure 2a. Publicly funded HIV testing in King County**

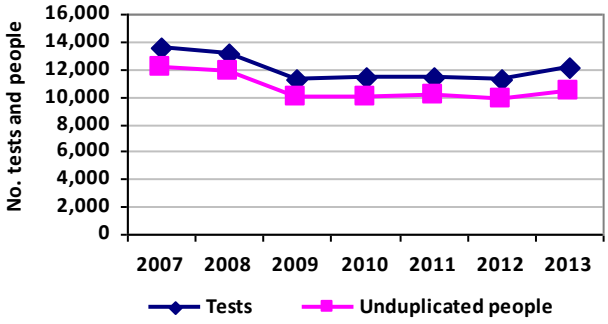
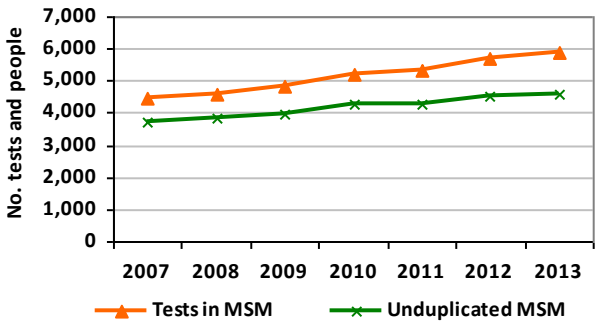



**Figure 2b. Publicly funded HIV testing in King County among men who have sex with men (MSM)**




Figures 2a and 2b show trends in the number of HIV tests performed and numbers of persons tested using Public Health funds between 2007 and 2013. Over a seven year period, the total number of tests performed declined 11%, from 13,560 to 11,270. During this same period, the number of tests performed among men who have sex with men (MSM) increased 31%. This change reflects a concerted effort by Public Health - Seattle & King County to focus HIV testing resources on the population at greatest risk for HIV infection.

**Figure 3a. Percent of individuals, excluding MSM, testing HIV positive through publicly funded HIV testing in King County**

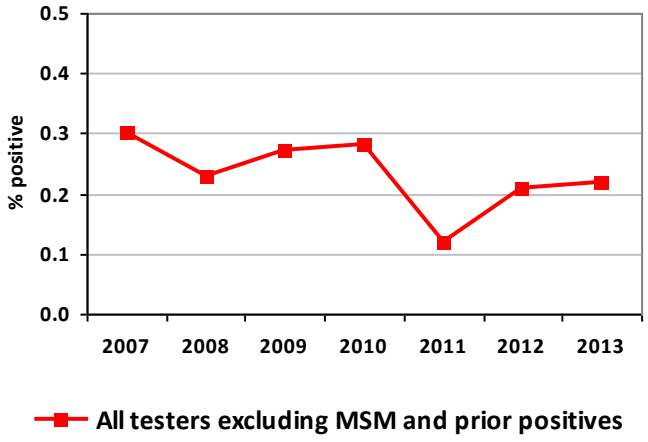
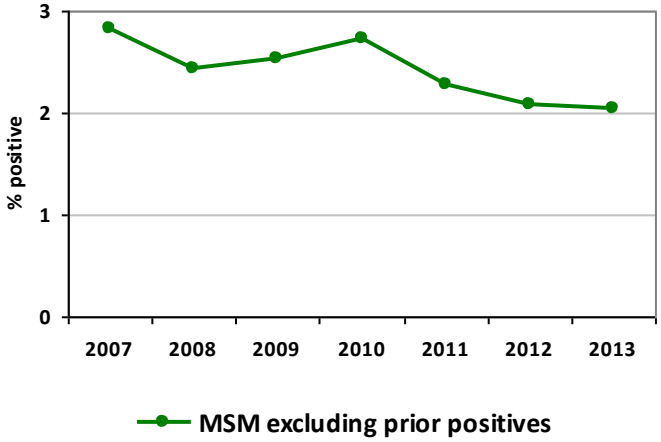



**Figure 3b. Percent of men who have sex with men (MSM) testing HIV positive through publicly funded HIV testing in King County**




Figures 3a and 3b show the percentage of all people excluding MSM (3a) and all MSM (3b) testing positive for HIV infection among all individuals testing through publicly funded testing sites. Between 2007 and 2013, the percentage of MSM testing HIV positive declined from 2.8% to 2.0%.

**Figure 3c. Median and inter-quartile range (IQR) of intertest intervals for MSM (time of last negative to first positive test), King County**

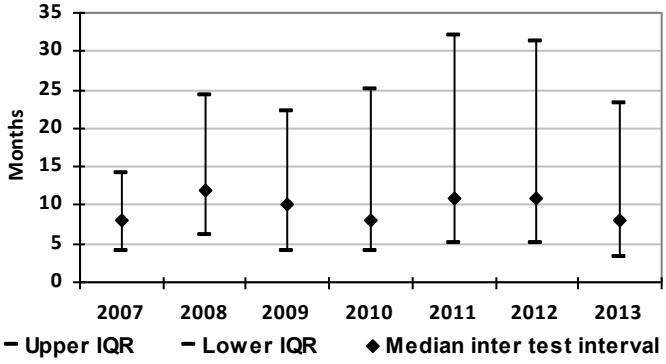



**Figure 3d. Percent of MSM who never had an HIV test before HIV diagnosis, King County**

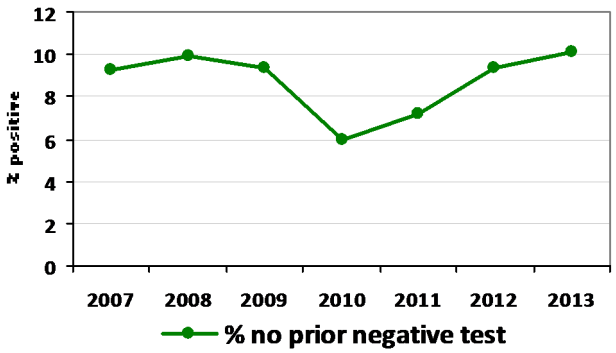
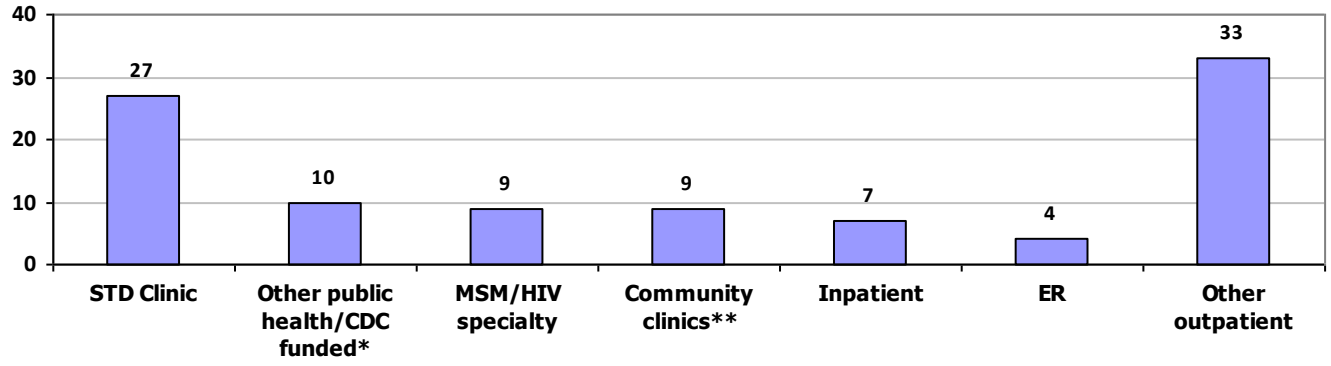



Figure 3c indicates the median intertest interval (ITI, or time from a last negative test to a first positive test) remained stable for MSM between 2007 and 2013. The median ITP varied from 8 to 12 months over the period 2007 to 2013. Throughout this period, 6% to 10% of MSM reported never testing negative for HIV prior to an initial HIV diagnosis (Figure 3d).

**Figure 4. Percent of new HIV diagnoses by type of testing site, King County 2012-2013**




* Other public health/CDC-funded sites exclude the Harborview Medical Center STD clinic and include sites that receive federal or local funds for HIV testing

** Community clinics are those listed as community health centers on this web page: http://www.kingcounty.gov/healthservices/health/locations/community.aspx

Figure 4 presents information on where persons with newly diagnosed HIV infection were diagnosed. Inclusion is limited to individuals with a medical record review or partner services interview confirming an initial HIV diagnosis in 2012 or 2013 (n = 378). The PHSKC STD clinic was the largest single diagnosing site for HIV infection, diagnosing 27% of all new infections in 2012-2013. A total of 37% of all cases, including 43% of cases in MSM, were diagnosed through publically funded HIV testing.

**Figure 5. Rate of new HIV diagnoses, overall and for men and women per 100,000 population per year, 2003 through 2013**

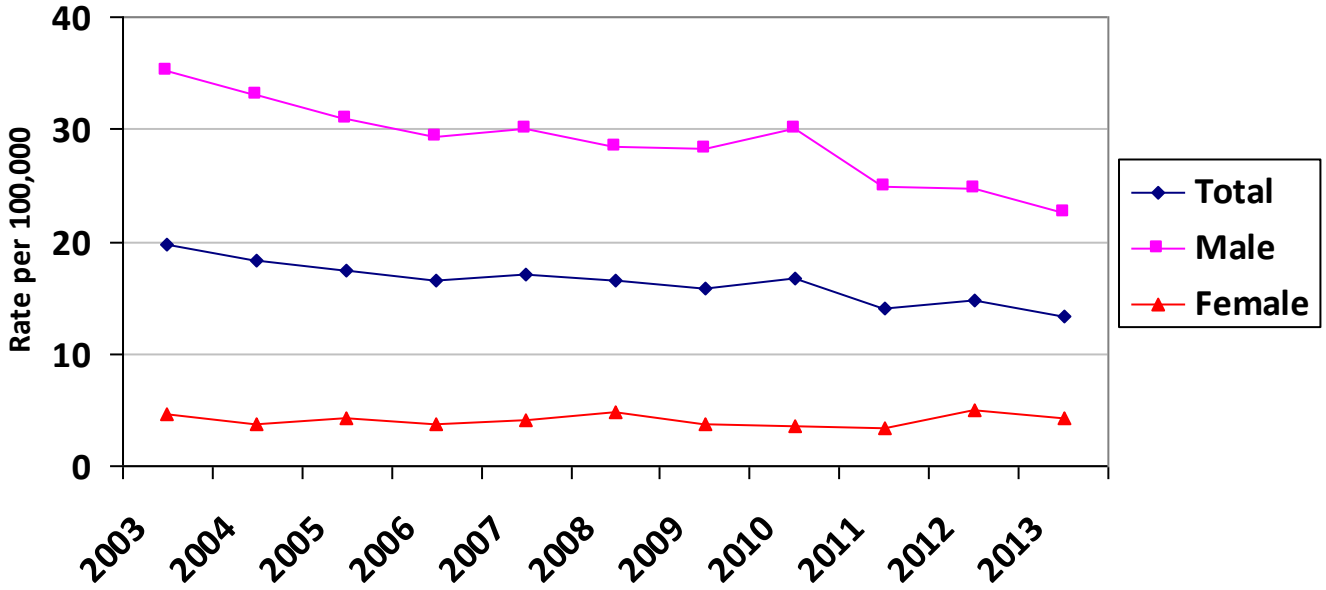
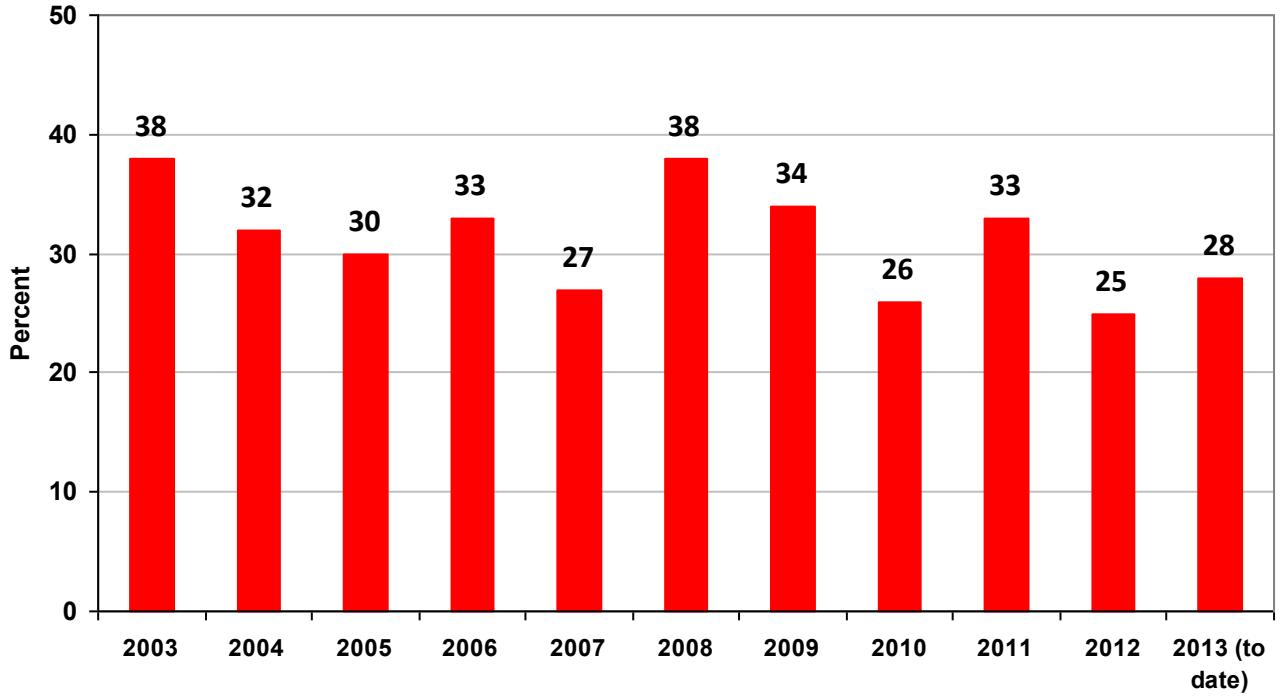



Figure 5 shows the rate of new HIV diagnoses in King County, 2003-2013. Over the eleven-year period, the rate of HIV diagnosis declined by 33%. This decline was evident both overall and for men, but not among women, who comprise a relatively small proportion of cases.

**Figure 6. AIDS diagnosis within 1 year of HIV diagnosis, King County**




As shown in Figure 6, the percentage of individuals with newly diagnosed HIV infection diagnosed with AIDS within 12 months of first testing HIV positive has been roughly stable for over a decade. In 2012 (the most recent year with a full year of follow-up available), 25% of all persons diagnosed with HIV infection, including 21% of MSM, 16% of IDU and 58% of heterosexuals were diagnosed with AIDS within 1 year of HIV diagnosis.

**Figure 7. Median and inter-quartile range (IQR) of First CD4 Counts, King County**

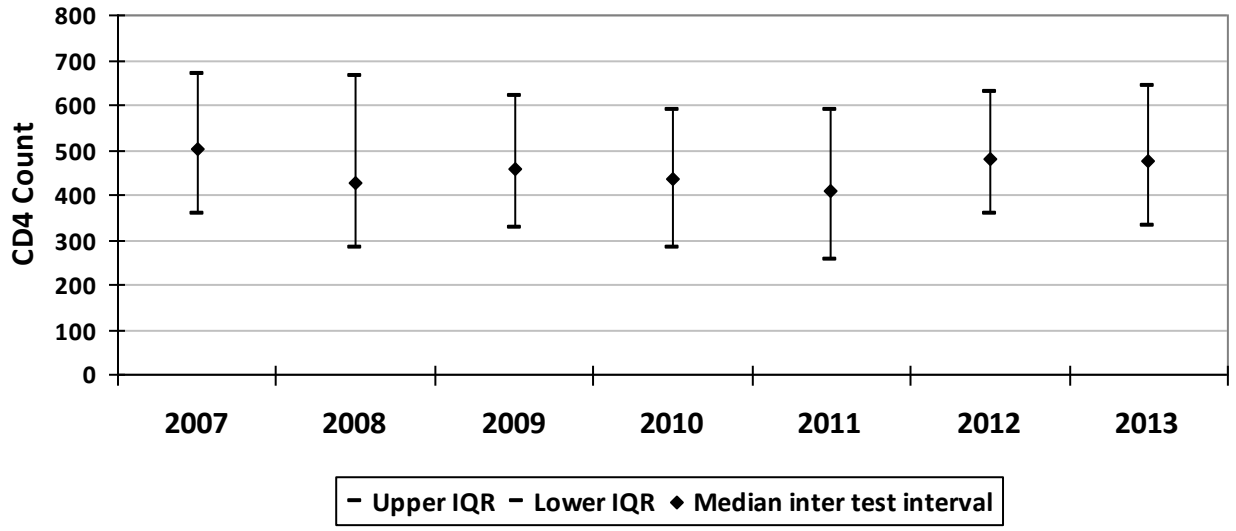
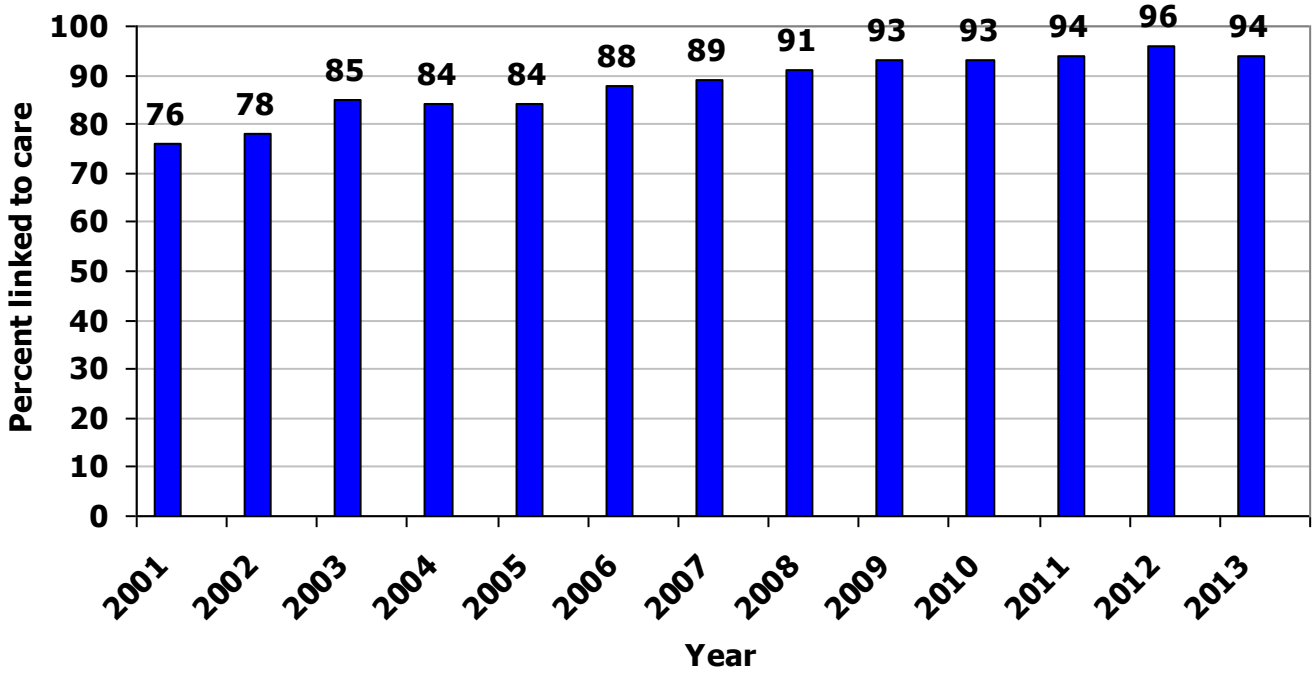



**Figure 8. Timely linkage to care (CD4 or viral load testing within 3 months of diagnosis), King County**




The median CD4 count at time of HIV diagnosis has been high and roughly stable since 2007, between 411 and 504 (Figure 7). In 2013 the HIV classification was changed in two ways that will impact defining late HIV diagnosis as AIDS within one year of HIV diagnosis. First, individuals with a negative HIV test up to six months before HIV will be classified as Stage 0, and diagnoses which previously had been AIDS-defining occurring within this window of six months from a last negative HIV test will no longer be counted as AIDS. Secondly CD4 percent <14% will no longer define AIDS in the setting of a concurrent absolute CD4+ count > 200 cells/µL. Figure 8 shows that linkage to care in King County is extremely high. In each year since 2008, over 90% of all persons with newly diagnosed HIV infection have linked to HIV care within 3 months of diagnosis, defined as a reported CD4 count or viral load within three months of diagnosis. In 2013, 94% of people with newly diagnosed HIV infection were known to have linked to HIV care.

## Increase access to care and improve health outcomes for all people living with HIV

**Figure 9A. Most recent CD4+ T-lymphocyte counts, King County (based on 5,720 CD4 tests reported in 2013)**

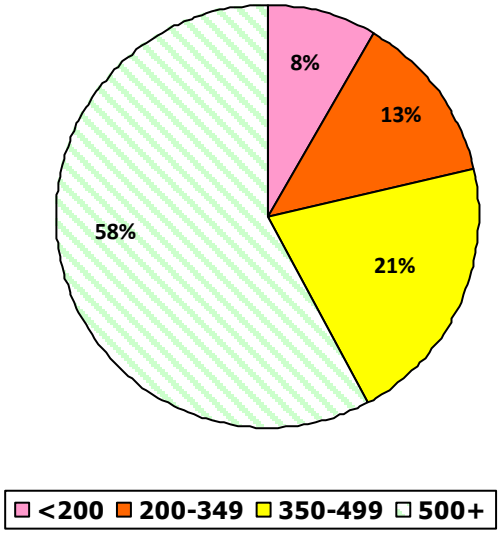
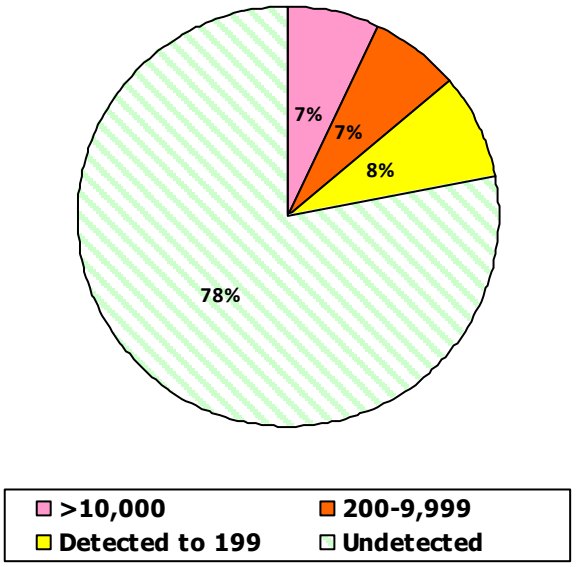



**Figure 9B. Most recent plasma viral load 2013, King County (based on 5,696 viral load tests reported in 2013)**




Figures 9a and 9b: The CD4 lymphocyte count is a measure indicating the strength of a patient's immune system. A normal CD4 count is about 1,000 cells/mm$^3$ (range 500-1500 cells/mm$^3$), and persons with a CD4 count under 200 are defined as having AIDS. In 2013, 58% of PLWHA for whom laboratory data were available had a CD4 count over 500 cells/mm$^3$, and only 8% had a CD4 count under 200 cells/mm$^3$. During this same period 78% of persons for whom laboratory data were available had an undetectable viral load, and an additional 8% had a detectable viral load under 200 copies.

**Figure 9C. Percent with any visit and undetectable viral load by age in 2013, King County**

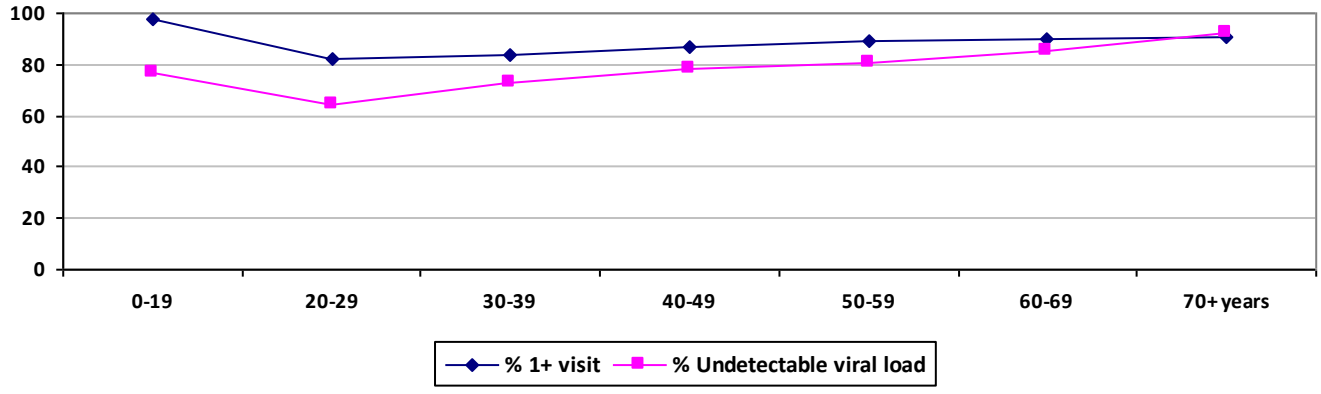
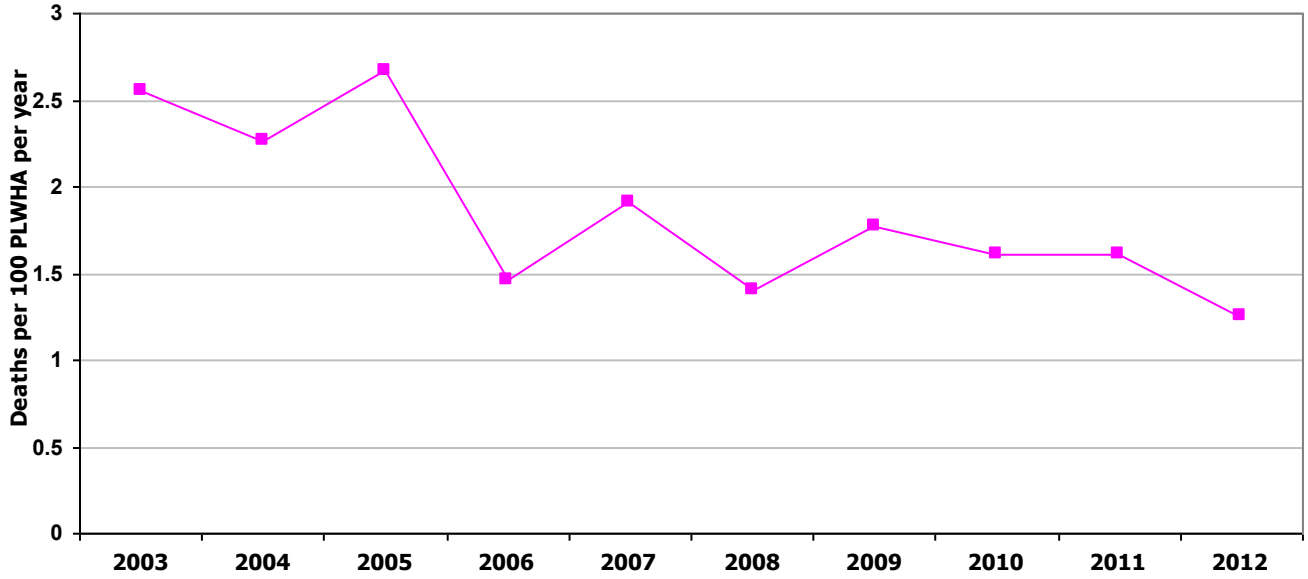



Figure 9c shows that engagement with care and viral suppression increased with age among adult PLWHA; engagement was also high among children less than 20 years of age. Note that any potential associations between age and both engagement in care and viral suppression may be partly due to the length of time it has been since an HIV diagnosis, rather than the age of the individual.

**Figure 10. Adjusted death rates (by reporting lag and age) per 100 people living with HIV/AIDS 2003 through 2012**




Mortality rates among PLWHA have plummeted over the last decade. As shown in Figure 10, age and lag adjusted mortality among PLWHA in King County declined 51% between 2003 and 2012.

## Reduce health-related disparities

**Figure 11a. HIV care cascade by gender for King County as of December 31, 2013**

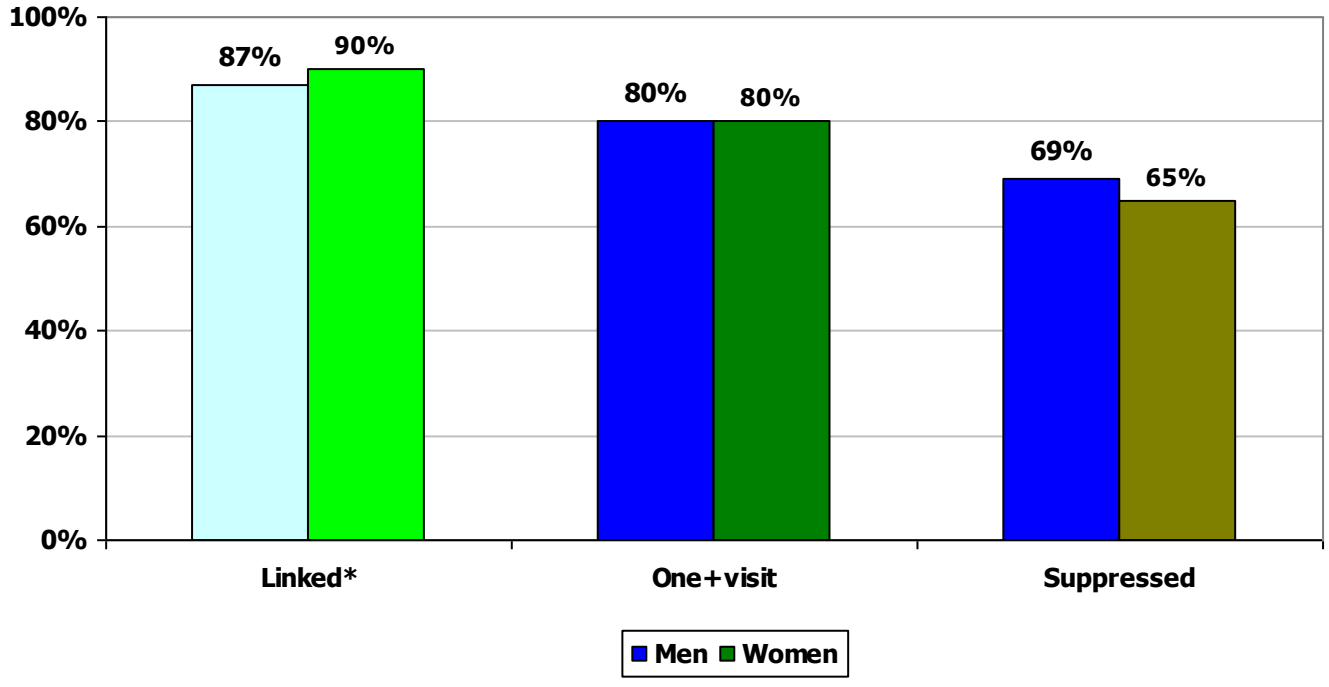


**Figure 11b. HIV care cascade by race/ethnicity for King County as of December 31, 2013**

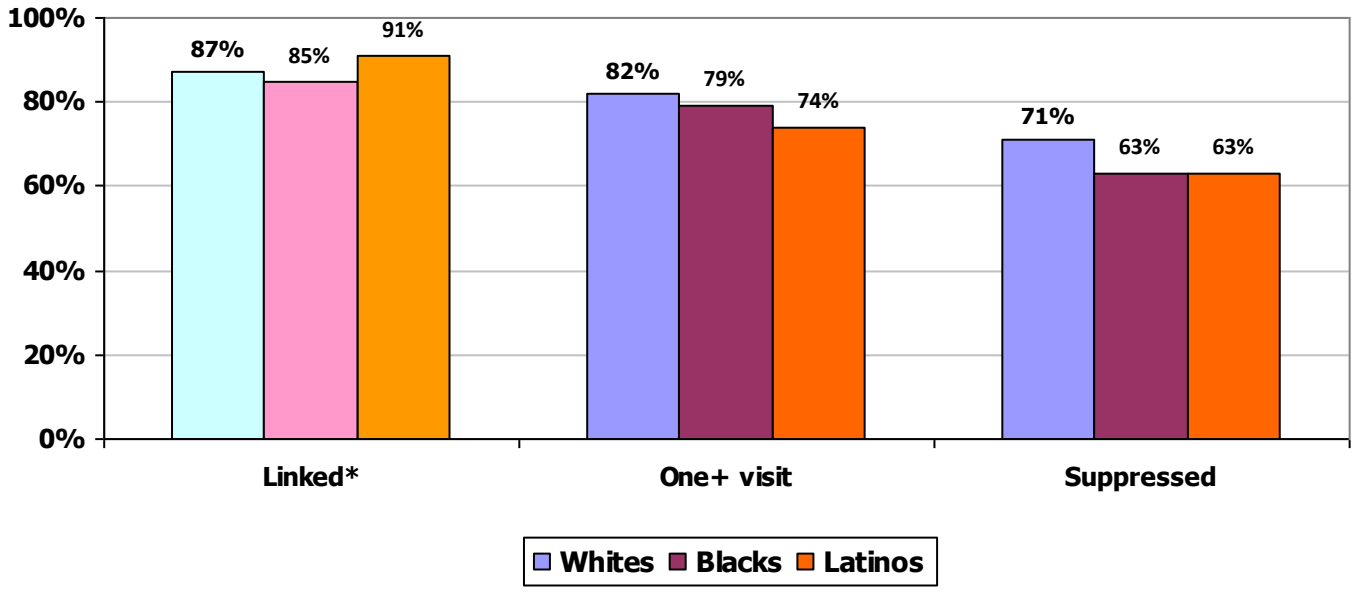



**Figure 11c. HIV care cascade by birthplace for King County as of December 31, 2013**

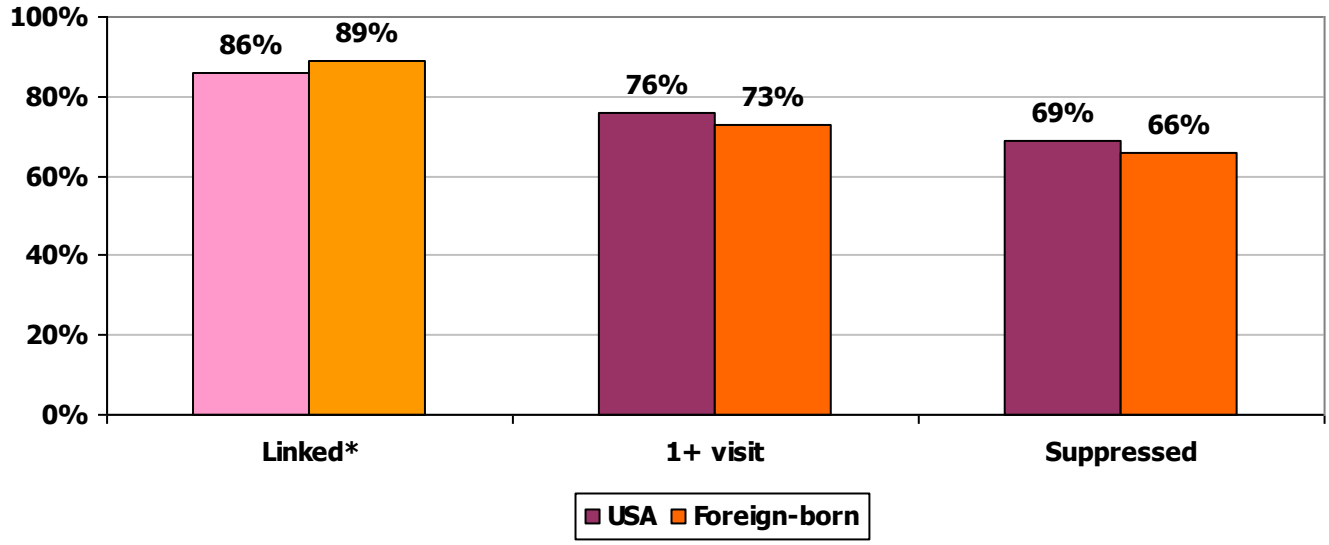
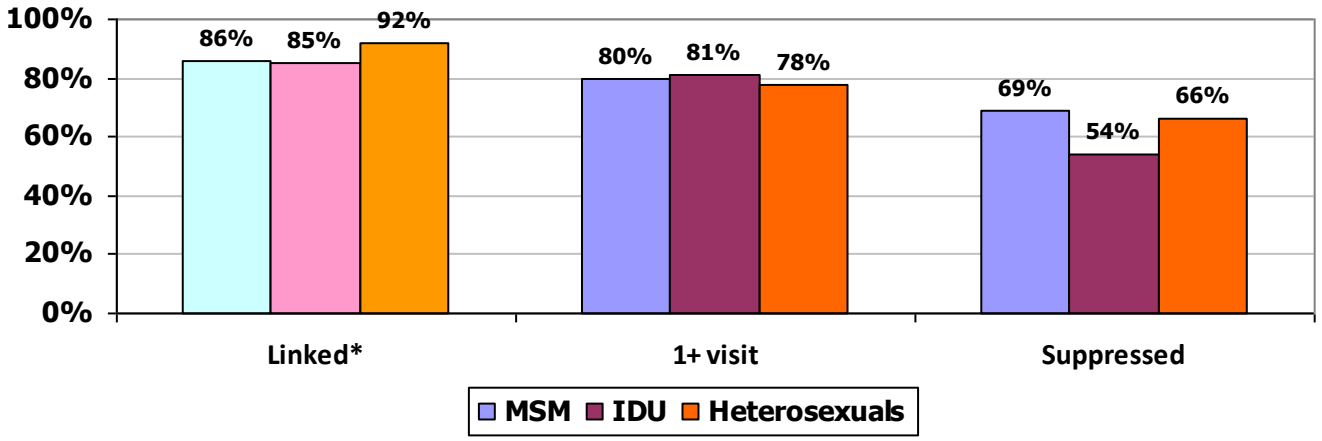


**Figure 11d. HIV Care Cascade by HIV risk - men who have sex with men (MSM)**, injection drug users (IDU)**, and heterosexuals King County as of December 31, 2013**




* "Linked" is based on percent of cases diagnosed in 2012 and 2013 linking to care based on CD4/viral load tests within 3 months of diagnosis. Two years were used to gather a more robust estimate for smaller sub-categories. The percent linked presented were all multiplied by 0.92 to account for 8% undiagnosed cases. Bars are shown as a paler color to indicate linked status is not based on all PLWHA (as the remainder of the bars are).

**MSM-IDU are included in both categories.

Figures 11a-d present data on the HIV care cascade stratified by gender, race/ethnicity, nativity and HIV risk (among MSM, IDU and heterosexuals). The first two bars of the care cascade, "Estimated PLWHA" and "Diagnosed" are not shown because we do not have data specific to all categories. Virologic suppression is approximately 8% lower among Blacks than among Whites and is 15% lower among IDU than among MSM. These disparities merit concerted efforts to ensure that all PLWHA receive the medical care they need. At the same time, it is worth noting that levels of viral suppression in King County are very much higher than for the U.S. as a whole[1].

**Figure 12. HIV diagnosis prevalence among men who have sex with men (MSM) by race/ethnicity, and among non-MSM, non-injection drug* users by race/ethnicity and nativity: Blacks are stratified by U.S. or foreign birthplace.**

**Figure 12a. Percent of MSM** with an HIV diagnosis by race**

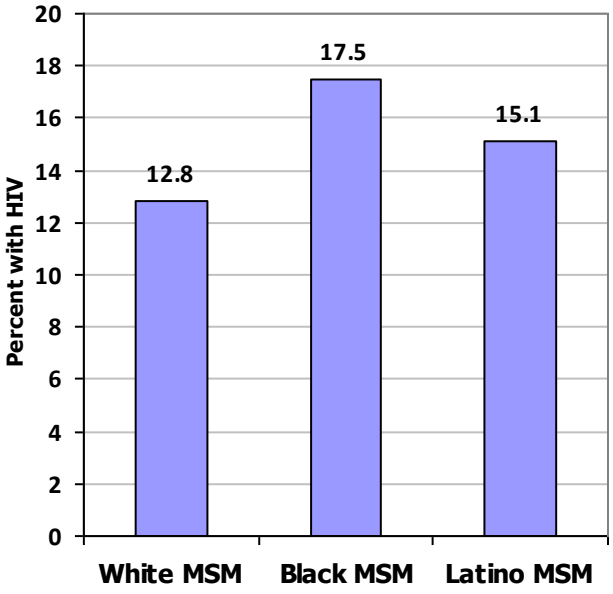
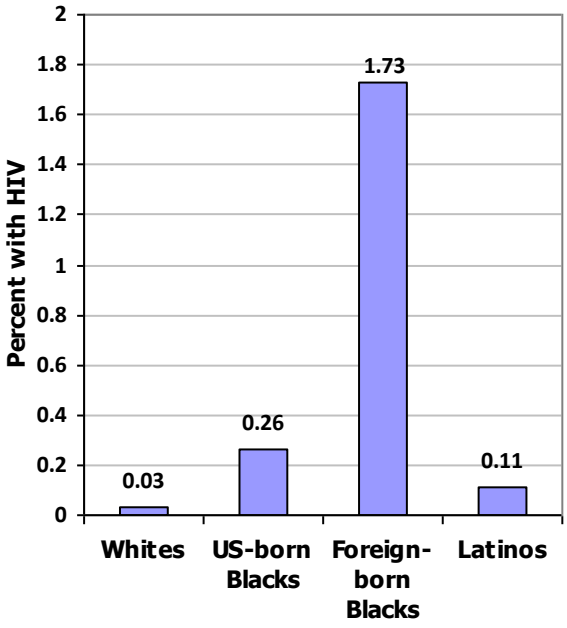



**Figure 12b. Percent of non-MSM, non-IDU with HIV diagnoses, 2013, King County residents**




* HIV diagnosis prevalence among injection drug users is estimated at 2-4%.
**MSM are estimated at 5.4% of King County 2013 male residents age 15 years and greater.

Figures 12a and 12b: The population of MSM was estimated as 5.4% of males age 15 years and higher for the prevalence percents in Figure 12a. Black MSM were 37% more likely to be HIV infected than White MSM, and Latino MSM were 18% more likely to have HIV than White MSM. In King County, HIV infection remains relatively rare among women and heterosexual men without a history of injection drug use, with fewer than 1 in 1,000 persons having diagnosed HIV infection. However, this prevalence varies markedly by race/ethnicity. Assuming foreign born Blacks were 29% of the 2013 Black population, and excluding foreign-born MSM and IDU, an estimated 1.7% of foreign-born Blacks in King County have diagnosed HIV infection (Fig. 12b). In 2013, 33% of all new HIV diagnoses in King County occurred in persons born out of the US, including 7% of Whites, 58% of Blacks, 68% of Latinos, and 87% of Asians (data not shown). Excluding cases occuring in MSM and persons with a history of injection drug use, the prevalence of diagnosed HIV infection is 8.6 times higher among US-born African Americans relative to Whites, and 3.7 times higher among Hispanics compared to Whites.

***Contributed by Matthew Golden and Susan Buskin***

**References:**

1. Millett GA, et al. A way forward: the National HIV/AIDS Strategy and reducing HIV incidence in the United States. J Acquir Immune Defic Syndr. 2010 Dec;55 Suppl 2:S144-7.
2. Hall HI, et al., Differences in human immunodeficiency virus care and treatment among subpopulations in the United States. JAMA Intern Med, 2013. 173: 1337-44.

# Completeness of HIV/AIDS lab reported data from 2009-2013 in King County, WA

**Background**

Regular medical care for HIV infection includes the monitoring of two laboratory tests, CD4+ T-lymphocyte counts and plasma viral load levels. Care recommendations for individuals with HIV who have been on antiretroviral therapy for at least 2 years, are consistently virally suppressed, and have a CD4 count >300 cells/$mm^3$ include testing for CD4 annually and testing for viral load at least every 6 months[1]. These lab tests are often used as a proxy for receipt of regular medical care. Since 2006, both tests have been reportable in Washington State regardless of the lab result value, which newly included undetectable viral loads and CD4 counts that are not AIDS defining (<200 cells/$mm^3$). It has been a challenge to quantify the degree of compliance with this changed reporting requirement. Without knowing the completeness of laboratory reporting in King County, the validity of summary measures of CD4 and viral suppression status for the King County Persons Living with HIV (PLWH) population is called into question. With planning and evaluation of prevention and treatment programs often tied to the Care Cascade, it is a goal of the PHSKC Epidemiology & Surveillance unit to generate valid estimates of viral suppression status. The purpose of this project was to (1) assess the completeness of reported HIV labs, (2) rectify missing data if possible, and (3) identify any systematic biases in reporting.

**Methods**

The Enhanced HIV/AIDS Reporting System (eHARS) is a browser-based application provided by the Centers for Disease Control and Prevention (CDC) to facilitate the collection, management, and reporting of HIV/AIDS surveillance data. Data on HIV viral load and CD4 count is also collected via medical chart review in supplementary surveillance projects, including the Ambulatory Care Evaluation (ACE), Medical Monitoring Project (MMP), and Case Surveillance Based Sampling (CSBS). ACE is a quality assurance assessment of Ryan White funded clinics. MMP is a national surveillance project conducted in 23 jurisdictions, yielding a nationally representative sample of "in care" PLWH. CSBS is similar to MMP, but it samples participants directly from HIV case surveillance data to also capture those who are not receiving care.

To assess the completeness of eHARS viral load and CD4 data, we estimated the percent of eHARS labs that matched to those collected by ACE/MMP/CSBS. The initial match was achieved by merging ACE/MMP/CSBS data with eHARS data using SAS (version 9.3), linking by state identification number, sample date, and lab result. Since we only had the month and year of the ACE labs, they were considered a match if they had the same result from the same month and year. MMP and CSBS labs included the day of the lab, and eHARS labs were considered a match if their sample date was within 7 days of the MMP/CSBS lab. ACE/MMP/CSBS labs that did not match to eHARS labs were individually investigated by a trained researcher. The researcher determined why each lab did not match and categorizing non-matches to detect patterns. Some common reasons why ACE/MMP/CSBS labs did not successfully link to eHARS were data discrepancies, research study participation, or patient residence outside of King County.

**Results**

The estimated percent completeness of eHARS CD4 data had an increasing trend from 2009-2013 (Figure 1), and completeness was never below 90% during that time period. The estimated percent completeness of eHARS viral load data also had an increasing trend from 2009-2013 (Figure 2), but the lab data from 2009 was only 60% complete.

We assessed whether percent complete differed by suppression status (<200 versus ≥200 copies/mL) and CD4 count (<350 versus ≥350 cells/$mm^3$). There was no evidence of differential reporting in 2011-2013, but in 2009-2010, suppressed viral load tests appeared to be less likely to be reported (Figure 3). In 2009, 50% of suppressed labs and 6% of non-suppressed labs were missing in eHARS. In 2010, 25% of suppressed labs and 9% of non-suppressed labs were missing. There was no evidence of differential reporting by CD4 level (Figure 4).

To assess how low percentages of completeness might affect estimates of suppression, we ascertained whether both ACE and eHARS classified a patient as suppressed during a given sample year, regardless of the specific dates of the samples. After discounting actual sample dates, the completeness improved dramatically from 60% to 92% in 2009 (Figure 5).

Through the investigation of missing labs, we found a large portion of CD4 count labs from December 2009 and January 2010 from the same laboratory that appeared to be missing in eHARS (Figures 6 and 7). An investigation at the Washington State Department of Health determined that the labs were missing from both the county and state lab data. It is still unknown why these labs were missing, but the investigation will continue.

## Discussion

The completeness of lab reporting data has improved over time. We estimate that 95% of CD4 labs and 97% of viral load labs were in the 2013 eHARS data, which lends credibility to the estimates of care status generated from eHARS data. The estimates of the completeness of HIV/AIDS lab reporting data allows for the adjustment of the viral load suppression estimates on the Care Cascade and more accurate estimates of unmet need. It also provides an adjustment factor to be used, to adjust for laboratory reporting completeness when making population based projections of the proportion of people living with HIV who are engaged in medical care.

Overall, labs had a high percentage of completeness, but the differential reporting of viral load labs in 2009 and 2010 and large portion of missing CD4 count labs in December 2009 and January 2010 require further investigation.

**Submitted by Marielle Goyette**

**References**


1. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1 infected adults and adolescents. Department of Health and Human Services. Available at http://aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf. Section accessed August 20,2014, Page C2, Table 3.


**Figure 1. Percent completeness of eHARS CD4 labs by sample year**

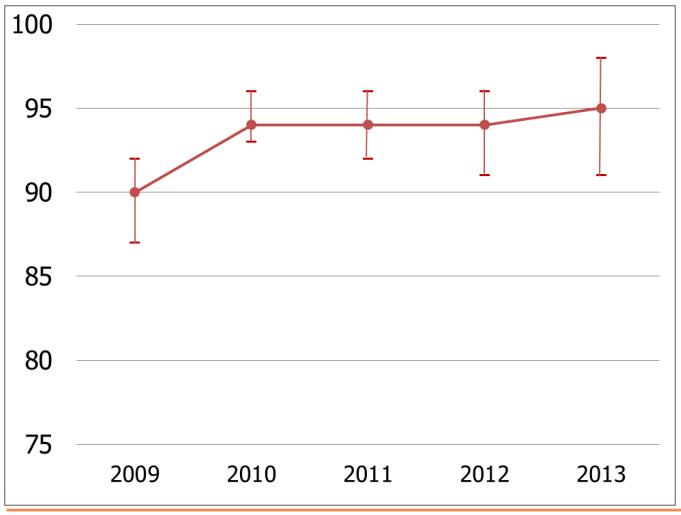



**Figure 2. Percent completeness of eHARS viral load labs by sample year**

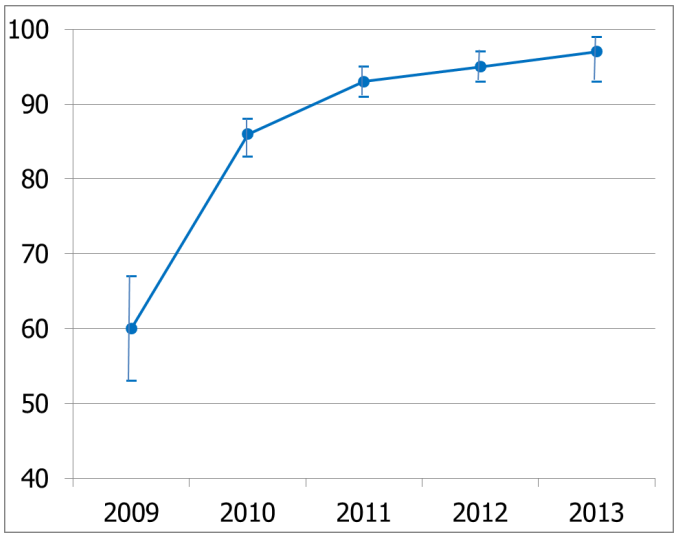



**Figure 3. Percent missing by viral load suppression status by sample year**

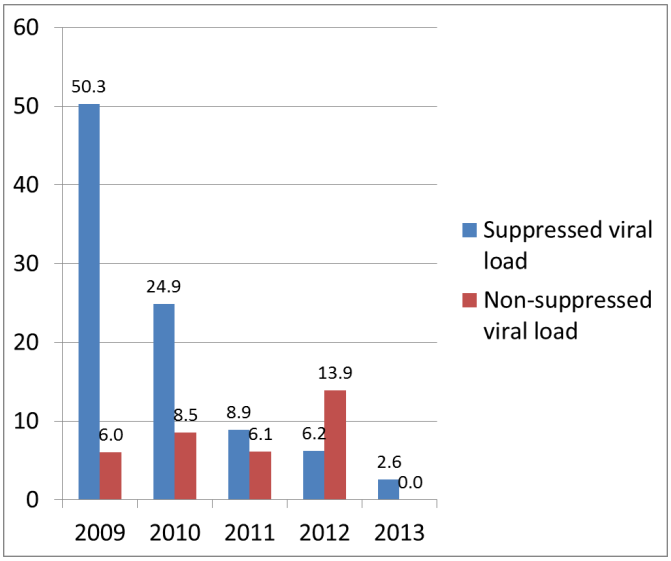



**Figure 4. Percent missing by CD4 level by sample year**

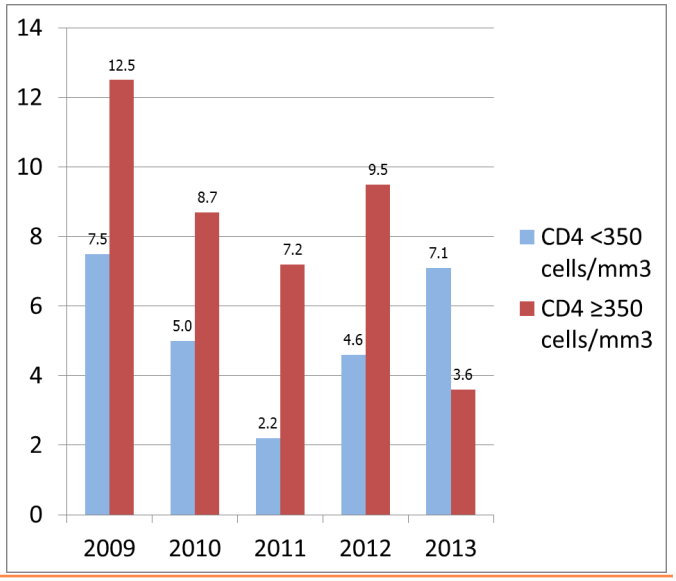


**Figure 5: Completeness of 2009 viral load suppression estimates regardless of sample date**

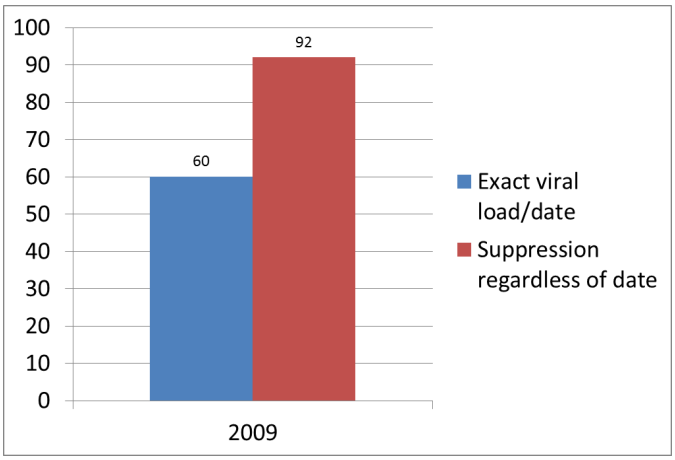



**Figure 6. Reasons eHARS CD4 count labs did not match to ACE/MMP/CSBS in 2009**

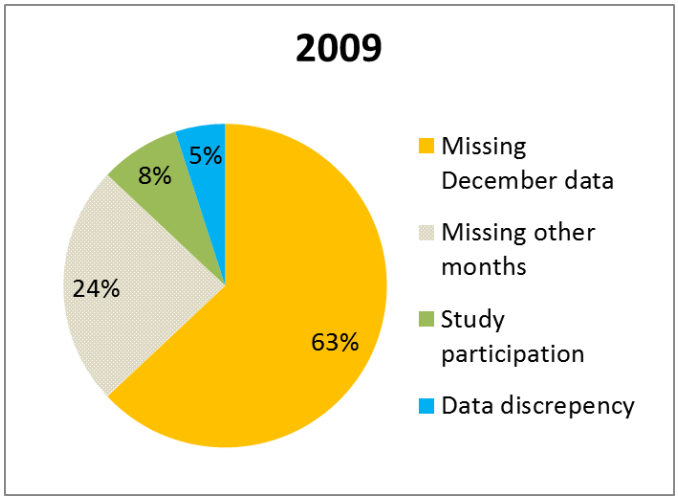
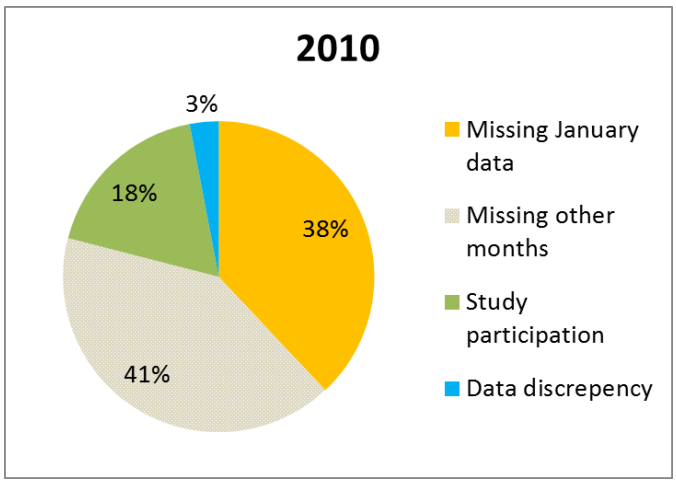



**Figure 7. Reasons eHARS CD4 count labs did not match to ACE/MMP/CSBS in 2010**



# Update on HIV Incidence Surveillance in King County and Washington State

**Introduction**

HIV Incidence Surveillance (HIS) is a supplemental surveillance activity funded by the U.S. Centers for Disease Control and Prevention (CDC). The project is designed to estimate HIV incidence - the number of new HIV infections that occur within a given time period - both within the United States and within participating local jurisdictions. Washington State is one of 25 jurisdictions that are collecting additional data on each new HIV case in order to estimate HIV incidence. While case surveillance data provide us with an accurate number of HIV diagnoses, it is not uncommon for people to be infected for many years prior to diagnosis. Hence, HIV incidence cannot be directly measured and can be challenging to approximate.

Nationally, the CDC estimates that about 50,000 HIV infections occur annually.[1] In the Second Half 2012 issue of the HIV/AIDS Epidemiology Report, we published the first Washington State estimates from HIS. Those findings suggested that reported HIV diagnoses are a reasonable proxy for HIV incidence estimates. Here, we present updated HIV incidence estimates for Washington State and King County during the years 2008 to 2012.

**Methods**

We estimated HIV incidence among Washington State residents ages 13 and older between 2008 and 2012. Our estimates are based on data collected from individuals who were diagnosed with HIV infection during the same time frame and reported to the Washington State HIV surveillance system as of August 2014.

The algorithm we used for estimating HIV incidence is known as the Stratified Extrapolation Approach (SEA) and has been previously described.[2,3] Briefly, this method considers each case's HIV testing and treatment history (including information about the case's last negative HIV test and their history of antiretroviral use) which is collected through routine case investigation procedures. Also, a two-part STARHS (serologic testing algorithm for recent HIV seroconversion) assay is performed on remnant HIV antibody-positive blood specimens to determine if a person was likely to have been recently infected with HIV, or within approximately six months of diagnosis. Cases diagnosed with AIDS within six months of their HIV diagnosis were considered to have long-term infections and were not included in the analysis.

Annual rates were generated by dividing the number of HIV cases diagnosed or the number of estimated incident cases by the number of people (ages 13+) who were living in Washington during that year.[4]

**Results**

Between 2008 and 2012, the number of new HIV cases diagnosed and reported each year ranged from a low of 490 to a high of 547 (**Table 1** and **Figure 1**). Mid-point incidence estimates were equal to or lower than the number of cases diagnosed, ranging from 389 to 537 infections annually. Each incidence estimate was accompanied by a wide margin of uncertainty (represented by a 95% confidence interval). Annual case counts were consistently within the 95% CI of the incidence estimate, indicating there was not a significant difference between diagnosis counts and incidence estimates.

The majority of new diagnoses occurred among men who have sex with men (MSM) (66% on average) and among King County residents (57% on average) each year. Incidence estimates tended to follow the same patterns when examined by sex, age, risk and residency **(Table 1** and **Figures 2-5)**. In general, incidence estimates were lower than the number of new cases diagnosed for each characteristic that was evaluated.

Rates of HIV diagnosis in Washington State were relatively stable between 2008 and 2012, ranging from 8.7 to 9.8 diagnoses per 100,000 residents (**Figure 6**). Incidence rates generally mirrored diagnoses, though with greater variability, ranging from 7.0 to 9.8 infections per 100,000 residents. Again, 95% confidence intervals of annual incidence rate estimates included the diagnosis rate for each year.

**Discussion**

HIV incidence estimates produced by the combined SEA and STARHS methodologies tended to mirror HIV case counts in Washington State. If anything, the incidence estimates might be lower than the number of cases diagnosed each year. We observed these similarities both overall and when we stratified by characteristics such as sex, age, risk, and city or county of residence. These findings further support the conclusion that, in Washington State, diagnosis data collected through means of routine HIV case surveillance provides a reasonable proxy for identifying general trends in HIV transmission.

The methods used to estimate new HIV infections in Washington State are not without limitations. The mathematical model for generating the incidence estimates operates under certain assumptions which we are not certain are always true, including: (a) missing data occurs at random, (b) the likelihood of HIV testing between infection and an AIDS diagnosis is constant with respect to time, (c) HIV testing behavior has not changed during the time period of interest. We anticipate future challenges in using this method to estimate local HIV incidence. Currently, most of the large, national commercial laboratories have protocols in place to submit remnant sera from positive HIV-antibody tests for the two-test STARHS algorithm (for which detectable HIV antibody is a requirement). In recent years, just over half of new cases in our state had an antibody-positive specimen available for testing. However we may struggle to meet this threshold as more cases are diagnosed based on viral load testing alone, including during acute infection when HIV antibody levels are too low for detection. Additionally, a history of HIV antiretroviral use renders a specimen ineligible for two-step STARHS testing. With the advent of pre-exposure prophylaxis (PrEP) being promoted in certain high risk groups[5], we expect that some of our newly diagnosed cases in the future may have a history of taking ARV as PrEP and therefore their specimens would be unsuitable for STARHS. Anecdotally, uptake of PrEP among local MSM (the largest risk group in our state) has been enthusiastic. (See Pride Survey results elsewhere in this issue.)

While it is reassuring that HIV incidence estimates appear to be in line with data from our case surveillance system, we will continue to measure incidence in combination with case surveillance reports and other local data on HIV transmission to monitor HIV infections in Washington State.

***Submitted by Jason Carr and Christina Thibault***

**References**


1. Centers for Disease Control and Prevention. Estimated HIV incidence in the United States, 2007–2010. HIV Surveillance Supplemental Report 2012;17(No. 4). http://www.cdc.gov/hiv/topics/surveillance/resources/reports/#supplemental. Published December 2012.
2. HIV/AIDS Epidemiology Unit, Public Health – Seattle & King County and the Infectious Disease Assessment Unit, Washington State Department of Health. HIV/AIDS Epidemiology Report, Second Half 2012: Volume 81
3. Karon JM, et al (2008) Estimating HIV incidence in the United States from HIV/AIDS surveillance data and biomarker HIV test results. Stat med 27(23):265-73. HIV/AIDS Epidemiology Report, Second Half 2012: Volume 81.
4. Population estimates from the Washington State Office of Financial Management, Forecasting Division (2014). Retrieved from http://www.ofm.wa.gov/pop/asr/default.asp.
5. US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States – 2014 Clinical Practice Guideline. http://www.cdc.gov/hiv/pdf/prepguidelines2014.pdf

**Table 1. Comparing new HIV cases* with estimated new HIV infections, Washington State, 2008-2012**

| | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | New HIV Cases | Estimated Infections | New HIV Cases | Estimated Infections | New HIV Cases | Estimated Infections | New HIV Cases | Estimated Infections | New HIV Cases | Estimated Infections |
| | No. | No. (95% CI) | No. | No. (95% CI) | No. | No. (95% CI) | No. | No. (95% CI) | No. | No. (95% CI) |
| **Total** | 537 | 537 (292, 783) | 539 | 389 (224, 553) | 547 | 445 (288, 603) | 490 | 446 (276, 617) | 510 | 499 (336, 661) |
| **Gender** | | | | | | | | | | |
| Male | 446 | 438 (217, 659) | 457 | 321 (199, 442) | 478 | 327 (212, 442) | 425 | 392 (235, 550) | 427 | 398 (266, 531) |
| Female | 91 | 99 (5, 194) | 82 | 68 (0, 151) | 69 | 118 (12, 224) | 65 | 54 (0, 113) | 83 | 101 (15, 186) |
| **Age** | | | | | | | | | | |
| 13-24 | 79 | 76 (18, 134) | 81 | 90 (23, 158) | 74 | 94 (31, 158) | 67 | 91 (27, 155) | 80 | 126 (53, 199) |
| 25-34 | 160 | 192 (50, 335) | 159 | 146 (66, 227) | 167 | 167 (82, 253) | 149 | 116 (63, 168) | 163 | 183 (95, 270) |
| 35-44 | 156 | 161 (16, 307) | 144 | 76 (23, 128) | 156 | 103 (26, 180) | 125 | 123 (33, 214) | 134 | 114 (42, 185) |
| 45+ | 142 | 108 (2, 214) | 155 | 77 (19, 134) | 150 | 80 (19, 141) | 149 | 116 (9, 224) | 133 | 76 (12, 141) |
| **HIV risk** | | | | | | | | | | |
| MSM and MSM/IDU** | 331 | 394 (189, 599) | 363 | 298 (190, 406) | 374 | 307 (210, 403) | 343 | 366 (217, 516) | 322 | 377 (251, 503) |
| Other | 206 | 144 (25, 262) | 176 | 91 (0, 193) | 173 | 138 (22, 255) | 147 | 80 (7, 153) | 188 | 122 (23, 221) |
| **Residency** | | | | | | | | | | |
| Inside Seattle | 216 | 222 (74, 369) | 196 | 147 (82, 212) | 241 | 193 (112, 275) | 197 | 221 (111, 330) | 206 | 201 (123, 280) |
| Outside Seattle | 321 | 316 (135, 496) | 343 | 242 (107, 377) | 306 | 252 (123, 382) | 293 | 226 (106, 345) | 307 | 297 (162, 433) |
| Inside King Co. | 311 | 326 (144, 508) | 299 | 202 (120, 284) | 322 | 271 (167, 375) | 268 | 280 (150, 410) | 284 | 270 (169, 371) |
| Outside King Co. | 226 | 211 (67, 356) | 240 | 187 (68, 305) | 225 | 175 (67, 283) | 222 | 166 (68, 265) | 226 | 229 (113, 345) |
| **HIV risk by residency** | | | | | | | | | | |
| MSM inside Seattle** | 163 | 200 (61, 339) | 157 | 134 (78, 191) | 202 | 153 (100, 206) | 166 | 197 (95, 298) | 156 | 174 (108, 241) |
| MSM outside Seattle** | 168 | 194 (55, 333) | 206 | 164 (82, 245) | 172 | 154 (81, 227) | 177 | 170 (69, 270) | 166 | 202 (100, 304) |

* Cases newly diagnosed with HIV infection and reported to the state's HIV surveillance system

** Includes men who have sex with men who are injection drugs users (MSM/IDU) and those who are not (MSM)

**Figure 1. Total new HIV diagnoses vs. total estimated infections, Washington State, 2008-2012**

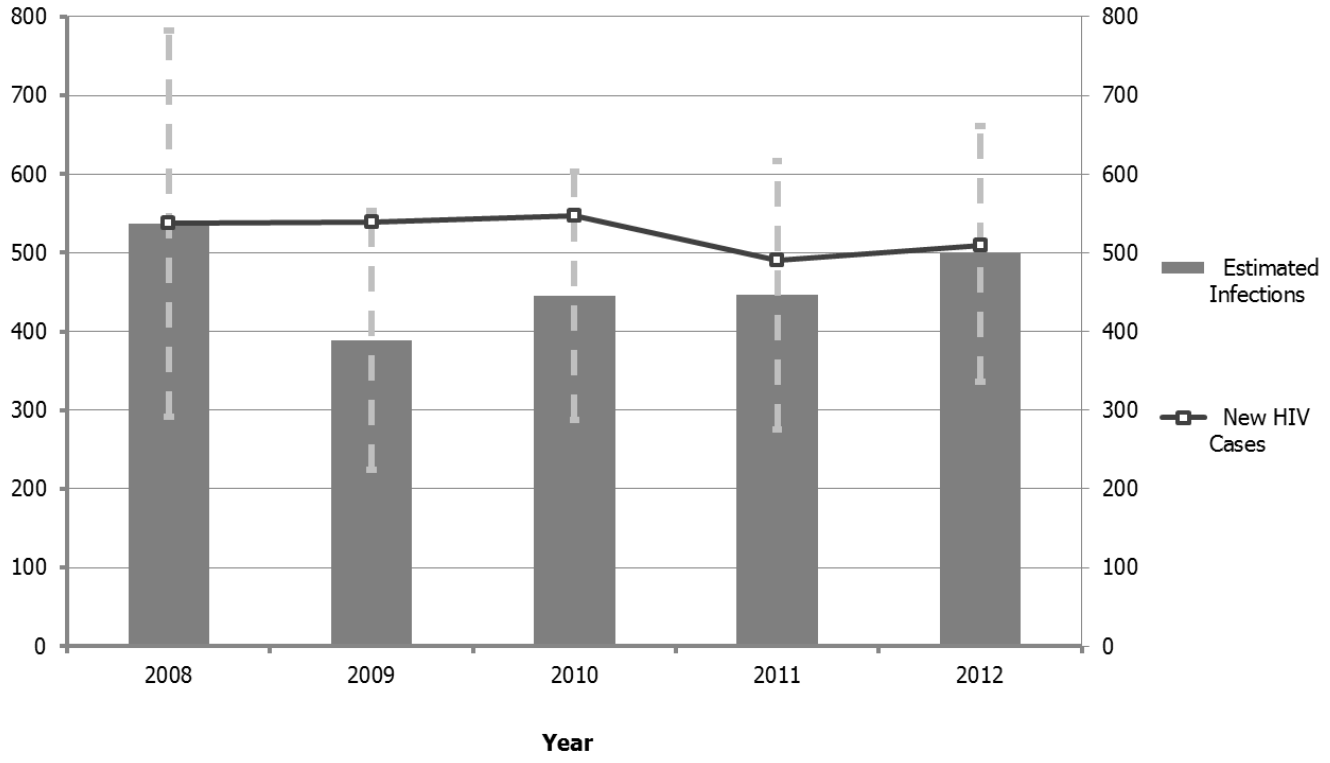



**Figure 2. New HIV diagnoses vs. estimated infections inside King County, 2008-2012**

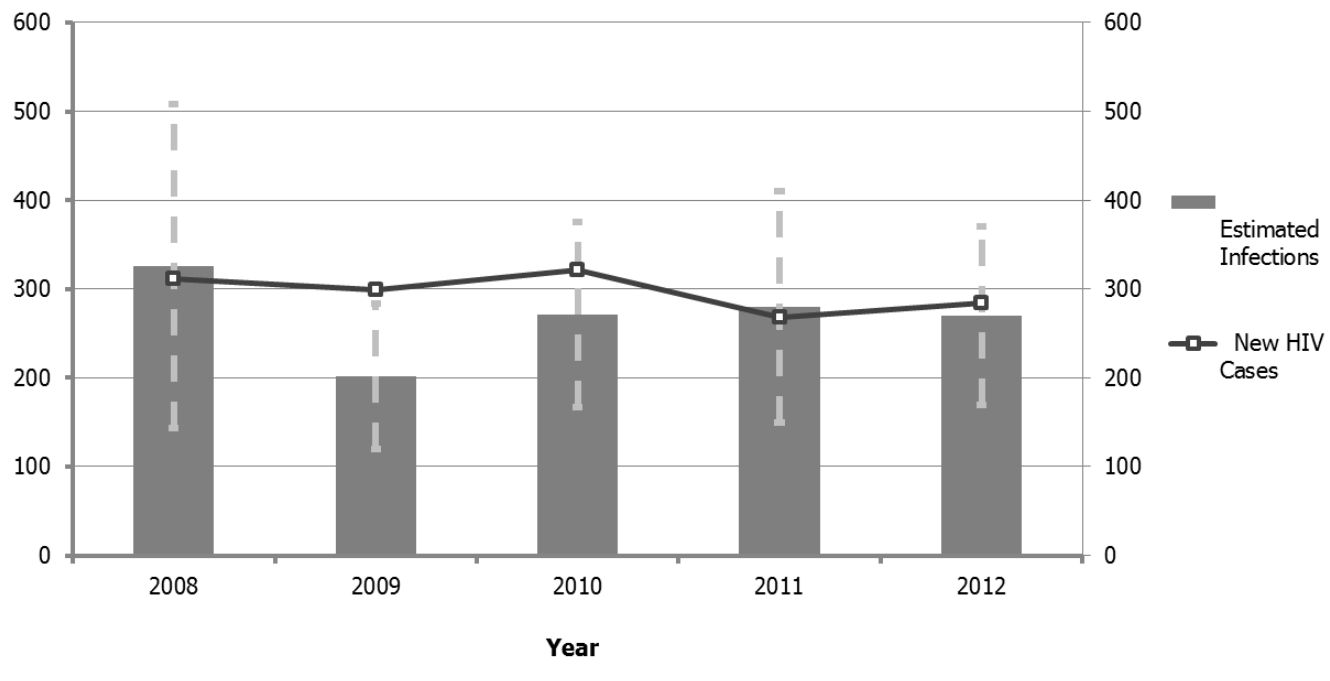


**Figure 3. New HIV diagnoses vs. estimated infections outside King County, 2008-2012**

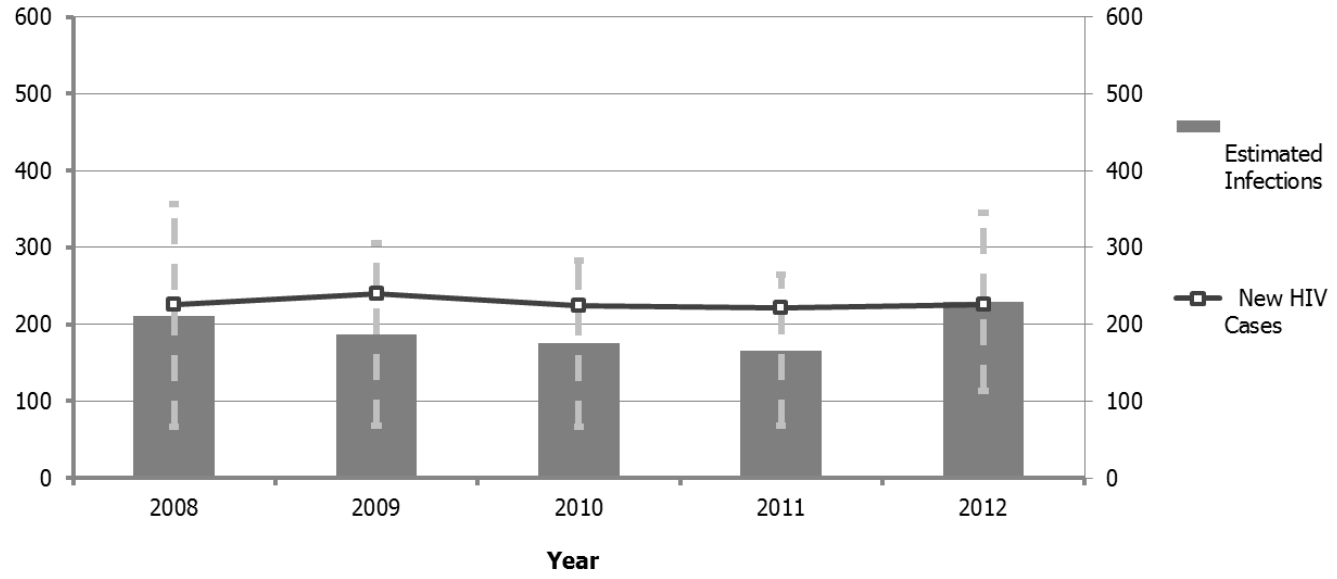



**Figure 4. New HIV diagnoses vs. estimated infections among MSM in Washington State, 2008-2012**

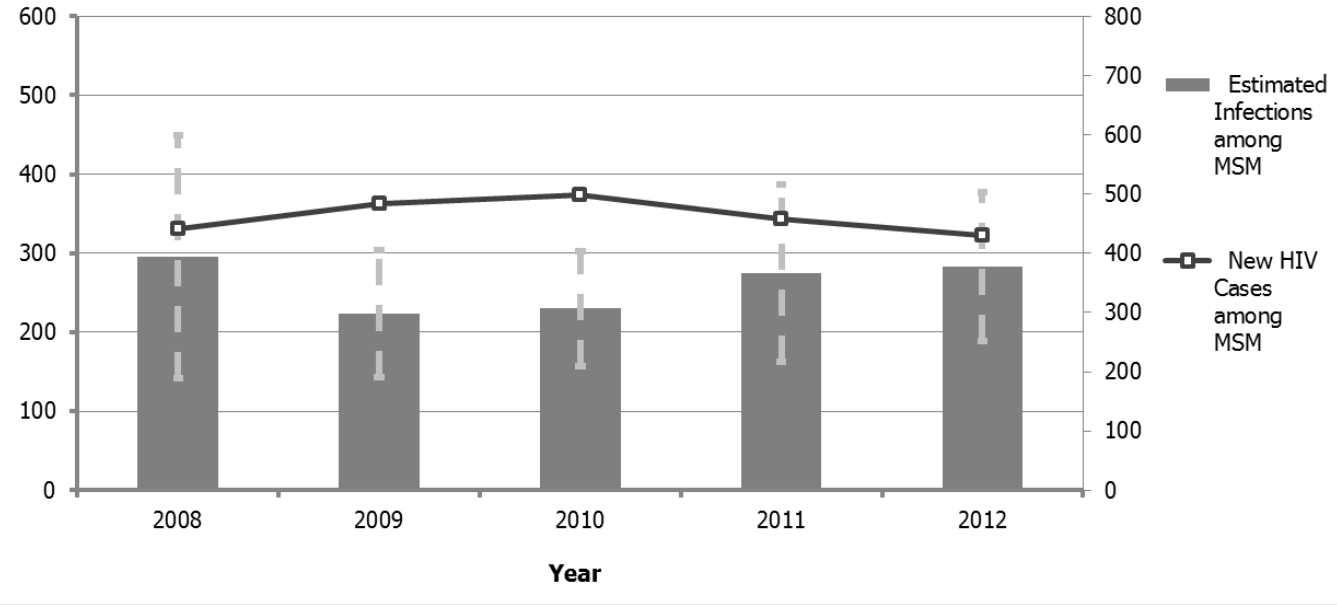


**Figure 5. New HIV diagnoses vs. estimated infections among MSM in Seattle, 2008-2012**

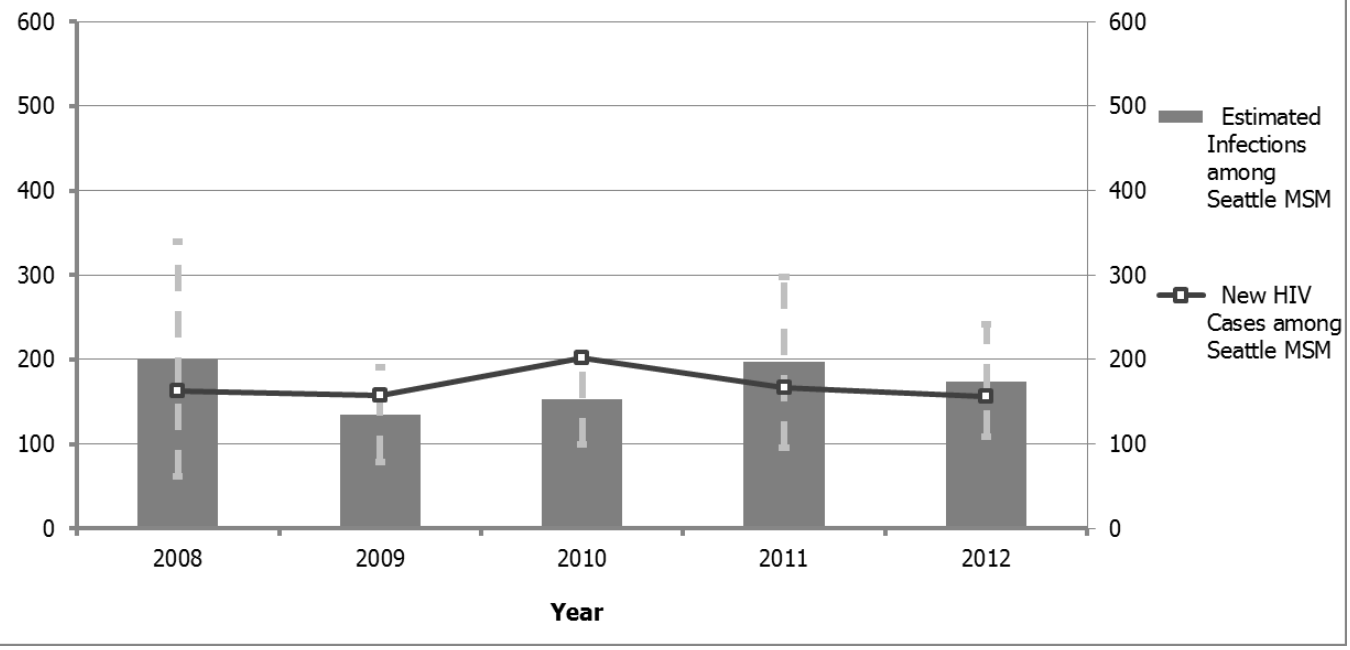
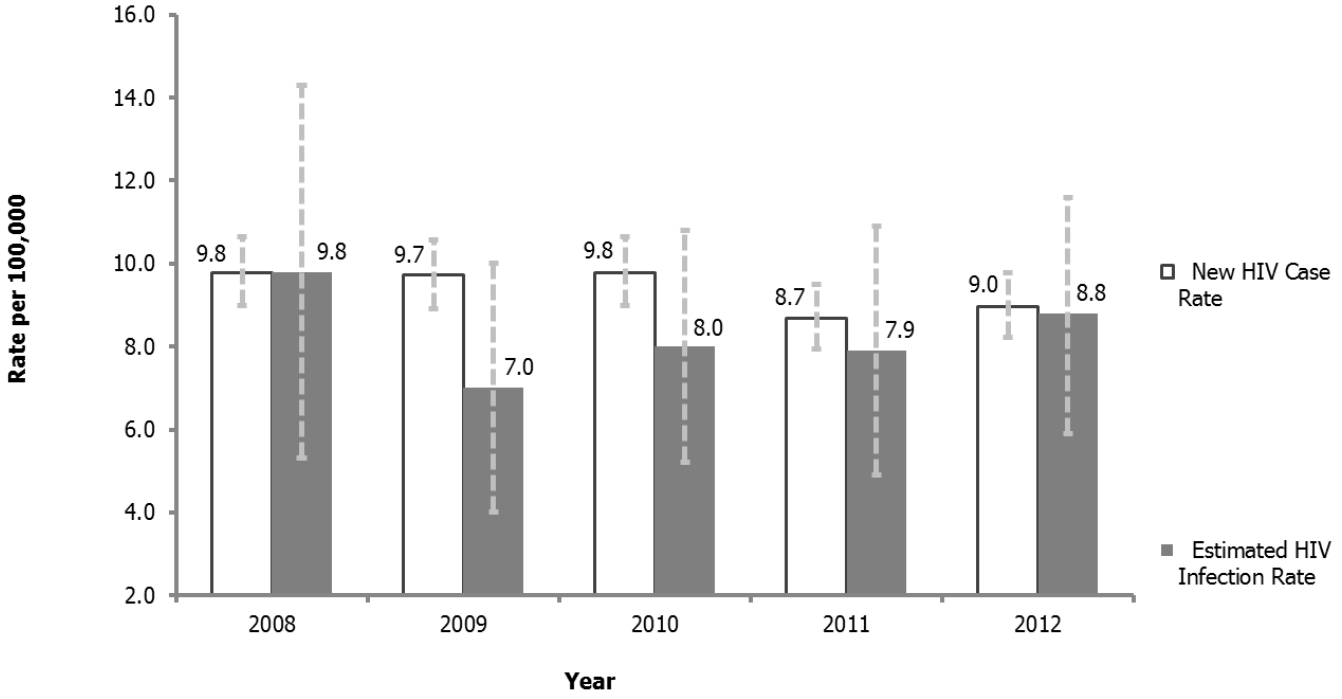



**Figure 6. New HIV diagnosis rates vs. estimated HIV infection rates, Washington State, 2008-2012**



# Trends from the Seattle Pride Survey, 2009-2014

The majority (78%) of persons living with HIV in King County are men who have sex with men (MSM). To inform prevention initiatives that target this key population, Public Health – Seattle & King County (PHSKC) conducts an annual survey at the Seattle Pride parade, an event that draws thousands of participants and spectators, many of whom are MSM. Trained interviewers, disbursed along the parade route, approach parade participants and spectators, briefly explain the purpose of the survey and the $5 coffee card incentive, and ask whether the person "identifies as a man who has sex with men." Persons answering affirmatively and indicating their willingness to complete the survey are offered the survey, which could be self- or interviewer-administered. Since 2009, 2,095 MSM at the parade have completed the survey.

The survey assesses: risk behaviors, access to and utilization of health services, and awareness and attitudes pertaining to HIV prevention strategies/ campaigns. In this article, we focus on two topics: (1) the potential impact of the Affordable Care Act (ACA) on MSM in Seattle, and (2) awareness and utilization of HIV prevention innovations. Survey responses are summarized using descriptive statistics. Adjusted measures of association, including adjusted odds ratios or aOR and their 95% confidence intervals (CI), were generated from multivariate logistic and linear regression models.

## Insurance status of pride survey respondents following implementation of the Affordable Care Act

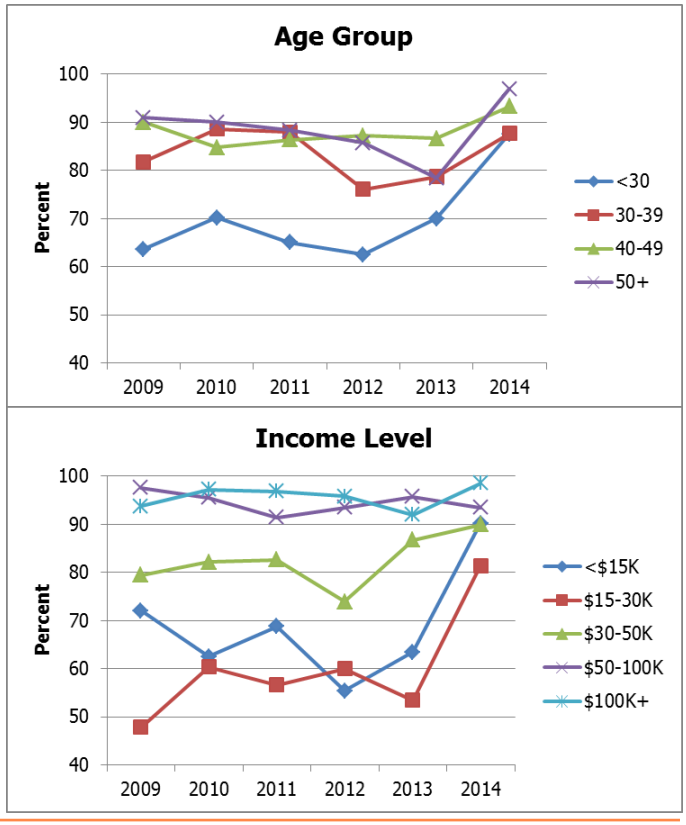
The Affordable Care Act (ACA) was established to improve the quality, accessibility, and cost of health care in the United States. Washington ranked among the top 10 states on two Kaiser Family Foundation ACA implementation metrics: proportion of uninsured selecting an insurance plan through exchange, and percent change in Medicaid enrollment. To assess how ACA might have impacted men who have sex with men (MSM) in Seattle, we compared Pride Survey responses by year.

The proportion of respondents with health insurance increased significantly in 2014, especially among young and low-income respondents (**Figure 1**). Controlling for age, race, education, income, and HIV risk, respondents in 2014 were significantly more likely to be insured than respondents in prior years (aOR= 3.3, 95% CI= 2.3 - 4.7, p<0.0001). The income disparity in insurance status narrowed considerably in 2014. The percent insured among respondents with an annual income <$30,000 increased from 59% in 2013 to 86% in 2014. Sixteen percent of respondents reported having used the Washington HealthPlanFinder (State ACA) website, and 12% enrolled in an insurance plan via the website. In 2014, 18% of respondents reported that their health care had improved as a result of ACA; 6% reported that their health care had worsened. After controlling for age and HIV risk level, health insurance status was significantly associated with STD testing in the prior 12 months (aOR=2.1, 95% CI=1.1 - 4.0, p=0.03) but was unassociated with HIV testing in the prior 2 years (p=0.25). The percent of insured and uninsured respondents *without* a regular medical provider was 17% and 53%, respectively.

**Conclusions:**

The proportion of low-income Seattle MSM with health insurance increased dramatically with institution of the ACA. Despite this, nearly a quarter of MSM reported not having a regular medical provider, highlighting the need to link all MSM to medical care.

**Figure 1. Percent of HIV-Negative Pride Survey Respondents who Possessed Health Insurance, 2009-2014, by Age Group and Income Level**

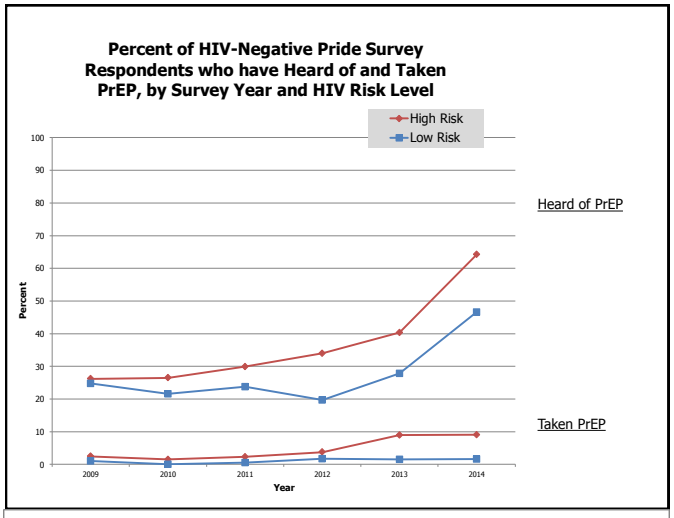


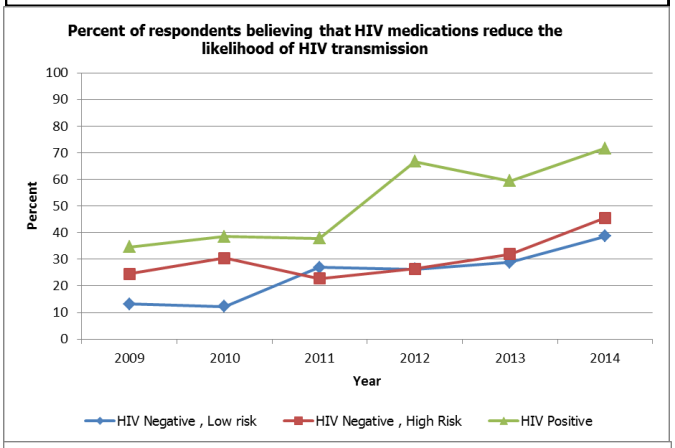
# Awareness & utilization of HIV prevention innovations among HIV-negative Pride Survey respondents

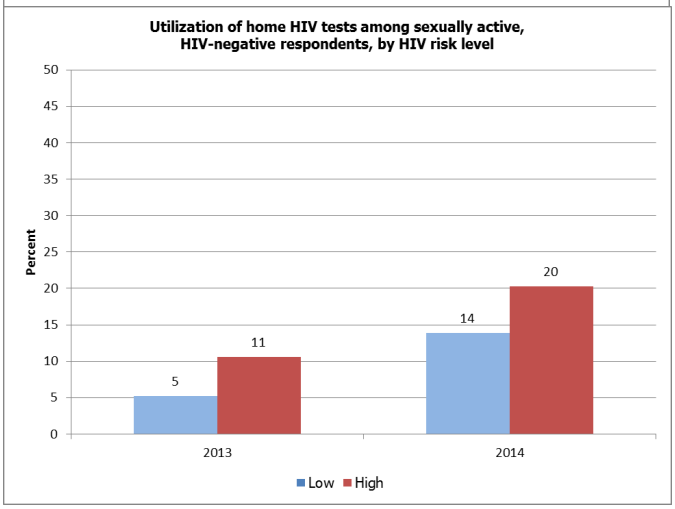
Biomedical interventions have garnered the focus of HIV prevention research and programs. With the efficacy of pre-exposure prophylaxis (PrEP) and 'treatment as prevention' (TasP) well established, health agencies have released revised budgets and clinical guidelines for prophylactic and therapeutic use of antiretroviral therapies. Meanwhile, HIV testing options expanded to include home test kits, which became commercially available in the US in 2012. Home test kits were distributed for free starting with the 2013 Pride parade as part of a local campaign led by Gay City, a Seattle non-governmental organization conducting HIV testing. We assessed awareness and utilization of these innovations among Pride Survey respondents. Between 2009 and 2014 (n=2,095), 91% of Pride survey MSM participants had ever tested for HIV, 63% of sexually active, HIV-negative men tested ≥2 times in the past 2 years; these percentages were stable across survey years. Between 2013 and 2014, use of home HIV tests among sexually active, HIV-negative men increased from 8% to 17%. Year of survey and elevated HIV risk were associated with home HIV testing.

Between 2009 and 2014, awareness of PrEP and TasP increased significantly: the proportion of HIV-uninfected respondents who had heard of PrEP increased from 25% to 51% ($p < 0.0001$); the proportion of HIV uninfected and infected men believing that HIV medications reduce the likelihood of HIV transmission increased from 17% to 40% and from 35% to 72%, respectively ($p<.0001$ for both). Respondents were considered "high HIV risk" if they reported an STD diagnosis, methamphetamine or popper use, 10+ sex partners, or non-concordant condomless anal sex in last year. Higher levels of awareness of PrEP and TasP were associated with high HIV risk, higher income and educational attainment, and more recent year of survey. PrEP was utilized by 44 respondents. Among high-risk MSM without a prior HIV diagnosis, utilization of PrEP increased from 2% in 2009 to 9% in 2014 ($p=.003$). Higher income was also significantly associated with PrEP use.

**Conclusions**:
In this sample of MSM, awareness of PrEP and TasP has increased substantially. Use of PrEP and home testing has also increased, though PrEP use remains relatively low. While these findings are encouraging, use of home testing in this population may be cause for concern due to low test sensitivity.




**Contributed by Julia Hood**


1. Kaiser Family Foundation. State Health Facts. Health Reform. Available at: http://kff.org/health-reform/state-indicator/marketplace-enrollment-as-a-share-of-the-potential-marketplace-population/. Accessed 10/1/2014
2. Kaiser Family Foundation. State Health Facts. Health Reform. Available at http://kff.org/health-reform/state-indicator/total-monthly-medicaid-and-chip-enrollment/ Accessed 10/1/2014

# Highlights from the 2013 Seattle area NHBS survey of persons at increased risk of heterosexually transmitted HIV infection

In the United States an estimated 49,273 persons were diagnosed with HIV infection in 2011.[1] Twenty-seven percent of these cases occurred as a result of heterosexual transmission (defined as heterosexual contact with a person known to have, or to be at high risk for, HIV infection), including 86% of female cases and 12% of male cases. There are considerable racial disparities in HIV infection. In 2011, the estimated rate of new HIV diagnoses in African American males nationwide was 113/100,000 compared to 15/100,000 among white males and 31/100,000 among all males. Nineteen percent of cases among African American males were attributed to heterosexual transmission compared to 4% of cases among white males.[1] Among African American females, the estimated 2011 HIV rate was 40/100,000 compared to 2/100,000 among white females.[2] HIV epidemiology varies across the country. In King County where male-to-male sexual contact is the predominant transmission route, 8% of cases with known risk factors that were diagnosed 2010-2012 were attributed to heterosexual contact.[3] Heterosexual transmission accounted for 1% of cases among males, 75% of cases among females and 22% among cases born outside the U.S.

The Centers for Disease Control and Prevention (CDC) sponsors the National HIV Behavioral Surveillance System (NHBS) to monitor HIV-related risk behaviors and seroprevalence and to assess the use of prevention services in three groups at increased risk for HIV infection: men who have sex with men (MSM), persons who inject drugs (PWID) and heterosexuals at increased risk (HET).[4] Each population is surveyed every third year using a common protocol and questionnaire. Twenty Metropolitan Statistical Areas (MSAs) participated in the 2013 NHBS-HET3 survey. These MSAs were chosen based on their high prevalence of AIDS cases. This report describes findings from the 2013 Seattle area NHBS-HET3 survey.

## Methods

The aim of NHBS is to survey populations at highest risk for HIV. While the NHBS MSM and PWID survey populations are defined by behaviors (male-male sex and injection drug use), which are directly associated with HIV transmission, there is no analogous behavioral definition for the NHBS HET population. To develop a definition, CDC conducted a review of the literature, held a series of expert consultations and analyzed data from the 2007 HET1 pilot study in 24 NHBS sites.[5] CDC judged that social-structural variables were the most effective way to identify a representative sample of heterosexuals at increased risk of HIV. The definition targets persons of low socioeconomic status, which is defined as having an income at or below the Department of Health and Human Services poverty guidelines or no more than a high school education.

NHBS-HET3 used respondent-driven sampling (RDS) to recruit participants. RDS is a form of snowball sampling where participants are paid a small incentive to recruit a limited number of their network members to the study. Recruitment starts with a small number of participants ("seeds") of diverse sociodemographic characteristics who are asked to recruit 3-5 of their peers for the study. These referrals are screened for eligibility and those who complete the study are asked to recruit a new wave of participants. RDS is based on the theory that if peer recruitment proceeds through a sufficiently large number of waves, the composition of the sample will overcome any bias that may have been introduced by the nonrandom selection of seeds.[6,7] RDS data can be adjusted during analysis to reduce biases associated with differential recruitment patterns and network sizes to produce prevalence estimates of variables of interest. We present unadjusted data for this report.

Following the CDC protocol, we identified the 25% of the 397 King County census tracts with the highest proportion of residents below the Census Bureau's poverty threshold to help guide decisions on interview field office location and recruitment of seeds. These 99 census tracts were scattered across the western part of the county with the poorest tracts in the University District, Downtown and South Seattle, and South King County.

Potential participants were screened for eligibility. Those who met the survey eligibility criteria of being 18 to 60 years of age, having had sex with a person of the opposite gender in the past 12 months, living in King or Snohomish County, and being able to complete the survey in English or Spanish were invited to participate in the study. After obtaining informed consent, study interviewers administered a 30-35 minute risk behavior survey using tablet computers to record responses. Participants were offered HIV counseling and rapid testing. Confirmatory testing using Western Blot was performed on specimens from rapid tests with reactive results. At the end of the study session they were given coupons to distribute to

members of their social networks. Only participants who met the low socioeconomic criteria described above and who had not injected illicit drugs in the past 12 months were eligible to recruit others. Participants received a monetary incentive and information about HIV prevention and social and health services. No names were collected and the study was approved by

## Results

***Recruitment***: We recruited 10 seeds of different demographic characteristics from census tracts with higher proportions of poverty. Six of the seeds provided referrals leading to a total of 670 eligible participants over 19 waves of recruitment. Eighty percent of the referrals derived from a single seed and 16% from one other seed. For this analysis we focused on participants of low socioeconomic status according to the CDC definition and excluded men who reported ever having sex with men and persons who reported ever injecting drugs, leaving data from 402 participants (including seeds) for inclusion in the analysis.

***Demographic and socioeconomic characteristics:*** The 402 participants resided in 43 different zip codes and 68 different census tracts (**Figure 1**). Fifty-six percent of the participants came from zip codes 98104, 98118, 98122 located in Downtown, Central and South Seattle, respectively. Of the 402 participants, 62% were male and 38% were female (**Table 1**). The median age was 41 years, similar to the age distribution among the 18-60 year old King County population. The sample was predominantly African American (64%), compared to 6% of the King County population. Among the 39 (10%) who reported multiple races, 51% included African American and Native American, 46% African American and white, and 31% Native American and white as their racial backgrounds. Seventeen percent of participants were born abroad, primarily in African countries (74%). The percentage of foreign born participants was slightly lower than the King County population as a whole (20%). Educational attainment and income were much lower than the general population, which was not surprising considering the eligibility criteria for the sample (**Table 2**). Seventy-six percent had graduated from high school compared to 92% countywide and 22% had education beyond high school compared to 77% of the 25-44 year old population. Thirty-five percent of the sample was unemployed compared to 8% of the general King County population. Over half (54%) reported being homeless either currently or at some point in the last 12 months. One-quarter had been incarcerated in the last 12 months.

***Healthcare coverage:*** Thirty-eight percent lacked health care coverage compared to 14% of the general population and this percentage did not change significantly over the course of the survey (**Table 2**). The vast majority of those with coverage had Medicaid. Among the 154 without current health insurance, 148 responded to local questions about health care coverage issues. Seventeen percent of those reported having had coverage in the past year, 23% two to three years ago, 42% more than three years ago, and 18% never. Twenty-five percent of those without current coverage reported not taking prescribed medication because of the cost and 26% had medical bills that were being paid off over time (data not shown in tables). In logistic regression analysis of demographic and socioeconomic factors associated with health care coverage, we found that those who were female, 40 years and older, on disability and not currently homeless were significantly more likely to have health care coverage (data not shown in tables).

***Substance use behaviors:*** Almost three-quarters of the sample reported use of an illicit drug during the last 12 months (**Table 3**). The most common drug was marijuana (65%) followed by crack cocaine (27%), powder cocaine (18%), and painkillers (18%). Over half binged on alcohol once in the last 30 days and 30% on four or more occasions. Slightly less than half of the sample had been in alcohol treatment and 40% had been in drug treatment at some point in their lives.

***Sexual identity and sexual behaviors:*** Among women, 24% identified as bisexual and 1% as lesbian (data not shown in tables). One man reported identifying as bisexual, but also reported never having sex with other men. Over 80% reported more than one sex partner and 45% reported five or more sex partners in the last year (**Table 4**). Males were more likely than females to report five or more sex partners, and in particular casual sex partners ($p<0.01$). Almost everyone (92%) reported vaginal or anal sex without a condom in the last 12 months, including 60% with a partner of opposite or unknown HIV status. Thirty-eight percent reported engaging in sex in exchange for money or drugs in the last 12 months.

A series of more detailed questions asked about the last sexual encounter. Two-thirds of the sample did not know the HIV status of their last sexual partner even though 50% reported that their last sex partner was a main partner ("someone you feel committed to above anyone else"). Overall, 51% reported vaginal or anal sex without a condom with a partner of opposite or unknown HIV status at their last sexual encounter, including 22% with a main and 29% with a casual partner. Among participants with more than one sex partner in the last 12 months, 70% had sex without a condom at their last sexual encounter (data not shown in tables).

Fifty-nine percent reported having concurrent sexual relationships based on responses to questions of the form "During the time when you were having a relationship with this partner (their last sex partner), did you have sex with other people?" Over half reported use of alcohol (25%), drugs (8%) or both alcohol and drugs (21%) at their last sexual encounter.

Associations of high risk sexual behavior defined as vaginal or anal sex without a condom with a partner of opposite or unknown HIV status in the last 12 months were examined using logistic regression analysis to control for demographic and socioeconomic variables. Gender, current health care coverage and having been homeless in the last 12 months were the only variables significantly and independently associated with such high risk sex in logistic regression models. Men were more likely than women to report this high risk behavior as were those without health care coverage and those who had been homeless in the last 12 months (**Table 5**). After controlling for gender, health care coverage and homelessness, participants who reported two or more sex partners in the last 12 months, a casual partner at their last sexual encounter, binging on alcohol on at least four occasions in the last 30 days, or using drugs during their last sexual encounter were significantly more likely to report sex without a condom with a partner of unknown HIV status in the last year.

***HIV prevalence and testing and participation in HIV prevention programs:*** Three (0.8%) of the 402 participants tested HIV positive (**Table 6**). HIV prevalence was 0.4% among males and 1.3% among females. Two of the three participants reported already knowing their HIV-positive status. All three positive participants were born in the U.S. Overall, 73% had ever been tested for HIV, including 27% in the last 12 months. The most common locations for HIV testing were community health centers or public health clinics (46%). Few had participated in individual level (6%) or group level (4%) HIV prevention programs in the last 12 months (data not shown in tables). Of the 78% who reported having visited a healthcare provider in the last 12 months, 28% had been recommended HIV testing.

We also examined factors associated with having had an HIV test in the last 12 months after controlling for demographic and socioeconomic variables in logistic regression analyses. Gender and incarceration in the last 12 months were the only two variables that were significantly and independently associated with having had an HIV test in the last 12 months (**Table 7**). Women were more likely than men and those who had been incarcerated were more likely than those who had not been incarcerated to have had an HIV test. After control for gender and incarceration, participants who reported vaginal or anal sex with a partner of opposite or unknown HIV status in the last 12 months or with their last sex partner, did not know the HIV status of their last sex partner, whose last sexual encounter was with a casual partner, or who used alcohol at their last sexual encounter were significantly less likely to have had an HIV test in the last 12 months. Those who reported using marijuana or who were diagnosed with a sexually transmitted disease (STD) in the last 12 months were significantly more likely to have had an HIV test in the last 12 months.

***Other health-related issues:*** Female participants were more likely than male participants to report diagnosis with a sexually transmitted disease in the last 12 months (14% vs. 5%, $p<0.01$) and more likely to have been vaccinated against hepatitis B (41% vs. 22%, $p<0.01$). However, hepatitis B vaccination appeared to be greatly underreported since only 53% of 18 to 29 years old participants reported vaccination even though the majority of that age group should have been vaccinated as children or adolescents. Vaccine for human papillomavirus (HPV) has been recommended for use in 9-26 year old females since June 2006 and for males 9-21 years old (22-26 years old for MSM) since October 2009.[8] Among the 57 female participants 33 years or younger in our study who would have been eligible for HPV vaccine, 33% reported having been vaccinated. Only two males reported HPV vaccination.

## Comments

CDC based its definition of the NHBS HET survey population on the proposition that populations of lower socioeconomic status are at elevated risk for heterosexually transmitted HIV. An analysis of data from the 24 NHBS-HET1 sites indicated that among a study population of low socioeconomic status, HIV prevalence was highest among those with lower educational attainment, the unemployed, and those with incomes below the poverty level.[5] The Seattle-area NHBS-HET3 survey successfully recruited a study population with low income and educational attainment and high levels of homelessness, unemployment and incarceration, which constitute a group presumed to be at risk for heterosexually transmitted HIV based on national data.

The Seattle-area NHBS-HET3 sample reported elevated levels of sexual and drug-associated risk behaviors. Almost half (45%) reported five or more sex partners in the last year compared to 2.8% of 15-44 year old respondents in the National Survey of Family Growth (NSFG).[9] Among NHBS-HET3 participants 70% of those with two or more sex partners reported sex without a condom at their last sexual encounter compared to 56% of 18-49 year old respondents in the

2010 Washington State Behavioral Risk Factor Surveillance System (BRFSS).[10] While 73% of NHBS-HET3 participants reported ever testing for HIV, (well above the 43% of adults ages 13–64 years reported by the 2011 BRFSS),[10] participants who practiced sexual behaviors that put them at higher risk for HIV were less likely to have tested for HIV. Use of non-injection drugs and binge drinking were much more prevalent in our survey than among the general population. According to data from the 2005-2010 National Survey on Drug Use and Health (NSDUH), 19% in the Seattle-Tacoma-Bellevue MSA had used an illicit drug, 14% marijuana and 7% non-medical pain relievers in the past year compared to 73%, 65% and 18% of the NHBS-HET3 participants, respectively.[11.] Alcohol binging was 22% in the NSDUH sample compared to 54% in the NHBS-HET3 sample.

A very high proportion of the NHBS-HET3 sample lacked health care coverage even though many may have been eligible for Medicaid. Hopefully, they will be able to benefit from Medicaid and subsidized care under the Affordable Care Act.

HIV prevalence was 0.8% in NHBS-HET3, which is similar to the prevalence seen in the 2007 and 2010 Seattle area NHBS HET surveys.[12,13] The Seattle prevalence was comparable to that in NHBS-HET2 sites in the West (0.4%, 95% CI=0.2-0.8) and Midwest (0.5%, 95% CI=0.2-1.0), but well below that seen in NHBS sites in the Northeast (4.1%) and the South (3.9%).[14] HIV prevalence is estimated to be 0.05% among heterosexual adults in King County overall (Susan Buskin, personal communication). In King County there is currently little evidence for increasing rates of heterosexual transmission. In fact, there was a significant decline in the rate of heterosexually transmitted cases reported in King County from 4.1/100,000 in 2003 to 3.1/100,000 in 2012. There is some evidence that in King County, as elsewhere, low socioeconomic status is associated the heterosexually transmitted HIV. King County heterosexual cases are disproportionately African American and we previously found a modest but statistically significant correlation between the rate of reported heterosexual HIV cases and the proportion of households living below the poverty level in those King County census tracts ($\beta$=0.32; p<.001).[15] The high levels of sexual and drug associated risk behaviors we found in the NHBS-HET3 sample suggest that, once established, HIV could be transmitted efficiently in the local heterosexual population. The NHBS HET surveys thus provide a means of monitoring trends in behavior and HIV prevalence in a population with potential to become a significant public health concern.

***Contributed by: Hanne Thiede, Richard Burt, Carrie Shriver and Courtney Moreno***

*We would like to acknowledge the Seattle area NHBS-HET3 interviewers for their great work: Titus Chembukha, Victor Cruz, Lilly Hankins, Emerin Hatfield, Jake Ketchum, Rachel Patrick, Taylor Sheehan-Farley, and George Ure. We are also grateful to the participants for volunteering their time.*

**References**

1. Centers for Disease Control and Prevention. HIV Surveillance Report, 2011; vol. 23. Published February 2013. Table 3a. Available at http://www.cdc.gov/hiv/library/reports/surveillance/2011/surveillance_Report_vol_23.html
2. Centers for Disease Control and Prevention. HIV Surveillance by Race/Ethnicity (through 2011) slide set. Available at http://www.cdc.gov/hiv/pdf/statistics_surveillance_raceEthnicity.pdf
3. HIV/AIDS Epidemiology Report, 2013, 1st Half , Table 8. Available at http://www.kingcounty.gov/healthservices/health/communicable/hiv/epi/reports.aspx
4. Gallagher KM, Sullivan PS, Lansky A, Onorato IM. Behavioral surveillance among people at risk for HIV infection in the U.S.: the National HIV Behavioral Surveillance System. Public Health Rep. 2007;122 Suppl 1:32-38.
5. DiNenno EA, Oster AM, Sionean C, Denning P, Lansky A. Piloting a system for behavioral surveillance among heterosexuals at increased risk of HIV in the United States. Open AIDS J 2012;6:169–76. Available at http://benthamopen.com/toaidj/articles/V006/SI0065TOAIDJ/169TOAIDJ.pdf
6. Hackathorn DD. Respondent-driven sampling II: Deriving valid population estimates from chain-referral samples of hidden populations. Social Problems. 2002; 29:11-34.
7. Salganik M, et al. Sampling and estimation in hidden populations using respondent-driven sampling. Sociological Methodology. 2004;34:193-240.
8. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report. Human Papillomavirus Virus Vaccination: Recommendations of the Advisory Committee on Immunization Practices (ACIP). August 29, 2014 / 63(RR05);1-30 Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6305a1.htm#tab1.
9. Sexual Health of Washington State, Washington Department of Health, updated 8/23/2013. Available at http://www.doh.wa.gov/Portals/1/Documents/5500/RPF-Sex2013.pdf.
10. Centers for Disease Control and Prevention. Key Statistics from the National Survey of Family Growth. Table 1. Available at http://www.cdc.gov/nchs/nsfg/key_statistics/s.htm#sexualactivity .
11. Substance Use and Mental Disorders in Metropolitan Areas: Results from the 2005-2010 National Survey on Drug Use and Health. 5/13/2014. Available at: http://www.samhsa.gov/data/sites/default/files/NSDUHMetroBriefReports/NSDUHMetroBriefReports/NSDUH_Metro_Tables.pdf.
12. Burt R, Snyder N, Thiede H. Results from the National HIV/AIDS Behavioral Survey of persons at high risk for heterosexually transmitted HIV in the Seattle area, 2007. HIV/AIDS Epidemiology Report 2nd Half 2008: 9-19. Available at http://www.kingcounty.gov/healthservices/health/communicable/hiv/epi/reports.aspx.
13. Thiede H, Burt R, Snyder N. Highlights from the 2010 Seattle area NHBS survey of persons at increased risk of heterosexually transmitted HIV infection. HIV/AIDS Epidemiology Report 1st Half 2011:33-42. Available at http://www.kingcounty.gov/healthservices/health/communicable/hiv/epi/reports.aspx.
14. CDC MMWR. HIV infection among heterosexuals at increased risk – United States, 2010. March 15,2013**/62(10);183-188.** Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6031a1.htm?s_cid=mm6031a1_w.
15. Thiede H, Burt R. Seattle area NHBS-HET2 Secondary Data Report, February 2010. Available from the authors upon request.

**Figure 1. Resident zip codes of participants in the 2013 Seattle Area NHBS-HET3 survey**

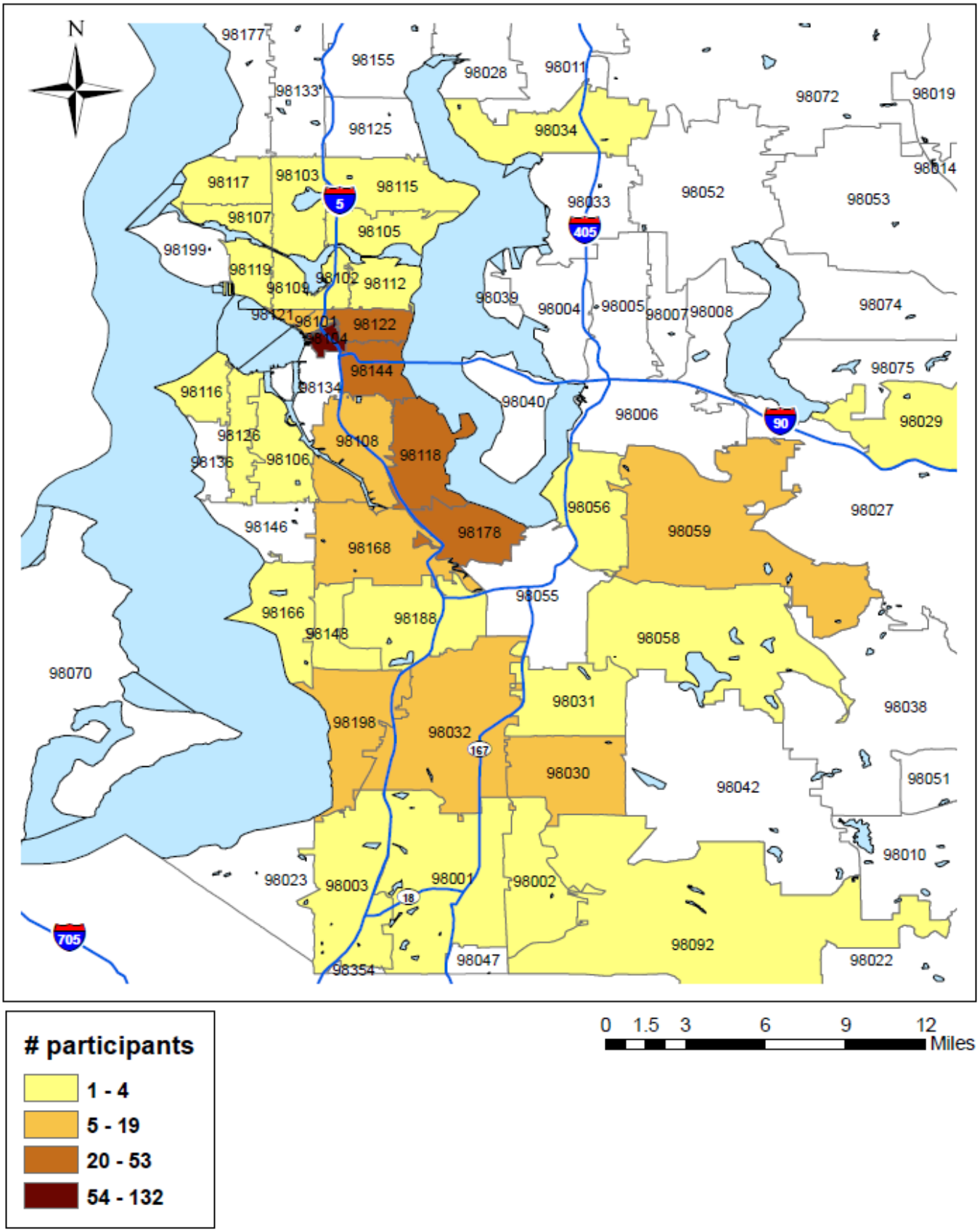


**Table 1. Demographic characteristics of participants in the 2013 Seattle area NHBS-HET3 survey**

| Characteristics | 2013 NHBS-HET3 N=402 | | King County population[1] 1,226,923 (18 – 60 years) |
|---|---|---|---|
| | n | % | |
| **Gender** | | | |
| Male | 250 | 62% | 51% |
| Female | 152 | 38% | 49% |
| **Age (years)** | | | |
| 18 – 29 | 99 | 25% | 26% |
| 30 – 39 | 81 | 20% | 25% |
| 40 – 49 | 116 | 29% | 24% |
| 50 – 60 | 106 | 26% | 25% |
| **Race/ethnicity** | | | |
| White non-Hispanic | 62 | 15% | 65% |
| Black non-Hispanic | 259 | 64% | 6% |
| Hispanic | 22 | 5% | 9% |
| Native American | 8 | 2% | 1% |
| Asian/Pacific Islander | 12 | 3% | 16% |
| Multiple races | 39 | 10% | 3% |
| **Foreign born** | | | |
| Yes | 68 | 17% | 20% |

[1] The gender, age and race/ethnicity data are from 2012 population estimates for King County residents aged 18-60 years old from Washington State Department of Health and Krupski Consulting (Community Health Assessment Tool). Foreign born residents data are from 2013 U.S. Census State and County QuickFacts available at http://quickfacts.census.gov/qfd/states/53/53033.html

**Table 2. Socioeconomic characteristics of participants in the 2013 Seattle area NHBS-HET3 survey**

| Characteristics | 2013 NHBS-HET3 N=402 | | King County population[1] 1,226,923 (18 – 60 years) |
|---|---|---|---|
| | n | % | |
| **Education** | | | |
| Less than high school | 96 | 24% | |
| High school | 216 | 54% | 92% |
| Post high school | 90 | 22% | 77% (25-44 year old pop.) |
| **Yearly income** | | | |
| <$5,000 | 146 | 37% | Per capita median $39,664 |
| $5,000 - $9,999 | 106 | 26% | Household median $71,175 |
| $10,000 - $19,999 | 99 | 25% | |
| $20,0000+ | 50 | 12% | |
| **Employment status** | | | |
| Disabled for work | 122 | 30% | |
| Unemployed | 141 | 35% | 8% |
| Full or part time | 71 | 18% | |
| Other | 68 | 17% | |
| **Incarcerated** | | | |
| Ever | 305 | 76% | |
| Last 12 months | 109 | 27% | |
| **Marital status** | | | |
| Never married | 258 | 64% | |
| Divorced/separated/widowed | 115 | 29% | |
| Married/domestic partner | 29 | 7% | |
| **Homeless[2]** | | | |
| Currently | 143 | 36% | |
| Other time last 12 months | 75 | 19% | |
| Not homeless last 12 months | 183 | 46% | |
| **Health care coverage** | | | |
| None | 154 | 38% | 14% |
| Private | 15 | 4% | |
| Medicaid/Medicare | 213 | 53% | |
| Other | 20 | 5% | |

1. High school graduates (persons 25+ years) and per capita and median household income (2008-2012, 2012 dollars) data for King County are from 2013 U.S. Census State and County QuickFacts available at http://quickfacts.census.gov/qfd/states/53/53033.html. Post high school education, employment, health insurance data for King County are from University of Wisconsin County health rankings. Available at http://www.countyhealthrankings.org/washington/king.
2. Homeless was defined as "living on the street, in a shelter, a single occupancy room hotel, or in a car."

Categories may not add up to total because of missing data for individual variables.

**Table 3. Substance use behaviors among participants in the 2013 Seattle area NHBS-HET3 survey**

| Substance use behaviors | N=402 | |
|---|---|---|
| | n | % |
| **Any non-injection drug use** | | |
| Yes | 292 | 73% |
| **Use of most common drugs last 12 months** | | |
| Marijuana | 262 | 65% |
| Crack cocaine | 108 | 27% |
| Powdered cocaine | 73 | 18% |
| Painkillers (i.e. Oxycontin, Vicodin, Percocet) | 73 | 18% |
| Ecstasy | 37 | 9% |
| Methamphetamine | 33 | 8% |
| Downers (i.e.Valium, Ativan, Xanax) | 25 | 6% |
| **Alcohol use** | | |
| Binged once in last 30 days[1] | 215 | 54% |
| Binged 4+ times in last 30 days[1] | 122 | 30% |
| **Alcohol treatment** | | |
| Never | 215 | 53% |
| Yes, but not in the last 12 months | 115 | 29% |
| Yes, in the last 12 months | 72 | 18% |
| **Drug treatment** | | |
| Never | 243 | 60% |
| Yes, but not in the last 12 months | 96 | 24% |
| Yes, in the last 12 months | 63 | 16% |

[1]Four or more drinks in one setting for women and five or more drinks in one setting for men.

**Table 4. Sexual behaviors among participants in the 2013 Seattle area NHBS-HET3 survey**

| Sexual behaviors | Males N=250 | | Females N=152 | | Total N=402 | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| ***Last 12 months*** | | | | | | |
| **Number of sex partners** | | | | | | |
| 1 | 33 | 13% | 40 | 26% | 73 | 18% |
| 2-4 | 89 | 36% | 60 | 39% | 149 | 37% |
| 5+ | 128 | 51% | 52 | 34% | 180 | 45% |
| **Number of main sex partners[1]** | | | | | | |
| 0 | 87 | 35% | 30 | 20% | 117 | 29% |
| 1 | 96 | 38% | 92 | 61% | 188 | 47% |
| 2-4 | 57 | 23% | 28 | 18% | 85 | 21% |
| 5+ | 10 | 4% | 2 | 1% | 12 | 3% |
| **Number of casual sex partners[2]** | | | | | | |
| 0 | 41 | 16% | 43 | 28% | 84 | 21% |
| 1 | 34 | 14% | 30 | 20% | 64 | 16% |
| 2-4 | 61 | 24% | 42 | 28% | 103 | 26% |
| 5+ | 114 | 46% | 37 | 24% | 151 | 38% |
| **Any vaginal or anal sex without a condom** | | | | | | |
| Yes | 224 | 90% | 143 | 94% | 367 | 92% |
| **Vaginal or anal sex without a condom with partner of opposite or unknown HIV status** | | | | | | |
| Yes | 156 | 66% | 75 | 50% | 231 | 60% |
| **Any sex in exchange for money or drugs** | | | | | | |
| Yes | 95 | 38% | 58 | 38% | 153 | 38% |
| ***Last sexual encounter*** | | | | | | |
| **Partner type[1]** | | | | | | |
| Main partner | 102 | 41% | 101 | 66% | 203 | 50% |
| Casual partner | 148 | 59% | 51 | 34% | 199 | 50% |
| **HIV status of sex partner (vaginal or anal sex)** | | | | | | |
| Positive | 2 | <1% | 0 | 0 | 2 | <1% |
| Negative | 74 | 30% | 64 | 42% | 138 | 34% |
| Unknown | 174 | 70% | 88 | 58% | 262 | 65% |
| **Vaginal or anal sex without a condom** | | | | | | |
| Overall | 172 | 69% | 112 | 75% | 284 | 71% |
| With main partner | 76 | 31% | 82 | 55% | 158 | 40% |
| With casual partner | 96 | 38% | 30 | 20% | 126 | 31% |
| **Vaginal or anal sex without a condom with partner of opposite/unknown HIV status** | | | | | | |
| Overall | 137 | 55% | 68 | 45% | 205 | 51% |
| With main partner | 48 | 19% | 40 | 26% | 88 | 22% |
| With casual partner | 89 | 36% | 28 | 19% | 117 | 29% |
| **Concurrent sex partners** | | | | | | |
| Yes | 142 | 61% | 80 | 56% | 222 | 59% |
| **Substance use** | | | | | | |
| No alcohol or drug use | 103 | 41% | 78 | 51% | 181 | 45% |
| Alcohol | 70 | 28% | 32 | 21% | 102 | 25% |
| Drugs | 17 | 7% | 16 | 11% | 33 | 8% |
| Both alcohol and drugs | 60 | 24% | 26 | 17% | 86 | 21% |

[1] Main sex partner: "Someone you feel committed to above anyone else. This is a partner you would call your girlfriend/boyfriend, wife/husband, significant other or life partner."
[2] Casual sex partner: "Someone you don't feel committed to or don't know very well."
Categories may not add up to total because of missing data for individual variables.

**Table 5. Factors associated with high risk sex (vaginal or anal sex without a condom with partner of unknown or opposite HIV status in the last 12 months) among participants in the 2013 Seattle area NHBS-HET3 survey**

| High risk sex in the last 12 months | | | | | |
|---|---|---|---|---|---|
| **Characteristics and behaviors** | **n/N** | **%** | **OR[2]** | **95% CI** | **p-value** |
| **Total[1]** | 231/387 | 60% | | | |
| **Gender** | | | | | |
| Male | 156/236 | 66% | 1.0 | | |
| Female | 75/151 | 50% | 0.6 | 0.4-0.9 | 0.02 |
| **Current health insurance** | | | | | |
| No | 103/147 | 70% | 1.0 | | |
| Yes | 128/240 | 53% | 0.6 | 0.4-0.9 | 0.01 |
| **Homeless last 12 months** | | | | | |
| No | 92/180 | 51% | 1.0 | | |
| Yes | 139/207 | 67% | 1.7 | 1.1-2.6 | 0.01 |
| **Number of sex partners last 12 months** | | | | | |
| 1 | 28/73 | 38% | 1.0 | | |
| 2-4 | 80/141 | 57% | 1.9 | 1.04-3.4 | 0.04 |
| 5+ | 123/173 | 71% | 3.0 | 1.6-5.5 | <0.01 |
| **Partner type at last sexual encounter[3]** | | | | | |
| Main | 101/199 | 51% | 1.0 | | |
| Casual | 130/188 | 69% | 1.8 | 1.1-2.7 | 0.01 |
| **Binged 4+ times in last 30 days[4]** | | | | | |
| No | 148/271 | 55% | 1.0 | | |
| Yes | 83/116 | 72% | 1.7 | 1.1-2.8 | 0.03 |
| **Drug use during last sexual encounter** | | | | | |
| No | 152/274 | 55% | 1.0 | | |
| Yes | 79/113 | 70% | 1.6 | 1.0-2.6 | 0.049 |

[1] Among 387 participants with data on the high risk sex variable.
[2] All odds ratios are controlled for sex, current health insurance and being homeless in the last 12 months.
[3] Main sex partner: "Someone you feel committed to above anyone else. This is a partner you would call your girlfriend/boyfriend, wife/ husband, significant other or life partner." Casual sex partner: "Someone you don't feel committed to or don't know very well."
[4] Four or more drinks in one setting for women and five or more drinks in one setting for men.

**Table 6. HIV and health-related characteristics among participants in the 2013 Seattle area NHBS-HET3 survey**

| Health-related characteristics | Males N=250 | | Females N=152 | | Total N=402 | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| **HIV status** | | | | | | |
| Negative by serology | 249 | 99.6% | 150 | 98.7% | 399 | 99.3% |
| Positive by serology (confirmed) | 1 | 0.4% | 2 | 1.3% | 3 | 0.8% |
| Self-reported HIV positive | 1 | 0.4% | 1 | 0.7% | 2 | 0.5% |
| **Most recent HIV test[1]** | **N=243** | **%** | **N=145** | **%** | **N=388** | **%** |
| 0-6 months | 23 | 9% | 31 | 21% | 54 | 14% |
| 7-12 months | 27 | 11% | 24 | 17% | 51 | 13% |
| 13-24 months | 30 | 12% | 17 | 12% | 47 | 12% |
| > 24 months | 83 | 34% | 50 | 34% | 133 | 34% |
| Never | 80 | 33% | 23 | 16% | 103 | 27% |
| **Location of most recent HIV test in last 5 years[2]** | **N=119** | **%** | **N=101** | **%** | **N=220** | **%** |
| Community or public health clinic | 57 | 48% | 44 | 44% | 101 | 46% |
| HIV testing site or outreach | 22 | 18% | 13 | 13% | 35 | 16% |
| Private healthcare provider | 5 | 4% | 14 | 14% | 19 | 9% |
| Correctional facility | 11 | 9% | 4 | 4% | 15 | 7% |
| Hospital (in-patient) | 6 | 5% | 8 | 8% | 14 | 6% |
| Other | 18 | 15% | 18 | 18% | 36 | 16% |
| **Other health issues** | **N=250** | **%** | **N=152** | **%** | **N=402** | **%** |
| STD diagnosis last 12 months | 12 | 5% | 22 | 14% | 34 | 8% |
| Hepatitis C infection | 4 | 2% | 4 | 3% | 8 | 2% |
| Hepatitis B vaccination | 54 | 22% | 63 | 41% | 117 | 29% |
| **HPV vaccine[3]** | **N=69** | **%** | **N=57** | **%** | **N=126** | **%** |
| Yes | 2 | 3% | 19 | 33% | 21 | 17% |

[1] Excluding data from two persons who self-reported being HIV-positive and 12 without data on testing in the last 12 months.
[2] Excluding those who tested more than five years ago or never tested.
[3] Among females and males less than 34 years of age.
Categories may not add up to total because of missing data for individual variables.

**Table 7. Factors associated with having an HIV test in the last 12 month among participants in the 2013 Seattle area NHBS-HET3 survey**

| HIV test in the past 12 months | | | | | |
|---|---|---|---|---|---|
| **Characteristics and behaviors** | **n/N** | **%** | **OR[2]** | **95% CI** | **p-value** |
| **Total[1]** | 105/388 | 27% | | | |
| **Sex** | | | | | |
| Male | 50/243 | 21% | 1.0 | | |
| Female | 55/145 | 38% | 2.8 | 1.7-4.5 | <0.01 |
| **Incarcerated last 12 months** | | | | | |
| No | 68/283 | 24% | 1.0 | | |
| Yes | 37/105 | 35% | 2.2 | 1.3-3.7 | <0.01 |
| ***Last 12 months*** | | | | | |
| **Vaginal or anal sex without a condom with partner of opposite/unknown HIV status** | | | | | |
| No | 56/149 | 38% | 1.0 | | |
| Yes | 47/225 | 21% | 0.4 | 0.3-0.7 | <0.01 |
| **Marijuana** | | | | | |
| No | 27/134 | 20% | 1.0 | | |
| Yes | 78/254 | 31% | 1.8 | 1.1-3.0 | 0.02 |
| **STD diagnosis** | | | | | |
| No | 87/354 | 25% | 1.0 | | |
| Yes | 18/34 | 53% | 2.7 | 1.3-5.6 | <0.01 |
| ***Last sexual encounter*** | | | | | |
| **Partner type[3]** | | | | | |
| Main | 65/197 | 33% | 1.0 | | |
| Casual | 40/191 | 21% | 0.6 | 0.4-0.96 | 0.03 |
| **Knowledge of partner's HIV status** | | | | | |
| Yes | 51/135 | 38% | 1.0 | | |
| No | 54/253 | 21% | 0.5 | 0.3-0.7 | <0.01 |
| **Vaginal or anal sex without a condom with partner of opposite/unknown HIV status** | | | | | |
| No | 69/188 | 37% | 1.0 | | |
| Yes | 34/197 | 17% | 0.4 | 0.2-0.6 | <0.01 |
| **Substance use** | | | | | |
| Alcohol | 15/98 | 15% | 1.0 | | |
| Drugs | 11/33 | 33% | 2.9 | 1.1-7.6 | 0.03 |
| Both alcohol and drugs | 22/80 | 28% | 2.1 | 1.0-4.6 | 0.047 |
| No alcohol or drug use | 57/177 | 32% | 2.8 | 1.5-5.4 | <0.01 |

[1] Excluding data from two persons who self-reported being HIV-positive and 12 without data on testing in the last 12 months.
[2] All odds ratios are controlled for gender and incarceration in the last 12 months.
[3] Main sex partner: "Someone you feel committed to above anyone else. This is a partner you would call your girlfriend/boyfriend, wife/husband, significant other or life partner." Casual sex partner: "Someone you don't feel committed to or don't know very well."

# Prenatal HIV screening in King County and Washington State

## Background

Vertical transmission of HIV - from mother to child - in the United States has become increasingly rare as maternal HIV screening has increased and antiretrovirals are used to prevent perinatal infection. When antiretrovirals are used, and breastfeeding is avoided, transmission from an HIV-infected mother to her child occurs in less than 1% of births.[1] Although perinatal transmissions are rare in Washington and King County, the number of women living with HIV, including women of childbearing age, has increased. It is important that maternal screening continue to be conducted to avoid HIV infection of newborns. The Pregnancy Risk Assessment Monitoring System (PRAMS) is an annual population-based survey of new mothers about health behaviors just before, during, and after birth of an infant. We used PRAMS data to monitor to what extent prenatal maternal screening for HIV is occurring locally.

## Methods

PRAMS has been conducted in Washington State since 1995. We restricted this analysis to 2004 to 2011 because additional HIV related questions were added in 2004 and 2011 is the last year data are available. The sampling frame is drawn from the birth certificate database, with oversampling among Asian/Pacific Islander, American Indian/Alaska Native, Black/African American, and Hispanic mothers. Mothers must be Washington residents with a live birth; adoption, multiple births, and infant deaths are excluded. Infants are between two and six months of age when surveys are completed. Mothers are sent a written self-administered questionnaire; for those that do not respond to the written questionnaire a completed interview is sought via computer-assisted telephone interviews. The survey is available in Spanish and English. PRAMS responses are then linked to the birth certificate data to provide a wealth of information about birth outcomes and medical risk factors. All analyses consider the weighted sampling strategy of the survey and all analyses are weighted to take into account sampling, non-coverage, and nonresponse weights (http://www.cdc.gov/prams/methodology.htm [accessed 10/1/2014]). Our analyses of the PRAMS survey are exempt from Institutional Review Board (IRB) review, as for assessment purposes analyses use anonymous non-identifiable data under our data sharing agreement with the Washington State Department of Health.

Data are presented for King County and Washington State separately. King County was not removed from the Washington State totals. The data are given as percentages with 95% confidence intervals (CI) around each percent. The number of women with noted HIV infection present during the pregnancy was too small to allow for analyses (n=12).

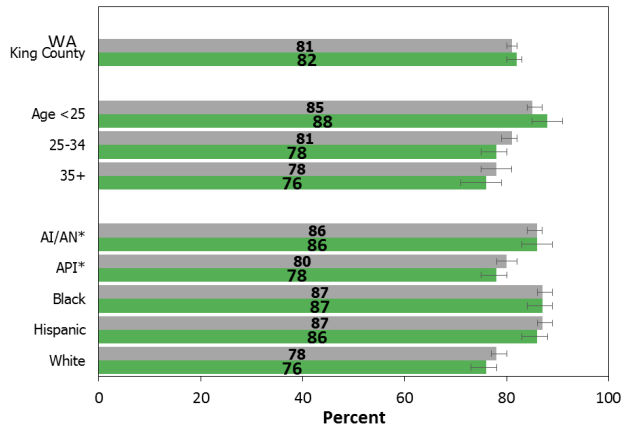
The HIV-related questions asked by PRAMS include asking all women (1) had their medical provider talked to them about HIV testing; (2) had the medical provider asked if they wanted HIV testing; (3) did they get an HIV test during pregnancy or delivery; (4) if not, were they offered a test; (5) If offered, did they turn down the test; and (6) if turned down, why did they turn down the test.

## Results

PRAMS surveyed 11,741 women in Washington State over 2004 through 2011, including 4,572 in King County, or about 570 per year in King County and 1,500 per year Statewide. The yearly response rate ranged from 66% to 79%. Over the eight years the participation rate has remained level and the CDC-required minimum response rates have been achieved. The responses for each question (and the 95% confidence interval around each percent) are given for King County and Washington State (including King County).

Question 1. During any of your prenatal care visits, did a doctor, nurse, or other health care work talk with you about getting tested for HIV (the virus that causes AIDS)? (Please count only discussions, not reading materials or videos.). N=4419 King; 11,397 WA (**Figure 1**)

**Figure 1. Talked about getting tested for HIV with healthcare provider, 2004-2011 combined**



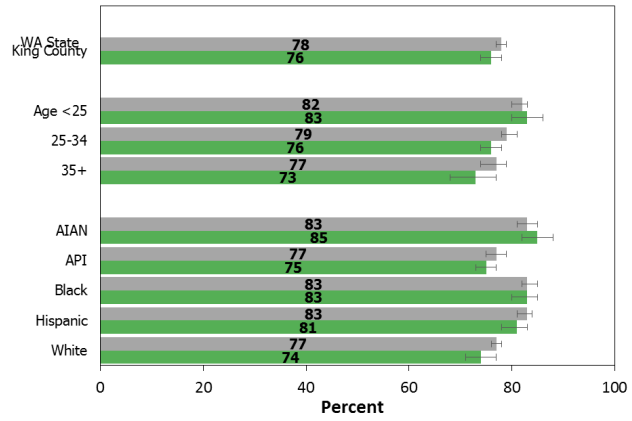

*AI/AN=American Indian/Alaska Native; API=Asian or Pacific Islander. Source: Pregnancy Risk Assessment Monitoring System

Prepared by: Public Health Seattle & King County, APDE /HIV, 10/2014

Younger women (<25 years) were more likely to report medical providers talking about getting HIV testing than older women (25 years of age and older). White and Asian/Pacific Islander women, relative to women of other races/ethnicities, were also less likely to report medical providers talking with them about an HIV test during their prenatal care.

Question 2. During any of your prenatal care visits, did a doctor, nurse, or other health care worker ask if you wanted to be tested for HIV (the virus that causes AIDS)? N=4,402 King; 11,361 WA (**Figure 2)**

**Figure 2. Asked by healthcare provider if wanted to be tested for HIV, 2004-2011 combined**



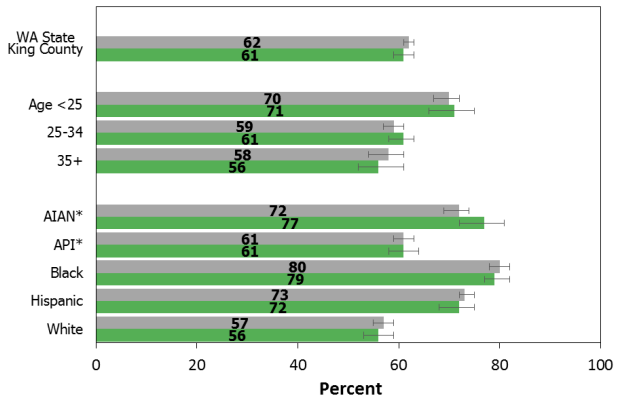

*AI/AN=American Indian/Alaska Native; API=Asian or Pacific Islander. Source: Pregnancy Risk Assessment Monitoring System

Prepared by: Public Health Seattle & King County, APDE /HIV,

Similar to talking about HIV testing, younger women (<25 years) relative to older women (age 25 years and older) were more likely to report medical providers asking them if they wanted to be tested for HIV. White and Asian/Pacific Islander women, relative to women of other races/ethnicities, were also less likely to report medical providers asking them if they wanted an HIV test during their prenatal care.

Question 3. At any time during your most recent pregnancy or delivery, did you have a test for HIV (the virus that causes AIDS)? N=4,175 King; 10,720 WA (**Figure 3)**

**Figure 3. Tested for HIV during most recent pregnancy, 2004-2011 combined**



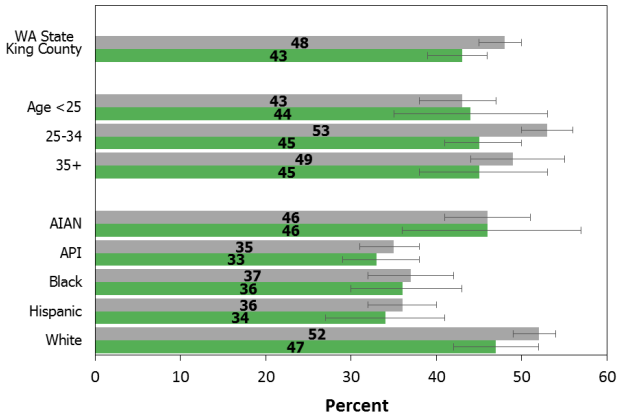

*AI/AN=American Indian/Alaska Native; API=Asian or Pacific Islander. Source: Pregnancy Risk Assessment Monitoring System

Prepared by: Public Health Seattle & King County, APDE /HIV, 10/2014

The same trends held for actually receiving an HIV test. Younger women (<25 years) were more likely to be tested for HIV than older women (25 years of age and older). White and Asian/Pacific Islander women, relative to women of other races/ethnicities, were also less likely to report receiving an HIV test during their prenatal care. Each trend was present in Washington State and King County.

Among those that responded "No" or "I don't know" to the prior question about getting an HIV test, 43% of new mothers in King County (95% CI = 39-46) and 48% of Washington State new mothers (95% CI = 45-50) were offered an HIV test during their most recent pregnancy or delivery. N=1,306 King; 3,427 WA. (**Figure 4**)

**Figure 4. Offered an HIV test (among untested), 2004-2011 combined**




*AI/AN=American Indian/Alaska Native; API=Asian or Pacific Islander.Source: Pregnancy Risk Assessment Monitoring System

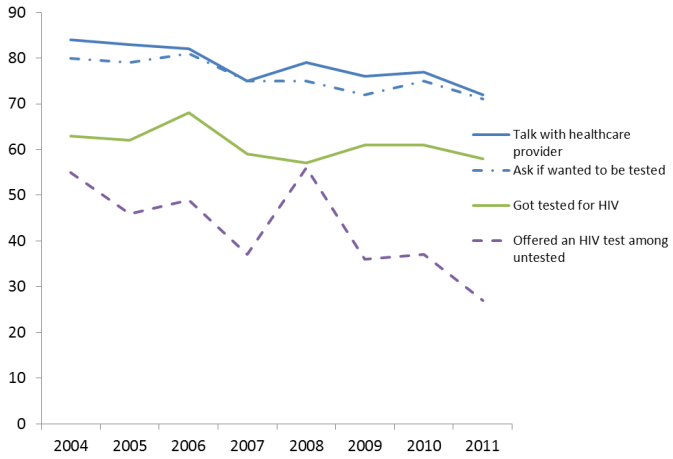
Prepared by: Public Health Seattle & King County, APDE /HIV, 10/2014

Of those who were offered but did not get an HIV test, 82% of new mothers in King County (95% CI=78-86) and 83% of Washington State new mothers (95% CI=81-85) turned down the offer of an HIV test during their most recent pregnancy or delivery (N=506 King; 1,475 WA). Reasons for turning down the test included:

- not thinking they were at risk for HIV (48% of King County refusers (CI=43-54) and 53% of Washington State refusers (CI=50-56)
- having an HIV test prior to their pregnancy [(43% of King County refusers (CI=38-49) and 42% of Washington State refusers (CI=39-45)]

In King County, relative to Washington State, fewer women reported being asked if they wanted to be tested for HIV, and fewer women reported being offered an HIV test during the most recent pregnancy. We also examined trends in these survey elements over the eight years of observation for King County (**Figure 5**). All of the trends showed a decline in HIV testing and HIV test-related discussions. The percent of women that reported getting tested also declined statewide (data not shown).

**Figure 5. HIV prenatal testing, King County, 2004-2011**




## Discussion

Despite a high level of promotion of HIV testing for pregnant women since a definitive trial of zidovudine monotherapy was published in 1994[2] and the availability of an even greater prevention of vertical transmission with combination therapy[3] not all women are screened for HIV in the United States. Only 61-62% of Washington State and King County mothers report getting an HIV test during their pregnancy or delivery in 2011. It could be that the low level of HIV infection among women and newborns locally has allowed this important screening tool to fall into decline. Additionally, a decrease in concern, or increase in complacency regarding HIV, may have resulted in the appearance of decreased testing if women were less likely to recall an HIV test in more recent years of the survey.

The most effective type of screening is use of an opt-out screening. Under opt out screening a provider would tell the expectant mother that HIV screening is part of routine prenatal care and unless she objects, HIV testing would be included with other prenatal care. Thus providers do not need to screen for HIV risk, such as a history of injection drug use, nor do they need to provide additional informed consent for HIV testing other than that needed to provide any medical care. Rates of screening under opt-out methods have been 85 to 98%. In comparison, other methods of screening have testing rates ranging from 25 to 69%.[4] We recommend that perinatal medical care providers intensify their efforts to provide universal HIV testing for pregnant women and that medical institutions carefully monitor the success of their HIV screening efforts.

***Submitted by Eva Wong and Susan Buskin***

*Additional acknowledgements are due to Linda Lohdefinck of the Washington State Department of Health and the CDC and other members of the PRAMS Working Group. The full list of PRAMS researchers is available at http://www.cdc.gov/prams/pdf/workinggroup_7-2012.pdf*

## References

1. CDC. HIV Among Pregnant women, infants, and children in the United States. Available at http://www.cdc.gov/hiv/pdf/risk_WIC.pdf. Accessed 9/25/14.
2. Connor EM, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group. N Engl J Med. 1994 Nov 3;331(18):1173-80.
3. Forbes JC,et al. A national review of vertical HIV transmission. AIDS. 2012 Mar 27;26(6):757-63.
4. Reducing HIV transmission from mother to child: an opt out approach to HIV screening. Available at http://www.cdc.gov/hiv/risk/gender/pregnantwomen/opt-out.html. Accessed 9/25/14.

# Updated men who have sex with men (MSM) and people who inject drugs (PWID) population estimates for King County

Estimates of the sizes of populations who are most impacted by HIV infection are needed to calculate population rates of HIV and other health conditions that affect these groups. These estimates are also useful for planning and evaluation of prevention and care services for at-risk populations. In December 2013, we convened a group of Public Health and University of Washington epidemiologists and researchers with knowledge of local HIV epidemiology and the affected populations to review and update the King County estimates of three populations: 1) men who have sex with men (MSM), 2) people who inject drugs (PWID), and 3) MSM/PWID. There are no standard methods available to estimate MSM and PWID population sizes because of lack of accurate population-based data - partly due to the stigma associated with male-male sex and drug injection and the illegality of drug use. We reviewed information on population estimates and estimation methods from several sources, including peer-reviewed publications and local data. We agreed to use data from the sources that are listed in tables 1, 2 and 3 to inform our estimates. We used 2012 King County population estimates, which were the most recent estimates available.[1] The estimates will be updated as new King County population estimates and additional data become available. The new estimates for 2012 for persons 15 years and older are as follows:

2012 At Risk Population Sizes for King County

- MSM who had male-male sex in recent years (includes MSM/PWID): 43,100
- PWID who injected in recent years (includes MSM/ PWID): 33,000
- MSM/PWID who had male-male sex and injected in recent years: 3,000

MSM population estimate

1. *A meta-analysis by authors from the Centers for Disease Control and Prevention (CDC)*

This study analyzed recent data from all the major national population-based surveys to estimate the proportion of men 13 years and older in the U.S. who are MSM.[2] These surveys included the General Social Survey (GSS), The National Health and Nutrition Examination Surveys (NHANES), the National Survey on Drug Use and Health (NSDUH), the National Health and Social Life Survey (NHSLS), the National STD Behavior Measurement Experiment (NSBME), the National Survey of Family Growth (NSFG), and Project HOPE International Survey of AIDS-Risk Behaviors. Overall, 2.9% reported male-male sex in the past year, 3.9% in the past 5 years and 6.9% ever.

2. *King County data from the Behavioral Risk Factor Surveillance System (BRFSS)*

BRFSS is national phone health survey of non-institutionalized adults.[3] States can add questions to the survey and WA State has included a question about sexual orientation for persons aged 18-65 years for several years. According to King County BRFSS data from 2009 to 2012, 3.5% of males reported identifying as homosexual and 1.2% as bisexual. We applied these percentages to 2012 King County population estimate for males 18 years and older and males 15 years and older. Because not all MSM identify as gay or bisexual, we adjusted these estimates using data from the Public Health STD Clinic that showed that 93% of male clients who reported only male-male sex in the past year identified as gay or bisexual. This resulted in estimates of 38,509 MSM (18+ years) and 40,300 (15+ years).

3. *Census and NHBS data on cohabitating male couples*

The 2010 census includes information on the percentage of cohabitating male couples and there were 5,579 couples or 11,158 individual MSM living with a partner in King County.[1] According to the 2011 Seattle area National HIV Behavioral Surveillance System (NHBS) survey of MSM (NHBS-MSM3),[4] 25.07% reported living with a male partner translating to a total of 44,507 MSM in King County.

*New estimate*

Based on review of these data sources, we decided to use the mid-point (5.4%) from the CDC meta-analysis between male-male sex in the past 5 years (3.9%) and ever (6.9%) to reflect the percent of males 15 years and older who had male-male sex in recent years. We multiplied 5.4% by the 2012 King County population estimate of males 15 years and older and rounded it to the nearest 100. This estimate is in close agreement with other estimates (the one based on census and NHBS data and the estimate based on BRFSS data).

**Table 1. King County MSM population estimates (includes MSM/PWID)**

| MSM estimates (percent of 2012 King County male population 15 years and older) | N |
|---|---|
| New King County estimate for MSM 15 years and older (5.4% of 797,434) | 43,100 |
| Old King County estimate | 43,974 |
| **Data sources for new estimate** | |
| **CDC meta-analysis (≥ 13 years)[1]** | |
| Male-male sex past year (2.9% of 820,290) | 23,788 |
| Male-male sex past 5 years (3.9% of 820,290) | 31,991 |
| Male-male sex ever (6.9% of 820,290) | 56,600 |
| **BRFSS (sexual orientation ≥ 18)** | |
| Gay/bisexual orientation, 18 years and older (4.7% of 761,982) | 35,813 |
| Gay/bisexual orientation, 15 years and older (4.7% of 797,434) | 37,479 |
| Male-male sex past year (93% of 35,813 ≥ 18 years) | 38,509 |
| Male-male sex past year (93% of 37,479 ≥ 15 years) | 40,300 |
| **2010 Census & 2011 NHBS-MSM3 survey data[2]** | |
| Male-male sex past year, 18 years and older | 44,507 |

PWID population estimate

*1. An analysis by Tempalsky et al. of trends in the number of people who inject drugs*

This article reports trends in population prevalence of people aged 15 - 64 years who inject drugs in the U.S. overall and in 96 metropolitan statistical areas (MSA) from 1992 to 2007.[5] The MSA estimates included an upper and lower estimate and were calculated based on: annual number of drug users in treatment multiplied by the proportion of drug treatment entrants who injected, annual number of PWID tested for HIV, interpolation and extrapolation of previous MSA estimates, and number of incident AIDS cases adjusted for HIV prevalence. We multiplied the 2007 Seattle-Bellevue-Everett MSA PWID estimate by the proportion of the 2007 MSA 15-64 year old population that resided in King County (73.6%). We then calculated the percentage of the 2007 King County population who injected (01.02% and 2.62%) and applied the numbers to the 2012 15-64 year old King County population (1,381,551) resulting in estimates of 14,085 and 36,225 with a midpoint of 25,155.

*2. A meta-analysis by authors from the CDC.*

This study used data from four national surveys including NHANES, NSFG, GSS and NSDUH to calculate national estimates lifetime or past-year injection drug use among persons 13 years and older.[6] We applied the national percentages to the 2012 King County population 15 years and older resulting in an estimate of 41,830, only a little higher than the higher current injection estimate based on the Templaski study. In several local NHBS surveys of MSM and in data from the PHSKC STD Clinic, we have found that the ratio between lifetime injection and past year injection is approximately 2:1. Applying that ratio to the CDC lifetime estimate yielded an estimate of 20,914 current PWID, a little lower than the lower estimate for current injection (25,155) derived from the Tempalski analysis.

*New estimate*

Based on review of these data sources, we decided to use the mid-point between 25,155 and 20,915 (23,035) and round it to 23,000 for the new past year injection estimate. For lifetime injection, we used the 41,830 estimate based on the CDC meta-analysis and increased it to 43,000 to more closely approximate the ratio described above. The recent PWID estimate is the midpoint between the ever and past year estimates.

**Table 2. King County PWID population estimates (includes MSM/PWID)**

| PWID estimates (percent of 2012 King County population 15 years and older) | N |
|---|---|
| New King County estimate of PWID past year, 15 years and older (1.43% of 1,608,842) | 23,000 |
| New King County estimate of PWID recent years, 15 years and older (2.05% of 1,608,842) | 33,000 |
| New King County estimate PWID ever, 15 years and older (2.67% of 1,608,842) | 43,000 |
| Old King County estimate PWID past year | 18,150 |
| **Data sources for new estimates** | |
| **Tempalski PWID population trends[3]** | |
| Injected past year, 15 years and older, lower estimate (1.02% of 1,381,551) | 14,085 |
| Injected past year, 15 years and older, higher estimate (2.62% of 1,381,551) | 36,225 |
| Injected past year, 15 years and older, mid-point estimate | 25,155 |
| **CDC meta-analysis** | |
| Injected ever, 15 years and older (2.6% of 1,608,842) | 41,830 |
| **CDC meta-analysis applied to local 2:1 ratio** | |
| Injected past year, 15 years and older (41,830/2) | 20,915 |
| Midpoint between 25,155 and 20,915 | 23,035 |

MSM/PWID population estimate

1. *An analysis by authors from the CDC* Based on NHANES, the proportion of the male population 20 -59 years old who ever had sex with another man and who ever injected drugs was estimated to be 0.35%.[7]
2. *Data from the Seattle area NHBS and Pride surveys and STD clinic data*

In the 2011 Seattle area NHBS-MSM3 survey 14% of participants reported ever using injection drugs and 7% percent reported using injection drugs in the past year. In the 2013 Seattle area NHBS-IDU3 survey 25% of male participants reported ever having male-male sex and 15% of male participants reported male-male sex in the past year. In the annual Pride surveys (anonymous surveys of MSM at Gay Pride parades 2012-2014) an average of 5% reported injecting drugs in the last year. According to data from the Public Health STD Clinic (9/2013-8/2014), 11% of MSM reported ever injecting and 6% reported injecting in the last year. Applying these percentages to the MSM and PWID population estimates yield the numbers listed in **Table 3.**

*New estimate*

Based on review of these data sources, we decided to use 2,000 as the new past year MSM/PWID estimate, 4,000 as the new estimate for ever MSM/PWID, and the midpoint 3,000 for recent MSM/PWID.

**Table 3. King County MSM/PWID population estimates**

| MSM/PWID estimates (% of 2012 King County male population 15 years and older) | N |
|---|---|
| New King County estimate (male-male sex and injected past year) (0.25% of 797,434) | 2,000 |
| New King County estimate (male-male sex and injected recent years) (0.38% of 797,434) | 3,000 |
| New King County estimate (male-male sex and injected ever) (0.50% of 97,434) | 4,000 |
| Old King County estimate (past year injection) | 3,150 |
| **Data sources for new estimates** | |
| **CDC analysis (NHANES)** | |
| Male-male sex ever, injected ever, 15 years and older (0.35% x 797,434) | 2,791 |
| Male-male sex ever, injected ever, 18 years and older (0.35% x 761,983) | 2,667 |
| **NHBS surveys (2011-2012)** | |
| MSM3, male-male sex past year, injected ever (14% of 43,100 MSM) | 6,034 |
| MSM3, male-male sex past year, injected past year (7% of 43,100 MSM) | 3,017 |
| IDU3, injected last year, male-male sex ever (16% of 43,000 PWID) | 6,880 |
| IDU3 ,injected last year, male-male sex past year (9% of 23,000 PWID) | 2,070 |
| **Pride surveys (2012-2014)** | |
| MSM (no specific time frame) and injected past year (5% of 43,100) | 2,155 |
| **STD Clinic data (9/2013-8/2014)** | |
| Male-male sex past year and injected ever (11% of 43,063) | 4,736 |
| Male-male sex past year and injected past year (6% of 43,063) | 2,583 |

**References**


1. Washington State Department of Health and Krupski Consulting, 1990-2009 Population Estimates: Population Estimates for Public Health Assessment, 1990–2011, December 2012 Revised: Washington State Office of Financial Management, Forecasting Division, single year intercensal estimates 2001-2010, December 6, 2011.
2. Purcell DW, Johnson CH, Lansky A et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. Open AIDS J. 2012;6:98-107. Epub 2012 Sep 7. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3462414/
3. Behavioral Risk Factor Surveillance System (BRFSS) Available at http://www.cdc.gov/brfss/about/brfss_faq.htm.
4. Thiede H, Burt RD, Shriver CJ. Highlights from the 2011 Seattle area national HIV behavioral survey of men who have sex with men. HIV/AIDS Epidemiology Unit, Public health – Seattle & King County and the Infectious Disease Assessment Unit, Washington state Department of Health, HIV/AIDS Epidemiology Report, 2nd Half 2012, 22-32.report MSM12 survey
5. Tempalski B, Pouget ER, Cleland CM et al. Trends in the population prevalence of people who inject drugs in US metropolitan areas 1992-2007. PLoS One. 2013 Jun 5;8(6). http://www.ncbi.nlm.nih.gov/pubmed/23755143, Seattle MSA estimates attached.
6. Lansky A, Finlayson T, Johnson C et al. Estimating the number of injection drug users in the United States to calculate national rates of HIV infection. Poster at the 2012 National summit on HIV and Viral Hepatitis Diagnosis, Prevention and Access to Care (#115, Washington DC).
7. Centers for Disease Control and Prevention (CDC). Estimated percentages and characteristics of men who have sex with men and use injection drugs--United States, 1999-2011. MMWR Morb Mortal Wkly Rep. 2013 Sep 20;62(37):757-62.


***Contributed by Hanne Thiede and Susan Buskin***


*We would like to thank the members of the committee who developed the estimates: Matt Golden, Christine Thibault, Roxanne Kerani, Julia Dombrowski, Julia Hood, David Katz, Richard Burt, Michael Hanrahan, Lindley Barbee, and Caleb Bante-Green.*

# PrEP: Pre-exposure Prophylaxis

In response to a growing interest in pre-exposure prophylaxis, or PrEP, the Washington State Department of Health (DOH), Public Health – Seattle and King County (PHSKC), and the Snohomish Department of Public Health have created a variety of resources to help patients pay for and find medical providers willing to prescribe PrEP.

In April 2014, DOH launched the PrEP Drug Assistance Program (PrEP DAP). PrEP DAP is modeled after the state's Early Intervention Program (AIDS Drug Assistance Program), and will provide support to eligible individuals interested in utilizing PrEP. Support includes co-pay coverage for insured individuals and full coverage for un- or under-insured individuals. Currently, only medication-related costs for Truvada are covered.

PrEP DAP eligibility is limited to:

1. Individuals uninfected with HIV with sex/needle sharing partners who are HIV-positive (sero-discordant couples)
2. Gay and bisexual men and other men who have sex with men who are sexually active and have one or more of the following risk conditions:
    a. A diagnosis of a bacterial STI in the last year
    b. Exposure to an STI through a sexual network in the last year
    c. Ten or more sexual partners in the last year
    d. Used methamphetamine in the last year
    e. Unprotected anal intercourse with a partner of unknown HIV-1 status with any of the factors listed above.

Individuals interested in being considered for PrEP DAP should work with their healthcare providers to complete an application, available at http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/HIVAIDS/HIVCareClientServices/PrEPDAP. This web site also has informational brochures in English and Spanish. Completed applications should be sent via fax or mail to the DOH HIV Client Services Early Intervention Program: PO Box 47841; Olympia, WA 98501 or fax number 360-664-2216. For questions, please call the Early Intervention Program at 877 376 9316. As of September 23, 2014, there were 70 applications received by the PrEP DAP program.

King and Snohomish County health departments have created PrEP Providers' lists which include HIV medical providers who have expressed interest in evaluating patients for HIV pre-exposure prophylaxis (PrEP) and who are willing to prescribe PrEP to persons at high-risk for HIV infection. The Snohomish County list is available at http://www.snohd.org/Portals/0/Snohd/Diseases/files/SnoCountyPrepProviders_CD.pdf. In addition to name, address, and phone number this Snohomish County PrEP provider list has the insurance plan(s) which each medical provider accepts. About one dozen medical providers and/or clinics are currently included.

In King County, the PrEP provider list is available at http://www.kingcounty.gov/healthservices/health/communicable/hiv/prevention/prep.aspx. This page also includes a question and answer fact sheet (in English and Spanish), and links to the DOH PrEP DAP program and clinical practice guidelines. Currently 34 medical providers are listed with phone numbers and their clinic affiliations. King County medical providers may be added to or deleted from the list at any time by sending an email to buskins@kingcounty.gov. Medical providers on the list should be willing to follow the published CDC PrEP guidelines. These guidelines include that:

1. PrEP is contraindicated in persons with unknown or positive HIV status or with an estimated creatinine clearance <60 mL/min;
2. PrEP should be targeted to adults at very high risk for HIV acquisition;
3. PrEP should be delivered as part of a comprehensive set of prevention services; and
4. PrEP should be accompanied by quarterly monitoring of HIV status, pregnancy status, side effects, medication adherence, and risk behaviors, as outlined in previous interim guidance.[1-3]

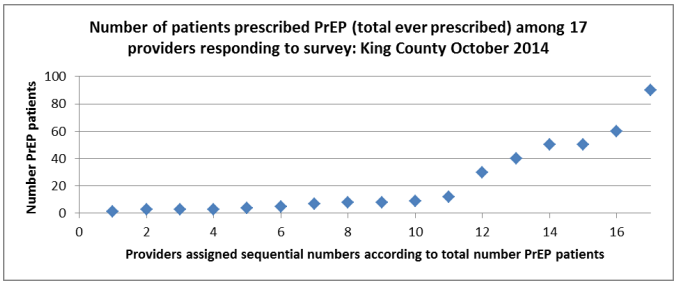
Public Health further recommends that medical providers discuss PrEP with all HIV-uninfected men who have sex with men being treated for rectal gonorrhea or syphilis, and that providers use either a fourth generation HIV EIA or an HIV RNA test when testing persons prior to PrEP initiation or as part of PrEP monitoring. Thank you for your ongoing efforts to prevent HIV in our community.

In October 2014, a brief survey was administered to the medical providers listed on the King County PrEP provider list. A summary of the results follows.

Of the 36 providers surveyed, 14 work at clinics (UW Virology and Madison Clinics) not yet often seeing negative patients. (Five replied to the survey anyway). Of the 22 non UW/Madison medical providers, we

received 18 replies (82% participation). (One respondent replied for two practicing together, thus 17 hereafter.)
Of the 17 providers (all numbers should be considered, as requested, estimates):

- 383 total patients were prescribed PrEP
- 252 of these (66%) were prescribed PrEP in the last 6 months
- 295 of the 383 were currently prescribed PrEP (77%)
- 49 of these patients were known to apply for the WA PrEP Drug Assistance Program




In answer to how often do you discuss PrEP with negative patients,

- 5 always
- 7 usually
- 6 sometimes or occasionally

In answer to, do you discuss PrEP more often with patients who report risky behavior, 16/17 said yes.

In answer to, do you discuss PrEP more often with patients diagnosed with an STI,

- 7 always
- 9 usually
- 1 occasionally

In answer to, have you ever turned down a person asking about PrEP, 5 providers said yes and all of those were associated with low risk of the person inquiring.

In answer to "What do you do to promote adherence?" answers typically addressed (1) tenets of their adherence counseling, (2) frequency of refills/follow-up visits, and (3) specific tools to promote better adherence. The tenets suggested included discussing: "as often as possible" "drug resistance" "PrEP is not a morning after pill" "PrEP is not effective for people not taking regularly" and "PrEP must be taken daily." Also, the tone of adherence counseling was mentioned, including "honest open communication" and "non-judgmental atmosphere" and explaining that "it is a joint responsibility (provider's and patient's) not to create drug resistant virus". The frequency of follow-back/refills mentioned was at least every 3 months (N=5) and every 6 months (N = 1). Tools suggested included use of medisets/pill boxes, combining taking PrEP with other meds, pharmacy reviews, automated phone calls and/or email check-ins, and use of a hand-out.

***Contributed by Richard Aleshire, Jessica Burt, and Susan Buskin***

**References**


1. US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States – 2014: a clinical practice guideline. Published 5/14/2014. Available at http://www.cdc.gov/hiv/pdf/PrEPguidelines2014.pdf
2. CDC. Interim guidance: preexposure prophylaxis for the prevention of HIV infection in men who have sex with men. MMWR 2011;60:65–8. (Updated June 14, 2013 http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6223a2.htm?s_cid=mm6223a2_w)
3. CDC. Interim guidance for clinicians considering the use of preexposure prophylaxis for the prevention of HIV infection in heterosexually active adults. MMWR 2012;61:586–9.

# Update on Antiretroviral Drug Resistance and HIV subtype Surveillance in King County

**Background**
Molecular HIV Surveillance (MHS) is the national HIV drug resistance and HIV subtype surveillance system run by the Centers for Disease Control and Prevention as part of the National HIV Surveillance System. Approximately 16 states and an additional eight metropolitan areas participate. MHS followed two earlier projects: VARHS (Variant and Resistant HIV Surveillance) and ARVDRT (Antiretroviral Drug Resistance Testing). The objectives of MHS are to monitor the frequency of important antiretroviral resistance mutations, especially mutations present at the time of HIV diagnosis, follow the outcomes of those with and without mutations, and measure the prevalence of different HIV-1 viral strains/types.

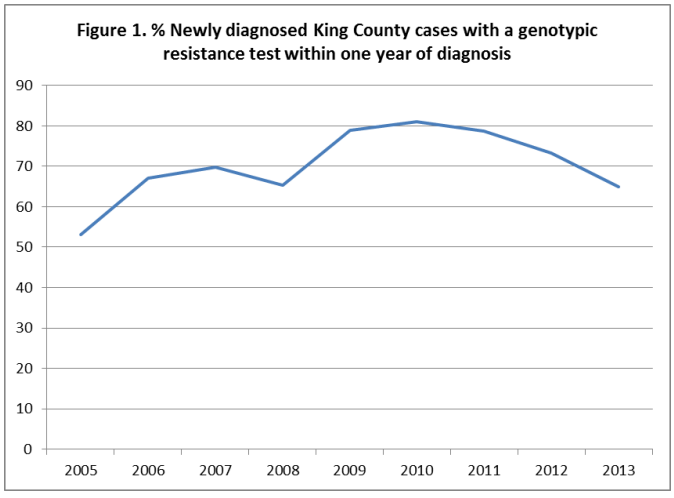
**Methods**
Unlike VARHS and ARVRT, MHS does not conduct any genotypic testing of remnant sera. Other than legacy data from VARHS and ARVDRT, all genotypic sequences included in MHS are collected from drug resistance testing done as part of routine clinical care for HIV-infected individuals. Additionally, although a primary goal of MHS is to follow trends in primary or transmitted drug resistance, all sequences, regardless of proximity to HIV diagnosis are collected by MHS. Thus both transmitted and acquired drug resistance may eventually be examined in MHS. These projects are all conducted under HIV/AIDS surveillance authority. HIV drug resistance and subtype surveillance has a federal non-research determination designating it a routine public health surveillance activity; neither CDC nor local IRB approval is required for the submission of and collection of genotypic data.

Two types of HIV drug resistance testing are commonly available in the US. *Genotypic testing*, or *genotyping*, evaluates genetic information in the relevant portions of the HIV genome and detects the presence of mutations known to be associated with resistance to one or more antiretrovirals. *Phenotypic testing,* or *phenotyping,* evaluates the drug concentration necessary to stop the growth of HIV, and compares that to the amount needed to prevent drug-susceptible HIV from reproducing itself. Only genotypic testing data, or sequences, are included in MHS.

Unlike most HIV surveillance data collected, MHS data may be shared on an individual level with a medical provider currently treating an HIV-infected individual in whom they suspect drug resistance, or when an earlier drug resistance test, not in the current medical record, may be available. In this situation, feel free to contact the local MHS Principal Investigator, Susan Buskin, at 206 263-2020 or buskins@kingcounty.gov (please do not email patient name).

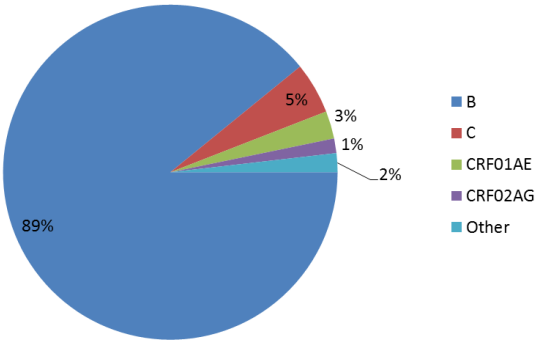
**Results**
Between 2000 and August 2014, 11,823 reports of genotypic sequences have been received in King County. After eliminating multiple sequences for the same person, sequences for 7,095 individuals have been collected. When restricting to genotypic tests conducted on specimens collected within 12 months of HIV diagnosis and eliminating individuals with a self-reported HIV test more than three months prior to their surveillance HIV diagnosis date, 2,029 had a genotypic test conducted and reported to King County. Of these, 94% were for individuals diagnosed between 2005 and 2013.

Over these nine years (2005-2013), the proportion of newly diagnosed individuals with a genotype reported to surveillance increased from 53% to 81% through 2010, and has recently declined to 65% (**Figure 1**). Ninety-two percent of the sequences were collected within three months of HIV diagnosis.



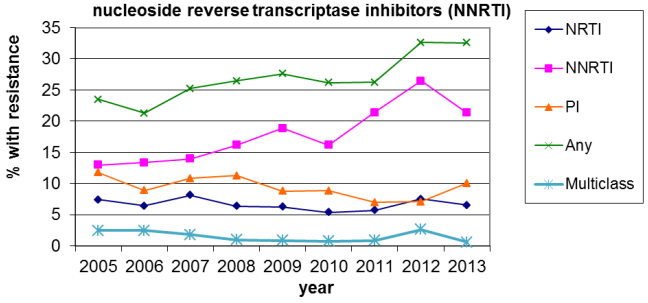

Most individuals included in MHS were reported with subtype B (89%), followed by subtype C (5%) and circulating recombinant form 01/AE (3%)(**Figure 2**).

**Figure 2. HIV-1 Subtype among newly diagnosed King County residents 2005-2013**




Drug resistance genotypic sequences may be interpreted by the Stanford web as susceptible, potential-low level resistance, low-level resistance, intermediate resistance or high-level resistance. In **Figure 3**, resistance interpretations for protease inhibitors (PI), nucleoside reverse transcriptase inhibitors (NRTI) and non-nucleoside reverse transcriptase inhibitors (NNRTI) with any level of resistance reported are shown. Multi-class resistance is limited to high level resistance in two or more drug classes.

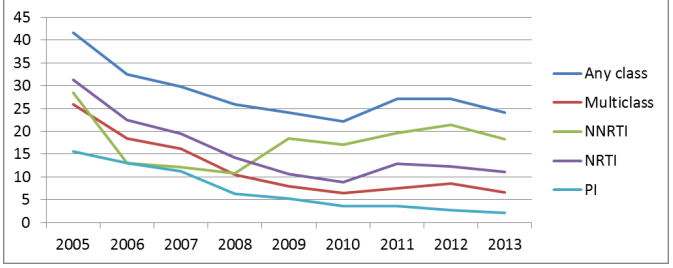
**Figure 3. Drug resistance by drug class among King County residents within one year of HIV diagnosis: protease inhibitors (PI), nucleoside reverse transcriptase inhibitors (NRTI) and non-nucleoside reverse transcriptase inhibitors (NNRTI)**




Recently, genotypic sequences have been submitted for 157 individuals tested for drug resistance for a fourth class of antiretroviral: integrase inhibitors. The majority (n=93, 57%) of these sequences were not for individuals initially diagnosed with HIV in King County. Of the remaining 64, only 12 had integrase resistance testing within one year of diagnosis, and none of those individuals had drug resistance found. Of the entire 64, 10 (16%) had resistance mutations. All ten were diagnosed with HIV between 1990 and 2009.

Drug resistance may also be monitored among all individuals receiving genotypic testing with sequences reported to King County, not just those newly diagnosed with HIV. **Figure 4** thus combines acquired and transmitted resistance. Levels of resistance are likely higher in this figure than among all individuals living with HIV, as medical providers testing for acquired drug resistance may have some suspicion that the individual has been non-adherent or otherwise at risk of acquired drug resistance.

**Figure 4: Acquired and transmitted drug resistance in all sequences reported to King County HIV surveillance: protease inhibitors (PI), nucleoside reverse transcriptase inhibitors (NRTI) and non- nucleoside reverse transcriptase inhibitors (NNRTI)**




## Discussion

HIV drug resistance surveillance in King County is in a state of flux. Under the previous projects (ARVDRT and VARHS; 2005-2011) active surveillance for drug resistance was conducted using remnant sera from individuals tested for HIV at public health clinics, and the focus was on newly diagnosed individuals. Under MHS (2012-2014), all sequences passively reported to the health department are included. However, funding for MHS activities has not been reliable. To more accurately monitor primary or transmitted drug resistance, date of initiation of antiretrovirals would be required. Unfortunately, date of antiretroviral initiation is not frequently reported to the national HIV surveillance system. Previously ARVDRT and VARHS required a sequence to be collected within three months of HIV diagnosis, as a method to reduce the likelihood that antiretrovirals had been used prior to testing. We included genotypic drug resistance tests conducted up to 12 months after diagnosis to increase the number of available tests (92% of these are within three months) and due to increased evidence of the stability of resistance-associated mutations, especially NNRTI mutations. Partner services and other health department outreach projects are increasingly following individuals until antiretroviral use commences, so in the future, transmitted drug resistance will be more easily distinguished from acquired drug resistance.

Despite these limitations, our data indicate that NRTI resistance, PI resistance and multiclass antiretroviral drug resistance are all declining, both as transmitted drug resistance and acquired drug resistance. Integrase inhibitor resistance was not found among a small number of individuals tested in close proximity to HIV diagnosis, but was present in about one of six individuals tested overall. NNRTI resistance continues to be a concern locally and was present in 21-26% of specimens tested within a year of diagnosis among those diagnosed in 2012-2013 and 18-21% of specimens tested those same years regardless of proximity to HIV diagnosis.

***Contributed by Katelynne Gardner Toren, Christina Thibault, and Susan Buskin***

# Behavioral and Clinical Characteristics of Patients Receiving HIV Care in King County: Medical Monitoring Project in 2009-2011

**Background**

As of December 31, 2010, the estimated number of persons with a *diagnosis* of human immunodeficiency virus (HIV) infection or acquired immunodeficiency syndrome (AIDS) was 803,771 for the United States and 6,749 for King County, WA. HIV surveillance programs in the United States collect limited information about people who have received diagnoses of HIV infection and AIDS. Supplemental surveillance projects collect more detailed information about care-seeking behaviors, healthcare use, and other behaviors among persons living with HIV. Together, these data informs program planning, resource allocation, HIV prevention efforts, evaluation of existing clinical and social services, and development of new HIV-related interventions.

**Methods**

The Medical Monitoring Project (MMP) is a supplemental surveillance system that collects annual cross-sectional clinical, sociodemographic, and behavioral data on randomly selected HIV-infected adults who are in care. MMP uses a three stage sampling design to obtain representative samples of adults receiving HIV/AIDS care. Data collection for MMP is conducted in 16 states and Puerto Rico, areas where 73% of the total PLWH population in the United States reside. During face-to-face or telephone interviews, information on demographics, adherence to HIV medication regimens, behavioral risk factors, and service utilization is collected. Medical record abstractions (MRA) are conducted to collect clinical data pertaining to diagnoses, medications, laboratory results, and health service utilization. A more detailed description of the MMP methodology is available elsewhere.

In this article, we describe key health indicators of persons who receive HIV care in King County. This article is modeled after a report that was generated for the *national* MMP sample, available here: http://www.cdc.gov/hiv/pdf/MMP_2010_surveillancesummary.pdf. We included data from participants in the 2009, 2010, and 2011 data collection cycles who had linked interview and MRA records, yielding an analytic dataset comprised of 509 records. The data were weighted for probability of selection and nonresponse to be representative of adults receiving outpatient medical care for HIV in King County. It should be noted that the MMP sampling design was intended to yield estimates for the HIV infected population in care in Washington State, not to yield county-level estimates; as such, the results from this analysis should be interpreted with caution. Statistical software (SAS, version 9.3) was used for analysis of weighted data. Data are not reported for variables with <5 responses or a coefficient of variation of ≥30%.

**Results**

The 509 MMP participants included in this analysis represent 5,078 adults who receive HIV care in King County. The majority of patients receiving HIV care in King County are male (87%), White (64%), 40 years or older (80%), have a high school degree or higher (70%), were born in the United States (85%), and have lived with HIV for 10 or more years (59%) (**Table 1**). More than 10% of patients experienced homeless and 5% experienced incarceration in the 12 months preceding their interview. Nearly all patients had some health insurance coverage, but 15% of patients experienced some type of lapse of coverage in the prior 12 months. Roughly half of patients were financially supported by salary or wages, 30% received Supplemental Security Income or Social Security Disability Insurance. Almost one-third of respondents (30%) were at or below the federal poverty line.

The vast majority of adults living with HIV in care in King County had at least one CD4 and one viral load test in the last 12 months (95% and 94%, respectively) (**Table 2**). Averaged across all CD4 tests in the prior 12 months, less than half (47%) of respondents had a geometric mean CD4 count exceeding 500 cells per microliter. Regarding most *recent* viral load test, 79% of participants were undetectable or had a viral load <200 copies/mL. The majority of patients were currently taking antiretroviral therapy (90%). There was a slight increase in percent virally suppressed by MMP data collection cycle (**Figure 1**), though the increase was non-statistically significant.

In the 12 months preceding the MMP interview, 46% of patients had a syphilis test and 22-23% of patients had a chlamydia and gonorrhea test documented in their medical charts (**Table 3**). STD testing was more commonly documented for persons who reported any recent sexual activity and any condomless sex. In the last 12 months, 7% of patients were diagnosed with syphilis and 2% were diagnosed with gonorrhea.

Based upon documentation in medical records in the 12 months prior to the MMP interview, 28% of patients had hypertension, 10% had diabetes, and 13% had dyslipidemia (**Table 4**). With regard to hepatitis, 16% of patients had a history of Hepatitis C and 10% had a history of Hepatitis B. According to interview responses to the *Public Health Questionnaire-8*, which asks about depressive symptoms in the two weeks prior to the MMP interview, 23% of patients had major or other depression.

Substance use in the 12 months prior to the MMP interview was commonly reported by adults living with HIV and receiving care in King County (**Table 5**). A large proportion of patients (35%) were current smokers and 27% of patients were former smokers. Binge drinking was reported by 16% of patients. Non-injection drug use was reported by 42% of patients; 8% reported injection drug use. The most commonly reported drugs were marijuana, methamphetamines, and poppers, which were utilized by 34%, 15%, and 14% of patients, respectively.

The majority (70%) reported oral, vaginal, or anal sex in the prior 12 months (**Table 6**). Condomless sex was reported by 38% of patients; condomless sex with an HIV-negative or status unknown partner was reported by 12% of patients. Among men who have sex with men (MSM), 48% reported having insertive anal sex in the past 12 months, 33% reported condomless insertive anal sex, and 6% reported condomless insertive anal sex with an HIV-negative or status unknown partner. These percentages did not vary tremendously by partner type (e.g. main partner or casual partner) (**Table 7**).

Dental care, HIV case management, public benefits, mental health services, and the AIDS Drug Assistance Program (ADAP) were the most needed ancillary services (**Table 8**). A large proportion (19%) of those who needed dental care could not get dental care. Eleven-percent of patients indicated that they needed peer group support and could not get peer group support. Otherwise, unmet need for other support service categories was reported by less than 10% of patients.

**Discussion**

Although many of the metrics presented in this article are generally positive, the following points should be underscored: 30% of adults living with HIV and receiving care in King County were below the federal poverty line, 10% recently experienced homelessness, 35% were current smokers, 15% were methamphetamine users, and 12% had condomless sex with an HIV-negative or status unknown partner. Many PLWH have not been able to utilize dental care and medical record abstraction data suggest that STD testing rates might be sub-par. Nonetheless, about 80% of patients receiving HIV care in King County are estimated to be virally suppressed, which is higher than national MMP estimates (74%). For more information about MMP in King County, please visit our website: tinyurl.com/kcmmp.

***Contributed by Julia Hood***

## Table 1. Characteristics of patients who receive HIV care in King County, Medical Monitoring Project, 2009-2011

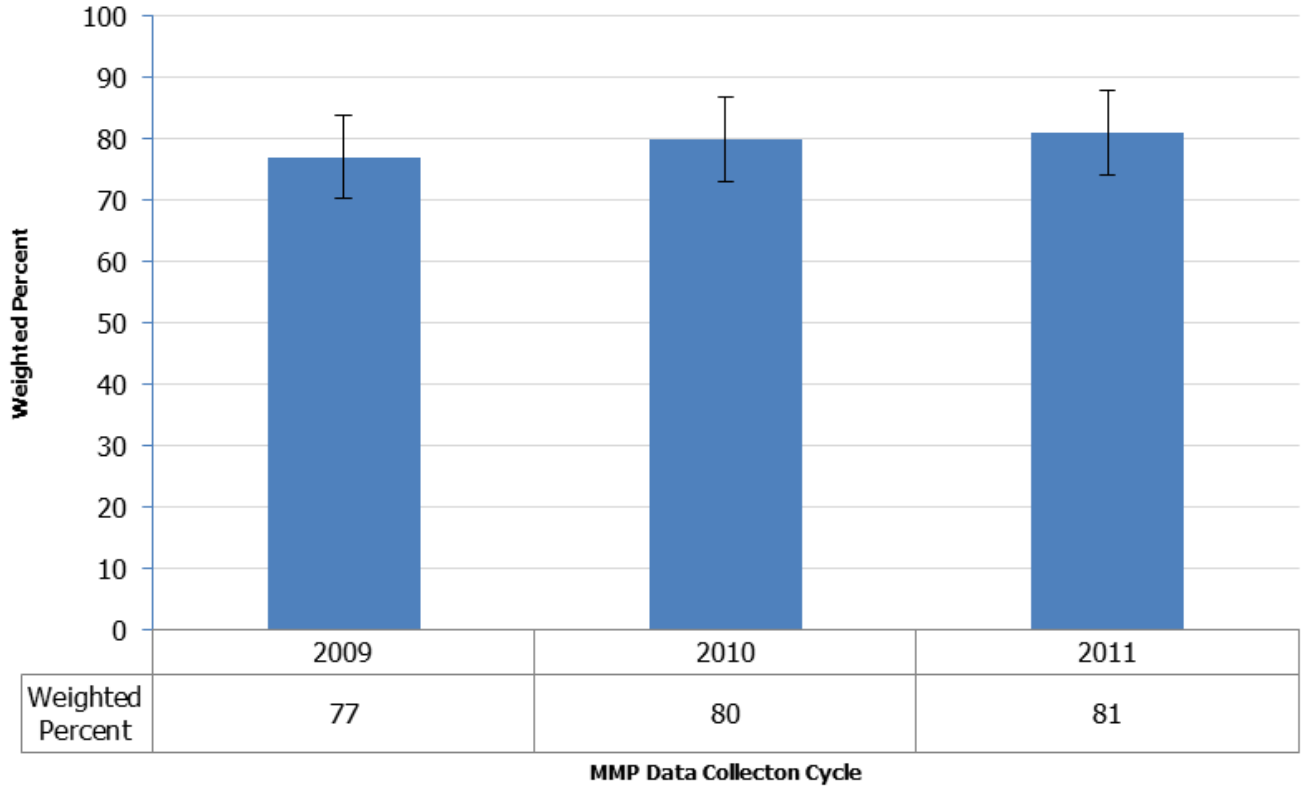
| | Weighted Percent | Weighted 95% Confidence Interval |
|---|---|---|
| **Gender** | | |
| Male | 87 | 83, 91 |
| Female | 12 | 9, 16 |
| **Sexual Orientation** | | |
| Homosexual | 71 | 66, 76 |
| Heterosexual | 18 | 15, 22 |
| Bisexual | 8 | 5, 10 |
| Other/unclassified | 3 | 1, 4 |
| **Race/ethnicity** | | |
| White, non-Hispanic | 64 | 60, 69 |
| Black, non-Hispanic | 15 | 11, 18 |
| Hispanic or Latino[×] | 11 | 8, 14 |
| Other/Unclassified | 10 | 7, 13 |
| **Age at time of interview (years)** | | |
| 18–29 | 5 | 3, 8 |
| 30-39 | 15 | 11, 19 |
| 40-49 | 43 | 38, 47 |
| ≥50+ | 37 | 31, 43 |
| **Education** | | |
| Less than high school | 9 | 6, 12 |
| High school diploma or GED | 21 | 18, 24 |
| More than high school | 70 | 66, 74 |
| **Born in the United States** | 85 | 81, 89 |
| **Time since HIV diagnosis (years)** | | |
| <5 | 18 | 14, 22 |
| 5–9 | 20 | 16, 24 |
| ≥10 | 59 | 54, 64 |
| **Homeless[Δ] at any time (past 12 months)** | 11 | 7, 14 |
| **Incarcerated >24 hours (past 12 months)** | 5 | 3, 8 |
| **Had Health insurance or coverage[*] (past 12 months)** | 98 | 97, 99 |
| **Any lapse in health coverage (past 12 months)** | 15 | 11, 18 |
| **Most common types of health insurance (past 12 months)** | | |
| Private health insurance | 46 | 40, 52 |
| Medicaid | 30 | 25, 35 |
| Medicare | 22 | 19, 25 |
| **Primary source of financial support (past 12 months)** | | |
| Salary or wages | 51 | 46, 56 |
| Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI) | 30 | 25, 34 |
| Other public assistance (welfare) | 9 | 6, 11 |
| Family, partner, or friend(s) | 4 | 3, 6 |
| Pension or retirement fund | 3 | 2, 5 |
| **Combined yearly household income[°] (US$)** | | |
| $0 to $19,999 | 51 | 45, 57 |
| $20,000 to $39,999 | 20 | 17, 23 |
| $40,000 to $74,999 | 14 | 11, 17 |
| $75,000 and more | 15 | 10, 20 |
| **At or below poverty threshold[†]** | 30 | 25, 35 |

[×]Hispanics or Latinos might be of any race. Participants are classified in only one category.
[Δ] Living on the street, in a shelter, in a single-room–occupancy hotel, or in a car.
[*]Participants could select more than one response for health insurance or coverage for antiretroviral medications.
[°]Income from all sources, before taxes, in the last calendar year.
[†]Poverty guidelines as defined by the Department of Health and Human Services (HHS); more information regarding the HHS poverty guidelines can be found at http://aspe.hhs.gov/poverty/faq.cfm.

**Table 2. CD4 and viral load monitoring, prescription of antiretroviral therapy, and viral suppression during the 12 months before the interview—Medical Monitoring Project, King County, 2009-2011**

| | Weighted Percent | Weighted 95% Confidence Interval |
|---|---|---|
| **Number of CD4 tests in 12 month period** | | |
| 0 | 5 | 3, 7 |
| 1 | 19 | 15, 23 |
| 2 | 28 | 24, 32 |
| ≥3 | 48 | 41, 54 |
| **Geometric mean CD4 count (cells/µL) in last 12 months** | | |
| Missing/Unknown | 5 | 3, 7 |
| 0–199 | 11 | 8, 14 |
| 200–349 | 16 | 13, 19 |
| 350–499 | 22 | 18, 25 |
| ≥500 | 47 | 42, 51 |
| **Lowest CD4 count (cells/µL) in the last 12 months** | | |
| Missing/Unknown | 5 | 3, 7 |
| 0–49 | 4 | 2, 5 |
| 50–199 | 10 | 7, 12 |
| 200–349 | 20 | 17, 24 |
| 350–499 | 25 | 21, 28 |
| ≥500 | 36 | 32, 41 |
| **Number of Viral Load tests in 12 month period** | | |
| 0 | 6 | 4, 9 |
| 1 | 16 | 13, 19 |
| 2 | 28 | 25, 32 |
| ≥3 | 49 | 44, 54 |
| **Most recent viral load documented undetectable or <200 copies/mL** | 79 | 75, 83 |
| **Prescribed ART in 12 month period** | 90 | 87, 93 |
| *Note:* This table summarizes medical record abstraction data | | |

**Figure 1. Most recent viral load documented undetectable or <200 copies/mL**




| | 2009 | 2010 | 2011 |
|---|---|---|---|
| Weighted Percent | 77 | 80 | 81 |

MMP Data Collecton Cycle

**Table 3. Sexually transmitted disease testing during the 12 months before the interview—Medical Monitoring Project, King County, 2009-2011**

| | All patients | | Sexually active patients only | | Patients who Reported Condomless Sex | |
|---|---|---|---|---|---|---|
| | Weighted Percent | Weighted 95% Confidence Iterval | Weighted Percent | Weighted 95% Confidence Interval | Weighted Percent | Weighted 95% Confidence Interval |
| Chlamydia testing | 22 | 18, 27 | 27 | 22, 32 | 33 | 22, 44 |
| Gonorrhea testing | 23 | 19, 27 | 28 | 23, 33 | 36 | 26, 46 |
| Syphilis testing | 46 | 39, 53 | 52 | 44, 59 | 59 | 49, 68 |
| Gonorrhea, chlamydia, & syphilis testing | 18 | 14, 21 | 21 | 16, 26 | 27 | 18, 37 |
| Chlamydia diagnosis | -- | -- | -- | -- | -- | -- |
| Gonorrhea diagnosis | 2 | 1, 2 | -- | -- | -- | -- |
| Syphilis diagnosis | 7 | 5, 9 | -- | -- | -- | -- |

Note: Information on STD testing and diagnoses was based on documentation in medical records; designation of being 'sexually active' based upon interview data.
The symbol, --, indicates that the cell size was too small to yield stable estimates.
*Neisseria gonorrhoeae testing* was defined as documentation of a result from culture, gram stain, the nucleic acid amplification test (NAAT), or the nucleic acid probe.
*Chlamydia trachomatis* testing was defined as a result from culture, direct fluorescent antibody (DFA), enzyme immunoassay (EIA) or enzyme-linked immunoassay (ELISA), the nucleic acid amplification test (NAAT), or nucleic acid probe.
Syphilis testing was defined as a result from non-treponemal syphilis tests (rapid plasma reagin [RPR], Venereal Disease Research Laboratory [VDRL]), treponemal syphilis tests (*Treponema pallidum* hemagglutination assay [TPHA], *T. pallidum* particle agglutination [TP-PA], microhemagglutination assay for antibody to *T. pallidum* [MHA-TP], fluorescent treponemal antibody absorbed [FTA-ABS] tests), or dark-field microscopy.

**Table 4. Estimated prevalence of co-morbidities, Medical Monitoring Project, King County, 2009-2011.**

| | Weighted Percent | Weighted 95% Confidence Interval |
|---|---|---|
| Hypertension* | 28 | 24, 32 |
| Diabetes* | 10 | 8, 12 |
| Dyslipidemia* | 13 | 9, 16 |
| History of Hepatitis C | 16 | 13, 19 |
| History of Hepatitis B | 10 | 8, 12 |
| Depression based on DSM-IV criteria† | | |
| No depression | 74 | 70, 78 |
| Other depression | 11 | 8, 13 |
| Major depression | 12 | 10, 15 |

*Note:* With the exception of depression, all estimates presented in this table summarize medical record abstraction data.
*Per medical record documentation in the 12 month period prior to interview
†Based upon interview data ; responses to the 8 items on the Patient Health Questionnaire (PHQ-8) were used to define "major depression" and "other depression," according to criteria from the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV-TR). "Major depression" was defined as having at least 5 symptoms of depression, while "other depression" was defined as having 2-4 symptoms of depression.

**Table 5. Reported substance use during the 12 months before interview, Medical Monitoring Project, King County, 2009-2011.**

| | Weighted Percent | Weighted 95% Confidence Interval |
|---|---|---|
| **Smoking status** | | |
| Never smoked | 38 | 34, 42 |
| Former smoker | 27 | 22, 31 |
| Current smoker | 35 | 31, 39 |
| **Any alcohol use° (during past 12 months)** | 75 | 71, 79 |
| **Binge drinking× (during past 30 days)** | 16 | 13, 20 |
| **Use of any non-injection drugs (during past 12 months)** | 42 | 38, 47 |
| **Use of any injection drugs (during past 12 months)** | 8 | 6, 10 |
| **Types of drugs used (injection or non-injection)** | | |
| Marijuana | 34 | 30, 39 |
| Methamphetamine (crystal meth, tina, crank, ice) | 15 | 12, 18 |
| Poppers (amyl nitrate) | 14 | 11, 17 |
| Crack | 7 | 5, 9 |
| Cocaine | 7 | 5, 9 |
| GHB | 6 | 4, 7 |
| Downer (e.g., Valium, Ativan, or Xanax) | 4 | 2, 6 |
| Heroin or opium | 3 | 2, 5 |
| Painkiller (e.g., Oxycontin, Vicodin, or Percocet) | 2 | 1, 4 |
| X or Ecstacy | 2 | 1, 4 |

*Note:* Information on substance use was based on patient report during interview.
°Participants who drank at least 1 alcoholic beverage during the 12 months preceding the interview. Alcoholic beverage was defined as a 12-ounce beer, 5-ounce glass of wine, or 1.5-ounce shot of liquor.
×Participants who drank ≥5 alcoholic beverages at one sitting (≥4 for women) during the 30 days preceding the interview.

**Table 6. Sexual activity during the 12 months before the interview, Medical Monitoring Project, King County, 2009-2011**

| | Weighted Percent | Weighted 95% Confidence Interval |
|---|---|---|
| **Classification of sexual partnership types** | | |
| Any MSM (MSM only, and men who have sex with men and women) | 78 | 73, 82 |
| Men who have sex with women only | 8 | 6, 11 |
| Any women who have sex with men (women who have sex with men only, and women who have sex with men and women) | 11 | 8, 14 |
| **Any sexual activity (during past 12 months)** | 70 | 66, 74 |
| **Engaged in any unprotected sex with…** | | |
| Any partner | 38 | 33, 43 |
| Any partner whose HIV status was negative or unknown | 12 | 10, 15 |

**Table 7. Sexual risk behaviors during the 12 months before the interview among men who have sex with men, by type of partner, Medical Monitoring Project, King County, 2009-2011**

| MSM | Main or Casual Partner | | Main* partner | | Casual$^{\Delta}$ partner | |
|---|---|---|---|---|---|---|
| | Weighted Percent | Weighted 95% Confidence Interval | Weighted Percent | Weighted 95% Confidence Interval | Weighted Percent | Weighted 95% Confidence Interval |
| **Any anal sex** | 62 | 56, 68 | 42 | 37, 47 | 40 | 33, 47 |
| **Any unprotected† anal sex** | 43 | 37, 50 | 27 | 22, 31 | 29 | 23, 35 |
| **Unprotected† anal sex with partner whose HIV status was negative or unknown** | 13 | 9, 16 | 5 | 3, 7 | 9 | 6, 12 |
| **Insertive anal sex** | 48 | 43, 54 | 33 | 28, 38 | 30 | 24, 35 |
| **Unprotected† insertive anal sex** | 33 | 28, 38 | 21 | 16, 25 | 21 | 16, 25 |
| **Unprotected† insertive anal sex with partner whose HIV status was negative or unknown** | 6 | 4, 8 | 3 | 1, 4 | 4 | 2, 5 |

*Note*. Men who have sex with men were defined as men who reported sex with men during the 12 months preceding the interview, regardless of whether they also reported sex with women, or if no sexual activity was reported, men who identified as homosexual, gay, or bisexual.
*A partner with whom the participant had sex and to whom he felt most committed to (e.g., boyfriend, spouse, significant other, or life partner).
$^{\Delta}$A partner with whom the participant had sex but to whom he did not feel committed or whom he did not know very well.
†Neither the participant nor his partner used a condom.

**Table 8. Met and unmet needs for ancillary services during the 12 months before the interview, Medical Monitoring Project, King County, 2009-2011**

| | Persons who received service | | Persons who needed but did not receive services by time of interview | | Persons who did not need or receive services | |
|---|---|---|---|---|---|---|
| | Weighted Percent | Weighted 95% Confidence Interval | Weighted Percent | Weighted 95% Confidence Interval | Weighted Percent | Weighted 95% Confidence Interval |
| **Dental care** | 68 | 64, 72 | 19 | 16, 22 | 13 | 10, 15 |
| **HIV case management services** | 55 | 49, 62 | 5 | 3, 7 | 39 | 33, 46 |
| **Public benefits (e.g., SSI or SSDI)** | 39 | 34, 43 | 8 | 5, 10 | 54 | 49, 59 |
| **Mental health services** | 33 | 28, 38 | 8 | 6, 11 | 59 | 54, 64 |
| **Medicine through ADAP** | 32 | 27, 37 | 4 | 2, 6 | 60 | 56, 65 |
| **Meal or food services** | 29 | 24, 34 | 5 | 3, 8 | 66 | 60, 72 |
| **Transportation assistance** | 18 | 14, 22 | 8 | 6, 10 | 74 | 70, 78 |
| **Shelter or housing services** | 19 | 15, 22 | 6 | 3, 8 | 75 | 71, 79 |
| **Counseling about how to prevent spread of HIV** | 24 | 20, 29 | -- | -- | 75 | 71, 80 |
| **HIV peer group support** | 11 | 9, 14 | 11 | 8, 14 | 77 | 73, 81 |
| **Professional help remembering to take HIV medicines on time or correctly (adherence support services)** | 20 | 16, 24 | 3 | 1, 4 | 77 | 73, 81 |
| **Drug or alcohol counseling or treatment** | 10 | 8, 13 | 4 | 2, 6 | 85 | 82, 89 |
| **Home health services** | 4 | 3, 6 | -- | -- | 94 | 92, 96 |
| **Domestic violence services** | -- | -- | -- | -- | 95 | 93, 98 |
| **Interpreter services** | 3 | 2, 5 | -- | -- | 96 | 94, 98 |
| **Childcare services** | -- | -- | -- | -- | 98 | 97, 100 |

Abbreviations: SSI, Social Security Supplemental Income; SSDI, Social Security Disability Insurance; ADAP, AIDS Drug Assistance Program.
*Note*. Participants could report receiving or needing more than one service.
The symbol, --, indicates that the cell size was too small to yield stable estimates.


1. Centers for Disease Control and Prevention. *Behavioral and Clinical Characteristics of Persons Receiving Medical Care for HIV Infection—Medical Monitoring Project, United States, 2010*. HIV Surveillance Special Report 9.
2. HIV/AIDS Epidemiology Unit, Public Health – Seattle & King County and the Infectious Disease Assessment Unit, Washington State Department of Health. *HIV/AIDS Epidemiology Report 2nd Half 2010.*
3. McNaghten, A.D., et al., *Improving the representativeness of behavioral and clinical surveillance for persons with HIV in the United States: the rationale for developing a population-based approach.* PLoS One, 2007. **2**(6): p. e550.
4. Centers for Disease Control and Prevention. *Behavioral and Clinical Characteristics of Persons Receiving Medical Care for HIV Infection—Medical Monitoring Project, United States, 2010*. HIV Surveillance Special Report 9.

## STD Case Counts

### Table 1: King County STD morbidity

| | 2013 | | 2014 | |
|---|---|---|---|---|
| | 2013Q2 | YTD | 2014Q2 | YTD |
| Gonorrhea (GC) | 386 | 866 | 524 | 970 |
| GC: MSM* | 207 | 504 | 281 | 536 |
| Urethral GC | 76 | 177 | 109 | 195 |
| Rectal GC | 71 | 203 | 121 | 234 |
| Pharyngeal GC | 94 | 245 | 135 | 257 |
| GC: Women^ | 96 | 187 | 127 | 238 |
| GC: MSW^† | 64 | 133 | 88 | 141 |
| Chlamydia (CT) | 1671 | 3448 | 1858 | 3685 |
| CT: MSM | 257 | 549 | 302 | 597 |
| Urethral CT | 95 | 204 | 117 | 217 |
| Rectal CT | 161 | 349 | 174 | 358 |
| CT: Women^ | 1039 | 2112 | 1097 | 2169 |
| CT: MSW^ | 300 | 617 | 347 | 674 |
| Syphilis‡ | 129 | 222 | 98 | 207 |
| Primary and secondary | 41 | 79 | 40 | 92 |
| Early latent | 48 | 77 | 26 | 53 |
| Late + unk duration | 40 | 66 | 32 | 61 |
| Early syphilis: MSM | 82 | 138 | 62 | 132 |
| Early syphilis: Women | 0 | 4 | 1 | 5 |
| E syphilis: MSW | 4 | 7 | 3 | 6 |
| Congenital syphilis | 0 | 0 | 0 | 1 |

* Men who have sex with men
† Men who have sex with women
^ Genital tract infection
‡ Total cases (all stages)

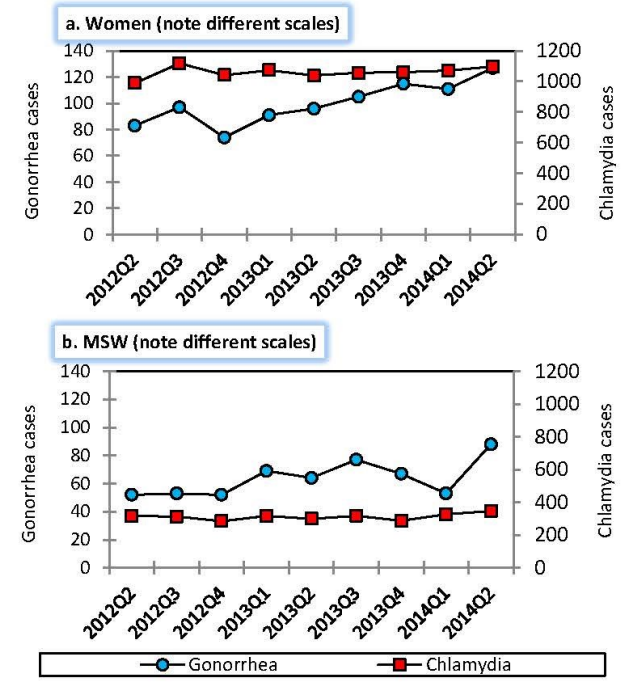
### Table 2: King County newly diagnosed HIV cases*

| | 2013 | | 2014 | |
|---|---|---|---|---|
| | 2013Q1 | YTD | 2014Q1 | YTD |
| Total^ | 74 | 74 | 52 | 52 |
| MSM | 51 | 51 | 30 | 30 |
| Women | 11 | 11 | 11 | 11 |
| MSW | 5 | 5 | 3 | 3 |

* Data shown for prior quarter due to reporting delay
^ Column may not equal total due to missing sexual preference data

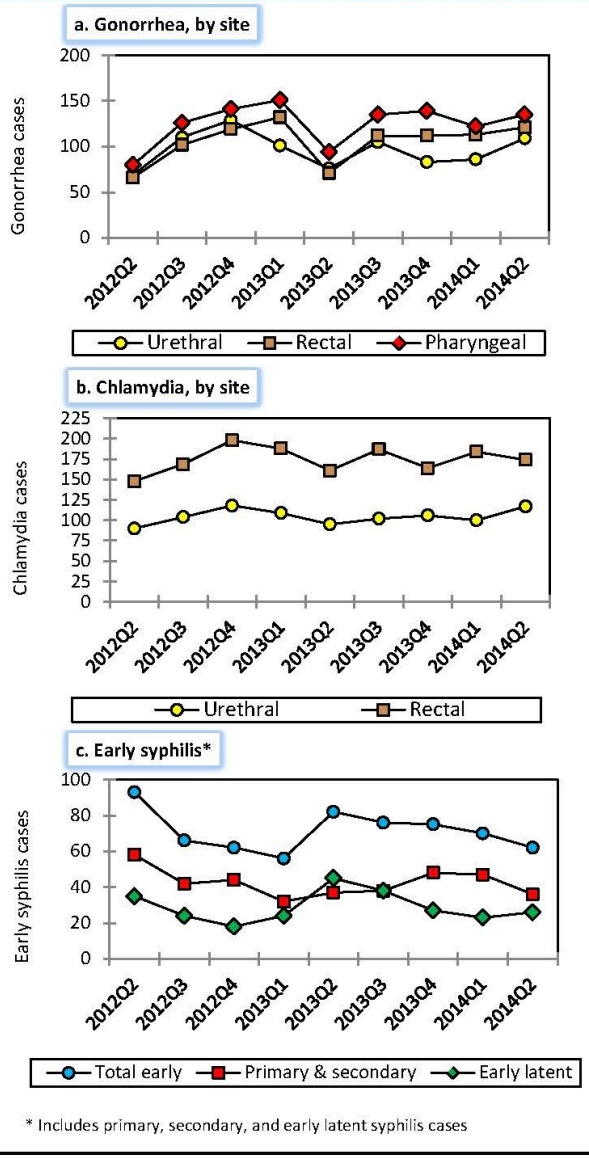
## Trends in STD Morbidity

### Figure 1: Quarterly King County STD morbidity, women and MSW




## Trends in STD Morbidity

### Figure 2: Quarterly King County STD morbidity among MSM




* Includes primary, secondary, and early latent syphilis cases

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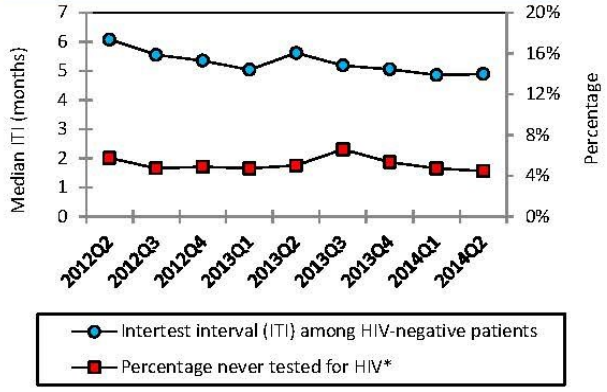
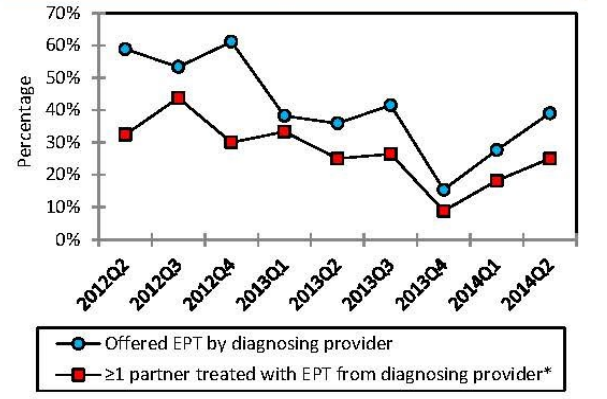
Figure 3: HIV testing among PHSKC STD Clinic patients, MSM (note different scales)




* Denominator includes patients who reported never testing or negative/unknown results

HIV testing should be performed annually on low-risk MSM and quarterly on high-risk MSM[a].

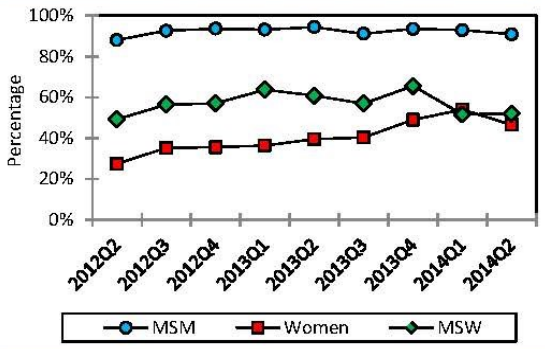
Figure 5: Expedited Partner Therapy (EPT) among King County women and MSW diagnosed with GC or CT




* Median number of patients surveyed per quarter = 36 (Range 16-53)

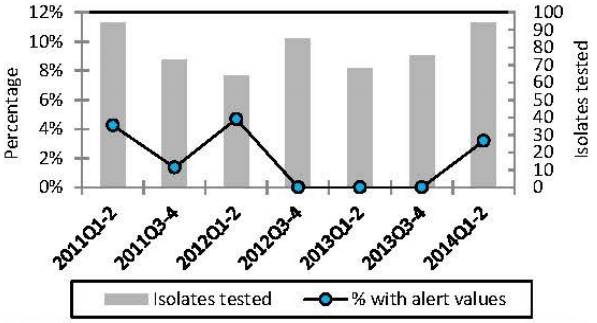
All women and MSW diagnosed with gonorrhea or chlamydia should be offerred EPT by their diagnosing provider.

Figure 4: Percentage of King County residents with a bacterial STD tested for HIV (excludes HIV+ residents)




Anyone diagnosed with a bacterial STD should be tested for HIV.

Figure 6: Percentage of male GISP[b] urethral isolates with alert values for cephalosporins or azithromycin (note scales)




Alert value = Minimum Inhibitory Concentration (MIC, lowest antibiotic concentration needed to halt bacterial growth) is higher than preset thresholds[c]. Alert value MICs represent decreased susceptibility to an antibotic but may not represent resistance.

Table 3: Male GISP urethral isolates with alert values for cephalosporins or azithromycin[d]

| | 2013 | | 2014 | |
|---|---|---|---|---|
| | 2013Q1-2 | YTD | 2014Q1-2 | YTD |
| Total isolates tested* | 68 | 68 | 94 | 94 |
| MSM | 54 | 54 | 78 | 78 |
| MSW | 5 | 5 | 14 | 14 |
| Total alert isolates* | 0 | 0 | 3 | 3 |
| MSM | 0 | 0 | 3 | 3 |
| MSW | 0 | 0 | 0 | 0 |

* Column may not equal total due to missing sexual preference data

**Footnotes:**

[a]High-risk = MSM with any one of the following in the prior year: diagnosis of a bacterial STD, methamphetamine or popper use, ≥10 sex partners (anal or oral), or unprotected anal sex with a partner of unknown or discordant HIV status
Low-risk = sexually active MSM who do not meet high-risk criteria

[b]Gonococcal Isolate Surveillance Project (GISP), source of antibiotic susceptibility data, is supported by the Centers for Disease Control and Prevention

[c]Alert values:
Ceftriaxone MIC ≥ 0.125 µg/ml
Cefixime MIC ≥ 0.25 µg/ml
Azithromycin MIC ≥ 2.0 µg/ml

[d]Three non-GISP azithromycin-resistant isolates (2 pharyngeal, 1 rectal) were identified during the first quarter of 2014

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# Latent Reservoirs in HIV: New information and new studies from the UW Primary Infection Clinic and the UW AIDS Clinical Trials Unit

Cellular and anatomic reservoirs of latent HIV are recognized as key determinants of HIV persistence despite long-term anti-retroviral therapy. Understanding these reservoirs is critical to working toward their eradication and an eventual cure for HIV infection.

The recent news that the "Mississippi Baby", thought to have been cured through initiation of very early treatment, has shown a return of detectable virus after more than two years is extremely disappointing, but also highlights the importance of understanding reservoirs as locations from which viral recrudescence may occur.

Two ongoing studies at the University of Washington seek to add to our knowledge of HIV reservoirs:
A new study at the **UW Primary Infection Clinic** will assess cellular and anatomic reservoirs among a group of patients who were initially treated during primary infection and have since maintained undetectable levels of plasma virus. Participants will be asked to undergo leukapheresis for collection of white blood cells in order for detailed and sensitive analyses of quantity and integration location of latent HIV. Leukapheresis is a procedure in which white blood cells are separated from the rest of the blood and the remainder of the blood components are returned to the person. It is similar to a blood donation. A subset of these participants will also undergo bronchoscopy, for collection and study of alveolar macrophages and pulmonary T-cells, and sigmoidoscopy, for sampling of gastrointestinal tissue. The aim of the project is to further understand mechanisms that sustain persistent HIV reservoirs and what the impact of early treatment may have been on such reservoirs.

A second study looking at reservoirs is being conducted at the **UW AIDS Clinical Trials Unit**.
A5315: The ROMIDEPSIN Study - A Study of Single Dose Romidepsin (RMD) in HIV-Infected Adults with Suppressed Viremia on Antiretroviral Therapy to Assess Safety, Tolerability, and Activation of HIV-1 Expression. The purpose of the study is to determine:

- the safety and tolerability of a single dose of an investigational drug called RMD, and
- whether RMD can "wake-up" HIV in people on suppressive anti-HIV drug regimens

Participants in this study will also have the leukapheresis procedure described above.
"Waking-up" HIV is being studied as part of strategies referred to as "kick and kill" that someday in the future may help cure HIV. Since the HIV latent reservoir is thought to be comprised of long-lived cells containing HIV in their DNA, the premise of "kick and kill" is that you find a way to stimulate those cells to begin producing HIV, or turn on the HIV genes (i.e. with histone deacetylase [HDAC] inhibitors like romidepsin). If a person is on effective antiretroviral therapy (ART), that newly produced HIV would not be able to infect other cells. Those cells actively producing HIV hopefully would die very quickly. While some compounds that turn on HIV genes have been identified, those stimulated cells do not seem to die. So a second component might be needed to target and kill those cells producing HIV. Presumably that would be through an increased immune response from a vaccine or neutralizing antibodies. As those cells are producing HIV they should be more visible or recognizable to the immune system than they were when they were resting. These studies will ask a lot of the participants, as the reservoirs will require sampling of tissues in places such as the lung, the gastrointestinal tract, the spinal fluid, or in lymph nodes. A5315 is an important early step on the research pathway that hopefully someday will lead to a combination of strategies that could result in the long-term control of HIV without daily medications.

***Contributed by Janine Maenza and Jeffrey Schouten***

# The AIDS Malignancy Clinical Trials Consortium (AMC)

The AIDS Malignancy Consortium (AMC) Seattle would like regional HIV providers and oncologists to know about the AMC sponsored research that is being conducted at Harborview Medical Center, the Virginia Mason Medical Center and the Seattle Cancer Care Alliance. The aim of sharing this information is to establish a connection between the AMC and local clinical providers, and to increase awareness of the AMC sponsored cancer research among providers and HIV+ patients. We hope that this will provide access for your patients to the AMC sponsored research studies. The AMC is enrolling people in several protocols. The research coordinators/nurses at each participating site are:

1. **Virginia Mason Medical Center:** Leila Ponce, CCRP Leila.Ponce@VirginiaMason.org (Research Coordinator) Office: 206-342-6926
2. **Fred Hutchinson Cancer Research: Center/ Seattle Cancer Care Alliance.** Peace Imani, MMED, MPH pimani@fhcrc.org (Research Coordinator) Office: 206-667-3160
3. **Harborview Medical Center:** Lindsay Legg, RN lmlegg@uw.edu (Research Nurse) Office: 206-744-8748

The AMC is a National Cancer Institute-supported clinical trials group founded in 1995 to support innovative trials for AIDS-related cancers. The AMC is composed of over 37 Clinical Trials Sites worldwide, five Working Groups, an Administrative Office, a Statistical Office, and an Operations and Data Management Office. Collectively, these components develop and oversee the scientific agenda, manage the groups' portfolio of clinical trials and other science-based studies, and help to develop new protocols. Four of the working groups deal with the cancers that affect HIV-positive patients: Kaposi's sarcoma, lymphomas, human papillomavirus-related cancers (for example, anal and cervical cancers), and Non-AIDS defining cancers (for example, lung cancer, head and neck cancer, liver cancer). The Laboratory Working Group oversees the Central Laboratories of the AMC and develops laboratory studies to answer important scientific questions related to cancer in HIV-positive patients. In addition, all of the groups within the AMC are working to expand the AMC globally and to conduct clinical trials for AIDS-related cancers in diverse patient populations in the United States, South Africa, Zimbabwe, Uganda, and Kenya. More information on the AMC can be found on the AMC website at http://pub.emmes.com/study/amc/public/index.htm

**The studies currently enrolling include:**

1. Safety and efficacy treatment studies of:
   - Kaposi's sarcoma
   - Non-Hodgkin's lymphoma
   - Hodgkin's lymphoma
   - Advanced solid tumors (histologically confirmed solid malignancy that is metastatic or unresectable and for which standard curative or palliative measures do not exist or are no longer effective)
   - Non-small cell lung cancer
2. A tissue repository study for HIV-infected individuals with diffuse large B cell lymphoma, non-small cell lung malignancy, anal cancer, or cervical cancer
3. HPV vaccination efficacy in young HIV-positive males (13 to 26 years)
4. A one-time interview study of HIV-infected individuals eligible for another AMC study to examine why people choose to volunteer or choose not to participate in AMC clinical studies

***Contributed by David Aboulafia and Leila Ponce***

# ACTU Current Studies September 2014

**DID YOU KNOW?**

- Pretty much everything we know about HIV treatment has come from research—and not just any research, but clinical trials involving HIV-positive people.
- People living with HIV today have yesterday's clinical trial volunteers to thank for the highly effective, better tolerated and easier-to-take medications now available.
- Research not only benefits the advancement of treatments, but it also helps reduce the stigma and wrongful shame that is associated with HIV in many cultures.
- Research's power can bridge divides in culture and forge bonds with and between those communities that go on outside of any research site.
- Participating in a study is **an important decision.** We hope that talking with our staff—along with talking with a provider, a family member, or a friend—will help anyone better understand the ins and outs of participating in research.

For referrals or additional information, call the **UW ACTU** at **206-744-3184** and ask for **Eric Helgeson.**

**THE ROMIDEPSIN STUDY: FOR HIV+ PEOPLE WITH AN UNDETECTABLE VIRAL LOAD**
**A CURE RESEARCH STUDY**

This study will test whether one dose of an investigational drug called Romidepsin will wake up the sleeping or hidden HIV in your body and bring it out of hiding. We will also test whether your body and your HIV medicines will begin to clear out the exposed virus from areas in your body where HIV has been stored. Exams, tests and the study medication are all provided at no cost. Participants receive $20 per visit upon entry.

**REQUIREMENTS:**

- HIV+ men & women, 18 yrs or older
- CD4+ count is higher than 300
- Have an undetectable viral load with no blips
- Taking a Sustiva® or Isentress® based regimen
- No hepatitis B or C infection
- Are not pregnant, breast feeding or planning pregnancy
- Willing and able to have an IV infusion over 4 hours

**LENGTH OF STUDY:** 4 weeks (28 days)

**SCHEDULE:** Screening, Pre-Entry, Entry, Day 1, Day 2, Day 14 and 28

**WAKING UP THE RESERVOIRS?**

A major obstacle to eradicating HIV infection is the persistence of virus in long-lived cells, such as latently infected memory CD4+ T-cells. Current estimates of the size of the latent HIV reservoir are that approximately one in a million memory CD4+ T cells contains integrated replication-competent HIV. It has been estimated that the decay half-life of these cells exceeds 40 months and that more than 70 years of suppressive ART would be required to eliminate this viral reservoir. In addition, recent studies have shown the majority of patients on ART with an undetectable viral load have residual viremia that can be detected by assays with single copy sensitivity, underscoring the need for new therapeutic approaches to eliminate these reservoirs.

Because viral replication in activated CD4+ T cells usually results in the death of the cell, one approach for eliminating the HIV-1 reservoir is to specifically activate viral replication in latently-infected CD4+ T cells. These cells would then be killed by the virus or following immune recognition. In the presence of ART the virus produced would be prevented from infecting new CD4+ T cells. The death of the reactivated latently infected cells may gradually deplete the HIV-1 reservoir. Alternatively, based on recent *in vitro* work, induction of HIV from latency may not be sufficient to eliminate infected cells, and additional measures, such as stimulation of cytotoxic T lymphocytes, may be necessary to deplete cells that have been induced to express HIV. Nevertheless, activation of virus from latency is likely to be required in any strategy that seeks to eliminate HIV infection.

**THE CONTROLLERS STUDY: FOR HIV+ PEOPLE WHO HAVE MAINTAINED A LOW VIRAL LOAD <u>WITHOUT</u>**

HIV controllers are a small group of HIV+ people who are able to keep the virus from replicating *without* taking HIV medicine. Despite 'controlling' their virus, controllers may still have T-cell activation and inflammation, which contribute to heart disease and other chronic conditions that affect all HIV+ people. Our study hopes to determine if starting antiretroviral therapy (ART) with Complera® will result in a significant reduction in immune activation, inflammation and the size of the latent HIV reservoir in HIV controllers. All study medicines are all provided at no cost as part of this study. Participants receive $20 per visit upon entry.

**REQUIREMENTS:**

- HIV+ men and women 18 years or older
- Have never taken HIV medications
- Have a viral load below 500 for more than 2 years

- Be willing to start HIV medications for 48 weeks
- No evidence of certain drug resistant virus
- Not currently treated, nor planning on being treated, for hepatitis C
- No hepatitis B infection
- Not pregnant, breast feeding nor planning pregnancy

**LENGTH OF STUDY:** about 60 weeks
**SCHEDULE:** Screening, pre-entry, entry, and weeks 4, 12, 16, 24, 36, 48, and 60.
If entering Step 2 of the study, add weeks 72, 84, and 108.

**THE LYMPH NODES STUDY: FOR HIV+ PEOPLE WITH AN UNDETECTABLEVIRAL LOAD**
HIV causes inflammation (irritation) inside the body, and may also cause scarring of the body called fibrosis. Fibrosis might contribute to the heart attacks, diabetes, and kidney problems that some HIV+ people develop. Fibrosis in lymph nodes can prevent your immune cells from coming back and protecting you from many kinds of infections. This study will see if a drug called telmisartan will decrease fibrosis (scarring) and inflammation (irritation) in people who are infected with HIV and doing well on their HIV medications. Length of Study: About 48 weeks.Telmisartan is FDA-approved for treating high blood pressure and decreasing the chance of heart attacks and strokes in people over 55 years of age. It has not been FDA-approved to treat anything specifically in people with HIV. Participants will receive $20.00 per study visit, starting at entry, and $125 for each biopsy visit.
**REQUIREMENTS:**
- HIV+ men and women,18 years or older
- Have been on anti-HIV medication for more than 48 weeks
- Have an undetectable viral load (a single blip of less than 500 is OK)
- Plan to stay on your meds for the duration of the 48 week study
- Do not have severe liver disease
- Are not pregnant, breast feeding or planning pregnancy
- Are willing and able to have a fat biopsy and lymph node biopsy
- Have a Body Mass Index between 20-35 kg/m2
- Do not have uncontrolled high blood pressure

**THE HCV-LTC STUDY: FOR ALL PEOPLE WITH HEP C or WITH HEP C and HIV**
In the past few years, there has been a rapid development of new, more effective treatments for hepatitis C (HCV). And yet, we don't know much about the long-term outcomes for people, especially those living with HIV, who have been treated with these new medicines. This observational study will help us to understand the impact of successful OR unsuccessful Hep C treatment on a person's health over many years. It will also help us understand how long resistance to new Hep C medications lasts in a person and whether it affects future Hep C treatments.

**LENGTH OF STUDY:** About 260 weeks (5 years)
**SCHEDULE OF STUDY VISITS:** Screening, Entry, and then every 6 months for 5 years.

**THIS IS AN OBSERVATIONAL STUDY AND DOES NOT PROVIDE ANY MEDICATION**
**REQUIREMENTS:**
- Women & men at least 18 years old who are infected with Hep C OR co-infected with Hep C and HIV
- Completed treatment for Hep C within the past 12 months as part of a clinical trial
- Not currently on Hep C treatment (you may start a new treatment once you join this study)
- Be willing to make 2 study visits a year
- Other requirements to be discussed.

**HOW WILL I KNOW IF I AM CURED OF HEPATITIS C?**
Being cured will prevent the progression of liver fibrosis and can reduce the risk of liver cancer. However, the chance of being cured depends on a number of elements, including the virus genotype, your medical history, the extent of your liver damage and how well you respond to treatment. You are deemed cured if the virus cannot be detected in your blood six months after the end of treatment. This is known as a sustained virologic response, or SVR.

As the number of available treatments for hepatitis C has increased, so has the chance of being cured. However, not all people who undergo treatment will be cured. Some people will not respond to current treatment options. During treatment it is possible that the virus becomes undetectable but returns to detectable levels after the end of the treatment. This is known as a relapse.

**THE NEXT-PREP STUDY: USING HIV MEDICINES TO PREVENT PEOPLE FROM GETTING HIV**
Pre-exposure prophylaxis (PrEP) is a promising new biomedical intervention to prevent HIV transmission in HIV-negative people who are at risk of becoming exposed to HIV. Our study will assess the safety and tolerability of 4 antiretroviral (ARV) drug regimens used as PrEP to prevent HIV transmission in
- heterosexual women
- transgender women & men
- gay & bisexual men
- other men who have sex with men

Participants will be randomly assigned (like flipping a coin) to one of 4 groups.
- Group A: Selzentry + Emtriva placebo + Viread placebo
- Group B: Selzentry + Emtriva + Viread placebo
- Group C: Selzentry + Emtriva Placebo + Viread
- Group D: Selzentry placebo + Emtriva placebo +Viread

Our previous classes of anti-HIV medications have worked only after the virus has gotten inside the cell

and has already been doing some of its infection processes. This new class of medication works much earlier, so that is blocks the virus's ability to get inside the cell to begin with. Approved HIV medicines used for PrEP must be taken every day to work.
**LENGTH OF STUDY:** About 49 weeks.
**SCHEDULE:** Screening, entry, and weeks 2, 4,8,16, 24, 32, 40, 48 and 49.

Participants will receive $20.00 per study visit, starting at entry. This is an investigational study of new medicines for PrEP. The FDA has recently approved one drug, Truvada, for use to prevent HIV infection. Exams, lab tests, and all study drugs are provided at no cost.

**REQUIREMENTS:**

- Were born female or male, age 18 y/o & older
- Had receptive OR insertive anal intercourse without using condoms with either an HIV-positive male partner OR a male partner of unknown HIV status within 3 months of entering the study
- Not enrolled in an HIV vaccine trial and received active drug (not a placebo)
- Not enrolled in any other HIV interventional research study
- Have not used HIV medicines (for PEP or PrEP) 90 days prior to entry
- Are willing to undergo all required study procedures (including sexual assessment by computer assisted self-interview, use of a drug monitoring device, and text messaging)

**MORE ABOUT SELZENTRY AND THE CCR5 RECEPTOR**

Selzentry® (Maraviroc) is the first "attachment inhibitor" drug. It's a brand new class of medicines that works by what we call a "new mechanism of action," because it stops HIV from getting inside of a human immune cell. This is important, because when a medicine works by a new mechanism of action, it is going to be active against viruses that have become resistant or non-responsive to our previous classes of HIV meds. Rather than fighting HIV inside white blood cells (like most antiretrovirals used to treat infection with HIV) maraviroc prevents the virus from entering uninfected cells. It does this by blocking the predominant route of entry, the CCR5 co-receptor, a protein on the surface of the immune cells. When maraviroc blocks this receptor, HIV cannot infect that cell.

**OUR COMMITMENT TO YOU**

A study visit at the UW AIDS Clinical Trials Unit (ACTU) includes physical examinations, updating your health status and obtaining a wide variety of often costly laboratory tests. Our commitment to you is to use your contributions to our studies wisely and respectfully as we monitor and evaluate your physical health and response to the study drug. This also includes providing you with accurate, up-to-date information about HIV infection and its effect on your body, and steps you can take to minimize its impact. We will also keep you informed of any new information about the study medications you are taking, and once the study has been completed, we will share the results with you. Progress in conquering HIV infection and AIDS is a team effort, and you are a critical and much appreciated part of that team.

**THE ROLE OF RESEARCH STUDIES**

HIV/AIDS clinical trials are carefully designed research studies that involve people and are designed to answer specific questions about the safety and effectiveness of treatment for HIV/AIDS and related conditions.

Clinical trials are vitally important because there are no other direct ways to learn how different people respond to medications, treatments, or therapeutic approaches.

Clinical trials may study experimental medications to treat HIV and AIDS, FDA approved medications used in new ways or in new combinations, or medications to prevent or treat related infections. They may also study ways to help persons manage their HIV/AIDS medications and the long-term general health of persons with HIV/AIDS.

Clinical trials and laboratory studies conducted by the ACTG have made major contributions to:

- optimizing antiretroviral therapy (ART)
- managing drug resistance
- preventing and treating co-infections
- evaluating acute and long-term toxicities
- demonstrating the importance of pharmacogenomics in predicting drug toxicities

Results of these studies have helped establish the standard for the management of HIV disease and form the basis of current treatment guidelines.

This progress in the treatment of HIV-1-infected individuals has resulted in dramatic reductions in AIDS mortality in the U.S. and other countries of the developed world.

**UW AIDS Clinical Trials Unit**
Harborview Medical Center
2nd Floor, West Clinic, Desk B
325 Ninth Ave Box 359929
Seattle, WA 98104
Phone: 206-744-3184
Fax: 206-744-3483
www.uwactu.org
facebook.com/uwactu

***Submitted by Michel Louella***