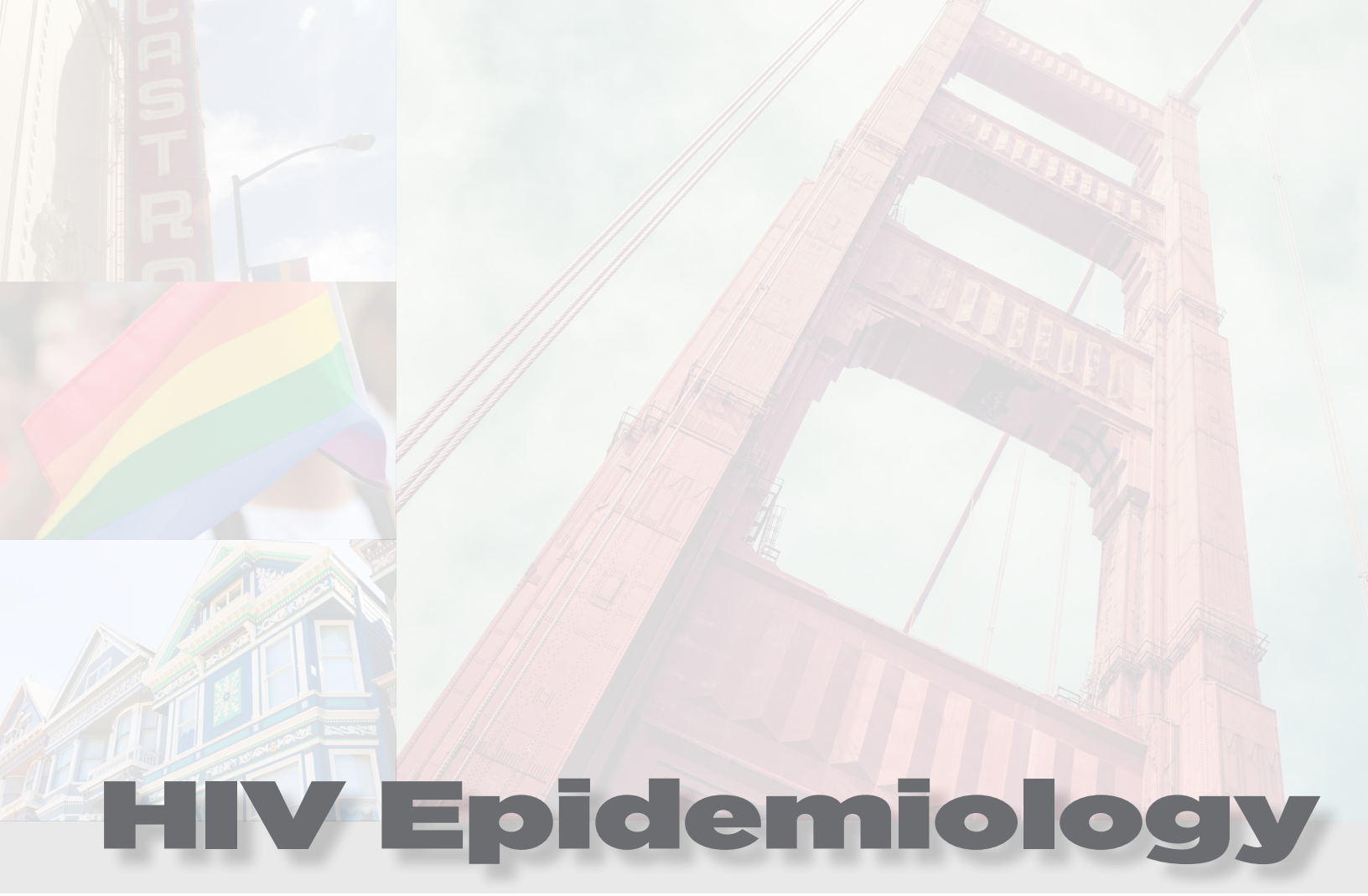
HIV Epidemiology

Annual Report

2016

San Francisco
Department of Public Health
Population Health Division



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San Francisco Department of Public Health
HIV Epidemiology Section
25 Van Ness Avenue, Suite 500
San Francisco, CA 94102 USA

Phone (415) 437-6335
Fax (415) 431-0353

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San Francisco Department of Public Health

Director of Health	Barbara Garcia, MPA
Health Officer and Director of Population Health Division	Tomás Aragón, MD, DrPH

Applied Research, Community Health Epidemiology, and Surveillance Branch

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Staff	Jonathan Brock Aida Flandez Veronica Jimenez Patrick Norton, PhD, MA Amadeia Rector Rufina San Juan Nashanta Stanley, MBA Belinda Van Qianya Vinson James Wendelborn
Researchers	Nancy Hessol, MSPH Sandra Schwarcz, MD, MPH

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Abbreviations

ART	Antiretroviral therapy
CDC	Centers for Disease Control and Prevention
MMP	Medical Monitoring Project
MSM	Men who have sex with men
MSM-PWID	Men who have sex with men and who also inject drugs
OOJ	Out-of-jurisdiction
PLWH	Persons living with HIV
PWID	People who inject drugs
SFDPH	San Francisco Department of Public Health
STD	Sexually transmitted diseases

Introduction

Surveillance data are most often used to characterize the "who, what, when, and where" of disease patterns and to guide public health prevention and control measures at the population level. In San Francisco, HIV surveillance data are widely used to measure progress toward reducing HIV incidence and improving health outcomes for people living with HIV (PLWH). Surveillance data, such as that presented annually in this report, can identify successes as well as identify vulnerable populations who are experiencing barriers to HIV prevention, treatment and care. Our data are used widely throughout the City for program evaluation and prevention planning.

However, HIV surveillance data are increasingly being used for public health action including direct outreach to individuals to prevent HIV transmissions and to facilitate linkage to and re-engagement in HIV medical care. Data routinely collected by HIV surveillance can be used to monitor individuals' receipt of HIV care and help to identify individuals who may need assistance receiving optimal care. One key example is "Data-to-Care," a collaborative San Francisco Department of Public Health activity conducted by HIV surveillance and the Linkage, Integration, Navigation, and Comprehensive Services Program (LINCS). HIV surveillance staff use laboratory data, including CD4 and viral load tests, to identify people "not-in-care" and refer them to LINCS. LINCS staff then work to address patient needs, including assistance in finding insurance, attending care appointments and adhering to medication. In this report, we present for the first time linkage, retention and viral suppression care indicators among PLWH who received LINCS services.

Surveillance-based referral programs such as Data-to-Care are promising efforts to facilitate HIV medical care and improve outcomes for PLWH along the HIV care continuum. As we continue to move from simply monitoring surveillance data to describe trends and patterns of HIV in the community to using surveillance for public health action, we will be reporting on successes and adding new sections to this report. We look forward to using HIV surveillance data to help achieve our City's goal of "Getting to Zero" new HIV transmissions and ensuring that all PLWH are supported in efforts to maintain their health.

1 Overview of HIV in San Francisco

From the beginning of the HIV epidemic, HIV case surveillance in San Francisco has been conducted through active and passive methods and routinely evaluated. As of December 31, 2016, there were 16,010 San Francisco residents diagnosed and living with HIV (Table 1.1). These persons comprised 13% of California's living HIV cases and 2% of persons living with HIV (PLWH) in the United States. Compared to cases reported in California and the United States, San Francisco living HIV cases were more likely to be male and white, and to occur among men who have sex with men (MSM), including MSM who also inject drugs (MSM-PWID).

Compared to persons newly diagnosed with HIV nationally, newly diagnosed people with HIV in San Francisco were more likely to be male, white, and MSM. Compared to all San Franciscans living with HIV, San Francisco newly diagnosed persons in 2016 had greater proportion of females, African Americans, Latinos, and Asian/Pacific Islanders, and a smaller proportion of MSM (including MSM-PWID). San Francisco's newly diagnosed persons were similar to California's newly diagnosed persons in 2014 by gender, but differed by racial/ethnic group and transmission category distribution; San Francisco's newly diagnosed persons had higher proportions of whites, Asian/Pacific Islanders, and PWID (MSM and non-MSM).

Table 1.1 Characteristics of persons living with HIV and persons newly diagnosed with HIV in San Francisco, California and the United States

	Living HIV Cases			Newly Diagnosed HIV Cases		
	San Francisco[1] (N = 16,010) %	California[2] (N = 126,241) %	United States[3] (N = 972,813) %	San Francisco[1], 2016 (N = 223) %	California[2], 2014 (N = 5,002) %	United States[3], 2015 (N = 40,040) %
Gender						
Male	92%	87%	76%	87%	87%	81%
Female	6%	12%	24%	11%	12%	19%
Transgender[4]	2%	1%	--	2%	1%	--
Race/Ethnicity						
White	59%	42%	31%	39%	29%	26%
African American	12%	18%	42%	15%	17%	44%
Latino	19%	34%	22%	28%	44%	24%
Asian/Pacific Islander	6%	4%	1%	15%	7%	3%
Native American	<1%	<1%	<1%	0%	<1%	<1%
Other/Unknown	3%	2%	4%	3%	2%	2%
Transmission Category[5]						
MSM	74%	66%	53%	70%	74%	67%
PWID	6%	7%	14%	9%	3%	6%
MSM-PWID	15%	7%	5%	9%	3%	3%
Heterosexual	4%	15%	26%	6%	10%	24%
Other/Unidentified	2%	5%	2%	5%	10%	<1%

1 San Francisco data are reported through March 31, 2017 for cases diagnosed through December 31, 2016.
2 California data are reported through December 2015 for cases diagnosed through December 31, 2014.
3 U.S. data are reported through June 30, 2016 and reflect cases diagnosed through December 31, 2015. U.S. data reflect unadjusted numbers for 50 states and 6 dependent areas and may be found in the CDC HIV Surveillance Report, 2015; vol. 27. http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Published November 2016. Accessed May 8, 2017.
4 Transgender data are not reported by the United States. See Technical Notes "Transgender Status."
5 Transmission category data reported by the United States have been statistically adjusted for missing values.

The number of San Francisco residents diagnosed with HIV stage 3 (AIDS) reached a peak of 2,328 in 1992 and has declined in all subsequent years (Figure 1.1). Beginning in 1995, the number of deaths among people living with HIV ever classified as stage 3 has decreased dramatically due to effective combination antiretroviral therapies (ART). From 1999 the number of new stage 3 diagnoses and the number of deaths have continued to decline but at a slower rate than from 1995 to 1998. Beginning in 2013, the number of deaths among people with stage 3 diagnosis has exceeded the number of new stage 3 diagnoses which may reflect the impact of pre-exposure prophylaxis, behavioral interventions to prevent HIV transmission, and use of ART that reduces both the risk of HIV transmission and disease progression among those living with HIV. The result of declining deaths is that the number of San Franciscans living with HIV ever classified as stage 3 increased from 1980 through 2012 and then modestly declined. By the end of 2016, there were 9,347 San Francisco residents living with HIV ever classified as stage 3.

The number of deaths in 2016 may be incomplete because of the lag time for obtaining death data from state and national death registry matches. In addition, the case definition for HIV disease stage 3 (AIDS) was updated in 2014, and persons who have a lower CD4 T-lymphocyte percentage (<14%) but whose CD4 count >200 cells/μL are no longer considered as stage 3 cases (see Technical Notes "Stage of Disease at HIV Diagnosis"). This change in definition may have reduced the number of people diagnosed with stage 3 in 2014 and onward.

Figure 1.1 HIV disease stage 3 (AIDS) cases, deaths, and prevalence, 1980-2016, San Francisco

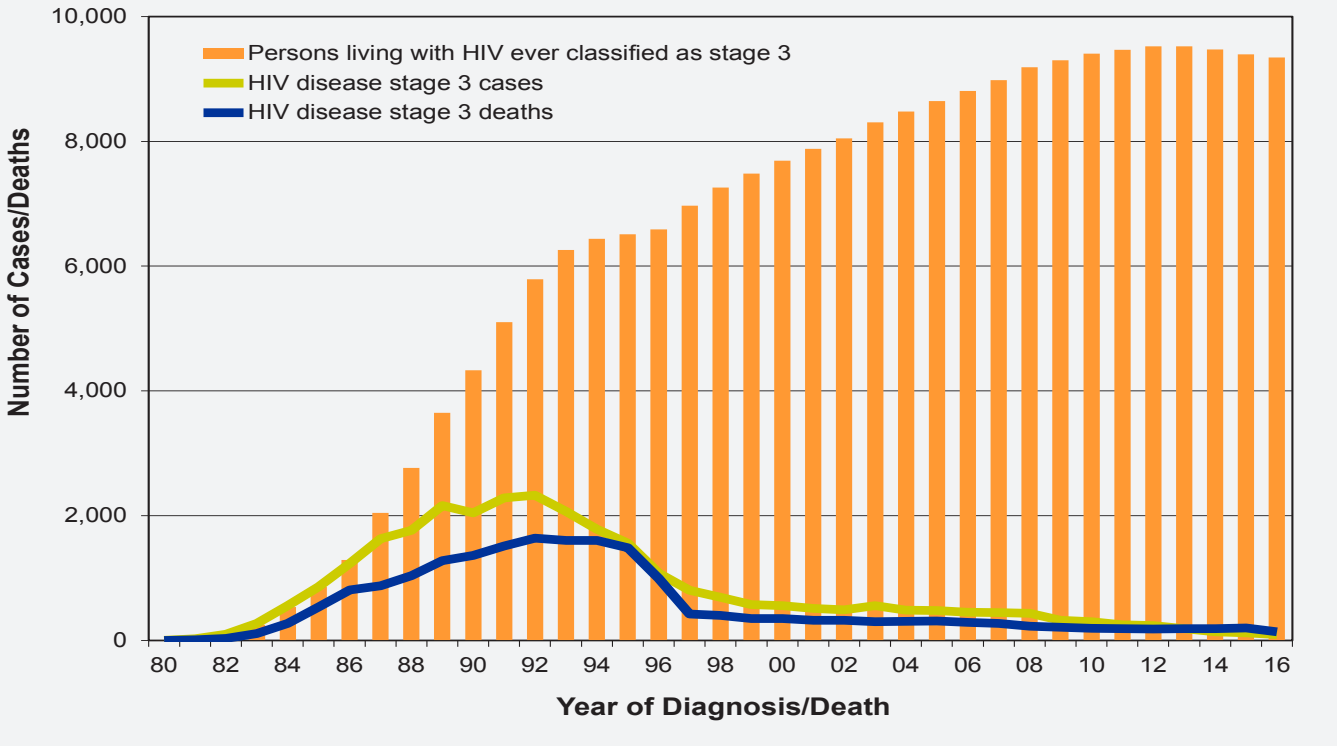
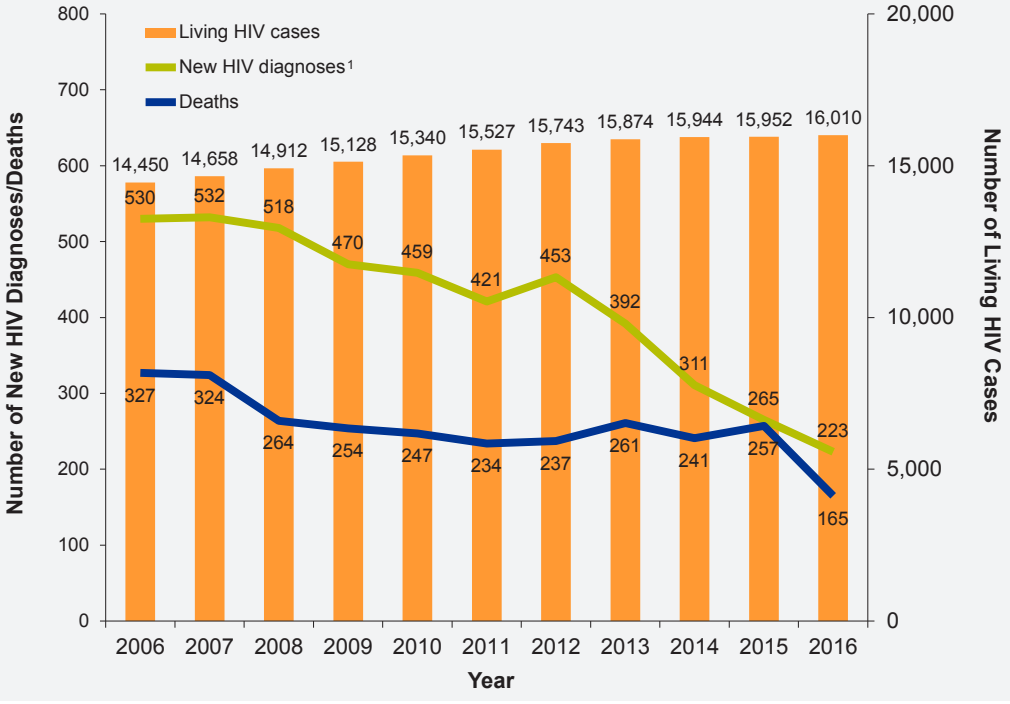


Figure 1.2 illustrates the number of persons newly diagnosed with HIV (green line), number of deaths each year (blue line), and number of PLWH (orange bars) between 2006 and 2016. Reporting of HIV cases (except for stage 3 HIV diagnosis) prior to 2006 is incomplete because name-based HIV case reporting was not in place until 2006. The number of new HIV diagnoses shown by year includes persons who were newly diagnosed with HIV in that year, persons initially diagnosed with stage 3 HIV (AIDS), and persons initially diagnosed with HIV (stages 0, 1, 2, or without staging information reported) and developed stage 3 in a later year.

The number of new HIV diagnoses declined from 530 in 2006 to 223 in 2016. The number of deaths declined from 327 in 2006 to 257 in 2015, the last year that death reporting is complete. The numbers of new diagnoses and deaths are converging with the difference in diagnoses and deaths diminishing substantially beginning in 2013. The death estimate for 2016 is underestimated due to reporting delays in deaths from state and national death registries. Also for recent years, the number of cases diagnosed may be underestimated due to reporting delays.

The number of PLWH includes persons who were diagnosed with HIV during or prior to the year shown and not known to have died by the end of that year. The number of PLWH increased from 14,450 in 2006 to 16,010 in 2016. The increasing number of PLWH is a result of a steady addition of newly diagnosed cases over time coupled with a decline in deaths among PLWH in each year. These data only include people who have been diagnosed with HIV (all disease stages) and reported to the health department. People who are unaware (undiagnosed) and persons diagnosed with an anonymous HIV test are not included unless they also tested confidentially or entered care in San Francisco. Therefore these figures may underestimate the true prevalence and incidence of HIV in San Francisco.

Figure 1.2 New HIV diagnoses, deaths, and prevalence, 2006-2016, San Francisco



1 See Technical Notes "Date of Initial HIV Diagnosis."

Table 1.2 shows the characteristics of persons newly diagnosed with HIV between 2006 and 2016. The majority were male, age 30-49 years, and MSM. Trends in race/ethnicity distributions show small increases in proportions of Latinos and Asian/Pacific Islanders and declines in proportions of whites since 2012. The proportion of new diagnoses aged 25-29 years also continued to increase from 2013 through 2016, while proportion of diagnoses aged 40-49 years decreased from 31% in 2011 to 15% in 2016. The proportion of female diagnoses trended upward in 2015 and 2016. No children (<13 years) were diagnosed with HIV during these years.

Table 1.2 Trends in persons newly diagnosed with HIV by demographic and risk characteristics, 2006-2016, San Francisco

	Year of Initial HIV Diagnosis[1]										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Number	530	532	518	470	459	421	453	392	311	265	223
Gender											
Male	91%	86%	89%	89%	89%	87%	93%	92%	93%	88%	87%
Female	7%	9%	8%	6%	8%	10%	5%	6%	4%	10%	11%
Trans Female[2]	2%	5%	3%	5%	3%	3%	2%	3%	3%	3%	2%
Race/Ethnicity											
White	55%	51%	49%	48%	48%	52%	50%	45%	43%	41%	39%
African American	14%	15%	15%	14%	14%	15%	10%	13%	10%	15%	15%
Latino	21%	20%	23%	24%	24%	20%	24%	25%	28%	26%	28%
Asian/Pacific Islander	6%	9%	8%	9%	8%	8%	11%	12%	14%	12%	15%
Native American	1%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%
Multi-race	3%	5%	4%	5%	5%	4%	3%	4%	5%	5%	3%
Unknown	0%	0%	0%	<1%	<1%	<1%	<1%	1%	0%	1%	0%
Age at HIV Diagnosis (years)											
13 - 17	0%	<1%	1%	<1%	1%	<1%	0%	0%	<1%	1%	0%
18 - 24	12%	10%	11%	13%	12%	10%	13%	14%	12%	13%	14%
25 - 29	12%	19%	15%	14%	14%	16%	16%	20%	18%	23%	24%
30 - 39	34%	35%	35%	30%	31%	27%	30%	29%	29%	30%	33%
40 - 49	28%	25%	29%	26%	28%	31%	29%	25%	24%	22%	15%
50+	14%	11%	9%	17%	14%	16%	12%	12%	17%	12%	15%
Transmission Category											
MSM	69%	65%	72%	69%	65%	72%	77%	77%	74%	72%	70%
PWID	7%	8%	7%	5%	8%	7%	4%	5%	7%	7%	9%
MSM-PWID	18%	17%	13%	17%	15%	13%	10%	11%	12%	9%	9%
Heterosexual	5%	8%	7%	6%	8%	7%	6%	4%	3%	7%	6%
Other/Unidentified	2%	3%	2%	3%	4%	2%	3%	2%	4%	5%	5%

1 Data include persons diagnosed with HIV in any stage and reported as of March 31, 2017. Percentages may not add to 100 due to rounding. See Technical Notes "Date of Initial HIV Diagnosis."

2 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

The number of PLWH continued to increase due to continued new HIV diagnoses combined with longer life after diagnosis. Persons were counted as living in a year if their HIV diagnosis date was in or before that year and they were known to be alive at the end of the year. Demographic and risk characteristics of PLWH remained mostly stable between 2012 and 2016; cases were predominately white, aged 50 years and older, and MSM (including MSM-PWID) (Table 1.3). This table exhibits the aging of PLWH: the proportion of persons aged 60-69 years increased from 15% to 21% between 2012 and 2016, while the proportions of persons aged 40-49 years decreased.

Table 1.3 Trends in persons living with HIV by demographic and risk characteristics, 2012-2016, San Francisco

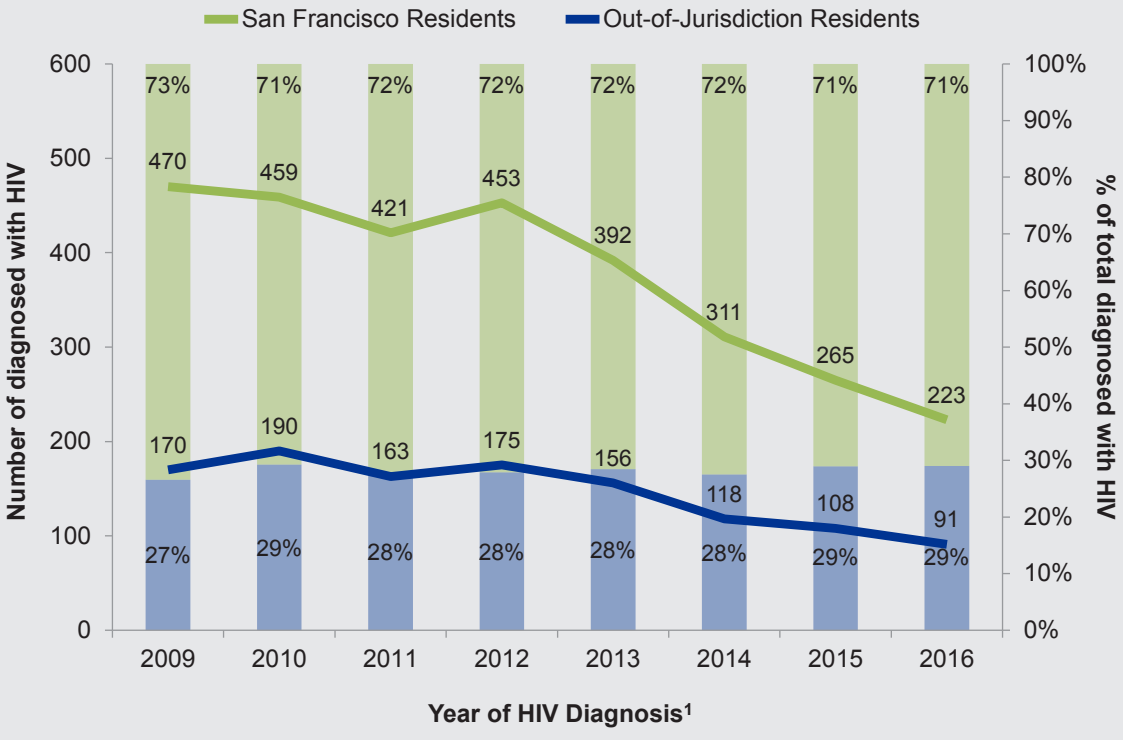
	2012		2013		2014		2015		2016	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Gender										
Male	14,438	(92)	14,576	(92)	14,657	(92)	14,660	(92)	14,718	(92)
Female	919	(6)	912	(6)	905	(6)	904	(6)	910	(6)
Trans Female[1]	386	(2)	386	(2)	382	(2)	388	(2)	382	(2)
Race/Ethnicity										
White	9,538	(61)	9,567	(60)	9,563	(60)	9,526	(60)	9,517	(59)
African American	1,979	(13)	1,980	(12)	1,959	(12)	1,948	(12)	1,938	(12)
Latino	2,857	(18)	2,916	(18)	2,968	(19)	3,006	(19)	3,050	(19)
Asian/Pacific Islander	820	(5)	862	(5)	900	(6)	923	(6)	956	(6)
Native American	70	(<1)	70	(<1)	71	(<1)	71	(<1)	71	(<1)
Multi-race	473	(3)	471	(3)	475	(3)	468	(3)	468	(3)
Unknown	6	(<1)	8	(<1)	8	(<1)	10	(<1)	10	(<1)
Age in Years (at end of each year)										
0 - 12	3	(<1)	3	(<1)	3	(<1)	3	(<1)	2	(<1)
13 - 17	9	(<1)	4	(<1)	3	(<1)	5	(<1)	3	(<1)
18 - 24	163	(1)	158	(1)	136	(1)	131	(1)	112	(1)
25 - 29	482	(3)	487	(3)	470	(3)	440	(3)	418	(3)
30 - 39	1,944	(12)	1,901	(12)	1,872	(12)	1,815	(11)	1,764	(11)
40 - 49	5,129	(33)	4,761	(30)	4,347	(27)	3,956	(25)	3,657	(23)
50 - 59	5,320	(34)	5,555	(35)	5,758	(36)	5,854	(37)	5,910	(37)
60 - 69	2,285	(15)	2,538	(16)	2,783	(17)	3,069	(19)	3,324	(21)
70+	408	(3)	467	(3)	572	(4)	679	(4)	820	(5)
Transmission Category										
MSM	11,513	(73)	11,666	(73)	11,754	(74)	11,804	(74)	11,874	(74)
PWID	990	(6)	962	(6)	943	(6)	916	(6)	913	(6)
MSM-PWID	2,453	(16)	2,443	(15)	2,432	(15)	2,397	(15)	2,370	(15)
Heterosexual	533	(3)	544	(3)	544	(3)	556	(3)	564	(4)
Transfusion/Hemophilia	25	(<1)	25	(<1)	25	(<1)	25	(<1)	25	(<1)
Other/Unidentified	229	(1)	234	(1)	246	(2)	254	(2)	264	(2)
Total[2]	**15,743**		**15,874**		**15,944**		**15,952**		**16,010**	

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

2 Persons living with HIV at the end of each year.

In addition to reporting HIV cases who were residents of San Francisco at time of diagnosis, the San Francisco Department of Public Health (SFDPH) reports cases who resided outside San Francisco but were diagnosed by a provider or facility within San Francisco (out-of-jurisdiction, OOJ, residents). Beginning in 2009, case surveillance and reporting of OOJ residents was done in the same manner as San Francisco residents. Figure 1.3 compares the annual case counts and trends of San Francisco residents and OOJ residents at diagnosis from 2009 to 2016. Case counts for recent years may be revised upward due to reporting delays. These data show that among all new cases reported by the SFDPH, approximately 28% resided outside of San Francisco at the time of diagnosis and this has been relatively stable overtime.

Figure 1.3 New San Francisco HIV cases and new out-of-jurisdiction HIV cases diagnosed in San Francisco, 2009-2016, San Francisco



1 See Technical Notes "Date of Initial HIV Diagnosis."

The overall number of PLWH in San Francisco is affected by 1) out-migration: San Francisco residents at the time of diagnosis who later moved out of San Francisco, and 2) in-migration: OOJ residents at the time of diagnosis who moved to and received care in San Francisco. As of December 31, 2016, 16,010 San Francisco residents at diagnosis were alive and 10,242 (64%) of these persons were still living in the city based on their most recent available address (Table 1.4). Additionally, more than 3,000 OOJ residents at diagnosis have a current San Francisco address and received care in San Francisco at some point after their diagnosis.

The demographic and risk distributions of San Francisco residents at diagnosis who were still living in San Francisco were very similar to all living San Francisco residents at diagnosis. A greater proportion of OOJ residents at diagnosis now living in San Francisco were under 50 years and MSM compared to San Francisco residents at diagnosis.

Table 1.4 Characteristics of persons living with HIV as of December 2016 by residence status, San Francisco

	PLWH who were SF residents at diagnosis		PLWH who were SF residents based on most recent address			
			SF residents at diagnosis		OOJ residents at diagnosis	
	Number	(%)	Number	(%)	Number	(%)
Gender						
Male	14,718	(92)	9,313	(91)	2,925	(94)
Female	910	(6)	649	(6)	107	(3)
Trans Female[1]	382	(2)	280	(3)	65	(2)
Race/Ethnicity						
White	9,517	(59)	5,801	(57)	1,702	(55)
African American	1,938	(12)	1,254	(12)	425	(14)
Latino	3,050	(19)	2,145	(21)	669	(22)
Asian/Pacific Islander	956	(6)	697	(7)	138	(4)
Native American	71	(<1)	44	(<1)	11	(<1)
Other/Unknown	478	(3)	301	(3)	152	(5)
Age in Years (as of 12/31/2016)						
0 - 12	2	(<1)	1	(<1)	0	(0)
13 - 17	3	(<1)	1	(<1)	0	(0)
18 - 24	112	(1)	74	(1)	40	(1)
25 - 29	418	(3)	302	(3)	163	(5)
30 - 39	1,764	(11)	1,155	(11)	682	(22)
40 - 49	3,657	(23)	2,348	(23)	834	(27)
50 - 59	5,910	(37)	3,685	(36)	993	(32)
60 - 69	3,324	(21)	2,120	(21)	327	(11)
70+	820	(5)	556	(5)	58	(2)
Transmission Category						
MSM	11,874	(74)	7,452	(73)	2,408	(78)
PWID	913	(6)	641	(6)	140	(5)
MSM-PWID	2,370	(15)	1,551	(15)	395	(13)
Heterosexual	564	(4)	402	(4)	82	(3)
Transfusion/Hemophilia	25	(<1)	11	(<1)	2	(<1)
Other/Unidentified	264	(2)	185	(2)	70	(2)
Total	**16,010**		**10,242**		**3,097**	

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

Among male PLWH diagnosed in San Francisco, white MSM comprised the largest group (51%). White and African American male HIV cases had similar age distributions at the end of 2016, while Latino, Asian/Pacific Islander, Native American, and multiracial males were younger than whites and African Americans (Table 1.5).

Among female PLWH diagnosed in San Francisco, whites and African Americans made up the majority. Injection drug use was the predominant transmission category for white, African American, and multiracial women while heterosexual sex was the predominant transmission category for Latinas and Asian/Pacific Islander and Native American women combined. African American females were older than other female racial/ethnic groups with 25% age 60 years or older compared to whites (19%), Latinas (23%), multiracial women (12%) and Asian/Pacific Islanders and Native Americans (16%).

Table 1.5 Characteristics of persons living with HIV as of December 2016, San Francisco

	White		African American		Latino		Asian/Pacific Islander & Native American		Multi-Race		Total
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number[1]
Male											
Transmission Category											
MSM	7,481	(82)	866	(59)	2,238	(82)	779	(85)	299	(71)	11,666
PWID	186	(2)	202	(14)	66	(2)	19	(2)	15	(4)	488
MSM-PWID	1412	(15)	291	(20)	327	(12)	79	(9)	94	(22)	2,203
Heterosexual	30	(<1)	67	(5)	52	(2)	16	(2)	5	(1)	170
Transfusion/Hemophilia	6	(<1)	2	(<1)	2	(<1)	3	(<1)	1	(<1)	14
Other/Unidentified	61	(1)	41	(3)	47	(2)	18	(2)	5	(1)	177
Age in Years (as of 12/31/2016)											
0 - 12	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
13 - 17	0	(0)	1	(<1)	1	(<1)	0	(0)	1	(<1)	3
18 - 24	21	(<1)	23	(2)	23	(1)	20	(2)	3	(1)	90
25 - 29	127	(1)	49	(3)	136	(5)	46	(5)	13	(3)	371
30 - 39	685	(7)	136	(9)	482	(18)	185	(20)	69	(16)	1558
40 - 49	1,842	(20)	294	(20)	776	(28)	300	(33)	120	(29)	3,336
50 - 59	3,621	(39)	520	(35)	918	(34)	249	(27)	141	(34)	5,450
60 - 64	2,266	(25)	380	(26)	321	(12)	96	(11)	64	(15)	3,129
65+	614	(7)	66	(4)	75	(3)	18	(2)	8	(2)	781
Male Subtotal	**9,176**		**1,469**		**2,732**		**914**		**419**		**14,718**
Female											
Transmission Category											
PWID	148	(56)	177	(51)	60	(31)	16	(22)	22	(67)	423
Heterosexual	91	(34)	140	(41)	103	(53)	48	(66)	7	(21)	389
Transfusion/Hemophilia	5	(2)	2	(1)	2	(1)	2	(3)	0	(0)	11
Other/Unidentified	21	(8)	25	(7)	28	(15)	7	(10)	4	(12)	87
Age in Years (as of 12/31/2016)											
0 - 12	0	(0)	1	(<1)	1	(1)	0	(0)	0	(0)	2
13 - 17	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
18 - 24	2	(1)	6	(2)	7	(4)	1	(1)	3	(9)	19
25 - 29	8	(3)	8	(2)	8	(4)	2	(3)	0	(0)	26
30 - 39	35	(13)	33	(10)	37	(19)	13	(18)	5	(15)	123
40 - 49	59	(22)	75	(22)	43	(22)	21	(29)	10	(30)	209
50 - 59	110	(42)	135	(39)	52	(27)	24	(33)	11	(33)	333
60 - 64	43	(16)	74	(22)	33	(17)	11	(15)	3	(9)	164
65+	8	(3)	12	(3)	12	(6)	1	(1)	1	(3)	34
Female Subtotal	**265**		**344**		**193**		**73**		**33**		**910**
Trans Female[2]	**76**		**125**		**125**		**40**		**16**		**382**
Total	**9,517**		**1,938**		**3,050**		**1,027**		**468**		**16,010**

1 Includes persons whose racial/ethnic information is not available.

2 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population. See Technical Notes "Transgender Status."

Persons diagnosed with stage 0 HIV infection

The surveillance case definition includes five HIV infection stages (See Technical Notes "Stage of Disease at HIV Diagnosis"). Stage 0 is designed to capture early HIV infection which includes acute HIV infection (generally infection within two weeks before diagnosis) and infections within 180 days before diagnosis. The criteria for stage 0 infection is generally established by a sequence of discordant HIV test results indicative of early HIV infection in which a negative or indeterminate result was within 180 days of a positive result. The date of negative HIV test is based on laboratory documentation and, for this analysis, patient's self-report of last negative test may be used in absence of laboratory documentation. Classification of stage 0 supersedes criteria for other stages. Stage 0 cases may be underestimated due to under-reporting of HIV negative test results.

Of the 625 San Francisco residents diagnosed with HIV in 2014-2015, 174 (28%) were diagnosed at stage 0, 296 (47%) stage 1 or 2, 91 (15%) stage 3, and 64 (10%) could not be staged due to not having a CD4 T-lymphocyte test within three months of diagnosis reported (Table 1.6). The proportion of stage 0 diagnoses was higher among trans females, whites, persons under age 30 years at time of diagnosis, and MSM (including MSM-PWID).

Table 1.6 Stage of HIV infection at diagnosis among persons newly diagnosed with HIV in 2014-2015, San Francisco

	New Diagnoses[1]	Stage at diagnosis							
		Stage 0		Stage 1-2		Stage 3		Unknown	
	Number	Number	(%[2])	Number	(%[2])	Number	(%[2])	Number	(%[2])
Total	**625**	**174**	**(28)**	**296**	**(47)**	**91**	**(15)**	**64**	**(10)**
Gender									
Male	569	157	(28)	268	(47)	86	(15)	58	(10)
Female	40	10	(25)	22	(55)	4	(10)	4	(10)
Trans Female	16	7	(44)	6	(38)	1	(6)	2	(13)
Race/Ethnicity									
White	259	82	(32)	126	(49)	30	(12)	21	(8)
African American	77	11	(14)	43	(56)	12	(16)	11	(14)
Latino	178	51	(29)	79	(44)	28	(16)	20	(11)
Asian/Pacific Islander	78	20	(26)	36	(46)	14	(18)	8	(10)
Other/Unknown	33	10	(30)	12	(36)	7	(21)	4	(12)
Age at HIV Diagnosis (years)									
13-24	79	28	(35)	38	(48)	3	(4)	10	(13)
25-29	118	42	(36)	59	(50)	7	(6)	10	(8)
30-39	188	49	(26)	83	(44)	33	(18)	23	(12)
40-49	147	40	(27)	69	(47)	26	(18)	12	(8)
50+	93	15	(16)	47	(51)	22	(24)	9	(10)
Transmission Category									
MSM	470	140	(30)	217	(46)	66	(14)	47	(10)
PWID	39	8	(21)	18	(46)	7	(18)	6	(15)
MSM-PWID	61	21	(34)	30	(49)	5	(8)	5	(8)
Heterosexual	31	2	(6)	21	(68)	7	(23)	1	(3)
Other/Unidentified	24	3	(13)	10	(42)	6	(25)	5	(21)
Year of HIV Diagnosis									
2014	329	94	(29)	157	(48)	49	(15)	29	(9)
2015	296	80	(27)	139	(47)	42	(14)	35	(12)

1 Includes persons diagnosed in the time period based on a confirmed laboratory HIV test regardless of whether the patient had an earlier self-report of HIV positive date.

2 Percent of new diagnoses.

Persons diagnosed with late stage HIV infection

Late HIV diagnosis was defined as having a stage 3 (AIDS) diagnosis within three months of HIV diagnosis. The proportion of persons newly diagnosed with HIV whose diagnosis occurred late in the stage of HIV disease decreased from 21% in 2012 to 16% in 2014 and 2015 (Table 1.7). In 2015, the proportion of new diagnoses that occurred late was higher among females than other genders, Latinos and persons with other or unknown race/ethnicity, persons aged 40 years or older at time of diagnosis, and persons whose transmission risk was other than MSM.

Efforts to diagnose persons earlier in the course of disease which can improve health outcomes and reduce forward transmission should continue. The racial and transmission risk disparities highlight populations in need of improved efforts to identify early disease.

Table 1.7 Late diagnoses among persons newly diagnosed with HIV in 2012-2015 by demographic and risk characteristics, San Francisco

	Year of diagnosis[1]							
	2012		2013		2014		2015	
	No. of new diagnoses	% of late diagnoses[2]	No. of new diagnoses	% of late diagnoses[2]	No. of new diagnoses	% of late diagnoses[2]	No. of new diagnoses	% of late diagnoses[2]
Total	**456**	**21%**	**399**	**18%**	**329**	**16%**	**296**	**16%**
Gender								
Male	424	20%	362	18%	307	17%	262	16%
Female	25	36%	27	22%	14	7%	26	23%
Trans Female	7	29%	10	10%	8	0%	8	13%
Race/Ethnicity								
White	231	20%	178	17%	143	13%	116	16%
African American	47	17%	52	19%	35	23%	42	12%
Latino	115	22%	100	14%	93	15%	85	19%
Asian/Pacific Islander	44	25%	51	29%	41	24%	37	11%
Other/Unknown	19	21%	18	11%	17	24%	16	31%
Age at Diagnosis								
13-24	56	11%	51	10%	35	6%	45	7%
25-29	68	15%	79	11%	54	9%	62	5%
30-39	142	18%	115	17%	99	19%	91	15%
40-49	134	27%	100	24%	81	19%	65	26%
50+	56	29%	54	28%	60	22%	33	33%
Transmission Category								
MSM	354	19%	301	16%	249	16%	221	14%
PWID	18	22%	24	25%	19	16%	20	25%
MSM-PWID	44	11%	43	16%	37	5%	24	17%
Heterosexual	29	48%	22	41%	11	45%	20	20%
Other/Unidentified	11	27%	9	11%	13	23%	11	36%
Housing Status								
Housed	415	21%	369	18%	294	17%	267	16%
Homeless	41	20%	30	13%	35	9%	29	17%

1 Date of HIV diagnosis is based on a confirmed laboratory HIV test and does not take into account patient self-report of HIV positive.
2 Percent of new diagnoses in the year who developed AIDS within 3 months of HIV diagnosis.

HIV incidence estimates

The SFDPH serves as one of the 25 national HIV incidence surveillance sentinel sites monitoring the number and rates of new HIV infections. Estimates of new infections track the leading edge of the HIV epidemic and are critical for allocating resources and evaluating effectiveness of prevention programs.

To identify incident HIV cases, the remnant blood specimens from persons newly diagnosed with HIV are retested using the serologic testing algorithm for recent HIV seroconversion (STARHS) which is a method to classify individuals as having either a recent HIV infection (infection occurring within approximately the past six months) or a long-standing infection. The results of STARHS testing are used with a statistical adjustment for HIV testing history to estimate HIV incidence. We applied this method, developed by the CDC, to 2007-2014 data.

The STARHS assay used from 2005-2013 was the BED HIV-1 ELA Capture Assay. Beginning in 2014, the Bio-Rad Avidity Assay has been used. CDC modified the incidence estimation methods to account for this change and to enable incidence estimates to be compared across all years.

Overall, the estimated number of incident or new HIV infections has remained relatively stable since 2007, the confidence intervals overlap from year to year, with declines in recent years (Figure 1.4).

Figure 1.4 Estimated number of new HIV infections, 2007-2014, San Francisco

CI: Confidence Interval.

Table 1.8 presents the estimated rate of new infections per 100,000 population by demographic and risk characteristics. The rate of new infections among MSM is disproportionately high: 598 infections per 100,000 MSM in 2014 compared to an overall rate of 40 in San Francisco. With caution given to the large margin of error, the data suggest higher incidence among African Americans and Latinos compared to whites for the years we are able to provide an estimate.

Table 1.8 Estimated rate of new HIV infections per 100,000 population[1] by demographic and risk characteristics, 2007-2014, San Francisco

	2007	2008	2009	2010	2011	2012	2013	2014
	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)	Rate per 100,000 (95% CI)
Overall	62 (43 - 81)	61 (45 - 77)	45 (32 - 57)	46 (29 - 64)	51 (36 - 66)	56 (42 - 71)	47 (35 - 60)	40 (29 - 50)
Sex at Birth								
Male	113 (76 - 151)	116 (85 - 148)	85 (60 - 110)	82 (49 - 114)	95 (66 - 124)	106 (78 - 134)	91 (67 - 116)	76 (56 - 96)
Female	**	**	**	**	**	**	**	**
Race/Ethnicity								
White	76 (47 - 105)	76 (51 - 101)	47 (30 - 63)	47 (23 - 72)	61 (37 - 85)	63 (41 - 84)	52 (34 - 70)	43 (29 - 57)
African American	**	96 (27 - 165)	142 (20 - 263)	**	109 (29 - 188)	**	**	**
Latino	90 (30 - 149)	123 (65 - 181)	60 (25 - 95)	104 (37 - 170)	76 (28 - 123)	102 (53 - 152)	98 (53 - 143)	77 (41 - 114)
Other	29 (10 - 48)	**	18 (9 - 28)	17 (0 - 33)	**	22 (9 - 36)	**	**
Age (years)								
13-29	112 (58 - 165)	99 (56 - 142)	91 (47 - 136)	86 (32 - 140)	100 (52 - 148)	118 (70 - 165)	127 (79 - 175)	81 (47 - 114)
30-39	79 (43 - 116)	83 (52 - 115)	56 (32 - 81)	51 (19 - 83)	51 (24 - 79)	66 (37 - 94)	55 (30 - 80)	49 (27 - 71)
40-49	65 (23 - 107)	94 (52 - 136)	45 (21 - 69)	77 (31 - 123)	72 (36 - 108)	65 (35 - 94)	43 (20 - 65)	41 (23 - 60)
50+	**	**	**	**	**	**	**	**
Transmission Category[2]								
MSM	835 (559 - 1110)	885 (641 - 1129)	674 (475 - 873)	653 (389 - 918)	777 (533 - 1021)	846 (616 - 1075)	726 (527 - 926)	598 (436 - 759)
Non-MSM	**	**	**	7 (1 - 14)	**	**	**	**

** Incidence estimates are not calculated due to incomplete data.

1 The population data by year, sex, race/ethnicity, and age are obtained from State of California, Department of Finance, Race/Ethnic Population with Age and Sex Detail, 2000-2050. Sacramento, CA, July 2007. The MSM and MSM-PWID population data are obtained from Hughes, AJ, Chen, YH, Scheer, S, et al. A novel modeling approach for estimating patterns of migration into and out of San Francisco by HIV status and race among men who have sex with men. J Urban Health (2017). doi:10.1007/s11524-017-0145-2.

2 MSM includes MSM-PWID; Non-MSM includes heterosexuals, non-MSM PWID, and other.

HIV testing history

To derive the annual HIV incidence estimate, in addition to the STARHS recency test result, another key component is a person's HIV testing and treatment history. Self-reported information about the number of negative HIV tests was collected as part of HIV testing and treatment history. Using this data, we assessed trends in the following: (a) the proportion of persons who ever had a HIV negative test, (b) the proportion of persons who had a recent HIV negative test within the two years before diagnosis, and (c) the number of times a person tested negative in that two year time frame. Data from a person's case report(s) with earliest self-reported HIV positive date were included in this analysis. If a person reported different numbers of HIV negative tests, the largest number was analyzed.

Table 1.9 shows that among persons diagnosed from 2007 to 2015, the proportion of persons who ever had a HIV negative test peaked in 2011 with almost three-quarters of diagnosed persons reporting ever having a negative test result. Among the persons diagnosed who ever had a negative test, the proportion with one or more negative tests in the two years before diagnosis increased from 64% in 2007 to 77% in 2013 and stayed stable through 2015. The median number of HIV negative tests before 2012 was one and increased to two negative tests in 2012 and thereafter. The increasing proportions of diagnosed persons who ever had one or more negative tests coupled with the increase in median number of negative tests suggest that routine HIV testing was on the rise in San Francisco during this time period. This points to wide uptake of the CDC's 2006 Revised Recommendations for HIV testing[1], including the recommendation to test persons at high risk at least annually.

1 CDC. Revised Recommendations for HIV testing of Adults, Adolescents, and Pregnant Women in Health-Care. MMWR 2006. 55(RR14):1-17

Table 1.9 Mean and median number of HIV tests in 2 years before positive test among HIV new diagnoses by year of diagnosis, 2007-2015, San Francisco

HIV diagnosis Year[1]	New diagnoses	Ever had a negative test		# of negative tests in 2 years before 1st positive test among persons who ever had a negative test			
				>=1		# of Negative tests	
	Number	Number	(%[2])	Number	(%[3])	Mean	Median
2007	538	326	(61)	208	(64)	1.8	1
2008	521	347	(67)	233	(67)	1.8	1
2009	474	335	(71)	231	(69)	1.8	1
2010	450	311	(69)	208	(67)	1.9	1
2011	423	308	(73)	220	(71)	2.2	1
2012	456	316	(69)	224	(71)	2.4	2
2013	399	268	(67)	206	(77)	2.5	2
2014	329	216	(66)	163	(76)	2.4	2
2015	296	174	(59)	134	(77)	2.3	2

1 Year of HIV diagnosis is based on the evidence of a confirmed HIV test and does not take into account patient self-report of HIV infection.
2 Percent of new diagnoses.
3 Percent of persons who ever had a negative test.

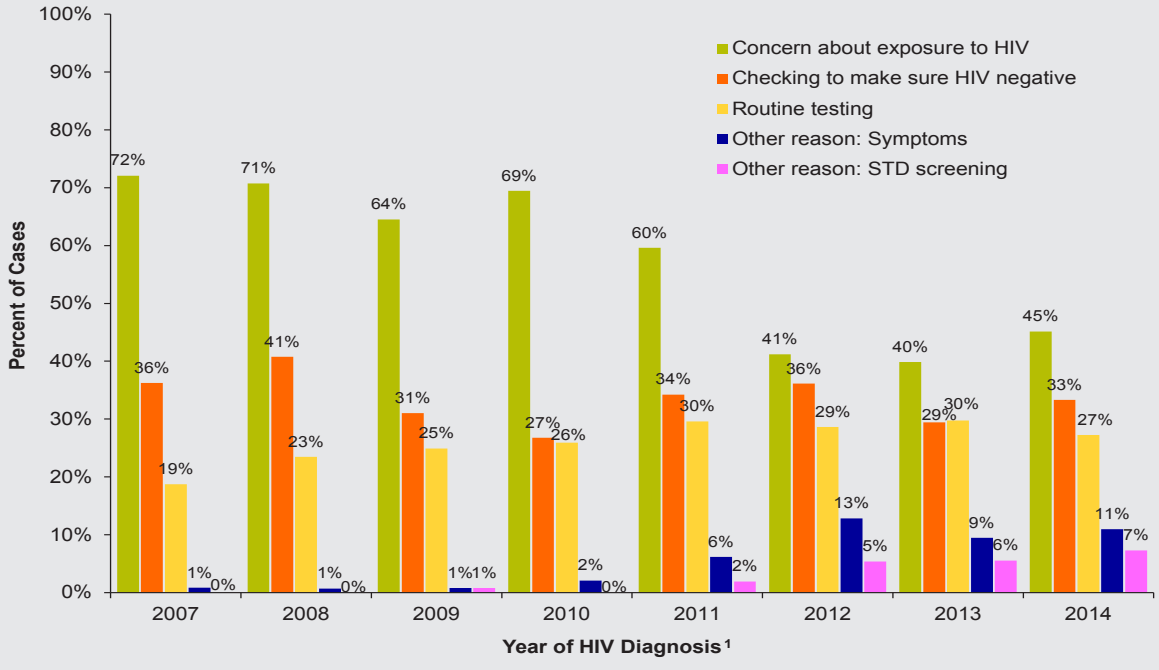
As part of a person's HIV testing history data collection, the reasons for HIV testing were routinely collected for persons with HIV reported from 2007 to 2014. Four reasons were assessed among all persons diagnosed: (a) concern about exposure to HIV in the six months before HIV testing, (b) testing on a regular basis (routine testing), (c) checking to make sure HIV negative, and (d) required to test by insurance, military, court, or other agency. Other reasons for testing were also assessed. Multiple reasons for testing may have been reported, per person. Reasons indicated on a person's case report(s) with earliest self-reported HIV positive date were included in this analysis.

For persons diagnosed from 2007 to 2014, the most frequently cited reason for testing was "concern about exposure to HIV" (ranging from 40% to 72% of annual persons diagnosed), followed by "checking to make sure HIV negative" (27% to 41%) and "routine testing" (19% to 30%) (Figure 1.5). Testing due to requirement by insurance, military, court, or other agency was infrequent (0% to 3%, data not displayed in Figure). Frequent reasons contained in the "Other" category included "symptoms" (1% to 13%) and "STD screening" (1% to 7%).

Over time, the annual proportion of diagnosed persons testing due to concern about exposure declined from 72% in 2007 to 45% in 2014 and those testing on a regular basis increased from 19% in 2007 to 27% in 2014. Annual proportions testing as part of STD screening also increased slightly in this time period. Taken together, these trends suggest that persons at risk for HIV in San Francisco adopted more routine HIV testing as part of their health care and fewer persons postponed testing until there was an HIV exposure event. The data also suggest that there was increased opportunity for HIV testing in the same setting as STD screening, which aligns with the 2006 CDC Revised Recommendations for HIV testing[1].

1 CDC. Revised Recommendations for HIV testing of Adults, Adolescents, and Pregnant Women in Health-Care. MMWR 2006. 55(RR14):1-17

Figure 1.5 Trends in reasons for HIV testing, 2007-2014, San Francisco



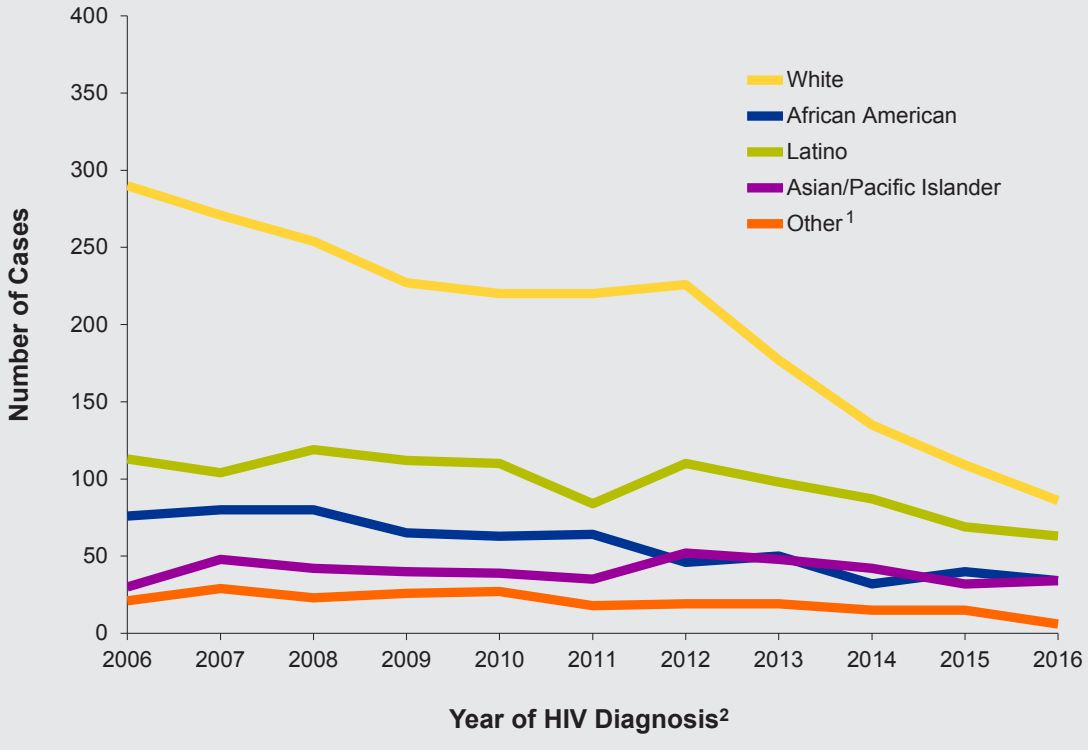
1 Year of HIV diagnosis is based on the evidence of a confirmed HIV test and does not take into account patient self-report of HIV infection.

2 Trends in HIV Diagnoses

Race/ethnicity

Trends by racial/ethnic category for persons newly diagnosed with HIV show that, from 2006 through 2016, whites accounted for the majority of newly diagnosed cases (Figure 2.1). The number of white HIV cases declined for most of this time period, leveled off between 2009 and 2012, and then continued to decline through 2016. The number of African American cases declined from 76 cases in 2006 to 34 cases in 2016. Annual number of diagnoses in Asian/Pacific Islanders is similar to African Americans from 2012 and onward. The number of Latino HIV cases declined from 119 cases in 2008 to 63 cases in 2016.

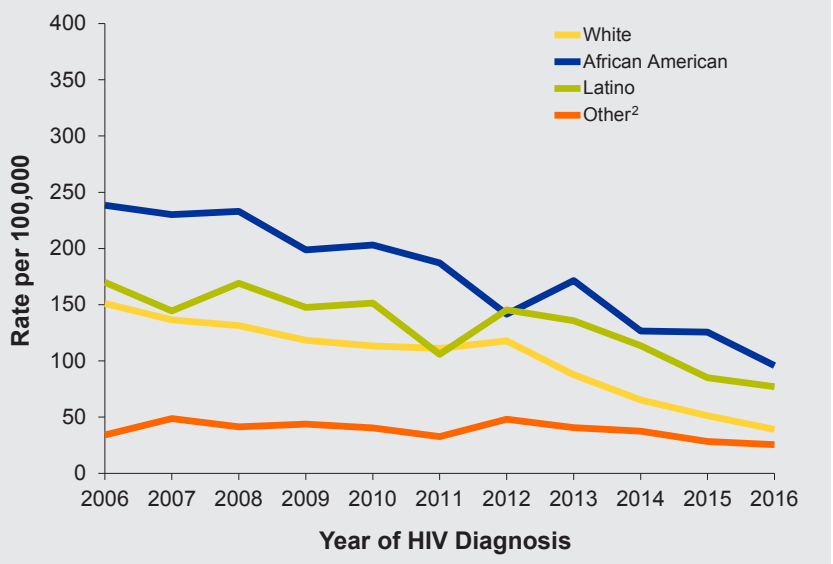
Figure 2.1 Number of persons newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco



1 Cases in the "Other" racial/ethnic category include 9% Native Americans, 88% multi-race, and 4% unknown.
2 See Technical Notes "Date of Initial HIV Diagnosis."

The annual gender and race/ethnicity specific population rates of HIV diagnosis in San Francisco were highest among African American men, ranging from 238 per 100,000 in 2006 to 96 per 100,000 in 2016 (Figure 2.2). The rates of HIV diagnosis for white men in this time period declined from 151 per 100,000 in 2006 to 39 per 100,000 in 2016. HIV rates for Latino men are more similar to those of African American men since 2012. Rates for men of other racial/ethnic groups declined more modestly between 2006 and 2016.

Figure 2.2 Annual rates[1] of men newly diagnosed with HIV per 100,000 population by race/ethnicity, 2006-2016, San Francisco

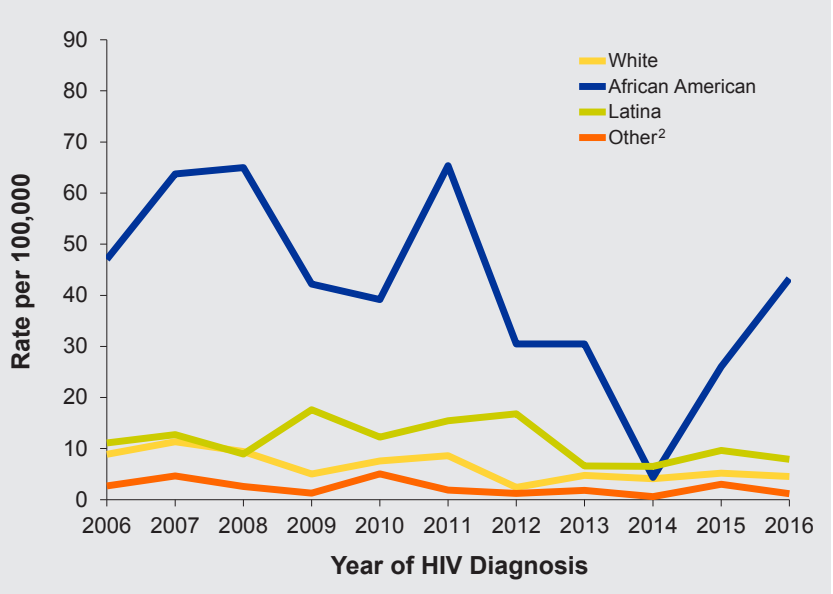


1 See Technical Notes "HIV Case Rates and HIV Mortality Rates." Includes persons with HIV by year of their initial HIV diagnosis. Excludes trans female cases.

2 Cases in the "Other"racial/ethnic group include 68% Asian/Pacific Islanders, 3% Native Americans, 28%, multi-race, and 1% unknown.

In San Francisco, annual gender and race/ethnicity specific population rates of HIV diagnosis are significantly lower among women, compared to men, and therefore the rates are more susceptible to fluctuation. For the period of 2006 to 2016, the annual rates of HIV diagnosis were higher for African American women compared to other racial/ethnic groups, from 47 per 100,000 in 2006 to 43 per 100,000 in 2016 (Figure 2.3). The most recent data show an increase in the rate for African American women. Annual rates of diagnosis for white women have been under 10 per 100,000 since 2008. Rates for Latina women peaked at 18 per 100,000 in 2009 and declined to 8 per 100,000 in 2016.

Figure 2.3 Annual rates[1] of women newly diagnosed with HIV per 100,000 population by race/ethnicity, 2006-2016, San Francisco



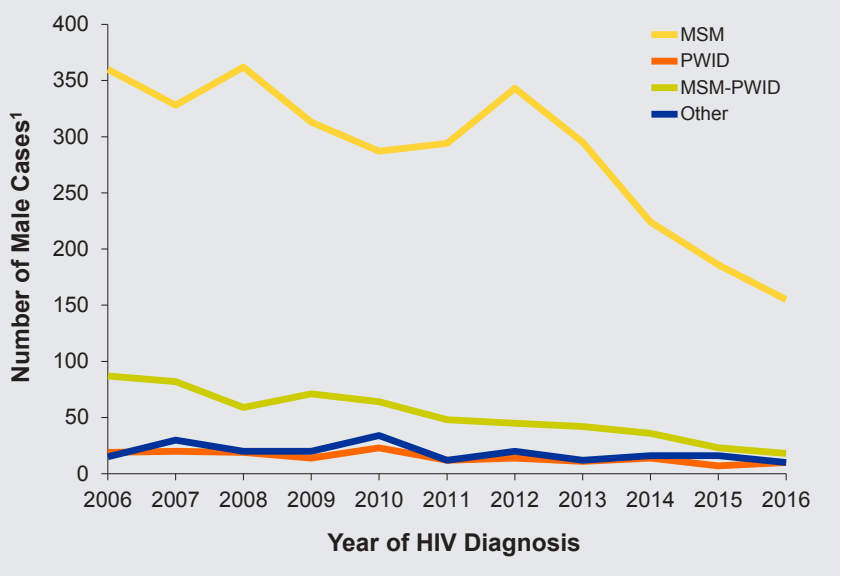
1 See Technical Notes "HIV Case Rates and HIV Mortality Rates." Includes persons with HIV by year of their initial HIV diagnosis. Excludes trans male cases.

2 Cases in the "Other" racial/ethnic group include 49% Asian/Pacific Islanders, 5% Native Americans, 41%, multi-race and 5% unknown.

Transmission category

The majority of males newly diagnosed with HIV in San Francisco are MSM, and while the annual number fluctuated, the overall trend declined (Figure 2.4). In recent years, trends in the number of male PWID cases (both MSM and heterosexual) also declined. In 2016, 80% of male HIV cases were MSM, 9% were MSM-PWID, and 5% were heterosexual PWID.

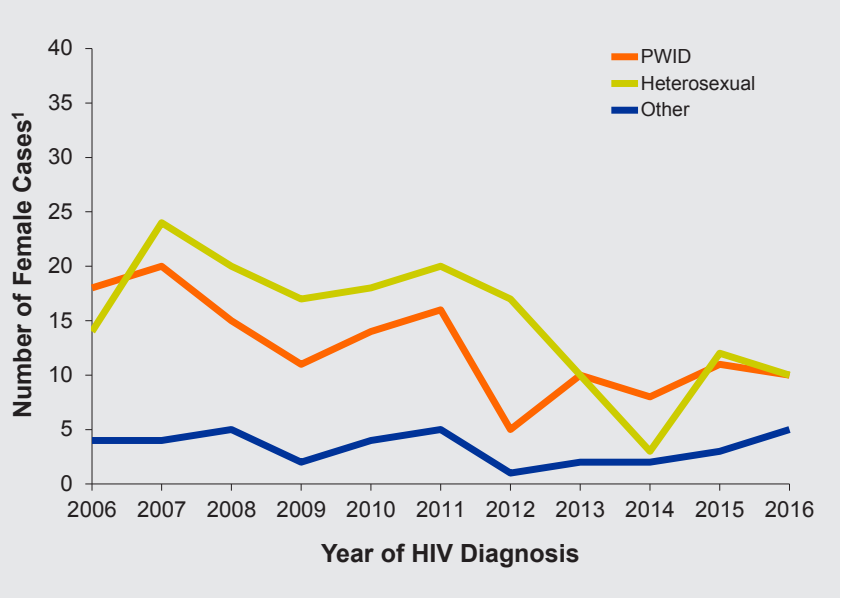
Figure 2.4 Number of men newly diagnosed with HIV by transmission category, 2006-2016, San Francisco



1 Excludes trans female cases diagnosed with HIV. Includes persons with HIV by year of their initial HIV diagnosis.

From 2006 to 2016, the annual number of female cases newly diagnosed with HIV due to heterosexual contact was very similar to that for female PWID cases (Figure 2.5). In 2016, 40% of female cases acquired HIV through injecting drugs and 40% through heterosexual contact.

Figure 2.5 Number of women newly diagnosed with HIV by transmission category, 2006-2016, San Francisco



1 Excludes trans male cases diagnosed with HIV. Includes persons with HIV by year of their initial HIV diagnosis.

Age

Table 2.1 shows the annual number of HIV diagnoses between 2012 and 2016 by gender and age at HIV diagnosis. The annual number of male HIV diagnoses declined from 422 in 2012 to 193 in 2016. Among males, the proportion of cases in the 40-49 years age group decreased each year in this time period. The proportion of cases in the 25-29 years age group increased in this time period from 17% to 24%. Overall, most male new diagnoses occurred in the 30-39 years age group, followed by diagnoses in males 40-49 years of age.

In this time period, the annual number of female HIV diagnoses remained mostly level, with 23 female cases in 2012 and 25 female cases in 2016. The annual age distribution among female cases shifted between 2012 and 2016 towards younger age groups, with proportions increasing in the 25-29 and 30-39 years age groups.

Table 2.1 Number of persons newly diagnosed with HIV by gender[1] and age at diagnosis, 2012-2016, San Francisco

	Year of Initial HIV Diagnosis[2]									
	2012		2013		2014		2015		2016	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Male (Age in years)										
0 - 12	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
13 - 17	0	(0)	0	(0)	1	(0)	2	(1)	0	(0)
18 - 24	54	(13)	52	(14)	34	(12)	32	(14)	27	(14)
25 - 29	71	(17)	74	(21)	52	(18)	54	(23)	46	(24)
30 - 39	133	(32)	105	(29)	87	(30)	67	(29)	66	(34)
40 - 49	118	(28)	90	(25)	69	(24)	51	(22)	29	(15)
50+	46	(11)	39	(11)	47	(16)	26	(11)	25	(13)
Male Subtotal	**422**	**(100)**	**360**	**(100)**	**290**	**(100)**	**232**	**(100)**	**193**	**(100)**
Female (Age in years)										
0 - 12	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
13 - 17	0	(0)	0	(0)	0	(0)	1	(4)	0	(0)
18 - 24	2	(9)	1	(5)	2	(15)	1	(4)	3	(12)
25 - 29	1	(4)	3	(14)	1	(8)	5	(19)	5	(20)
30 - 39	2	(9)	3	(14)	1	(8)	10	(38)	6	(24)
40 - 49	10	(43)	6	(27)	4	(31)	4	(15)	4	(16)
50+	8	(35)	9	(41)	5	(38)	5	(19)	7	(28)
Female Subtotal	**23**	**(100)**	**22**	**(100)**	**13**	**(100)**	**26**	**(100)**	**25**	**(100)**

1 Transgender data by age are not presented in the table due to small numbers and potential small population.
2 See Technical Notes "Date of Initial HIV Diagnosis."

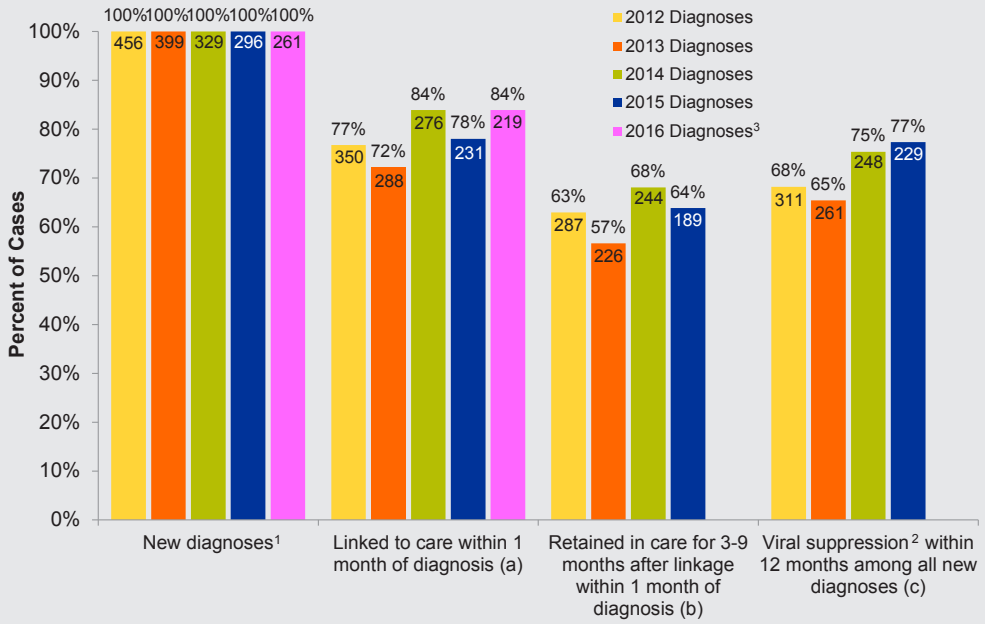
3 Spectrum of Engagement in HIV Prevention and Care

Continuum of HIV care among persons newly diagnosed with HIV

To prevent adverse health outcomes among persons newly diagnosed with HIV, rapid entry into health care, continuous engagement in care, and use of ART to achieve viral suppression is required. The SFDPH monitors these outcomes using reports of CD4, viral load and genotype tests as indicators of care, and viral load test results to measure viral suppression (defined as a viral load less than 200 copies/mL). The date of HIV diagnosis is determined based on a confirmed HIV test and does not take into account patient self-report of HIV infection. The most recent year for which data are available is 2016 for linkage to care and is 2015 for retention in care and viral suppression to account for enough follow-up time from diagnosis.

During the period 2012 through 2016, the number of persons newly diagnosed with HIV declined from 456 in 2012 to 261 in 2016 (Figure 3.1). In this time period, the proportion of newly diagnosed persons who entered care within one month fluctuated between 72% and 84%[(a)]. However, not all persons who entered care continued to receive care; 57%-68% of persons diagnosed in 2012 to 2015 remained in care three to nine months after initial linkage to care (i.e., had a subsequent laboratory test after their first laboratory test)[(b)]. The proportion of newly diagnosed persons who achieved viral suppression within 12 months increased from 68% in 2012 to 77% in 2015[(c)]. The continued increase in the proportion virally suppressed from 2013 to 2015 reflects expanded San Francisco citywide activities to ensure timely and sustained receipt of care and antiretroviral therapy to achieve viral suppression.

Figure 3.1 Continuum of HIV care among persons newly diagnosed with HIV, 2012-2016, San Francisco



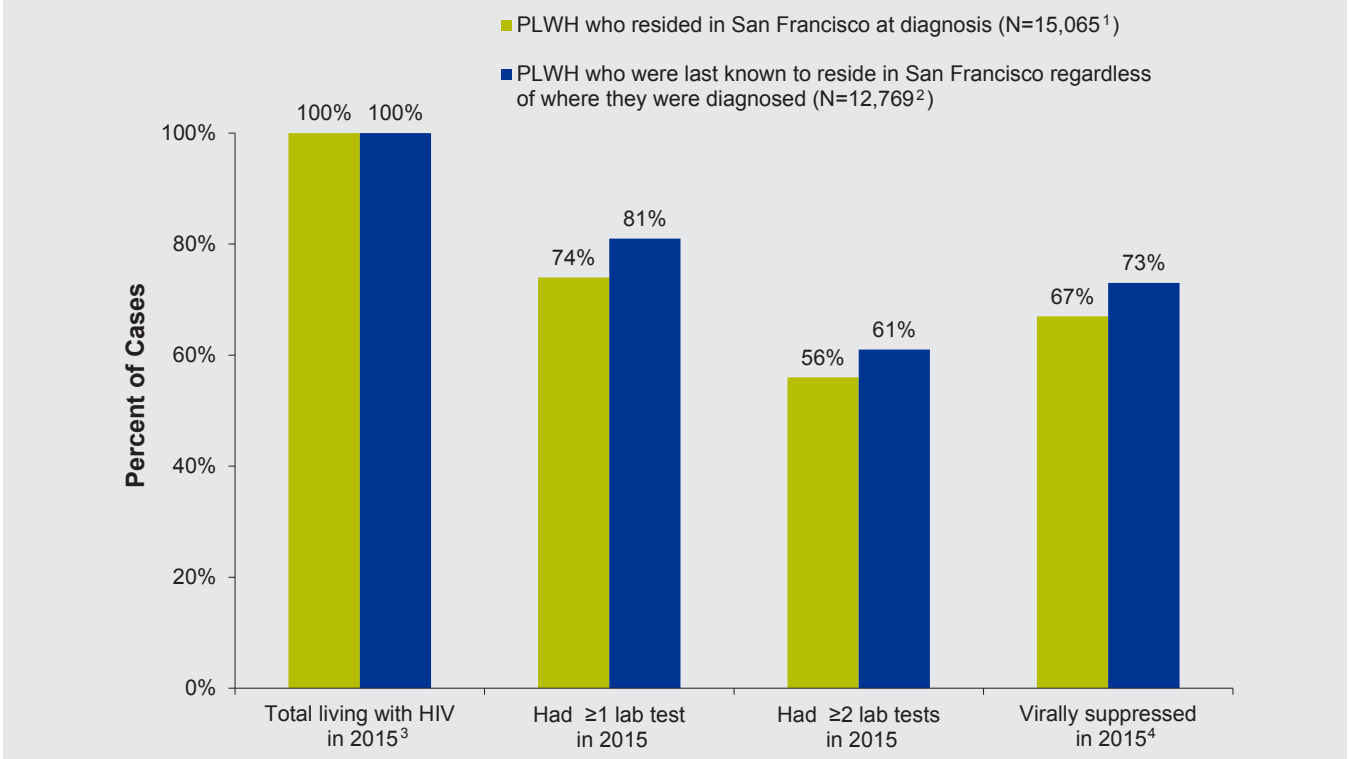
1 Number of new diagnoses shown each year is based on the evidence of a confirmed HIV test and does not take into account patient self-report of HIV infection.
2 Defined as the latest viral load test within 12 months of HIV diagnosis <200 copies/mL.
3 Retention in care and viral suppression data are not available yet for persons diagnosed in 2016.

Continuum of HIV care among persons living with HIV

As of December 31, 2015 there were 15,065 persons living with HIV (PLWH) who were diagnosed through the end of 2014 and who resided in San Francisco at time of diagnosis. Of these, 74% had at least one CD4, viral load or genotype test (received care), 56% had two or more laboratory tests at least three months apart (retained in care), and 67% were virally suppressed in 2015 (Figure 3.2).

Because in- and out-migration occur and the residence at time of diagnosis may differ from the current residence among PLWH, SFDPH collects and updates information regarding current residence for PLWH who resided in San Francisco at time of diagnosis as well as PLWH who resided elsewhere at time of diagnosis but receive care in San Francisco. There were 12,769 PLWH who had a most recent address in San Francisco. This includes 9,741 persons who were San Francisco residents at time of diagnosis and still in San Francisco and 3,028 persons who resided in another jurisdiction at time of diagnosis and moved to San Francisco after diagnosis. Of these, 81% received care, 61% were retained in care and 73% were virally suppressed in 2015.

Figure 3.2 Continuum of HIV care among persons living with HIV, 2015, San Francisco



1 Includes residents of San Francisco at time of diagnosis. Excludes persons who were non-San Francisco residents at time of HIV diagnosis but San Francisco residents at stage 3 HIV (AIDS) diagnosis.

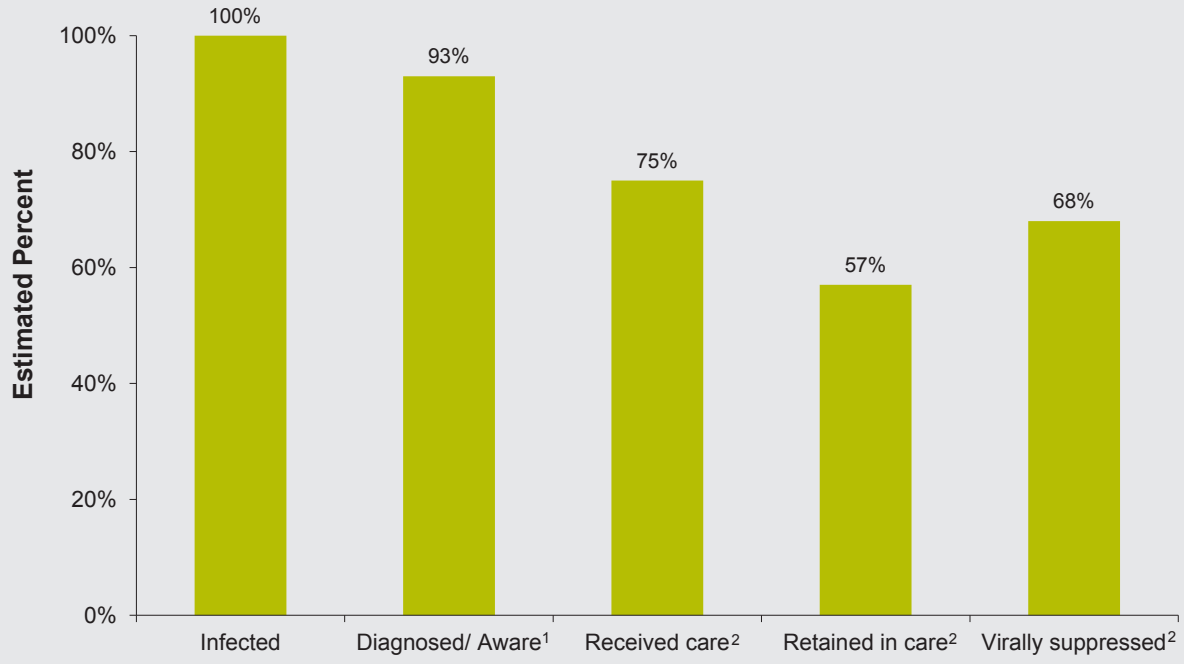
2 Includes persons whose most recent address was in San Francisco: 9,741 San Francisco residents at diagnosis who were still in San Francisco and 3,028 persons who resided outside San Francisco at diagnosis and moved to San Francisco after diagnosis.

3 Includes persons living with HIV at the end of 2015 (≥ 13 years old) and diagnosed by the end of 2014.

4 Defined as the latest viral load in 2015 <200 copies/mL.

The continuum of HIV care among PLWH includes those aware of their HIV status (diagnosed) as well as those infected and not aware (undiagnosed) and is shown in Figure 3.3. This is estimated by applying the percent of persons infected with HIV who know their serostatus, from the San Francisco's HIV behavioral surveillance, to the case surveillance data that assesses care indicators using the most recent residence information. It is estimated that 93% of all persons with HIV (diagnosed and undiagnosed) are aware of their infection, 75% received care, 57% retained in care, and 68% were virally suppressed in 2015.

Figure 3.3 Continuum of HIV care among persons living with diagnosed or undiagnosed HIV infection, 2015, San Francisco



1 The estimated percent aware of HIV infection for San Francisco was derived from the National HIV Behavioral Surveillance (MSM4 2014, PWID4 2015, HET4 2016) and the Transwomen Empowered to Advance Community Health study (TEACH3 2016).

2 The estimated percent received care, retained in care, and virally suppressed among all infected was derived by applying the 93% diagnosed/aware to the 81% who had ≥1 lab tests, 61% who had ≥2 lab tests, and 73% who were virally suppressed among persons living with HIV who were last known to reside in San Francisco as shown in Figure 3.2, respectively.

HIV care and prevention indicators

Key HIV care and prevention indicators for 2012 through 2015 among persons with HIV in San Francisco are shown in Table 3.1. The proportion of late stage HIV diagnosis, defined as a new case who developed HIV infection stage 3 (AIDS) within three months of HIV diagnosis, decreased from 21% in 2012 to 16% in 2014 and 2015. The median time from HIV diagnosis to viral suppression shortened from 148 days in 2012 to 76 days in 2015. The median number of days from HIV diagnosis to first care remained stable (7-8 days) while the median time from receipt of care to ART initiation (from 30 days in 2012 to 6 days in 2015) and from ART initiation to viral suppression (from 74 days in 2012 to 50 days in 2015) improved over time. The care outcome measures for living HIV cases remained relatively stable between 2012 and 2015. The proportion of PLWH who received two or more tests decreased, perhaps suggesting stabilized health conditions among PLWH in care that required less frequent testing to monitor HIV. Among persons living with HIV and with at least one viral load test, the proportion who were virally suppressed increased from 88% in 2012 to 92% in 2015.

Table 3.1 Care and prevention indicators among persons newly diagnosed with HIV and living with HIV, 2012-2015, San Francisco

	Year			
Indicators	**2012**	**2013**	**2014**	**2015**
New HIV diagnoses[1]	**N=456**	**N=399**	**N=329**	**N=296**
Proportion developed AIDS within 3 months of diagnosis	21%	18%	16%	16%
Proportion linked to care within 1 month of diagnosis	77%	72%	84%	78%
Proportion virally suppressed[2] within 12 months of diagnosis	68%	65%	75%	77%
Median time (days) from HIV diagnosis to first viral suppression	148	133	91	76
Median time (days) from HIV diagnosis to first care	7	8	7	7
Median time (days) from first care to ART initiation[3]	30	27	16	6
Median time (days) from ART initiation to first viral suppresssion[3]	74	70	53	50
Median CD4 count (cells/μL) at treatment initiation among those diagnosed with a CD4 count>500 cells/μL	635	675	660	678
Living HIV cases[4] (≥13 years old)	**N=14,602**	**N=14,815**	**N=14,972**	**N=15,065**
Proportion of cases who had ≥1 CD4/viral load test	75%	75%	75%	74%
Proportion received ≥2 tests among those with ≥1 test	79%	79%	76%	75%
Proportion virally suppressed[2] among living cases	65%	65%	65%	67%
Proportion virally suppressed among those with ≥1 viral load test	88%	89%	90%	92%

1 Includes persons diagnosed each year based on a confirmed HIV test and does not take into account patient self-report of HIV infection.

2 Defined as the latest viral load test within 12 months of HIV diagnosis <200 copies/mL. For living cases viral suppression is measured using the latest test in the year.

3 Calculation is limited to persons diagnosed with HIV who were known to have started ART. See Technical Notes "Estimate of ART Use."

4 Includes persons who were living with HIV at the end of each year and diagnosed as of the end of the previous year. Excludes persons who were non-San Francisco residents at time of HIV diagnosis but San Francisco residents at stage 3 HIV (AIDS) diagnosis.

Care indicators among persons with HIV by demographic and risk characteristics

Although the majority of San Franciscans newly diagnosed with HIV in 2015 were linked to care within one month of diagnosis (78%), retained in care three to nine months after linkage to care (64%), and achieved viral suppression within 12 months after diagnosis (77%), there are noticeable differences in these care indicators by demographic and risk characteristics (Table 3.2). A lower proportion of linkage to care, retention in care, and viral suppression was observed among females, African Americans, those aged 25-29 years, PWID (including MSM-PWID), and persons who were homeless at diagnosis.

Table 3.2 Care indicators among persons newly diagnosed with HIV in 2015 by demographic and risk characteristics, San Francisco

	Number of diagnoses[1]	% Linked to care within 1 month of diagnosis[2]	% Retained in care 3-9 months after linkage[2]	% Virally suppressed within 12 months of diagnosis[2]
Total	**296**	**78%**	**64%**	**77%**
Gender				
Male	262	79%	65%	79%
Female	26	73%	54%	65%
Trans Female	8	63%	63%	75%
Race/Ethnicity				
White	116	84%	70%	81%
African American	42	67%	45%	69%
Latino	85	78%	68%	79%
Asian/Pacific Islander	37	73%	59%	81%
Other/Unknown	16	81%	56%	56%
Age at Diagnosis				
13-24	45	84%	69%	76%
25-29	62	71%	61%	74%
30-39	91	73%	59%	81%
40-49	65	86%	71%	75%
50+	33	82%	61%	79%
Transmission Category				
MSM	221	81%	68%	82%
PWID	20	60%	40%	70%
MSM-PWID	24	63%	33%	50%
Heterosexual	20	85%	70%	75%
Other/Unidentified	11	73%	73%	64%
Housing Status				
Housed	267	79%	67%	79%
Homeless	29	66%	38%	59%

1 Includes persons diagnosed in 2015 based on a confirmed HIV test and does not take into account patient self-report of HIV infection.
2 Percent of total diagnoses.

Among PLWH in 2015 who were San Francisco residents at time of diagnosis, 67% were virally suppressed. The proportion who were virally suppressed was lower among females, African Americans, Latinos, persons younger than 50 years, PWID (including MSM-PWID), and homeless persons (Table 3.3).

Table 3.3 Care indicators among persons living with HIV in 2015 who resided in San Francisco at diagnosis, by demographic and risk characteristics

	Number of living cases[1]	% with >= 1 laboratory test in 2015[2]	% with >=2 laboratory tests in 2015[2]	% Virally suppressed (most recent viral load test in 2015 <200 copies/mL)[2]
Total	**15,065**	**74%**	**56%**	**67%**
Gender				
Male	13,871	73%	55%	67%
Female	845	78%	60%	62%
Trans Female	349	81%	69%	67%
Race/Ethnicity				
White	9,115	74%	56%	68%
African American	1,806	76%	57%	62%
Latino	2,804	71%	54%	64%
Asian/Pacific Islander	850	74%	55%	68%
Other/Unknown	490	80%	59%	68%
Age in Years (as of 12/31/2015)				
13-24	88	77%	58%	61%
25-29	349	73%	52%	61%
30-39	1,600	69%	46%	58%
40-49	3,699	71%	51%	62%
50-59	5,644	74%	55%	67%
60-69	3,017	78%	64%	73%
70+	668	80%	68%	76%
Transmission Category				
MSM	11,206	74%	55%	69%
PWID	860	74%	58%	58%
MSM-PWID	2,227	75%	58%	63%
Heterosexual	515	78%	56%	65%
Other/Unidentified	257	54%	37%	46%
Housing Status, Most Recent				
Housed	14,796	74%	56%	67%
Homeless	269	52%	41%	33%

1 Includes San Francisco residents at diagnosis living with HIV at the end of 2015 (≥13 years old) and diagnosed by the end of 2014. Excludes persons who were non-San Francisco residents at time of HIV diagnosis but San Francisco residents at stage 3 HIV (AIDS) diagnosis.

2 Percent of total living cases.

We assessed care indicators among the 12,769 PLWH in 2015 who were known to reside in San Francisco based on their most recent available residence. This excludes San Francisco residents at diagnosis who subsequently moved outside of San Francisco and includes persons who resided elsewhere at time of HIV diagnosis and moved to San Francisco after diagnosis. Among the 12,769 San Francisco residents living with HIV, 73% were virally suppressed. Similar to that observed among all living San Francisco residents at diagnosis in Table 3.3, the proportion of San Francisco residents living with HIV (last known to reside in San Francisco) who were virally suppressed was lower among females, African Americans, Latinos, persons less than 50 years, PWID (including MSM-PWID), and homeless persons (Table 3.4).

Table 3.4 Care indicators among persons living with HIV in 2015 who were last known to reside in San Francisco, by demographic and risk characteristics

	Number of living cases[1]	% with >= 1 laboratory test in 2015[2]	% with >=2 laboratory tests in 2015[2]	% Virally suppressed (most recent viral load test in 2015 <200 copies/mL)[2]
Total	**12,769**	**81%**	**61%**	**73%**
Gender				
Male	11,743	81%	61%	73%
Female	698	82%	63%	66%
Trans Female	328	84%	72%	67%
Race/Ethnicity				
White	7,294	82%	62%	75%
African American	1,600	82%	63%	67%
Latino	2,633	78%	59%	69%
Asian/Pacific Islander	756	81%	62%	75%
Other/Unknown	486	83%	59%	71%
Age in Years (as of 12/31/2015)				
13-24	94	81%	56%	68%
25-29	423	77%	53%	63%
30-39	1,737	75%	52%	63%
40-49	3,308	77%	56%	68%
50-59	4,522	83%	63%	76%
60-69	2,186	86%	72%	82%
70+	499	86%	74%	83%
Transmission Category				
MSM	9,437	81%	62%	76%
PWID	742	80%	63%	63%
MSM-PWID	1,903	80%	62%	66%
Heterosexual	447	82%	62%	69%
Other/Unidentified	240	59%	42%	55%
Housing Status, Most Recent				
Housed	12,468	81%	62%	74%
Homeless	301	52%	41%	31%

1 Includes San Francisco residents, based on the most recent available address, living with HIV at the end of 2015 (≥13 years old) and diagnosed by the end of 2014.

2 Percent of total living cases.

Table 3.5 displays care outcomes of clients that accepted and completed the SFDPH Linkage Integration Navigation Comprehensive Services (LINCS) program (see Technical Notes "Linkage Integration Navigation Comprehensive Services"). From January 1, 2015 through December 31, 2015, 209 PLWH were referred to LINCS for linkage and navigation services. About half of them (51%) were recorded as having been linked to care by a navigator. Ninety percent of cases who had completed the LINCS program had a viral load, CD4 test or genotyping test within three months of LINCS initiation.

Over half (64%) of individuals who completed LINCS had additional testing in the three to nine months after linkage, indicating retention in care. Sixty-eight percent of linked individuals also showed evidence of viral suppression at their most recent viral load in the 12 month period after they began the LINCS program. Linkage, retention and suppression rates varied by demographic factors, but small numbers make it difficult to infer demographic differences in care outcomes from these data.

Table 3.5 Care indicators among persons who accepted and completed LINCS services in 2015 by demographic and risk characteristics, San Francisco

	Number of referred to LINCS	Number of accepted and completed LINCS	% Linked to care within 3 months of LINCS initiation[1]	% Retained in care 3-9 months after linkage[1]	% Virally suppressed at most recent test in 12 months after LINCS initiation[1]
Total	**209**	**106**	**90%**	**64%**	**68%**
Gender					
Male	172	83	89%	66%	72%
Female	23	16	94%	56%	56%
Trans Female	14	7	86%	57%	43%
Race/Ethnicity					
White	84	41	88%	59%	61%
African American	58	32	88%	59%	88%
Latino	47	27	96%	78%	52%
Asian/Pacific Islander	11	3	100%	67%	67%
Other/Unknown	9	3	67%	67%	100%
Age in Years (as of 12/31/15)					
13-24	8	5	100%	60%	100%
25-29	24	10	90%	70%	80%
30-39	55	28	79%	64%	54%
40-49	71	37	97%	62%	65%
50+	51	26	88%	65%	77%
Transmission Category					
MSM	98	51	92%	67%	73%
PWID	29	16	100%	69%	63%
MSM-PWID	72	32	81%	59%	63%
Heterosexual	7	5	80%	40%	60%
Other/Unidentified	3	2	100%	100%	100%
Housing Status					
Housed	158	76	89%	62%	64%
Homeless	51	30	90%	70%	77%

1 Percent of persons accepted and completed LINCS.

Comparison of San Francisco HIV prevention and care indicators to California and the United States

HIV prevention and care indicator data for San Francisco, California, and the United States are displayed in Table 3.6 (year of the most recent available data is indicated in parentheses). Awareness of HIV status in San Francisco is high (93%) compared to all of California (85%) and the U.S. (85%). The proportion of persons with a late HIV diagnosis in San Francisco is lower than the proportion in California and the U.S. Access to HIV care and viral suppression among PLWH in San Francisco and California is assessed using the most current residence and does not include persons who are known to have moved outside of the jurisdiction. The proportions of PLWH who received care and were virally suppressed were higher in San Francisco than in California and the U.S. The higher proportion of persons with laboratory tests in San Francisco may reflect greater completeness of reporting CD4 and viral load test results in San Francisco compared to California and the U.S. The death rates per 1,000 persons with HIV or stage 3 HIV (AIDS) in San Francisco were slightly higher than that in California but lower than in the U.S. Of note, the California and the U.S. data were unavailable for more recent years therefore some of the observed differences may be due to the earlier time periods for the California and U.S. data.

Table 3.6 Comparison of HIV prevention and care indicators for San Francisco, California, and the United States

Indicators	San Francisco	California[2]	United States[2]
Awareness of HIV status[1]			
Estimated % persons living with HIV who know their serostatus	93% (2015)	85% (2014)	85% (2014)
Late HIV diagnosis			
% persons diagnosed with AIDS within 3 months of HIV diagnosis	16% (2015)	19% (2015)	22% (2015)
HIV care access and outcome[3]			
% newly diagnosed persons linked to care within 1 month of HIV diagnosis	78% (2015)	72% (2015)	75% (2015)
% PLWH who are in care (≥1 laboratory tests)	81% (2015)	75% (2014)	73% (2014)
% PLWH who are retained in care (≥2 laboratory tests)	61% (2015)	59% (2014)	57% (2014)
% PLWH who are virally suppressed	73% (2015)	63% (2014)	58% (2014)
% PLWH aged 13-24 years who are virally suppressed	68% (2015)	NA	48% (2014)
% PLWH who inject drugs who are virally suppressed	63% (2015)	NA	50% (2014)
HIV mortality			
Death rate per 1,000 persons with HIV (including AIDS) diagnosis	15.2 (2015)	13.0 (2014)	17.0 (2014)
Death rate per 1,000 persons with AIDS diagnosis	21.6 (2015)	18.4 (2014)	24.9 (2014)

1 The estimated percent aware of HIV infection for San Francisco was derived from the National HIV Behavioral Surveillance (MSM4 2014, PWID4 2015, HET4 2016) and the Transwomen Empowered to Advance Community Health study (TEACH3 2016).

2 CDC HIV Surveillance Supplemental Report 2017;22(No. 2). http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Published July 2017.

3 The percentages of persons living with HIV diagnosis who are in care, retained in care, and virally suppressed are calculated among those diagnosed and last known to be living in San Francisco and California, respectively.

NA: Not Available.

Use of antiretroviral therapy

The estimated use of ART among PLWH as of December 31, 2016 and among persons diagnosed in 2015 is shown in Table 3.7. Persons with a medical record indicating that they were prescribed ART were assumed to have received it (see Technical Notes "Estimate of ART Use"). The lower level estimate shown in the table was calculated among all living HIV cases (N=16,010). The upper level estimate was calculated among living cases who had follow-up information and whose chart review was completed within the last two years (N=7,159). Overall, 90%-97% of PLWH received ART. ART use was lower among females, African Americans, persons under 40 years, PWID, and the homeless. Among 296 persons newly diagnosed with HIV in 2015, 84% received ART. ART use was lower among females, African Americans, Asian/Pacific Islanders, persons aged 25 to 29 years, and PWID. Receipt of ART was similar by housing and insurance status at diagnosis, suggesting that these socioeconomic factors did not bar access to ART among newly diagnosed persons.

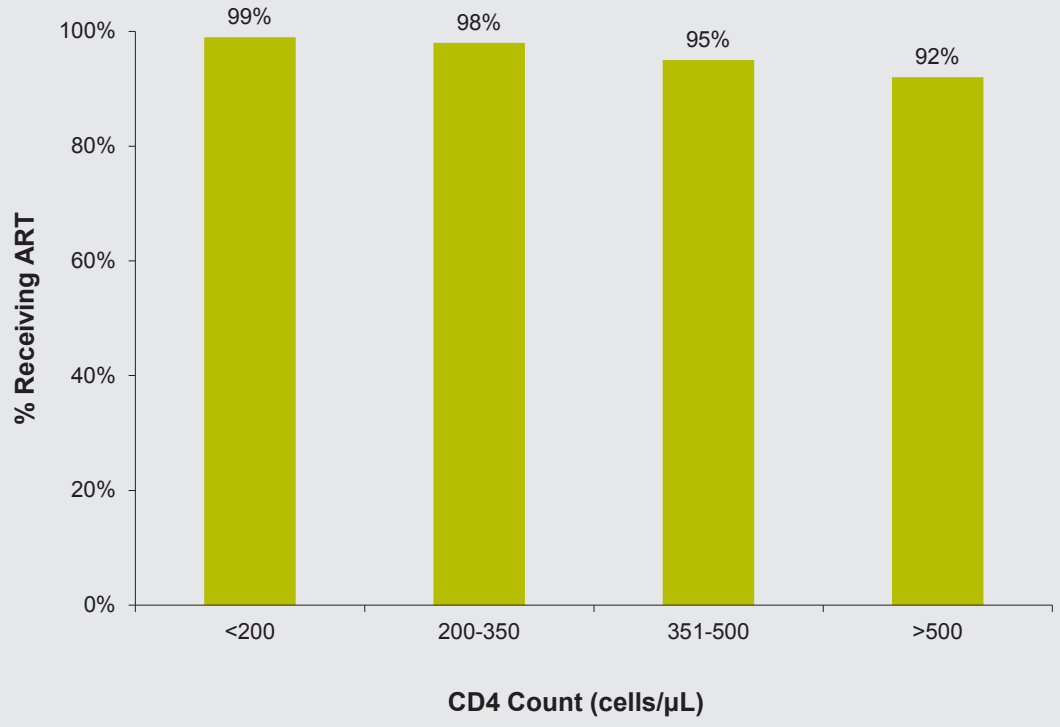
Table 3.7 Estimate of ART use among persons living with HIV as of December 2016 and diagnosed in 2015 by demographic and risk characteristics, San Francisco

	Persons living with HIV, December 2016 Percent receiving ART, ever		Persons newly diagnosed with HIV, 2015 Percent receiving ART
	Lower level estimate (N=16,010)	Upper level estimate (N=7,159)	(N=296)
Overall	**90%**	**97%**	**84%**
Gender			
Male	90%	97%	85%
Female	89%	94%	69%
Trans Female[1]	90%	97%	100%
Race/Ethnicity			
White	91%	98%	84%
African American	87%	95%	76%
Latino	90%	98%	91%
Asian/Pacific Islander	88%	96%	78%
Other/Unknown	89%	97%	81%
Age[2]			
13 - 24	85%	91%	90%
25 - 29	79%	89%	79%
30 - 39	83%	94%	85%
40 - 49	88%	97%	84%
50 +	93%	98%	81%
Transmission Category			
MSM	91%	98%	87%
PWID	86%	95%	60%
MSM-PWID	91%	97%	75%
Heterosexual	93%	96%	80%
Housing Status[3]			
Housed	90%	97%	84%
Homeless	75%	93%	83%
Insurance at HIV/AIDS Diagnosis			
Private	94%	98%	86%
Public	91%	96%	84%
None	87%	97%	86%

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to the potential small population size. See Technical Notes "Transgender Status."
2 Age as of December 31, 2016 for PLWH. Age at HIV diagnosis for persons newly diagnosed with HIV.
3 Housing status is based on the most recent residence for PLWH and the residence at HIV diagnosis for persons newly diagnosed with HIV.

The estimated use of ART by the lowest CD4 count ever reported ("nadir CD4") among PLWH who had their medical chart reviewed between January 2015 and March 2017 is shown in Figure 3.4 (N=7,159). Persons without follow-up information within the last two years or those known to have moved out of San Francisco were excluded from the estimate. As expected, the proportion receiving ART was highest among persons with the lowest CD4 count: 99% of cases with a nadir CD4 count below 200 cells/μL, 98% with a nadir CD4 count between 200-350 cells/μL, 95% with a nadir CD4 count between 351-500 cells/μL, and 92% with a nadir CD4 count above 500 cells/μL received ART.

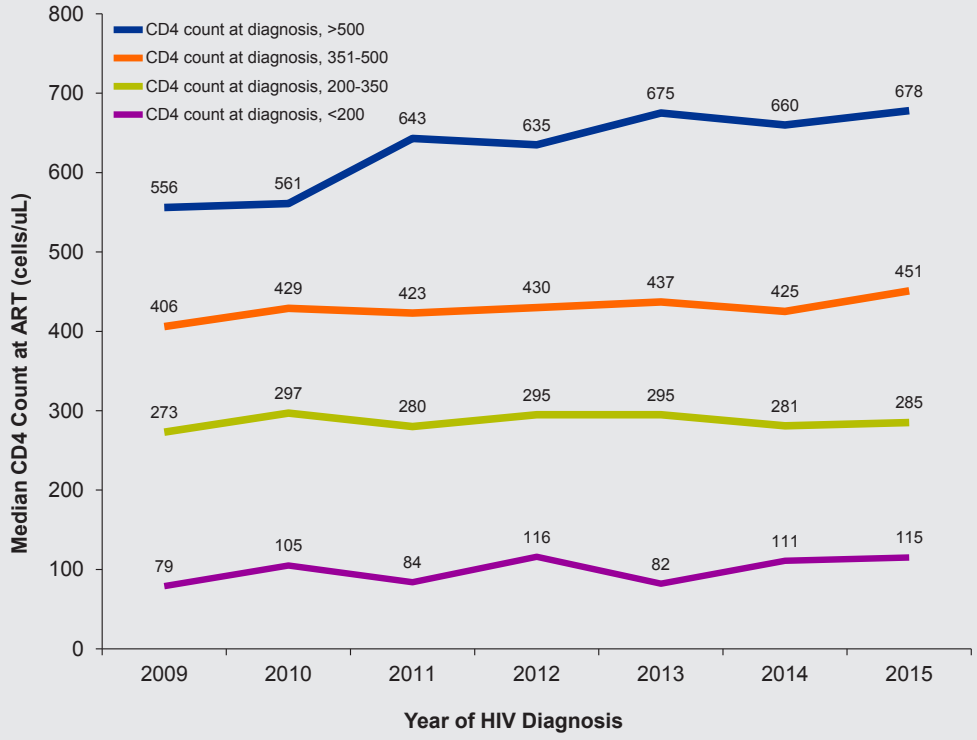
Figure 3.4 Estimate of ART use[1] among persons living with HIV and with chart review, by nadir CD4 level, December 2016, San Francisco



1 See Technical Notes "Estimate of ART Use."

Trends in median CD4 count at time of ART initiation by CD4 count at time of diagnosis for the years 2009-2015 are shown in Figure 3.5. Among persons newly diagnosed with HIV between 2009 and 2015 whose CD4 count at diagnosis was >500 cells/μL, the median CD4 count at ART initiation increased from 556 cells/μL in 2009 to 678 cells/μL in 2015. Among persons whose CD4 count at diagnosis was <500 cells/μL, the median CD4 count at ART initiation remained relatively stable over time.

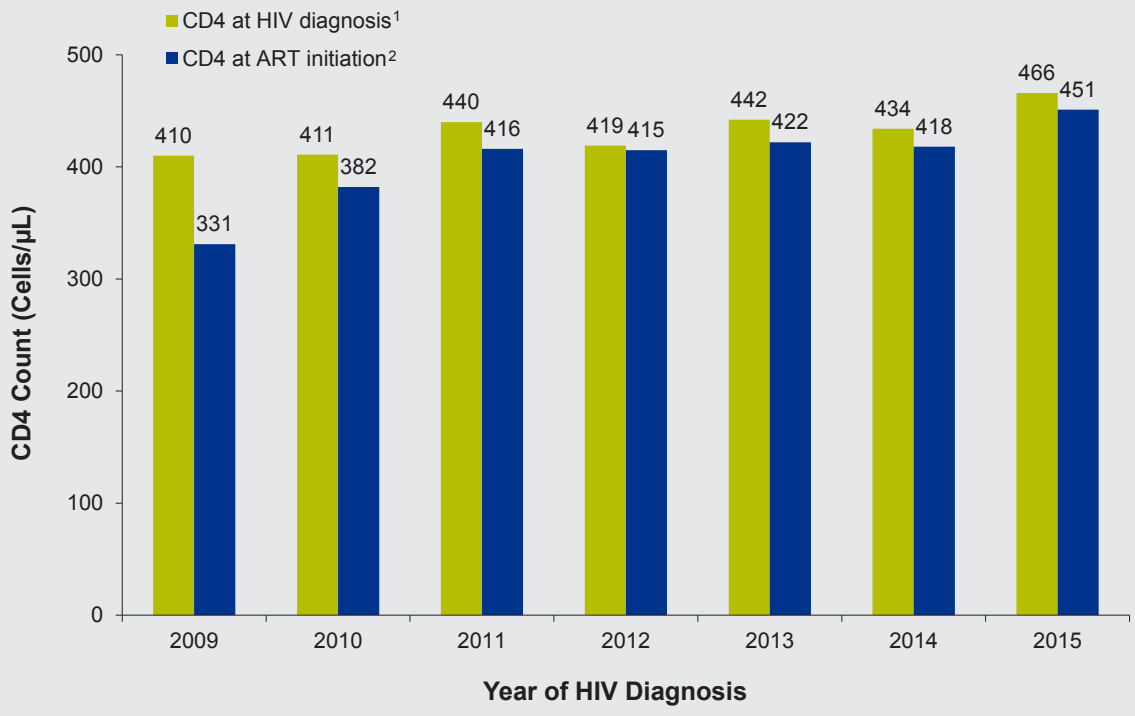
Figure 3.5 Trends in median CD4 count at time of ART initiation by CD4 count at time of diagnosis, 2009-2015, San Francisco



1 Median CD4 count at ART initiation was calculated among persons who started ART and whose CD4 count at HIV diagnosis and CD4 count at ART initiation were available (N=2,115).

Among 2,453 persons newly diagnosed with HIV between 2009 and 2015, the median CD4 count at HIV diagnosis increased from 410 cells/μL in 2009 to 466 cells/μL in 2015 (Figure 3.6). The temporal increase in CD4 count at ART initiation is more prominent: among persons who were diagnosed in 2009 and known to have started ART, the median CD4 count at ART initiation was 331 cells/μL while the median CD4 count at ART initiation for persons diagnosed in 2015 was 451 cells/μL, suggesting that the time between HIV diagnosis and ART initiation has shortened during 2009 to 2015. The increase in CD4 count at ART initiation may also be due to shorter time between HIV infection and HIV diagnosis.

Figure 3.6 Trends in median CD4 count at time of diagnosis and at time of ART initiation among persons newly diagnosed with HIV, 2009-2015, San Francisco



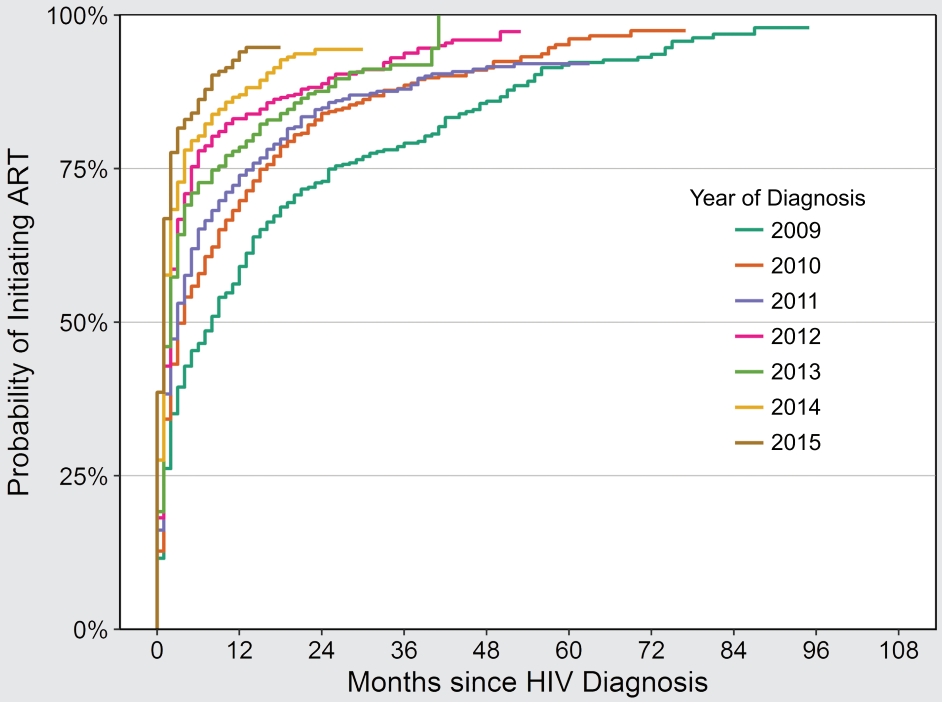
1 Median CD4 count at HIV diagnosis was calculated among persons whose CD4 count at HIV diagnosis was available (N=2,453).

2 Median CD4 count at ART initiation was calculated among persons who started ART and whose CD4 count at HIV diagnosis and CD4 count at ART initiation were available (N=2,115).

Trends in time from HIV diagnosis to ART initiation

Early entry in care and initiation of ART among persons diagnosed with HIV is essential to achieve optimal treatment outcomes. We estimated the time from HIV diagnosis to initiation of ART among 2,696 persons diagnosed with HIV between 2009 and 2015 who have evidence of receipt of care (had at least one CD4 or viral load test after diagnosis). The median time from diagnosis to ART initiation significantly decreased from eight months in 2009 to one month in 2014 and 2015 (Figure 3.7). A noticeable large decline in the median time to ART between 2009 and 2010 (eight months and four months, respectively) corresponded with the SFDPH recommendation in 2010 to offer universal treatment for all persons with HIV regardless of stage of disease.

Figure 3.7 Kaplan-Meier estimates of time from HIV diagnosis to ART initiation among persons newly diagnosed with HIV by year of diagnosis, 2009-2015, San Francisco



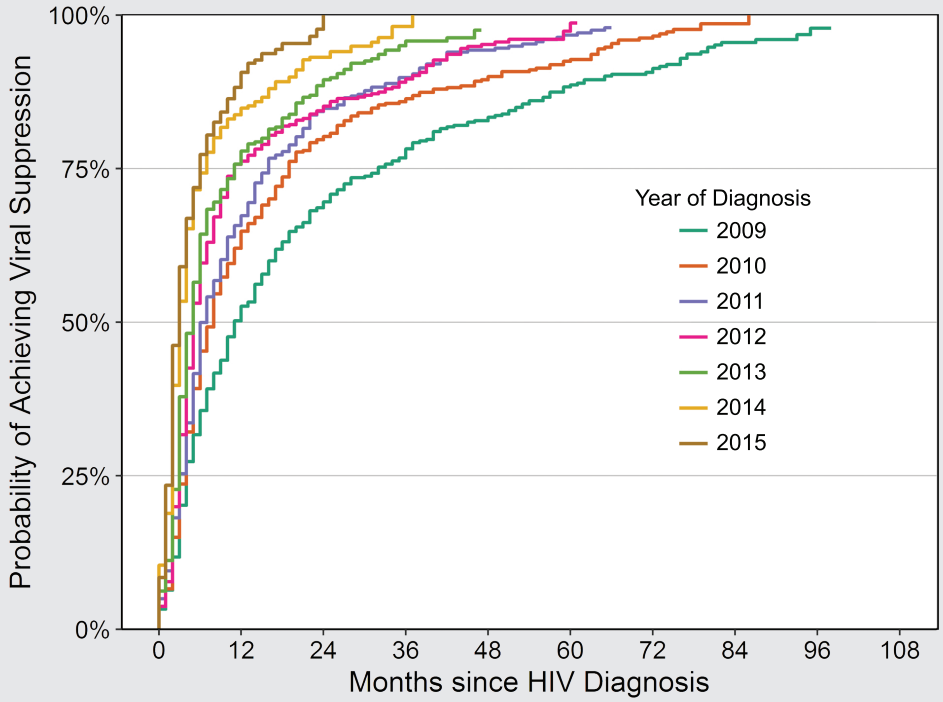
	Median time between diagnosis and ART initiation (months)	Total cases included[1]	No. initiated ART as of 03/31/2017	No. (%) censored at the last follow-up date
2009	8	459	392	67 (15%)
2010	4	432	378	54 (13%)
2011	3	403	346	57 (14%)
2012	2	430	383	47 (11%)
2013	2	371	307	64 (17%)
2014	1	316	271	45 (14%)
2015	1	285	243	42 (15%)

1 Includes persons diagnosed with HIV who were in care.

Trends in time from HIV diagnosis to viral suppression

Among PLWH, viral suppression (HIV viral load less than 200 copies/mL) is associated with a lower risk of HIV-related morbidity and mortality and a lower risk of transmitting HIV to others. The treatment goal for PLWH is rapid and sustained viral suppression. The time from HIV diagnosis to viral suppression has significantly shortened among 2,696 persons diagnosed in more recent years who were in care (Figure 3.8). Among persons diagnosed with HIV in 2009, half achieved viral suppression within 11 months following their diagnosis (median time to viral suppression). The median time to viral suppression shortened steadily in each of the following years: eight months among persons diagnosed in 2010, seven months among persons diagnosed in 2011, five months for persons diagnosed in 2012 and 2013, and three months among persons diagnosed in 2014 and 2015.

Figure 3.8 Kaplan-Meier estimates of time from HIV diagnosis to viral suppression among persons newly diagnosed with HIV by year of diagnosis, 2009-2015, San Francisco



	Median time between diagnosis and viral suppression (months)	Total cases included[1]	No. virally suppressed as of 03/31/2017	No. (%) censored at the last lab test date
2009	11	459	398	61 (13%)
2010	8	432	395	37 (9%)
2011	7	403	367	36 (9%)
2012	5	430	393	37 (9%)
2013	5	371	331	40 (11%)
2014	3	316	290	26 (8%)
2015	3	285	254	31 (11%)

1 Includes persons diagnosed with HIV who were in care.

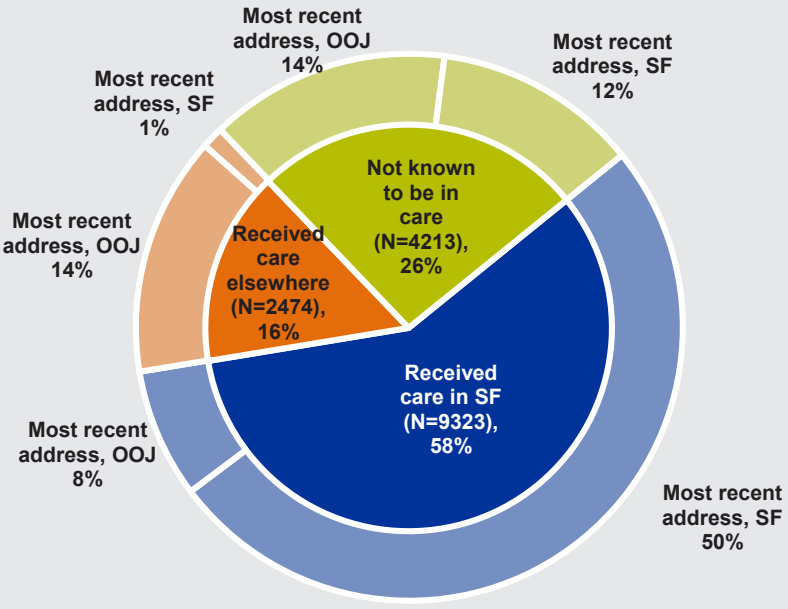
Receipt of HIV care among persons living with HIV by residence status

Local health jurisdictions are responsible for reporting all residents newly diagnosed with HIV/AIDS. However, gaps in follow-up data develop due to persons moving in or out of the jurisdiction following their diagnosis. Laboratory reports of CD4 and viral load test results were used as indicators of care in 2016. Incomplete HIV-related care information may result for San Francisco HIV cases who received care outside of San Francisco. Therefore, to examine the receipt of care among PLWH, we used the most current address and initial residence at diagnosis to study two patterns: 1) San Francisco residents at time of diagnosis who currently live and receive care elsewhere, and 2) residents outside of San Francisco at the time of their initial HIV diagnosis who currently receive care in San Francisco. Current address information on PLWH is routinely updated through chart reviews, laboratory reports, and other external data sources such as Lexis-Nexis, a national database comprised of 37 million public records to update those addresses for cases who have no follow-up information.

We included 16,010 PLWH in 2016 who resided in San Francisco at diagnosis and categorized them by their current address to examine receipt of HIV care patterns (Figure 3.9). Overall, 74% received HIV care in 2016 (58% received care in San Francisco, 16% received care outside of San Francisco) and 26% did not receive HIV care. Twelve percent (N=1,938) of all PLWH did not receive HIV care and had a San Francisco current address; these persons should be a high priority to be reengaged back into care.

Figure 3.9 Persons living with HIV in 2016 who resided in San Francisco at diagnosis by care and most recent residence status

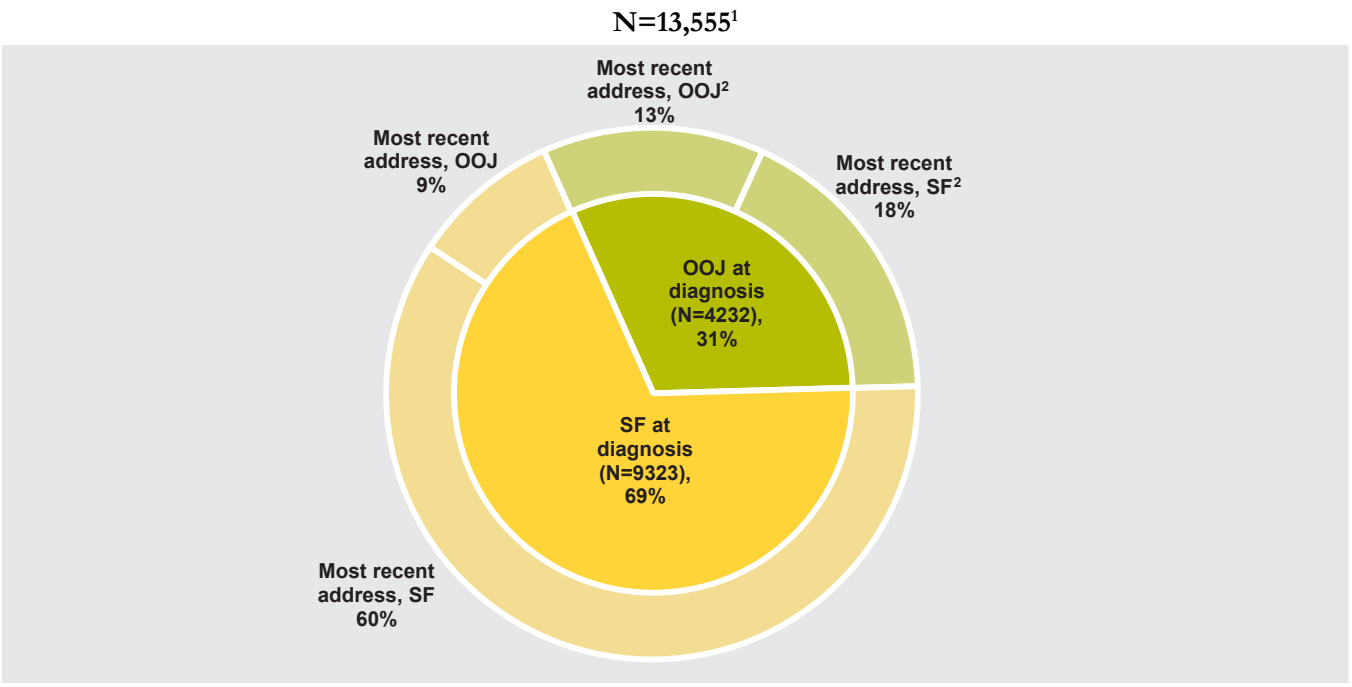
N=16,010[1]



1 Includes persons who resided in San Francisco at diagnosis and were alive as of December 2016 to assess where they live based on the most recent available address and where they receive care in 2016.

We also evaluated all PLWH who received care in San Francisco in 2016, regardless of their residence at time of HIV diagnosis. There were 13,555 persons who had an HIV-related test result (defined as a CD4 or viral load test) in San Francisco in 2016. Of those receiving at least one HIV-related test in 2016 in San Francisco, 31% were originally diagnosed elsewhere (Figure 3.10). Twenty-two percent of PLWH who received care in San Francisco currently reside outside of San Francisco. This quantifies the pattern of care for those who travel to San Francisco for their HIV care. However, the full extent of care utilization and HIV case migration patterns cannot be fully understood until more complete laboratory and residence information is collected and shared between jurisdictions.

Figure 3.10 Persons living with HIV who received care in San Francisco in 2016 by residence at diagnosis and most recent residence status



1 Includes persons who received HIV care in San Francisco in 2016 regardless of where they were initially diagnosed with HIV.
2 Most recent address for OOJ residents at diagnosis is less complete because the update on address information is not conducted regularly or consistently.

The majority of the PLWH who received care in 2016 in San Francisco were male, white, over 50 years old, and MSM (Table 3.8). The distribution of characteristics among those currently known to live in San Francisco and those known to live in another jurisdiction was similar.

Table 3.8 Characteristics of persons living with HIV who received care in San Francisco in 2016 by most recent residence status

	Persons receiving HIV care in San Francisco[1]					
	Total cases receiving care in 2016		Most recent residence in San Francisco[2]		Most recent residence outside San Francisco[2]	
	Number	(%)	Number	(%)	Number	(%)
Total	**13,555**	**(100)**	**10,502**	**(100)**	**3,053**	**(100)**
Gender						
Male	12,422	(92)	9,615	(91)	2,807	(92)
Female	803	(6)	606	(6)	197	(6)
Trans Female	330	(2)	281	(3)	49	(2)
Race/Ethnicity						
White	7,741	(57)	5,958	(57)	1,783	(58)
African American	1,845	(14)	1,363	(13)	482	(16)
Latino	2,601	(19)	2,116	(20)	485	(16)
Asian/Pacific Islander	826	(6)	644	(6)	182	(6)
Other/Unknown	542	(4)	421	(4)	121	(4)
Age in Years (as of 12/31/2016)						
0-12	9	(<1)	1	(<1)	8	(<1)
13-24	153	(1)	97	(1)	56	(2)
25-29	476	(4)	356	(3)	120	(4)
30-39	1,789	(13)	1,383	(13)	406	(13)
40-49	3,041	(22)	2,396	(23)	645	(21)
50-59	4,791	(35)	3,712	(35)	1,079	(35)
60-69	2,650	(20)	2,045	(19)	605	(20)
70+	646	(5)	512	(5)	134	(4)
Transmission Category						
MSM	10,133	(75)	7,802	(74)	2,331	(76)
PWID	759	(6)	633	(6)	126	(4)
MSM-PWID	1,829	(13)	1,529	(15)	300	(10)
Heterosexual	540	(4)	386	(4)	154	(5)
Other/Unidentified	294	(2)	152	(1)	142	(5)

1 Includes persons living with HIV at end of 2016 who received care in San Francisco in 2016 regardless of where they were initially diagnosed with HIV. Receipt of care in San Francisco is defined as having at least one CD4, viral load, or genotype test ordered by San Francisco HIV providers.

2 Based on most recent available address.

Medical Monitoring Project (MMP)

Selected clinical outcomes and care utilization among San Francisco MMP participants during the 2009 to 2014 MMP data collection cycles, by year and compared to the results from the national MMP participants for 2014 (see Technical Notes, "Medical Monitoring Project") are described in Table 3.9. Overall, the recommended clinical guidelines for PLWH were met for the majority of PLWH. Almost all PLWH in San Francisco and the U.S. had one usual place, such as a physician's office or clinic, where they received most of their HIV medical care. ART prescription and viral suppression at the most recent test was high both locally and nationally, but a higher percentage of San Franciscans had all undetectable viral load tests in the 12 months before their interview (79% versus 71% in 2014).

In San Francisco, there was an upward trend in the proportion of MMP participants that had a geometric mean CD4 cell count ≥500 cells/uL, all HIV undetectable viral load measurements in the past 12 months, and self-reported ART use from 2009-2013. There was a downward trend from 2009 to 2014 for the proportion of patients who received three or more CD4 or viral load tests in the previous year and viral load measured at least every six months.

Table 3.9 Selected clinical characteristics among MMP participants in San Francisco compared to MMP participants nationally, Medical Monitoring Project, 2009-2014

	San Francisco												United States[2]	
	2009		2010		2011		2012		2013		2014		2014	
	N	%[1]	N	%[1]	N	%[1]	N	%[1]	N	%[1]	N	%[1]	N	%[1]
Total sample	**206**	**(100.0)**	**213**	**(100.0)**	216	**(100.0)**	246	**(100.0)**	232	**(100.0)**	233	**(100.0)**	5154	**(100.0)**
Stage of disease														
Stage 3: Clinical AIDS or CD4+lymphocyte <200 cells/uL	133	(63.2)	140	(65.1)	143	(62.3)	158	(64.0)	153	(66.1)	163	(69.1)	3506	(67.8)
Had usual place of care	205	(99.6)	213	(100.0)	214	(99.0)	245	(99.6)	230	(99.1)	229	(98.9)	5130	(99.7)
Laboratory measures of CD4+ lymphocyte and HIV viral load tests in the 12 months before the interview														
Geometric mean CD4 cell count ≥500 cells/uL	105	(54.2)	121	(59.1)	103	(52.4)	128	(56.1)	142	(63.9)	125	(60.4)	2819	(57.3)
Lowest CD4+ cell count ≥500 cells/uL	82	(42.5)	87	(41.3)	85	(43.6)	107	(46.7)	120	(53.6)	105	(50.6)	2324	(47.2)
≥3 Outpatient lab tests for CD4+ cell count or HIV viral load	159	(77.7)	158	(74.0)	128	(60.8)	136	(55.6)	119	(51.5)	117	(50.0)	3049	(58.7)
≥3 Outpatient lab tests for CD4+ cell count count	149	(72.2)	149	(70.7)	117	(56.5)	129	(52.8)	102	(44.8)	89	(38.8)	2766	(53.2)
≥3 Outpatient lab tests for HIV viral load	135	(66.9)	135	(64.0)	112	(54.0)	119	(48.7)	105	(45.8)	100	(43.1)	2757	(53.1)
Viral load measured at least once every 6 months	163	(80.4)	169	(79.6)	155	(74.3)	180	(73.9)	162	(70.7)	154	(66.1)	3790	(73.7)
CD4+ cell count measured at least once annually	199	(97.0)	211	(99.3)	206	(95.5)	231	(95.0)	222	(96.2)	214	(93.0)	4908	(95.9)
Viral Suppression (most recent HIV viral load undetectable[3])	167	(82.3)	163	(76.9)	180	(84.9)	208	(84.3)	200	(86.6)	199	(85.9)	4243	(82.3)
All HIV viral load measurements in the past 12 months undetectable	140	(69.1)	150	(71.1)	167	(79.2)	194	(78.7)	187	(81.1)	182	(78.6)	3674	(71.0)
Antiretroviral treatment use														
Antiretroviral treatment prescription documented in the medical chart	185	(89.3)	193	(89.2)	206	(95.5)	220	(89.6)	221	(95.0)	228	(97.9)	NA[4]	
Participant self-reported current ART use	184	(89.8)	194	(91.1)	199	(92.8)	231	(94.0)	221	(95.4)	225	(96.6)	4933	(96.2)
Testing for selected sexually transmitted diseases among sexually active participants														
Received Gonorrhea testing	72	(43.8)	65	(40.1)	53	(35.2)	69	(37.4)	58	(33.3)	82	(37.0)	1513	(48.2)
Received Chlamydia testing	73	(44.6)	65	(40.1)	53	(35.6)	71	(38.4)	58	(33.3)	81	(36.5)	1511	(48.4)
Received Syphilis testing	128	(76.4)	129	(78.1)	101	(60.3)	134	(74.5)	124	(71.5)	160	(68.1)	2122	(70.2)
Received testing for all three STDs	65	(39.1)	60	(37.0)	42	(28.0)	62	(33.6)	52	(30.0)	58	(42.2)	1347	(43.2)

1 Weighted percent.

2 Centers for Disease Control and Prevention. Behavioral and Clinical Characteristics of Persons Receiving Medical Care for HIV Infection-Medical Monitoring Project, United States, 2014 Cycle (June 2014–May 2015). HIV Surveillance Special Report 17.

3 Undetectable defined as ≤200 copies/mL.

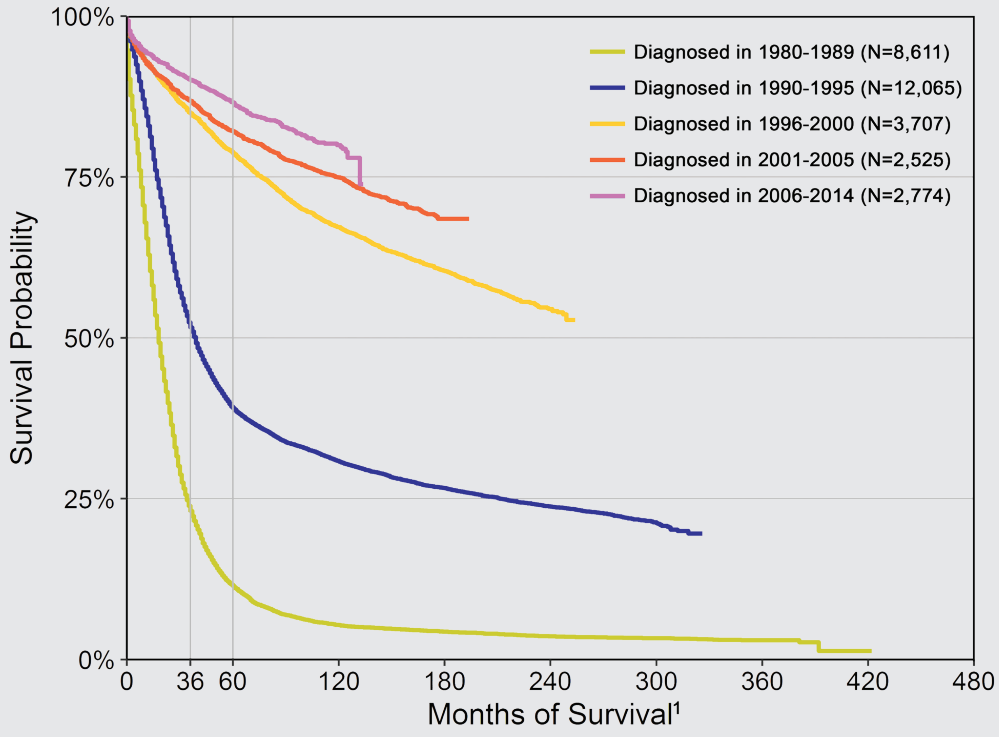
4 Data not available.

4 Survival among Persons with HIV Disease Stage 3 (AIDS)

The Kaplan-Meier survival curves in Figure 4.1 demonstrate continual improvement in survival after stage 3 HIV (AIDS) diagnosis since the 1980s with the greatest improvement in survival beginning in 1996, when highly effective antiretroviral therapy became widely available. Survival was poor for persons diagnosed in the first ten years of the epidemic (1980-1989) with a median survival time (survival probability of 50%) of 18 months after stage 3 HIV diagnosis. The median survival time increased to 38 months for persons diagnosed between 1990 and 1995. Survival among stage 3 HIV cases diagnosed in the two most recent time periods shows continued improvement. Survival after HIV stage 3 diagnosis was calculated for persons diagnosed through 2014 to allow for at least 24 months follow-up time after diagnosis.

The survival probability at three years (36 months) among stage 3 HIV diagnoses increased from 23% in the period 1980-1989 to 52% in the period 1990-1995 followed by an increase to 85% in the period 1996-2000 and smaller but continued increase in more recent years' diagnoses (87% in 2001-2005, 90% in 2006-2014, respectively). The survival probability at five years (60 months) after stage 3 HIV diagnosis followed a similar pattern with only 11% of HIV stage 3 cases diagnosed in 1980-1989 surviving for five years. Among persons diagnosed with stage 3 HIV in the years 2006-2014, there was a survival probability of 87% at five years.

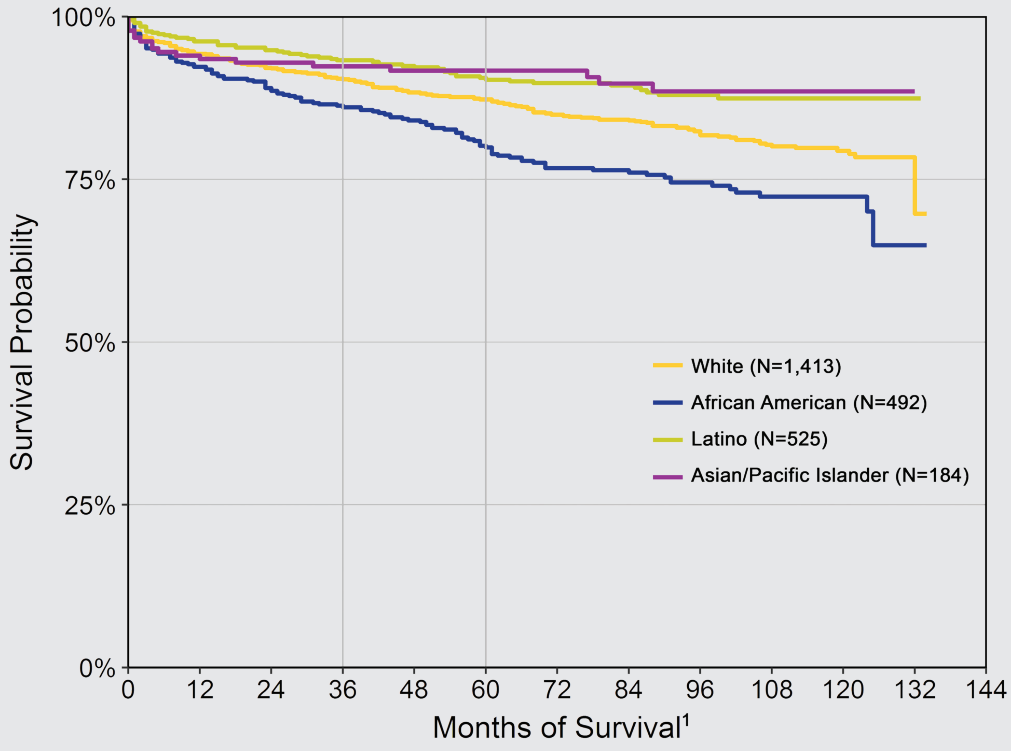
Figure 4.1 Kaplan-Meier survival curves for persons diagnosed with stage 3 HIV (AIDS) in five time periods, San Francisco



1 See Technical Notes "HIV Disease Stage 3 (AIDS) Survival."

Among persons diagnosed with stage 3 HIV (AIDS) in the years 2006-2014, survival probability at both three and five years was lower among African Americans compared to whites, Latinos, and Asian/Pacific Islanders (Figure 4.2). The three- and five-year survival probability of African Americans after HIV stage 3 diagnosis was 86% and 80%, respectively, compared to 90% and 87% among whites, 93% and 90% among Latinos, and 92% in both three- and five-year survival probabilities of Asian/Pacific Islanders.

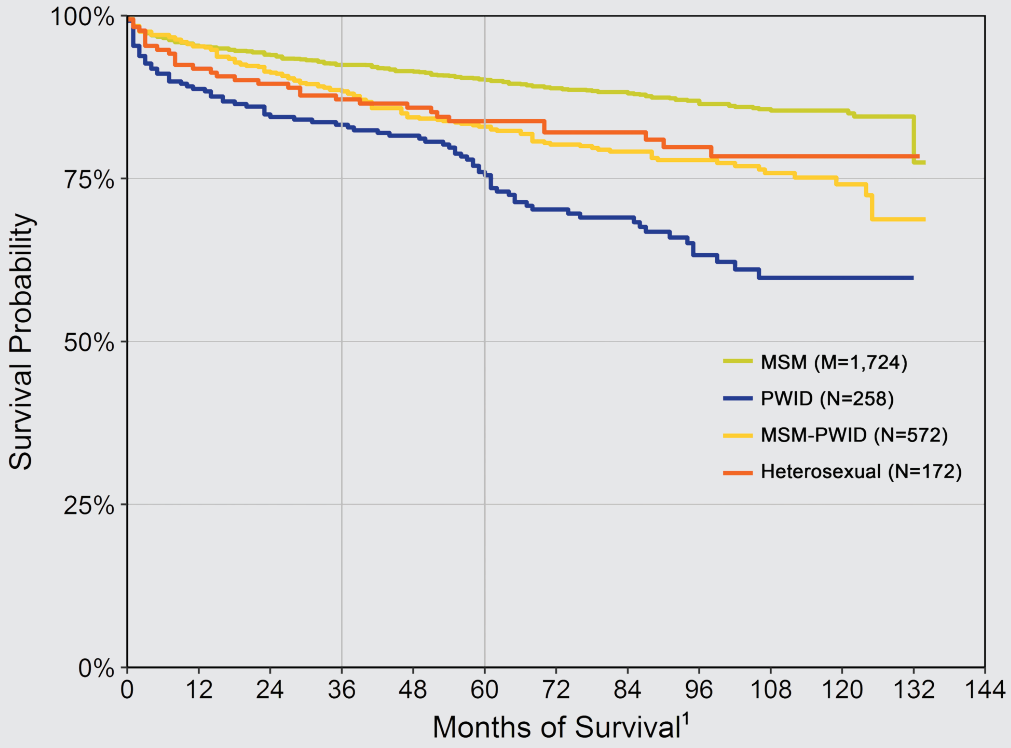
Figure 4.2 Kaplan-Meier survival curves for persons diagnosed with stage 3 HIV (AIDS) between 2006 and 2014 by racial/ethnic group, San Francisco



1 See Technical Notes "HIV Disease Stage 3 (AIDS) Survival."

For stage 3 HIV (AIDS) cases diagnosed from 2006 through 2014, the three- and five-year survival probability after stage 3 HIV diagnosis has been highest for MSM and worst for heterosexual PWID (Figure 4.3). Worse survival among PWID (compared with MSM non-PWID) partly reflects higher death rates from causes associated with drug use such as overdose, liver disease, viral hepatitis, and other infections.

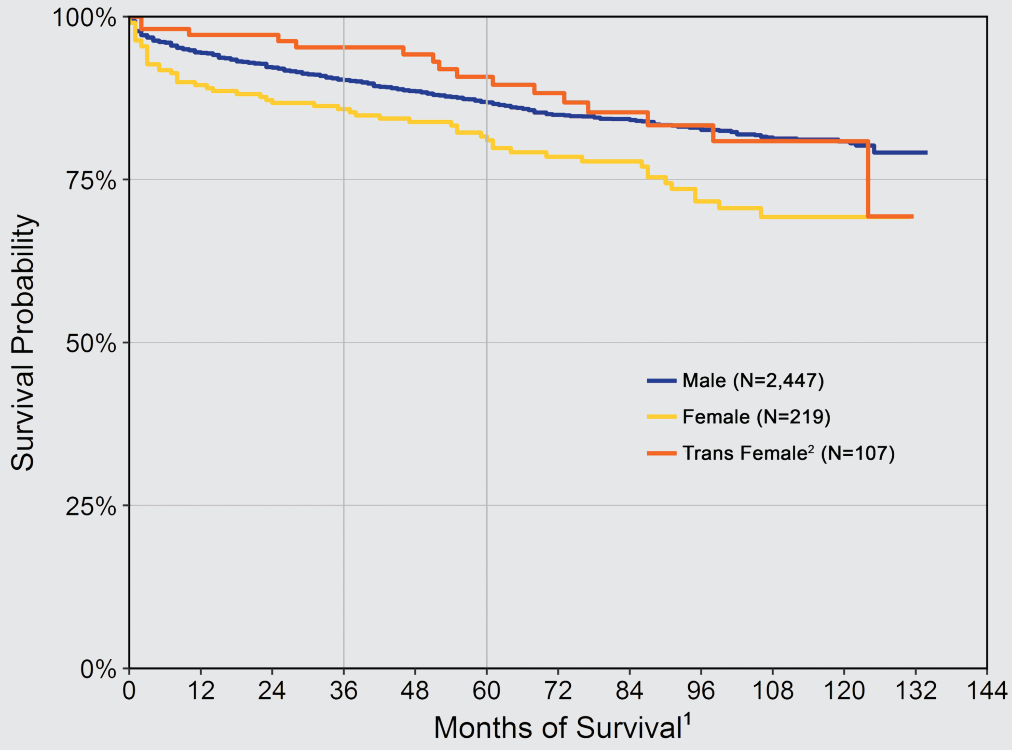
Figure 4.3 Kaplan-Meier survival curves for persons diagnosed with stage 3 HIV (AIDS) between 2006 and 2014 by transmission category, San Francisco



1 See Technical Notes "HIV Disease Stage 3 (AIDS) Survival."

Survival among women with stage 3 HIV (AIDS) diagnosis from 2006 through 2014 was lower than survival among men and trans women (Figure 4.4). The three- and five-year survival probability among women was 86% and 81%, respectively compared to 90% and 87% respectively among men and 95% and 90% among trans women. The differences in survival by gender are consistent with lower use of ART and higher proportion of PWID among female HIV cases.

Figure 4.4 Kaplan-Meier survival curves for persons diagnosed with stage 3 HIV (AIDS) between 2006 and 2014 by gender, San Francisco

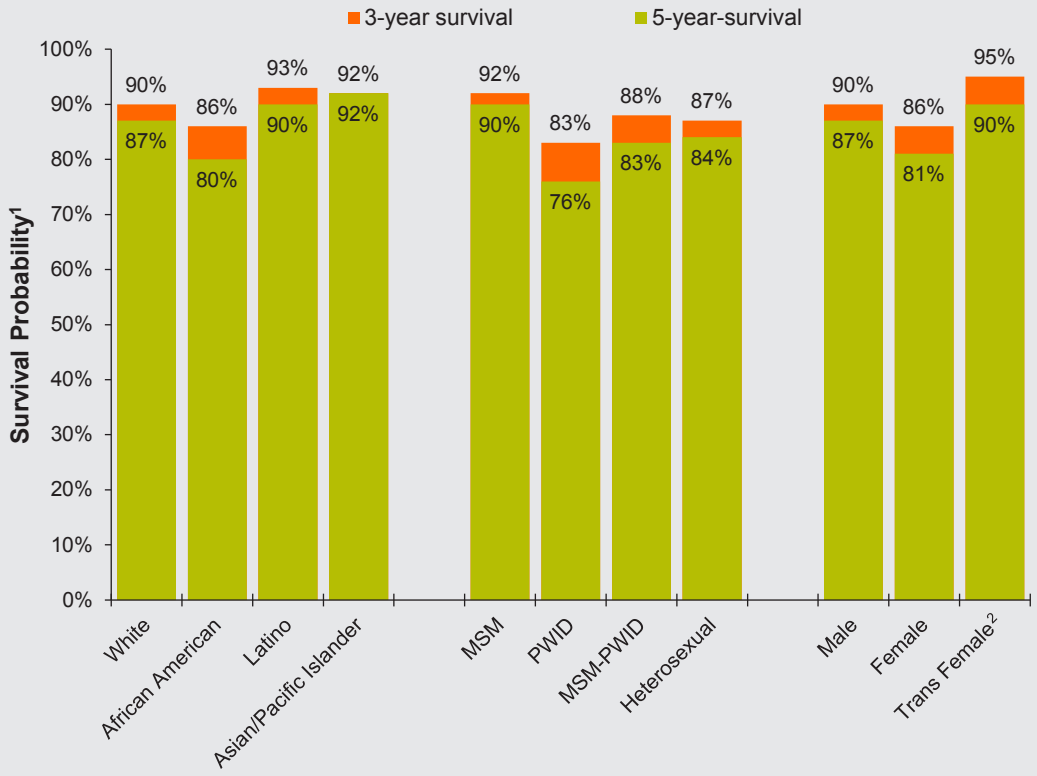


1 See Technical Notes "HIV Disease Stage 3 (AIDS) Survival."

2 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

The overall three-year and five-year survival probability after stage 3 HIV (AIDS) for persons diagnosed between 2006 and 2014 was 90% and 87%, respectively. Differences in survival occurred across race/ethnicity, transmission category, and gender groups (Figure 4.5). African Americans, PWID, and women had lower three-year and five-year survival probabilities compared to other groups.

Figure 4.5 Three-year and five-year survival probability after stage 3 HIV (AIDS) for persons diagnosed between 2006 and 2014 by racial/ethnic group, transmission category, and gender, San Francisco



1 Calculated from Kaplan-Meier method.

2 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

5 Trends in HIV Mortality

As of December 31, 2016, the cumulative number of deaths that have occurred among San Francisco HIV cases was 21,237 (Table 5.1). From 2011 to 2016 the proportion of deaths was relatively stable by gender, racial/ethnic groups, and transmission category. Deaths in persons aged 40-49 years old continued to decline. The majority of deaths during each of these years continues to occur among persons aged 50 years and older (62% to 78%) and persons with HIV disease stage 3 (AIDS) (79% to 86%).

Table 5.1 Deaths among persons diagnosed with HIV, by demographic and risk characteristics, 2011-2016, San Francisco

	Year of Death												Cumulative Totals as of 12/31/2016
	2011		2012		2013		2014		2015		2016[1]		
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	
Gender													
Male	209	(89)	211	(89)	222	(85)	209	(87)	229	(89)	135	(82)	20,087
Female	18	(8)	18	(8)	29	(11)	20	(8)	27	(11)	19	(12)	869
Trans Female[2]	7	(3)	8	(3)	10	(4)	12	(5)	1	(<1)	11	(7)	281
Race/Ethnicity													
White	128	(55)	149	(63)	148	(57)	139	(58)	146	(57)	95	(58)	15,430
African American	54	(23)	45	(19)	49	(19)	53	(22)	51	(20)	44	(27)	2,732
Latino	32	(14)	31	(13)	39	(15)	35	(15)	31	(12)	19	(12)	2,237
Asian/Pacific Islander/ Native American	6	(3)	3	(1)	9	(3)	4	(2)	10	(4)	1	(1)	546
Multi-Race	14	(6)	9	(4)	16	(6)	10	(4)	19	(7)	6	(4)	292
Transmission Category													
MSM	130	(56)	134	(57)	150	(57)	142	(59)	142	(55)	86	(52)	15,458
PWID	37	(16)	42	(18)	49	(19)	41	(17)	45	(18)	24	(15)	1,776
MSM-PWID	60	(26)	50	(21)	54	(21)	49	(20)	59	(23)	48	(29)	3,436
Heterosexual	4	(2)	7	(3)	5	(2)	9	(4)	6	(2)	6	(4)	244
Other/Unidentified	3	(1)	4	(2)	3	(1)	0	(0)	5	(2)	1	(1)	323
Age at Death (years)													
0 - 29	3	(1)	2	(1)	3	(1)	4	(2)	7	(3)	1	(1)	1,112
30 - 39	25	(11)	12	(5)	13	(5)	11	(5)	15	(6)	7	(4)	7,353
40 - 49	63	(27)	58	(24)	56	(21)	37	(15)	37	(14)	29	(18)	7,672
50 - 59	81	(35)	83	(35)	100	(38)	90	(37)	101	(39)	49	(30)	3,458
60 - 69	42	(18)	60	(25)	66	(25)	70	(29)	66	(26)	58	(35)	1,263
70+	20	(9)	22	(9)	23	(9)	29	(12)	31	(12)	21	(13)	379
HIV Disease Stage													
Stage 0, 1, 2, or unknown	33	(14)	43	(18)	55	(21)	42	(17)	43	(17)	24	(15)	574
Stage 3 (AIDS)	201	(86)	194	(82)	206	(79)	199	(83)	214	(83)	141	(85)	20,663
Cause of Death[3]													
HIV/AIDS-related	101	(43)	84	(35)	103	(39)	106	(44)	99	(39)	--		--
Non-HIV/AIDS-related	123	(54)	150	(63)	151	(58)	132	(55)	148	(58)	--		--
Unknown	10	(4)	3	(1)	7	(3)	3	(1)	10	(4)	--		--
Total	**234**	**(100)**	**237**	**(100)**	**261**	**(100)**	**241**	**(100)**	**257**	**(100)**	**165**	**(100)**	**21,237**

1 Data in recent years are incomplete due to reporting delays. In addition, deaths that occurred outside of San Francisco are identified through matching with the National Death Index (NDI), which is complete through December 31, 2015.

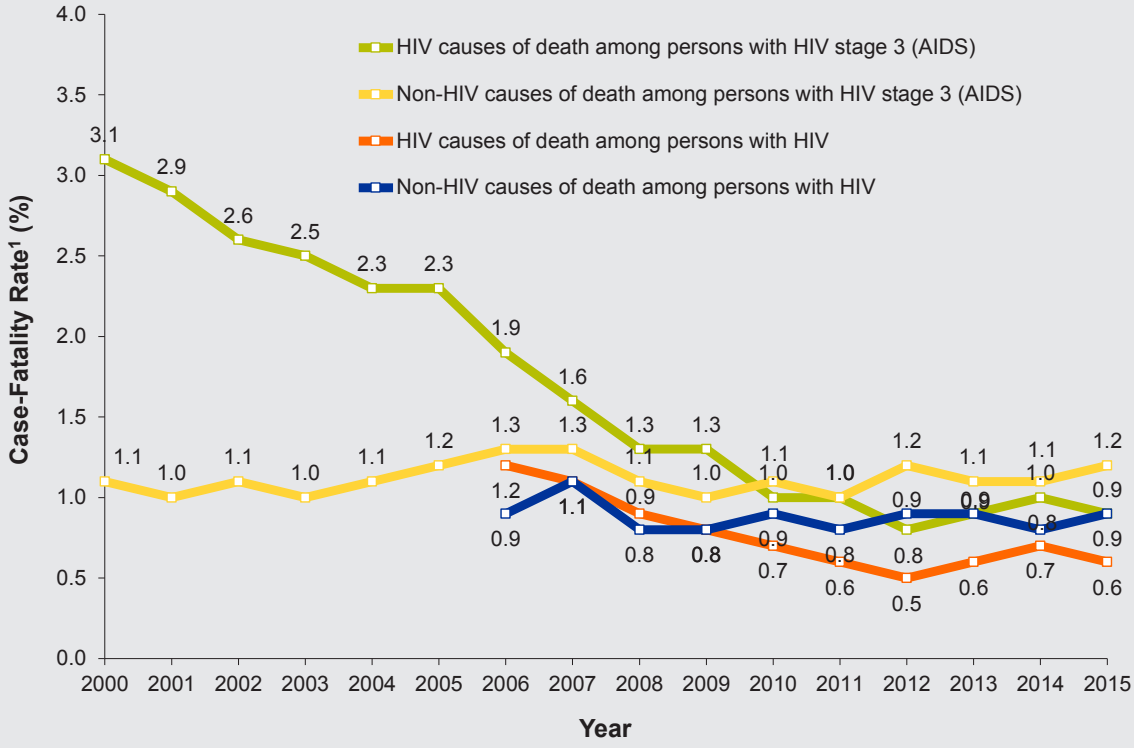
2 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

3 Underlying cause of death obtained from the NDI is available through 2015. See Technical Notes "Death Ascertainment."

The trend in case-fatality rates in persons diagnosed with HIV was examined by the single, underlying cause of death for each person. Cause of death information was available for deaths through 2015. The case-fatality rate due to HIV-related causes among persons with HIV stage 3 diagnosis declined from 3.1 per 100 persons in 2000 to 0.9 per 100 persons for 2015 (Figure 5.1). Non-HIV-related causes of death among persons with HIV stage 3 diagnosis fluctuated between 1.0 and 1.3 deaths per 100 persons from 2000 to 2015.

When deaths in all stages of HIV disease were evaluated, case-fatality rates for HIV-related causes declined from 1.2 per 100 persons in 2006 to 0.6 per 100 persons in 2015. Case-fatality rates for non-HIV causes were fairly stable.

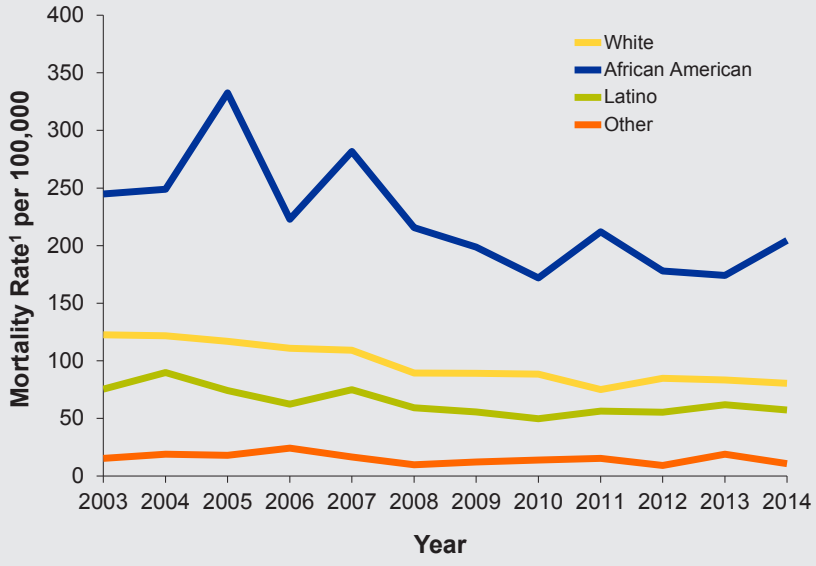
Figure 5.1 Case-fatality rates due to HIV-related and non-HIV-related causes among persons diagnosed with HIV, 2000-2015, San Francisco



1 Case-fatality rates are calculated as the number of persons with HIV stage 3 (AIDS), or all HIV disease stages, who died each year divided by the number of total HIV stage 3 (AIDS), or HIV disease all stage, cases alive during that year. See Technical Notes for "Death Ascertainment."

The HIV mortality rates among San Francisco males from 2003 to 2014 demonstrate a consistent disparity across racial/ethnic groups. The African American male mortality rate remained the highest during this time period with a peak in 2005 with 333 deaths per 100,000 before declining by nearly half during the subsequent five years (Figure 5.2). In 2014, the HIV mortality rate among African American men was 205 deaths per 100,000; this rate was 2.5 times higher than that of white men and 3.6 times higher than that of Latino men.

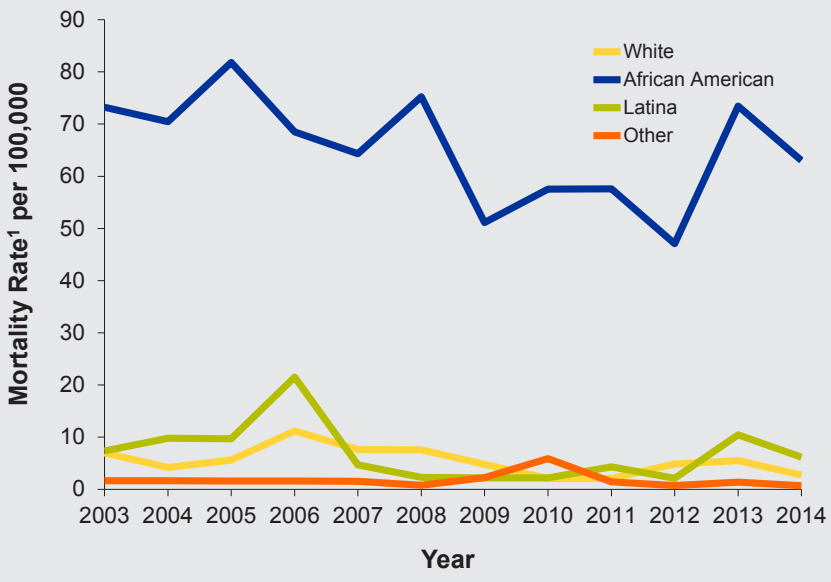
Figure 5.2 Mortality rates among men diagnosed with HIV per 100,000 population by race/ethnicity, 2003-2014, San Francisco



1 Mortality rates are calculated as the number of HIV cases who died each year divided by the population by sex and race/ethnicity. See Technical Notes for "HIV Case Rates and HIV Mortality Rates."

The San Francisco female HIV mortality rates were much lower than the male mortality rates by race/ethnicity. Despite some fluctuations in mortality rates in 2003-2014, African American women still experienced a higher HIV mortality rate compared to all other racial/ethnic groups (Figure 5.3). In 2014, the disparities across racial/ethnic groups were much higher than those observed among men; the HIV mortality rate among African American females was 63 deaths per 100,000, which was 10.2 times higher than Latino women and 22.8 times higher than white women.

Figure 5.3 Mortality rates among women diagnosed with HIV per 100,000 population by race/ethnicity, 2003-2014, San Francisco



1 Mortality rates are calculated as the number of HIV cases who died each year divided by the population by sex and race/ethnicity. See Technical Notes for "HIV Case Rates and HIV Mortality Rates."

For the years 2012 through 2015, HIV was the underlying cause of death for 40.3% of deaths among persons diagnosed with HIV demonstrating a continued decline in the proportion of underlying causes of death attributed to HIV disease (Table 5.2). Non-AIDS cancers continued to account for the second most frequent underlying cause of death in persons with HIV. Among the non-AIDS cancers, lung cancer was the most frequently occurring underlying cause. Accidents and other traumatic injury deaths constituted an important and relatively frequent cause of death among people with HIV. As HIV becomes a less frequent underlying cause of death, deaths due to diseases of older age and substance use (e.g. drug, alcohol, or tobacco use) are increasingly more common.

Table 5.2 Underlying causes of death among persons diagnosed with HIV, 2004-2015, San Francisco

	Year of Death					
	2004-2007 N=1,310		2008-2011 N=971		2012-2015 N=973	
Underlying Cause of Death[1]	Number	(%)	Number	(%)	Number	(%)
HIV	756	(57.7)	462	(47.6)	392	(40.3)
Non-AIDS cancer	132	(10.1)	117	(12.0)	133	(13.7)
Lung cancer	43	(3.3)	35	(3.6)	37	(3.8)
Liver cancer	26	(2.0)	18	(1.9)	17	(1.7)
Anal cancer	5	(0.4)	7	(0.7)	9	(0.9)
Pancreatic cancer	6	(0.5)	3	(0.3)	7	(0.7)
Colon cancer	7	(0.5)	8	(0.8)	5	(0.5)
Leukemia	1	(0.1)	2	(0.2)	5	(0.5)
Hodgkins lymphoma	1	(0.1)	1	(0.1)	2	(0.2)
Rectal cancer	8	(0.6)	3	(0.3)	2	(0.2)
Accident	102	(7.8)	116	(11.9)	103	(10.6)
Drug overdose	71	(5.4)	95	(9.8)	88	(9.0)
Heart disease	89	(6.8)	86	(8.9)	86	(8.8)
Coronary heart disease	52	(4.0)	39	(4.0)	43	(4.4)
Cardiomyopathy	10	(0.8)	2	(0.2)	7	(0.7)
Diseases of arteries	2	(0.2)	4	(0.4)	2	(0.2)
Suicide	45	(3.4)	38	(3.9)	34	(3.5)
Liver disease	27	(2.1)	25	(2.6)	23	(2.4)
Liver cirrhosis	15	(1.1)	13	(1.3)	12	(1.2)
Alcoholic liver disease	10	(0.8)	11	(1.1)	8	(0.8)
Chronic obstructive pulmonary disease	24	(1.8)	17	(1.8)	21	(2.2)
Assault	8	(0.6)	5	(0.5)	13	(1.3)
Diabetes	6	(0.5)	5	(0.5)	12	(1.2)
Cerebrovascular disease	8	(0.6)	10	(1.0)	11	(1.1)
Mental disorders due to substance use	37	(2.8)	14	(1.4)	11	(1.1)
Viral hepatitis	14	(1.1)	9	(0.9)	8	(0.8)
Renal disease	5	(0.4)	5	(0.5)	7	(0.7)
Undetermined intent	3	(0.2)	4	(0.4)	4	(0.4)
Septicemia	4	(0.3)	3	(0.3)	3	(0.3)

1 See Technical Notes "Death Ascertainment." Deceased HIV cases that lack cause of death information are not represented in this table.

The most frequent, yet declining, underlying cause of death for males and females was HIV (Table 5.3). The percentages of males and females with HIV as the underlying cause of death were similar in 2004-2007 and 2012-2015. In the first two time periods, men with HIV had a higher proportion of deaths due to non-AIDS cancers than women. In all three time periods, men had a higher proportion of deaths due to heart disease and suicide as the underlying causes. During all three periods, women had a higher proportion of underlying causes of death due to chronic obstructive pulmonary disease than did men.

Table 5.3 Underlying causes of death among persons diagnosed with HIV by sex, 2004-2015, San Francisco

	Year of Death					
	2004-2007		2008-2011		2012-2015	
	Male	Female	Male	Female	Male	Female
Underlying Cause of Death[1]	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total	**1,186**	**124**	**882**	**89**	**879**	**94**
HIV	687 (57.9)	69 (55.6)	415 (47.1)	47 (52.8)	356 (40.5)	36 (38.3)
Non-AIDS cancer	127 (10.7)	5 (4.0)	115 (13.0)	2 (2.2)	120 (13.7)	13 (13.8)
Accident	89 (7.5)	13 (10.5)	100 (11.3)	16 (18.0)	88 (10.0)	15 (16.0)
Drug overdose	60 (5.1)	11 (9.0)	82 (9.0)	13 (15.0)	73 (8.0)	15 (16.0)
Heart disease	81 (6.8)	8 (6.5)	81 (9.2)	5 (5.6)	82 (9.3)	4 (4.3)
Suicide	43 (3.6)	2 (1.6)	38 (4.3)	0 (0.0)	34 (3.9)	0 (0.0)
Liver disease	23 (1.9)	4 (3.2)	24 (2.7)	1 (1.1)	19 (2.2)	4 (4.3)
Chronic obstructive pulmonary disease	20 (1.7)	4 (3.2)	11 (1.2)	6 (6.7)	18 (2.0)	3 (3.2)
Assault	8 (0.7)	0 (0.0)	4 (0.5)	1 (1.1)	12 (1.4)	1 (1.1)
Diabetes	6 (0.5)	0 (0.0)	5 (0.6)	0 (0.0)	11 (1.3)	1 (1.1)
Mental disorders due to substance use	28 (2.4)	9 (7.3)	11 (1.2)	3 (3.4)	11 (1.3)	0 (0.0)
Cerebrovascular disease	8 (0.7)	0 (0.0)	8 (0.9)	2 (2.2)	10 (1.1)	1 (1.1)
Viral hepatitis	13 (1.1)	1 (0.8)	6 (0.7)	3 (3.4)	8 (0.9)	0 (0.0)
Pneumonia	5 (<1)	0 (0.0)	5 (0.6)	0 (0.0)	7 (0.8)	0 (0.0)

1 See Technical Notes "Death Ascertainment." Deceased HIV cases that lack cause of death information are not represented in this table.

Table 5.4 shows both underlying and contributory causes of death among persons diagnosed with HIV. The proportion of deaths in which HIV was either the underlying or contributory cause declined from 74.0% in the period 2004-2007 to 68.4% during the following four years, and then to 61.8% in the years 2012-2015. Heart disease continued to be the second most common cause of death among HIV diagnosed persons in San Francisco. Non-AIDS cancers remained a frequent cause of death among persons diagnosed with HIV and of these, lung, liver, and anal cancers are the most common and were likely due to tobacco use, chronic hepatitis B and C infections, and infection with the human papilloma virus. Deaths due to accidents (including drug overdoses) increased in the second time period.

Table 5.4 Multiple causes of death among persons diagnosed with HIV, 2004-2015, San Francisco

	Year of Death					
	2004-2007 N=1,310		2008-2011 N=971		2012-2015 N=973	
Multiple Causes of Death[1]	Number	(%)	Number	(%)	Number	(%)
HIV	969	(74.0)	664	(68.4)	601	(61.8)
Heart disease	278	(21.2)	269	(27.7)	277	(28.5)
Coronary heart disease	82	(6.3)	81	(8.3)	86	(8.8)
Cardiomyopathy	28	(2.1)	21	(2.2)	26	(2.7)
Diseases of arteries	6	(0.5)	11	(1.1)	12	(1.2)
Non-AIDS cancer	181	(13.8)	169	(17.4)	168	(17.3)
Lung cancer	45	(3.4)	41	(4.2)	41	(4.2)
Liver cancer	30	(2.3)	27	(2.8)	18	(1.8)
Anal cancer	8	(0.6)	12	(1.2)	10	(1.0)
Pancreatic cancer	7	(0.5)	3	(0.3)	10	(1.0)
Leukemia	4	(0.3)	5	(0.5)	8	(0.8)
Colon cancer	8	(0.6)	8	(0.8)	5	(0.5)
Hodgkin lymphoma	5	(0.4)	7	(0.7)	4	(0.4)
Rectal cancer	11	(0.8)	5	(0.5)	4	(0.4)
Viral hepatitis	179	(13.7)	121	(12.5)	125	(12.8)
Liver disease	174	(13.3)	134	(13.8)	112	(11.5)
Liver cirrhosis	83	(6.3)	65	(6.7)	73	(7.5)
Alcoholic liver disease	11	(0.8)	12	(1.2)	9	(0.9)
Accident	115	(8.8)	127	(13.1)	108	(11.1)
Drug overdose	78	(6.0)	104	(10.7)	88	(9.0)
Renal disease	142	(10.8)	103	(10.6)	99	(10.2)
Pneumonia	169	(12.9)	123	(12.7)	94	(9.7)
Septicemia	141	(10.8)	98	(10.1)	93	(9.6)
Mental disorders due to substance use	126	(9.6)	95	(9.8)	91	(9.4)
Chronic obstructive pulmonary disease	74	(5.6)	60	(6.2)	71	(7.3)
Diabetes	44	(3.4)	46	(4.7)	51	(5.2)
Cerebrovascular disease	37	(2.8)	35	(3.6)	44	(4.5)
Suicide	46	(3.5)	38	(3.9)	34	(3.5)

1 Includes underlying and contributory causes of death. Individuals may have more than one cause of death. See Technical Notes "Death Ascertainment." Deceased HIV cases that lack cause of death information are not represented in this table.

Among both women and men, HIV was the most frequent underlying or contributory cause of death in all time periods although the proportions declined over the three time periods (Table 5.5). Heart disease was the second most frequent underlying or contributory cause of death in both women and men and these proportions increased. In the most recent time period, heart disease was listed as a cause of death in 28.8% of deaths among men and 25.5% of deaths among women. Deaths from non-AIDS cancers accounted for a greater proportion of deaths in men than in women during the first two time periods. In the most recent time period, deaths in which viral hepatitis, accidents including drug overdose, renal disease, pneumonia, and chronic obstructive pulmonary disease were listed as a cause of death accounted for a higher proportion of deaths in women than in men.

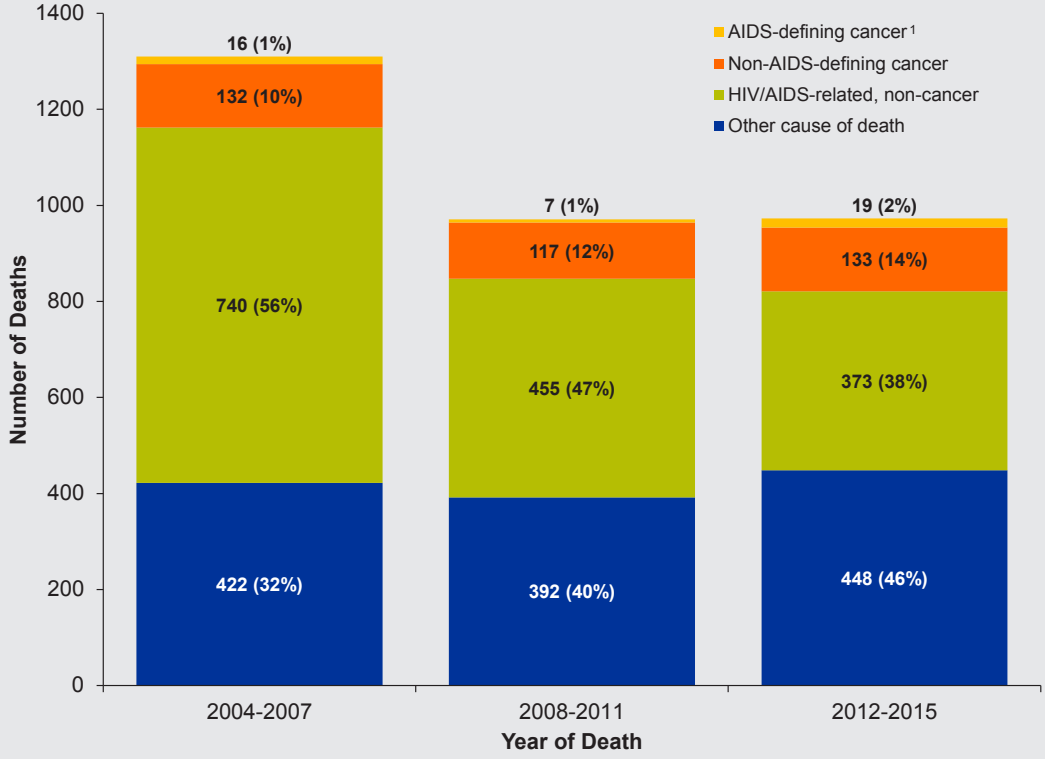
Table 5.5 Multiple causes of death among persons diagnosed with HIV by sex, 2004-2015, San Francisco

	Year of Death					
	2004-2007		2008-2011		2012-2015	
	Male	Female	Male	Female	Male	Female
Multiple Causes of Death[1]	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Total	**1,186**	**124**	**882**	**89**	**879**	**94**
HIV	883 (74.5)	86 (69.4)	600 (68.0)	64 (71.9)	542 (61.7)	59 (62.8)
Heart disease	249 (21.0)	29 (23.4)	240 (27.2)	29 (32.6)	253 (28.8)	24 (25.5)
Non-AIDS cancer	174 (14.7)	7 (5.6)	166 (18.8)	3 (3.4)	151 (17.2)	17 (18.1)
Viral hepatitis	164 (13.8)	15 (12.1)	106 (12.0)	15 (16.9)	108 (12.3)	17 (18.1)
Liver disease	157 (13.2)	17 (13.7)	118 (13.4)	16 (18.0)	100 (11.4)	12 (12.8)
Accident	98 (8.3)	17 (13.7)	110 (12.5)	17 (19.1)	93 (10.6)	15 (16.0)
Drug overdose	65 (5.5)	13 (10.5)	90 (10.2)	14 (15.7)	73 (8.3)	15 (16.0)
Mental disorders due to substance use	100 (8.4)	26 (21.0)	80 (9.1)	15 (16.9)	84 (9.6)	7 (7.4)
Septicemia	124 (10.5)	17 (13.7)	87 (9.9)	11 (12.4)	84 (9.6)	9 (9.6)
Renal disease	123 (10.4)	19 (15.3)	93 (10.5)	10 (11.2)	83 (9.4)	16 (17.0)
Pneumonia	149 (12.6)	20 (16.1)	106 (12.0)	17 (19.1)	82 (9.3)	12 (12.8)
Chronic obstructive pulmonary disease	63 (5.3)	11 (8.9)	47 (5.3)	13 (14.6)	59 (6.7)	12 (12.8)
Diabetes	38 (3.2)	6 (4.8)	42 (4.8)	4 (4.5)	48 (5.5)	3 (3.2)
Cerebrovascular disease	33 (2.8)	4 (3.2)	26 (2.9)	9 (10.1)	40 (4.6)	4 (4.3)
Suicide	44 (3.7)	2 (1.6)	38 (4.3)	0 (0.0)	34 (3.9)	0 (0.0)

1 Includes underlying and contributory causes of death. Individuals may have more than one cause of death. See Technical Notes "Death Ascertainment." Deceased HIV cases that lack cause of death information are not represented in this table.

The number of deaths among persons diagnosed and reported with HIV has declined from 1,310 deaths during 2004 through 2007 to 971 deaths during 2008 through 2011 and 973 deaths during 2012 through 2015 (Figure 5.4). In the first 4-year time period (2004-2007), the HIV/AIDS-related non-cancer causes of death were the majority (56%), followed by other non-HIV non-cancer causes of death (32%), non-AIDS-defining cancers (10%), and AIDS-defining cancers (1%). In the middle time period (2008-2011), the HIV/AIDS-related non-cancer causes of death represented slightly less than half of the deaths (47%), followed by other non-HIV non-cancer causes of death (40%), non-AIDS-defining cancers (12%), and AIDS-defining cancers (1%). In the most recent 4-year time period (2012-2015), other non-HIV non-cancer causes of death were the most frequent underlying causes (46%), followed by non-cancer HIV/AIDS (38%), non-AIDS-defining cancers (14%), and AIDS-defining cancers (2%). These trends highlight the decline in HIV/AIDS-related non-cancer causes of death and an increase in both the non-AIDS-defining cancers and other non-HIV non-cancer causes of death. AIDS-defining cancers decreased in the middle time period but increased in the most recent time period.

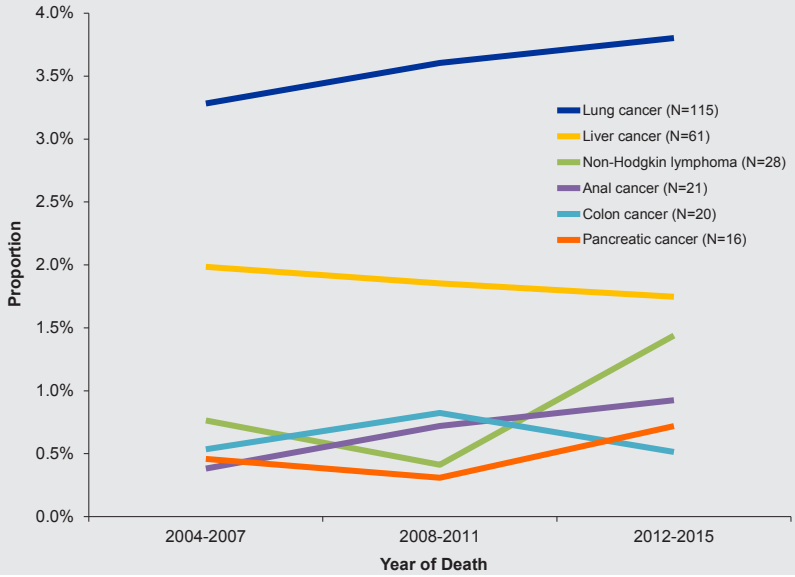
Figure 5.4 Cancer related underlying causes of death among persons diagnosed with HIV, 2004-2015, San Francisco



1 Includes Kaposi sarcoma, non-Hodgkin lymphoma, invasive cervical cancer.

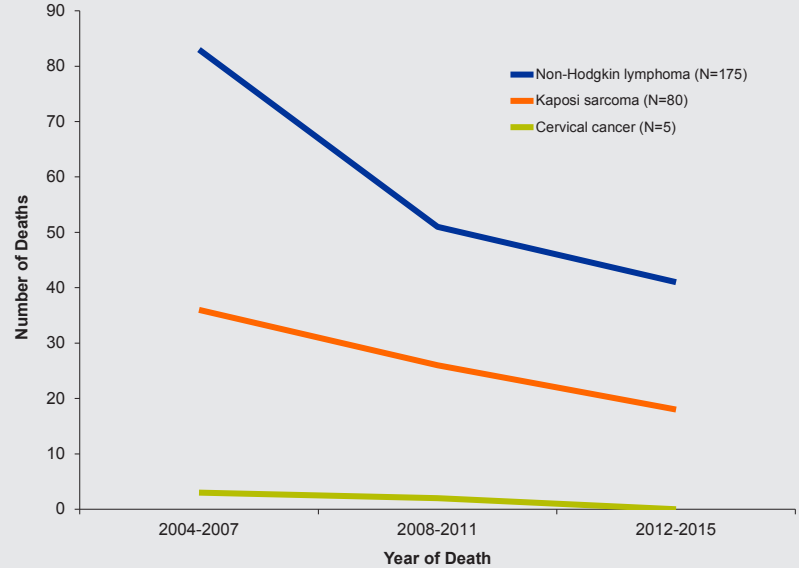
During the three four-year calendar time periods there was an increase in the proportion of lung cancer from 3.3% of all deaths from the first time period (2004-2007) to 3.8% during the most recent time period (2012-2015) (Figure 5.5). The proportion of anal cancer also increased from 0.4% in the first time period to 0.9% in the last time period. Liver cancer deaths declined from 2.0% in the first time period to 1.7% in the most recent time period. None of the other common cancers showed a consistent trend.

Figure 5.5 Proportion of underlying causes of death for the most common cancers among persons diagnosed with HIV, 2004-2015, San Francisco



There was a decline in the number of Kaposi sarcoma cases listed as either an underlying or contributory cause of death, from 36 in the first four-year time period to 18 in the most recent four-year time period (Figure 5.6). Non-Hodgkin lymphoma cases also declined from 83 in the first time period to 41 in the most recent time period. Cervical cancer also declined, from 3 cases in the first time period to 0 in the recent time period.

Figure 5.6 Number of multiple causes of death for AIDS-defining cancers among persons diagnosed with HIV, 2004-2015, San Francisco



6 Health Insurance Status at Time of HIV Diagnosis

Insurance status at time of initial HIV diagnosis differed by racial/ethnic group (Figure 6.1). Among whites diagnosed each year, 38% or greater had private insurance in 2011-2016. In contrast, 43% or greater of African Americans diagnosed each year were publicly insured during this time period. No type of insurance was predominant for Latinos between 2011 and 2016. Among other racial/ethnic groups, private insurance was most predominant.

Figure 6.1 Trends in health insurance status at time of HIV diagnosis by race/ethnicity, 2011-2016, San Francisco

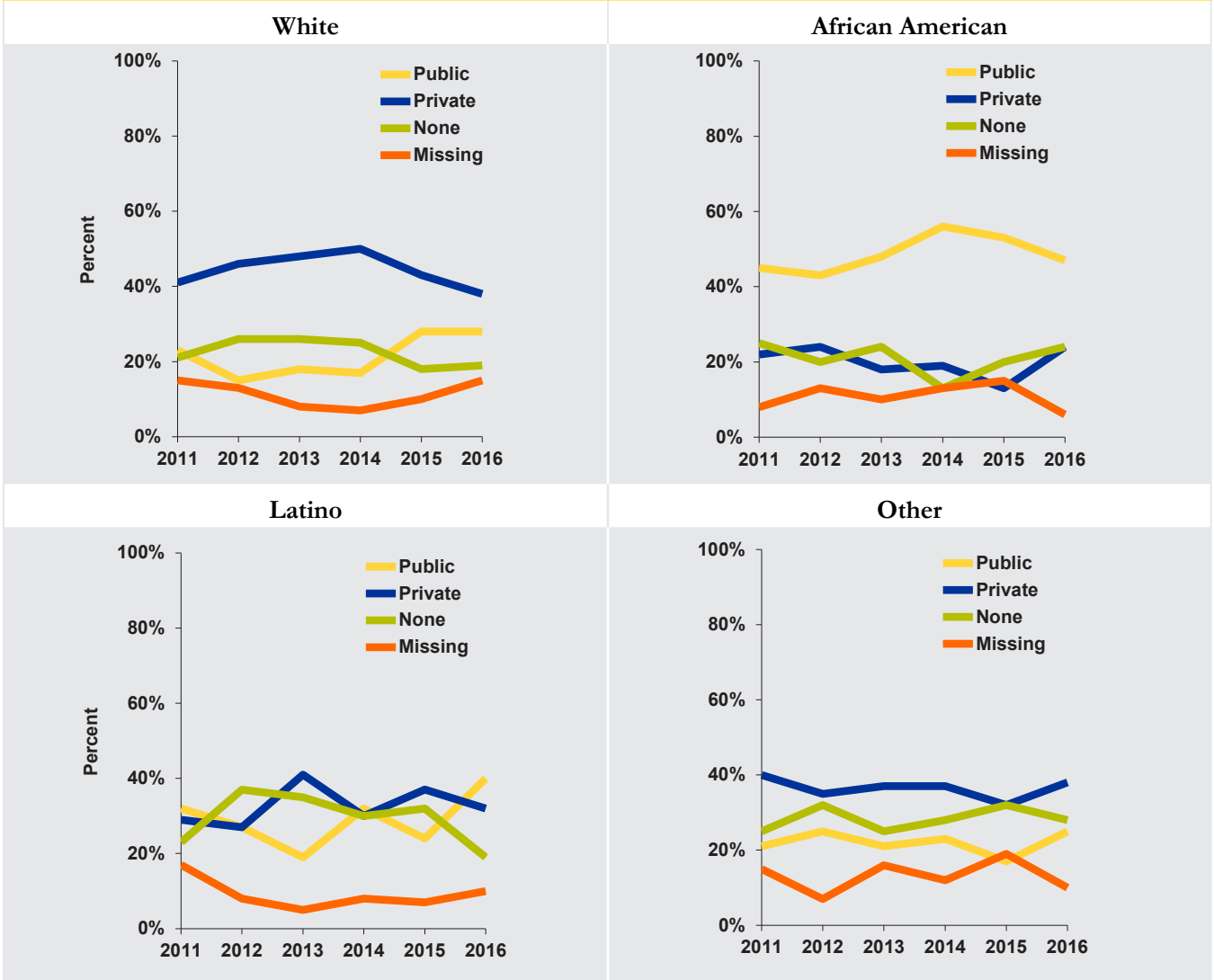
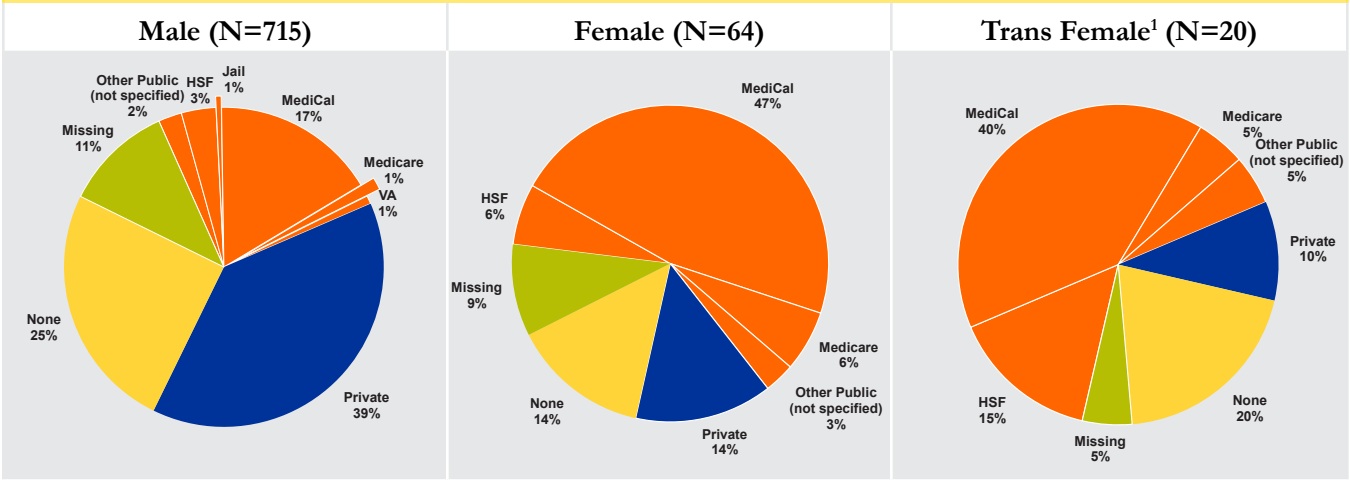


Figure 6.2 shows the distribution of insurance types by gender for persons newly diagnosed with HIV between 2014 and 2016. Compared to males, females and trans females diagnosed during this time period had higher proportions with public insurance (including MediCal, Medicare, Healthy San Francisco, Veteran Administration, county jail, and other unspecified public insurance). At diagnosis, 47% of females and 40% of trans females reported using MediCal, state-sponsored insurance for persons meeting financial criteria. In addition, Healthy San Francisco (HSF), the county-sponsored health access program for residents was used by 3% of males, 6% of females, and 15% of trans females at time of diagnosis. One-quarter of the males, 14% of females, and 20% of trans females had no health insurance at time of diagnosis.

Figure 6.2 Health insurance status at time of HIV diagnosis by gender, 2014-2016, San Francisco

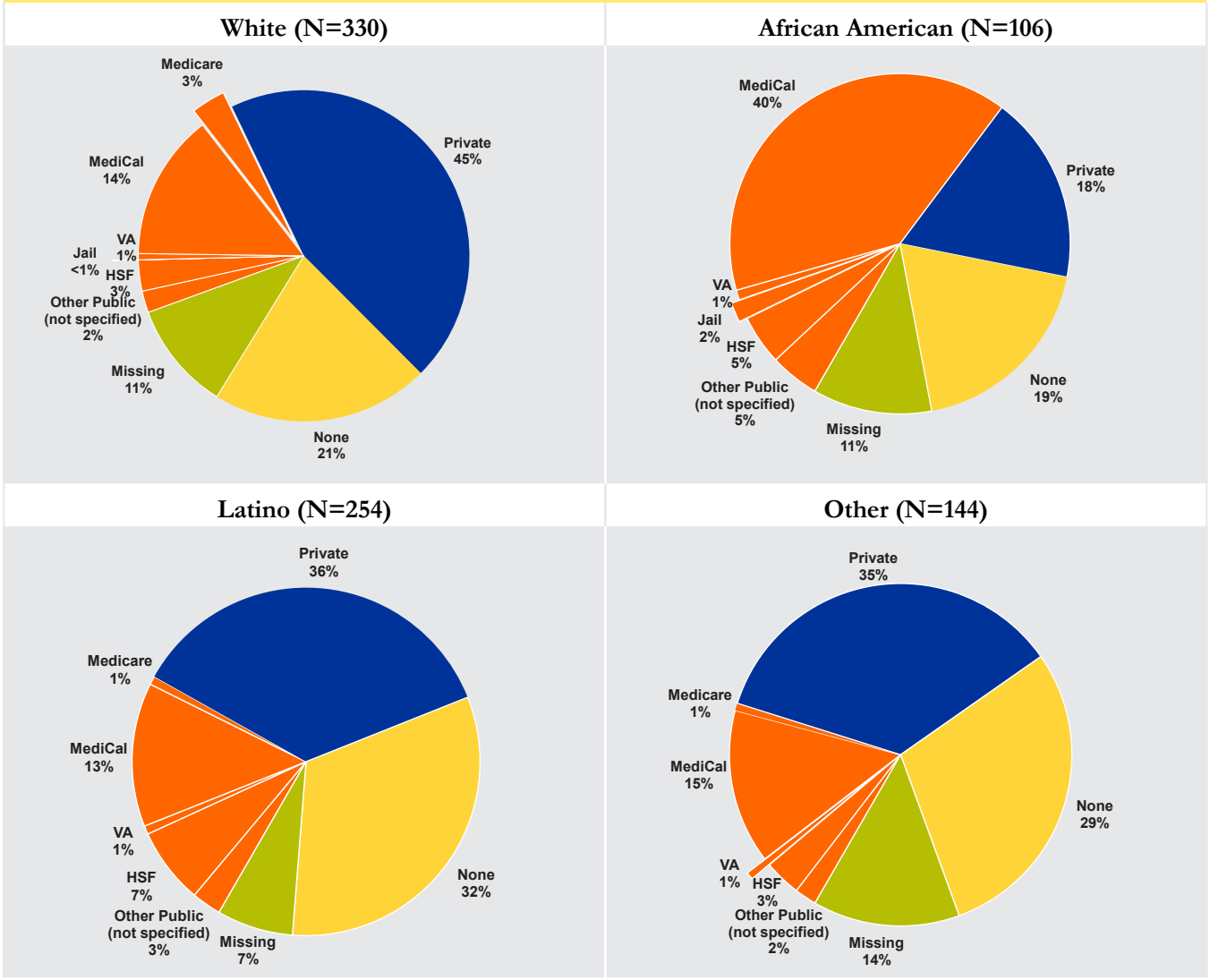


1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

HSF: Healthy San Francisco.

Figure 6.3 shows the distribution of insurance types by racial/ethnic groups for persons newly diagnosed with HIV between 2014 and 2016. Sixty-eight percent of whites were insured, 70% of African Americans, 61% of Latinos, and 57% of other racial/ethnic (non-Latino) groups were insured at diagnosis. In the past three years, African Americans diagnosed with HIV reported having publicly-funded insurance types more frequently than other racial/ethnic groups. Latinos had the highest proportion using HSF for health care coverage at time of diagnosis (7%).

Figure 6.3 Health insurance status at time of HIV diagnosis by race/ethnicity, 2014-2016, San Francisco



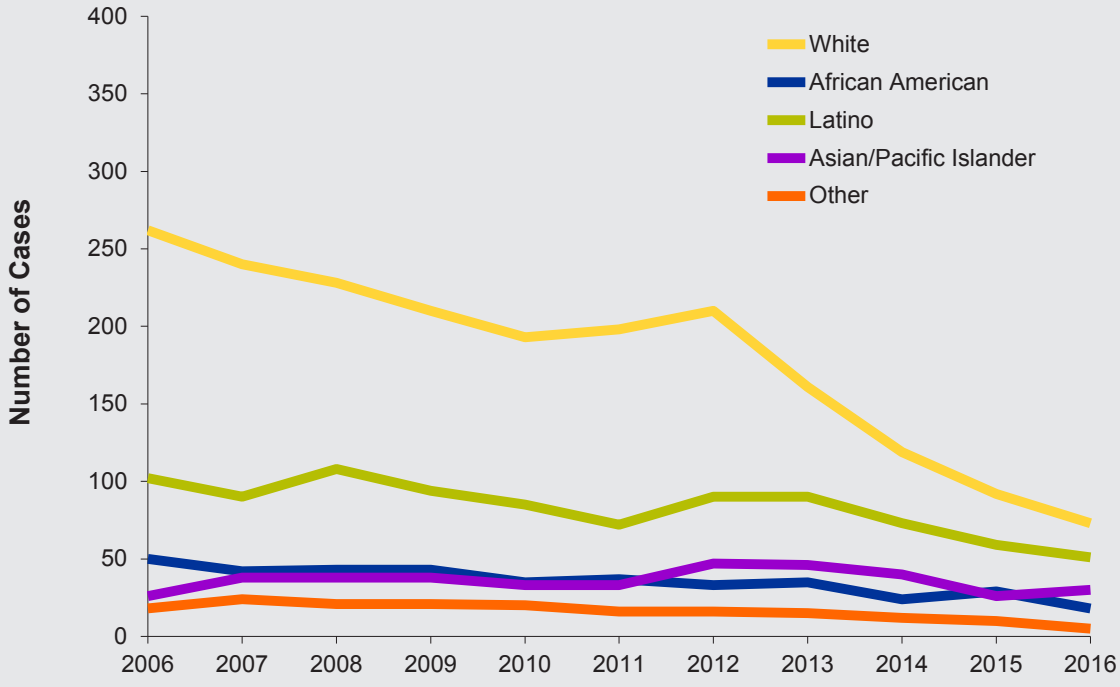
HSF: Healthy San Francisco.

7 HIV among Men who Have Sex with Men

HIV surveillance data

Among MSM newly diagnosed with HIV from 2006 through 2016, whites account for the largest number of cases in San Francisco (Figure 7.1). The number of MSM newly diagnosed with HIV from 2006 to 2016 declined in whites, Latinos, and African Americans. The decline was most pronounced among white MSM with annual numbers converging closer to annual numbers of Latino MSM. The number of Asian/Pacific Islander MSM diagnosed increased from 26 in 2006 to a high of 47 in 2012 and then decreased to 30 in 2016.

Figure 7.1 Number of MSM newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco



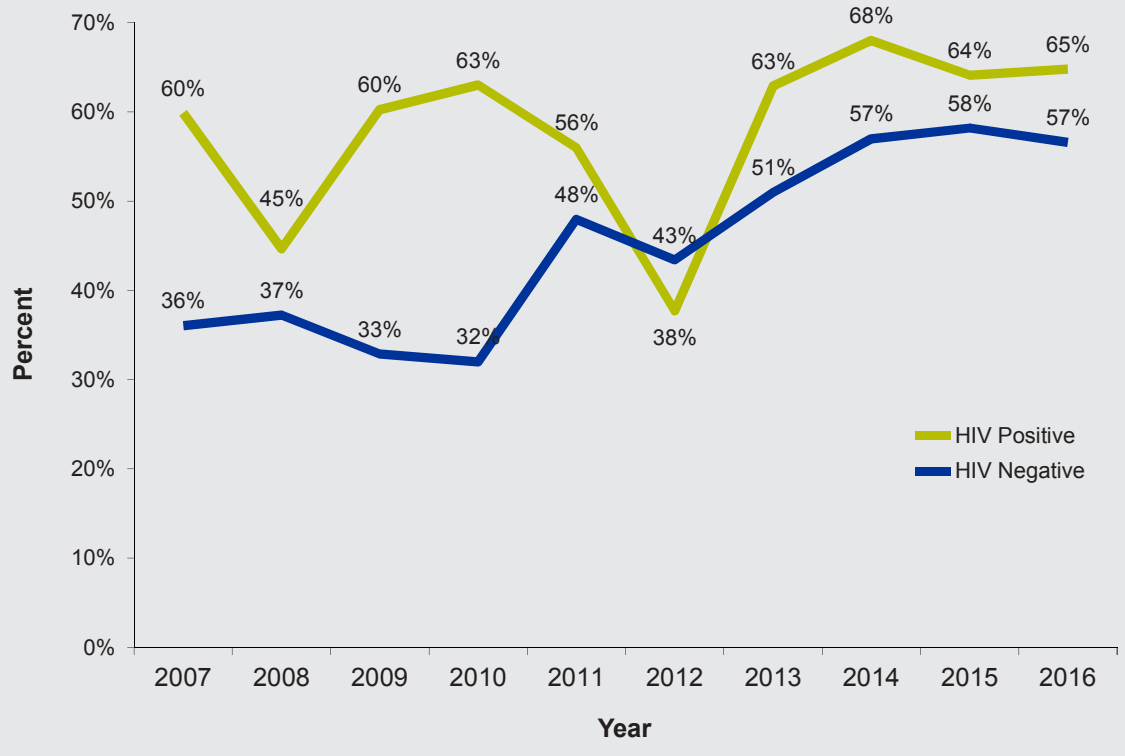
1 Includes MSM and MSM-PWID with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

HIV sexual behavior data

The STOP AIDS Project collects information on sexual behaviors and self-reported HIV status of MSM who participate in their outreach prevention activities in San Francisco. These data are collected anonymously to track trends in HIV-related risk behavior. Such data may not be representative of all MSM in San Francisco. In this section, trends in condomless anal intercourse in the past six months are assessed for MSM who are 18 years and older and reside in San Francisco.

Figure 7.2 shows trends in any reported condomless anal intercourse (either insertive or receptive) by self-reported HIV serostatus. The percent of HIV negative MSM who reported any condomless anal intercourse declined slightly from 36% in 2007 to 32% in 2010, but rose to a high of 58% in 2015. Among HIV positive men, the percent reporting any condomless anal intercourse has generally remained 60% and over with a high of 68% in 2014. Caution must be given to low numbers of MSM interviewed, especially among HIV positive men each year, which may influence the fluctuating proportions.

Figure 7.2 Percent of MSM reporting condomless anal intercourse in the last six months by self-reported HIV status, the STOP AIDS Project, 2007-2016, San Francisco



Sexually transmitted diseases among MSM

Sexually transmitted diseases (STD) serve as a marker of condomless sex and some have been shown to increase HIV transmission. Figure 7.3 shows trends in male rectal gonorrhea and male gonococcal proctitis among MSM in San Francisco from 2006 through 2016 by HIV serostatus. Data on male rectal gonorrhea originate from case reporting by laboratories and health providers throughout the city. Data on male gonococcal proctitis originate from the municipal STD clinic only and represent men with symptomatic infection. Among men, rectal gonorrhea is a biological marker for condomless receptive anal sex.

The last five years has seen an increase in reported cases of male rectal gonorrhea irrespective of HIV serostatus. The number of reported cases of male rectal gonorrhea has been higher among HIV negative men than among HIV infected men beginning in 2008. The relatively stable numbers of cases of male gonococcal proctitis suggest that some of the increase in reported male rectal gonorrhea may be due to increased screening or reporting.

Data may underestimate true levels of infections due to several factors, including lack of rectal screening by many health providers, underreporting, and a large proportion of asymptomatic cases.

Figure 7.3 Male rectal gonorrhea and male gonococcal proctitis among MSM by HIV serostatus, 2006-2016, San Francisco

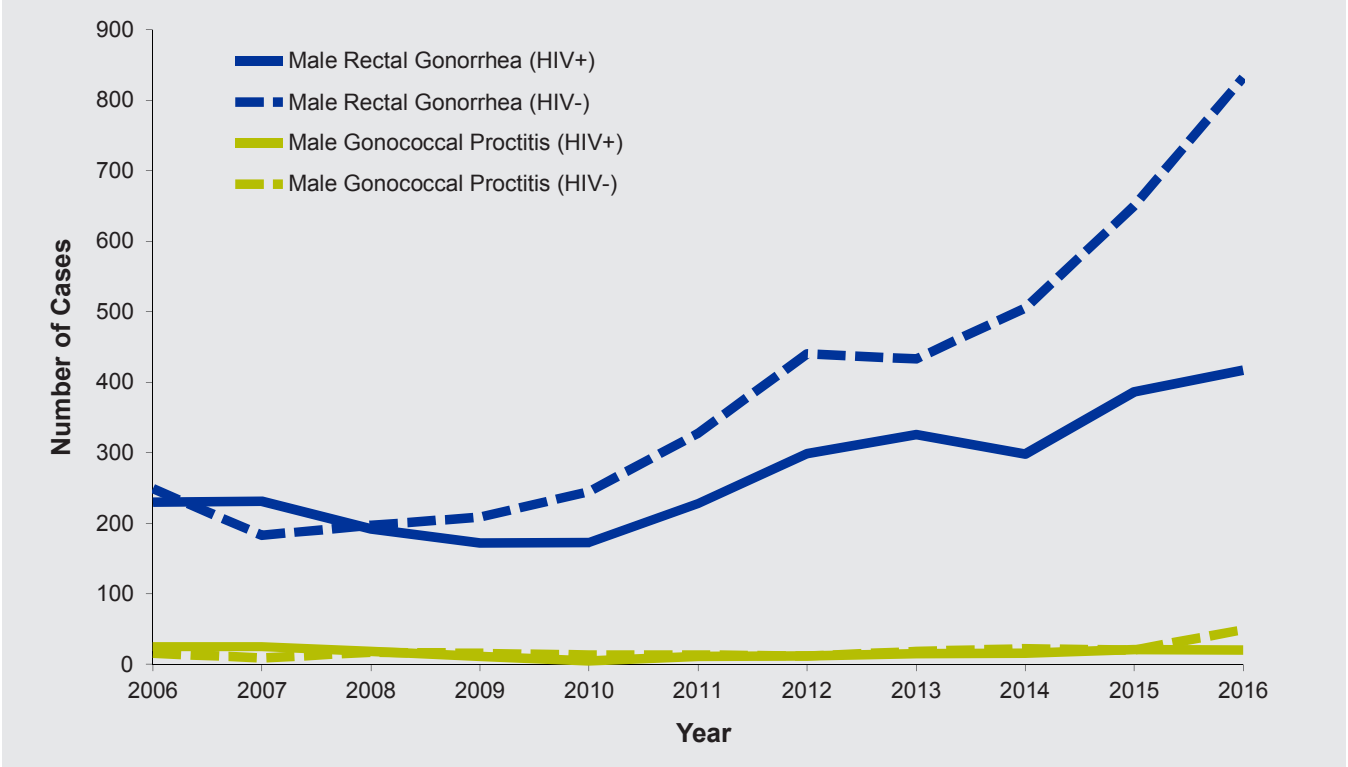
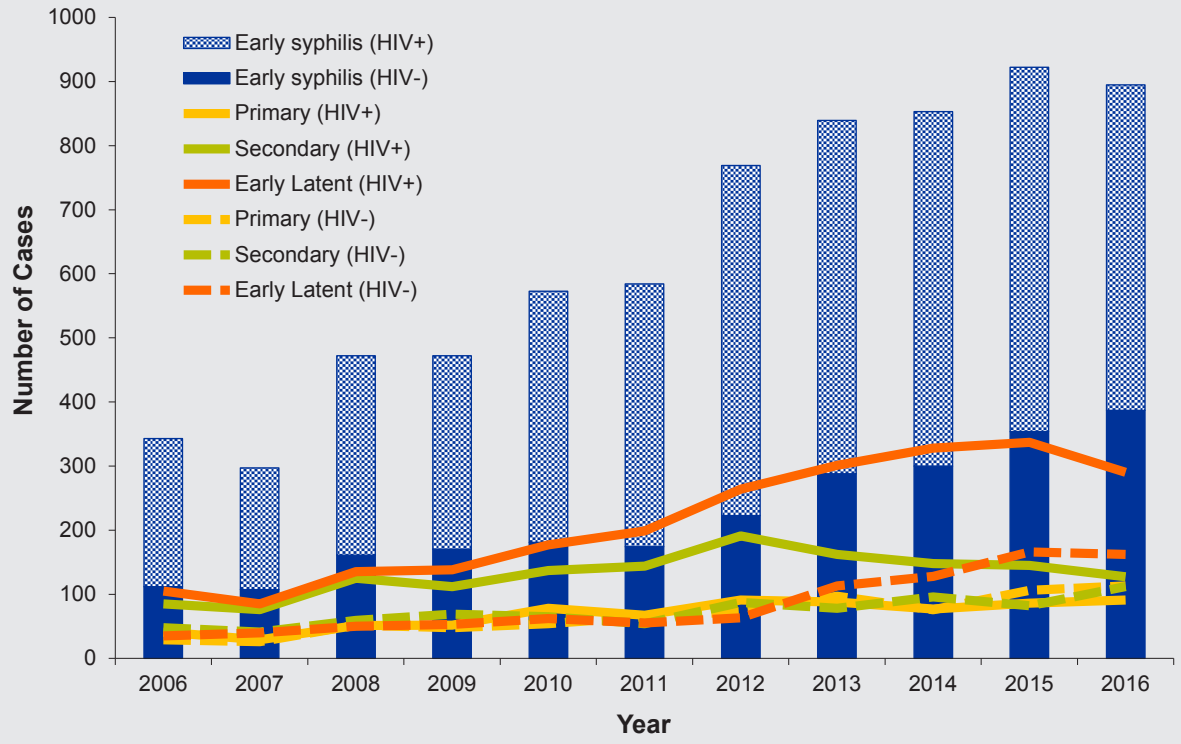


Figure 7.4 shows trends in early syphilis cases (primary, secondary, and early latent) among MSM in San Francisco from 2006 through 2016 by HIV serostatus. Data originate from case reporting by laboratories and health providers throughout the city and from the municipal STD clinic, the site where most of the patients were diagnosed. Like gonorrhea, syphilis is a biological marker for condomless sex. The increase from 2007 to 2015 in early latent is dramatic, especially among HIV-positive MSM who account for a greater proportion of early syphilis cases than HIV-negative MSM.

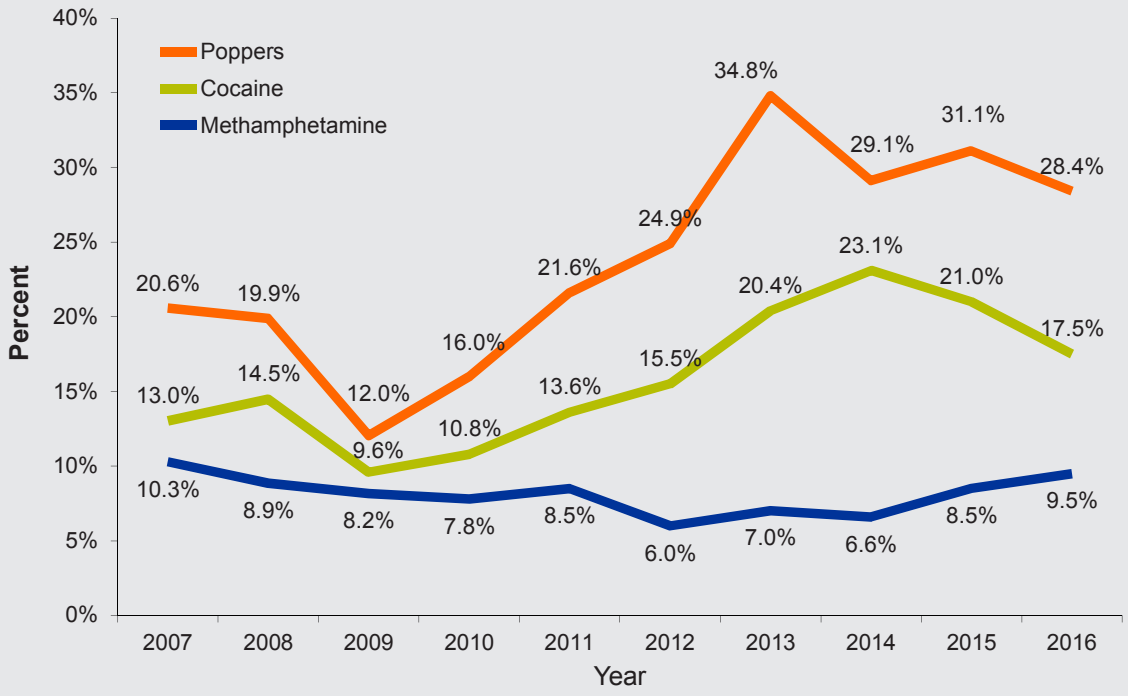
Figure 7.4 Early syphilis among MSM by HIV serostatus, 2006-2016, San Francisco



Substance use

The STOP AIDS Project records substance use among San Francisco MSM. Figure 7.5 shows the percent of MSM who used methamphetamines, "poppers," or cocaine in the past six months for the years 2007 to 2016. The most recent years show an increase in cocaine use with a high of 23.1% in 2014 and an increase in poppers use from 12.0% in 2009 to 34.8% in 2013 followed by a decrease to 28.4% in 2016. Methamphetamine use has declined since 2007 but 2015 and 2016 show a possible increase up to 9.5% in 2016.

Figure 7.5 Substance use among MSM, the STOP AIDS Project, 2007-2016, San Francisco

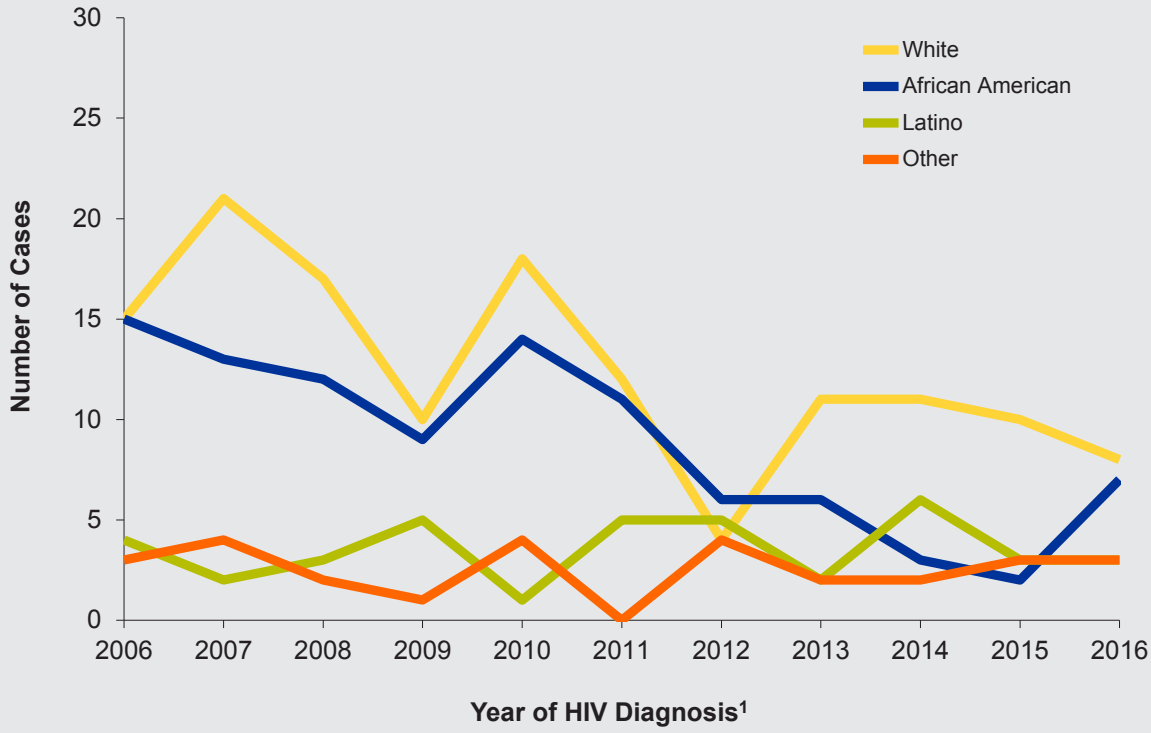


8 HIV among People who Inject Drugs

HIV surveillance data

From 2006 to 2016, whites accounted for 45% of non-MSM PWID cases, African Americans 32%, and Latinos 13% (Figure 8.1). White non-MSM PWID cases have declined the most in numbers from 21 in 2007 to eight in 2016, but have mostly been level since 2013.

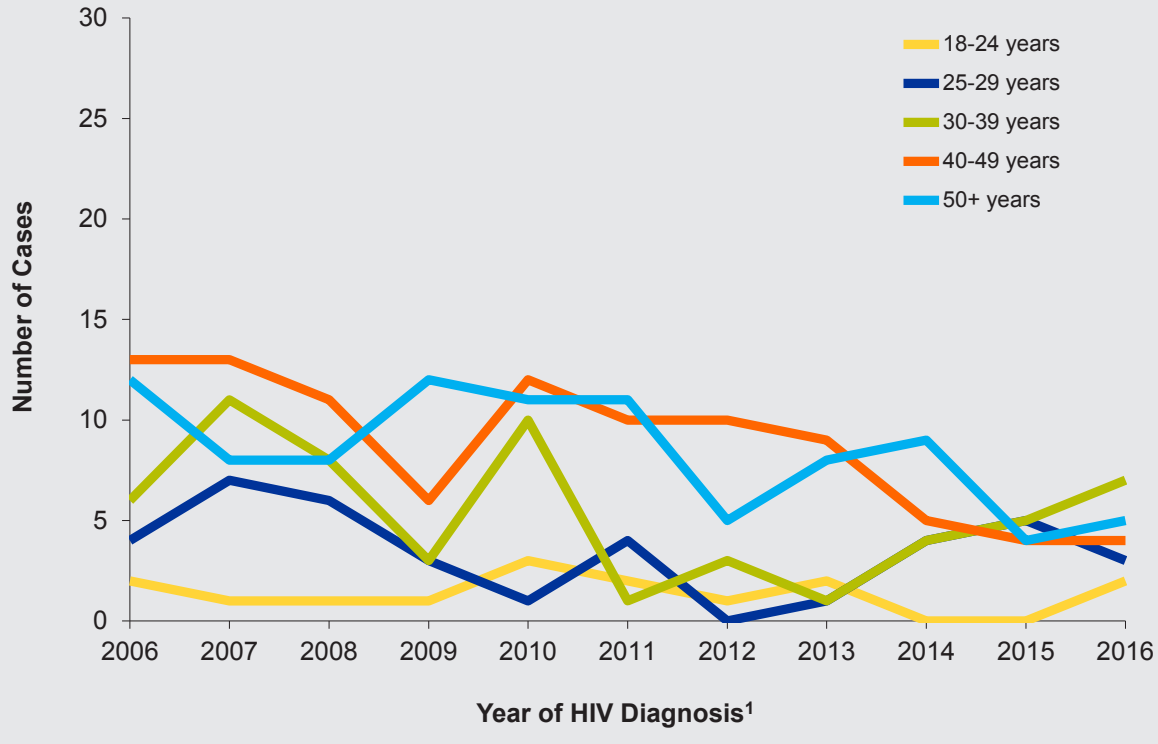
Figure 8.1 Number of non-MSM PWID newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

Sixty-three percent of non-MSM PWID newly diagnosed with HIV between 2006 and 2016 were aged 40 years and older at time of diagnosis (Figure 8.2). Since 2011, annual HIV diagnoses among persons aged 40 and older decreased. Although the annual numbers were small, since 2013 there were increases in the number of persons aged 30-39 years. There were very few PWID aged 18-24 years and no PWID under age 18 diagnosed in this time period.

Figure 8.2 Number of non-MSM PWID newly diagnosed with HIV by age group at HIV diagnosis, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

Medical Monitoring Project (MMP)

Table 8.1 describes current injection drug use among San Francisco MMP participants during the 2009 to 2014 MMP data collection cycles (see Technical Notes, "Medical Monitoring Project"). Among patients receiving HIV care, 8.3% reported injecting drugs in the prior 12 months. The most commonly reported drug injected was methamphetamine. Among participants reporting injecting drugs, 75.6% reported injecting drugs before or during sex, 9.2% reported sharing a needle with someone else after using it, and 4.4% reported sharing works (cookers, cotton or rinse) with someone else after using it.

Table 8.1 Self-reported injection drug use during the 12 months before the interview, Medical Monitoring Project, 2009-2014, San Francisco

	Number	%[1]
Use of any injection drugs	124	8.3%
Use of any injection drugs before or during sex[2]	92	75.6%
Injection drugs used by participant[2]		
Crystal methamphetamine ("tina", "crack", "ice")	106	85.2%
Heroin	31	25.0%
Cocaine	9	6.8%
Heroin and cocaine	14	11.4%
Crack	7	6.2%
Amphetamines ("speed")	13	9.2%
Oxycontin	4	3.3%
Shared needle after using[2]	11	9.2%
Shared works after using[2]	5	4.4%
Total	1,346	100.0%

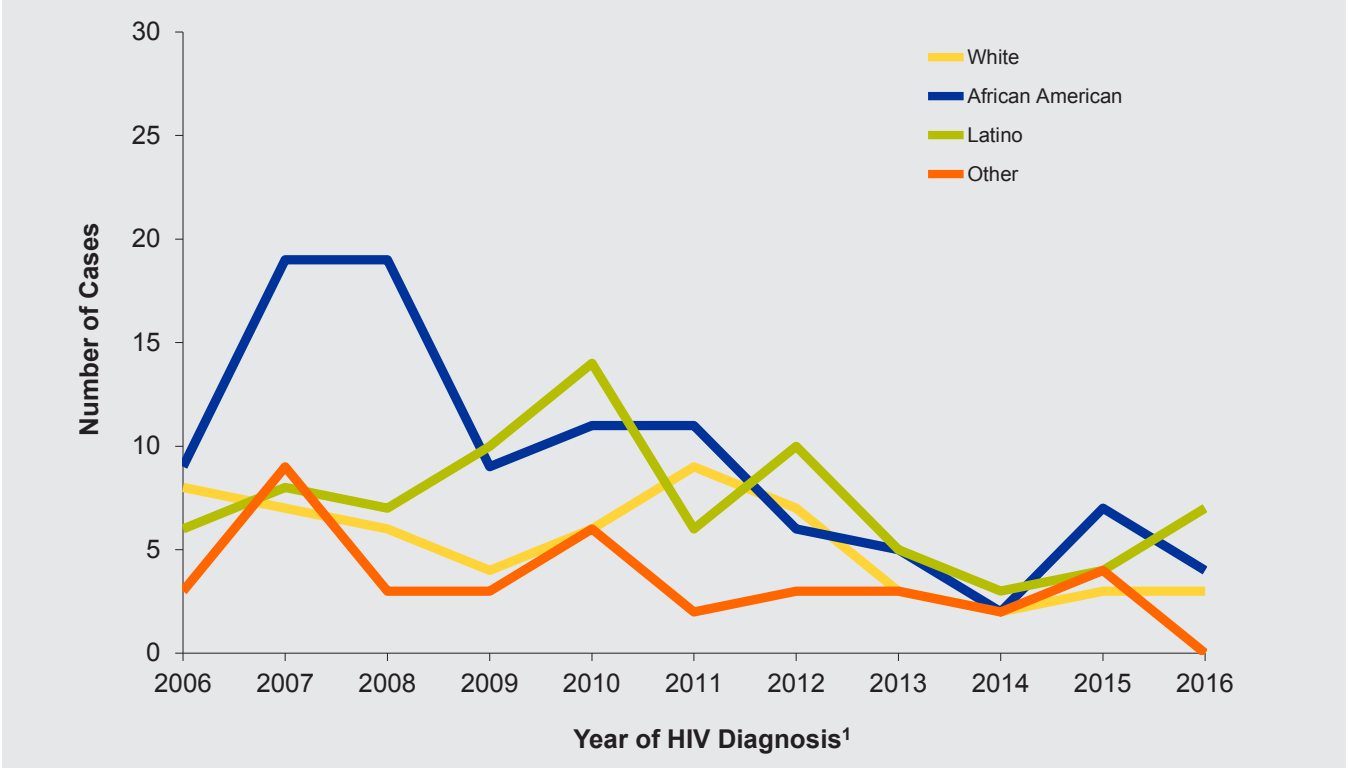
1 Weighted percent.
2 Among persons who reported injecting drugs in the previous 12 months.

9 HIV among Heterosexuals

HIV surveillance data

Racial/ethnic trends in heterosexual males and females newly diagnosed with HIV are difficult to characterize due to the relatively small numbers infected through heterosexual contact (Figure 9.1). From 2006 through 2016 African Americans accounted for 37% of heterosexual HIV cases, followed by Latinos at 29%, and whites at 21%.

Figure 9.1 Number of heterosexuals newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

Sexually transmitted diseases among heterosexuals

Figure 9.2 shows the annual number of primary, secondary, and early latent cases of early syphilis among heterosexual men in San Francisco from 2006 through 2016. Data originate from case reporting from laboratories and health providers throughout the city, although the majority are patients seen at the municipal STD clinic. The number of early syphilis cases among heterosexual men increased from 2011 through 2013, decreased in 2014 and then increased in 2015 to 57 cases, the highest number since 2006.

Figure 9.2 Early syphilis among heterosexual men, 2006-2016, San Francisco

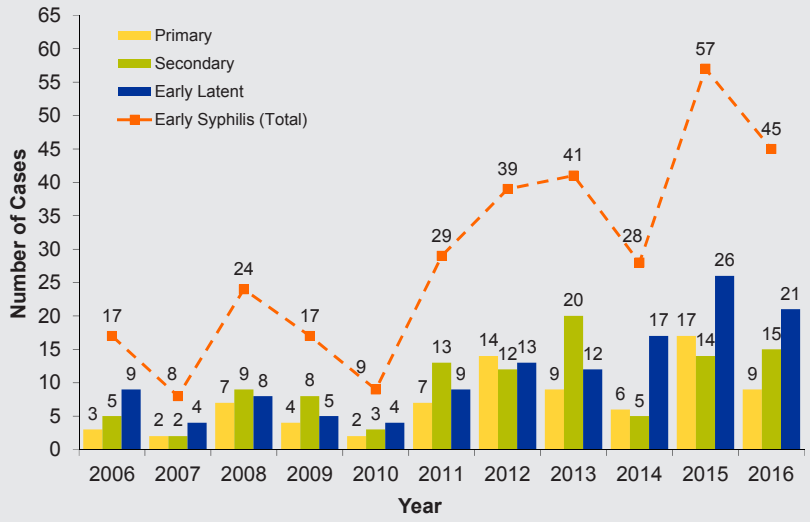
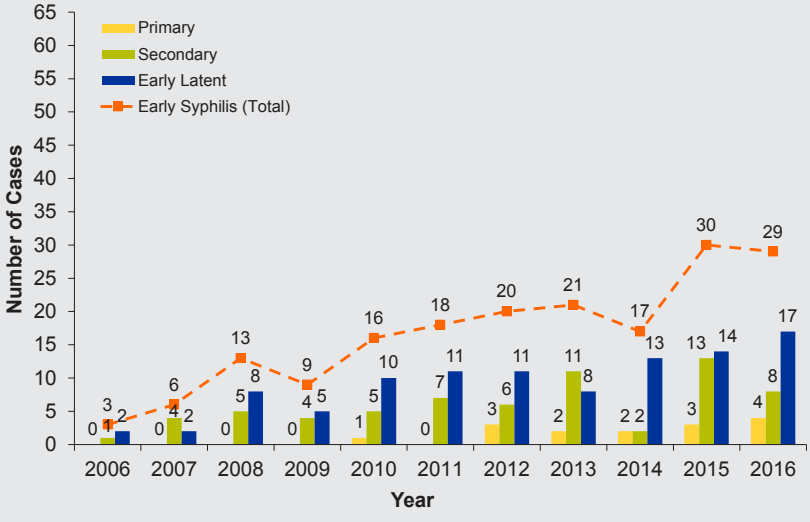


Figure 9.3 shows the annual number of primary, secondary, and early latent cases of syphilis among women in San Francisco from 2006 through 2016. Data originate from case reporting from laboratories and health providers throughout the city, although the majority are patients seen at the municipal STD clinic. Among women, syphilis cases have been low and stable, with increases in early syphilis in 2015 and 2016.

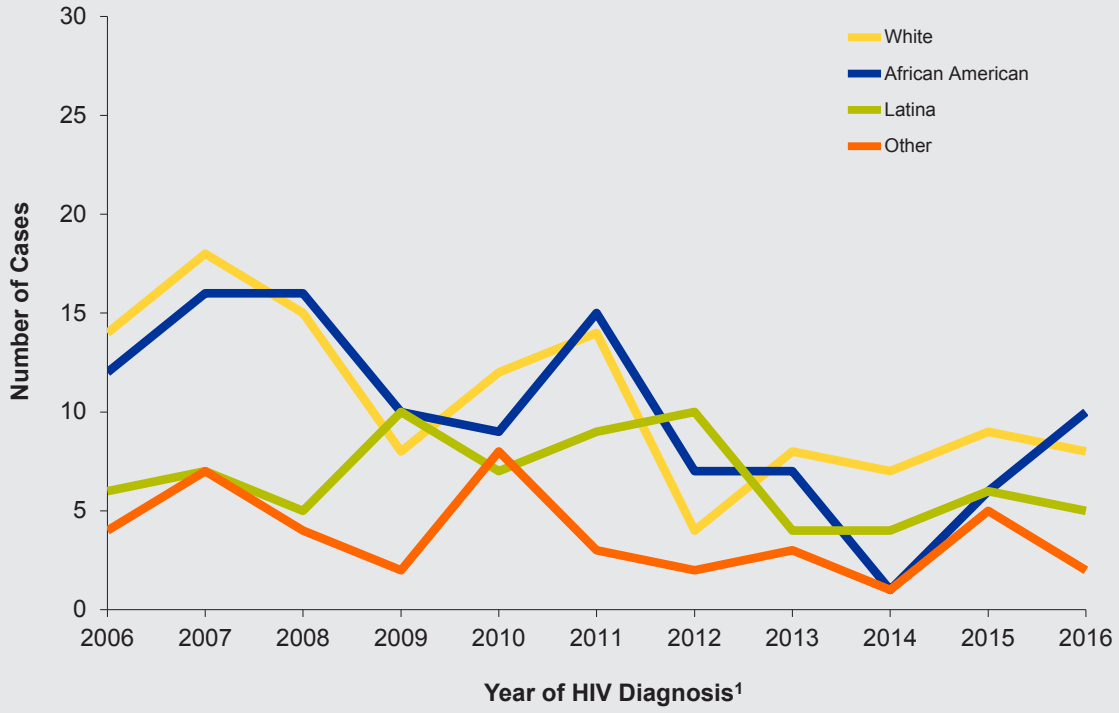
Figure 9.3 Early syphilis among women, 2006-2016, San Francisco



10 HIV among Women

Among females newly diagnosed with HIV from 2006 to 2016, whites accounted for 35% of the cases, African Americans accounted for 31%, and Latinas accounted for 21% (Figure 10.1). The number of female African Americans diagnosed with HIV increased in 2015 and 2016.

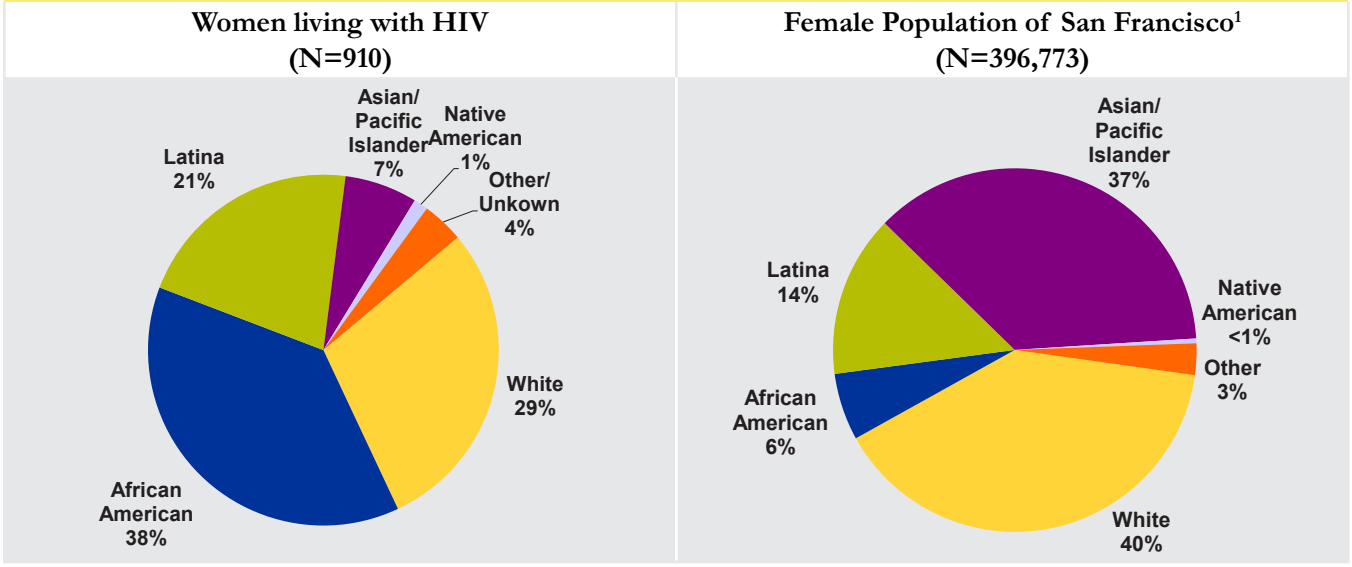
Figure 10.1 Number of women newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

Among women, African Americans are disproportionately affected by HIV. This is evident when comparing females living with HIV in San Francisco to the city's female population (Figure 10.2). Although African American women represent 6% of the total female population, as of December 31, 2016 they accounted for 38% of females living with HIV in San Francisco.

Figure 10.2 Women living with HIV diagnosed through December 2016 and female population by race/ethnicity, San Francisco

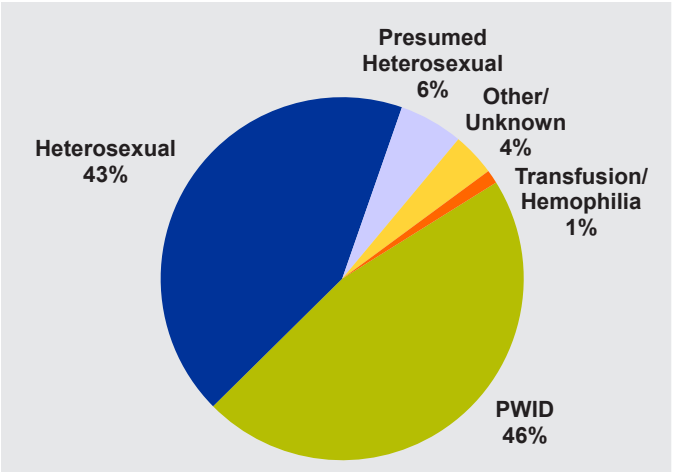


1 United States 2010 Census data.

The current transmission category definition for heterosexual contact does not adequately describe transmission for a large number of females who were infected heterosexually. The CDC HIV Incidence Case Surveillance Branch's definition for female presumed heterosexual contact reclassifies the transmission category for female cases who would otherwise be reported with no identified risk (see Technical Notes "Female Presumed Heterosexual Contact"). Among all females living with HIV diagnosed with HIV in San Francisco through the end of 2016, 46% acquired HIV through injecting drugs and 49% through heterosexual contact (Figure 10.3).

Figure 10.3 Women living with HIV diagnosed through December 2016 by transmission category, San Francisco

N=910



11 HIV among Children, Adolescents and Young Adults

Adolescents (current age 13-17 years) or young adults (current age 18-24 years) living with HIV in San Francisco make up less than 1% of persons living with HIV in the city. As of December 31, 2016 there were fewer than five adolescents and 112 young adults living with HIV. Among young adults living with HIV, 77% were MSM (either with or without a history of injecting drugs; Table 11.1). Twenty-nine percent of living young adults were African American, 27% were Latino, 21% were white, and 19% Asian/Pacific Islander. Adolescent data are not displayed due to small numbers.

Table 11.1 Young adults living with HIV by transmission category, gender, and race/ethnicity, December 2016, San Francisco

	18 - 24 Years Old	
	Number	(%)
Total	**112**	**(100)**
Transmission Category		
MSM	82	(73)
PWID	2	(2)
MSM-PWID	4	(4)
Heterosexual	6	(5)
Perinatal	12	(11)
Other/Unidentified	6	(5)
Gender		
Male	90	(80)
Female	19	(17)
Trans Female[1]	3	(3)
Race/Ethnicity		
White	23	(21)
African American	32	(29)
Latino	30	(27)
Asian/Pacific Islander	21	(19)
Multi-race	6	(5)

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

Table 11.2 compares adolescents or young adults at time of HIV diagnosis in San Francisco with those in the same age groups at diagnosis nationally for the years 2013-2016. Compared to the U.S., San Francisco had lower proportions of adolescents and young adults diagnosed with HIV.

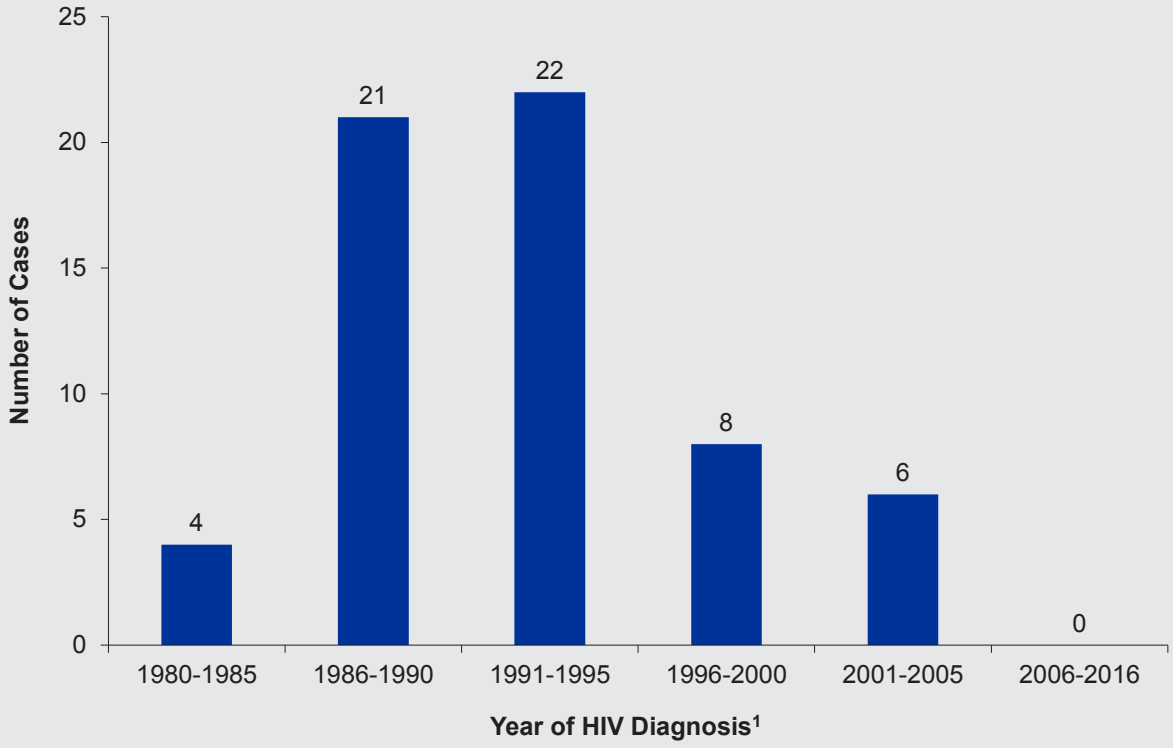
Table 11.2 Number of adolescents and young adults newly diagnosed with HIV, 2013-2016, San Francisco and the United States

	Year of HIV Diagnosis							
	2013		2014		2015		2016	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)
San Francisco (All ages)	392		311		265		223	
Age 13-19 years at HIV diagnosis	6	(2)	1	(<1)	4	(2)	4	(2)
Age 20-24 years at HIV diagnosis	48	(12)	38	(12)	33	(12)	27	(12)
U.S.[1] (All ages)	40,300		40,873					
Age 13-19 years at HIV diagnosis	1,756	(4)	1,786	(4)	N/A		N/A	
Age 20-24 years at HIV diagnosis	7,129	(18)	7,418	(18)	N/A		N/A	

1 U.S. data are based on reported case counts from the 50 states and 6 dependent areas with confidential name-based HIV reporting in CDC HIV Surveillance Report, 2015 (volume 27). U.S. 2015 data is preliminary and therefore not included when assessing trends.

As of December 31, 2016, there was a cumulative total of 61 pediatric HIV cases (children less than 13 years old who resided in San Francisco at time of diagnosis). The number of pediatric HIV cases peaked between 1986 and 1995, and has declined over the following years (Figure 11.1). No pediatric HIV cases have been diagnosed among residents of San Francisco since 2005. Of the 61 reported pediatric HIV cases, 26 (43%) have died as of December 2016, 33 (54%) have survived beyond childhood (current age ≥13 years), and two (3%) aged <13 years were living at the end of 2016.

Figure 11.1 Number of children diagnosed with HIV by time period of HIV diagnosis, 1980-2016, San Francisco



1 See Technical Notes "Date of Initial HIV Diagnosis."

12 HIV among Persons Aged 50 Years and Older

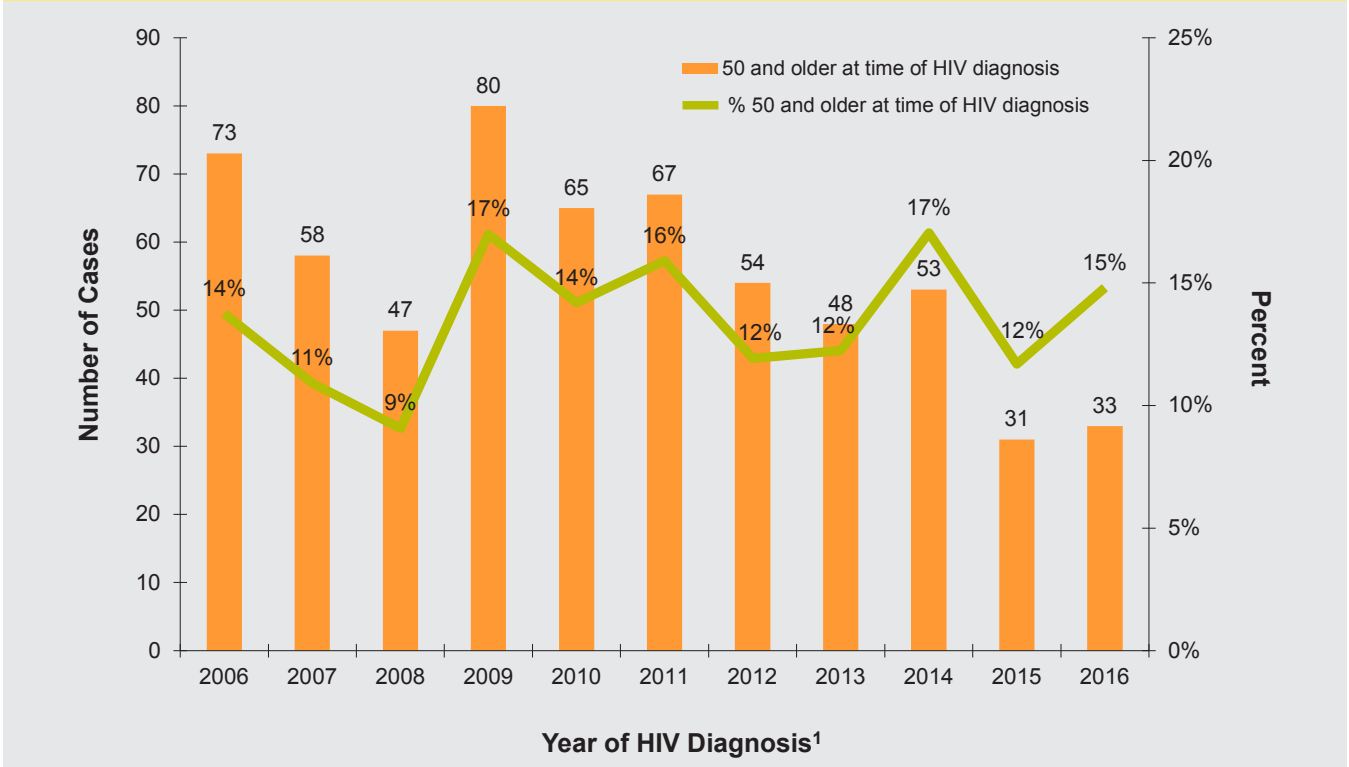
The impact of effective combination ART use in the community has succeeded in extending the lives of persons with HIV and resulted in larger numbers of PLWH who are 50 years and older. Sixty-three percent (N=10,054) of PLWH in San Francisco were aged 50 years and older as of December 31, 2016. Of these, 32% were aged 50-54 years, 27% aged 55-59 years, 21% aged 60-64 years, and 21% aged 65 years and older. The demographic characteristics for persons aged 50 years and older are compared to those in persons under 50 years in Table 12.1 revealing a similar gender and transmission category distribution across these age groups. Those aged 50 years and older had a higher proportion of whites while those under age 50 had higher proportions of Latinos and Asian/Pacific Islanders.

Table 12.1 Characteristics of persons living with HIV by age group, December 2016, San Francisco

	Age ≥ 50 years as of 12/31/2016 (N=10,054)		Age < 50 years as of 12/31/2016 (N=5,956)	
	Number	(%)	Number	(%)
Gender				
Male	9,360	(93)	5,359	(90)
Female	531	(5)	379	(6)
Trans Female	163	(2)	218	(4)
Race/Ethnicity				
White	6,699	(67)	2,818	(47)
African American	1,248	(12)	690	(12)
Latino	1,452	(14)	1,598	(27)
Asian/Pacific Islander	379	(4)	577	(10)
Native American	36	(<1)	35	(1)
Other/Unknown	240	(2)	238	(4)
Transmission Category				
MSM	7,561	(75)	4,313	(72)
PWID	645	(7)	268	(5)
MSM-PWID	1,402	(14)	968	(16)
Heterosexual	306	(3)	258	(4)
Other/Unidentified	140	(1)	149	(3)

In the last eleven years (2006-2016), the proportion of newly diagnosed persons with HIV at age of 50 years and older has fluctuated from a low of 9% in 2008 to a high of 17% in 2009 and again in 2014 (Figure 12.1). The biggest one-year percentage drop, 5%, occurred between 2014 and 2015.

Figure 12.1 Number and percent of persons newly diagnosed with HIV at age 50 years and older, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

During 2006-2016, persons who were newly diagnosed with HIV and aged 50 years or older had a slightly different demographic profile in comparison to those were newly diagnosed and under the age of 50 (Table 12.2), including a higher proportion of women, whites, African Americans, PWID, and heterosexuals. Of those diagnosed at age of 50 or older in 2006-2016, 50% were 50-54 years old, 26% aged 55-59 years, 16% aged 60-64 years, and 9% aged 65 years or older.

Table 12.2 Characteristics of persons newly diagnosed with HIV in 2006-2016 by age at diagnosis, San Francisco

	Age ≥ 50 years at diagnosis (N=610)		Age < 50 years at diagnosis (N=3,964)	
	Number	(%)	Number	(%)
Gender				
Male	514	(84)	3,577	(90)
Female	87	(14)	253	(6)
Trans Female	9	(1)	134	(3)
Race/Ethnicity				
White	351	(58)	1,864	(47)
African American	127	(21)	503	(13)
Latino	80	(13)	989	(25)
Asian/Pacific Islander	25	(4)	417	(11)
Other/Unknown	27	(4)	191	(5)
Transmission Category				
MSM	348	(57)	2,889	(73)
PWID	93	(15)	209	(5)
MSM-PWID	65	(11)	560	(14)
Heterosexual	69	(11)	209	(5)
Other/Unidentified	35	(6)	97	(2)

13 HIV among Transgender Persons

Transgender status relies on review of information in medical records. Information on transgender status has been collected since 1996. From 2006 through 2016, there were 144 transgender persons newly diagnosed with HIV in San Francisco (Table 13.1). Ninety-eight percent of these diagnoses were trans female. Transgender persons comprised almost 3% of all persons diagnosed with HIV in this time period. Compared to all persons diagnosed with HIV during the period of 2006-2016, transgender persons were more likely to be non-white, PWID, and younger; 42% of newly diagnosed transgender persons were 18-29 years old.

As of December 31, 2016, there were 382 transgender persons living with HIV in San Francisco (Table 13.2). African Americans and Latinas were the largest racial/ethnic groups among transgender persons living with HIV, each accounting for one-third of living transgender persons. Forty-four percent of transgender persons living with HIV were PWID. Similar to persons newly diagnosed with HIV in 2006-2016, a higher proportion of non-whites, PWID, and younger ages occurred among transgender persons living with HIV when compared to all persons living with HIV in San Francisco.

Table 13.1 Characteristics of transgender persons compared to all persons newly diagnosed with HIV in 2006-2016, San Francisco

	Transgender HIV Cases[1] 2006-2016		HIV Cases 2006-2016	
	Number	(%)	Number	(%)
Total	**144**		**4,574**	
Race/Ethnicity				
White	29	(20)	2,215	(48)
African American	40	(28)	630	(14)
Latino	47	(33)	1069	(23)
Asian/Pacific Islander	18	(13)	442	(10)
Native American	0	(0)	19	(<1)
Multi-Race	10	(7)	191	(4)
Other/Unknown	0	(0)	8	(<1)
People who Inject Drugs				
Yes	51	(35)	927	(20)
No	93	(65)	3,647	(80)
Age at HIV Diagnosis (Years)				
13 - 17	0	(0)	16	(<1)
18 - 24	32	(22)	550	(12)
25 - 29	29	(20)	756	(17)
30 - 39	45	(31)	1,438	(31)
40 - 49	29	(20)	1,204	(26)
50+	9	(6)	610	(13)

1 See Technical Notes "Transgender Status."

Table 13.2 Characteristics of transgender persons living with HIV compared to all persons living with HIV, December 2016, San Francisco

	Transgender PLWH[1]		All PLWH	
	Number	(%)	Number	(%)
Total	**382**	**(100)**	**16,010**	**(100)**
Race/Ethnicity				
White	76	(20)	9,517	(59)
African American	125	(33)	1,938	(12)
Latino	125	(33)	3,050	(19)
Asian/Pacific Islander	39	(10)	956	(6)
Multi-Race	16	(4)	468	(3)
Other/Unknown	1	(<1)	81	(1)
People who Inject Drugs				
Yes	169	(44)	3,283	(21)
No	213	(56)	12,727	(79)
Age in Years (at end of 2015)				
13 - 17	0	(0)	5	(<1)
18 - 24	3	(1)	112	(1)
25 - 29	21	(5)	418	(3)
30 - 39	83	(22)	1,764	(11)
40 - 49	112	(29)	3,657	(23)
50+	163	(43)	10,054	(63)

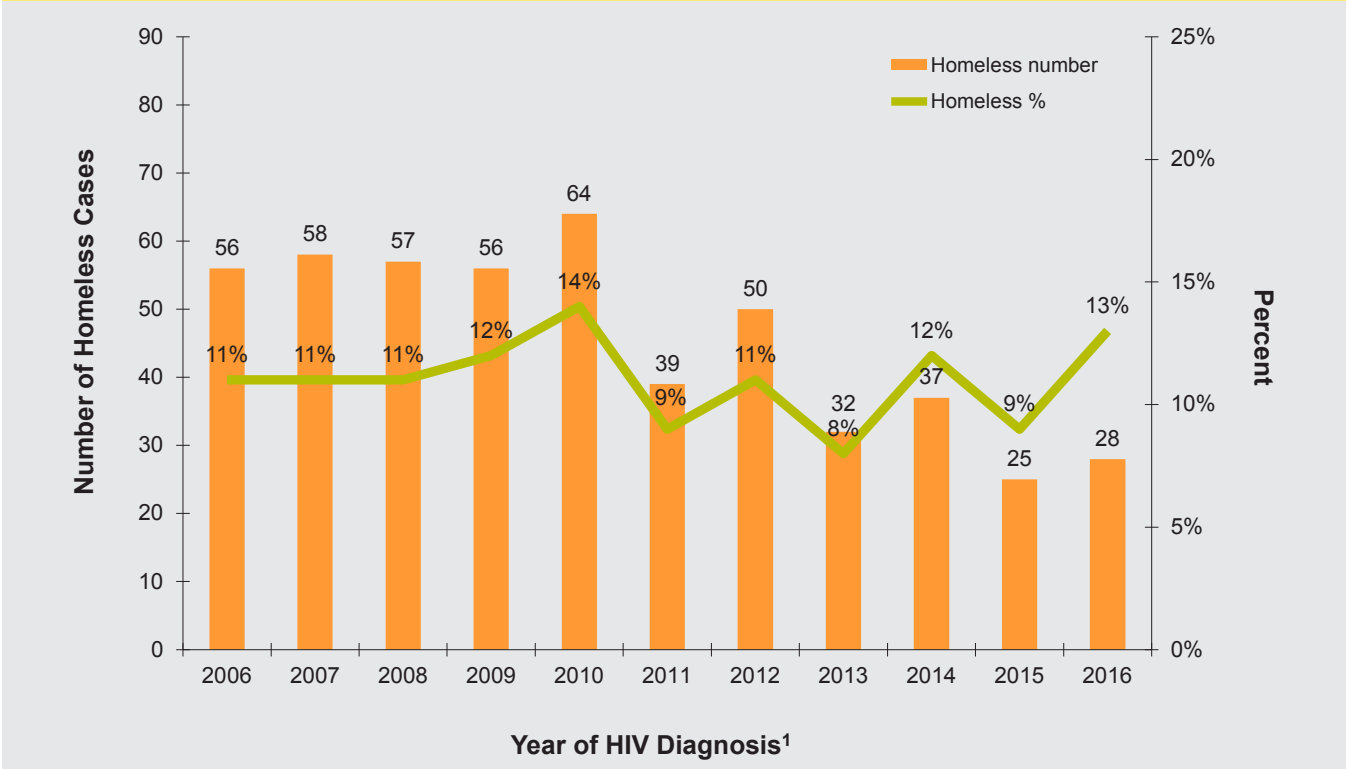
1 See Technical Notes "Transgender Status."

14 HIV among Homeless Persons

A case is defined as homeless if the medical record states that the patient is homeless or not housed at time of HIV diagnosis, or the patient's address at diagnosis is a known homeless shelter or a free postal address not connected to a residence ("general delivery"). Cases with missing information on residence at diagnosis are not classified as homeless. In addition, a case is not considered homeless if the person lives in a single room occupancy or transitional housing, lives with partners, family or other non-family members, or is institutionalized (such as hospice, inpatient drug/alcohol recovery facility, facility for physically/mentally disabled, residential treatment program, correctional facility). Because our definition for homelessness excludes those with marginalized or unstable housing, our findings may differ from other programs.

Among homeless persons newly diagnosed with HIV from 2006 through 2016, the number of cases peaked at 64 in 2010 and then dropped to 28 in 2016 (Figure 14.1). The proportion of persons who were homeless at diagnosis was highest (14%) in 2010. Although the proportions fluctuated, data from 2011-2016 suggest that the annual proportion of homeless persons newly diagnosed with HIV has been increasing.

Figure 14.1 Number and percent of homeless persons newly diagnosed with HIV by year of diagnosis, 2006-2016, San Francisco



1 Includes persons with HIV by year of their initial HIV diagnosis. See Technical Notes "Date of Initial HIV Diagnosis."

Compared to all persons diagnosed with HIV in 2006 to 2016, persons who were homeless at time of HIV diagnosis were more likely to be female or trans female, African American, PWID, and MSM-PWID (Table 14.1). The age distribution for all persons diagnosed with HIV and those among the homeless was similar.

Table 14.1 Characteristics of homeless persons compared to all persons newly diagnosed with HIV in 2006-2016, San Francisco

	Homeless HIV Cases 2006-2016		HIV Cases 2006-2016	
	Number	(%)	Number	(%)
Total	**502**		**4,574**	
Gender				
Male	380	(76)	4,090	(89)
Female	72	(14)	340	(7)
Trans Female[1]	50	(10)	144	(3)
Race/Ethnicity				
White	216	(43)	2,215	(48)
African American	138	(27)	630	(14)
Latino	97	(19)	1,069	(23)
Asian/Pacific Islander	13	(3)	442	(10)
Other/Unknown	38	(8)	218	(5)
Transmission Category				
MSM	160	(32)	3,237	(71)
PWID	126	(25)	302	(7)
MSM-PWID	167	(33)	625	(14)
Heterosexual	35	(7)	278	(6)
Other/Unidentified	14	(3)	132	(3)
Age at Diagnosis (Years)				
0 - 17	1	(<1)	16	(<1)
18 - 24	76	(15)	550	(12)
25 - 29	97	(19)	756	(17)
30 - 39	126	(25)	1,438	(31)
40 - 49	122	(24)	1,204	(26)
50+	80	(16)	610	(13)

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical Notes "Transgender Status."

Table 14.2 shows the proportion of self-reported homeless persons among San Francisco MMP participants by year from 2009 to 2014 (see Technical Notes "Medical Monitoring Project"). In 2014, 13.5% of MMP participants reported being homeless at any time in the previous 12 months, with 8.6% that reported living in a single room occupancy (SRO) hotel, 4.5% reported living on the street, 2.9% reported living in a shelter, and 1.6% reported living in a car.

Table 14.2 Percent of all participants that self-reported homelessness during the 12 months before the interview among MMP participants in San Francisco, Medical Monitoring Project, 2009-2014

	2009 %[2]	2010 %[2]	2011 %[2]	2012 %[2]	2013 %[2]	2014 %[2]
Any homelessness[1]	13.6%	15.9%	12.6%	13.2%	10.5%	13.5%
Lived in a single room occupancy (SRO) hotel	12.1%	14.0%	11.6%	11.2%	8.6%	8.6%
Lived on the street	2.1%	3.4%	2.7%	4.0%	3.6%	4.5%
Lived in a shelter	1.5%	2.5%	2.7%	2.4%	2.3%	2.9%
Lived in a car	1.4%	0.3%	1.4%	1.2%	2.1%	1.6%

1 Homelessness defined as reporting living on the street, in a shelter, SRO or a car in the previous 12 months.
2 Weighted percent.

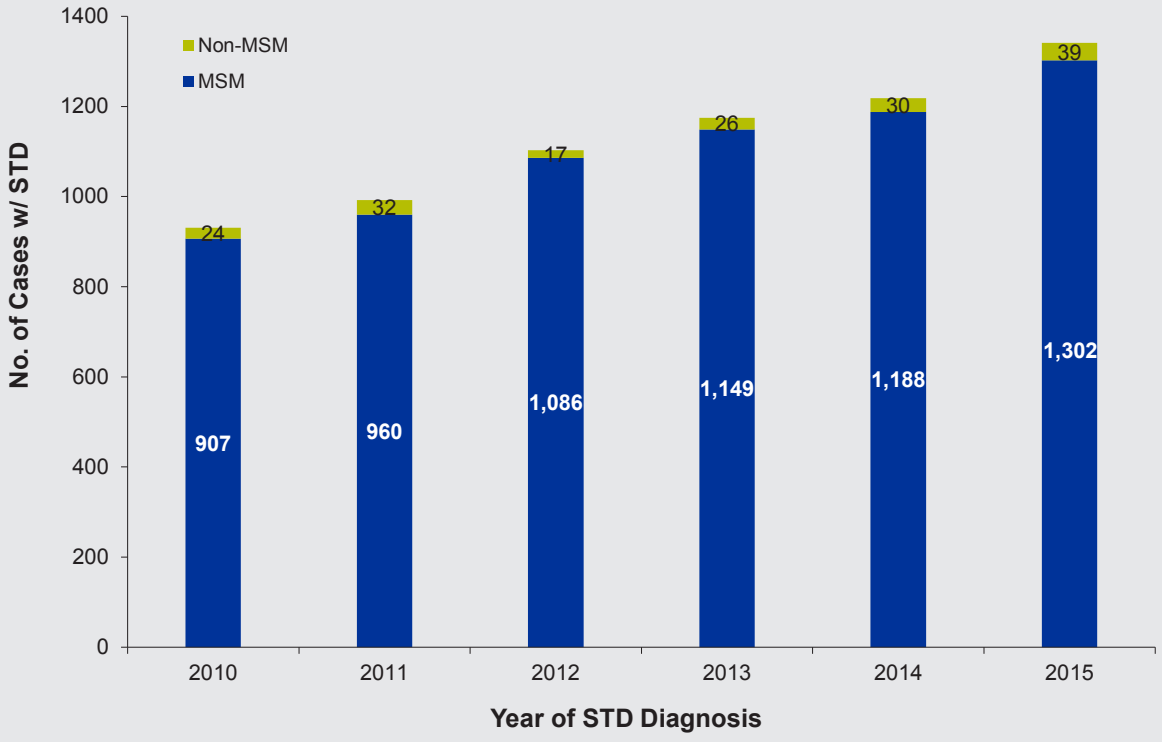
15 Persons Co-infected with HIV and Sexually Transmitted Diseases

Diagnoses of new sexually transmitted diseases (STD) such as early syphilis, gonorrhea, and chlamydia among persons living with HIV (PLWH) serve as a marker of condomless sex which, depending upon HIV treatment status and partner HIV serostatus, may result in HIV transmission. HIV-STD co-infections can be measured from the perspective of the burden of STD among PLWH as well as from the perspective of the burden of HIV among persons with other STD. We have been conducting annual computerized matches of the SFDPH HIV and STD case registries to measure the burden of STD among PLWH. In this annual report we also include results from a special analysis to measure the burden of HIV infection among persons diagnosed with other STD for the years 2007 through 2014.

STD co-infection among persons living with HIV

The data from the STD registry included persons reported with gonorrhea, chlamydia, non-gonococcal urethritis, or infectious syphilis. From 2010 to 2015, the number of STD cases among PLWH rose from 931 in 2010 to 1,341 in 2015 and the vast majority of cases (>95%) were among MSM (Figure 15.1). Overall, the increase coincided with the upward trend shown in early syphilis (Figure 7.4 on page 58) and in male gonorrhea (Figure 7.3 on page 57) reported from 2010 through 2015 among MSM diagnosed with HIV. All STD occurred after the HIV diagnosis, indicating condomless sex among persons with known HIV infection.

Figure 15.1 Number of STD diagnoses among persons living with HIV by year of STD diagnosis, 2010-2015, San Francisco



The majority of PLWH diagnosed with an STD from 2010 through 2015 were male, white, and aged 30-49 years at time of STD diagnosis (Table 15.1). The gender and racial/ethnic distributions were similar across the six year period. The proportion of PLWH reported with an STD at age 50 or older increased from 18% in 2010 to 29% in 2015, while the proportion of those aged 30-49 decreased during the same period of time.

Table 15.1 Demographic characteristics of persons living with HIV who were diagnosed with STD, 2010-2015, San Francisco

	Year of STD diagnosis											
	2010		2011		2012		2013		2014		2015	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Gender												
Male	907	(97)	960	(97)	1,083	(98)	1,147	(98)	1,181	(97)	1,286	(96)
Female	8	(1)	11	(1)	8	(1)	6	(1)	12	(1)	19	(1)
Trans Female[1]	16	(2)	21	(2)	12	(1)	22	(2)	25	(2)	36	(3)
Race/Ethnicity												
White	590	(63)	598	(60)	671	(61)	690	(59)	702	(58)	738	(55)
African American	76	(8)	89	(9)	86	(8)	104	(9)	103	(8)	118	(9)
Latino	199	(21)	215	(22)	257	(23)	269	(23)	284	(23)	331	(25)
Asian/Pacific Islander	48	(5)	60	(6)	68	(6)	80	(7)	85	(7)	94	(7)
Other/Unknown	18	(2)	30	(3)	21	(2)	32	(3)	44	(4)	60	(4)
Age at STD Diagnosis (years)												
13 - 29	101	(11)	110	(11)	132	(12)	141	(12)	155	(13)	157	(12)
30 - 39	252	(27)	245	(25)	265	(24)	291	(25)	287	(24)	300	(22)
40 - 49	415	(45)	415	(42)	461	(42)	471	(40)	460	(38)	486	(36)
50 - 59	128	(14)	172	(17)	197	(18)	230	(20)	247	(20)	326	(24)
60 +	35	(4)	50	(5)	48	(4)	42	(4)	69	(6)	72	(5)
Total	931		992		1,103		1,175		1,218		1,341	

1 Trans Female data include all transgender cases. Trans Male data are not released separately due to potential small population size. See Technical notes "Transgender Status."

HIV co-infection among persons reported with STD

In this special analysis, we include all diagnoses of early syphilis (primary, secondary, and early latent), gonorrhea, and chlamydia that occurred in San Francisco residents from 2007 to 2014 and were reported to the STD registry through August 2, 2016. All persons reported with HIV in California as of August 20, 2016 were included in the matching analysis. STD-HIV co-infection was defined as a HIV diagnosis that occurred on or before the date of STD diagnosis or within 30 days following the STD diagnosis.

Chlamydia was the most frequently reported STD, followed by gonorrhea and then early syphilis although co-infection with HIV occurred far more frequently among persons diagnosed with early syphilis (Table 15.2). The higher HIV co-infection with syphilis might reflect sexual networks among MSM who are the predominate group among persons with early syphilis or a more heterogeneous distribution of gonorrhea and chlamydia. The proportion of co-infection with HIV is also influenced by screening coverage and reporting practices. The vast majority of persons co-infected with STD and HIV were male. Persons with co-infection were older compared to those without co-infection. MSM account for the majority of early syphilis and gonorrhea cases both with and without HIV co-infection. For all three STD examined, the proportion of cases with a prior STD was higher among those with HIV co-infection compared to those without HIV co-infection.

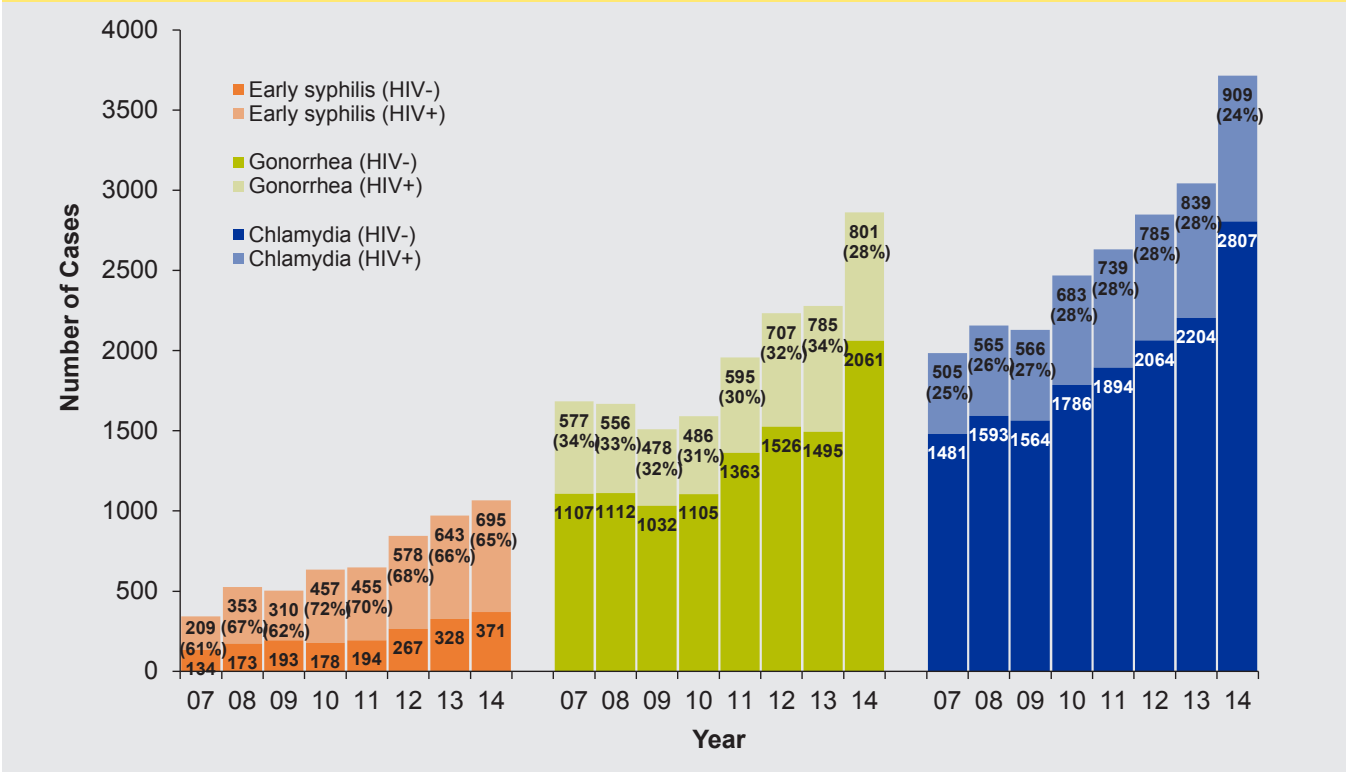
Table 15.2 Characteristics of reported early syphilis, gonorrhea, and chlamydia diagnoses, by HIV status, 2007-2014, San Francisco

	Early syphilis (N=5,745)				Gonorrhea (N=18,037)				Chlamydia (N=37,224)			
	HIV+		HIV-		HIV+		HIV-		HIV+		HIV-	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Total (row%)	**3,773**	**(66)**	**1,972**	**(34)**	**5,099**	**(28)**	**12,938**	**(72)**	**5,736**	**(15)**	**31,488**	**(85)**
Gender												
Male	3,700	(98)	1,838	(93)	4,985	(98)	10,801	(83)	5,591	(97)	15,393	(49)
Female	15	(<1)	104	(5)	37	(1)	1980	(15)	68	(1)	15,771	(50)
Transgender	50	(1)	30	(2)	59	(1)	109	(1)	58	(1)	125	(<1)
Unknown	8	(<1)	0	(0)	18	(<1)	48	(<1)	19	(<1)	199	(1)
Age at STD Diagnosis (years)												
13 - 29	430	(11)	552	(28)	1,065	(21)	6,117	(47)	962	(17)	21,087	(67)
30 - 39	984	(26)	571	(29)	1,634	(32)	3,843	(30)	1,846	(32)	6,368	(20)
40 - 49	1,604	(43)	544	(28)	1,735	(34)	2,121	(16)	2,137	(37)	2,842	(9)
50 +	755	(20)	305	(15)	665	(13)	857	(7)	791	(14)	1,191	(4)
Race/Ethnicity												
White	2,275	(60)	1,076	(55)	3,115	(61)	6,100	(47)	3,342	(58)	8,513	(27)
African American	344	(9)	239	(12)	525	(10)	2,469	(19)	483	(8)	6,644	(21)
Latino	754	(20)	373	(19)	952	(19)	1,865	(14)	1,162	(20)	4,633	(15)
Asian/Pacific Islander	250	(7)	190	(10)	261	(5)	1,088	(8)	438	(8)	4,532	(14)
Other/Unknown	150	(4)	94	(5)	246	(5)	1,416	(11)	311	(5)	7,166	(23)
Transmission Category[1]												
MSM	3,567	(95)	1,709	(87)	4,665	(91)	8,184	(63)	5,149	(90)	7,660	(24)
Other/Unidentified	206	(5)	263	(13)	434	(9)	4,754	(37)	587	(10)	23,828	(76)
History of STD												
No	894	(24)	1,030	(52)	1,044	(20)	7,005	(54)	1,233	(21)	21,116	(67)
Yes	2,879	(76)	942	(48)	4,055	(80)	5,933	(46)	4,503	(79)	10,372	(33)

1 Transmission category was determined from information in the STD registry. Other/Unidentified group might include MSM whose transmission risk was not reported to the STD registry.

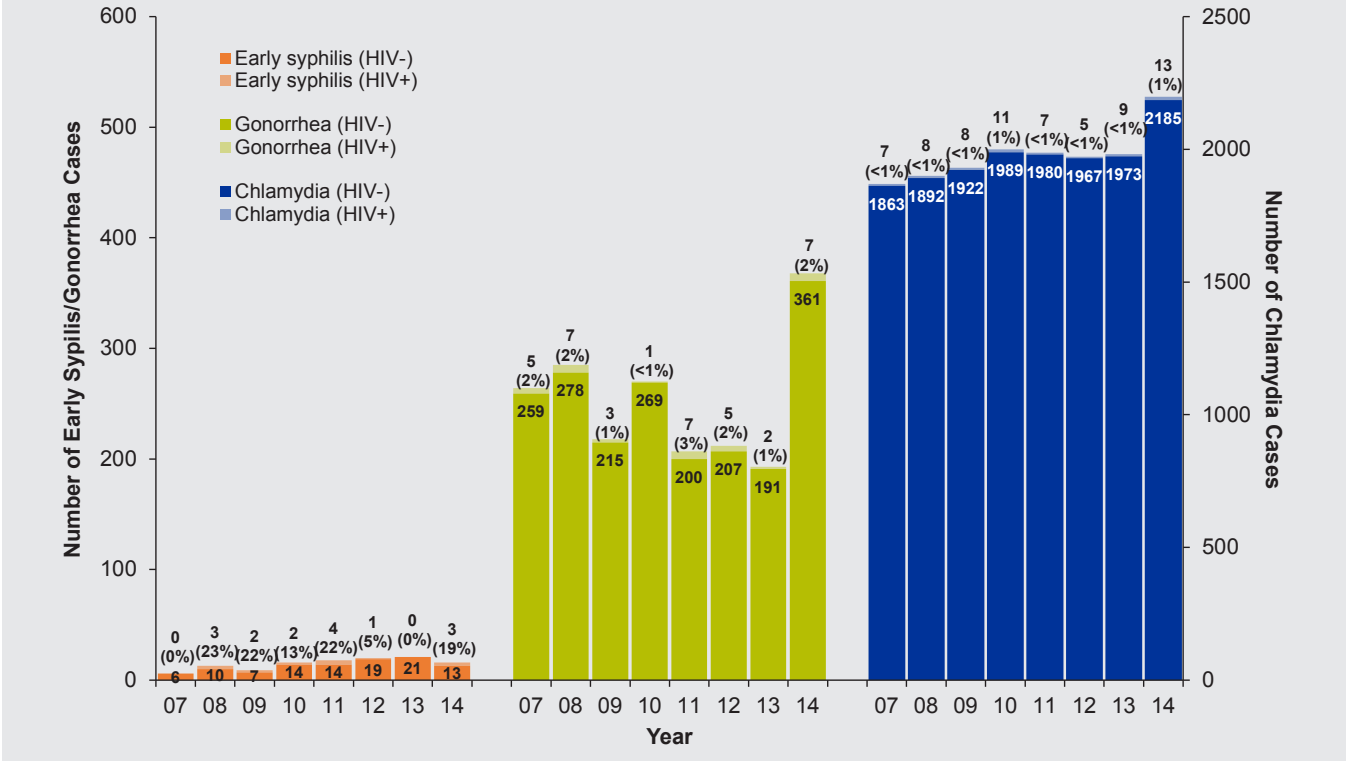
Early syphilis, gonorrhea, and chlamydia diagnoses among men increased from 2007 through 2014 with the most substantial increases starting in 2011 (Figure 15.2). The proportion of early syphilis, gonorrhea, and chlamydia male cases with HIV co-infection ranged from 61%-72% for early syphilis, from 28%-34% for gonorrhea, and from 24%-28% for chlamydia. The proportion of male cases with HIV co-infection declined in 2014 for each of the STD although the magnitude of co-infection, particularly with early syphilis remains very high.

Figure 15.2 Reported early syphilis, gonorrhea, and chlamydia diagnoses among men, by HIV status, 2007-2014, San Francisco



Among women, HIV co-infection with any of the STD is infrequent, reflecting the relatively low burden of HIV among women in San Francisco (Figure 15.3). Women were most severely impacted by chlamydia, followed by gonorrhea, and then early syphilis. The total number of chlamydia and gonorrhea infections increased in 2014 while the number of early syphilis cases declined in 2014.

Figure 15.3 Reported early syphilis, gonorrhea, and chlamydia diagnoses among women, by HIV status, 2007-2014, San Francisco



16 Persons Co-infected with HIV and Hepatitis B and C Viruses

The hepatitis B virus (HBV) and hepatitis C virus (HCV) cause liver infections that increase morbidity and mortality outcomes for persons living with HIV (PLWH). HBV is transmitted when infected blood and bodily fluids such as semen and saliva come into contact (percutaneous or mucosal) with an uninfected person. Persons at risk for HBV include those who have had unsafe sexual contact with an infected person and those who share needle equipment. HCV is transmitted through infected blood. Persons at risk for HCV are those who inject drugs, transfusion and hemodialysis recipients prior to consistent testing, and PLWH.

Since HBV and HCV share similar transmission pathways and risk behaviors with HIV (i.e. sexual contact and injection drug use), many people living with HIV or at risk for HIV are also at risk for being co-infected with HBV/HCV. In the United States, it is estimated that 25% of PLWH are co-infected with HCV and 10% are co-infected with HBV[1]. Despite effective HIV treatment, persons with HIV who are co-infected with hepatitis are more likely to suffer from liver-related morbidity such as liver disease and liver failure as well as liver-related causes of death.

San Francisco participated in a multi-jurisdictional match analysis lead by the CDC to assess co-infection rates across HIV/HBV/HCV. Acute and chronic HBV and HCV cases reported from 2007-2014 were included. Only confirmed and suspected cases were included in the analysis. We used a probabilistic linkage program to identify possible duplicates within the hepatitis dataset. Due to some data limitations with the hepatitis data (see Technical Notes "Hepatitis/HIV Co-infection"), we examined persons newly diagnosed with HIV in 2010-2014 and their co-infection rates.

Overall, among the 2,056 persons newly diagnosed with HIV in San Francisco in 2010-2014, 1.4% were co-infected with HBV and 8.3% were co-infected with HCV. These estimates are below the national estimates as the window of coinfection is narrow for the more recently diagnosed. In Table 16.1 on page 82, persons co-infected with HIV/HBV were likely to be male, Asian/Pacific Islander, and over 40 years old than those only HIV-infected. A different demographic profile is shown for persons co-infected with HIV/HCV as they are more likely to be female and transgender persons, African American, MSM and MSM-PWID, and aged 50 years and older.

1 https://www.cdc.gov/hiv/pdf/library_factsheets_hiv_and_viral_hepatitis.pdf

Table 16.1 Characteristics of persons diagnosed with HIV in 2010-2014 by hepatitis and co-infection status, San Francisco

	HIV/HBV				HIV/HCV			
	HIV without HBV		Co-infections		HIV without HCV		Co-infections	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Total	**2,027**	**(100)**	**29**	**(100)**	**1,886**	**(100)**	**170**	**(100)**
Gender								
Male	1,868	(92)	29	(100)	1,736	(92)	101	(59)
Female	144	(7)	0	(0)	103	(5)	59	(35)
Transgender	15	(1)	0	(0)	47	(2)	10	(6)
Race/Ethnicity								
White	983	(48)	14	(48)	912	(48)	85	(50)
African American	259	(13)	4	(14)	220	(12)	43	(25)
Latino	488	(24)	4	(14)	469	(25)	23	(14)
Native American	11	(1)	1	(3)	12	(1)	0	(0)
Asian/Pacific Islander	208	(10)	5	(17)	203	(11)	10	(6)
Other/Unknown	78	(4)	1	(3)	70	(4)	9	(5)
Transmission Category								
MSM	1,479	(73)	18	(62)	1,460	(77)	37	(22)
PWID	121	(6)	3	(10)	57	(3)	67	(39)
MSM-PWID	240	(12)	5	(17)	192	(10)	53	(31)
Heterosexual	126	(6)	3	(10)	120	(6)	9	(5)
Other/Unidentified	61	(3)	0	(0)	57	(3)	4	(2)
Age in Years								
<13	0	(0)	0	(0)	0	(0)	0	(0)
13-24	236	(12)	0	(0)	227	(12)	9	(5)
25-29	322	(16)	2	(7)	302	(16)	20	(12)
30-39	595	(29)	6	(21)	570	(30)	34	(20)
40-49	576	(28)	13	(45)	539	(29)	48	(28)
50+	298	(15)	8	(28)	248	(13)	59	(35)

17 Molecular HIV Surveillance

Transmitted drug resistance and HIV-1 subtypes

Transmitted drug resistance (TDR) occurs when a drug-resistant HIV strain is transmitted from a treatment experienced person to a treatment naïve person. TDR can compromise the effectiveness of antiretroviral therapy (ART) and complicate HIV treatment. In San Francisco, a city with widespread use of ART, TDR can be of public health concern. The San Francisco Department of Public Health implements Molecular HIV Surveillance (MHS), a CDC-funded supplemental project, to incorporate the collection of HIV nucleotide sequences into routine HIV laboratory reporting. HIV nucleotide sequences are generated by HIV genotypic testing, a test recommended by the U.S. Department of Health and Human Services to detect mutations associated with antiretroviral drugs at entry into health care and again later as needed to guide ART[1]. HIV nucleotide sequences can also be used to assess HIV genetic diversity. Monitoring HIV genetic diversity can enhance understanding of HIV transmission in the community and inform prevention efforts. We used HIV nucleotide sequences obtained from MHS and HIV case surveillance data to assess HIV-1 TDR and common HIV-1 subtypes among persons newly diagnosed with HIV between 2014 and 2015 and reported through December 2016.

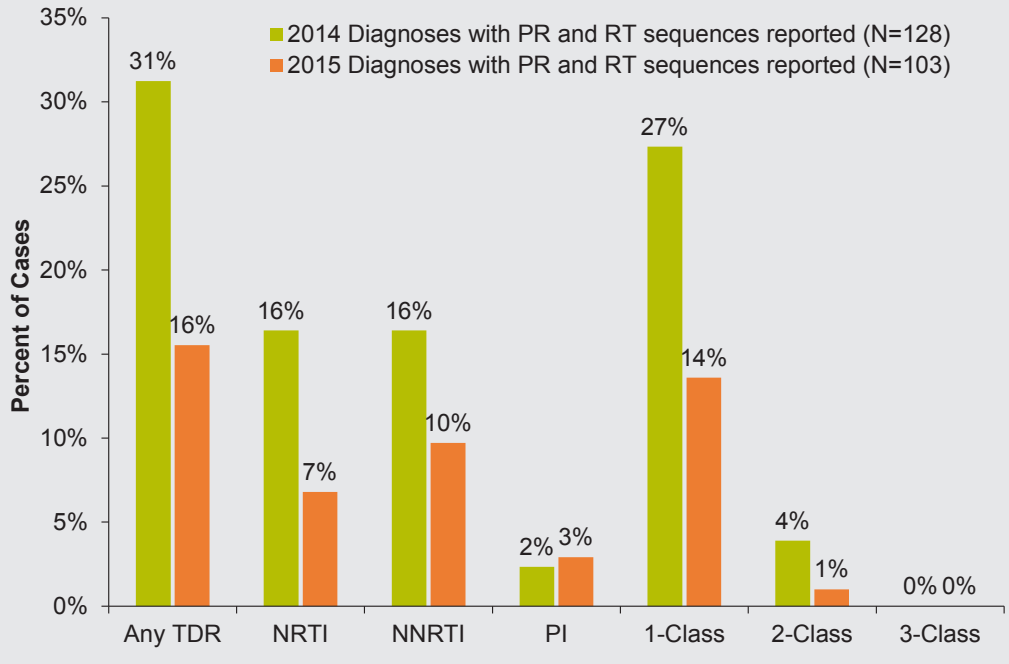
Of 329 new HIV diagnoses in 2014 and 296 new HIV diagnoses in 2015, 185 (56%) and 165 (56%), respectively, had any sequences reported. The completeness of HIV genotypic sequences was dependent upon the proportion of persons who were linked to care and received genotypic testing soon after HIV diagnosis, and the completeness of laboratory reporting. There were 128 (39%) persons diagnosed in 2014 and 103 (35%) in 2015 who had HIV protease (PR) and reverse transcriptase (RT) genes and met the inclusion criteria to assess TDR associated with nucleoside reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), and protease inhibitors (PIs) (see Technical Notes "Transmitted Drug Resistance and HIV-1 Subtype"). Integrase sequences were reported less frequently with 25 (8%) reported among new diagnoses in 2014 and 22 (7%) among new diagnoses in 2015.

Figure 17.1 on page 84 shows the proportion of TDR among new HIV diagnoses with reported PR and RT sequences by NRTI, NNRTI, and PI drug classes. TDR to any drug class occurred more frequently in 2014 (N=40, 31%) compared to 2015 (N=16, 16%). In 2014, the same number of persons had TDR for NNRTIs and for NRTIs (N=21, 16%), and three (2%) persons had TDR for PIs. In 2015, TDR to NNRTIs occurred most frequently (N=10, 10%), followed by TDR to NRTIs (N=7, 7%) and PI (N=3, 3%). TDR to multiple drug classes was low: 4% (N=5) in 2014 and 1% (N=2) in 2015 had TDR to two drug classes, and none had TDR to three drug classes in either year. TDR was not found among the small number of new diagnoses with integrase sequences reported (data not shown).

Figure 17.2 on page 84 shows the distribution of HIV-1 subtypes among new HIV diagnoses in 2014-2015 that had HIV sequences reported. Of 350 persons with sequence information, 312 (89%) were classified as subtype B. CRF01_AE was the most common non-B subtype, occurring in 18 (5.1%) of new diagnoses with sequences reported.

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/lvguidelines/AdultandAdolescentGL.pdf Section accessed [06/02/2017]

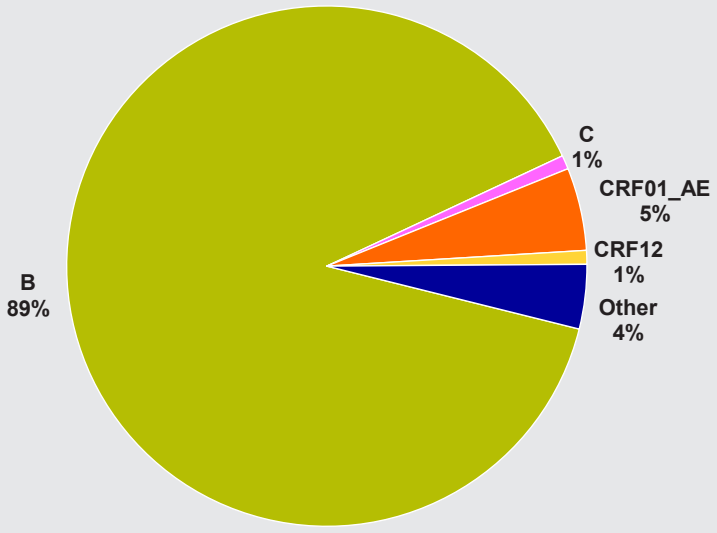
Figure 17.1 Transmitted HIV-1 drug resistance[1] among new HIV diagnoses with eligible protease and reverse transcriptase sequence by drug class, 2014-2015, San Francisco



1 Limit to persons with sequences collected within 3 months of HIV diagnosis and with no evidence of prior antiretroviral treatment. See Technical Notes "Transmitted Drug Resistance and HIV-1 subtypes." Drug classes include nucleoside reverse transcriptase inhibitors (NRTI), non-nucleoside reserves transcriptase inhibitors (NNRTI), and protease inhibitors (PI).

Figure 17.2 HIV-1 subtypes[1] among new HIV diagnoses with HIV nucleotide sequences, 2014-2015, San Francisco

(N=350)

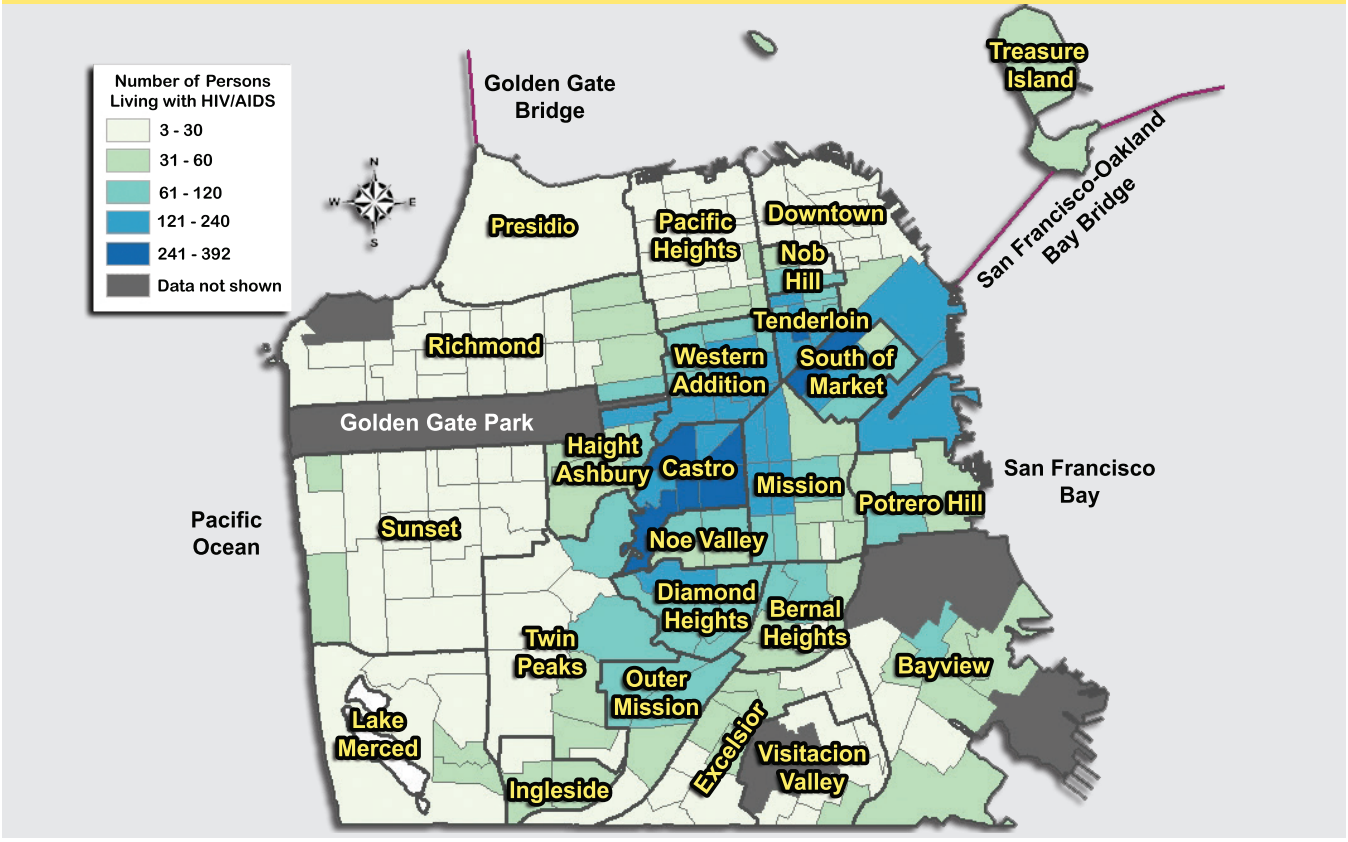


1 See Technical Notes "Transmitted Drug Resistance and HIV-1 Subtypes."

18 Geographic Distribution of Persons with HIV

In section 3 of this report, we noted the movement of persons in and out of San Francisco following their initial HIV diagnosis. To accurately display the geographic distribution of persons living with HIV (PLWH) in San Francisco, we included 13,338 PLWH who had a current San Francisco address, regardless of where they were initially diagnosed with HIV in Map 18.1. Current address is collected from various sources such as laboratory reports, chart review, and communications with other jurisdictions. The Castro and South of Market neighborhoods had the highest numbers of PLWH (the darker colors on the map).

Map 18.1 Geographic distribution of persons living with HIV who resided in San Francisco as of December 2016



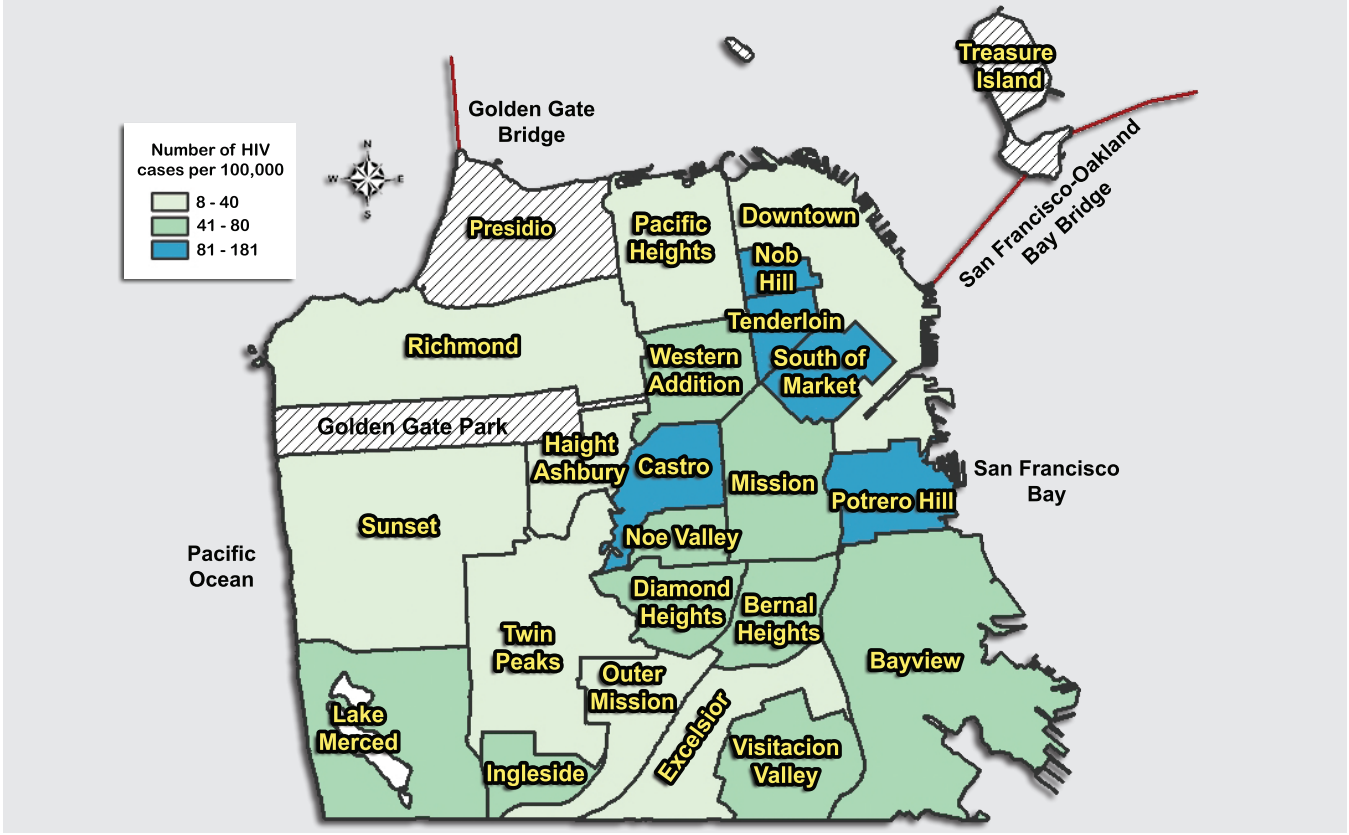
* Living homeless cases (N=520) and those with unknown or invalid addresses (N=440) are not displayed. Census tracts with population totals less than 500 are not shown.

The U.S. Census[1] estimated that 870,887 persons resided in San Francisco County in 2016. During 2015-2016, there were 488 San Francisco residents who were newly diagnosed with HIV. We calculated a two-year diagnosis rate[2] of 56 per 100,000. Map 18.2 uses the residential address at diagnosis for those diagnosed in 2015-2016 to display the newly diagnosed rates. The 2010 Census data for census tracts were aggregated to the neighborhood level to provide the neighborhood population denominators. The Tenderloin had the highest newly diagnosed rate in 2015-2016 (181 per 100,000), followed by Castro (177 per 100,000) and South of Market (131 per 100,000).

1 Annual Estimates of the Resident Population for Incorporated Places of 50,000 or More, Ranked by July 1, 2016 Population: April 1, 2010 to July 1, 2016. Source: U.S. Census Bureau, Population Division. Release Date: May 2017.

2 Two-year diagnosis rates' numerators represent 2 years' diagnosed cases.

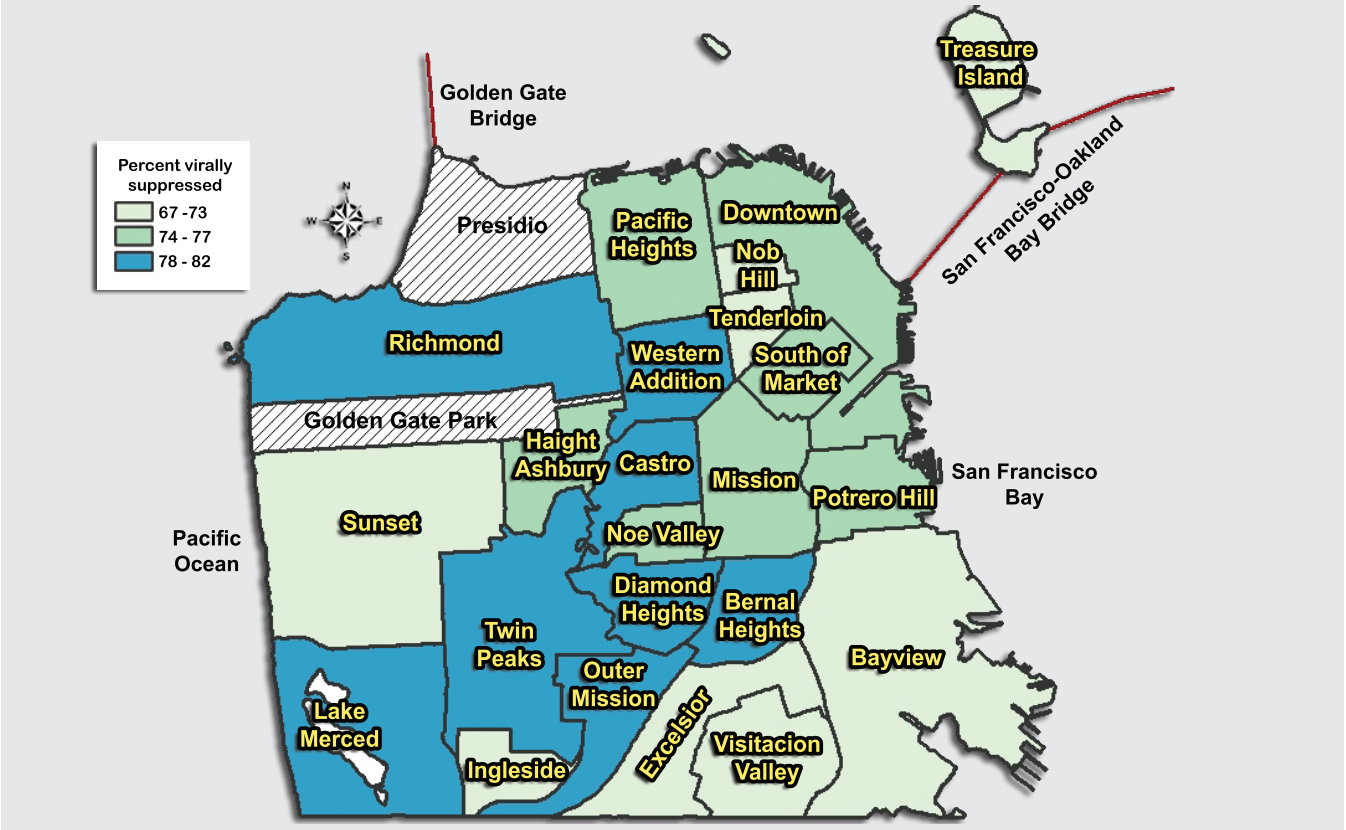
Map 18.2 Geographic distribution of rates of HIV diagnosis per 100,000 population per two years for persons newly diagnosed in 2015-2016, San Francisco



* Rates for the Presidio and Treasure Island are suppressed due to small cell sizes.

Map 18.3 displays the geographic distribution of PLWH who were virally suppressed in San Francisco. Included in the map are PLWH: (1) with a current San Francisco address as of December 31, 2014 and (2) were virally suppressed as of December 31, 2015. Overall, among those with a current San Francisco address, 74% were virally suppressed in 2015. Eight neighborhoods had a lower proportion of PLWH virally suppressed than the overall city estimate (light green color on the map): Visitacion Valley (67%), Nob Hill, Tenderloin, and Treasure Island (69% each), Excelsior (71%), Bayview (72%) and the Sunset and Ingleside (73% each). Those who were currently homeless had the lowest proportion who were virally suppressed (32%) in 2015 (not displayed).

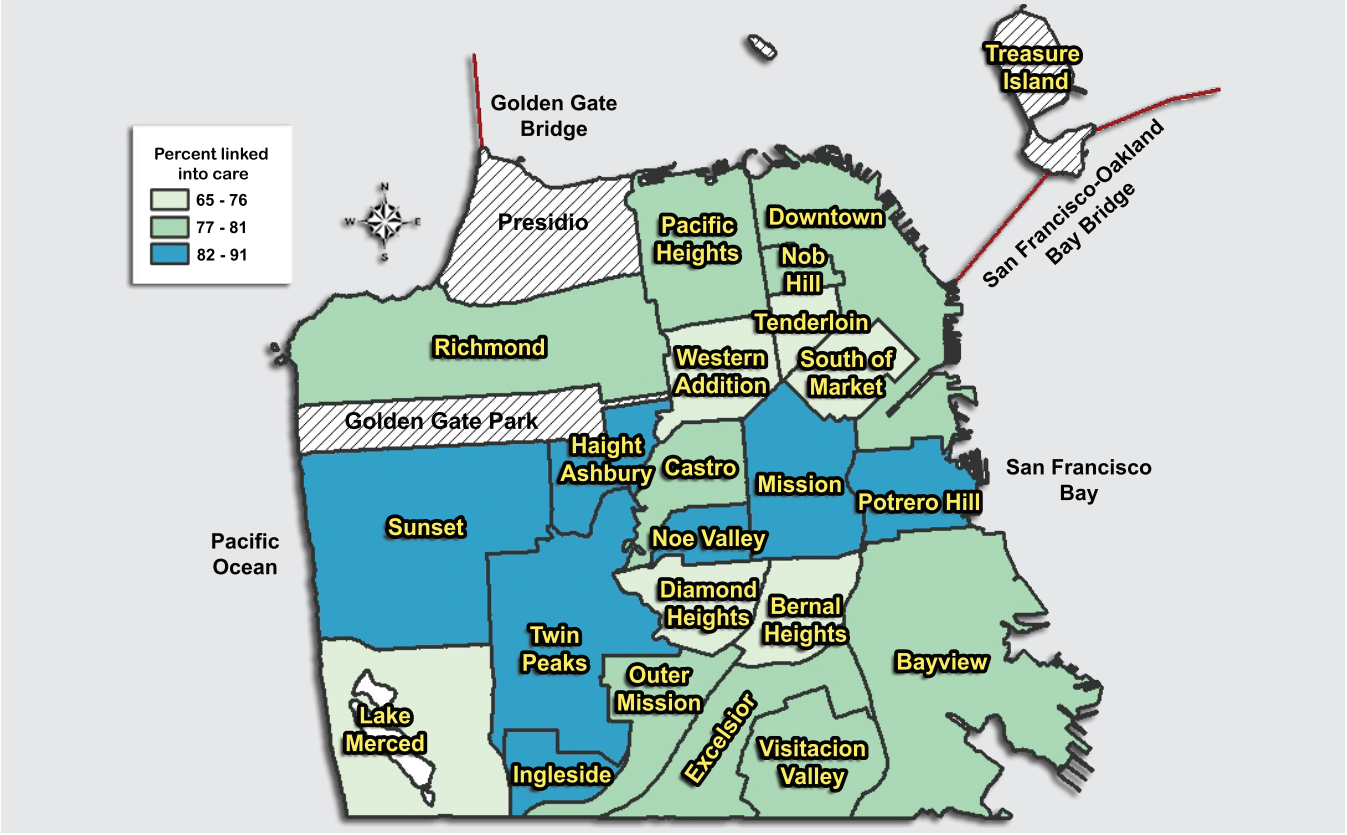
Map 18.3 Geographic distribution of proportion of persons living with HIV diagnosed through 2014 who were virally suppressed in 2015, San Francisco



* Thirty-two percent of homeless PLWH had viral suppression in 2015 while 46% those with unknown or invalid addresses were virally suppressed.

From 2012 to 2015, 77% of the 1,480 newly diagnosed San Francisco residents were linked to care within one month of their diagnosis. Six neighborhoods fell below this average (Map18.4). Three neighborhoods had the lowest linkage to care rates: Lake Merced (65%) and Western Addition and Diamond Heights (69% each). Seventy percent of those who were homeless at diagnosis were linked to care.

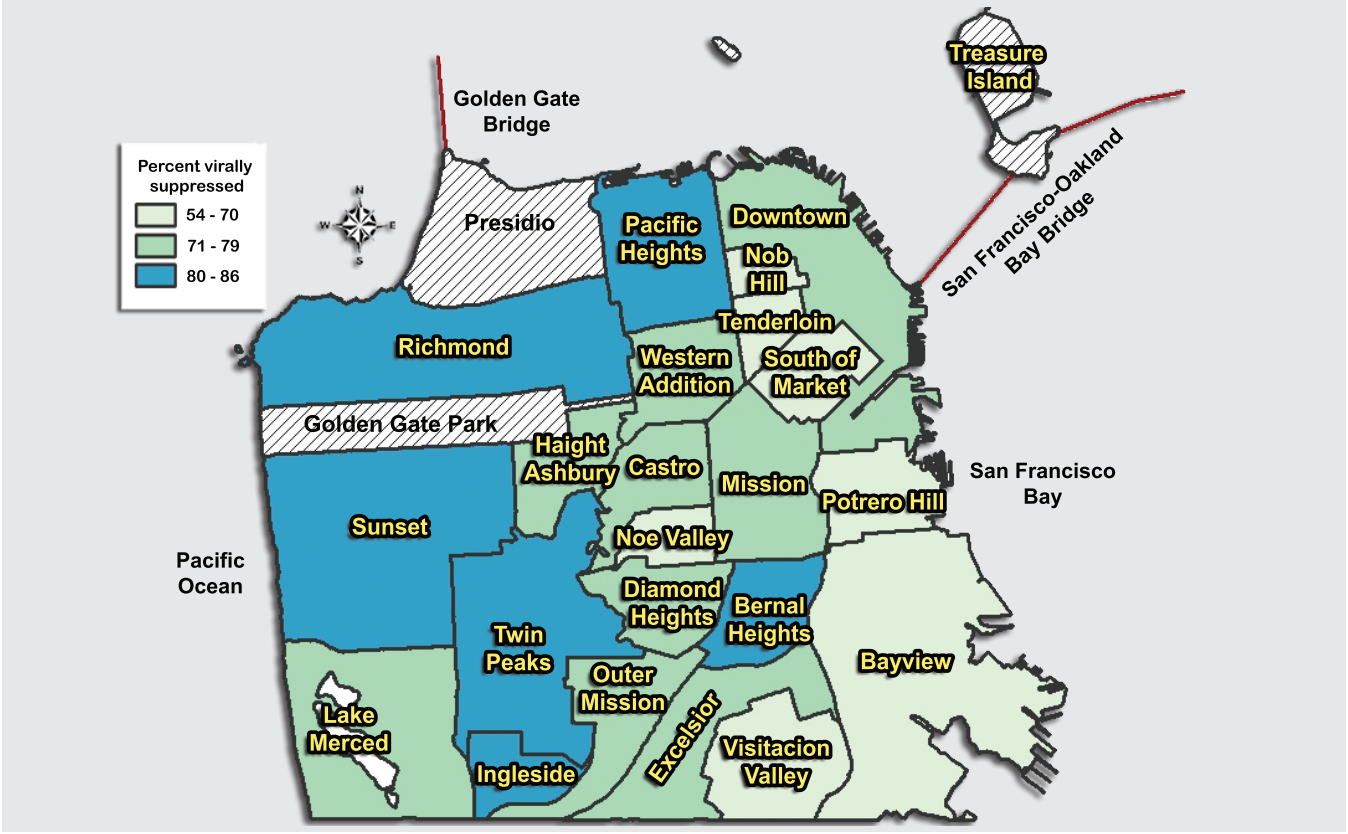
Map 18.4 Geographic distribution of proportion of persons newly diagnosed with HIV in 2012-2015 who were linked to care within one month of diagnosis, San Francisco



* Persons homeless at HIV diagnosis and those with invalid or unknown addresses are not displayed on this map (70% and 64% were linked to care within one month of HIV diagnosis, respectively.) Neighborhoods with less than 15 cases are not displayed.

During 2012 through 2015, 71% of persons newly diagnosed with HIV reached viral suppression within 12 months of diagnosis. Seven neighborhoods fell below this overall average (the lighter colors on the map; Map 18.5): Potrero Hill (54%), Bayview (55%), Visitacion Valley and Noe Valley (59% each), South of Market (65%), Tenderloin (68%), and Nob Hill (69%). While Ingleside exhibited both high linkage to care and viral suppression rates (91% linked, 86% virally suppressed), some neighborhoods had difficulty bridging successful linkage to care (medical appointments) to successful viral suppression. For example, a high percentage of newly diagnosed Noe Valley residents were successful in receiving HIV care within one month of their diagnosis (88%) but only 59% were able to achieve viral suppression within 12 months. This drop represents a missed opportunity to translate successful linkage to successful treatment uptake.

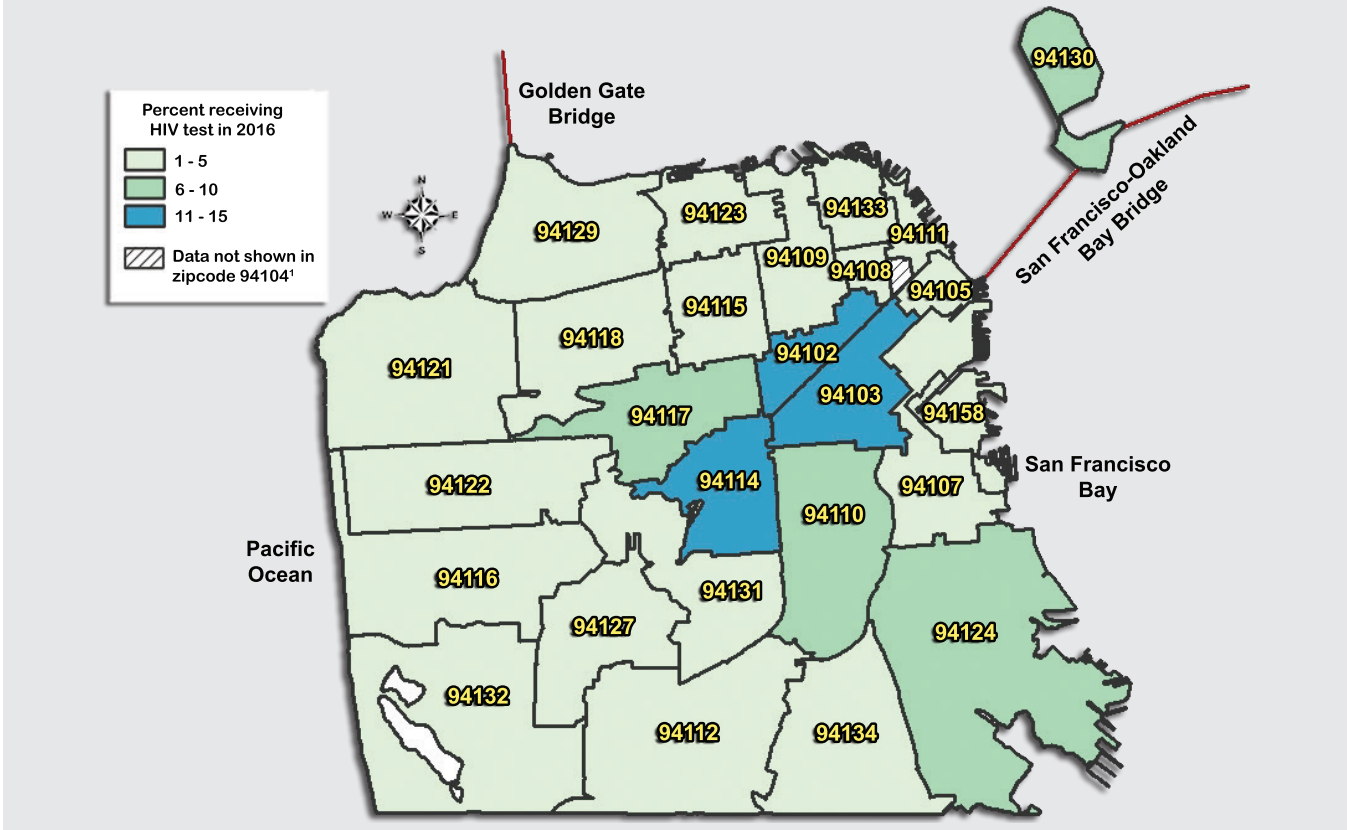
Map 18.5 Geographic distribution of proportion of persons newly diagnosed with HIV in 2012-2015 who achieved viral suppression within 12 months of diagnosis, San Francisco



* Persons homeless at HIV diagnosis and those with unknown or invalid addresses are not displayed (50% and 51% achieved viral suppression within 12 months, respectively). Neighborhoods with less than 15 cases are not displayed.

We examined male HIV testing rates in 2016 in San Francisco by zip code. The 2016 HIV testing data came from Evaluation Web, the CDC's de-identified HIV testing database. Tests in Evaluation Web include those performed in both community and medical settings. We used the 2010 Census data to establish the number of males who were 13 years old or older by zip code for the denominator and estimated the testing coverage among the male population. In three zip codes, 11% or more of the male population received an HIV test in 2016 (the darker colors on the map; Map 18.6): zip code 94102, 94103, and 94114 (15% each). Since Evaluation Web is a de-identified database, unique testers could not be differentiated in the community settings. This could result in repeat testers being counted more than once and a possible overestimate of the testing proportion.

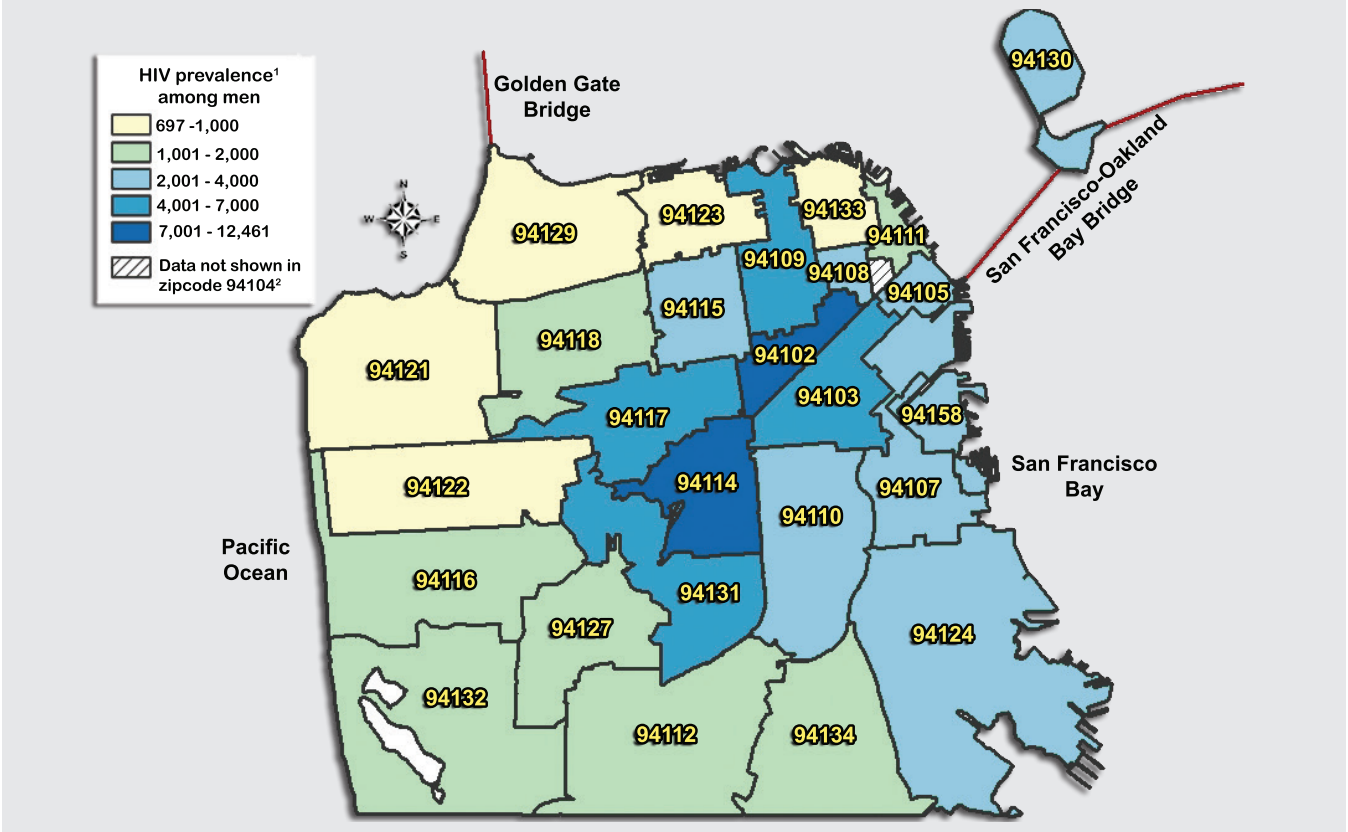
Map 18.6 Proportion of San Francisco male residents aged 13 years and older who received an HIV test by zip code, 2016



1 The 94104 zip code is not displayed because the total population in this zip code is less than 500.

The HIV prevalence by zip code among males aged 13 and older as of December 31, 2016 are displayed in Map 18.7. The 94114 zip code had the highest HIV prevalence of 12,461 per 100,000, followed by zip codes 94102 and 94103 (7,823 per 100,000 and 6,963 per 100,000, respectively). By comparing the data contained in Map 18.6 and Map 18.7, we can identify areas with discordant HIV prevalence and HIV testing rates to target and improve testing efforts.

Map 18.7 HIV prevalence per 100,000 population among men aged 13 years and older by zip code, 2016, San Francisco



1 See Technical Notes "HIV Prevalence by Zip Code."
2 The 94104 zip code is not displayed because the total population in this zip code is less than 500.

Technical Notes
(in alphabetic order by topic)

Date of Initial HIV Diagnosis

The date of HIV diagnosis for newly diagnosed cases is determined based on the earliest date of any of the following: positive HIV antibody test, positive HIV antigen/antibody combination test, detectable viral load test, or physician-documented diagnosis in absence of sufficient laboratory evidence. The date of initial HIV diagnosis for assessing trends in new HIV diagnoses in this report takes into account patient self-report of a positive HIV test as noted in the medical record that was prior to the confirmed HIV diagnosis made by laboratory or clinical evidence. However, CD4 or undetectable viral load tests prior to the confirmed HIV diagnosis are not used to determine date of initial HIV diagnosis.

Death Ascertainment

Death information among persons reported with HIV is obtained through the following mechanisms: (1) monthly matches with local vital statistics registry, (2) Social Security Death Master File (3) National Death Index, (4) medical record review, (5) notification from other health department, and (6) matches with other disease registry databases.

Cause of death information on death certificates is summarized and coded using the International Classification of Diseases, 10th revision (ICD-10) for deaths that occurred since 1999. A single cause of death is identified from all reported conditions that began the chain of events that resulted in death; this is known as the underlying cause of death. All conditions (including the underlying cause of death) listed on the death certificate are known as the multiple causes of death (http://www.cdc.gov/nchs/icd/icd10.htm). We obtained the ICD codes from annual matches to the National Death Index from 1999 to 2015. Deaths classified as B20-B24 and all AIDS-related opportunistic infections and cancers listed on the death certificate were included in the HIV-related classification.

Estimate of ART Use

Information on ART use is obtained from medical chart review. Using surveillance data to estimate use of ART will most likely result in an underestimate of ART use. The underestimate occurs because use of ART is collected at the time a person with HIV infection is reported (which is often close to the time that they are diagnosed), a time when some people have not yet begun treatment. The SFDPH collects follow-up information from selected health care facilities. For persons who receive care at these sites, treatment data are likely to be more complete because it allows us to capture the use of ART after diagnosis and the date the case report was completed. Follow-up information is not available for persons who have moved away from San Francisco or who receive ongoing care outside of the city. Surveillance data provide information that indicates when a person was prescribed ART but does not provide information on adherence. Persons whose medical records indicate that they were prescribed ART are assumed to have received it.

The lower level estimate of ART use (Table 3.7 on page 28) was calculated among all cases living with HIV. The upper level estimate (Table 3.7 on page 28, Figure 3.4 on page 29) was calculated among cases who had follow-up information within the last two years, whose chart review was completed between January 2015 and March 2017, and who were not known to have moved out of San Francisco.

Female Presumed Heterosexual Contact

In 2010 the CDC HIV Incidence and Case Surveillance Branch accepted a definition for female presumed heterosexual contact to reclassify the transmission category for adult female cases who would otherwise be reported with no identified risk. The definition for female presumed heterosexual contact was first proposed by the Council of State and Territorial Epidemiologists[1]. Like other transmission categories, the definition uses patient history variables collected on the HIV adult case report form. The female presumed heterosexual contact definition includes the following components: (1) the patient's sex at birth is female, (2) the patient had sex with male(s), (3) the patient had no indication of injection drug use, and (4) there is no other known information that would suggest a likely alternative source of HIV infection.

Grouping of Data Categories

Data in certain racial/ethnic or risk categories are grouped together when the number of persons with HIV in that particular group is small and/or does not present significant trends. For example, "Other" in the Race/Ethnicity breakdown in some tables or figures represents Asian/Pacific Islander, Native American, and people of mixed race. Whenever possible, this report presents the expanded racial/ethnic categories rather than aggregating into the group "Other." The label "Other" in the Transmission Category breakdown may include transfusion recipients, hemophiliacs, heterosexuals, persons acquiring HIV perinatally, or persons of unidentified risk.

Hepatitis/HIV Co-infection

A dataset with all acute/chronic hepatitis B and hepatitis C cases reported from 2007-2014 were eligible for the match. The hepatitis data were deduplicated using a probabilistic linkage software called LinkKing. This program examined the combination of name, date of birth, and social security number to assign match scores to identify possible duplicates within the data. Once a manual review of the possible duplicates were reconciled, we ensured the earliest reported date was retained. The eligible HIV data included cumulative HIV/AIDS cases reported through September 2016 who were presumed to be alive and whose most recent address through December 31, 2014 was in San Francisco. The diagnosis year used the earliest HIV disease diagnosis date. A SAS program created by the CDC was used to determine true and possible matches across the two datasets using 14 match criteria. The demographic information uses HIV surveillance data. When surveillance data are missing, data from the hepatitis surveillance system are used. The ages among co-infected HIV-HBV/HCV persons reflect the age at second viral infection.

1 Council of State and Territorial Epidemiologists Positions statements 2007: Heterosexual HIV transmission classification. Available from http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/07-ID-09.pdf

HIV Case Rates and HIV Mortality Rates

Annual race-specific rates are calculated as the number of cases diagnosed for a particular racial/ethnic group during each year divided by the population for that race/ethnicity, multiplied by 100,000. Annual race-specific mortality rates are calculated as the number of deaths (including all causes of death) among persons with HIV for a particular racial/ethnic group during each year divided by the population for that race/ethnicity, multiplied by 100,000. These rates are calculated separately for males and females. The annual populations are not available for transgender persons. Population denominators by year are obtained from the State of California, Department of Finance, Demographic Research Unit, in two sources: the California Intercensal Population Estimates[2] and California Population Projections[3] (http://www.dof.ca.gov/Forecasting/Demographics/Projections/).

HIV Disease Stage 3 (AIDS) Survival

Survival was calculated as the time between the date of HIV stage 3 (AIDS) diagnosis and the date of death. This analysis included persons who met the case definition for HIV infection stage 3 (AIDS). The follow-up information for cases was obtained through retrospective and prospective reviews of laboratory records and medical charts. Dates of death were obtained through review of local death certificates, reports from the State Office of AIDS, and matches with the National Death Index (NDI) and Social Security death files. The most recent NDI and Social Security death file matches included deaths that occurred through December 31, 2015. Persons not known to have died were censored on the date of their last known follow-up or on December 31, 2015, whichever was more recent.

HIV Prevalence by Zip Code

The HIV prevalence among men is calculated using the number of living male HIV cases by their most current zip code divided by the male population aged 13 and older, multiplied by 100,000. Updated current address information and their corresponding zip codes are collected as part of routine surveillance including medical chart reviews and laboratory reports for all San Francisco cases. Population data used in the denominator are from the U.S. Census Bureau 2010 for Zip Code Tabulation Areas (ZCTAs). Prevalences were suppressed for a zip code if the case count was less than five or the population size was less than 500.

HIV Surveillance Methods

San Francisco HIV cases are reported primarily through active surveillance activities in which public health personnel review laboratory and pathology reports and medical records to identify cases and complete the case report forms. HIV cases are also identified through passive reporting, review of death certificates, validation studies using secondary data sources such as hospital billing records or other disease registries, and reports

2 State of California, Department of Finance, Race/Hispanics Population with Age and Gender Detail, 2000–2010. Sacramento, California, September 2012.
3 State of California, Department of Finance, Report P-3: State and County Population Projections by Race/Ethnicity, Detailed Age, and Gender, 2010-2060. Sacramento, California, December 2014.

from other health departments. The surveillance system is evaluated regularly for completeness, timeliness, and accuracy.

Completeness of HIV case reporting in San Francisco was evaluated for cases diagnosed in 2015 using capture-recapture methods[4] as recommended by the CDC HIV Incidence and Case Surveillance Branch. The completeness of case reporting of HIV diagnoses in 2015 was found to be 99% (evaluated at 12 months after the end of the diagnosis period based on the capture-recapture log-linear models). In terms of timeliness, 94% of expected cases were reported within six months of the HIV diagnosis.

Completeness of HIV laboratory reporting for specimens collected in 2014 to 2016 was evaluated through four sensitivity studies of high volume laboratories. HIV laboratory reporting from the SFDPH Public Health Laboratory was >99% complete (15,475 laboratory records assessed for January 2014 to June 2016). Two studies evaluated the reporting of CD4 laboratory results from San Francisco General Hospital and the completeness of reporting was 94% and 100%, with 10,878 (January 2015 to July 2016) and 2,352 records (August to November 2016) assessed respectively. HIV and CD4 laboratory reporting from a large, private commercial laboratory was 96% complete (7,586 records with specimen collection dates August to November 2015).

The HIV data in this report include persons who were residents of San Francisco at the time they were diagnosed with HIV (all stages of infection) including San Francisco residents who were diagnosed in other jurisdictions. San Francisco started name-based case reporting for HIV cases in April 2006, as mandated by California law. Only cases reported confidentially by name are included in this report.

Linkage Integration Navigation Comprehensive Services

Linkage Integration Navigation Comprehensive Services (LINCS) is a program maintained by SFDPH that helps PLWH re-engage with care. Since 2011, health care navigators on the LINCS team have worked at San Francisco City Clinic and other SFDPH sites to address patient needs, including difficulties in finding insurance, attending care appointments and adhering to medication. Patients may come to LINCS through direct referral by a provider or, more recently, through not-in-care lists generated from HIV surveillance or medical record databases. LINCS programmatic data were used to define patient's race/ethnicity and housing status. Trans women were defined as either being transgender in HIV surveillance or in LINCS programmatic data. Transmission category was determined from HIV surveillance data.

Medical Monitoring Project

The Medical Monitoring Project (MMP) is an ongoing CDC-funded national HIV/AIDS supplemental surveillance project. San Francisco is one of 23 project areas currently conducting MMP. Multi-stage probability

4 Hall HI, Song R, Gerstel JE. Assessing the completeness of reporting human immunodeficiency virus diagnoses in 2002-2003: Capture recapture methods. American Journal of Epidemiology. 2006; 164:391-397.

proportional-to-size sampling is used to recruit HIV-infected adults receiving care at health facilities in San Francisco. Information about care utilization, clinical outcomes, resource needs, and HIV risk behaviors is collected through patient interviews and medical chart review. Interview and medical record abstraction data from 1,346 participants from the 2009-2014 San Francisco MMP cycles was used in this report. Data were weighted for the probability of selection based on known probabilities of selection at each sampling stage. In addition, data were weighted to adjust for non-response using predictors of patient level response, including facility size, race/ethnicity, time since HIV diagnosis and age group. Prevalence estimates (weighted percentages) were calculated using information from participants who completed both the standard questionnaire and also had their medical record abstracted. Percentages are weighted percentages and might not sum to 100 because of rounding.

Out-of-Jurisdiction Cases

Routine HIV case surveillance assigns case ownership by residence at diagnosis. HIV cases residing in San Francisco at time of diagnosis are considered San Francisco cases. HIV cases receiving care in San Francisco but who resided elsewhere at time of diagnosis are considered out-of-jurisdiction (OOJ) cases. In 2009, California Department of Public Health upgraded the surveillance database and updated procedures, and case reporting for OOJ cases was conducted and reported in the same manner as San Francisco cases.

Stage of Disease at HIV Diagnosis

In 2014, the United States surveillance case definition[5] for HIV infection among adults and adolescents aged ≥13 years and children age<13 years was revised to expand the HIV infection classification staging system to five stages of HIV infection as described below. With the new case definition, stages 1-3 are classified on the basis of the first CD4 T-lymphocyte count and age on date of CD4 T-lymphocyte test, unless there is a stage-3-defining opportunistic illness. The CD4 T-lymphocyte percentage of total lymphocytes is only used when the corresponding CD4 T-lymphocyte count is unknown.

- HIV infection stage 0: This stage is early HIV infection and is established by a sequence of discordant HIV test results indicative of early HIV infection. The criteria for stage 0 infection can be established by a testing history of 1) a confirmed HIV positive test that occurs 180 days or less after a negative or indeterminate test for HIV infection, 2) a negative or indeterminate HIV antibody test is on or less than 180 days before a positive HIV virologic test and on or less than 60 days after a positive HIV antibody test, or 3) a negative or indeterminate HIV antibody test is on or less than 60 days after a positive HIV virologic test. This sequence of discordant results may be based on testing history (previous laboratory documented or patient's self-report of negative/indeterminate results), or by a HIV testing algorithm. If the criteria for stage 0 are met, the stage is 0 (supersedes other stages) regardless of criteria for other stages (CD4 T-lymphocyte test results and opportunistic illness diagnoses).

5 Selik RE, Mokotoff ED, Branson B, Owen SM, Whitmore S, Hall HI. Revised Surveillance Case Definitions for HIV Infection -- United States, 2014. MMWR 2014;63(No. RR-3):1-10.

- HIV infection stage 1-3: HIV infection stage 1-3 is based on age-specific CD4 T-lymphocyte count or CD4 T-lymphocyte percentage of total lymphocytes.

	Age on date of CD4 T-lymphocyte test					
	<1 year		1-5 years		≥6 years	
Stage	Cells/ μL	%	Cells/ μL	%	Cells/ μL	%
1	≥1,500	≥34	≥1,000	≥30	≥500	≥26
2	750-1,499	26-33	500-999	22-29	200-499	14-25
3	<750	<26	<500	<22	<200	<14

Data on persons with HIV infection, stage 3 (AIDS) include persons whose infection has ever been classified as stage 3 (AIDS).

- HIV infection, stage unknown: No information available on CD4 count or percentage and no reported information on AIDS-defining conditions (every effort is made to collect CD4 counts or percentages at time of diagnosis).

Transgender Status

In September 1996, SFDPH began noting transgender status when this information is contained in the medical record. Transgender individuals are listed as either male-to-female or female-to-male. The majority of transgender HIV cases are male-to-female (trans female). Due to the small number of trans male cases and potential small population size, their data are included with trans female cases to protect confidentiality. Please note that there are several limitations of our transgender data. We believe that our report likely underestimated the number of transgender persons affected by HIV because data collected for HIV reporting are derived from the medical record. Consequently, information that may be discussed with the health care provider but not recorded in the medical record is generally not available for the purposes of HIV case reporting.

Transmitted Drug Resistance and HIV-1 Subtypes

The Stanford HIV Web Service, Sierra (Version 1.1)[6], is used to identify mutations in HIV protease, reverse transcriptase, and integrase sequences reported. Sequence data evaluated by Sierra do not contain any personally identifiable information and are not stored on the Sierra system. HIV-1 subtypes are assigned by COMET[7] (Context-based Modeling for Expeditious Typing) v2.2 and evaluated only among sequences with the length of 500 characters or more. The CDC mutation list for surveillance[8] is applied to determine mutations conferring resistance to non-nucleoside reverse transcriptase inhibitors (NNRTIs), nucleoside reverse transcriptase inhibitors (NRTIs), protease inhibitors (PIs) and integrase strand-transfer inhibitors (INSTIs).

6 Information on Sierra is available at https://hivdb.stanford.edu/DR/webservices/
7 Information on COMET is available at https://comet.lih.lu/
8 Wheeler W. et al. Prevalence of transmitted drug resistance-associated mutations and HIV-1 subtypes in new HIV-1 diagnoses, U.S., 2006. AIDS 2010, 24: 1203-1212.

To assess transmitted drug resistance, we include HIV nucleotide sequences obtained from HIV genotypic testing performed within three months of HIV diagnosis and from persons with no evidence of prior antiretroviral treatment. For persons with multiple sequences, the earliest and longest sequence is used. HIV nucleotide sequences that are excluded from the analysis if they are 1) possible HXB2, the wild-type reference strain, contaminant, 2) do not have all amino acid positions specified in the CDC mutation list, or 3) have not been classified as the following HIV subtypes: A, B, C, D, F, G, CRF01_AE and CRF02_AG as listed in the CDC mutation list.

D Data Tables

Figure 1.1 HIV disease stage 3 (AIDS) cases, deaths, and prevalence, 1980-2016, San Francisco 2

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
HIV disease stage 3 cases	3	26	99	274	558	860	1236	1632	1763	2160
HIV disease stage 3 deaths	0	8	32	111	273	534	807	878	1040	1279
Persons living with HIV ever classified as stage 3	3	21	88	251	536	862	1291	2045	2768	3649

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
HIV disease stage 3 cases	2046	2285	2328	2069	1781	1556	1076	803	694	577
HIV disease stage 3 deaths	1364	1512	1640	1603	1601	1485	995	424	402	353
Persons living with HIV ever classified as stage 3	4331	5104	5792	6258	6438	6509	6590	6969	7261	7485

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
HIV disease stage 3 cases	557	512	493	557	483	480	450	446	434	324
HIV disease stage 3 deaths	350	324	323	303	309	312	289	271	229	211
Persons living with HIV ever classified as stage 3	7692	7880	8050	8304	8478	8646	8807	8982	9187	9300

Year	2010	2011	2012	2013	2014	2015	2016
HIV disease stage 3 cases	301	250	241	189	139	123	92
HIV disease stage 3 deaths	195	188	184	192	189	203	137
Persons living with HIV ever classified as stage 3	9406	9468	9525	9522	9472	9392	9347

Figure 2.1 Number of persons newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco. 15

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	290	271	254	227	220	220	226	177	135	109	86
African American	76	80	80	65	63	64	46	50	32	40	34
Latino	113	104	119	112	110	84	110	98	87	69	63
Asian/Pacific Islander	30	48	42	40	39	35	52	48	42	32	34
Other	21	29	23	26	27	18	19	19	15	15	6

Figure 2.2 Annual rates of men newly diagnosed with HIV per 100,000 population by race/ethnicity, 2006-2016, San Francisco 16

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	151	136	131	118	113	111	118	88	65	51	39
African American	238	230	233	199	203	187	141	172	127	126	96
Latino	170	145	169	148	151	106	145	136	114	85	77
Other	34	49	41	44	40	33	48	41	38	28	26

Figure 2.3 Annual rates of women newly diagnosed with HIV per 100,000 population by race/ethnicity, 2006-2016, San Francisco 16

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	9	11	9	5	8	9	2	5	4	5	5
African American	47	64	65	42	39	65	30	30	4	26	43
Latina	11	13	9	18	12	15	17	7	7	10	8
Other	3	5	3	1	5	2	1	2	1	3	1

Figure 2.4 Number of men newly diagnosed with HIV by transmission category, 2006-2016, San Francisco 17

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
MSM	360	328	362	313	287	294	343	295	224	186	155
PWID	19	20	19	14	23	12	14	11	14	7	10
MSM-PWID	87	82	59	71	64	48	45	42	36	23	18
Other	15	30	20	20	34	12	20	12	16	16	10

Figure 2.5 Number of women newly diagnosed with HIV by transmission category, 2006-2016, San Francisco 17

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PWID	18	20	15	11	14	16	5	10	8	11	10
Heterosexual	14	24	20	17	18	20	17	10	3	12	10
Other	4	4	5	2	4	5	1	2	2	3	5

Figure 5.2 Mortality rates among men diagnosed with HIV per 100,000 population by race/ethnicity, 2003-2014, San Francisco 45

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
White	123	122	117	111	109	89	89	88	75	85	83	80
African American	245	249	333	223	282	216	199	172	212	178	174	205
Latino	75	90	74	62	75	59	56	50	56	55	62	57
Other	15	19	18	24	16	10	12	14	15	9	19	11

Figure 5.3 Mortality rates among women diagnosed with HIV per 100,000 population by race/ethnicity, 2003-2014, San Francisco 45

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
White	7	4	6	11	8	8	5	2	2	5	6	3
African American	73	70	82	68	64	75	51	58	58	47	73	63
Latina	7	10	10	22	5	2	2	2	4	2	10	6
Other	2	2	2	2	2	1	2	6	1	1	1	1

Figure 5.5 Proportion of underlying causes of death for the most common cancers among persons diagnosed with HIV, 2004-2015, San Francisco 51

	2004-2007	2008-2011	2012-2015
Lung cancer (N=115)	3.3%	3.6%	3.8%
Liver cancer (N=61)	2.0%	1.9%	1.7%
Non-Hodgkin lymphoma (N=28)	0.8%	0.4%	1.4%
Anal cancer (N=21)	0.4%	0.7%	0.9%
Colon cancer (N=20)	0.5%	0.8%	0.5%
Pancreatic cancer (N=16)	0.5%	0.3%	0.7%

Figure 5.6 Number of multiple causes of death for AIDS-defining cancers among persons diagnosed with HIV, 2004-2015, San Francisco 51

	2004-2007	2008-2011	2012-2015
Non-Hodgkin lymphoma (N=175)	83	51	41
Kaposi sarcoma (N=80)	36	26	18
Cervical cancer (N=5)	3	2	0

Figure 6.1 Trends in health insurance status at time of HIV diagnosis by race/ethnicity, 2011-2016, San Francisco 52

White	2011	2012	2013	2014	2015	2016
Public	23%	15%	18%	17%	28%	28%
Private	41%	46%	48%	50%	43%	38%
None	21%	26%	26%	25%	18%	19%
Missing	15%	13%	8%	7%	10%	15%

African American	2011	2012	2013	2014	2015	2016
Public	45%	43%	48%	56%	53%	47%
Private	22%	24%	18%	19%	13%	24%
None	25%	20%	24%	13%	20%	24%
Missing	8%	13%	10%	13%	15%	6%

Latino	2011	2012	2013	2014	2015	2016
Public	32%	27%	19%	32%	24%	40%
Private	29%	27%	41%	30%	37%	32%
None	23%	37%	35%	30%	32%	19%
Missing	17%	8%	5%	8%	7%	10%

Other	2011	2012	2013	2014	2015	2016
Public	21%	25%	21%	23%	17%	25%
Private	40%	35%	37%	37%	32%	38%
None	25%	32%	25%	28%	32%	28%
Missing	15%	7%	16%	12%	19%	10%

Figure 7.1 Number of MSM newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco 55

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	262	240	228	210	193	198	210	161	119	92	73
African American	50	42	43	43	35	37	33	35	24	29	18
Latino	102	90	108	94	85	72	90	90	73	59	51
Asian/Pacific Islander	26	38	38	38	33	33	47	46	40	26	30
Other	18	24	21	21	20	16	16	15	12	10	5

Figure 7.3 Male rectal gonorrhea and male gonococcal proctitis among MSM by HIV serostatus, 2006-2016, San Francisco. 57

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Male Rectal Gonorrhea											
HIV+	230	231	192	172	173	228	299	326	298	386	417
HIV-	249	183	197	209	245	328	440	433	505	650	832
Male Gonococcal Proctitis											
HIV+	25	25	18	11	5	11	12	15	16	21	20
HIV-	16	9	17	16	13	13	12	18	22	20	49

Figure 7.4 Early syphilis among MSM by HIV serostatus, 2006-2016, San Francisco 58

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Primary (HIV+)	41	29	51	52	78	67	91	88	77	86	91
Secondary (HIV+)	85	76	125	112	137	144	191	162	148	145	127
Early Latent (HIV+)	105	85	135	138	177	199	264	301	328	337	290
Early syphilis (HIV+)	231	190	311	302	392	410	546	551	553	568	508
Primary (HIV-)	29	26	52	48	54	65	73	97	76	106	113
Secondary (HIV-)	48	41	59	69	65	54	87	78	96	82	112
Early Latent (HIV-)	35	40	50	53	62	55	63	113	128	166	162
Early syphilis (HIV-)	112	107	161	170	181	174	223	288	300	354	387

Figure 8.1 Number of non-MSM PWID newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco 60

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	15	21	17	10	18	12	4	11	11	10	8
African American	15	13	12	9	14	11	6	6	3	2	7
Latino	4	2	3	5	1	5	5	2	6	3	3
Other	3	4	2	1	4	0	4	2	2	3	3

Figure 8.2 Number of non-MSM PWID newly diagnosed with HIV by age group at HIV diagnosis, 2006-2016, San Francisco 61

Age in years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
18-24	2	1	1	1	3	2	1	2	0	0	2
25-29	4	7	6	3	1	4	0	1	4	5	3
30-39	6	11	8	3	10	1	3	1	4	5	7
40-49	13	13	11	6	12	10	10	9	5	4	4
50+	12	8	8	12	11	11	5	8	9	4	5

Figure 9.1 Number of heterosexuals newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco 63

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	8	7	6	4	6	9	7	3	2	3	3
African American	9	19	19	9	11	11	6	5	2	7	4
Latino	6	8	7	10	14	6	10	5	3	4	7
Other	3	9	3	3	6	2	3	3	2	4	0

Figure 10.1 Number of women newly diagnosed with HIV by race/ethnicity, 2006-2016, San Francisco. 65

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
White	14	18	15	8	12	14	4	8	7	9	8
African American	12	16	16	10	9	15	7	7	1	6	10
Latina	6	7	5	10	7	9	10	4	4	6	5
Other	4	7	4	2	8	3	2	3	1	5	2

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