



**2015
King County
Sexually Transmitted Diseases
Epidemiology Report**

**Public Health – Seattle and King County
2015 Sexually Transmitted Diseases Epidemiology Report**

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Executive Summary

The 2015 Sexually Transmitted Diseases Epidemiology report describes recent trends in chlamydial infection, gonorrhea, and early syphilis among King County residents. Left untreated, these infections may cause serious long-term health consequences. The information contained in this report will be useful to providers, policy-makers, researchers and others interested in reducing the transmission of sexually transmitted infections (STIs) in King County.

Key findings in the epidemiology of STIs in King County in 2015 include:

- **Rates of bacterial STI among men who have sex with men (MSM) dramatically increased in 2015**, and rates of syphilis and gonorrhea among MSM in King County are now at an all-time high. While some of the observed increase in STI rates likely reflect increased screening – particularly increased testing of asymptomatic persons for rectal and pharyngeal gonorrhea and chlamydial infections – the increase in urethral gonorrhea and symptomatic syphilis strongly suggests that a true increase in the rate of these infections is ongoing. The causes for this increase are uncertain, but likely include decreased condom use in an era of decreased HIV transmission. The rise in STI rates among MSM merit additional efforts to promote condoms as an effective prevention intervention for diverse STIs, as well as increased screening, particularly for syphilis and extragenital gonorrhea and chlamydial infection.

Recommendations:

- Public Health urges MSM and their medical providers to test regularly for syphilis.
- MSM should promptly seek medical evaluation for sores on the penis, mouth, or anus or for rash, and specifically ask to be tested for syphilis.
- HIV medical providers should test their MSM patients with any sexual activity outside of long-term mutually monogamous relationships for syphilis each time they draw blood.

- MSM and transgender persons who have sex with men with any of the following risks in the prior year should test for STIs (and HIV if not HIV-positive) every three months:
 - diagnosis of syphilis, gonorrhea or chlamydia,
 - methamphetamine or amyl nitrite (popper) use,
 - condomless anal sex with an HIV-positive or unknown status partner, or
 - ≥ 10 sex partners.

Additional information on local MSM STD screening and PrEP guidelines are available at:

<http://www.kingcounty.gov/healthservices/health/communicable/hiv/providers.aspx>

- **Gonorrhea rates increased among heterosexuals and the rate among women is at its highest rate since 2007.** The rate of gonorrhea among women in King County has been increasing steadily since 2012. This increase is ongoing throughout Washington State as well as other states in the western U.S. Medical providers are urged to:

- routinely test all sexually active women under the age of 25 annually for gonorrhea and chlamydial infection,
- rescreen all persons treated for gonorrhea 3 months after their initial infection, and
- ensure that all potentially exposed sex partners of persons with gonorrhea or chlamydial infection receive treatment.

Public Health and the WA State Department of Health make free partner treatment available for medical providers to use as expedited partner therapy (EPT). More information about EPT is available at:

<http://www.kingcounty.gov/healthservices/health/communicable/hiv/providers/ept.aspx>

- **Approximately 10% of gonorrhea cases in MSM in King County are caused by a microorganism that is relatively resistant to one of antibiotics commonly used to treat gonorrhea.** In 2015, 5% of cases of gonorrhea in MSM were caused by bacteria that were relatively resistant to azithromycin, and another 5% were caused by bacteria that were relatively resistant to cefixime. While not all of these bacteria were known to be truly resistant, they exceeded “alert values” set by the Centers for Disease Control and Prevention. Public Health has not identified any infections with alert values among women or men who have sex with women only.
 - Medical providers should treat gonorrhea, particularly gonorrhea in MSM, with ceftriaxone (an injectable drug) plus azithromycin.

Public Health and the WA State Department of Health were recently awarded a new 5-year grant to combat antimicrobial resistant gonorrhea in King County and are developing intensified interventions to limit the spread of this important public health threat.

- **Overall chlamydia incidence is stable, with the highest rates of reported infection observed among young women and MSM.**
- **Rates of all STDs continue to show marked racial and ethnic disparities.** The highest rates of infections among women and men who have sex with women only (MSW) are observed among non-Hispanic blacks, and the highest rates among MSM are observed among Latinos.
- **The Public Health STD Clinic remains a vital resource for residents and health care providers in King County, diagnosing a substantial proportion of all reportable STDs reported in King County in 2015.** In 2015, the STD clinic diagnosed 22% of all early syphilis cases, 18% of all gonorrhea cases, 15% of all HIV cases, and 7% of all chlamydial cases reported in King County. As in past years, the Public Health STD Clinic diagnosed more cases of HIV in 2015 than any other single clinical site in Washington State.²

- **Family planning clinics play a critical role in the control of chlamydial infection in King County.** As a group, family planning clinics diagnosed 1,414 (17%) of the total reported cases of chlamydial infections in King County. Public Health Family Planning Clinics diagnosed 4% of King County chlamydial infection cases in 2015.

¹ Incidence is a measure describing the number of new cases of disease in a specific population over a period of time. In King County, incidence of STIs is calculated by dividing the number of reported cases of an infection over the total King County population, and is usually expressed as a number of cases per 100,000 population per year.

² Some of the 42 cases of HIV diagnosed in the STD Clinic were not King County residents.

Data sources

King County morbidity data:

This report describes case numbers and rates of infection for three sexually transmitted infections in King County. These three infections (chlamydial infection, gonorrhea, and syphilis) are notifiable diseases in Washington State. Medical providers and laboratories are required by law to report all laboratory confirmed cases of these infections to Public Health – Seattle & King County (Public Health). The Public Health HIV/STD Program forwards these reports to the Washington State Department of Health. For this report, yearly infection totals are based on year of diagnosis, rather than year of report. The numbers contained in the chlamydial infection, gonorrhea, and syphilis sections of this report are for cases diagnosed from 1992-2015 and reported through March 7, 2016. Throughout this report, Hispanic/Latino ethnicity is treated as a separate racial group, and all other racial groups (White, Black, Native American (including Alaska Natives), and Asian/Pacific Islander (including Native Hawaiians)) are non-Hispanic.

Population data:

Incidence rates were calculated using population estimates provided by the Washington State Office of Financial Management for intercensal years and U.S. census data for 2010.

Overall population estimates used for MSM represent 5.7% of men ages 15 and older in King County per year, according to Behavioral Risk Factor Surveillance System (BRFSS) data collected in 2013 and 2014 in King County. This is comparable to estimates for the percent of the male population that is MSM from several population-based studies. Population estimates for HIV-positive and negative MSM were provided by the Public Health HIV/AIDS Epidemiology Unit from National HIV Surveillance System data.

Data limitations:

Notifiable disease data have several limitations. In some cases, considerable differences in numbers and rates of infection between subgroups are attributable in large part to screening and testing practices. For example, the rate of chlamydial infection in King County is substantially higher among women than men, reflecting national recommendations that young women be screened for chlamydia annually, and the absence of corresponding recommendations for young men.

While chlamydial infection, gonorrhea, and syphilis are all notifiable diseases in Washington State, these data are subject to under-reporting by physicians and laboratories. Additionally, because undiagnosed infections cannot be reported, infections which are frequently experienced with no symptoms, such as chlamydia, may exist at higher levels in the population than notifiable disease data indicate.

Men are stratified by gender of sex partners into men who have sex with men (MSM) and men who have sex with women only (MSW). In case report data, men whose provider indicated male sex partners on the case report, who reported sex with men in the last year during partner services interviews, or who were diagnosed with rectal gonorrhea or chlamydial infection were defined as MSM. Men without rectal infections who are missing data regarding gender of sex partners are assumed to be MSW except where indicated, which may result in misclassification of these men and underestimation of incidences among MSM. In 2015, 14%, 8%, and 1% of male cases of chlamydial infection, gonorrhea, and early syphilis were missing this information, respectively.

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Chlamydial Infection

Overview

In 2015, 8,533 cases of chlamydial infection were reported among King County residents, representing an overall reported incidence of 416 per 100,000 people (Table 1), a 10% increase over the incidence in 2014 (Table 3). In 2015, 4,757 cases were reported among women for a reported incidence of 463 per 100,000 women, and 3,776 cases were reported among men for a reported incidence of 368 per 100,000 men (Table 1). Incidence of reported chlamydial infection remains much higher among MSM (3,541 per 100,000) than among MSW (188 per 100,000) or women (553 per 100,000) ages 15 and older (Figure 3).

Age and gender

Among women, the incidence of chlamydial infection was highest among 20-24 year olds (2,738 per 100,000) followed by 15-19 year olds (1,874 per 100,000), while among men, reported incidence was highest among 20-24 year olds (1,421 per 100,000) followed by 25-29 year olds (1,018 per 100,000) (Table 2, Figure 2). Higher rates among women than men largely reflect differential screening practices in King County, whereby asymptomatic women are frequently screened for chlamydial infection and men are not.

The incidence of reported chlamydial infection among 15-29 year-old women in King County is substantially lower than that observed nationally or in the rest of Washington State (Figure 1). Trends in King County have also varied from those observed elsewhere in the state and nationally. Among women aged 15-29, reported incidence in King County rose between the mid-1990s and 2004, declined somewhat between 2004 and 2010 and has gradually increased since that time; over the last decade, the rate of

infection among women has varied by 12% or less. (Table 4, Figure 1). In contrast, the incidence of reported chlamydial infection among 15-29 year-old Washington State (excluding King County) women has been steadily rising since 2007.

The relative stability of chlamydial rates among women in King County obscures more nuanced trends in rates of infection. The incidence of chlamydial infection in women aged 20-24 and 25-29 is rising, while incidence among adolescent girls aged 15-19 is declining (Figure 2). The reason for this change is not certain, but may reflect a long term trend toward older age of sexual debut¹.

Race and ethnicity

Among women, reported incidence was highest among black women (1,551 per 100,000 women), followed by Latina women (917 per 100,000), Native American women (845 per 100,000), Asian/Pacific Islander (391 per 100,000), and white (303 per 100,000) women (Table 2). This pattern of disparity was also evident when analysis was restricted to women ages 15-29 (Figure 4). Among men, black men had the highest reported incidence of chlamydial infection (966 per 100,000 men), followed by Latino (589 per 100,000), Native American (567 per 100,000), white (322 per 100,000), and Asian/Pacific Islander (181 per 100,000) men (Table 2).

Men who have sex with men (MSM)

The number and incidence of cases of chlamydial infection reported among MSM has increased each year since 2008 (Figure 3). In 2015, 1,607 cases of chlamydial infection were reported among MSM for an incidence of 3,541

¹ Martinez G, Copen CE, Abma JC. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, 2006–2010 National Survey of Family Growth. National Center for Health Statistics. Vital Health Stat 23(31). 2011.

per 100,000 persons, up from 1,181 and 2,741 per 100,000 in 2010 and 2014, respectively.

The increase in reported chlamydial infections observed in MSM varied substantially by anatomic site of infection (Figures 5 and 6). Since 2010, the rate of reported rectal chlamydial infection among MSM has increased from 470 to 2,198 per 100,000, more than a 400% increase. Meanwhile, the rate of urethral infection increased from 748 to 1,002 per 100,000, a 34% increase. This dramatic difference in the trends likely reflects substantial changes in medical practice as rectal screening has become widespread.

As in the heterosexual population, chlamydia rates in MSM vary greatly by race/ethnicity (Figure 7). In 2015, Latino MSM had the highest rate of chlamydial infection (6,910 infections per 100,000 MSM), reflecting a dramatic, ongoing increase in the rate of infection in this population since 2011. Black MSM and white MSM had very similar rates (3,162 and 3,264 per 100,000, respectively), and Asian/Pacific Islanders had the lowest chlamydial infection rate of all MSM (1,721 per 100,000).

Medical venues diagnosing chlamydial infection

While local family planning clinics play an important role in the control of chlamydial infection in King County, diagnosing 17% overall and 21% of female cases in 2015, the majority of chlamydia infections (72% overall and 73% of female cases) were diagnosed by community providers outside a family planning, public health, or correctional setting.

Limitations of data

Public Health does not currently monitor the number of chlamydial tests performed in the population. Therefore, we cannot estimate the extent to

which changes in the number of cases reported reflect true changes in incidence vs. increased case detection or ascertainment due to changes in the number of tests performed, changes in the sensitivity of the tests employed, or more complete reporting of diagnosed cases. The increase observed in national reported chlamydial incidence from 1997 through 2004 is likely due, at least in part, to increased screening among women in states that did not previously have screening programs. Changes in testing technology may also have influenced trends in reported incidence. Locally, Public Health began pilot testing nucleic acid amplification tests (NAATs) for chlamydial infection in 1994; this more sensitive test may have resulted in increases in chlamydia diagnoses in the years following 1994. All Public Health clinics and sites participating in the Infertility Prevention Project (IPP), a national chlamydial testing program, were using NAATs by the end of 1999.

Table 1: Chlamydial Infection – Number of Reported Cases and Incidence, King County, WA, 2015

	Cases	Incidence per 100,000 population
Sex		
Women	4757	463
Men	3776	368
Total cases	8533	416

Table 2: Chlamydial Infection – Number of Reported Cases and Incidence among Men and Women by Age and Race/Ethnicity King County, WA, 2015

	Women (N=4757)		Men (N=3776)	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
Race/ethnicity*^				
White, Non-Latino	1494	303	1694	322
Black, Non-Latino	756	1551	532	966
Nat Am, Non-Latino	44	845	31	567
Asian/PI, Non-Latino	543	391	243	181
Latino	676	917	519	589
Other	71		34	
Multiple	105	286	66	177
Unknown	1068		657	
Age				
0-9 years	0	0	2	2
10-14 years	53	94	4	7
15-19 years	1,108	1,874	289	475
20-24 years	1,808	2,738	942	1,421
25-29 years	978	1,199	865	1,018
30-34 years	415	486	628	691
35-44 years	291	197	622	403
45-54 years	87	62	324	223
>=55 years	16	6	100	42

* Cases with unknown race and ethnicity were included in race/ethnicity-specific rates after being distributed among race/ethnicity categories based on the distribution of cases with known race/ethnicity. In 2015, 1,068 and 657 case reports were missing race and ethnicity among women and men, respectively.

^Race/ethnicity specific rates exclude cases reported with "multiple" or "other" races.

Table 3: Chlamydial Infection – Number of Reported Cases and Incidence among Men and Women, King County, WA, 1992-2015

Year	Women		Men		Total	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
1992	3,000	375	965	124	3,965	251
1993	2,563	316	813	102	3,376	210
1994	2,742	334	811	101	3,553	219
1995	2,410	291	802	98	3,212	196
1996	2,356	282	880	107	3,236	195
1997	2,247	266	903	108	3,150	188
1998	2,447	286	1,071	127	3,518	207
1999*	2,719	315	1,357	158	4,076	237
2000	3,388	388	1,653	191	5,041	290
2001	3,285	373	1,612	184	4,897	279
2002	3,483	390	1,750	198	5,233	294
2003	3,796	423	2,031	228	5,827	326
2004	4,108	455	2,061	230	6,172	343
2005	4,070	447	2,188	242	6,261	345
2006	3,956	428	2,016	219	5,974	324
2007	3,932	419	1,855	199	5,792	310
2008	4,013	424	2,059	218	6,072	321
2009	3,971	415	1,985	208	5,956	312
2010	3,962	409	2,088	217	6,050	313
2011	4,134	424	2,365	244	6,499	335
2012	4,157	424	2,741	281	6,898	352
2013	4,229	426	2,719	275	6,948	351
2014	4,439	439	3,168	315	7,607	377
2015	4,757	463	3,776	368	8,533	416

* Some PHSKC clinics began using NAATS testing for chlamydial infection in 1994, and all PHSKC clinics were using NAATs by 1999.

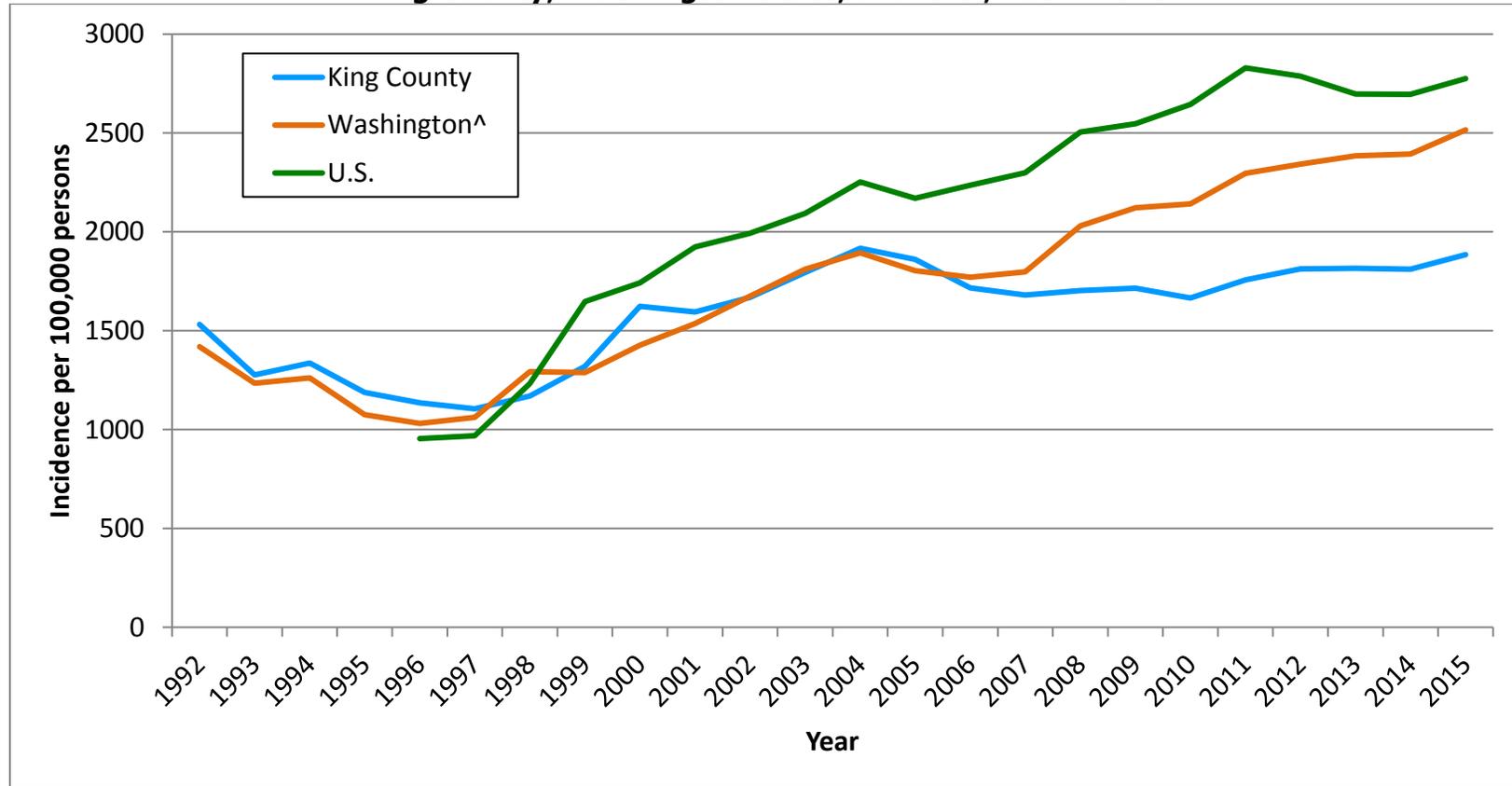
Table 4: Chlamydial Infection – Number of Reported Cases and Incidence among Men and Women Ages 15-29, King County, WA, 1992-2015

Year	Women, ages 15-29		Men, ages 15-29		Total, ages 15-29	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
1992	2,658	1,531	805	452	3,464	985
1993	2,212	1,276	695	390	2,908	827
1994	2,302	1,337	637	358	2,939	840
1995	2,051	1,188	642	359	2,693	766
1996	1,976	1,136	664	367	2,640	744
1997	1,942	1,105	644	353	2,586	722
1998	2,081	1,170	788	426	2,869	790
1999*	2,357	1,320	934	502	3,291	903
2000	2,918	1,624	1,154	617	4,071	1,110
2001	2,877	1,595	1,065	569	3,942	1,072
2002	3,050	1,669	1,215	642	4,265	1,146
2003	3,312	1,795	1,385	725	4,698	1,251
2004	3,589	1,917	1,349	696	4,938	1,296
2005	3,536	1,860	1,508	768	5,045	1,305
2006	3,359	1,716	1,297	642	4,656	1,171
2007	3,360	1,681	1,185	575	4,545	1,120
2008	3,448	1,704	1,374	659	4,822	1,173
2009	3,490	1,715	1,352	645	4,842	1,172
2010	3,341	1,666	1,322	637	4,663	1,143
2011	3,504	1,758	1,433	694	4,937	1,217
2012	3,514	1,813	1,658	829	5,172	1,313
2013	3,550	1,816	1,558	776	5,108	1,289
2014	3,644	1,812	1,856	898	5,499	1,349
2015	3,895	1,884	2,096	988	5,991	1,430

* Cases with unknown age were included in age-specific counts and rates after being distributed among age categories based on the distribution of cases with known age.

* Some PHSKC clinics began using NAAT testing for chlamydial infection in 1994, and all PHSKC clinics were using NAATs by 1999.

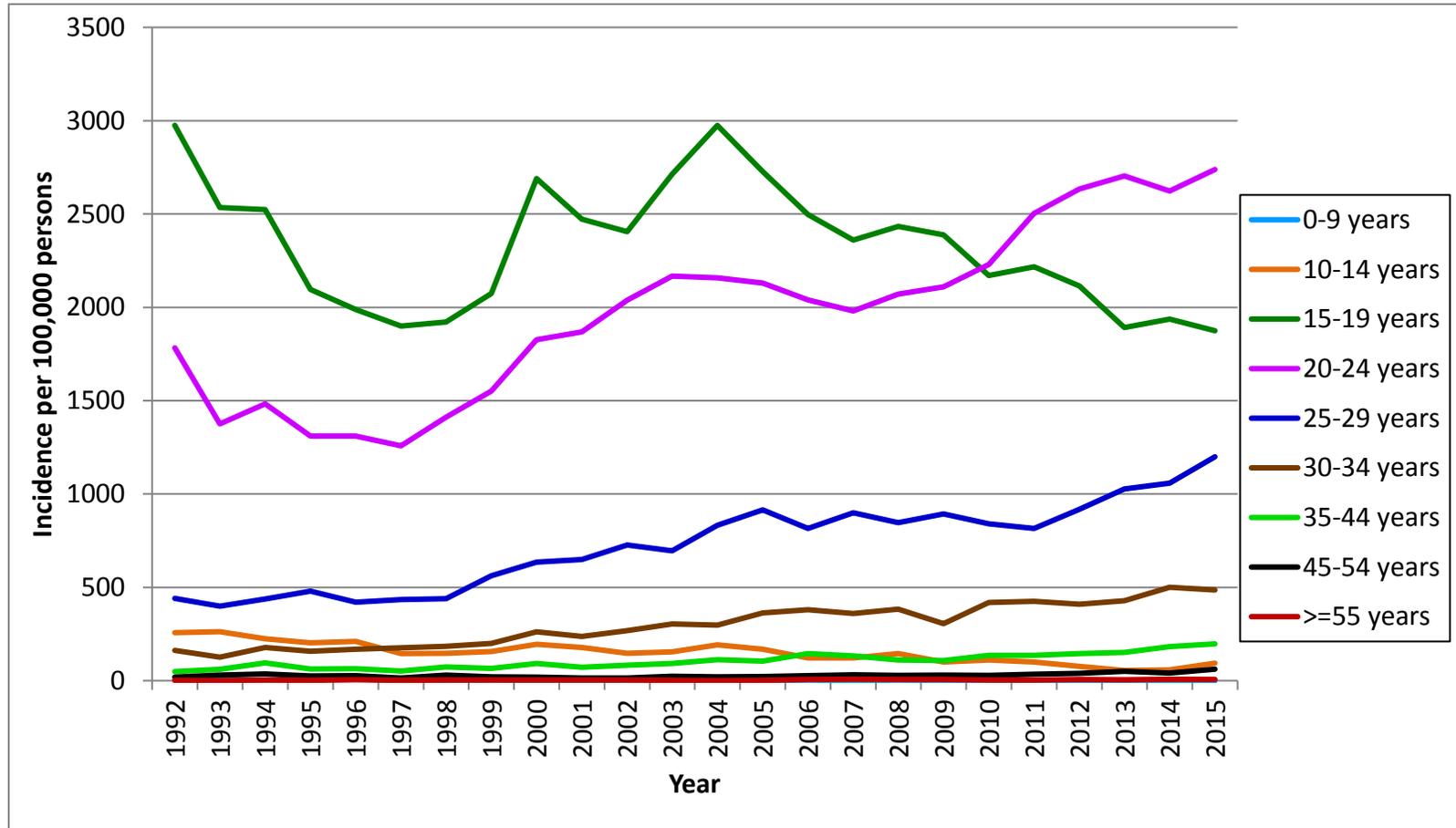
**Figure 1: Chlamydial Infection – Incidence among Women Ages 15-29*
King County, Washington State, and U.S., 1992-2015**



*Cases with unknown age were distributed according to annual age distributions among cases with known age and included in age-specific incidences.

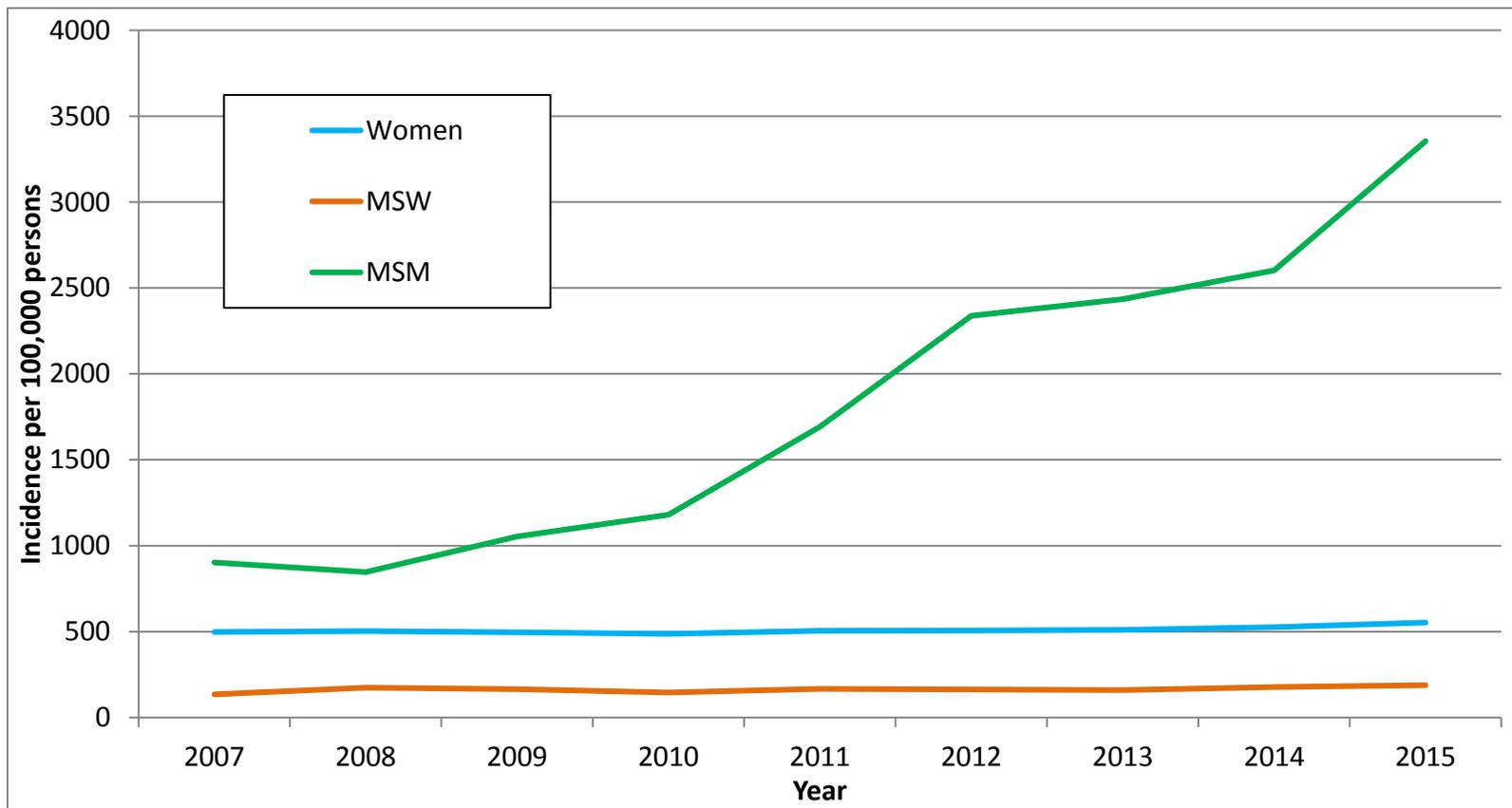
^Washington State rates exclude King County.

**Figure 2: Chlamydial Infection – Incidence among Women by Age
King County, WA, 1992-2015**

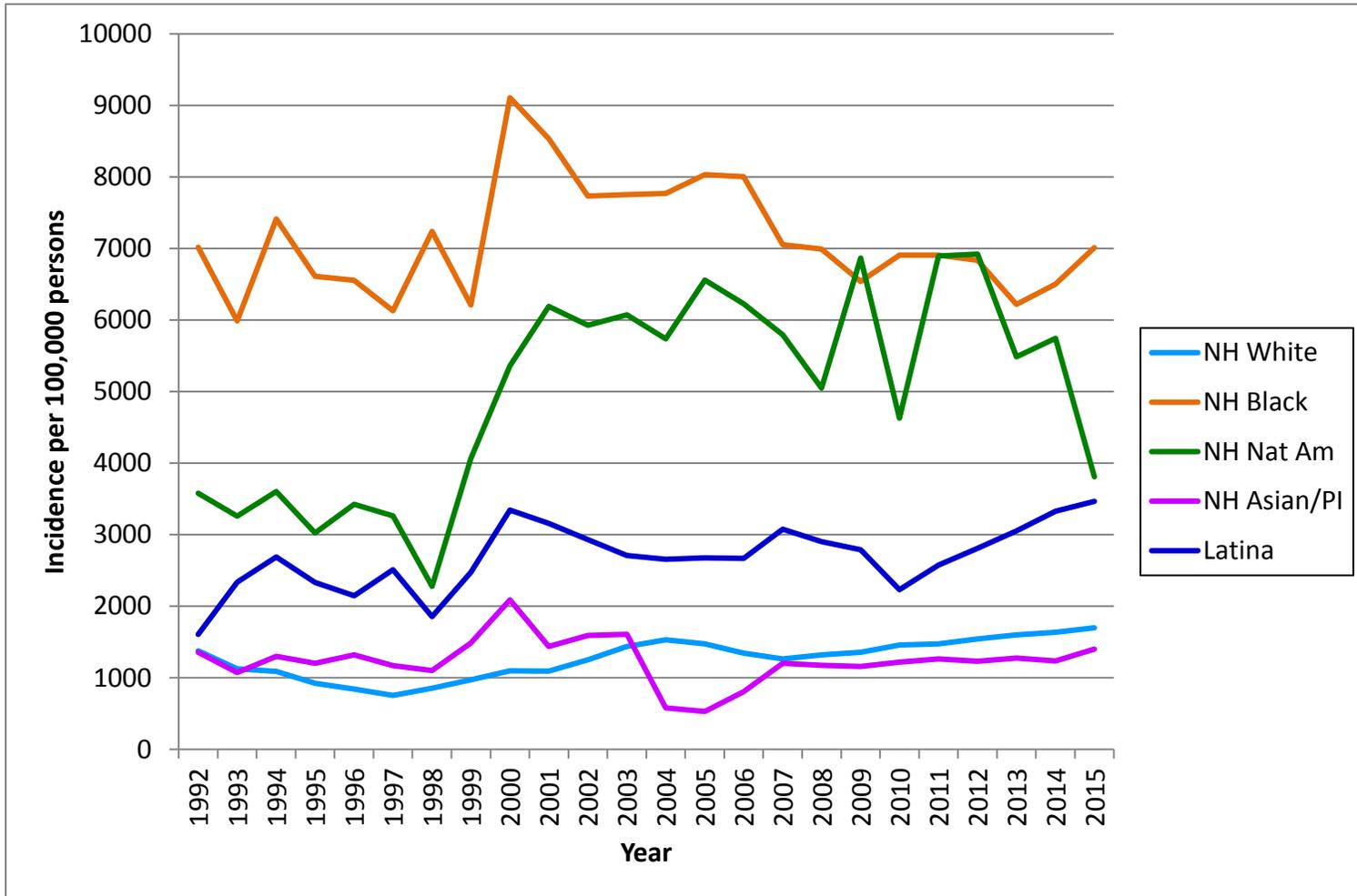


Cases with unknown age were distributed according to annual age distributions among cases with known age and included in age-specific incidences.

Figure 3: Chlamydial Infection – Incidence among Women, MSW, and MSM 15 years and older, King County, WA, 2007-2015



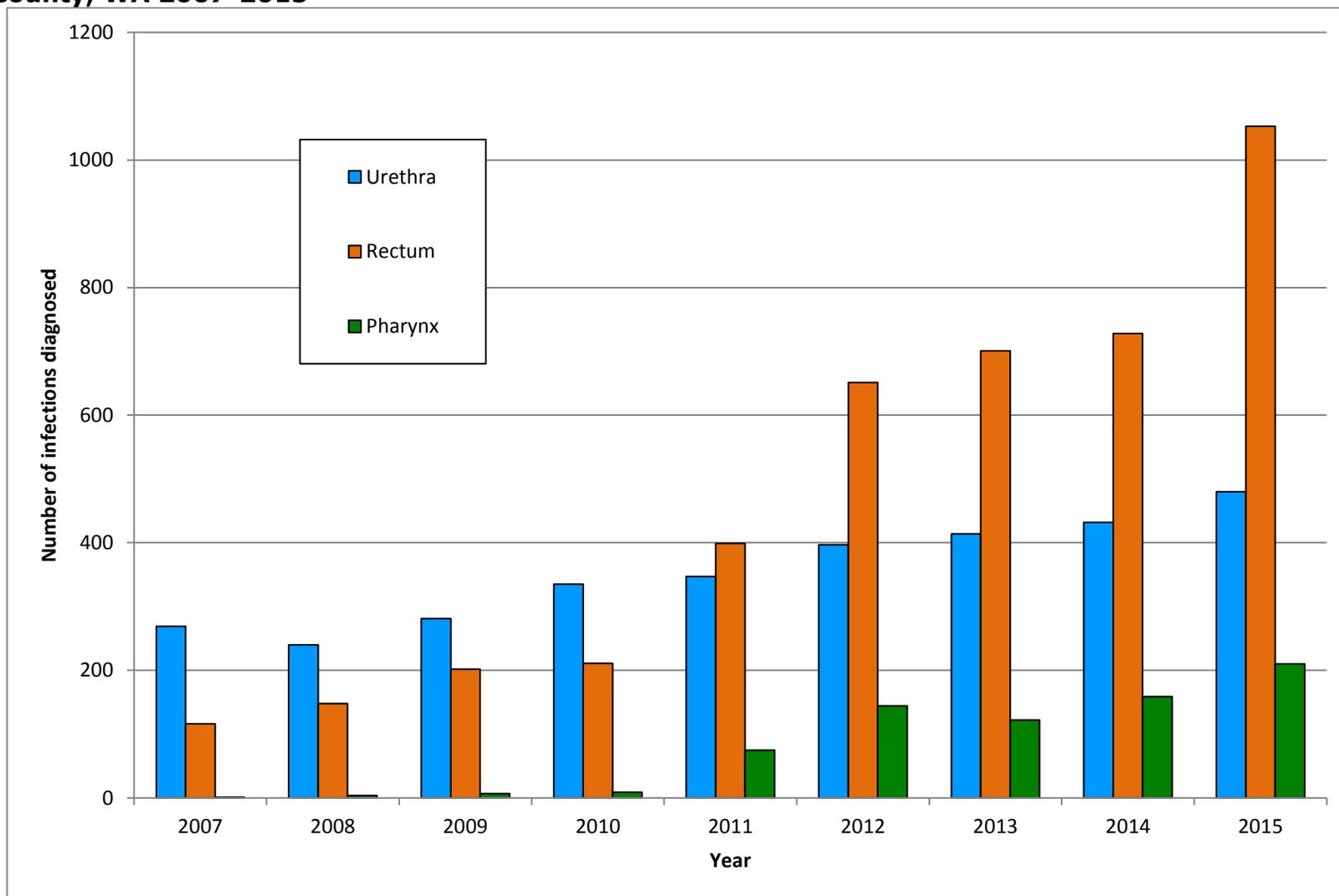
**Figure 4: Chlamydial Infection – Incidence among Women Ages 15-29 by Race and Ethnicity
King County, WA, 1992-2015**



NH = Non-Hispanic, PI = Pacific Islander

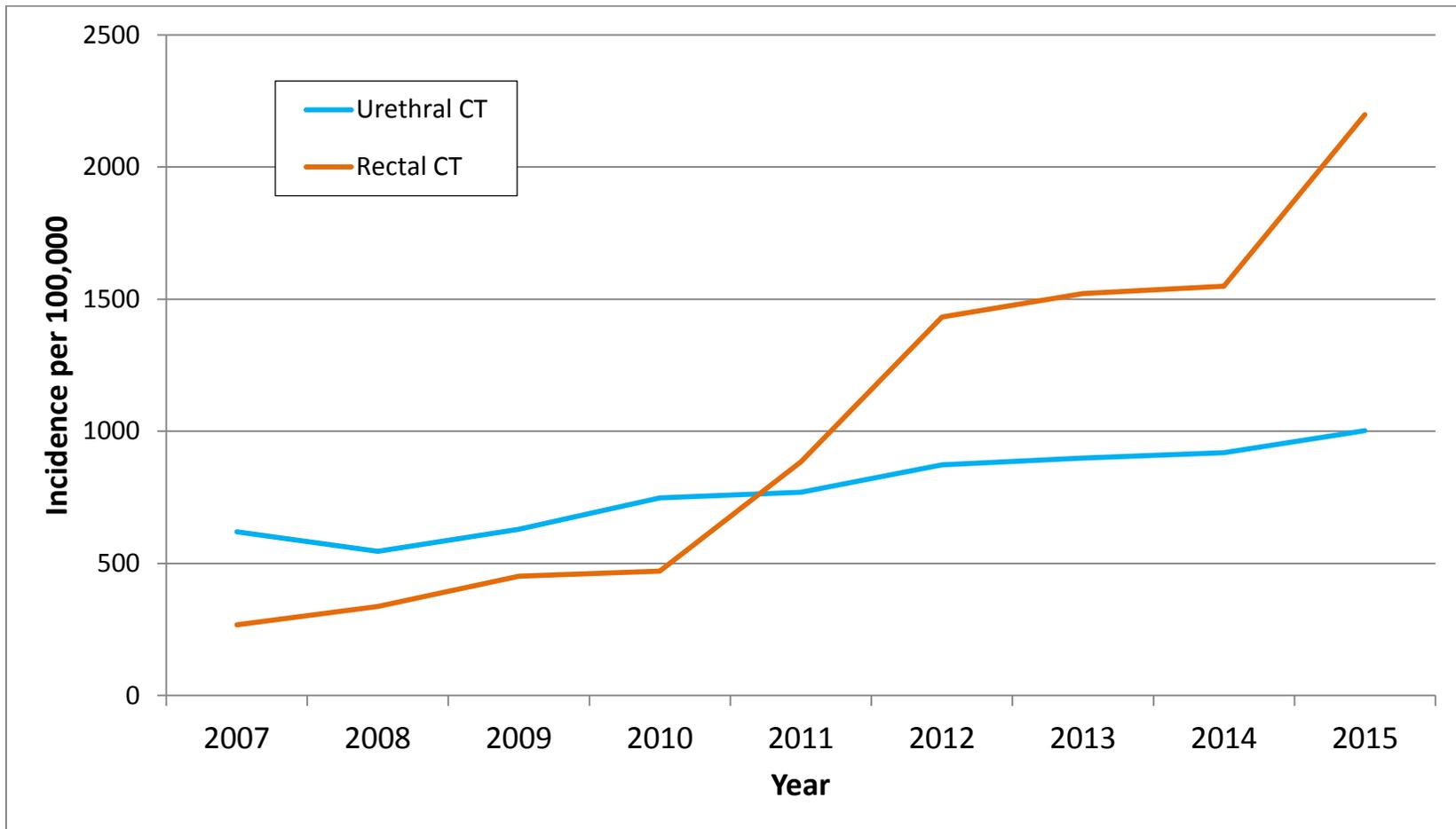
Cases with unknown race, ethnicity, and age were distributed according to annual race, ethnicity, and age distributions among cases with known race, ethnicity, and age and included in race/ethnicity-specific incidences.

Figure 5: Chlamydial Infection - Number of Reported Infections among MSM by Anatomic Site, King County, WA 2007-2015

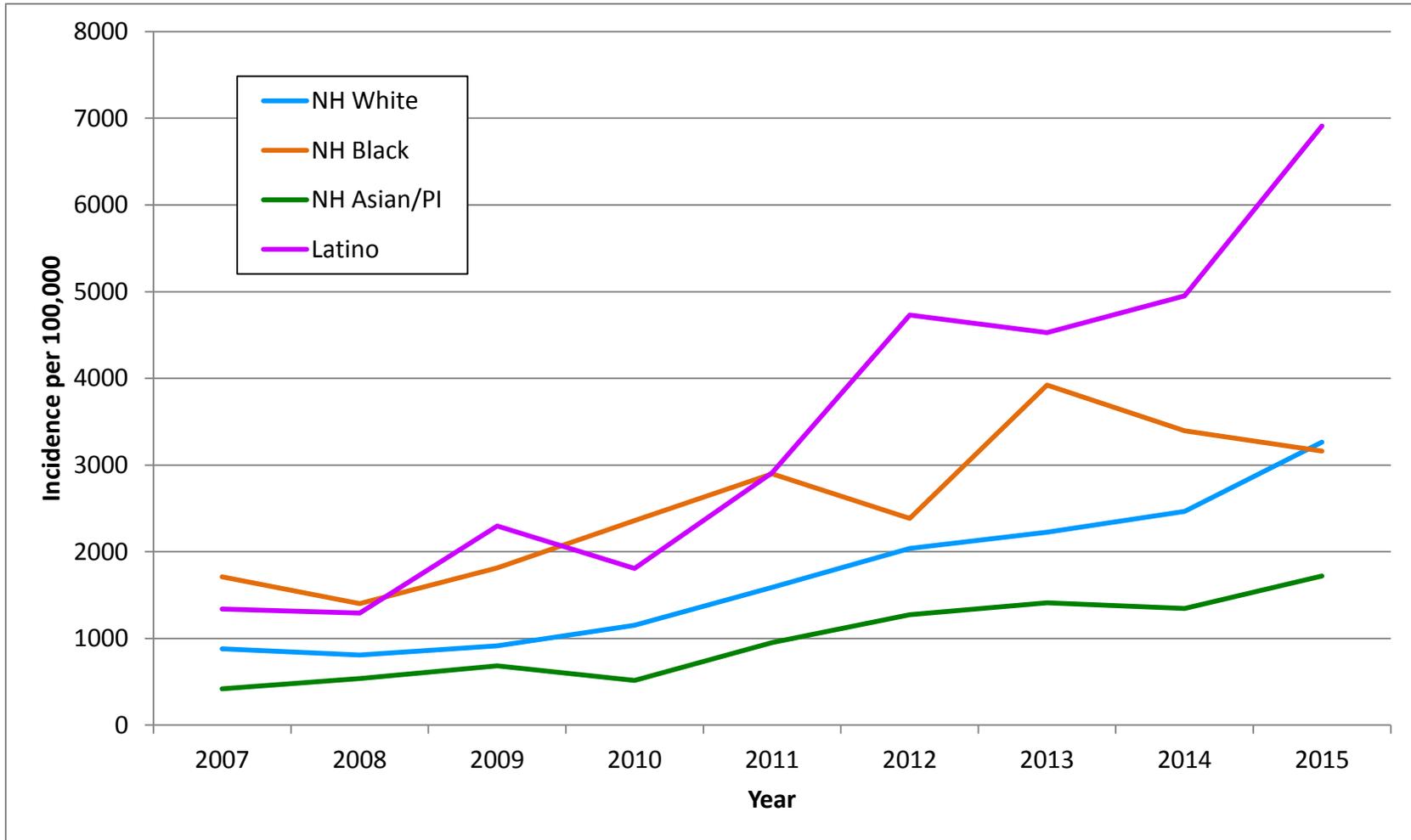


* In 2015, 10% of MSM diagnosed with CT were infected at more than one anatomic site.

Figure 6: Chlamydial Infection - Incidence among MSM by Anatomic Site, King County, WA, 2007-2015



**Figure 7: Chlamydia Infection - Incidence among MSM by Race and Ethnicity
King County, WA, 2007-2015**



NH = Non-Hispanic, PI = Pacific Islander

Cases with unknown race and ethnicity were distributed according to annual race and ethnicity distributions among cases with known race and ethnicity and included in race/ethnicity-specific incidences.

Gonorrhea

Overview

King County is experiencing increasing epidemics of gonorrhea among both heterosexuals and MSM. The increase in gonorrhea among women, which has now been ongoing since 2013, is part of a regional epidemic affecting heterosexuals in the western U.S., the cause of which is uncertain. The rise in gonorrhea rates is particularly marked among African Americans, the heterosexual population that has traditionally been most affected by gonorrhea. The epidemic among MSM reflects a broader international trend of rising rates of STDs among MSM, with increasing rates of reported infection reflecting a combination of increased screening and a true increase in infections.

In 2015, 2,984 cases of gonorrhea were reported among residents of King County, resulting in an overall incidence of 145 per 100,000 persons (Table 5), a 30% increase from 112 per 100,000 persons in 2014 (Table 7). Among women, 797 cases of gonorrhea were reported in 2015 for an incidence of 78 per 100,000. Among men, 2,187 cases were reported in 2015 (213 per 100,000). Gonorrhea incidence remains much higher among MSM (3,208 per 100,000) than among MSW (92 per 100,000) or women (94 per 100,000) ages 15 and older (Figure 8).

The rate of gonorrhea among women in King County and in Washington State has varied dramatically over time (Table 7). In 2006, the rate of gonorrhea among King County women was 104 per 100,000. It then declined sharply and stabilized between 31 to 43 cases per 100,000 between 2009 and 2012. Since that time, the rate of gonorrhea among women has risen steeply to 78 per 100,000 in 2015. A similar trend has affected other

states on the west coast of the U.S., though this trend is not apparent in national data.

Age and gender

The incidence of gonorrhea was highest in the 15-19 and 20-24 year age groups among women in 2015, while in men incidence was highest in the 20-24, 25-29, and 30-34 year-old age groups (Table 6). Among women, incidence increased sharply among 15-19, 20-24, and 25-29 year olds from 2012 to 2015 (Figure 10; Figures 10 and 11 include women only to better illustrate trends in gonorrhea among heterosexuals.)

Race and ethnicity

Gonorrhea rates vary substantially among different racial and ethnic groups. In 2015, Black and Native American women ages 15-29 experienced incidences of gonorrhea that were nine and seven times that observed in white women, respectively (Figure 11). The rate of gonorrhea in Latinas ages 15-29 was 53% higher than that observed in Whites. From 2000 to 2006, gonorrhea incidence in black women ages 15-29 in King County was, at times, 30% higher the US national rate (Figure 12), then from 2007 to 2013 the gonorrhea rate in young black King County women decreased and stabilized to levels approximately 50% below those observed nationally. Since 2014, however, gonorrhea in this group has sharply increased. The persistence of very large racial disparities in gonorrhea incidence represents a major challenge in King County and in the rest of the U.S. and is a critical area in need of additional clinical and public health intervention.

MSM

Gonorrhea diagnoses among MSM have increased steadily from 2008 to 2015, and reached an historical high of 3,208 per 100,000 in 2015 (Figure 8).

Trends in the number of reported gonorrhea cases among MSM vary by anatomic site (Figure 13). The number of reported infections at each anatomic site has steadily increased over the last 5 years, though the magnitude of that increase has varied somewhat by anatomic site, with the largest recent increase observed in rectal gonorrhea (from 484 in 2014 to 662 in 2015). Urethral gonorrhea is almost always a symptomatic infection. Thus, the observed increase in urethral gonorrhea (from 431 in 2014 to 513 in 2015) likely represents a true increase in the rate of gonorrhea and not simply an increase in diagnoses due to increased screening.

Like chlamydial infection rates, gonorrhea rates in MSM also vary greatly by race/ethnicity (Figure 15). In 2015, Latino MSM had the highest rate of gonorrhea infection (6,129 infections per 100,000 MSM). Black MSM had the next highest rate (4,026 per 100,000) followed by whites (2,965 per 100,000) and Asian/Pacific Islanders (1,206 per 100,000).

The PHSKC STD Clinic participates in the Gonococcal Isolate Surveillance Project (GISP) in which up to 25 men diagnosed with urethral gonorrhea each month have a specimen tested for resistance to antimicrobial drugs used for gonorrhea treatment. From 2009 to 2013, the proportion of tested specimens with alert values to azithromycin or oral third generation cephalosporins (i.e. cefixime) ranged from 0% to 3% (Figure 16). In 2014 and 2015, the proportion of specimens with alert values increased sharply, to 5% and 9%, respectively. In 2015, 78% of the 192 specimens that were

tested were from MSM, and MSM were the source of all 18 specimens with alert values (9 had an alert value for cephalosporin and 9 had an alert value for azithromycin) (Table 9). No isolate had an alert value to both azithromycin and cefixime.

Table 5: Gonorrhea – Number of Reported Cases and Incidence, King County, WA, 2015

	Cases	Incidence per 100,000 population
Sex		
Women	797	78
Men	2187	213
Total cases	2984	145

Table 6: Gonorrhea – Number of Reported Cases and Incidence among Men and Women by Age and Race/Ethnicity, King County, WA, 2015

	Women (N=797)		Men (N=2187)	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
Race/ethnicity* ^				
White, Non-Hispanic	260	49	1085	188
Black, Non-Hispanic	244	469	384	635
Nat Am, Non-Hispanic	17	306	20	333
Asian/PI, Non-Hispanic	26	18	114	77
Hispanic	66	84	317	327
Other	35		12	
Multiple	11	28	52	127
Unknown	138		203	
Age				
0-9 years	1	1	0	0
10-14 years	17	30	1	2
15-19 years	176	298	75	123
20-24 years	240	363	413	623
25-29 years	158	194	533	627
30-34 years	94	110	392	431
35-44 years	77	52	434	281
45-54 years	31	0	256	176
>=55 years	3	1	82	35

* Cases with unknown race and ethnicity were included in race/ethnicity-specific rates after being distributed among race/ethnicity categories based on the distribution of cases with known race/ethnicity. In 2015, 138 and 203 case reports were missing race and ethnicity among women and men, respectively.

^Race/ethnicity specific rates exclude cases reported with "other" races.

Table 7: Gonorrhea – Number of Reported Cases and Incidence among Men and Women, King County, WA, 1992-2015

Year	Women		Men		Total	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
1992	900	112.6	1052	134.8	1952	123.6
1993	649	80.0	878	110.5	1527	95.1
1994	543	66.2	675	83.9	1218	75.0
1995	516	62.3	762	93.6	1278	77.8
1996	354	42.4	559	67.9	913	55.0
1997	395	46.7	519	62.2	914	54.4
1998	324	37.9	655	77.4	979	57.5
1999	347	40.2	608	71.0	955	55.5
2000	583	66.8	894	103.4	1477	85.0
2001	727	82.5	1164	133.2	1891	107.7
2002	584	65.5	1197	135.2	1781	100.2
2003	528	58.9	1119	125.6	1647	92.1
2004	556	61.6	1021	113.7	1577	87.6
2005	788	86.6	1457	161.0	2245	123.7
2006	962	104.0	1506	163.6	2468	133.8
2007	559	59.6	865	92.6	1428	76.3
2008	497	52.5	833	88.2	1329	70.3
2009	295	30.9	820	86.0	1115	58.4
2010	417	43.0	1189	123.6	1606	83.2
2011	394	40.4	1012	104.6	1406	72.4
2012	333	33.9	1228	125.9	1560	79.7
2013	407	41.0	1396	141.3	1803	91.0
2014	589	58.3	1669	165.8	2258	111.9
2015	797	77.5	2187	213.4	2984	145.4

Table 8: Gonorrhea – Number of Reported Cases and Incidence among Men and Women Ages 15-29, King County, WA, 1992-2015

Year	Women, ages 15-29		Men, ages 15-29		Total, ages 15-29	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
1992	713	411	706	396	1419	403
1993	514	296	530	297	1044	297
1994	451	262	421	237	872	249
1995	420	243	422	236	842	240
1996	287	165	302	167	589	166
1997	325	185	258	141	583	163
1998	262	147	334	180	596	164
1999	286	160	317	171	603	166
2000	436	243	378	202	815	222
2001	552	306	549	293	1101	300
2002	466	255	557	294	1023	275
2003	392	212	464	243	856	228
2004	444	237	419	216	864	227
2005	630	332	648	330	1278	331
2006	716	366	699	346	1416	356
2007	433	216	426	207	859	212
2008	379	187	413	198	792	193
2009	238	117	416	199	654	158
2010	291	145	481	232	772	189
2011	305	153	476	231	781	193
2012	256	132	557	279	813	207
2013	315	161	628	313	943	238
2014	443	220	820	397	1263	310
2015	574	278	1021	482	1595	381

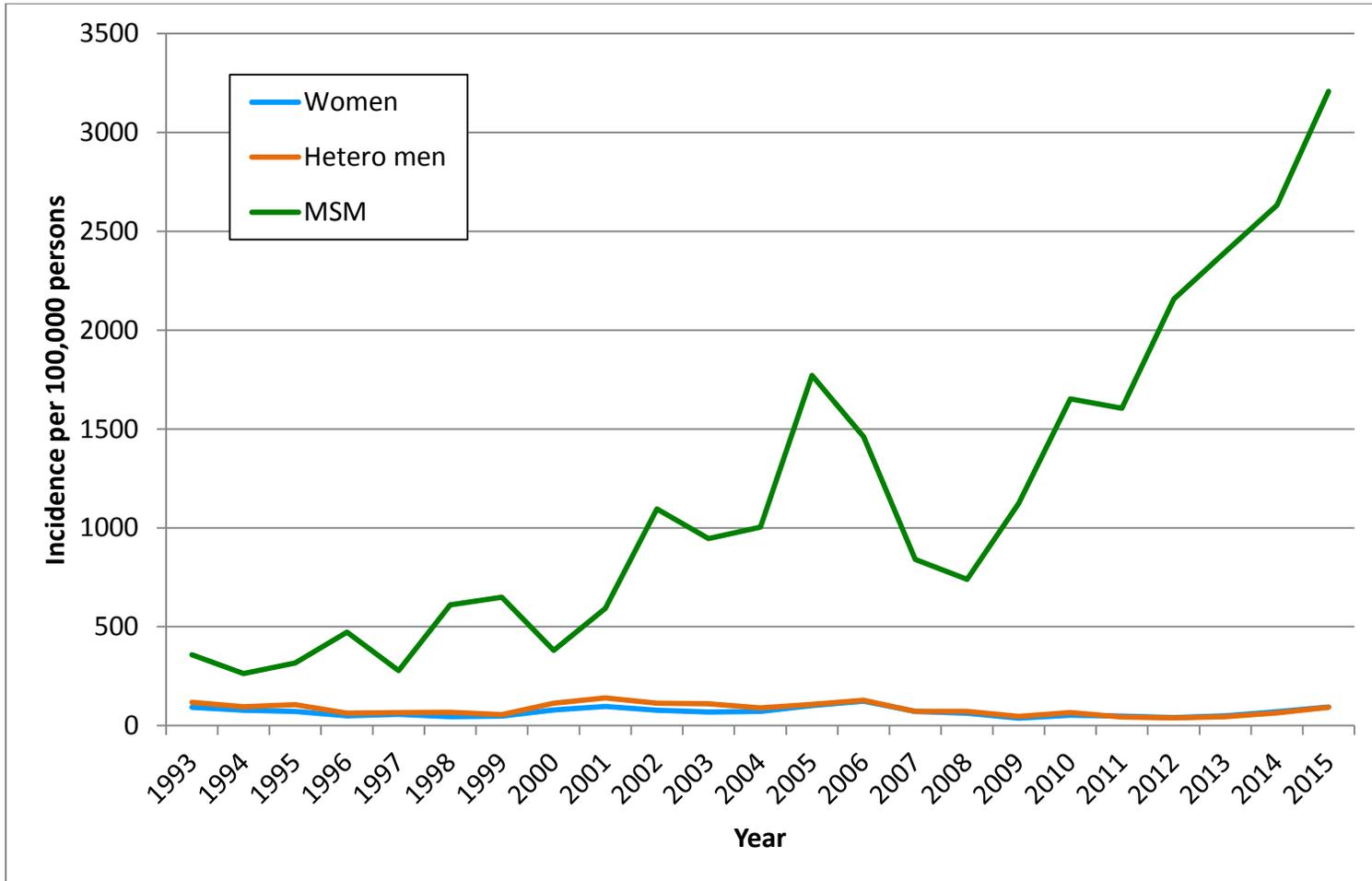
* Cases with unknown age were included in age-specific counts and rates after being distributed among age categories based on the distribution of cases with known age.

Table 9: Gonorrhea - Male GISP Urethral Isolates with Alert Values for Cephalosporins or Azithromycin, King County, WA 2015

	# urethral isolates tested	# urethral isolates w/alert values for cephalosporin*	# urethral isolates w/alert values for azithromycin*	Total # with alert values
MSM	149	9 (6%)	9 (6%)	18 (12%)
MSW	43	0	0	0
Total	192	9 (5%)	9 (5%)	18 (9%)

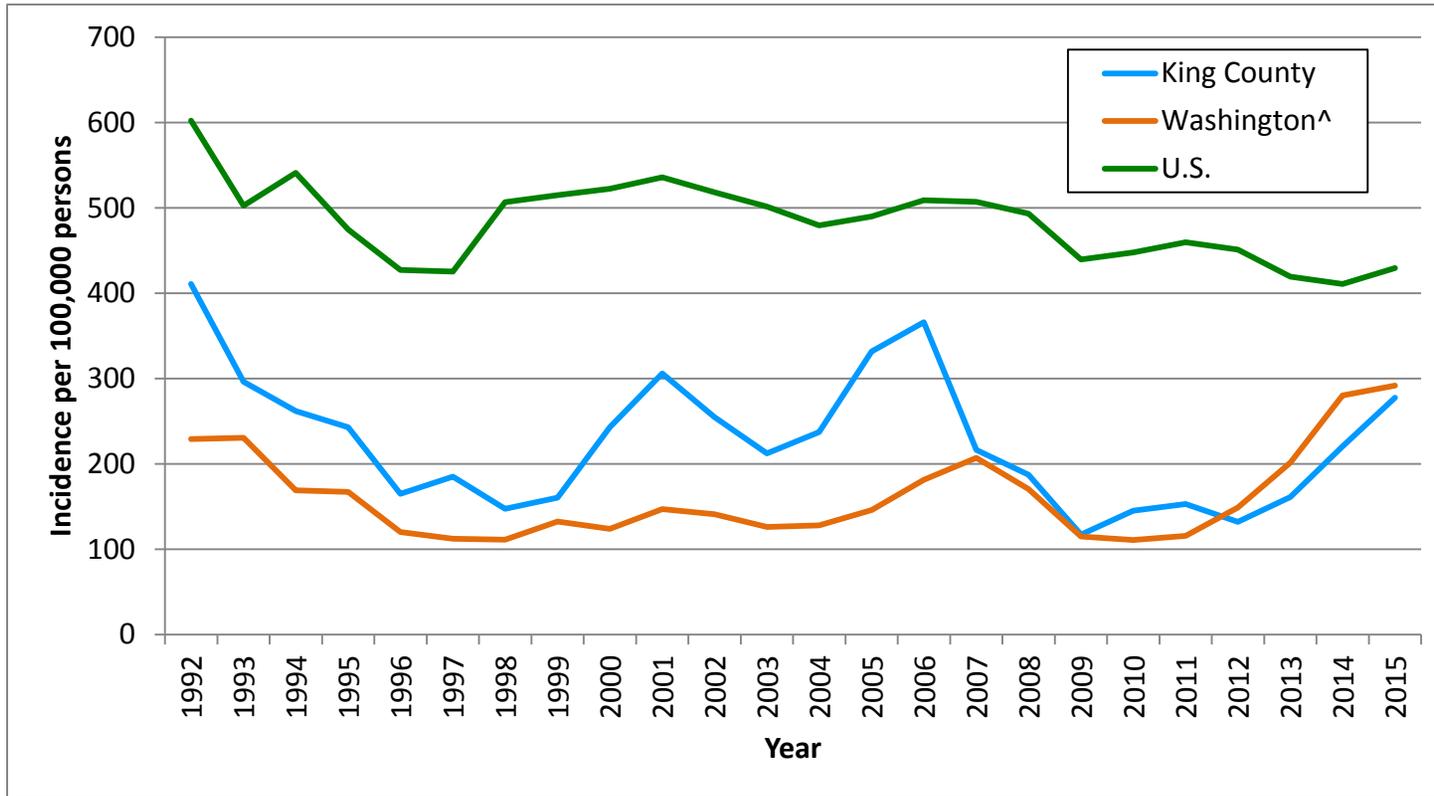
*Alert value for azithromycin $\geq 2.0\mu\text{g/ml}$. Alert value cefixime $\geq 0.25\mu\text{g/ml}$

**Figure 8: Gonorrhea – Incidence among Women, MSW, and MSM
15 years and older, King County, WA, 1993-2015**



In 2004, a field for gender of sex partners was added to the STD case report form. Before 2004, ascertainment of MSM status was likely less complete than in 2004 and after.

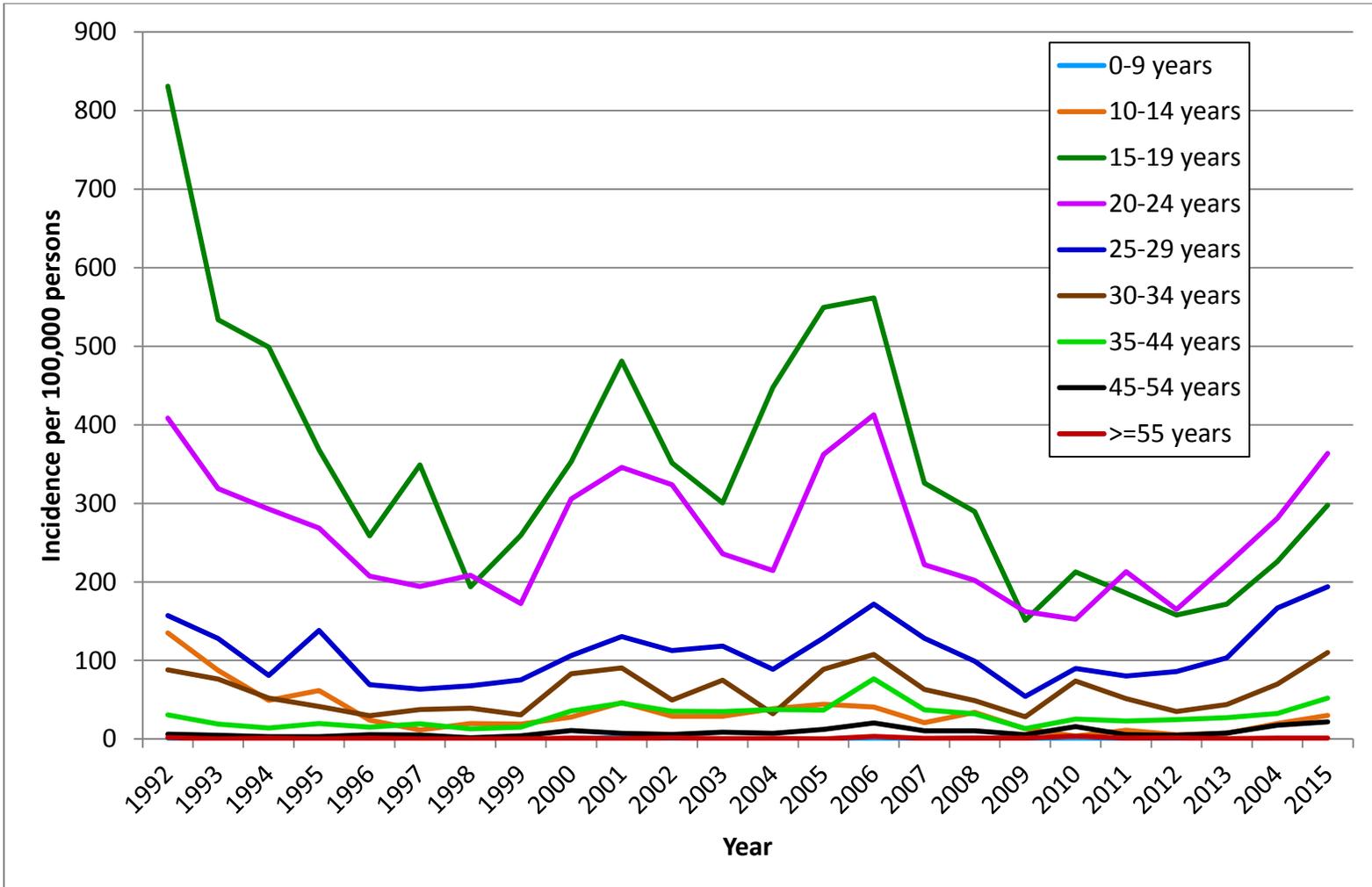
**Figure 9: Gonorrhea – Incidence among Women Ages 15-29
King County, Washington State, and U.S., 1992-2015**



Cases with unknown age were distributed according to annual age distributions among cases with known age and included in age-specific incidences.

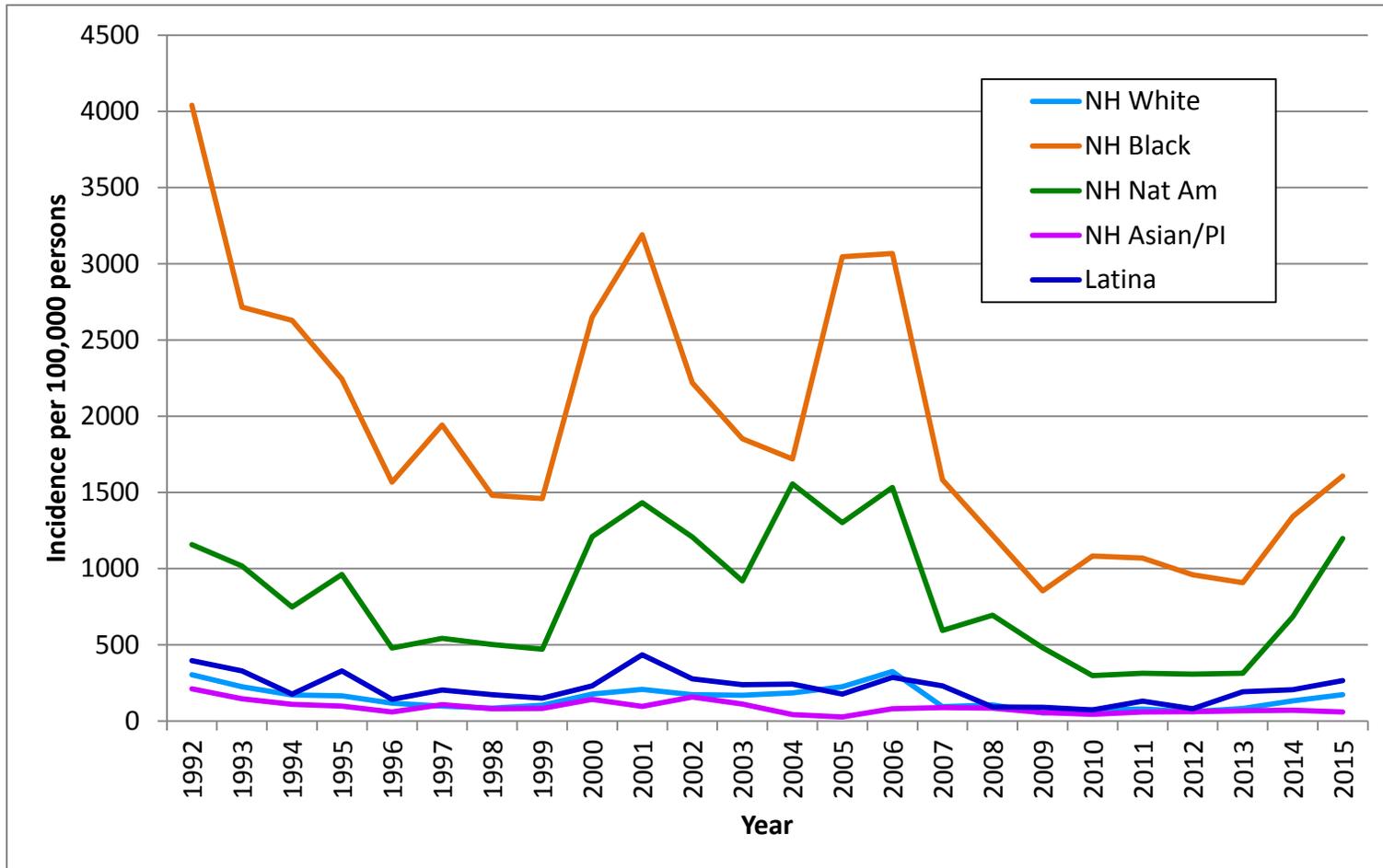
^ Washington State rates exclude King County.

**Figure 10: Gonorrhea – Incidence among Women by Age
King County, WA, 1992-2015**



Cases with unknown age were distributed according to annual age distributions among cases with known age and included in age-specific incidences.

Figure 11: Gonorrhea – Incidence among Women Ages 15-29 by Race and Ethnicity, King County, WA, 1992-2015



NH = Non-Hispanic, PI = Pacific Islander

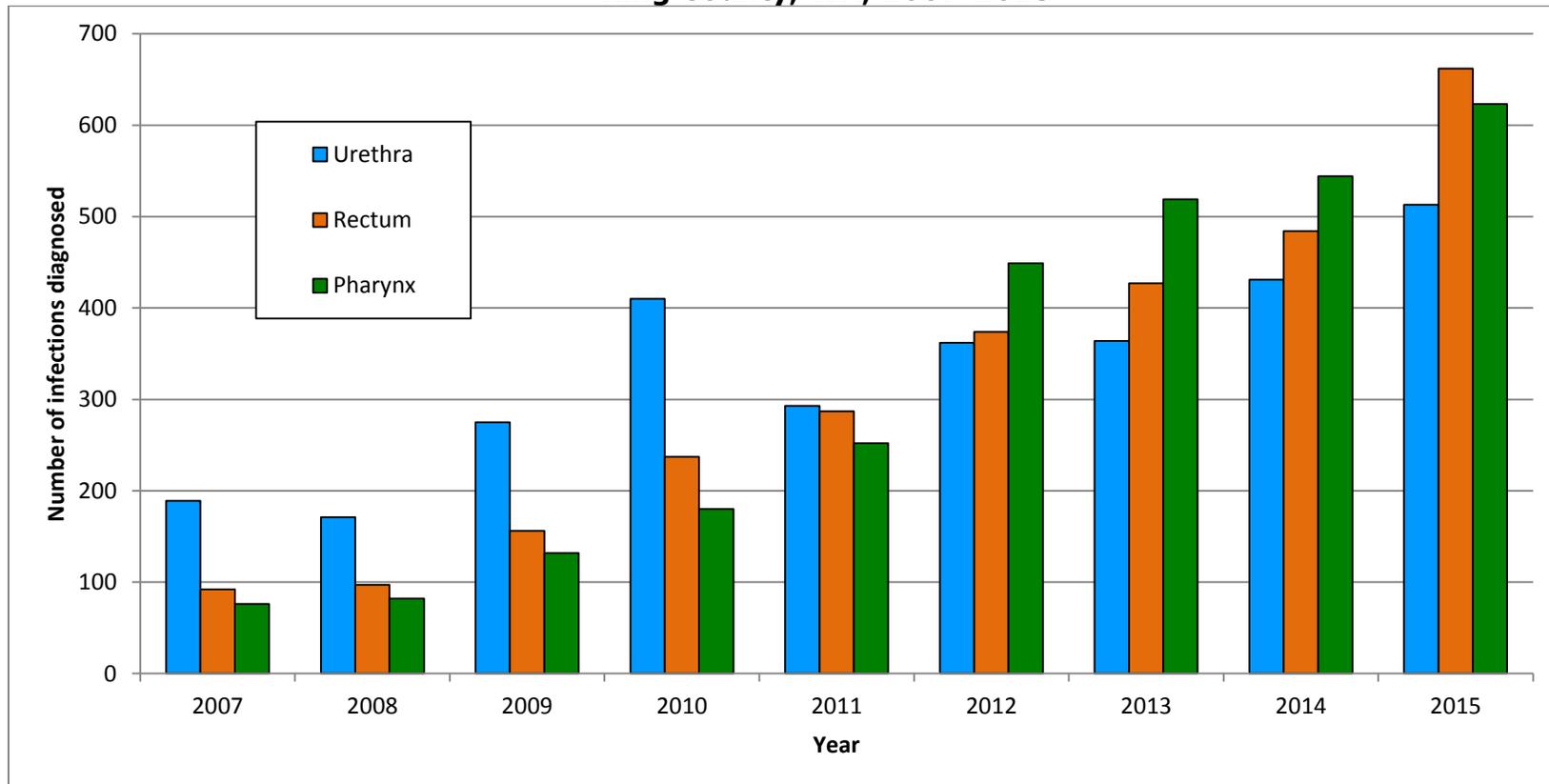
Cases with unknown race, ethnicity, and age were distributed according to annual race, ethnicity, and age distributions among cases with known race, ethnicity, and age and included in race/ethnicity-specific incidences.

Figure 12: Gonorrhea - Incidence among Black Women Ages 15-29, King County and US, 1996-2015



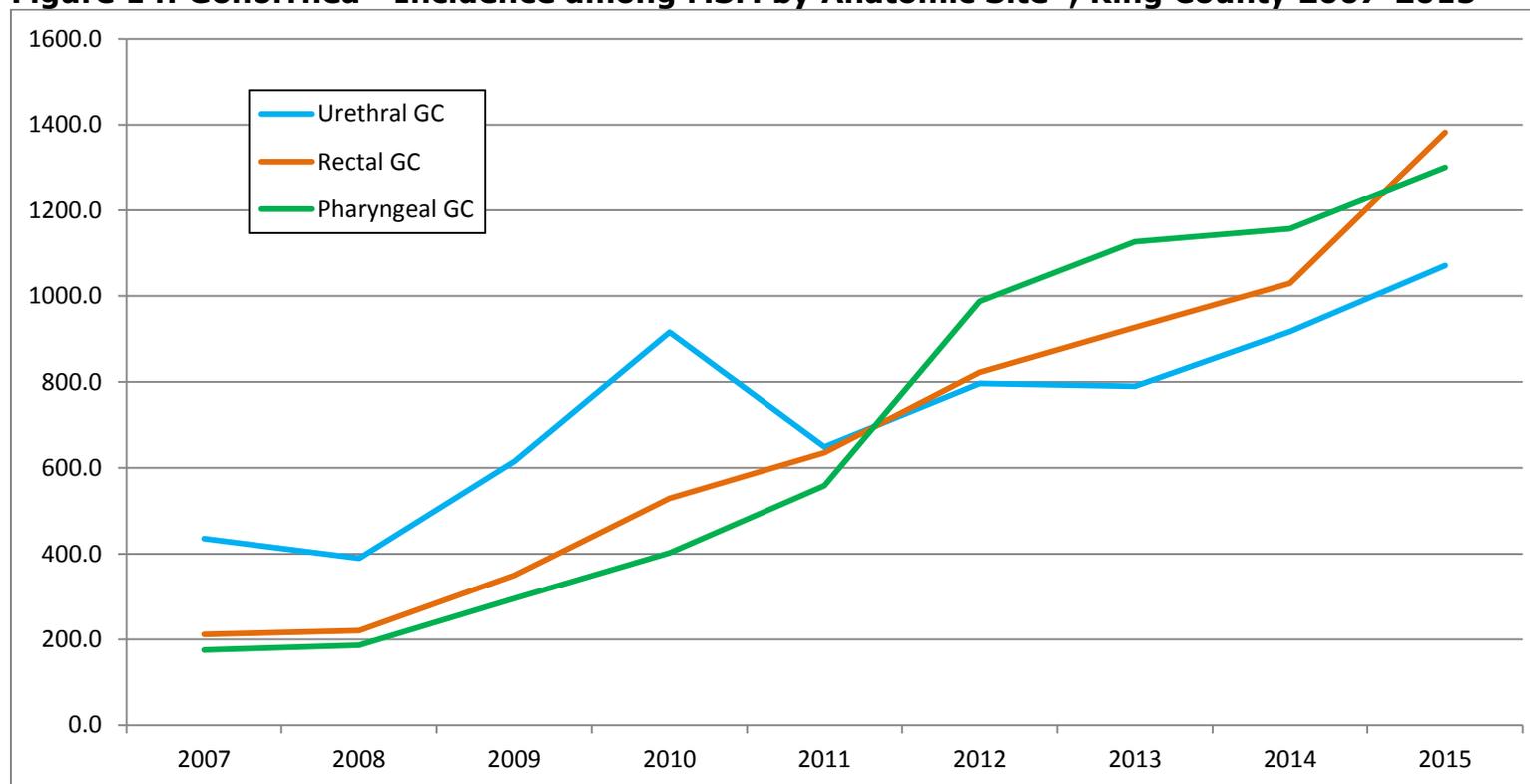
Cases with unknown race, ethnicity, and age were distributed according to annual race, ethnicity, and age distributions among cases with known race, ethnicity, and age and included in race/ethnicity-specific incidences.

**Figure 13: Gonorrhea – Number of Reported Infections among MSM by Anatomic Site*
King County, WA, 2007-2015**



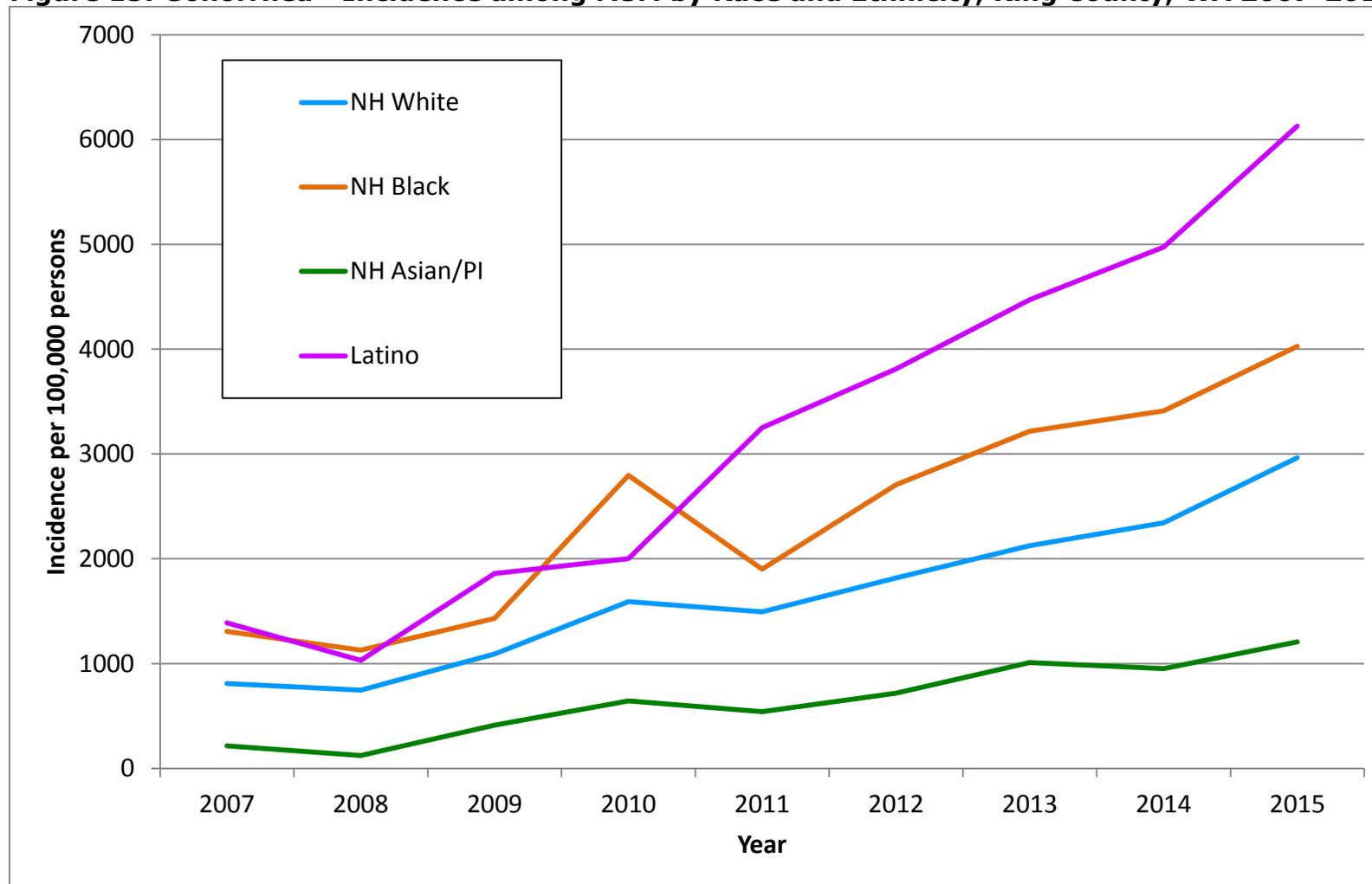
*In 2015, 22% of MSM diagnosed with GC were infected at more than one anatomic site.

Figure 14: Gonorrhea - Incidence among MSM by Anatomic Site*, King County 2007-2015



*In 2015, 22% of MSM diagnosed with GC were infected at more than one anatomic site.

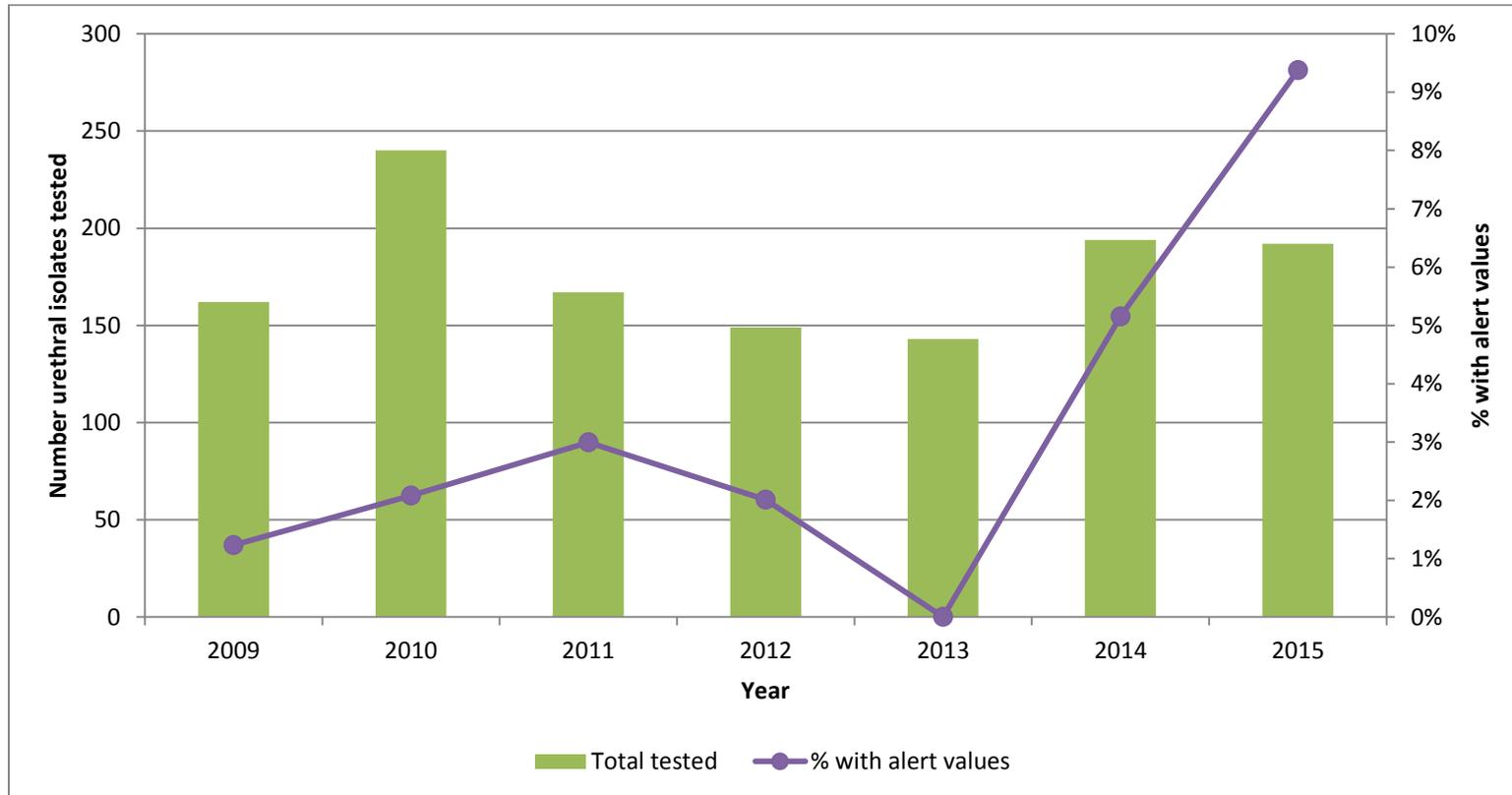
Figure 15: Gonorrhea - Incidence among MSM by Race and Ethnicity, King County, WA 2007-2015



NH = Non-Hispanic, PI = Pacific Islander

Cases with unknown race and ethnicity were distributed according to annual race and ethnicity distributions among cases with known race and ethnicity and included in race/ethnicity-specific incidences.

Figure 16: Percentage of Male GISP Urethral Isolates with Alert Values for Cephalosporins or Azithromycin, King County, 2009-2015



Syphilis

Overview

King County has experienced an epidemic of syphilis among MSM since 1997 (Figure 8). In 2015, the total number of early syphilis (primary, secondary, and early latent) cases reported in King County reached a new historical high of 444 cases (Tables 10 and 12), for an overall incidence of 22 per 100,000 persons (Table 10). Over 90% of all syphilis cases in 2015 occurred in MSM, with only 7 cases occurring in women. The recent rise in syphilis among MSM appears to reflect a combination of increased ascertainment of asymptomatic infections resulting from increased screening, and a true increase in syphilis rates associated with an extension of the epidemic into populations of MSM who have traditionally been at lower risk for syphilis.

MSM

Of all 2015 cases, 92% (409) occurred in MSM (Table 11, Figure 18). The incidence of early syphilis among MSM in 2015 was 644 times greater (901 per 100,000) than among MSW (1.4 per 100,000) (Table 13). Rates of syphilis among MSM having been increasing since 1997, but the pattern of increase has been somewhat inconsistent, with interspersed periods of rapid increase, plateauing of rates and declines (Figure 18). Most recently, the rate of early syphilis in MSM reached a peak in 2011 (339 per 100,000), then decreased for three consecutive years to a rate of 260 per 100,000 in 2014, and then rose dramatically to 409 per 100,000 in 2015.

Racial and ethnic differences among early syphilis MSM cases are similar to those observed with chlamydial infections and gonorrhea. The number of early syphilis cases diagnosed in Latino MSM doubled from 2014 to 2015, and this group had the highest incidence of early syphilis (2,028 per

100,000) of all MSM in 2015 (Figure 19). Black MSM had the second highest incidence in 2015 (1,097 per 100,000) followed by whites and Asian/Pacific Islanders (783 and 364 per 100,000, respectively).

At least in part, the recent rise in syphilis among MSM appears to reflect an extension of the epidemic into a population of MSM that have traditionally been at lower risk for infection. Throughout the ongoing epidemic, syphilis has disproportionately affected HIV-positive MSM, with the majority of all cases occurring in the approximately 11% of King County MSM who are living with HIV (Figure 21). In 2015, the estimated incidence of early syphilis among HIV-positive MSM was 7.6 times higher than in HIV-negative MSM (3,464 vs. 453 per 100,000). However, syphilis is increasingly affecting HIV-negative MSM. For the first time in 2015, the majority of early syphilis cases did not occur in MSM living with HIV. In 2015, 45% of MSM diagnosed with syphilis were known to be HIV infected and 47% were HIV-uninfected (Figure 20).

Heterosexuals

Early syphilis incidence among heterosexuals remained very low in 2015. Only 18 of 444 cases occurred among MSW (11 cases) and women (7 cases) (Tables 11-13). None of the women or MSW reported with syphilis in 2015 were known to be HIV-infected. One case of congenital syphilis was diagnosed in King County in 2015.

Stage of infection and reason for diagnosis

In 2015, 56% of all syphilis cases in MSM had primary or secondary syphilis (Table 11, Figure 17), and 48% sought medical care because of symptoms (Table 11, Figure 22). While the majority of early syphilis cases in King County have traditionally sought medical care because of symptoms of

primary or secondary infection, the percentage of persons diagnosed through routine testing and because of a sex partner's diagnosis has increased over the last several years. In 2015, 33% of cases were diagnosed through asymptomatic screening and 14% because of a sex partner's syphilis diagnosis. Data suggest that increased ascertainment of asymptomatic infections is an important factor contributing to the overall increase in the syphilis rate among MSM. The number of symptomatic cases diagnosed among MSM has varied over time without a clear recent trend. In 2015, clinicians in King County diagnosed 198 symptomatic MSM with early syphilis, an increase from 127 such diagnoses in 2014, but similar to that observed in 2012 (n=180) and lower than in 2011 (n=227).

Public Health recommends that MSM at elevated risk for syphilis test for STIs, including syphilis, every three months and that medical providers test HIV-positive MSM for syphilis each time they draw their blood. (Such testing is not needed in men who are not sexually active or who are in long-term mutually monogamous relationships.)

Many types of providers in King County are diagnosing early syphilis (Figure 23). In 2015, as in past years, the Public Health STD Clinic was the largest single source of care for persons with early syphilis, accounting for 23% of all diagnoses. As a group, HIV care providers reported 34% in 2015, while "Other" (typically private practice) providers diagnosed 28% of cases. Family planning clinics, community clinics, county jails, community-based organizations, and other public health clinics accounted for 15% of cases in 2015.

**Table 10: Early Syphilis – Reported Cases and Incidence
King County, WA, 2015**

	Cases	Percent	Incidence per 100,000 population
Sex			
Men	437	98%	43
Women	7	2%	0.7
Total cases	444		22

**Table 11: Early Syphilis – Stage of Infection, HIV Status, and
Reason for Testing by Sexual Orientation, King County, WA, 2015**

	MSM* (N=409)		MSW and Women (N=18)	
	Number	Percent	Number	Percent
Stage of Infection				
Primary	96	23%	6	33%
Secondary	135	33%	8	44%
Early latent	178	44%	4	22%
HIV Status				
Positive	154	38%	0	0%
Negative	184	45%	12	67%
Unknown	71	17%	6	33%
Reason for Visit				
Routine exam	137	33%	2	11%
Symptoms	198	48%	13	72%
Known exposure	56	14%	3	17%
None/other	18	4%	0	0%

*MSM: all men who acknowledged sex with a man. These data exclude 17 men for whom gender of sex partners is unknown.

Table 12: Early Syphilis – Number of Reported Cases and Incidence among Men and Women, King County, WA, 1992-2015

Year	Women		Men		Total	
	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population	Cases	Incidence per 100,000 population
1992	26	3.3	42	5.4	68	4.3
1993	21	2.6	15	1.9	36	2.2
1994	6	0.7	12	1.5	18	1.1
1995	1	0.1	4	0.5	5	0.3
1996	0	0.0	2	0.2	2	0.1
1997	10	1.2	10	1.2	20	1.2
1998	1	0.1	37	4.4	38	2.2
1999	3	0.3	67	7.8	70	4.1
2000	4	0.5	67	7.8	71	4.1
2001	1	0.1	51	5.8	52	3.0
2002	0	0.0	64	7.2	64	3.6
2003	2	0.2	80	9.0	82	4.6
2004	7	0.8	159	17.7	166	9.2
2005	7	0.8	186	20.6	193	10.6
2006	2	0.2	183	19.9	185	10.0
2007	1	0.1	200	21.4	201	10.7
2008	4	0.4	203	21.5	207	10.9
2009	6	0.6	153	16.1	159	8.3
2010	4	0.4	291	30.2	295	15.3
2011	5	0.5	366	37.8	371	19.1
2012	6	0.6	339	34.8	345	17.6
2013	11	1.1	320	32.4	331	16.7
2014	13	1.3	281	27.4	294	14.3
2015	7	0.7	437	42.6	444	21.6

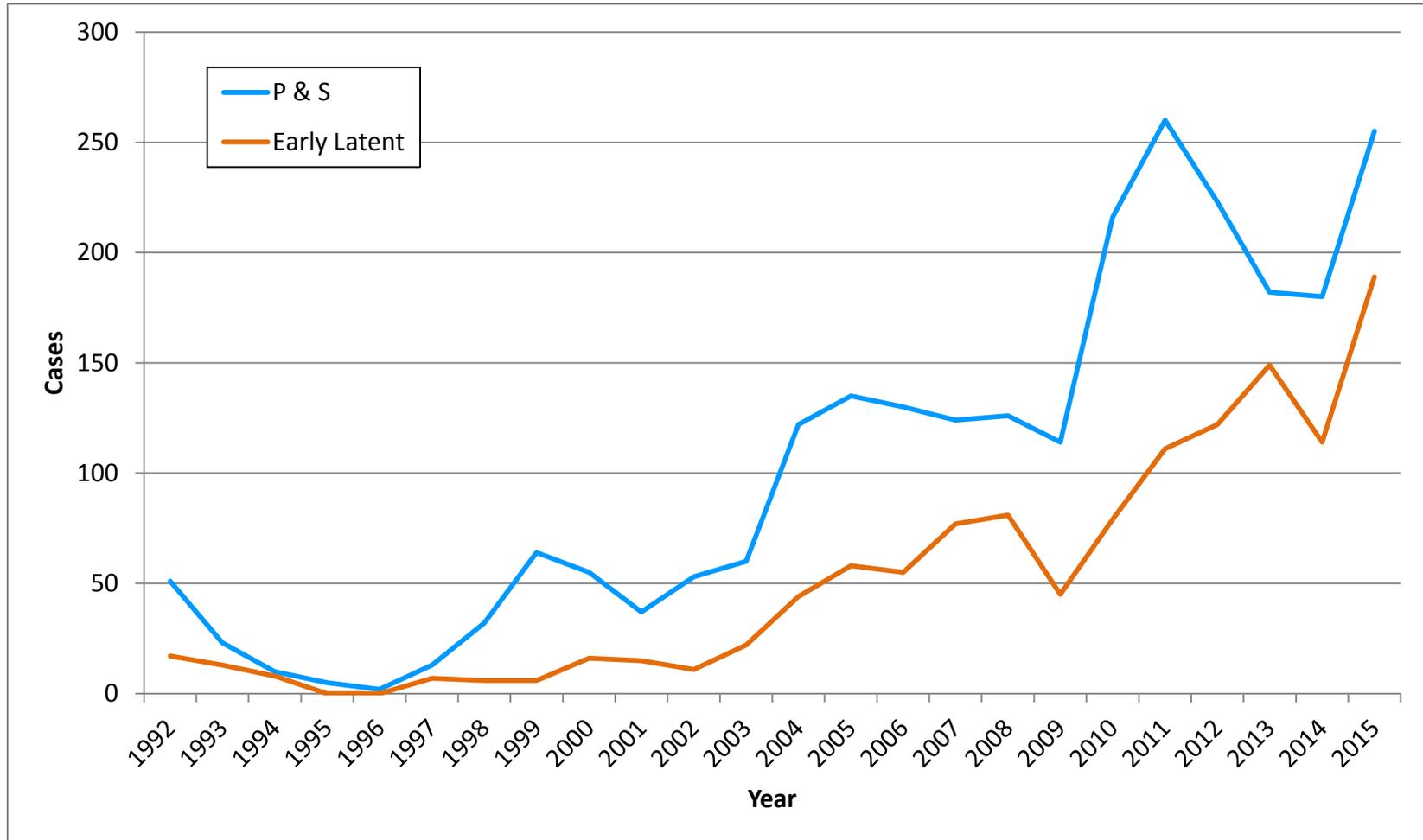
Table 13: Number of Reported Early Syphilis Cases and Incidence among MSM and MSW, King County, WA, 1992-2015

Year	MSM		MSW	
	Cases	Incidence per 100,000 population*	Cases	Incidence per 100,000 population
1992	0	0	0	0.0
1993	1	3	5	0.8
1994	2	6	10	1.7
1995	2	6	2	0.3
1996	1	3	1	0.2
1997	5	14	5	0.8
1998	32	87	3	0.5
1999	60	162	6	0.9
2000	58	154	8	1.2
2001	50	131	1	0.1
2002	60	155	3	0.4
2003	77	197	3	0.4
2004	140	356	19	2.8
2005	179	450	6	0.9
2006	174	430	8	1.1
2007	194	472	6	0.8
2008	199	478	3	0.4
2009	142	338	4	0.5
2010	267	629	9	1.2
2011	339	793	17	2.3
2012	308	715	11	1.5
2013	289	662	19	2.5
2014	260	584	12	1.5
2015	409	901	11	1.4

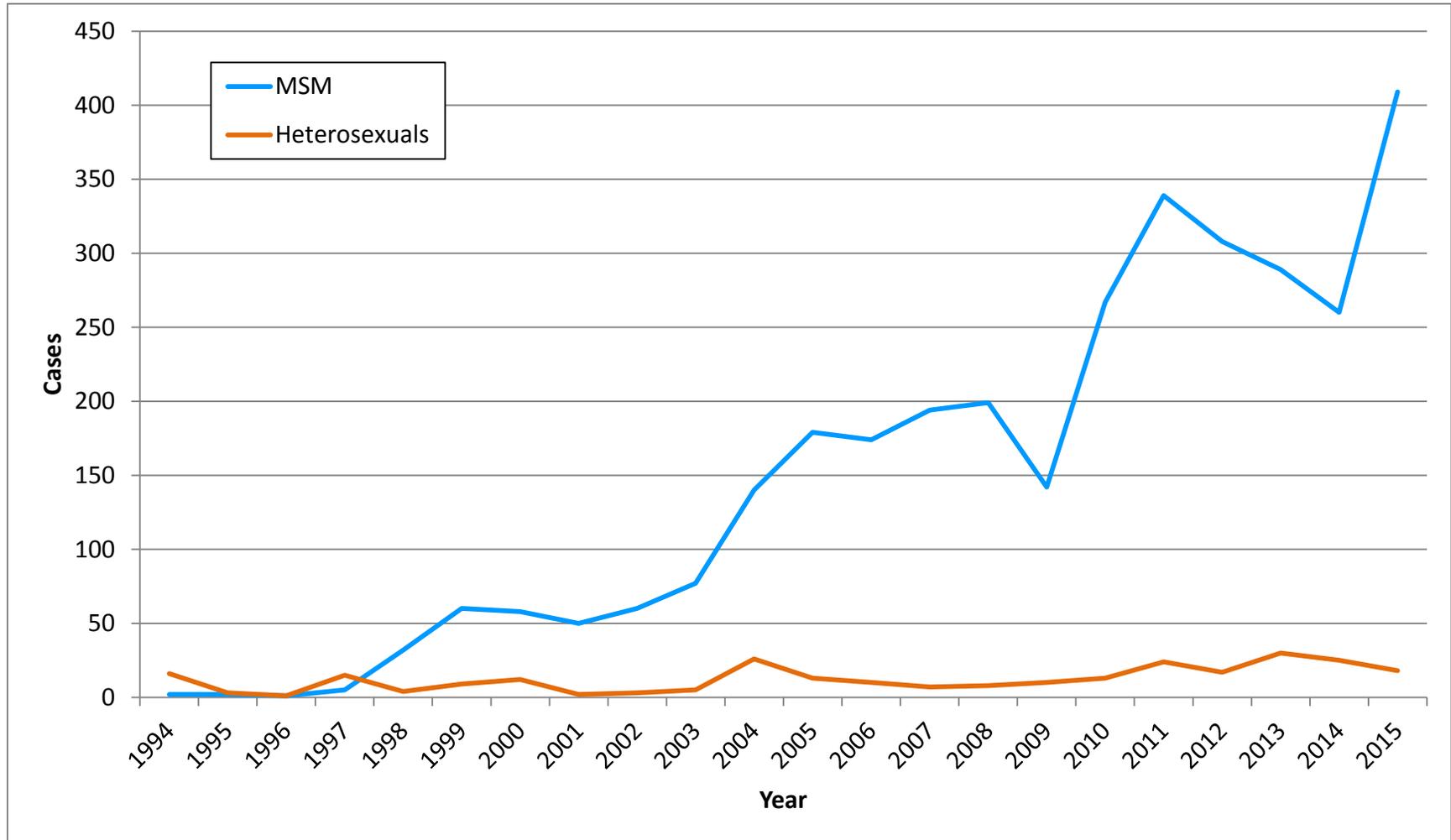
Men were missing sexual orientation data in the following years (numbers missing are included in parentheses): 1992 (42), 1993 (9), 1998 (2), 1999 (1), 2000 (1), and 2002 (1), 2005 (1), 2006 (1), 2007 (0), 2008 (0), 2009 (7), 2010 (15), 2011 (8), 2012 (19), 2013 (12), 2014 (9), 2015 (17).

* MSM incidence is calculated using an annual MSM population size estimate of 5.7% of the male population aged 15 and higher as the denominator.

**Figure 17: Early Syphilis – Reported Cases of Primary and Secondary vs. Early Latent Syphilis
King County, WA, 1992-2015**

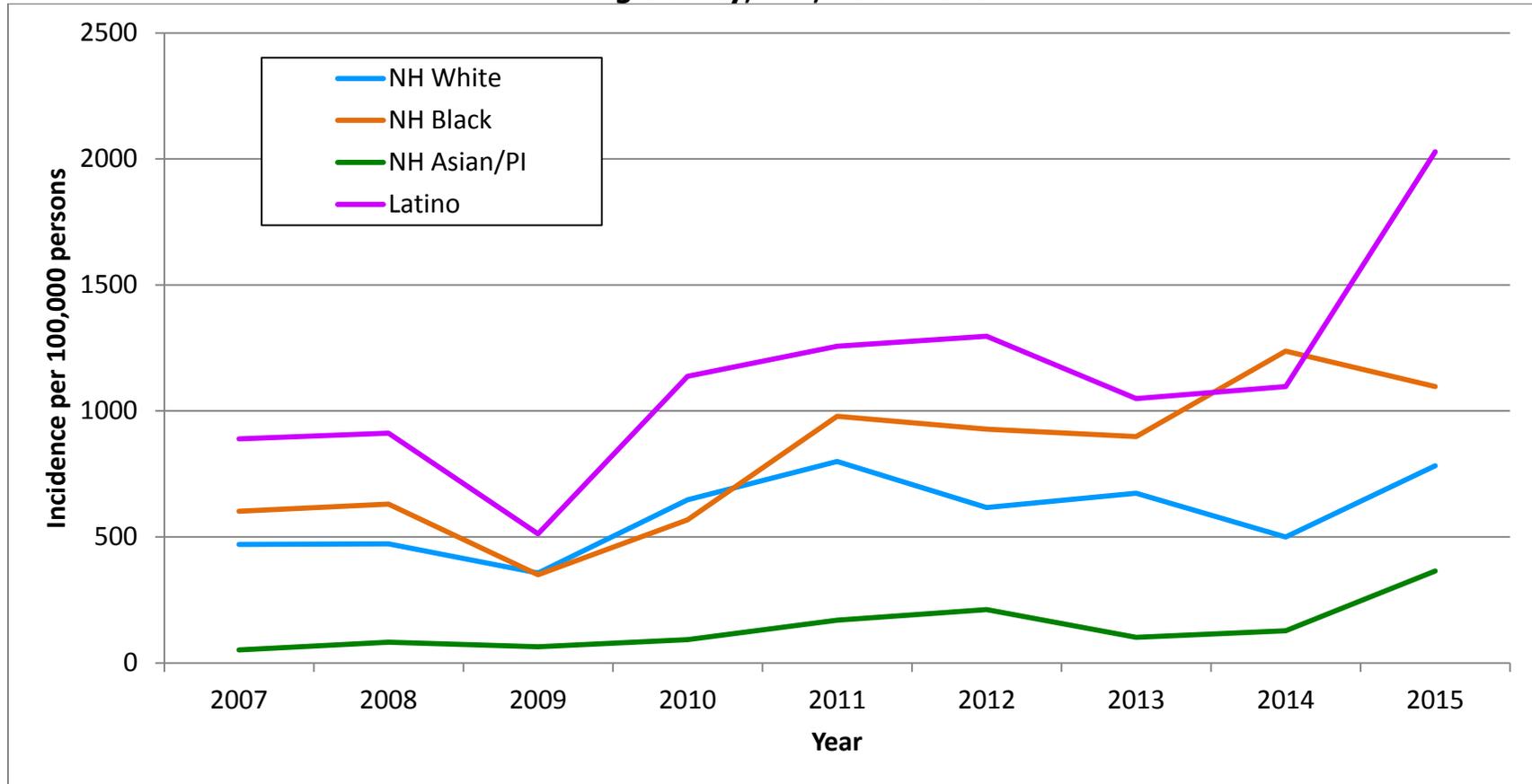


**Figure 18: Early Syphilis – Reported Cases by Sexual Orientation
King County, WA, 1994-2015**



Men were missing sexual orientation data in the following years (numbers missing are included in parentheses): 1992 (42), 1993 (9), 1998 (2), 1999 (1), 2000 (1), 2002 (1), 2005 (1), 2006 (1), 2009 (7), 2010 (15), 2011 (8), 2012 (20), 2013 (12), 2014 (9), 2015(17).

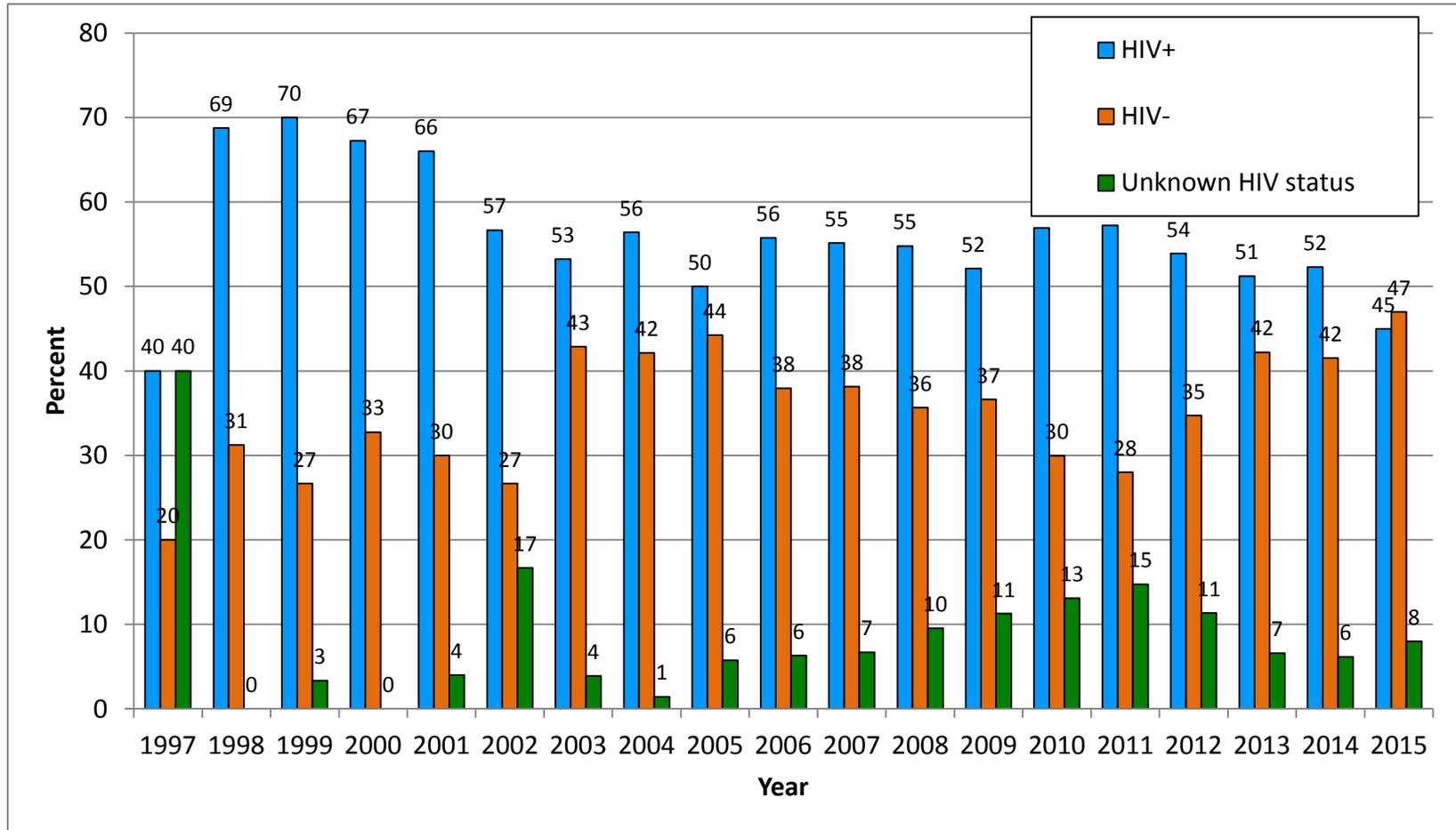
**Figure 19: Incidence of Early Syphilis among MSM by Race and Ethnicity
King County, WA, 2007-2015**



NH = Non-Hispanic, PI = Pacific Islander

Cases with unknown race and ethnicity were distributed according to annual race and ethnicity distributions among cases with known race and ethnicity and included in race/ethnicity-specific incidences.

**Figure 20: Early Syphilis – Percent of Reported Cases among MSM by HIV Status
King County, WA, 1997-2015**



**Figure 21: Early Syphilis – Incidence among MSM by HIV Status
King County, WA, 1997-2015**

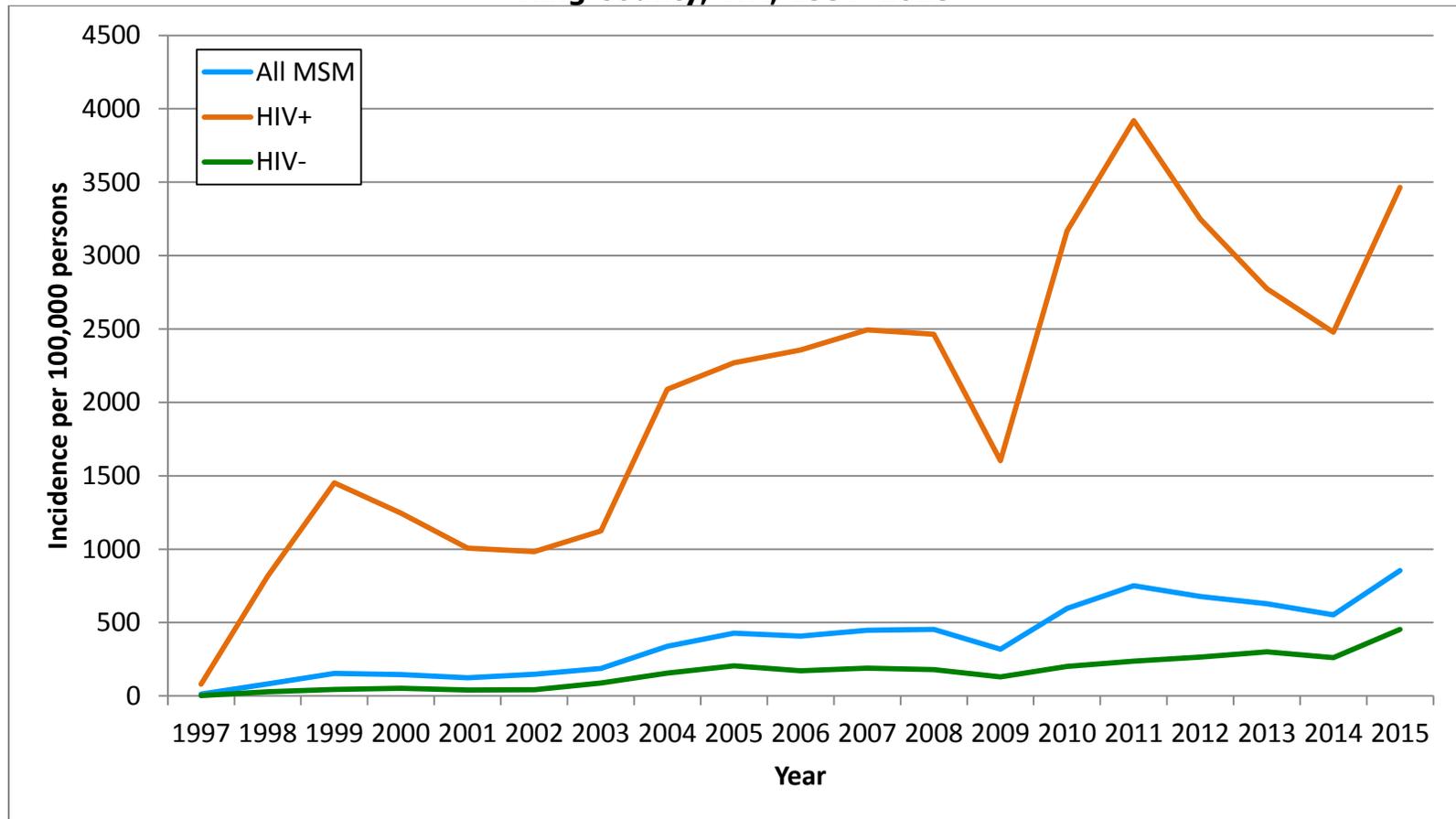
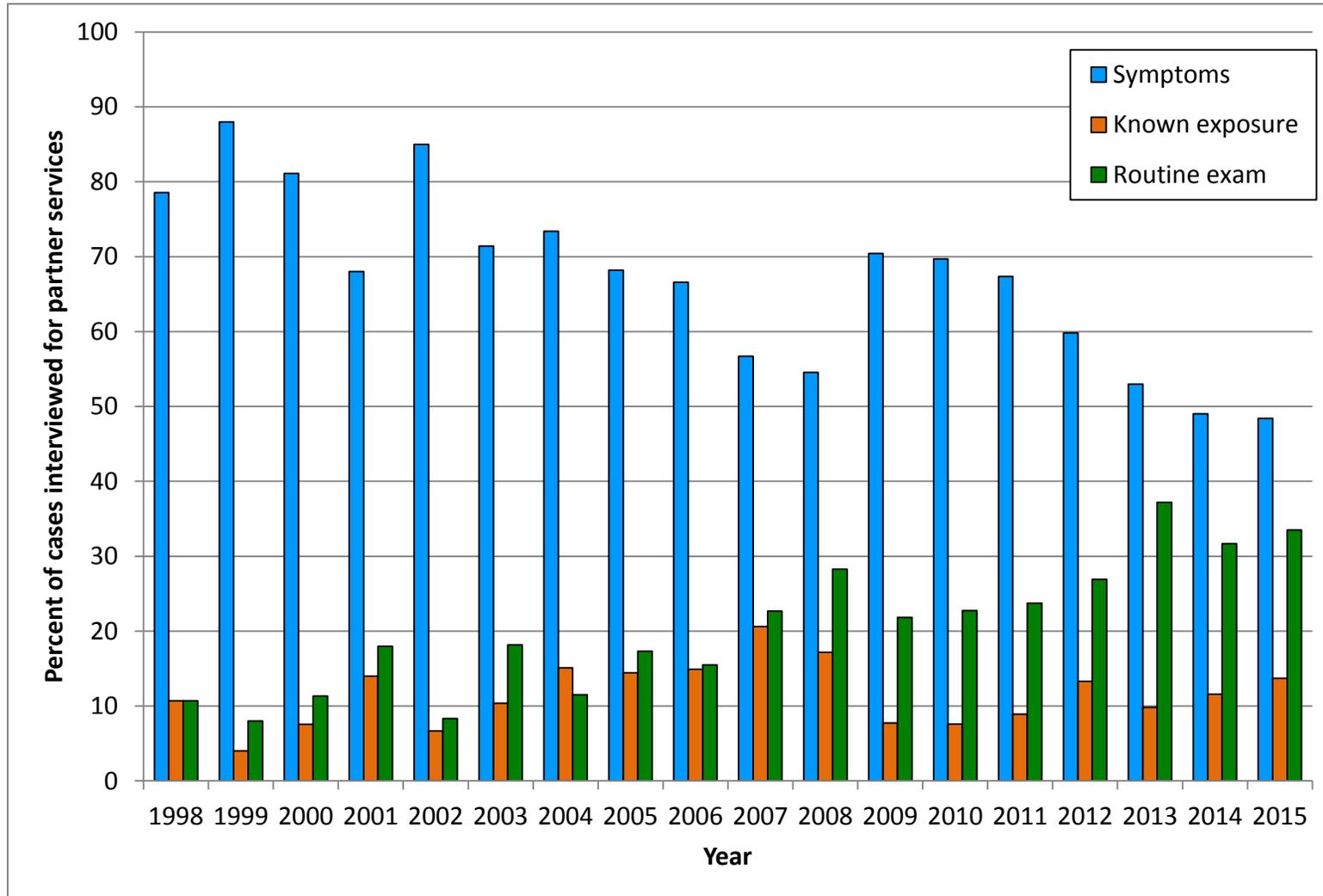


Figure 22: Early Syphilis – Reason for Visit among MSM, King County, WA, 1998-2015



Percentages exclude MSM not interviewed for partner services or who did not report a reason for visit.

**Figure 23: Early Syphilis – Reporting Providers
King County, WA, 1997-2015**

