
C. SYPHILIS INFECTION

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The nature and epidemiology of syphilis

Syphilis is caused by the organism *Treponema pallidum*. Sexual transmission occurs as a result of direct exposure to the lesions of early, infectious syphilis. Syphilis has a complex and variable clinical course. Untreated infections may progress through several stages of disease.

Primary syphilis is characterized by the presence of one or more chancres that may occur from 10 to 90 days after exposure, with an average of 21 days. **Secondary syphilis** occurs from 17 days to 6.5 months after the chancre appears (average 10 weeks) and is characterized by localized or diffuse mucocutaneous lesions, often with lymphadenopathy. The primary lesion may still be present. **Latent syphilis** occurs when the organisms persist in the body of the infected person without causing symptoms or signs. Latent syphilis is divided into early, late, and unknown categories based on duration of infection. Early latent syphilis is identified less than one year after the initial syphilis infection, and late latent syphilis has greater than one year's duration. Latent syphilis of unknown duration is diagnosed when the date of initial infection cannot be established as having occurred within the previous year and the patient's age and titer meet certain surveillance case definition criteria. **Tertiary syphilis** may occur after the latent infection, is characterized by chronic, inflammatory lesions that occur through out the body, but predominantly in skin, subcutaneous tissues, and bone. Tertiary syphilis may also produce cardiovascular and central nervous system disorders.

The incidence rates for syphilis infection increased in the United States over the decade of the 1980's, peaking in 1990. The increase occurred in both men and women; nationally, the male to female ratio of incidence rates is approximately 1:1.

Rates vary with age, race/ethnicity, socio-economic status, and among disease stages. In 2001, US rates for primary and secondary (P&S) syphilis were highest in the 20-29 year range for males and females and all race/ethnicity groups. For all ages, rates were highest among Blacks.² Texas ranked 14th among states in primary and secondary syphilis rates with 2.3 per 100,000 population; Houston ranked 26th among selected cities with greater than 200,000 population, with 5.8 cases per 100,000. The year 2000 objective for primary and secondary syphilis is 4.0 per 100,000 population; P&S rates reported in 2001 were 3.0/100,000. Houston is within the Year 2000 Objectives for primary and secondary syphilis.

Congenital syphilis may occur in infants born to mothers with untreated syphilis, especially primary, secondary, or early latent disease. The Year 2000 Objective for congenital syphilis is 40 cases per 100,000 live births; in 1999, Houston reported 39 cases for a rate of 31.5 per 100,000. US rates for congenital syphilis have declined since 1991; however, rates are still many time higher than most industrialized countries where congenital syphilis had been essentially eliminated.²

Syphilis elimination projects

The United States launched a national syphilis elimination campaign in late Fall, 1999 (HDHHS, STD Prevention Letter, January 2000). Syphilis elimination is defined by the CDC as the absence of sustained transmission (i.e., no transmission after 90 days of the report of an imported index case).¹⁸ The plan expects to address the race-related disparities in syphilis rates in the U.S and in other health status markers, such as AIDS, infant mortality, and coronary heart disease mortality. One of the main strategies in the syphilis elimination campaign is to develop and support communication between the multiple audiences participating in syphilis, HIV, and other STD prevention programs.

In a recent report from the CDC¹⁸, data for syphilis cases reported to state health departments show an increase in primary and secondary syphilis among men who have sex with men. Houston is listed as having a 50% increase in P&S syphilis (Table 2 is taken from MMWR 51(43);971-973:2002).

The pattern of syphilis in the US is changing. Racial/ethnic differences seem to be decreasing and the ratio of males to females is increasing, especially in cities with large gay populations.

TABLE 2. Counties and independent cities accounting for ≥50% of reported cases of primary and secondary syphilis, by number and rate* of persons infected — United States, 2001

County (Major City)	No.	Rate
Wayne County, Michigan (Detroit)	379	18.4
Cook County, Illinois (Chicago)	339	6.3
Fulton County, Georgia (Atlanta)	224	27.5
Los Angeles County, California (Los Angeles)	211	2.2
Shelby County, Tennessee (Memphis)	208	23.2
Dade County, Florida (Miami)	185	8.2
Baltimore, Maryland†	161	24.7
Maricopa County, Arizona (Phoenix)	148	4.8
New York County, New York (New York City)	145	9.4
San Francisco County, California (San Francisco)	138	17.8
Marion County, Indiana (Indianapolis)	128	14.9
Dallas County, Texas (Dallas)	121	5.5
Harris County, Texas (Houston)	103	3.0
Robeson County, North Carolina	90	73.0
Essex County, New Jersey (Newark)	79	10.0
Philadelphia County, Pennsylvania (Philadelphia)	78	5.1
Davidson County, Tennessee (Nashville)	76	13.3
Bexar County, Texas (San Antonio)	71	5.1
Kings County, New York (New York City)	71	2.9
Guilford County, North Carolina (Greensboro)	70	16.6
Franklin County, Ohio (Columbus)	62	5.8

* Per 100,000 population.

† Independent city.

C. SYPHILIS: CRUDE RATES¹

Although syphilis rates in Houston/Harris County have declined more than 83% since 1991, rates have increased 8% since 2000. This is a trend that has also been reported in the US.

Rates for primary and secondary (P&S) syphilis decreased 95% from 1991 through 2001, dropping from 56.8 per 100,000 to 3.0 per 100,000; unfortunately, P&S rates have been higher the last two years than the two years previous.

In 2000, Houston rates for total syphilis were 2 times greater than US rates (24 compared to 11 per 100,000).

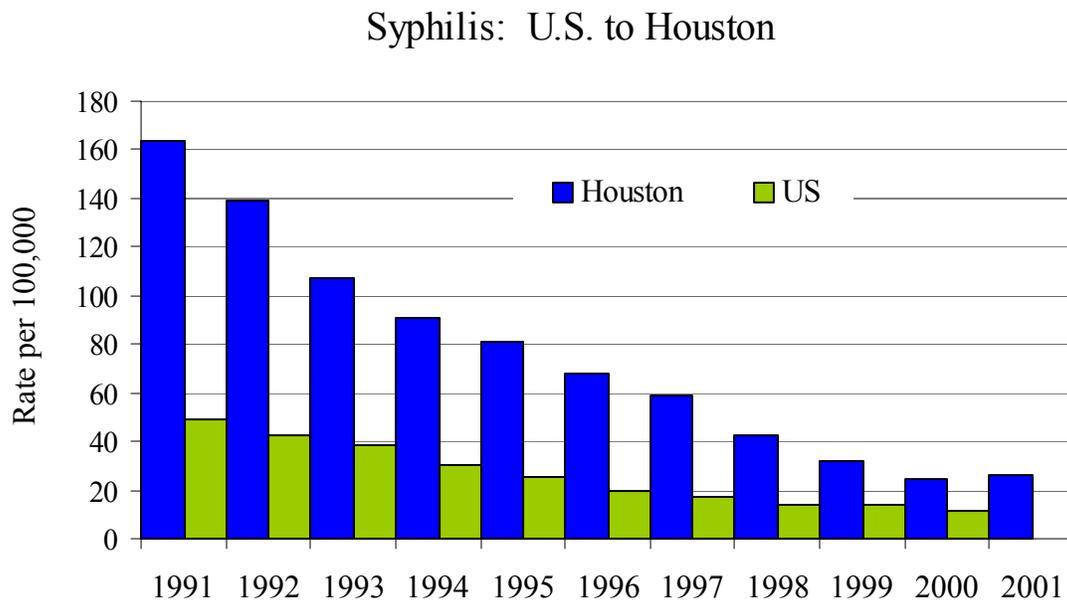


Figure C.1. Changes in total syphilis rates per 100,000 (excluding congenital) in Houston compared to the US. While there has been an 83% decline in syphilis rates in Houston since 1991, rates in 2001 were higher than rates in 2000. Rates are reported per 100,000 persons per year using Harris County population as the denominator (Appendix).

¹ Except where noted, syphilis rates will include all stages except congenital. Congenital syphilis will be reported separately.

C. SYPHILIS: CRUDE RATES

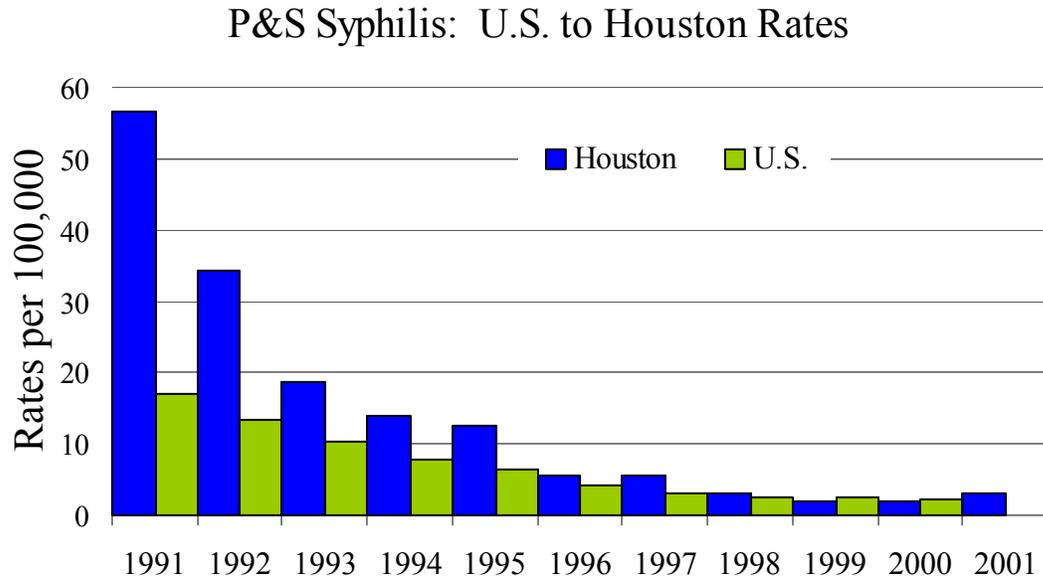


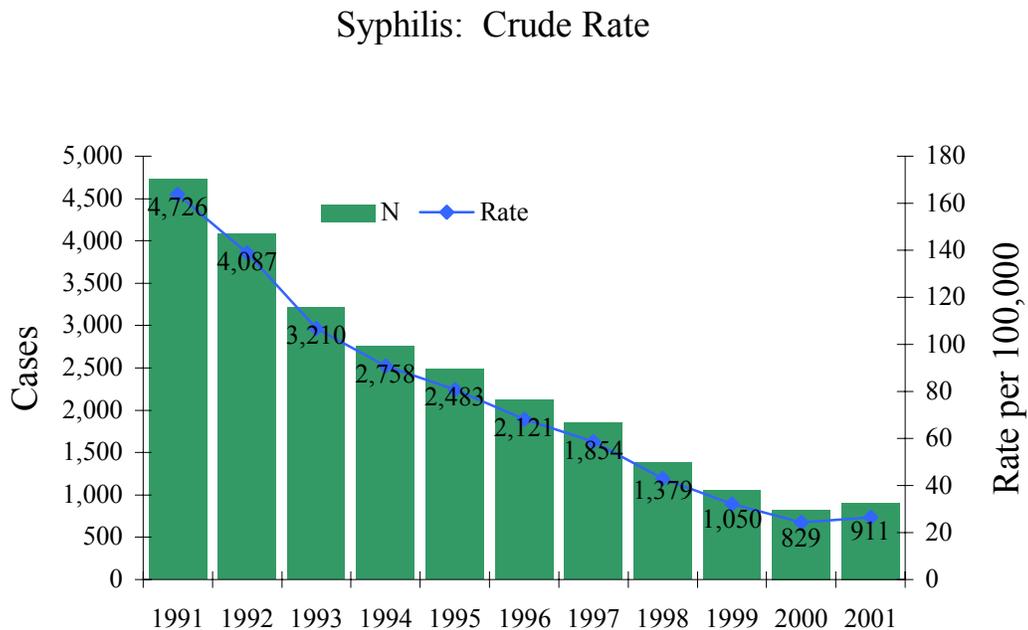
Figure C.2. Comparison of Primary & Secondary syphilis rates between the US and Houston/Harris County. *Health People 2010* goal for P&S syphilis is 0.2 case per 100,000. Crude P&S rates in Houston are 15 times that goal. Rates are presented per 100,000 persons per year using Harris County as the denominator (Appendix).

C. SYPHILIS: CRUDE RATES BY STAGE OF DISEASE**Table C.1.** Number of cases and rates per 100,000 population per year for primary and secondary syphilis (P&S), early latent syphilis (EL), and late latent syphilis (LL)*. Houston/Harris County, Texas, 1991-1997.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of Cases											
P&S	1,638	1,011	558	428	389	178	174	99	68	71	103
EL	2,349	2,466	1,538	1,116	868	755	520	366	239	133	134
LL	739	610	1,114	1,214	1,226	1,188	1,160	894	721	620	674
TOTAL	4,726	4,087	3,210	2,758	2,483	2,121	1,854	1,379	1,050	824	911
Rate per 100,000 population per year											
P&S	56.8	34.3	18.6	14.1	12.7	5.7	5.5	3.1	2.1	2.1	3.0
EL	81.4	83.8	51.2	36.7	28.3	24.2	16.4	11.4	7.3	3.9	3.9
LL	25.6	20.7	37.1	39.9	39.9	38.1	36.7	28.4	22.1	18.2	19.5
TOTAL	163.8	138.8	106.9	90.7	80.9	68.0	58.6	42.9	32.1	24.4	26.4

Rates per 100,000 persons per year based on intercensal estimates of Houston/Harris County population (Appendix).

* Syphilis of unknown duration was included with late latent syphilis.

**Figure C.3.** Crude number and rate of adult syphilis in Houston, 1991-2001. There is a modest, but troubling, 10% increase in rates in 2001 over 2000. Rates per 100,000 persons per year (Appendix).

C. SYPHILIS: CRUDE RATES BY STAGE OF DISEASE

Figure C.4. While rates for total syphilis have declined substantially since 1991, the rate of change has varied among the different stages of disease.

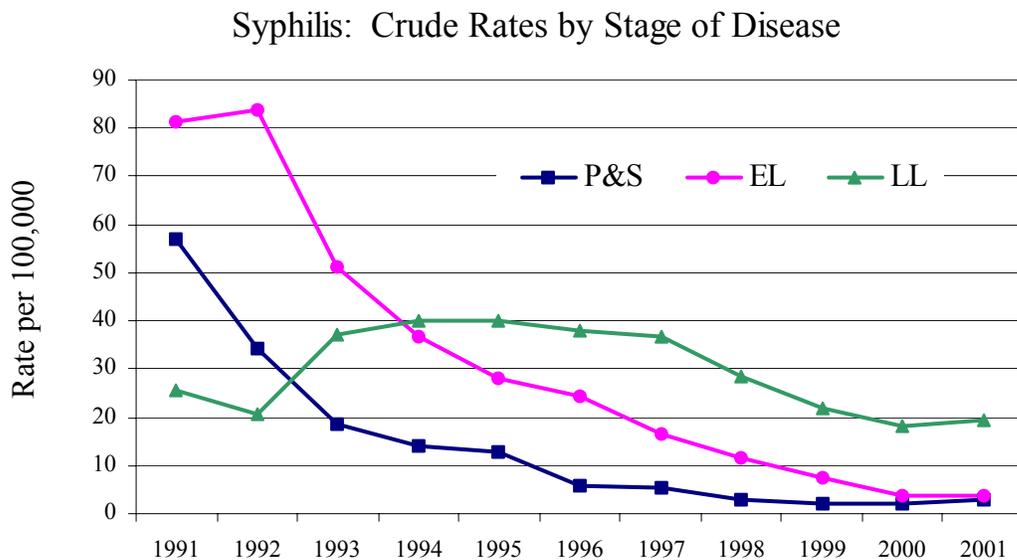
Primary and Secondary (P&S) syphilis declined 94% since the peak in 1991, however, rates in 2001 were 40% greater than the 2000 rates.

Early latent (EL) peaked in 1992 and has since declined 95%; rates in 2001 are essentially the same as the 2000 rates.

Late latent (including syphilis of unknown duration) did not peak until 1995, remained stable between 1995 and 1997, and declined 54% between 1997 and 2001; however, rates in 2001 are 10% greater than 2000 rates.

For all three stages of syphilis there was an increase in rates between 2000 and 2001.

Rates per 100,000 persons per year (Appendix).



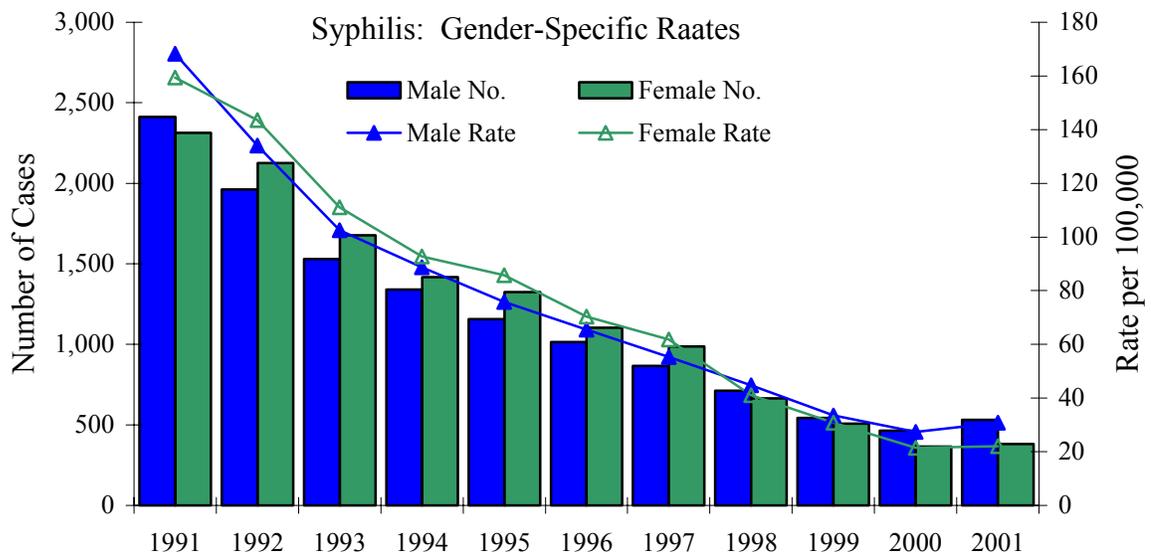
C. SYPHILIS: GENDER-SPECIFIC RATES

Table C.2. Gender-specific numbers and rates for syphilis in Houston/Harris County, Texas, 1991 – 2001.

	Male		Female	
	Total	Rate	Total	Rate
1991	2,412	168.3	2,314	159.4
1992	1,961	134.0	2,126	143.5
1993	1,530	102.5	1,678	111.1
1994	1,340	88.7	1,418	92.7
1995	1,156	75.8	1,324	85.7
1996	1,015	65.5	1,104	70.4
1997	867	55.3	987	61.8
1998	713	44.8	666	41.0
1999	534	33.5	507	30.7
2000	463	27.3	366	21.4
2001	530	30.8	381	22.0

Rates per 100,000 persons per year based on intercensal estimates of Houston/Harris County population (Appendix).

Figure C.5. Rates decreased dramatically from 1991 through 2000. In 2001, rates for both males and females increased slightly. The male to female ratio has been essentially 1:1 until 1999; the ratio was 1:3 in 2000 and 1:4 in 2001. Rates per 100,000 persons per year (Appendix).



C. SYPHILIS: GENDER-SPECIFIC RATES BY STAGE OF DISEASE

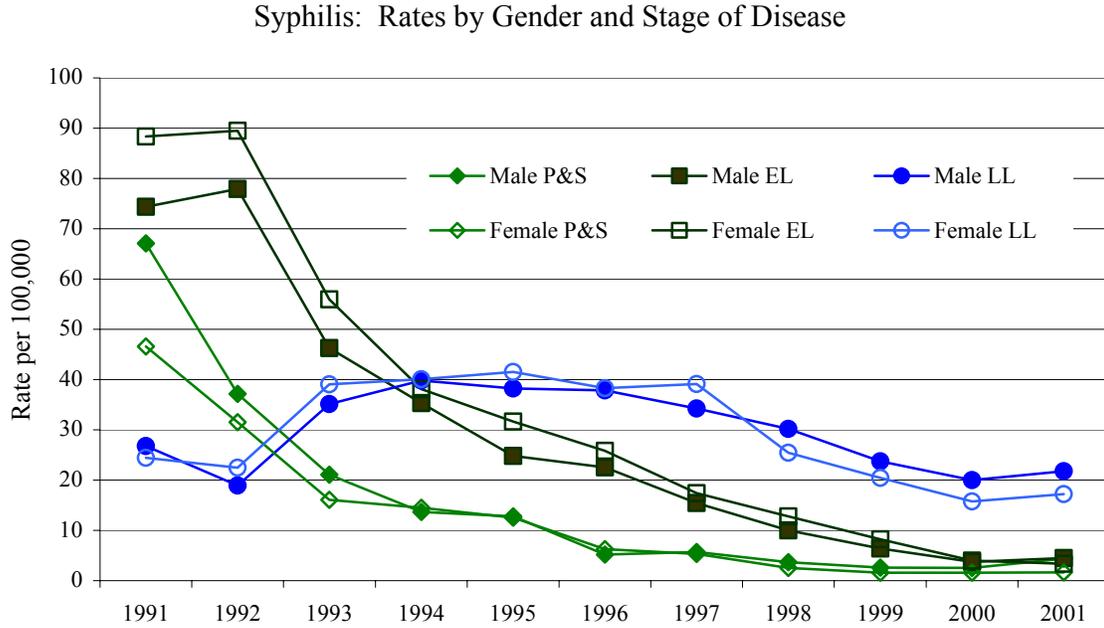


Figure C.6. The ratio of male rates to female rates has varied over time. From 1994 through 1997, the ratio in P&S syphilis was essentially 1:1. Since 1998 the ratio has increased (see Table C.3.) and may represent behavior changes in men who have sex with men.

Table C.3. Male to female ratio of syphilis rates, 1991 through 2001.

	Primary & Secondary	Early Latent	Late Latent
1991	1.4	0.8	1.1
1992	1.2	0.9	0.8
1993	1.3	0.8	0.9
1994	0.9	0.9	1.0
1995	1.0	0.8	0.9
1996	0.8	0.9	1.0
1997	1.1	0.9	0.9
1998	1.4	0.8	1.2
1999	1.6	0.8	1.2
2000	1.6	0.9	1.3
2001	2.7	1.4	1.3

C. SYPHILIS: RACE/ETHNICITY-SPECIFIC RATES

Table C.4. Number of total syphilis cases per year in Houston/Harris County, by race/ethnicity and gender

	Hispanic		African American		White		% Missing
	Male	Female	Male	Female	Male	Female	
1991	308	324	1991	1894	112	96	0.0%
1992	178	190	1660	1779	122	157	0.0%
1993	152	177	1250	1338	126	160	0.2%
1994	157	131	1067	1142	113	144	0.1%
1995	159	158	835	886	101	120	9.0%
1996	212	217	721	779	75	79	1.8%
1997	194	190	610	713	61	78	0.4%
1998	200	161	431	418	65	55	3.5%
1999	144	134	327	303	59	57	2.5%
2000	141	113	263	226	56	26	0.5%
2001	174	114	284	220	67	42	0.8%

Rates of total syphilis per year in Houston/Harris County, per 100,000 persons per year (Appendix).

	Hispanic		African American		White	
	Male	Female	Male	Female	Male	Female
1991	87	100	782	662	14	11
1992	48	56	641	612	15	18
1993	40	50	474	453	15	19
1994	40	36	400	382	13	17
1995	40	42	309	293	12	14
1996	51	56	264	254	9	9
1997	42	44	231	234	7	9
1998	40	36	158	134	8	6
1999	28	28	122	98	7	7
2000	25	22	93	70	6	3
2001	29	21	96	65	8	5

C. SYPHILIS: RACE/ETHNICITY-SPECIFIC RATES

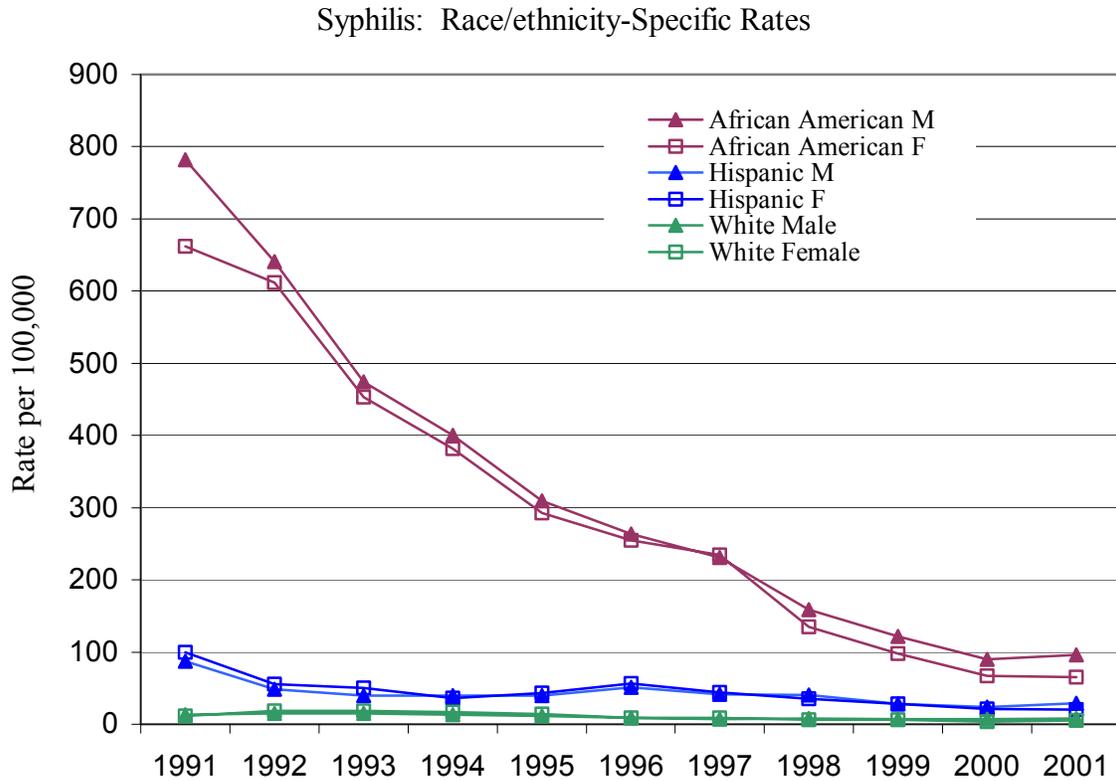


Figure C.7. Race-ethnicity specific numbers of cases and rates for total adult syphilis in Houston/Harris County, Texas, 1991-2001.

There are very few syphilis cases missing race/ethnicity data. Rates are highest among African Americans; intermediate among Hispanics, and lowest among Whites and all other race/ethnicity groups. Even with the differences in overall rates, all race/ethnicity groups have experienced similar declines until 2000, and all experienced slight increases in 2001.

Rates per 100,000 persons per year based (Appendix).

C. SYPHILIS: AGE DISTRIBUTION

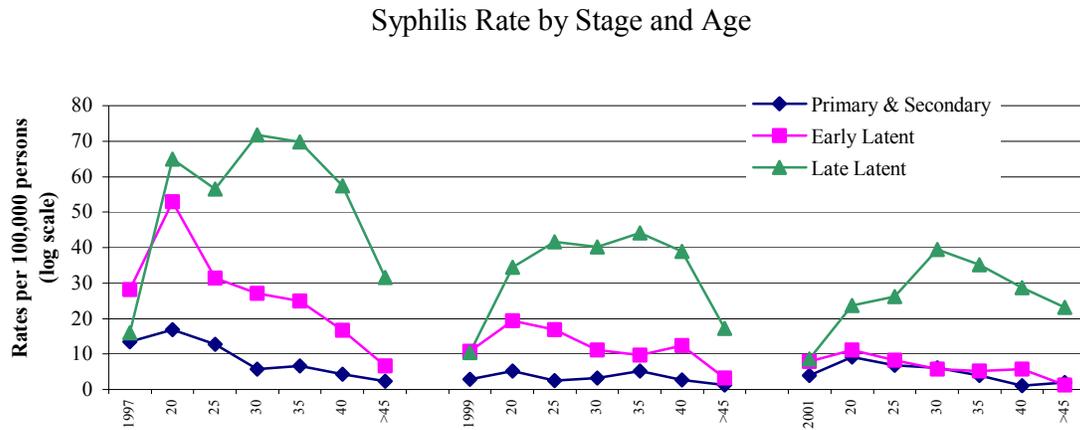


Figure C.8. Rates for primary and secondary and early latent syphilis have declined in each age category. P&S and early latent are most common among those in under age 30, while the majority of late latent syphilis cases seem to be in those over age 30. Data are presented on the log scale so that the patterns are more distinct.

Rates per 100,000 persons per year (Appendix).

C. SYPHILIS: CONGENITAL SYPHILIS

Table C.5. Harris County Congenital syphilis rates per 1,000 live births. 2001 live births are estimated, based on the average increase since 1997.

Year	Total	Hispanic	Black	White	Rate per 1000 live births (total)
1994	85	6	62	16	1.5
1995	88	14	58	18	1.5
1996	122	31	74	18	2.1
1997	108	29	76	5	1.8
1998*	51	23	27	1	0.8
1999	47	20	26	1	0.8
2000	34	12	20	2	0.5
2001	20	10	8	1	0.3

* Race/ethnicity data was not available for 1998.

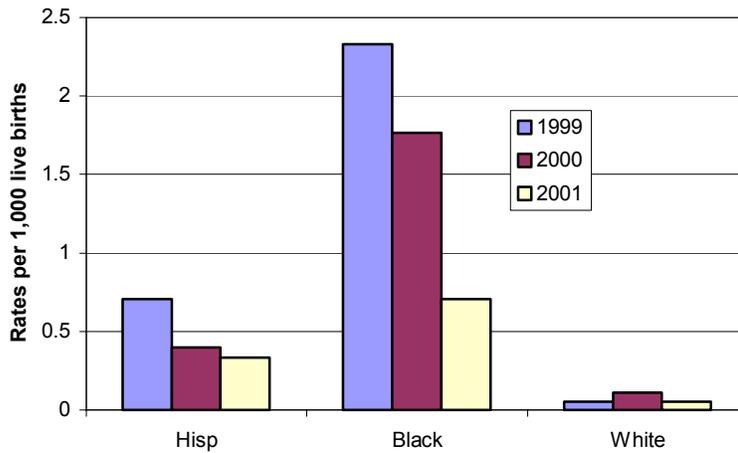


Figure C.9. Rates of Congenital Syphilis by race/ethnicity. The congenital syphilis rates per 1,000 live births has decreased since the peak in 1996. The proportion of cases that are Hispanic has increased; Hispanics now represent nearly half of the congenital syphilis cases. However, nearly half of all births in Harris County in 2000 were Hispanic. By 1,000 live births, congenital syphilis rates are highest among African Americans, followed by Hispanics.

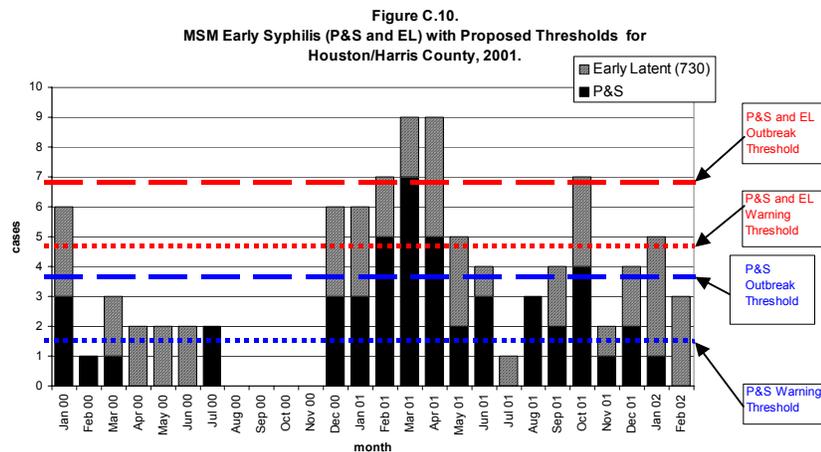
C. SYPHILIS: EPIDEMIC AMONG MEN WHO HAVE SEX WITH MEN²

A dramatic increase in the number of cases of primary and secondary syphilis was noted among men who have sex with men was noted in early 2001. There were 95 cases of primary and secondary syphilis reported in Houston, compared to 73 P&S cases in 2000. The increase was directly due to an outbreak of early syphilis in men who have sex with men. There was more than a 3 fold increase in early syphilis cases in MSM in 2001 (35 cases) compared to 2000 (10 cases). This increase was not observed in women or heterosexual men.

Outbreak trend

- after increasing numbers of syphilis cases among MSMs during December 2000 through March 2001, the number of P&S syphilis cases among MSM has decreased.
- MSM early syphilis cases were about the MSM outbreak threshold from December 2000 through June 2001, but have remained at or below this threshold 4 out of the last 6 months.
- During 2001, MSM accounted for 36% of P&S syphilis cases compared to only 14% in 2000.
- During 2001, 47% of MSM infected with P&S syphilis were known to be HIV positive and after removing those with unknown HIV status, 64% were HIV positive.
- The outbreak has not been limited to any race/ethnicity group.
- The highest percentage of cases are 30-39 years of age.

Although the outbreak slowed after a Spring peak, the number of P&S cases among MSMs remains higher than expected.



² This information is taken from a summary report produced by Liz Lee at the Bureau of HIV/STD Prevention, published in January, 2002.

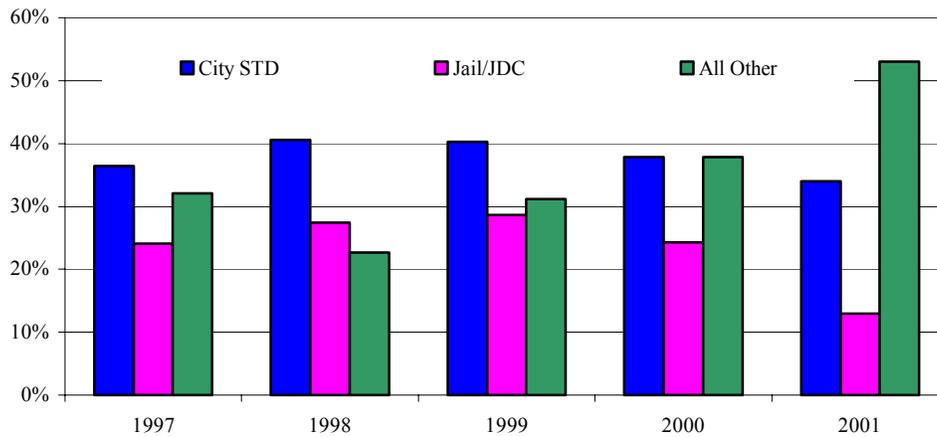
C: SYPHILIS DISTRIBUTION BY PROVIDER**Syphilis: Percent of Cases by Provider**

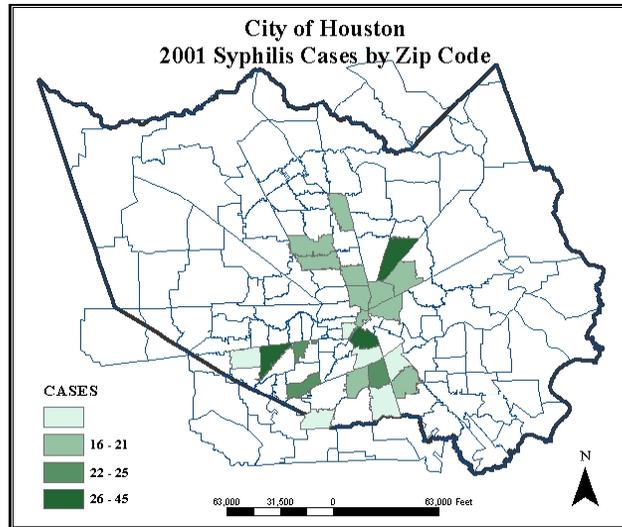
Figure C.10. Distribution of cases among provider types, 1997-2001. HDHHS STD clinics identified nearly 40% of all cases during the last five years and another 20% were identified through correctional facilities. In 2001, private facilities identified almost 25% of all cases; other institutions identifying syphilis include: HIV testing facilities, prenatal clinics, and other public clinics.

C. SYPHILIS: GEOGRAPHIC DISTRIBUTION**Table 3.5** More than 50% of syphilis cases reported in Houston/Harris County, 2001, listed as zip code of residence the following 23 zip code areas.

Zip Code	Cases	Percent of Total	Cumulative Percent
77016	45	4.8%	4.8%
77004	39	4.2%	9.0%
77036	33	3.5%	12.6%
77081	25	2.7%	15.3%
77033	23	2.5%	17.7%
77035	22	2.4%	20.1%
77020	21	2.3%	22.3%
77002	20	2.1%	24.5%
77088	20	2.1%	26.6%
77009	19	2.0%	28.7%
77026	19	2.0%	30.7%
77028	19	2.0%	32.8%
77051	18	1.9%	34.7%
77060	18	1.9%	36.6%
77091	18	1.9%	38.6%
77022	17	1.8%	40.4%
77061	17	1.8%	42.2%
77072	15	1.6%	43.8%
77021	14	1.5%	45.3%
77053	14	1.5%	46.8%
77087	14	1.5%	48.3%
77006	13	1.4%	49.7%
77048	13	1.4%	51.1%

C. SYPHILIS: GEOGRAPHIC DISTRIBUTION

Distribution of cases in Houston/Harris County, 2001.



**2001 Rates of Early Syphilis by Zip Code Area:
Houston, Harris County**

