

IV. RESULTS

A. CHLAMYDIA INFECTION

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The nature and epidemiology of *Chlamydia trachomatis* infections

Chlamydia trachomatis is the most common sexually transmitted disease. The estimated incidence of chlamydia in the US is over 4,000,000 new cases annually.⁵ However, because current screening efforts are not consistent across the US and documentation of cases is incomplete; there were only 783,242 cases reported in 2001.² Using CDC reported rates for 2001, Texas ranked 9th among states with 334.5 cases per 100,000 population; and Houston ranked 47th among selected cities of greater than 200,000 population with 332.0 cases per 100,000.

Healthy People Year 2000 goal for chlamydia was 5% infection rates among females 15-24 years old; year 2010 goal is to reduce the infection rate to 3%.³ In 2001, Houston had rates of 2.9% among females 15-19 years of age and 2.7% among females 20-24 years of age. However, rates as high as 28% were found among women screened at the Juvenile Detention Center in 1998.¹³

The Institute of Medicine has estimated the total annual cost of chlamydia to be 2.0 billion dollars in direct and indirect costs.⁵ Direct costs include health care expenditures and reflect the value of goods and services used to treat chlamydia; indirect costs refer to lost productivity associated with being infected with chlamydia.

It is difficult to interpret the rising US rates because of variable compliance with testing and reporting. Also, several different diagnostic tests with varying sensitivity and specificity are used to identify chlamydial infection.¹⁴ Chlamydia positivity among 15 to 24 year-old women varies by population studied. The female to male ratio among cases 15 to 24 year old is 8:1, and probably reflects current screening practices which focus on women.² Approximately 70% of chlamydial infections in women are asymptomatic; and, if not adequately treated, 20% to 40% of infected women develop pelvic inflammatory disease (PID).²

There are estimates that chlamydial urethral infection is present among 5% of males seeking general medical care, over 10% among asymptomatic soldiers undergoing routine physical examination, and up to 20% among heterosexual men seen at STD clinics.¹⁵ Similarly for women, cervical infections are found in 5% of asymptomatic college students, 10% of women seen in family planning clinics, and over 20% of women seen in STD clinics.

Approximately half of children exposed to *C. trachomatis* infections during birth go on to acquire the infection.

Screening and treating women for chlamydia may be an important intervention for preventing pelvic inflammatory disease (PID).¹⁶ Women at high risk for chlamydia infection who received routine screening were about half as likely to develop PID compared to similar women who did not receive routine screening.

A. CHLAMYDIA: CRUDE RATES**Table A.1.** Crude rates for chlamydia in Houston/Harris County, Texas, 1991 – 2001.

Chlamydia	N	Rate	% Change*
1991	7,020	243.3	
1992	8,891	302.0	24%
1993	8,231	274.1	-9%
1994	9,245	304.2	11%
1995	8,018	261.2	-14%
1996	9,092	291.7	12%
1997	10,635	336.2	15%
1998	11,499	357.6	6%
1999	10,443	319.5	-11%
2000	12,144	357.1	12%
2001	11,304	327.2	-8%

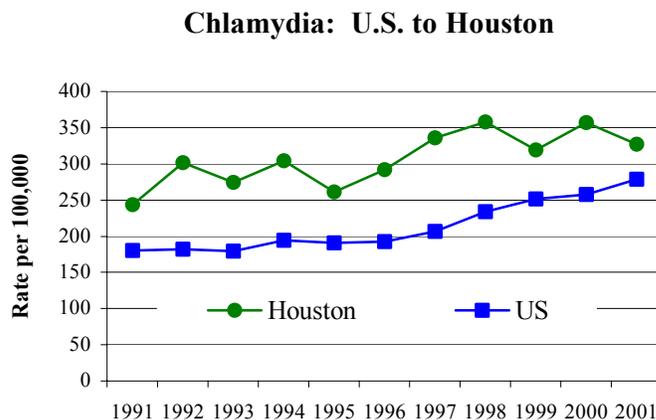
Rates per 100,000 persons per year based on intercensal estimates of Houston/ Harris County population (Appendix).

*Change in rate from the preceding year.

Although there has been variation from year to year, there has been a gradual increase in chlamydia rates since 1991; rates in 2001 are 24% higher than 1991 rates.

These changes may reflect changes in screening practices rather than a true increase in the incidence of chlamydia. Rates in Houston have remained consistently above reported rates in the US (Figure A.1).

Figure A.1. Comparison of chlamydia rates in the US to rates in Houston, 1991 through 2001. Rates are reported per 100,000 persons based on intercensal estimates of Houston/Harris County population.



A. CHLAMYDIA: CRUDE RATES

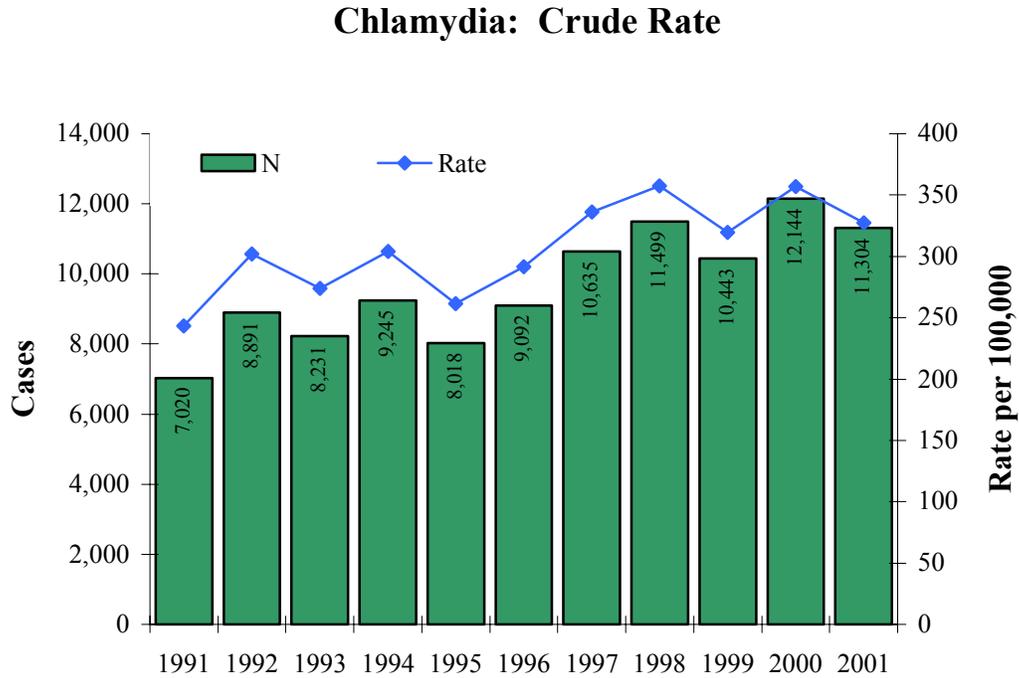


Figure A.2. Harris County chlamydia cases and rates per 100,000 persons per year for the years 1991 through 2001. There has been a 34% increase in the number of reported cases over the study period, during which time the population only increased 23%. Rates per 100,000 in 2001 were 34% higher than the 1991 rates.

Rates for 1991-1999 and 2001 are based on intercensal estimates of Houston/Harris County population; rates for 2000 are based on the 2000 census (Appendix).

A. CHLAMYDIA: GENDER-SPECIFIC RATES**Table A.2.** Gender-specific rates for chlamydia by race/ethnicity in Houston/Harris County, Texas, 1991 – 2001.

	Total Rate		Number of Cases			Missing Race/Ethnicity	
			Black	Hispanic	White	No.	%
Male							
1991	612	42.7	372	72	168	0	0%
1992	1,162	79.4	803	108	114	137	12%
1993	1,604	107.5	1,180	152	97	175	11%
1994	1,673	110.8	1,126	113	140	294	18%
1995	664	43.5	152	63	24	425	64%
1996	749	48.4	163	84	29	473	63%
1997	1,434	91.5	530	187	45	672	47%
1998	1,644	103.2	523	249	59	813	49%
1999	1,618	100.0	636	432	63	487	30%
2000	1,962	115.8	745	590	130	497	25%
2001	1,800	104.5	602	529	87	582	32%
Female							
1991	6,407	441.3	3,147	1,838	1,418	4	0%
1992	7,728	521.7	3,968	1,596	1,365	799	10%
1993	6,413	424.5	2,503	1,372	288	2,250	35%
1994	7,506	490.9	2,602	1,733	730	2,441	33%
1995	7,292	472.1	2,000	1,527	384	3,381	46%
1996	8,210	523.5	2,311	1,830	402	3,667	45%
1997	9,257	579.8	2,606	1,991	390	4,270	46%
1998	9,854	607.1	2,809	2,028	420	4,597	47%
1999	8,688	526.8	3,095	2,311	616	2,666	31%
2000	10,164	595.5	3,557	3,285	711	2,611	26%
2001	9,492	548.0	2,773	2,774	456	3,489	37%

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

Gender data is nearly complete; more than 80% of reported cases are female. There has been a relatively steady increase in rates for both males and females since 1991; the increase has been more pronounced among females. It is unclear if changes in surveillance practices are the likely explanation for the increasing rates, and for the fluctuations in rates by year.

Race/ethnicity data is relatively incomplete. In recent years, nearly one third of cases are missing race/ethnicity data, and for some years, nearly half the reported morbidity is missing race/ethnicity data. It is impossible to evaluate the prevalence of chlamydia by race/ethnicity with such a large proportion of the reported cases missing information.

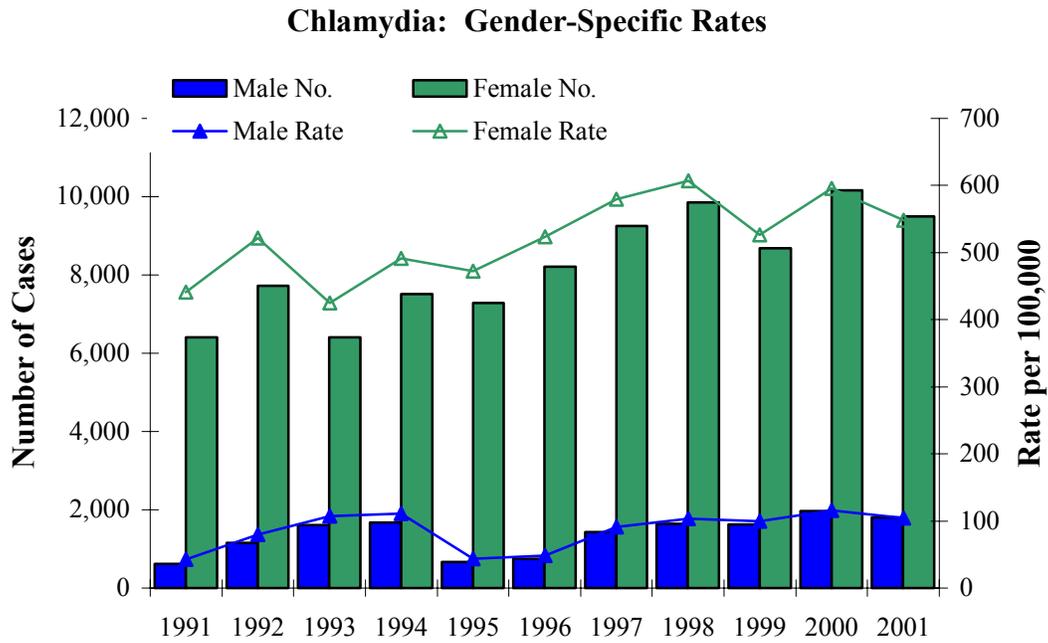
A. CHLAMYDIA: GENDER-SPECIFIC RATES

Figure A.3. Chlamydia cases and rates by gender. Females make up more than 80% of the total cases reported. Rates are presented per 100,000 population (Appendix).

A. CHLAMYDIA: AGE-SPECIFIC RATES

Table A.3. Age-specific rates for chlamydia in Houston/Harris County, Texas 1991 – 2001.

AGE	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15-19	1,455	1,710	1,546	1,668	1,419	1,460	1,645	1,798	1,672	1,782	1,593
20-24	1,113	1,340	1,189	1,360	1,161	1,174	1,479	1,533	1,454	1,651	1,585
25-29	308	436	372	484	453	479	505	554	530	589	538
30-34	118	183	143	186	156	171	209	229	200	235	230
35-39	49	90	64	85	68	73	105	112	89	104	97
40-44	22	33	37	33	23	27	48	57	36	48	49
>44	6	12	8	10	9	9	13	15	10	13	12
% UK	0%	0%	5%	4%	6%	14%	7%	6%	2%	5%	2%

Rates per 100,000 persons per year based on intercensal estimates of Houston/Harris County population (Appendix). %UK = percent of reported cases that are missing age data.

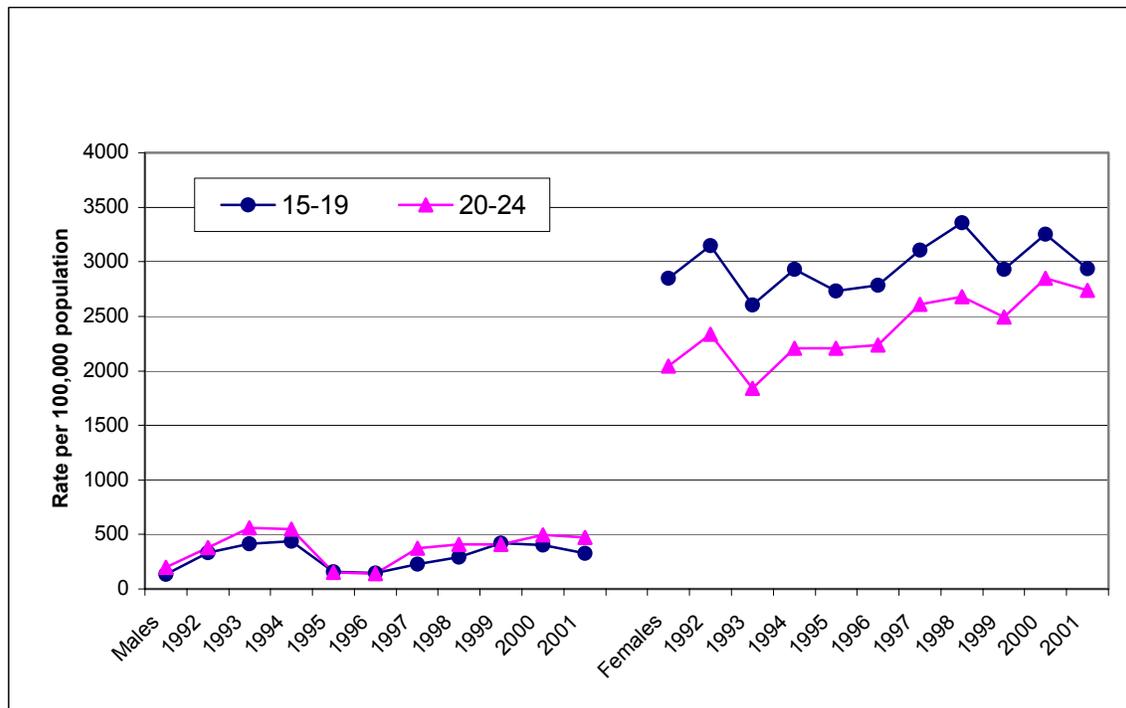


Figure A.4. Chlamydia rates by age and sex. For all years, rates are highest among females aged 15 to 24. Rates among young adults have been substantially higher among women than men (see Figure A.4.). However, this does not mean that the actual burden of disease varies by gender; females may be more likely to be screened and diagnosed with chlamydia than males because of differences in surveillance efforts. Rates are presented per 100,000 population (Appendix).

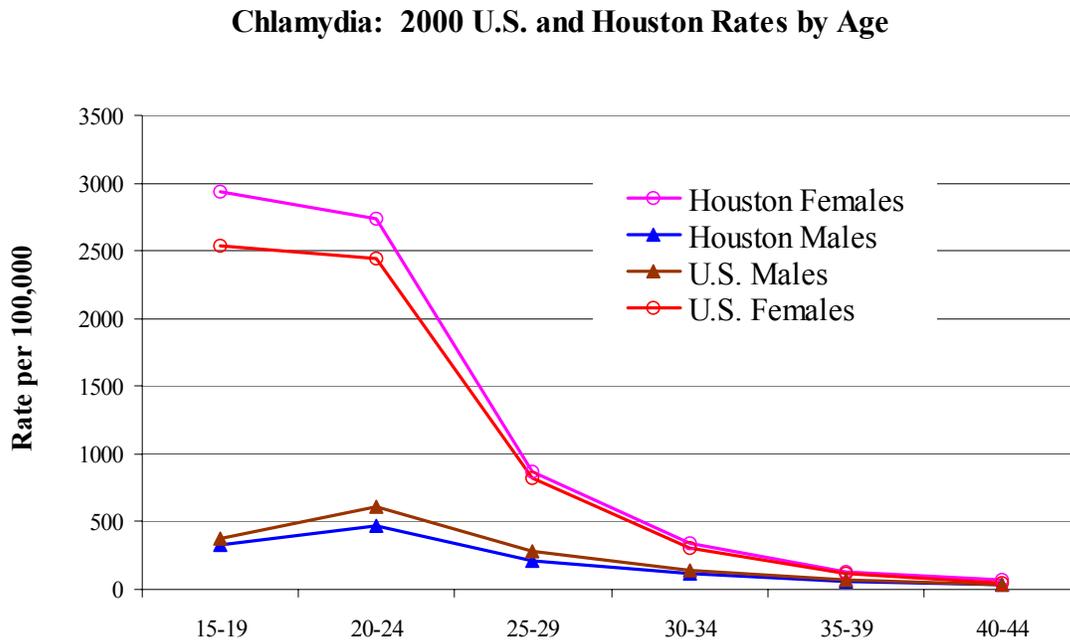
A. CHLAMYDIA: AGE-SPECIFIC RATES

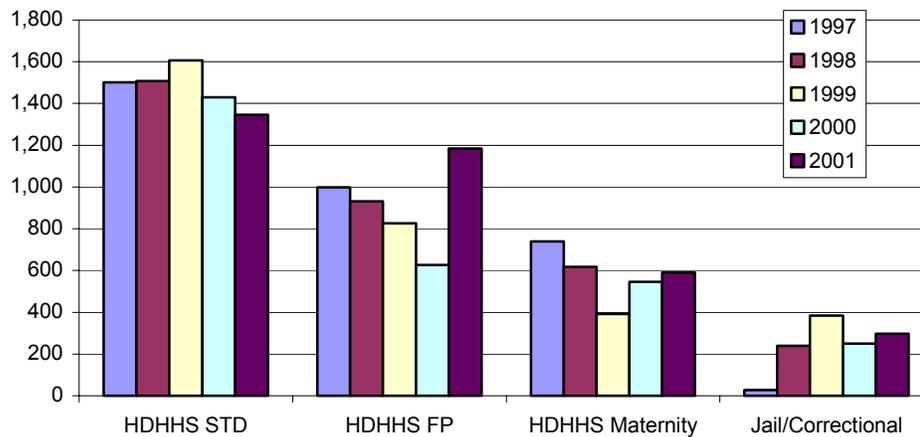
Figure A.5. The 2001 Houston rates among females aged 15 – 29 years are higher than corresponding US rates; 2001 rates among Houston males are similar to US rates at all ages. Rates are presented per 100,000 persons.

A. CHLAMYDIA: DISTRIBUTION BY PROVIDER**Table A. 4.** Distribution of cases among provider types, 1997 – 2001.

	1997	1998	1999	2000	2001
	N (%)				
HDHHS STD ¹	1,502 (14%)	1,507 (13%)	1,607 (15%)	1,430 (12%)	1,346 (12%)
HDHHS FP ²	998 (9%)	931 (8%)	826 (8%)	626 (5%)	1,184 (10%)
HDHHS Maternity ³	739 (7%)	618 (5%)	391 (4%)	546 (5%)	590 (5%)
Jail / Correctional ⁴	27 (1%)	240 (2%)	384 (4%)	250 (2%)	297 (3%)

More than 60% of all chlamydia cases are identified through private physicians, health maintenance organizations, or through laboratory reporting with type-of-provider not documented. Taken together, HDHHS Clinics identify nearly one-third of all Chlamydia cases.

In 2000, the Baylor Teen Clinics ⁵Teen Clinics and the Community Partners Teen Clinics reported almost 17% of all Chlamydia cases. In addition, the screening program at the Juvenile Detention Center reported 2% of the 1999 chlamydia cases and 1.5% of the 2000 cases.

Figure A.6. Number of cases reported by public providers.

¹ HDHHS STD: Lyons, Medical Center, Northside, Riverside, West End, and La Nueva Casa de Amigos

² HDHHS Family Planning: La Nueva Casa de Amigos, Lyons, Magnolia, Northside, Riverside, Sunnyside and West End.

³ HDHHS Maternity: La Nueva Casa de Amigos, Lyons, Magnolia, Northside, Riverside, Sunnyside, West End.

⁴ Jail / Correctional: Harris County Juvenile Detention Center, Harris County Jail, Municipal Detention Center.

⁵ Teen Clinics: Austin, Baylor, Ben Taub, Cavalcade, Lawn, LBJ, and Community Partners Clinics.

A. CHLAMYDIA: PREVALENCE

Prevalence at screening in Certain Clinical Settings

Prevalence varies depending on the population examined and whether testing is for screening or among symptomatic individuals or both (see Figure A.7.). Screening prevalence rates are available for several populations in Houston. During the summer of 1998, all juveniles entering the Juvenile Detention Center were screened for chlamydia. Also, women seeking care at HDHHS maternity clinics are routinely screened for STDs.

Juvenile Detention Center

Incarcerated youth are a high-risk population for sexually transmitted diseases, including chlamydia. During the summer of 1998, youths incarcerated at the Juvenile Detention Center were screened for chlamydia infection and interviewed for potential risk factors. Nearly 14% of all subjects (n=589; 76.4% male) were positive for chlamydia. Females were almost 3 times (95% CI 2.0 to 4.3) more likely to be infected than males (28.1% compared to 9.6%, respectively). Among females, Blacks and Hispanics compared to Whites had similar infection rates (29.0% compared to 27.3%); among males, Blacks and Hispanics had rates twice as high (95% CI 1.2 to 4.2) as Whites (13.5% compared to 6.6%). Self-reported drug use was not associated with increased risk of chlamydia infection, even after adjusting for sex and race/ethnicity ($p = 0.09$). Self-reported use of condoms as sometimes or never, compared to always, was not associated with increased risk of infection, and was not confounded by sex or race/ethnicity ($p = 0.62$). More than 80% of infected individuals (both male and female) were asymptomatic.¹³

HDHHS Maternity and Family Planning Clinics

Using data compiled through the HDHHS Laboratory, we can describe the prevalence of chlamydia among women seeking care at maternity and family planning clinics. Among women tested for chlamydia at HDHHS maternity clinics in 1998, 7.1% were found to be infected (727/10,238) and in 1999, 8.3% (828/9993) were infected; among women tested for chlamydia at HDHHS family planning clinics in 1998, 4.2% were found to be infected (1,013/24,240); in 1999, 6.8% (1850/27272) were infected. If there were no changes in screening practices in the HDHHS Family Planning and Maternity Clinics, these rates do not suggest that the prevalence of chlamydia has declined in the past year.

HDHHS STD Clinics

Symptomatic males examined at HDHHS STD Clinics who are gram stain positive for gonorrhea symptomatic are given dual therapy for gonorrhea and chlamydia. Only asymptomatic males are routinely screened for chlamydia infection. Therefore, the prevalence of chlamydia at screening in STD clinics for males, represents the prevalence of chlamydia in asymptomatic men.

Among males tested for chlamydia in HDHHS STD Clinics, in 1998, 7.2% (617/8,590) were infected, and in 1999, 8.3% (704/8471) were infected.

Among women tested in 1998, 8.6% (1,012/11,811) tested positive; in 1999, 8.3% (980/11,876) tested positive. These figures do not support an overall decline in the prevalence of chlamydia in Houston.

Percent Infected with Chlamydia at Testing

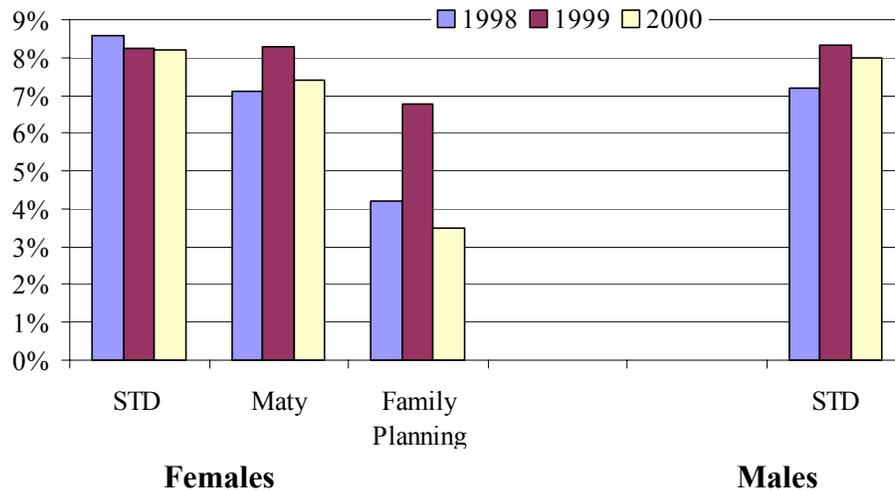


Figure A.7. The percent of individuals found infected with chlamydia among all tested, comparing prevalence at testing for 1998 through 2001.

A. CHLAMYDIA: GEOGRAPHIC DISTRIBUTION

Zip code information is missing for nearly 25% of reported chlamydia cases.

Among those reported by HDHHS STD, Family Planning, and Prenatal clinics, zip code information is available more than 95% of cases. Using this information, we can identify areas of the city where chlamydia rates were highest in 2001.

Fifty percent of infections identified through HDHHS STD clinics were from 25 of the City's 100 zip code areas listed below.

Distribution of Chlamydia cases identified through HDHHS STD
clinics in 2001, among zip codes of residence.

ZIP Code	Total Cases	Cumulative Percent
77033	97	4%
77004	93	7%
77036	76	10%
77088	58	12%
77051	57	15%
77009	56	17%
77045	54	19%
77060	54	21%
77093	54	23%
77091	53	25%
77016	52	27%
77026	52	29%
77021	50	31%
77020	47	33%
77035	47	35%
77055	46	36%
77081	46	38%
77506	46	40%
77520	44	42%
77022	43	43%
77080	42	45%
77053	40	46%
77087	39	48%
77074	38	49%
77092	38	51%

A. CHLAMYDIA: GEOGRAPHIC DISTRIBUTION

Figure A.8 Distribution of cases identified through HDHHS STD clinics, Houston/Harris County, 2001.

