

# Sexually Transmitted Disease and Teen Births in Groton and Groton City, CT

*Chlamydia & Gonorrhea (1997 – 2007)*  
*Teen Births (1998 – 2006)*

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A Report from the Ledge Light Health District Epidemiology Program

**January 2010**





Forward:

According to national guidelines stipulating the “ten essential services” for health departments in the U.S., the most important functions the Ledge Light Health District should perform include:

- Monitor the health status of the community
- Diagnose and investigate health problems
- Inform, educate and empower people
- Mobilize community partnerships
- Develop policies and interventions

To fulfill these functions, the District is initiating a series of reports on Communicable Disease Prevention for our communities, beginning with this report on ***Sexually Transmitted Diseases and Teen Births***. We deem this enormously sensitive subject to be of the highest priority, both because the problem tends to be “hidden” in our community – and thus go unchecked – and because of well documented adverse health outcomes, especially for adolescents and young adults.

A careful reading of this report will reveal the problem of sexually transmitted diseases to resemble an “equal opportunity” public health issue; that is, all ages, all races and every neighborhood show the impact of this steadily worsening situation, though, as with every other health issue in the U.S., denser urban areas and low income neighborhoods suffer disproportionately.

This report, covering Groton and New London, constitutes phase one of this STD report; phase two, reporting on Waterford, East Lyme and Ledyard, will be completed and released next summer.

Let me offer a special salute to Susan Starkey, MPH, RD, the health district’s staff epidemiologist, for conducting the research, compilation and analyses for these reports.

Baker Salisbury, MPH, MSW, MHSA  
Director of Health

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## Executive Summary

Sexually transmitted disease (STD) and teen pregnancy are issues of public health concern because they have a tremendous impact on individuals, families and communities. Eleven years of STD data and nine years of teen birth data were collected and analyzed by Ledge Light Health District to assess the occurrence of these two major reproductive health issues in Groton. Groton rates were compared to national rates to determine if Groton is experiencing unacceptably high levels of STDs or teen pregnancies. In general, Groton STD rates were lower than or comparable to U.S. rates. Groton teen pregnancy rates have increased among 15-17 year-old Black and 15-19 year-old Hispanics and are higher than U.S. target rates. Rates have decreased among 18-19 year-old Blacks, and are now lower than U.S. rates. Teen birth rates have been relatively stable among Whites and Others.

National data indicate that there are STD health disparities; females, non-Whites and young people age 15-24 are most often infected. These disparities are also seen in Groton, but they are more extreme — particularly among 15-29 year-old females. Compared to Whites, chlamydia infection rates were up to 10 times higher among young Black females and three times higher among Hispanics. In addition to female gender, Black race, and Hispanic ethnicity, this analysis suggests that Groton residents age 15-29 years are at highest risk for STD infections. This study also suggests that a past history of a chlamydia infection is a predictor of future chlamydia infections.

Over the past five years in Groton, there has been an average of 11 births per year to 15-17 year-olds and 51 births per year to 18-19 year-olds. Groton birth rates are higher than U.S. rates among 15-17 year-old Blacks and Hispanics and 18-19 year-old Whites, Other race and Hispanics.

There are racial/ethnic disparities in teen births in Groton. In comparison to White 15-17 year-olds, the 2006 birth rate among Blacks was over four times higher, and the rate among Hispanics was over eight times higher. Among 18-19 year-olds, birth rates were 30% higher among Hispanics compared to Whites; there were no births to Black 18-19 year-olds in 2006.

Limitations to the STD and teen pregnancy analysis must be recognized. All Groton rates presented herein are based on Census 2000 data (there is no more recent census data). Groton rates are distorted if the Groton population changed since 2000. For example, if the number of Hispanics has grown, rates among Hispanics are overestimated. Because most STDs are never reported, the numbers in this report underestimate actual numbers. However, comparisons between Groton and U.S. STD rates are not impacted by undercounting because both groups are equally affected. To adjust for the problem of missing race/ethnicity data on STD reports, the number of infections by race/ethnicity was estimated using established methods; these methods may have distorted the final results.

STD and teen pregnancy rates are increasing across the U.S and in Groton among subsets of the population. There is a need to improve the STD and teen pregnancy prevention efforts that are currently in place. Culturally appropriate interventions will be required to reduce the profound disparities between Whites and those who are Black or Hispanic, but broad-based efforts will be required as Whites account for more than half of STD infections and teen births. Successfully reducing the numbers of STDs and teen births in Groton will require the cooperative efforts of many public health partners including Ledge Light Health District, health care providers, Lawrence and Memorial Hospital, the Groton School System, municipal officials, local community agencies and concerned residents.

STD data Tables for the years 2008 – 2009 are provided in Appendix A

## Introduction

Sexually transmitted disease (STD) and teen pregnancy are associated with decreased maternal and child well-being, welfare dependency, out-of-wedlock births, single parenthood and problems with workforce development (National Campaign to Prevent Teen and Unplanned Pregnancy, 2008). The report that follows summarizes data describing the burden of STDs and teen births in Groton and Groton City, CT (hereinafter Groton). The data are useful for assessing trends and identifying demographic groups that have high STD or teen birth rates (*i.e.*, high-risk groups). Reducing STDs and teen births among high-risk groups is an effective means of decreasing health disparities.

In the fall of 2007, the Ledge Light Health District (Ledge Light) established a secure electronic database to track reportable infectious disease, vital statistics, and other health data. Eleven years of data on disease and nine years of data on births in Groton were analyzed to create this report. Limitations to the data include missing data on STD reports, unreliable population estimates and, most importantly, unreported disease. Notwithstanding these limitations, the District can use these numbers to plan its STD and teen pregnancy prevention efforts.

In this report, Ledge Light statistics for chlamydia, gonorrhea, and births to teens are presented and compared, where possible, to national figures in order to assess trends and to identify high-risk groups.

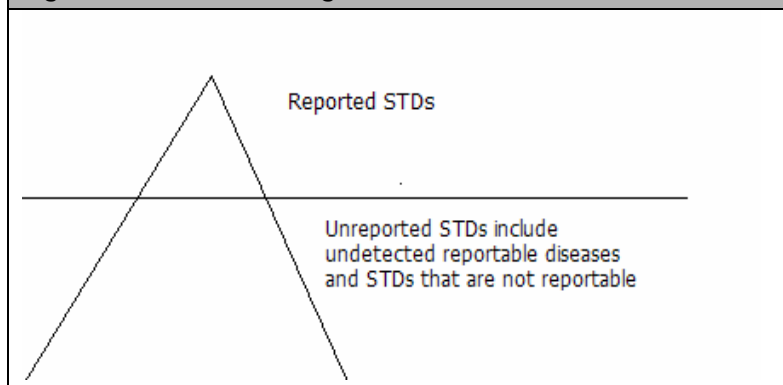
## Section 1. Sexually Transmitted Disease

“Despite the burdens, costs, complications, and preventable nature of STDs, they remain a significant public health problem, largely unrecognized by the public, policymakers, and public health and health care professionals in the United States” (Institute of Medicine, 1997). Many factors contribute to the ongoing STD epidemic in the U.S. Biological issues such as the asymptomatic nature of most STDs and the lag time between exposure and infection cause infections to go undetected. Social and behavioral factors such as access to care, poverty, substance abuse and sex work are all associated with STDs (U.S. Department of Health and Human Services [DHHS], 2000). STD rates reflect STD health disparities; in general, STDs are more common among young people, females, and non-White individuals. (The term *Health Disparities* is defined in the *Notes* section of this report.)

The STD statistics in this report are based on reported STDs, and reported STDs underestimate actual STDs. More than

25 diseases can be transmitted sexually, but only four – chlamydia, gonorrhea, chancroid, and syphilis – must be reported to the CT Department of Public Health (DPH) and local health

**Figure 1. The STD Iceberg**



departments (see *Notes*, page 52, for more information on reportable disease).

Reported infections also underestimate the actual number of infections because STDs can remain undetected. STDs, especially chlamydia, are often asymptomatic and, consequently, infected individuals do not always seek treatment. Additionally, health care providers and laboratories do not always report infections nor do they always report in a timely manner. Reported STDs are often described as the “tip of the iceberg” because what we see is only a small part of a much bigger problem (Figure 1).

## **CHLAMYDIA**

*Chlamydia trachomatis* is a bacterial infection that can be treated with antibiotics, but it is usually asymptomatic, often goes undiagnosed, and can lead to serious complications (Centers for Disease Control and Prevention [CDC], 2007). It is estimated that 75% to 85% of infected women are asymptomatic (Meyers, 2007). Chlamydia infections among females are related to cervicitis, urethritis, cervical cancer, and adverse birth outcomes including miscarriage, premature rupture of membranes, pre-term labor, low birthweight, infant mortality, neonatal chlamydial infection, and postpartum endometriosis. About 40% of untreated chlamydia infections progress to pelvic inflammatory disease (PID), and approximately 20% of women with PID become infertile (CDC, 2007; Meyers, 2007). Only about 5% of infected men experience adverse outcomes, which include urethritis, acute epididymitis and, rarely, urethral strictures and sterility (Meyers, 2007). Chlamydia is the most commonly reported infectious disease in the U.S. (CDC, 2007). Based on the estimated incidence of chlamydia in the U.S. and the actual number of infections reported it is estimated that less than 50% of chlamydia infections are reported (CDC, 2007). The number of chlamydia infections in the U.S. has been increasing for over a decade (CDC, 2007).

### **Chlamydia Infection Numbers**

Gender, age, and race/ethnicity are strong predictors of chlamydia infection risk (CDC, 2007; DHHS, 2000). Tables and figures depicting the number of infections by gender, age and race/ethnicity follow. It is necessary to know the number of infections in order to assess the burden of disease and to estimate prevention and control resource requirements.

### **Chlamydia Infection Rates**

The magnitude of chlamydia disease burden can be evaluated by comparing Groton numbers to national chlamydia numbers. Because there are many more people in the entire U.S. than in Groton and, accordingly, many more infections, rates are calculated in order to compare these two groups of different size. Rates are calculated for total

population, gender groups (females and males), race/ethnic groups (Whites, Blacks, Others and Hispanics), gender/race/ethnicity, gender/age groups (15-19, 20-24 and 25-29 year-olds), and by age/race/ethnicity for females but not males due to small numbers of infections among males (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 53, for further information).

Two comparisons are made for each rate presented: Groton rates are compared to U.S. rates to determine if Groton rates are high relative to the rest of the country, and rates among Groton Whites, Blacks, Others, and Hispanics are compared to determine if there are racial/ethnic disparities in Groton. Data from the year 2006 was used for comparisons because, at the time of data analysis, the most up-to date U.S. data were from the year 2006.

## **Assessing Gender as a Risk Factor for Chlamydia Infection**

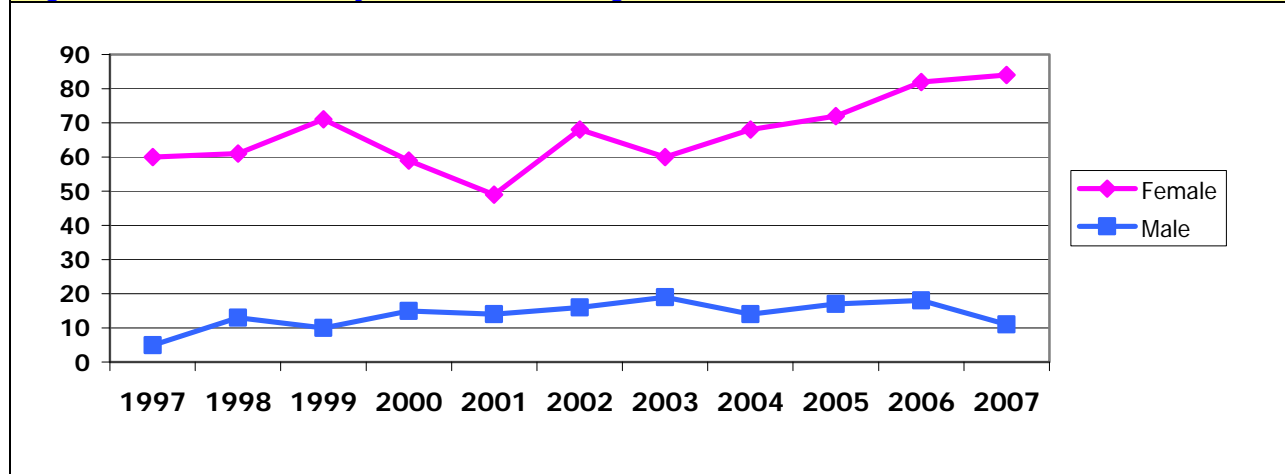
### **Number of Chlamydia Infections in Groton by Gender**

Between 63 and 100 chlamydia infections a year were reported in Groton between 1997 and 2007 (Table 1, Figure 2). Over the past 11 years, females accounted for approximately 83% of chlamydia infections in Groton.

The most current national STD statistics are from the years 2002 to 2006. In that time period, the number of U.S. chlamydia infections increased 19% among females and 41% among males (data not shown); in Groton, the number of chlamydia infections increased 21% among females and 13% among males.

Year	Females		Males		Total
	Number	Percent	Number	Percent	Number
<b>1997</b>	60	92.3	5	7.7	<b>65</b>
<b>1998</b>	61	82.4	13	17.6	<b>74</b>
<b>1999</b>	71	87.7	10	12.3	<b>81</b>
<b>2000</b>	59	79.7	15	20.3	<b>74</b>
<b>2001</b>	49	77.8	14	22.2	<b>63</b>
<b>2002</b>	68	81.0	16	19.0	<b>84</b>
<b>2003</b>	60	75.9	19	24.1	<b>79</b>
<b>2004</b>	68	82.9	14	17.1	<b>82</b>
<b>2005</b>	72	80.9	17	19.1	<b>89</b>
<b>2006</b>	82	82.0	18	18.0	<b>100</b>
<b>2007</b>	84	88.4	11	11.6	<b>95</b>
<b>Total (Average)</b>	<b>734</b>	<b>(82.8)</b>	<b>152</b>	<b>(17.2)</b>	<b>886</b>

**Figure 2. Number of Chlamydia Infections among Groton Females and Males, 1997-2007**



### ***Moving from Number of Infections to Infection Rates***

#### **Comparison of Groton and U.S. Chlamydia Infection Rates by Gender**

Table 2 (page 12) lists the number of chlamydia infections that occurred in Groton in 2006, the corresponding Groton rate and the comparable U.S. rate (2006 is the latest year for which U.S. data were available). As seen in Table 2, the 2006 chlamydia infection rate for the entire Groton population was 28% lower than the U.S. rate. However, rates among subsets of the population often differ significantly from the population rate. The 2006 chlamydia infection rates among Groton females and males were lower than the U.S. rates (18% and 49%, respectively).

#### **Using Rates to Assess Gender Disparities in Groton**

In Groton, chlamydia rates among females are much higher than rates among males. Again referring to Table 2 (page 12), in 2006 in Groton, the infection rate among females was almost five times (377%) higher than the rate among males. In contrast, across the U.S. infection rates among females was about three times (198%) higher than the rate among males (*i.e.*, the disparity between males and females in Groton is more extreme than it is across the U.S.).

**Table 2. Chlamydia Infections: Groton (Number and Rate per 100,000), U.S. (Rate per 100,000), Extent (Percent) to Which Groton Rates are Higher or Lower than U.S. Rates, and Extent (Percent) to Which Groton Rates are Higher or Lower than Groton Comparison Group Rates, 2006**

	Groton		U.S.	Groton % Higher (Lower) than U.S.	Groton % Higher (Lower) than comparison:
	Number	Rate	Rate		
<b>Total Population</b>	100	250.6	347.8	(28)	
<b>Female</b>	82	420.7	510.8	(18)	377
<b>Male</b>	18	88.2	171.3	(49)	XXX
<b>Race/Ethnicity</b>					
White, Non-Hispanic	53	163.3	153.1	6.7	XXX
Black, Non-Hispanic	20	766.9	1,275.0	(40)	370
Other, Non-Hispanic	9	(N.R.)	(N.R.)	(N.R.)	(N.R.)
Hispanic	18	899.6	477.0	87	451
<b>Gender and Race/Ethnicity</b>					
<b>Females</b>					
White, Non-Hispanic	43	270.9	237.0	14	XXX
Black, Non-Hispanic	17	1,416.7	1,760.9	(20)	423
Other, Non-Hispanic	5	349.7	(N.R.)	(N.R.)	29
Hispanic	17	1,718.9	761.3	126	535
<b>Males</b>					
White, Non-Hispanic	10	60.3	66.0	(9)	XXX
Black, Non-Hispanic	3	213.1	741.2	(71)	253
Other, Non-Hispanic	4	281.7	(N.R.)	(N.R.)	367
Hispanic	1	98.9	211.0	(53)	64
<b>Gender, Age Group (15-29 Year-Olds)</b>					
<b>Females</b>					
15-19	16	1,550.4	2,862.7	(46)	XXX
20-24	37	2,726.6	2,797.0	(3)	76
25-29	17	1,053.9	1,141.2	(8)	(32)
<b>Males</b>					
15-19	2	138.5	545.1	(75)	XXX
20-24	10	473.5	856.9	(45)	242
25-29	4	197.9	480.8	(59)	43
<b>Females by Race/Ethnicity, Age Group (15-29 Year-Olds)*</b>					
<b>White, Non-Hispanic</b>					
15-19	(N.R.)	1,209.7	1,378.4	(12)	XXX
20-24	(N.R.)	2,226.5	1,506.3	48	
25-29	(N.R.)	398.4	569.1	(30)	
<b>Black, Non-Hispanic</b>					
15-19	(N.R.)	(N.R.)	9,073.9	(N.R.)	(N.R.)
20-24	(N.R.)	6,000.0	7,973.0	(25)	170
25-29	(N.R.)	4,511.3	3,212.8	40	1,032
<b>Hispanic</b>					
15-19	(N.R.)	4,000.0	2,981.6	34	231
20-24	(N.R.)	6,837.6	3,346.6	104	207
25-29	(N.R.)	(N.R.)	1,525.5	(N.R.)	(N.R.)
<p><i>Note.</i> Numbers may differ from those in Tables 1 due to rounding. Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from age group analyses. XXX=Comparison group. N.R.=not reported. *Other race excluded from race/ethnicity, age group analysis due to small numbers (see <i>Notes, Understanding Public Health Data: Rates and Numbers</i>, page 52).</p>					

## Assessing Race/Ethnicity as a Risk Factor for Chlamydia Infection

### Numbers of Chlamydia Infections by Race/Ethnicity

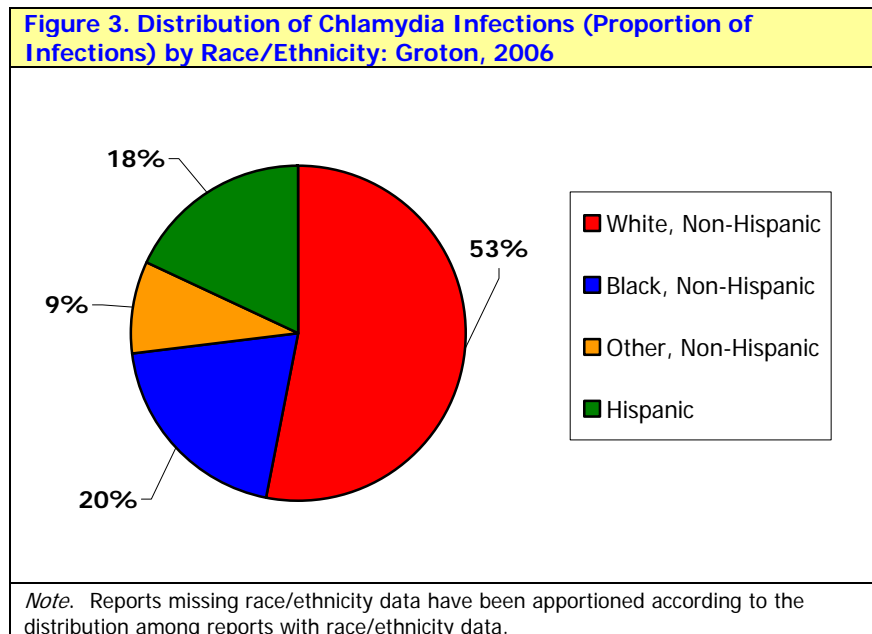
The numbers of chlamydia infections in Groton by race/ethnicity over the past 11 years are depicted in

Table 3, and the racial/ethnic distribution of the numbers of chlamydia infections in Groton in 2006 is displayed in Figure 3.

<b>Table 3. Number of Chlamydia Infections by Race/Ethnicity: Groton, 1997-2007</b>				
<b>Year</b>	<b>White, Non-Hispanic</b>	<b>Black, Non-Hispanic</b>	<b>Other, Non-Hispanic</b>	<b>Hispanic</b>
1997	29	25	0	12
1998	40	25	3	6
1999	45	28	1	7
2000	36	20	5	13
2001	26	29	0	9
2002	51	23	0	11
2003	45	23	2	9
2004	38	35	0	7
2005	54	19	1	14
2006	53	20	9	18
2007	48	34	0	13
<b>Total</b>	<b>465</b>	<b>281</b>	<b>21</b>	<b>119</b>

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Numbers may differ from those in Table 1 due to rounding.

It appears that Blacks and Hispanics bear a disproportionate burden of chlamydia: in 2006, Whites accounted for 81% of the population and 53% of the infections; Blacks accounted for 7% of the population and 20% of the infections; Others for 7% of the population and 9% of the infections; and Hispanics accounted for 5% of the population and 18% of the chlamydia infections.

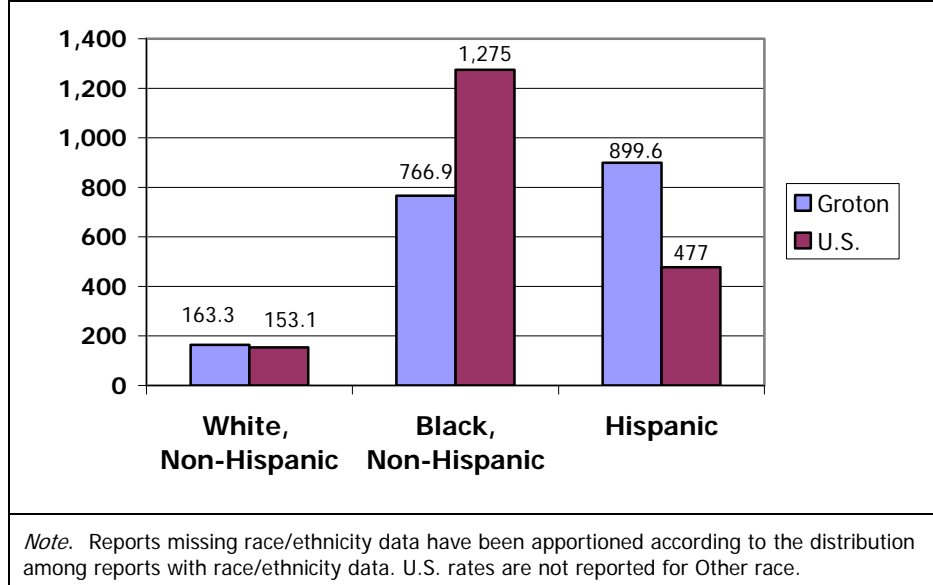


## Moving from Number of Infections to Infection Rates

### Comparison of Groton and U.S. Chlamydia Infection Rates by Race/Ethnicity

Table 2 (page 12) and Figure 4 show that in 2006 Groton chlamydia infection rates were higher than U.S. rates among Whites and Hispanics (7% and 89%, respectively), and 40% lower than U.S. rates among Blacks. U.S. rates are not reported for Other race.

**Figure 4. Chlamydia Infection Rates (per 100,000) by Race/Ethnicity: Groton and U.S., 2006**



### Using Rates to Assess Racial/Ethnic Disparities in Groton

Table 2 (page 12) and Figure 4 show that the 2006 U.S. chlamydia infection rate among Blacks was more than eight times (733%) higher than the rate among Whites; in Groton the rate among Blacks was almost five times (370%) higher than the rate among Whites (*i.e.*, disparities between Whites and Blacks in Groton were not as extreme as they were in the U.S.).

The U.S. chlamydia infection rate among Hispanics was over three times (212%) higher than the rate among Whites; the Groton rate among Hispanics was over five times (451%) higher than the rate among Whites (*i.e.*, disparities between Whites and Hispanics in Groton were more extreme than they were in the U.S.).

## Assessing Gender and Race/Ethnicity as Risk Factors for

### Chlamydia Infection

We have looked at gender as well as race/ethnicity as risk factors for chlamydia. In this section we look at the combination of gender and race/ethnicity. As previously stated, rates for large groups (such males and females or Whites, Blacks, Others, and Hispanics) do not necessarily represent rates for smaller subsets of the population. Rates for Whites, Blacks, Others and Hispanics differ for females and males.

### **Numbers of Chlamydia Infections by Gender and Race/Ethnicity**

The numbers of chlamydia infections among Groton females and males by race/ethnicity are depicted in Table 4. The number of infections is consistently highest among White and Black females.

Year	White, Non-Hispanic		Black, Non-Hispanic		Other, Non-Hispanic		Hispanic	
	Females	Males	Females	Males	Females	Males	Females	Males
1997	26	3	22	3	0	0	12	0
1998	34	6	20	5	2	1	5	1
1999	40	5	23	5	1	0	7	0
2000	33	3	14	6	5	0	7	6
2001	25	1	20	9	0	0	5	4
2002	41	10	19	4	0	0	9	2
2003	34	11	16	7	2	0	8	1
2004	37	1	24	11	0	0	6	1
2005	43	11	13	6	1	0	14	0
2006	43	10	17	3	5	4	17	1
2007	42	6	29	5	0	0	13	0
<b>TOTAL</b>	<b>398</b>	<b>67</b>	<b>217</b>	<b>64</b>	<b>16</b>	<b>5</b>	<b>103</b>	<b>16</b>

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Numbers may differ from those in Tables 1 and 3 due to rounding.

## *Moving from Numbers of Infections to Infection Rates*

### **Chlamydia Infection Rates By Gender and Race/Ethnicity**

The chlamydia infection rates that correspond to the numbers in Table 4 are presented in Table 5.

Year	White, Non-Hispanic		Black, Non-Hispanic		Other, Non-Hispanic		Hispanic	
	Females	Males	Females	Males	Females	Males	Females	Males
<b>1997</b>	163.8	18.1	1,833.3	213.1	0.0	0.0	1,213.3	0.0
<b>1998</b>	214.2	36.2	1,666.7	355.1	142.6	70.4	505.6	98.8
<b>1999</b>	252.0	30.2	1,916.7	355.1	71.3	0.0	707.8	0.0
<b>2000</b>	207.9	18.1	1,166.7	426.1	356.4	0.0	707.8	592.9
<b>2001</b>	157.5	6.0	1,666.7	639.2	0.0	0.0	505.6	395.3
<b>2002</b>	258.3	60.3	1,583.3	284.1	0.0	0.0	910.0	197.6
<b>2003</b>	214.2	66.4	1,333.3	497.2	142.6	0.0	808.9	98.8
<b>2004</b>	233.1	6.0	2,000.0	781.3	0.0	0.0	606.7	98.8
<b>2005</b>	270.9	66.4	1,083.3	426.1	71.3	0.0	1,415.6	0.0
<b>2006</b>	270.9	60.3	1,416.7	213.1	356.4	281.7	1,718.9	98.8
<b>2007</b>	264.6	36.2	2,416.7	355.1	0.0	0.0	1,314.5	0.0

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data.

### **Comparison of Groton and U.S. Chlamydia Infection Rates by Gender and Race/Ethnicity**

In 2006 among females (Table 2, page 12), the Groton chlamydia infection rate was:

- 14% higher than the U.S. rate among Whites;
- 20% lower than the U.S. rate among Blacks;
- 126% higher than the U.S. rate among Hispanics.

In 2006 among males (Table 2, page 12), the Groton chlamydia infection rate was:

- 9% lower than the U.S. rates among Whites;
- 71% lower than the U.S. rate among Blacks;
- 53% lower than the U.S. rate among Hispanics.

## Using Rates to Assess Gender/Race/Ethnicity Disparities in Groton

Looking at Groton data only (Table 2, page 12), we see that the 2006 chlamydia infection rate among Groton females was:

- 423% higher among Blacks compared to Whites;
- 29% higher among Others compared to Whites;
- 535% higher among Hispanics compared to Whites.

Looking at Groton data only (Table 2, page 12), we see that the 2006 chlamydia infection rate among Groton males was:

- 253% higher among Blacks compared to Whites;
- 367% higher among Others compared to Whites;
- 64% higher among Hispanics compared to Whites.

## Assessing Age as a Risk Factor for Chlamydia Infection

### Number of Chlamydia Infections by Gender and Age Group

Chlamydia infections among the very young and old are rare (Tables 6-7). There have been no sexually transmitted chlamydia infections among Groton males below age 15 and only 10 cases among females (all age 14) between 1997 and 2007. There were no chlamydia infections among residents over age 64. The annual number of infections increases dramatically after age 14 among females and after age 19 among males. The annual number of infections tends to drop off after age 29 among females and age 34 among males.

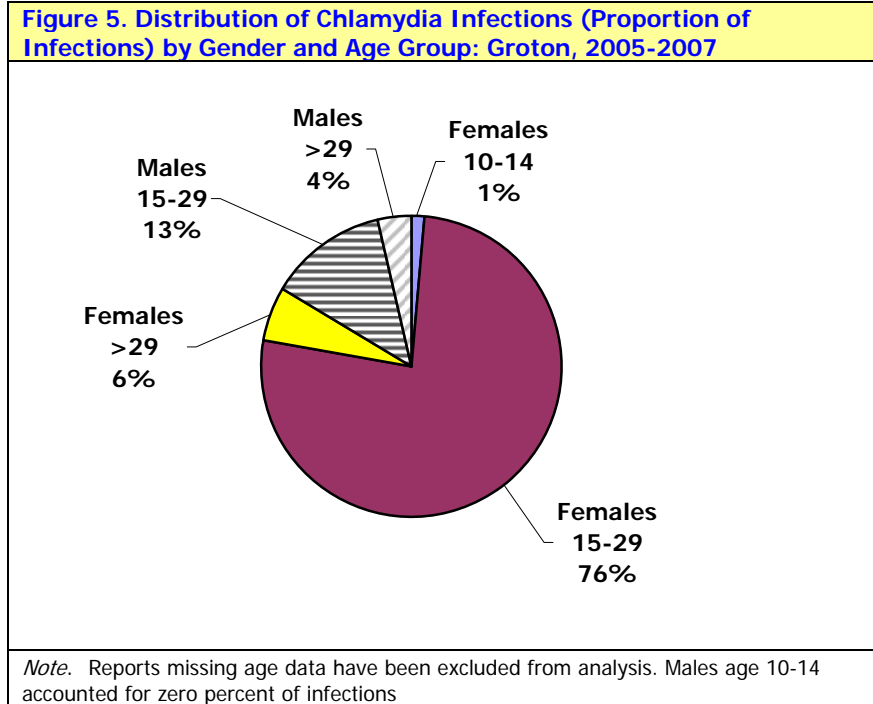
Year	<10*	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-54	55-64	Unknown	Total
1997	0	0	28	25	5	0	0	1	0	0	1	60
1998	0	1	23	28	7	1	1	0	0	0	0	61
1999	0	2	22	35	4	6	0	2	0	0	0	71
2000	0	2	26	21	7	1	0	0	0	0	2	59
2001	0	1	22	15	8	2	0	0	1	0	0	49
2002	0	0	28	27	9	3	0	0	0	0	1	68
2003	0	0	14	29	13	2	1	1	0	0	0	60
2004	0	0	22	29	12	3	1	0	0	1	0	68
2005	0	0	24	35	9	4	0	0	0	0	0	72
2006	0	1	16	37	17	4	4	0	0	0	3	82
2007	0	3	34	31	11	2	0	0	0	2	1	84
<b>TOTAL</b>	<b>0</b>	<b>10</b>	<b>259</b>	<b>312</b>	<b>102</b>	<b>28</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>8</b>	<b>734</b>

Note. \* Congenitally acquired.

Table 7. Number of Chlamydia Infections by Age Group: Groton Males, 1997-2007												
Year	<10*	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-54	55-64	Unknown	Total
1997	0	0	2	1	1	1	0	0	0	0	0	5
1998	0	0	3	7	1	2	0	0	0	0	0	13
1999	0	0	1	2	5	0	1	0	0	0	1	10
2000	0	0	1	8	1	4	1	0	0	0	0	15
2001	0	0	5	6	1	1	0	0	0	0	1	14
2002	0	0	2	7	4	2	1	0	0	0	0	16
2003	0	0	4	7	4	2	2	0	0	0	0	19
2004	0	0	2	7	1	1	2	0	1	0	0	14
2005	0	0	4	4	4	4	1	0	0	0	0	17
2006	0	0	2	10	4	1	1	0	0	0	0	18
2007	0	0	2	3	3	1	1	0	1	0	0	11
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>62</b>	<b>29</b>	<b>19</b>	<b>10</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>152</b>

Note. \* Congenitally acquired.

In 2006, 89% of chlamydia infections in Groton occurred among 15-29 year-olds (Figure 5). This was comparable to U.S. statistics; in 2006, 15-29 year-olds accounted for 86% of U.S. chlamydia infections (data not shown).



**Moving from Numbers of Infections to Infection Rates**

In this section, infection rates are only calculated for Groton residents age 15-29 because most infections occur among residents in that age group. Data on 15-19, 20-24 and 25-29 year-old females and males are compared.

### **Comparison of Groton and U.S. Chlamydia Infection Rates by Gender/Age**

Again, referring to Table 2 (page 12), the 2006 infection rates among 15-29 year-old Groton females were lower than U.S. rates:

- 46% lower among 15-19 year-olds;
- 3% lower among 20-24 year-olds;
- 8% lower among 25-29 year-olds.

The 2006 chlamydia infection rates among 15-29 year-old Groton males were also lower than U.S. rates:

- 75% lower among 15-19 year-olds;
- 45% lower among 20-24 year-olds;
- 59% lower among 25-29 year-olds.

### **Using Rates to Assess Groton Chlamydia Infection Trends by Gender and Age**

Although rates among 15-29 year-old Groton females and males are lower than U.S. rates, there is still reason for concern because infection rates in Groton have been increasing over the past 11 years (Table 8, Figures 6-7).

Among Groton females, chlamydia infection rates have increased:

- 21% among 15-19 year-olds;
- 24% among 20-24 year-olds;
- 120% among 25-29 year-olds.

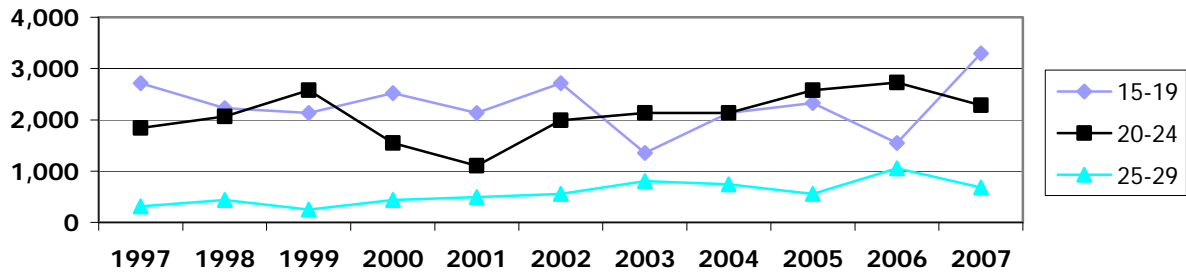
Among Groton males, chlamydia infection rates were stable among 15-19 year-olds and increased 200% among 20-29 year-olds between.

**Table 8. Chlamydia Infection Rates (per 100,000) by Gender and Age Group: Groton 15-29 Year-Olds, 1997-2007**

Year	Females			Males		
	15-19	20-24	25-29	15-19	20-24	25-29
1997	2,713.2	1,842.3	310.0	138.5	47.3	49.5
1998	2,228.7	2,063.4	434.0	207.8	331.4	49.5
1999	2,131.8	2,579.2	248.0	69.3	94.7	247.4
2000	2,519.4	1,547.5	434.0	69.3	378.8	49.5
2001	2,131.8	1,105.4	496.0	346.3	284.1	49.5
2002	2,713.2	1,989.7	558.0	138.5	331.4	197.9
2003	1,356.6	2,137.1	806.0	277.0	331.4	197.9
2004	2,131.8	2,137.1	744.0	138.5	331.4	49.5
2005	2,325.6	2,579.2	558.0	277.0	189.4	197.9
2006	1,550.4	2,726.6	1,053.9	138.5	473.5	197.9
2007	3,294.6	2,284.5	682.0	138.5	142.0	148.4

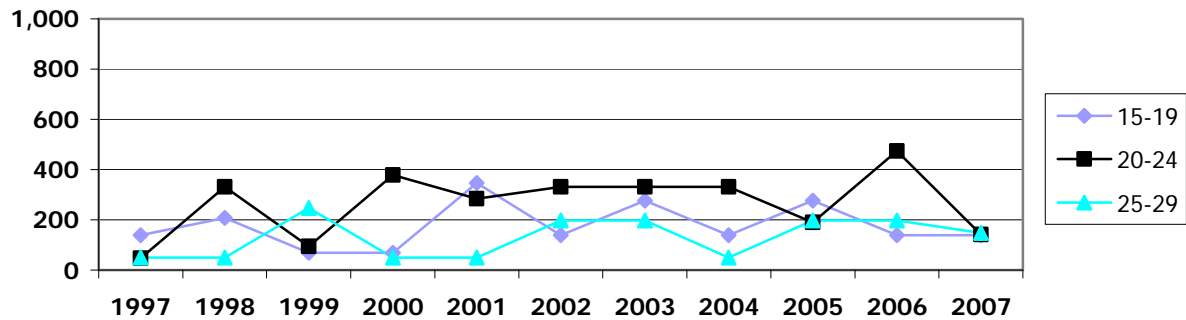
*Note.* Reports missing age data have been excluded from analysis.

**Figure 6. Chlamydia Infection Rates (per 100,000) by Age Group: 15-29 Year-Old Groton Females, 1997-2007**



*Note.* Reports missing age data have been excluded from analysis.

**Figure 7. Chlamydia Infection Rates (per 100,000) by Age Group: 15-29 Year-Old Groton Males, 1997-2007**



*Note.* Reports missing age data have been excluded from analysis.

## **Using Rates to Assess Gender/Age Disparities in Groton**

Looking at 2006 Groton data only (Table 2, page 12), we see that there are disparities between age groups. The chlamydia infection rate among females was:

- 76% higher among 20-24 year-olds compared to 15-19 year-olds;
- 32% lower among 25-29 year-olds compared to 15-19 year-olds.

In Groton in 2006 (Table 2, page 12), the chlamydia infection rate among males was:

- 242% higher among 20-24 year-olds compared to 15-19 year-olds;
- 43% higher among 25-29 year-olds compared to 15-19 year-olds.

## **Assessing Age and Race/Ethnicity as Risk Factors for Chlamydia Infection among Females**

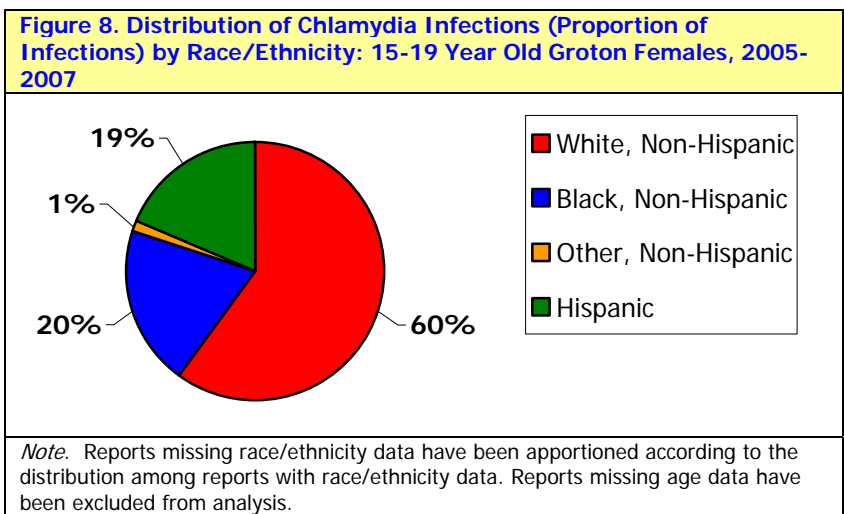
Thus far, we have reviewed chlamydia data for females and males by race/ethnicity or by age group. Sufficient data exist to examine the combination of age and race/ethnicity as a risk factor for chlamydia infections among females but not among males (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 52, for further information).

### **Number of Chlamydia Infections among Females by Age and Race/Ethnicity**

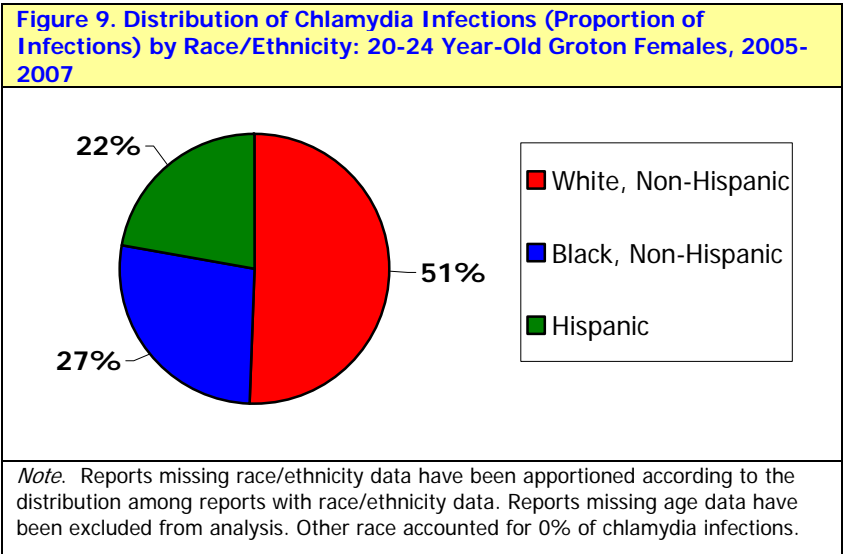
The number of infections experienced by 15-29 year-old females by age and race/ethnicity has been intentionally withheld (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 52, for further information).

Because the number of females in each age/race/ethnicity group is small and the number of infections among the females in those groups even smaller, it is useful to add together three years of data (2005-2007) to obtain a sufficient number of infections to calculate a reliable estimate of the distributions of chlamydia infections in each age/race/ethnicity group. The distributions of the number of infections among 15-29 year-old females by three-year age groups are depicted in Figures 8-10.

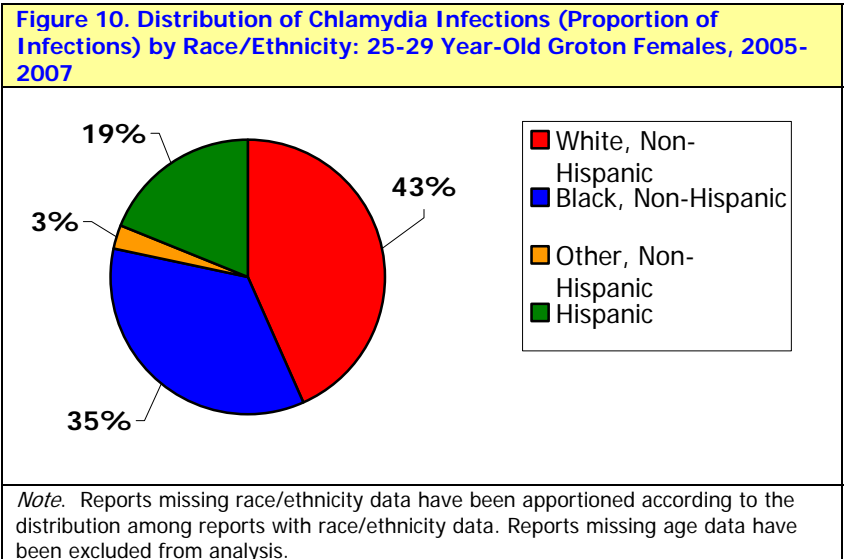
Among 15-19 year-old Groton females, Whites accounted for more than three times as many chlamydia infections as Blacks or Hispanics during the years 2005-2007 (Figure 8).



The proportion of infections among Blacks increases as females age, with a corresponding decrease in the proportion of infections among Whites (Hispanics consistently account for approximately 20% of infections [Figures 9-10]).



Among 25-29 year-old females, the proportion of infections among Whites dropped to 43% while the proportion among Blacks increased to 35% (Figure 10).



## Moving from Numbers to Rates

Table 9 depicts the chlamydia infection rates among 15-29 year-old Groton females by race/ethnicity and age group; rates among 15-19 year-old Blacks, 25-29 year-old Hispanics and Other race were not calculated for statistical considerations (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 52, for further information).

Year	15-19		20-24			25-29	
	White, Non-Hispanic	Hispanic	White, Non-Hispanic	Black, Non-Hispanic	Hispanic	White, Non-Hispanic	Black, Non-Hispanic
1997	1,747.3	4,000.0	968.1	7,000.0	5,982.9	159.4	1,503.8
1998	1,612.9	2,000.0	1,548.9	8,000.0	3,418.8	398.4	1,503.8
1999	1,881.7	3,000.0	1,742.5	16,000.0	854.7	239.0	751.9
2000	1,747.3	2,000.0	1,161.7	5,000.0	4,273.5	398.4	0.0
2001	1,881.7	0.0	387.2	8,000.0	3,418.8	478.1	0.0
2002	2,688.2	4,000.0	968.1	14,000.0	2,564.1	717.1	0.0
2003	1,209.7	0.0	1,452.1	6,000.0	6,837.6	637.5	3,759.4
2004	1,612.9	3,000.0	1,645.7	10,000.0	854.7	478.1	3,007.5
2005	2,150.5	3,000.0	1,742.5	6,000.0	9,401.7	398.4	1,503.8
2006	1,209.7	4,000.0	2,226.5	6,000.0	6,837.6	398.4	4,511.3
2007	2,688.2	7,000.0	1,064.9	16,000.0	3,418.8	478.1	3,759.4

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from analysis. \*Rates excluded for Others, 15-19 year-old Blacks, and 25-29 year-old Hispanics (See *Notes, Understanding Public Health Data: Rates and Numbers*, page 52).

## Comparison of Groton and U.S. Chlamydia Infection Rates by Female Gender, Age and Race/Ethnicity

Table 2 (page 12) and Figure 11 show that the 2006 chlamydia infection rate among 15-19 year-old females was:

- 12% lower among Groton Whites than U.S. Whites;
- not calculated for Blacks due to small Groton population size;
- 34% higher among Groton Hispanics than U.S. Hispanics;

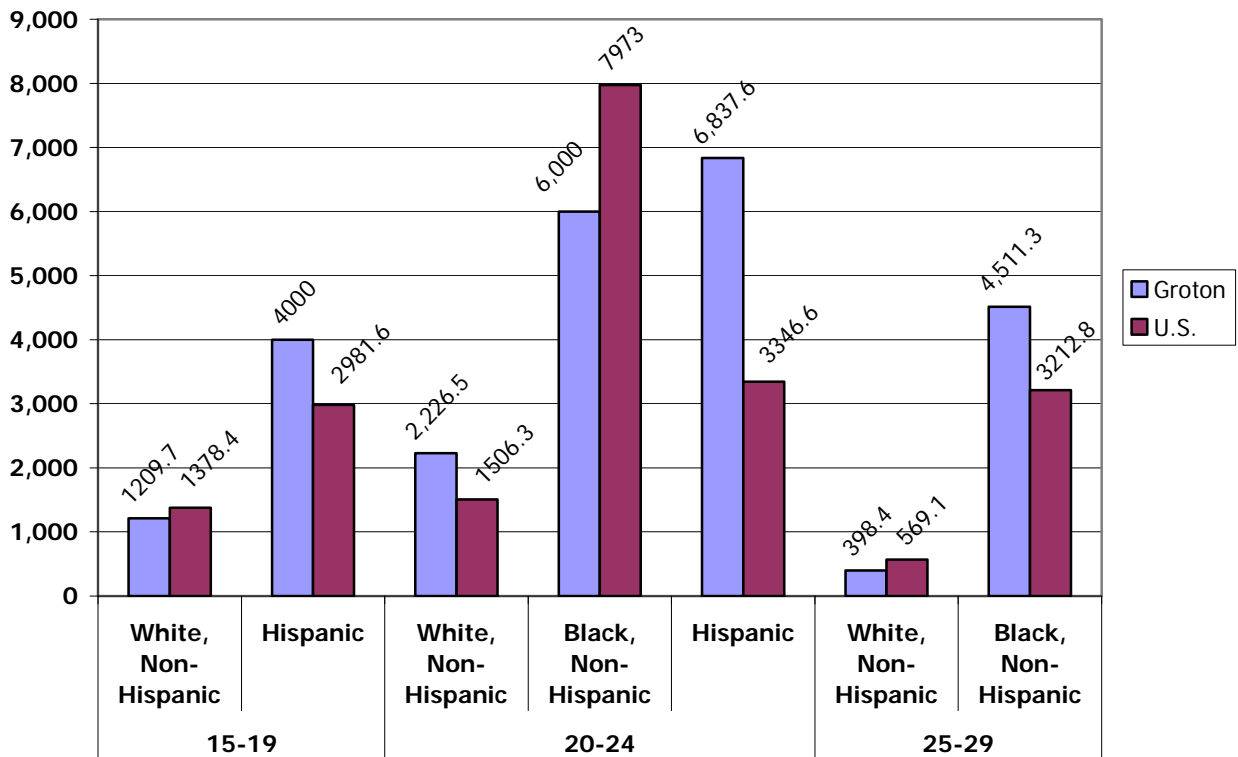
20-24 year-old females was:

- 48% higher among Groton Whites than U.S. Whites;
- 25% lower among Groton Blacks than U.S. Blacks;
- 104% higher among Groton Hispanics than U.S. Hispanics;

25-29 year-old females was:

- 30% lower among Groton Whites than U.S. Whites;
- 40% higher among Groton Blacks than U.S. Blacks;
- not calculated for Hispanics due to small Groton population size.

**Figure 11. Chlamydia Infection Rates (per 100,000) by Age Group and Race/Ethnicity\*: 15-29 Year-Old Groton and U.S. Females, 2006**



*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from analysis. \*Data excluded for Others, 15-19 year-old Blacks, and 25-29 year-old Hispanics due to small numbers (See *Notes, Understanding Public Health Data: Rates and Numbers*, page 52).

### Using Rates to Assess Age/Race/Ethnicity Disparities among Groton Females Age 15-29

Although Whites accounted for the majority of chlamydia infections among 15-24 year-old females in Groton (Figures 8-10), chlamydia infection rates are higher among 20-24 year-old Black and 15-24 year-old Hispanic females (Table 9, Figure 11).

Among Groton females, the 2006 chlamydia infection rate among:

- 15-19 year-olds was 231% higher among Hispanics than Whites (rates were not calculated for 15-19 year-old Black females);
- 20-24 year-old Blacks and Hispanics was greater than the rate among Whites (170% and 207%, respectively);
- 25-29 year-old Blacks was more than 11 times (1,032%) higher than the rate among Whites (rates were not calculated for 25-29 year-old Hispanics females).

## Introduction to Rolling Averages

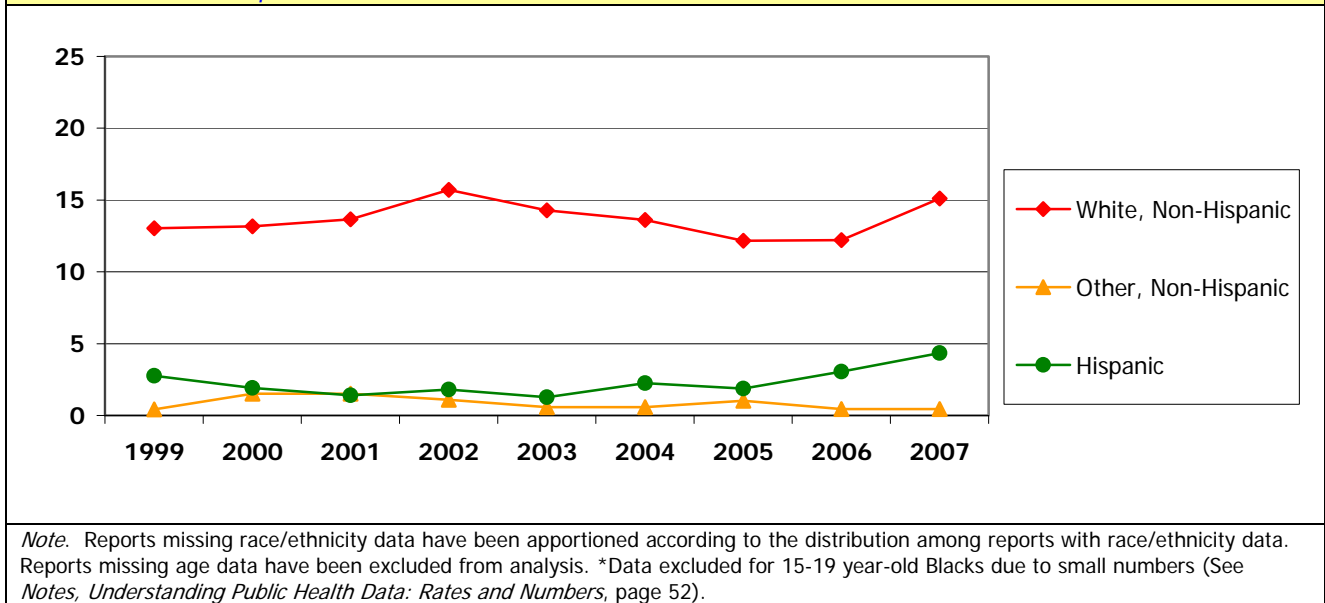
Groton chlamydia infection rates are dramatically affected by small changes in the number of infections; for example, the chlamydia infection rate among 15-19 year-old Hispanic Groton females increased 75% between 2006 and 2007 due to three additional infections that occurred in 2007. Annual variations in the number of chlamydia infections may reflect actual changes in the number of infections, random changes, and also over- and under-counting (because reports are not always received in the year in which the infection occurred). The three-year rolling average number of chlamydia infections (Table 10, and Figures 12-14) smoothes the variations in data and makes trends more apparent (see *Notes, Three-Year Rolling Averages*, page 54, for further information on rolling averages).

Year	15-19			20-24				25-29		
	White, Non-Hispanic	Other	Hispanic	White, Non-Hispanic	Black, Non-Hispanic	Other	Hispanic	White, Non-Hispanic	Black, Non-Hispanic	Other
1999	13	0	3	15	11	0	4	3	2	0
2000	13	2	2	15	10	0	3	4	1	1
2001	14	2	1	11	9	0	3	5	0	1
2002	16	1	2	9	9	0	4	7	0	1
2003	14	1	1	9	9	0	5	8	2	0
2004	14	1	2	14	10	0	4	8	3	0
2005	12	1	2	16	8	0	7	6	4	0
2006	12	0	3	19	8	0	7	5	4	0
2007	15	0	4	17	9	0	8	5	4	0

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from analysis. \*Rates excluded for 15-19 year-old Blacks and 25-29 year-old Hispanics due to small numbers (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 52).

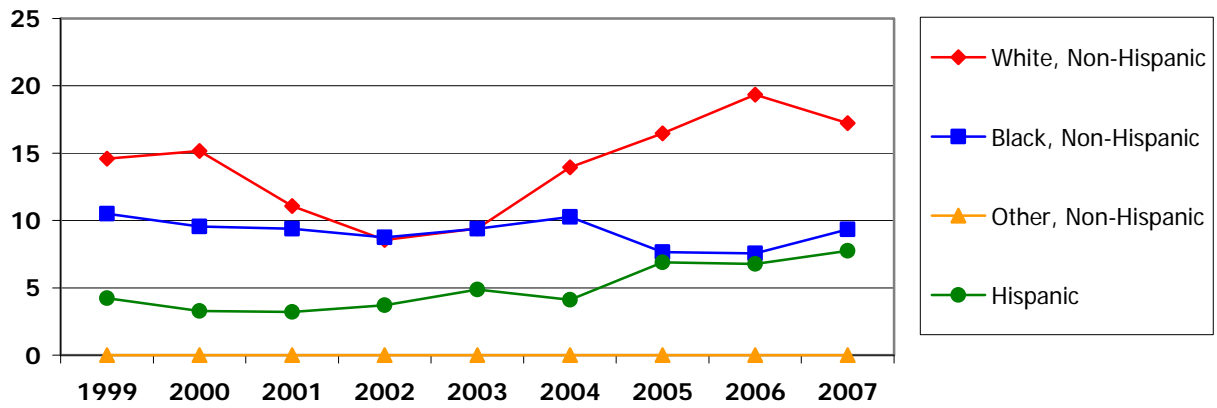
The three-year rolling averages (Figure 12) among 15-19 year-old females suggest a trend of a slight increase in numbers of infections among Whites and Hispanics (averages among Blacks are not depicted). Infections among 15-19 year-old females of Other race are virtually non-existent.

**Figure 12. Three-Year Rolling Average Number of Chlamydia Infections by Race/Ethnicity\*: 15-19 Year-Old Groton Females, 1999-2007**



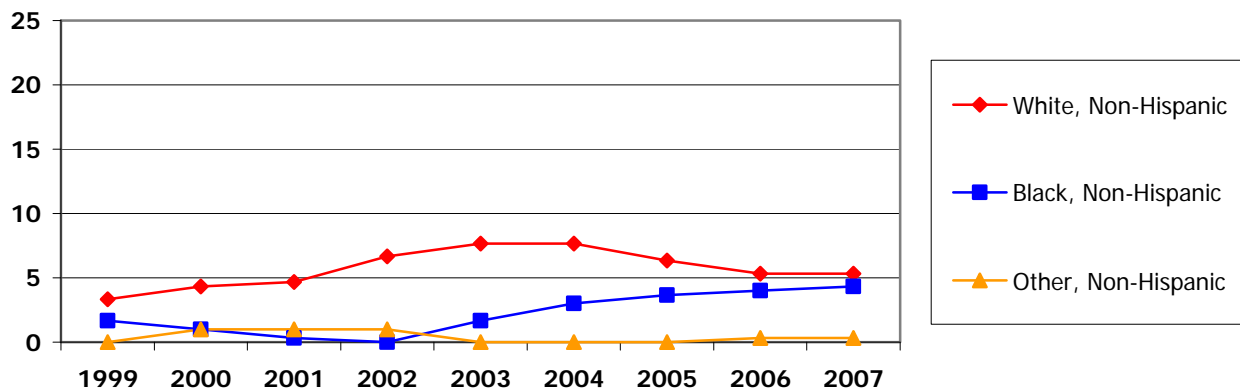
The three-year rolling averages (Figure 13) among 20-24 year-old females suggest that the trend of increasing numbers of infections among Whites has recently reversed and infections among Blacks and Hispanics have been relatively stable. Among Groton 25-29 year-old females (Figure 14), the three-year rolling averages suggest that chlamydia infections are stable among Whites, Blacks and Others (trends for Hispanics are not depicted).

**Figure 13. Three-Year Rolling Average Number of Chlamydia Infections by Race/Ethnicity: 20-24 Year-Old Groton Females, 1999-2007**



*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from analysis.

**Figure 14. Three-Year Rolling Average Number of Chlamydia Infections by Race/Ethnicity\*: 25-29 Year-Old Groton Females, 1999-2007**



*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Reports missing age data have been excluded from analysis. \*Data were excluded for 25-29 year-old Hispanics due to small numbers (See *Notes, Understanding Public Health Data: Rates and Numbers*, page 52).

## **Multiple Chlamydia Infections among Females and Males**

The data on Groton residents infected with chlamydia multiple times were examined to determine if a history of one chlamydia infection increases the likelihood of a subsequent chlamydia infection. If individuals who are infected once are likely to become re-infected, those individuals are appropriate targets for heightened prevention efforts. The number of chlamydia infections is not equal to the number of individuals who have been infected by chlamydia because individuals may be infected more than once. Record matching based on common name, address, and/or date of birth was used to classify all infections on an ordinal basis (*i.e.*, first, second or third infection). These matching criteria would lead to an under-estimation of individuals who experienced more than one infection if subsequent infections could not be matched to an individual (this would happen, for example, if one report had some but not all of the data required to match records). For this analysis, an infection was defined as a subsequent infection if that infection occurred at least one month after the previous infection. This time frame was established based on the recognition that chlamydia infections respond to treatment and would not result in a positive laboratory test at 30 days past initiation of treatment (personal conversation, Otilio Alvarides, CT DPH). This classification system is subject to error: if an infected individual were not treated and tested positive 30 days after the first test, that person would be counted erroneously as having had a subsequent infection. This error would only be of importance if there were a great number of individuals diagnosed with chlamydia who were not treated. The risk of subsequent infections was assessed separately for females and males to examine gender-based differences. Age-associated risk was also assessed; the percentages of infections among individuals less than age 28 and those less than age 19 were calculated to refine the definition of individuals at high risk for a chlamydia infection. The results of this analysis follow.

## **Females with Multiple Chlamydia Infections**

In Groton from 1997 through 2007, 612 females were diagnosed with a sexually transmitted chlamydia infection.

- 122 females (20% of those ever infected) had two or more chlamydia infections;
  - 109 (89%) of individuals with two or more infections were below age 28, and 21 (17%) were below age 19;
- 21 females (17% of those infected twice) had three or more infections
  - 18 (86%) of individuals with three or more infections were below age 28, and one (5%) was below age 19;
- four females (19% of those infected three times) had four infections
  - all individuals with four or more infections were below age 28, and none were below age 19;
- no females were reported to have more than four infections.

## **Males with Multiple Chlamydia Infections**

In Groton, from 1997 through 2007:

- 141 males were diagnosed with a sexually transmitted chlamydia infection;
- 11 males (11% of those ever infected) had two chlamydia infections
  - nine (82%) were below age 28, and one (9%) was below age 19
- no males were reported to have more than two chlamydia infections.

## **Multiple Chlamydia Infection Analysis Conclusions**

These findings suggest that a history of chlamydia infection is a predictor of subsequent infections; 20% of females and 8% of males who were infected once went on to become infected two or more times. Further, the data suggest females below age 28 are at highest risk of experiencing multiple chlamydia infections. Males are less likely than females to experience two or more chlamydia infections.

# Gonorrhea

## Background

Gonorrhea is the second-most commonly reported infectious disease in the U.S., and it is estimated that only 50% of gonorrhea infections are reported (Weinstock, 2004). Left untreated, gonorrhea can lead to serious health problems including pelvic inflammatory disease in women and epididymitis in men. Gonorrhea infections increase the risk of HIV infections (if exposed to HIV). Drug resistance is an important issue; currently there is only one class of antibiotic recommended to treat gonorrhea (CDC, 2007).

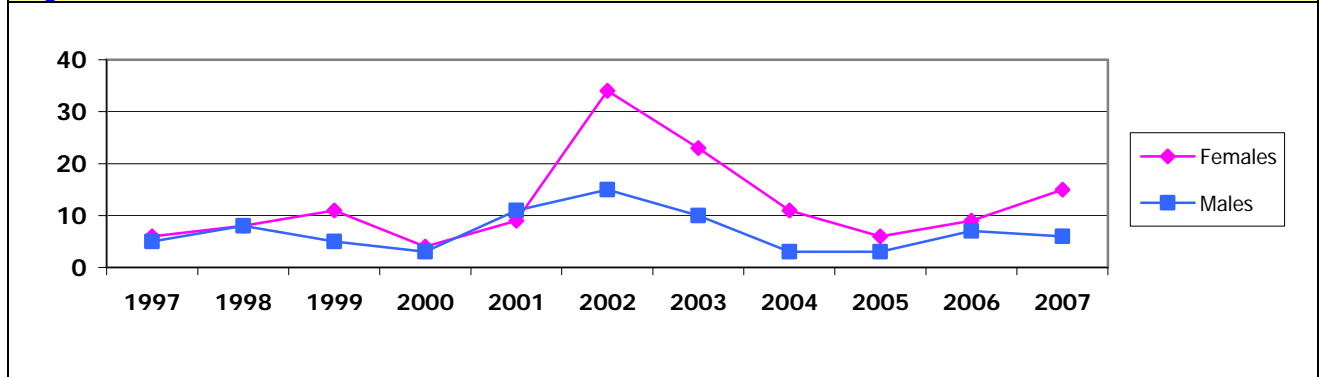
## Assessing Gender as a Risk Factor for Gonorrhea Infection

### Number of Gonorrhea Infections in Groton by Gender

Over the past 11 years, the annual number of gonorrhea infections in Groton has ranged from 7 to 49 (Table 11, Figure 15); infections decreased from 2002 until 2005 but have been increasing since then among both males and females. Gender is not a risk factor for gonorrhea; in 2006 females accounted for 56% of gonorrhea infections in Groton and 52% of U.S. gonorrhea infections (U.S. data not shown).

Year	Females		Males		Total
	Number	Percent	Number	Percent	Number
1997	6	54.5	5	45.5	11
1998	8	50.0	8	50.0	16
1999	11	68.8	5	31.3	16
2000	4	57.1	3	42.9	7
2001	9	45.0	11	55.0	20
2002	34	69.4	15	30.6	49
2003	23	69.7	10	30.3	33
2004	11	78.6	3	21.4	14
2005	6	66.7	3	33.3	9
2006	9	56.3	7	43.8	16
2007	15	71.4	6	28.6	21
<b>Total (Average)</b>	<b>136</b>	<b>(64.2)</b>	<b>76</b>	<b>(35.8)</b>	<b>212</b>

**Figure 15. Number of Gonorrhea Infections: Groton Females and Males, 1997-2007**



### ***Moving from Number of Infections to Infection Rates***

Table 12 depicts the number of gonorrhea infections in Groton in 2006, the corresponding gonorrhea infection rate and the comparable U.S. rate (2006 is the latest year for which U.S. data were available). Rates are also calculated for females and males. There were insufficient data to calculate infection rates by race or age group.

This was due to the small number of infections reported each year and the high proportion of reports that did not

**Table 12. Gonorrhea Infections: Groton (Number and Rates per 100,000), U.S. (Rates per 100,000), Extent (Percent) to which Groton Rates are Lower than U.S. Rates, 2006**

	Groton		U.S.	Groton % Lower than U.S.
	Number	Rate	Rate	
<b>Total Population</b>	16	40.1	120.9	67
<b>Female</b>	9	46.2	124.3	63
<b>Male</b>	7	34.3	116.8	71

have race/ethnicity data (see *Notes, Understanding Public Health Data: Rates and Numbers*, page 52, for further information).

### **Comparison of Groton and U.S. Gonorrhea Infection Rates by Gender**

The 2006 Groton gonorrhea infection rate among:

- the total population was 67% lower than the U.S. rate;
- females was 63% lower than the U.S. rate among females;
- males was 71% lower than the U.S. rates among males.

### **Using Rates to Assess Gender Disparities in Groton**

In Groton, the 2006 gonorrhea rate was 35% higher among females than males.

## Assessing Race/Ethnicity as a Risk Factor for Gonorrhea Infection

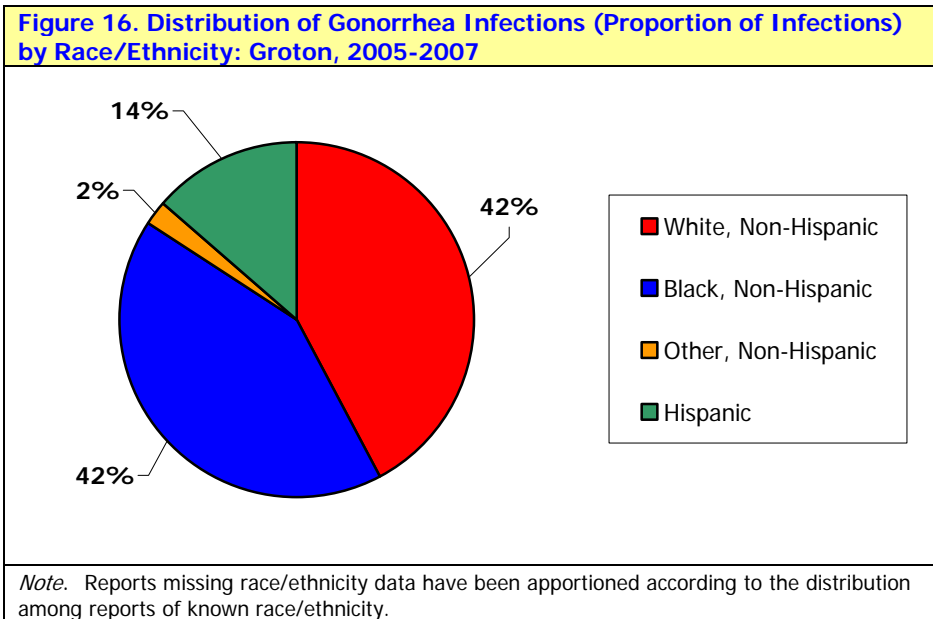
### Numbers of Gonorrhea Infections in Groton by Race/Ethnicity

The numbers of gonorrhea infections in Groton by race/ethnicity over the past 11 years are depicted in Table 13, and the racial/ethnic distribution of the numbers of gonorrhea infections in Groton during 2005-2007 is displayed in Figure 16.

<b>Table 13. Number of Gonorrhea Infections by Race/Ethnicity: Groton, 1997-2007</b>				
<b>Year</b>	<b>White, Non-Hispanic</b>	<b>Black, Non-Hispanic</b>	<b>Other, Non-Hispanic</b>	<b>Hispanic</b>
1997	7	2	0	2
1998	5	10	0	1
1999	6	8	1	1
2000	4	3	0	0
2001	5	13	1	0
2002	23	20	1	4
2003	18	10	1	5
2004	5	9	0	0
2005	6	3	0	0
2006	4	7	1	4
2007	10	10	0	2
<b>Total</b>	<b>93</b>	<b>95</b>	<b>5</b>	<b>19</b>

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Numbers may differ from those in Table 9 due to rounding.

Because the annual number of gonorrhea infections is small and varies from year to year, it is useful to add together three years of data in order to obtain a sufficient number of infections to calculate a reliable estimate of the distributions of gonorrhea infections in each race-ethnicity group. In Groton,



during 2005 through 2007, Whites accounted for 81% of the population and 42% of gonorrhea infections, Blacks accounted for 7% of the population and 42% of gonorrhea

infections, Others accounted for 7% of the population and 2% of the infections, Hispanics accounted for 5% of the population and 14% of the gonorrhea infections. Groton gonorrhea infection rates by race/ethnicity were not calculated because the small number of infections in each racial/ethnic group would result in statistically unreliable estimates.

## **Assessing Gender and Race/Ethnicity as Risk Factors for Gonorrhea Infection**

### **Number of Gonorrhea Infections in Groton by Gender and Race/Ethnicity**

Having assessed gender and race/ethnicity as separate risk factors for gonorrhea infection, we now look at the combination of gender and race/ethnicity. The number of gonorrhea infections among Groton females and males by race/ethnicity are displayed in Table 14.

Year	White, Non-Hispanic		Black, Non-Hispanic		Other, Non-Hispanic		Hispanic	
	Females	Males	Females	Males	Females	Males	Females	Males
1997	4	3	0	2	0	0	2	0
1998	4	1	3	7	0	0	1	0
1999	5	1	4	4	1	0	1	0
2000	2	2	2	1	0	0	0	0
2001	3	2	6	7	0	1	0	0
2002	17	6	11	9	1	0	4	0
2003	15	3	4	6	1	0	3	2
2004	4	1	7	2	0	0	0	0
2005	3	3	3	0	0	0	0	0
2006	3	1	3	4	0	1	2	2
2007	9	1	6	4	0	0	0	2
<b>Total</b>	<b>69</b>	<b>24</b>	<b>49</b>	<b>46</b>	<b>3</b>	<b>2</b>	<b>13</b>	<b>6</b>

*Note.* Reports missing race/ethnicity data have been apportioned according to the distribution among reports with race/ethnicity data. Numbers may differ from those in Table 11 due to rounding.

Because the number of gonorrhea infections is small and varies from year to year, it is useful to add together three years of data (2005-2007) in order to obtain a sufficient number of infections to make reliable comparisons between groups. Among females in Groton, from 2005 through 2007:

- Whites accounted for 81% of the population and 52% of gonorrhea infections;
- Blacks accounted for 6% of the population and 41% of gonorrhea infections;
- Other race accounted for 7% of the population and 0% of gonorrhea infections;
- Hispanics accounted for 6% of the population and 7% of gonorrhea infections.

Among males in Groton, from 2005 through 2007:

- Whites accounted for 81% of the population and 48% of gonorrhea infections;
- Blacks accounted for 7% of the population and 39% of gonorrhea infections;
- Other race accounted for 7% of the population and 6% of gonorrhea infections;
- Hispanics accounted for 5% of the population and 22% of gonorrhea infections.

### ***Moving from Numbers to Rates***

Groton gonorrhea infection rates by were not calculated due to the small annual number of infections in most gender/race/ethnicity groups.

## **Assessing Gender and Age as Risk Factors for Gonorrhea Infection**

### **Number of Gonorrhea Infections by Gender and Age Group**

In Groton, gonorrhea infections are rare until after age 14 (Tables 15-16). Infections decrease among females and males after age 29 and again after age 39. There are more gonorrhea infections among both female and male 20-24 year-olds than 15-19 year-olds.

<b>YEAR</b>	<b>&lt;10</b>	<b>10-14</b>	<b>15-19</b>	<b>20-24</b>	<b>25-29</b>	<b>30-34</b>	<b>35-39</b>	<b>40-44</b>	<b>45-54</b>	<b>55+</b>	<b>unknown</b>	<b>TOTAL</b>
<b>1997</b>	0	0	3	2	1	0	0	0	0	0	0	<b>6</b>
<b>1998</b>	0	0	1	4	2	1	0	0	0	0	0	<b>8</b>
<b>1999</b>	0	0	5	3	2	0	1	0	0	0	0	<b>11</b>
<b>2000</b>	0	0	0	1	2	0	1	0	0	0	0	<b>4</b>
<b>2001</b>	0	0	5	2	1	1	0	0	0	0	0	<b>9</b>
<b>2002</b>	0	0	11	14	5	1	3	0	0	0	0	<b>34</b>
<b>2003</b>	0	0	2	9	4	5	2	1	0	0	0	<b>23</b>
<b>2004</b>	0	0	0	3	1	2	3	1	1	0	0	<b>11</b>
<b>2005</b>	0	0	1	5	0	0	0	0	0	0	0	<b>6</b>
<b>2006</b>	0	0	1	2	5	1	0	0	0	0	0	<b>9</b>
<b>2007</b>	0	1	4	7	1	1	0	0	1	0	0	<b>15</b>
<b>TOTAL</b>	<b>0</b>	<b>1</b>	<b>33</b>	<b>52</b>	<b>24</b>	<b>12</b>	<b>10</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>136</b>

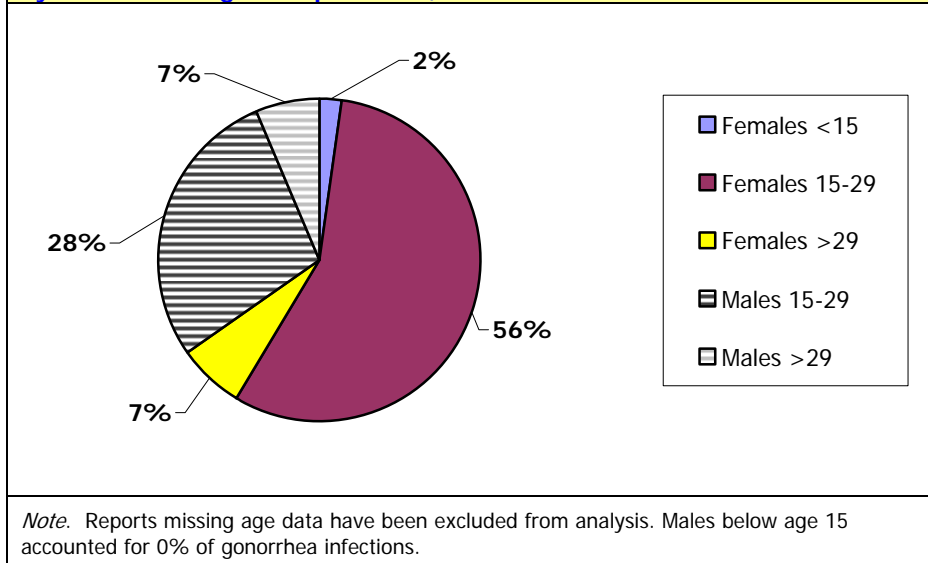
*Note.* Reports missing age data have been excluded from analysis.

Table 16. Number of Gonorrhea Infection by Age Group: Groton Males, 1997-2007												
YEAR	<10	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-54	55+	unknown	TOTAL
1997	0	0	1	1	1	0	1	0	1	0	0	5
1998	0	0	1	3	2	0	0	1	1	0	0	8
1999	0	0	2	1	1	1	0	0	0	0	0	5
2000	0	0	0	1	0	0	1	1	0	0	0	3
2001	0	0	0	8	1	0	1	0	0	1	0	11
2002	0	0	1	4	6	1	2	0	0	1	0	15
2003	0	0	2	5	1	1	1	0	0	0	0	10
2004	0	0	0	1	0	0	2	0	0	0	0	3
2005	0	0	1	0	1	0	0	1	0	0	0	3
2006	0	0	2	4	1	0	0	0	0	0	0	7
2007	0	0	0	3	1	0	0	0	2	0	0	6
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>31</b>	<b>15</b>	<b>3</b>	<b>8</b>	<b>3</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>76</b>

*Note.* Reports missing age data have been excluded from analysis.

In Groton and across the U.S., 15-29 year-olds are most likely to become infected with gonorrhea. In the U.S. in 2006, 75% of infections were among 15-29 year-olds, 24% among individuals over age 29, and 1% among individuals below age 15 (data not shown). In Groton, from 2005 through 2007, 84% of infections were among 15-29 year-olds, 14% among individuals over age 29, and 2% among individuals below age 15 (Tables 15-16, Figure 17).

**Figure 17. Distribution of Gonorrhea Infections (Proportion of Infections): by Gender and Age Group: Groton, 2005-2007**



## Syphilis

Syphilis is a genital ulcerative disease that, if untreated, progresses from a chancre (sore), to a rash and eventually to internal organ damage. Syphilis rates in the U.S.

reached a 59-year low in 2000 but have been increasing since then among males more so than

	2003	2004	2005	2006	2007	Total
Groton	1	0	1	3	1	6

among females (CDC, 2007). According to the CT DPH website, six cases of syphilis were reported in Groton during the past five years (Table 17).

## STDs Not Reportable

STDs that are not reportable can be more common and as, if not more, dangerous than those that are reportable. Human papilloma virus (HPV), a main cause of cervical cancer and genital warts, is not reportable. Also unreported are trichomoniasis, an STD associated with premature birth and low birthweight, and herpes simplex virus (HSV). A recent study from the CDC reported that 26% of a nationally representative sample of 14-19 year-old girls tested positive for an STD (CDC, 2008). (The CDC study measured STD prevalence. Prevalence is a measure of the number of individuals infected with a disease at a certain point in time. Prevalence data are not available for Groton because we do not know the number of individuals who were tested for STDs.) In the CDC study, HPV was the most common STD with a prevalence of 18%, followed by chlamydia which affected 3.9%; trichomoniasis was found in 2.5% and HSV in 2.0% of the sample. Because females were not tested for gonorrhea (the second-most commonly reported disease in the country) nor for syphilis, it is likely that more than 26% of females aged 14-19 were infected with a potentially dangerous STD. The 2008 CDC findings reinforce the message that reported STDs reflect the "tip of the iceberg." A disturbing implication of this study is that dangerous STDs such as HPV or trichomoniasis may be quite common, but infection rates cannot be determined because these diseases are not reportable.

## STD Discussion

Chlamydia and gonorrhea infections have been increasing in Groton and across the nation. Reports of disease have increased over time among both men and women for many reasons. Over the past 25 years screening tests have improved and are now better at detecting disease. More men and women are being tested and more physicians and labs are reporting disease (CDC, 2007). The increased number of reported infections may also reflect a true increase in the number of infections. **It is important to remember that the actual number of STDs far exceeds the reported number of cases because not all infections are detected and not all detected diseases are reported.**

The 2006 Groton chlamydia infection rate was 28% lower than U.S. rate and the Groton 2006 gonorrhea infection rate was 67% lower than the U.S. rate. However, Groton chlamydia infection rates were higher than U.S. rates among Hispanic and White females, (126% and 14%, respectively). Chlamydia infection rates among Groton males were lower than rates among U.S. males. Gender is a stronger risk factor for chlamydia than for gonorrhea. Gonorrhea infection rates among Groton females and males were lower than U.S. rates (63% and 71% respectively).

Race/ethnicity is a strong risk factor for both gonorrhea and chlamydia. In Groton, Blacks and Hispanics are more likely to become infected with chlamydia or gonorrhea than Whites. The 2006 Groton chlamydia infection rates were over five times (423%) higher among Black females and six times higher (535%) higher among Hispanic females compared to White females. Among Groton males, the 2006 chlamydia infection rates were 253% higher among Blacks and 64% higher among Hispanics compared to Whites. Groton data reveal racial/ethnic gonorrhea infection disparities; Blacks represent 7% of the population but accounted for 42% of gonorrhea infections reported in 2005-2007, and Hispanics represent 6% of the population but accounted for 14% of gonorrhea infections reported in 2005-2007. While it is crucial to reduce

racial/ethnic health disparities, it is important to note that Whites accounted for the majority of chlamydia infections in Groton and only slightly fewer gonorrhea infections than Blacks. It is also worth noting that although Groton chlamydia rates are highest among Hispanics, rates among Groton Hispanics are lower than rates among U.S. Hispanics.

Most STDs occur among 15-29 year-olds. In Groton, chlamydia infection rates are actually higher among 20-24 year-olds than among the 15-19 year-old, school-age children who are often the target of prevention efforts. A history of chlamydia infection has been identified as a risk factor for subsequent chlamydia infections among females. Twenty percent of Groton females ever infected with a chlamydia infection experienced a subsequent infection. Chlamydia and gonorrhea are not the only STDs that affect Groton residents. There have been six reported cases of syphilis over the past five years, and, according to national data, other dangerous STDs that are not reportable are common among sexually active young women.

## **Section 2. Teen Births**

### **Background**

Teen pregnancy has a tremendous impact on teens, their families, and, ultimately, all taxpayers. Pregnant teens are less likely than older females to receive timely prenatal care and more likely to experience complications of delivery and maternal death. Children born to teens are more likely to be born prematurely or at low birthweight, increasing the risk of infant death, blindness, chronic respiratory problems, mental retardation, cerebral palsy, dyslexia, and hyperactivity (Child Trends Databank).

According to the National Campaign to Prevent Teen and Unplanned Pregnancy, children born to teens inhabit a less stimulating home environment and experience poorer academic and behavioral outcomes than children born to older females. These children score lower on standardized tests, are more likely to repeat a grade, and less likely to complete high school. Compared to children born to older mothers, children born to teens suffer more abuse and neglect. Sons born to teen mothers are more likely to end up in prison, and daughters of teens are more likely to end up teen mothers themselves (National Campaign to Prevent Teen Pregnancy, 2008).

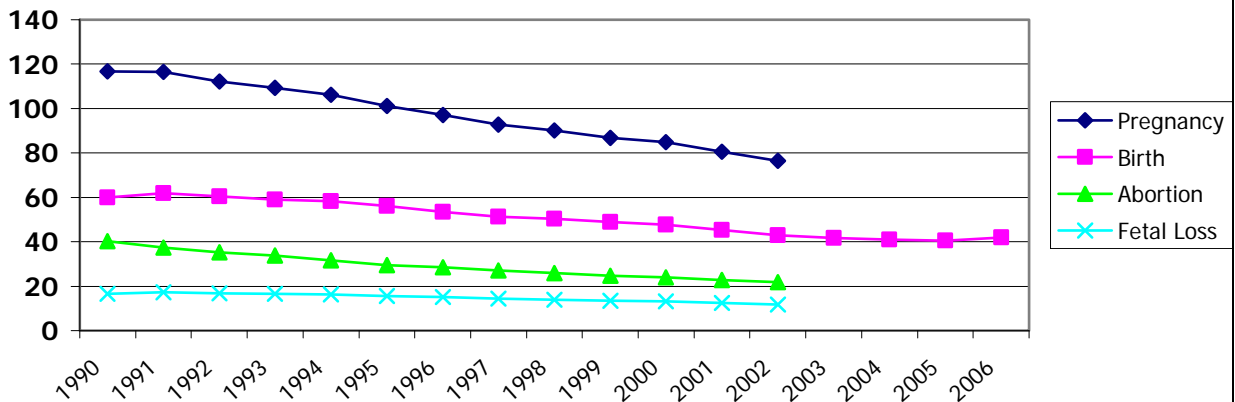
### **U.S .Teen Pregnancy and Pregnancy Outcome Trends**

Pregnancy among teens is a troubling public health issue; unfortunately, the only data related to teen pregnancy among Groton teens are the teen birth statistics available from CT DPH. No data exist on Groton teen pregnancies, abortions, or fetal losses, but national data were available. Table 18 and Figure 18 depict the most recent data on pregnancy and pregnancy outcomes for U.S. females age 15-19.

**Table 18. Pregnancy, Live Birth, Abortion, and Fetal Loss Rates (per 1,000) by Age Group: 15-19 Year-Old U.S. Females, 1990-2002**

Year	Pregnancy		Birth		Abortion		Fetal Loss	
	15-17	18-19	15-17	18-19	15-17	18-19	15-17	18-19
1990	77.1	167.7	23.3	88.6	21.1	24.3	8.1	21.2
1991	76.1	172.1	23.6	94.0	18.3	24.2	8.2	22.5
1992	73.5	169.3	22.7	93.6	16.0	26.8	7.9	22.4
1993	72.7	164.1	22.7	91.1	15.4	25.5	7.9	21.8
1994	71.1	159.6	22.7	90.2	14.1	26.1	7.9	21.6
1995	67.4	153.4	22.0	87.7	13.4	23.5	77.6	21.0
1996	63.4	149.0	20.6	84.7	12.6	22.9	7.2	20.3
1997	59.5	144.3	19.3	82.1	11.8	20.3	6.7	19.6
1998	56.7	140.3	18.3	80.9	10.7	21.5	6.4	19.4
1999	53.1	136.6	17.1	79.1	9.4	20.2	5.9	18.9
2000	50.8	134.5	15.8	78.1	8.5	18.4	5.5	18.7
2001	46.9	130.9	14.0	76.1	8.0	17.1	4.9	18.2
2002	44.4	125.0	13.1	72.8	7.4	16.8	4.6	17.4

**Figure 18. Pregnancy, Live Birth, Induced Abortion, and Fetal Loss Rates (per 1,000): 15-19 Year-Old U.S. Females, 1990-2002 (Live Birth Rates, 1990-2006)**



*Note.* Live birth data is the only pregnancy outcome data that is available for 2003-2006; pregnancy, induced abortion and fetal loss data for 2003-2006 have not been published.

On average, over the three most recent years for which complete U.S. birth outcome data (*i.e.*, pregnancy, birth, abortion and fetal loss) are available (2000-2002), birth rates have been about 44% lower than pregnancy rates and abortion rates have been about 50% lower than birth rates.

## Groton Teen Births

### Numbers of Births to Groton Teens

There has been only one birth to a Groton teen below the age of 15 in the past nine years; this occurred in 2002 to a White teen. The numbers of Groton births to 15-19 year-olds are depicted in Table 19. In general, in Groton and across the U.S., there are more births to 18-19 year-olds than 15-17 year-olds in each race/ethnicity group. For that reason, teen births will be analyzed separately for 15-17 and 18-19 year-olds.

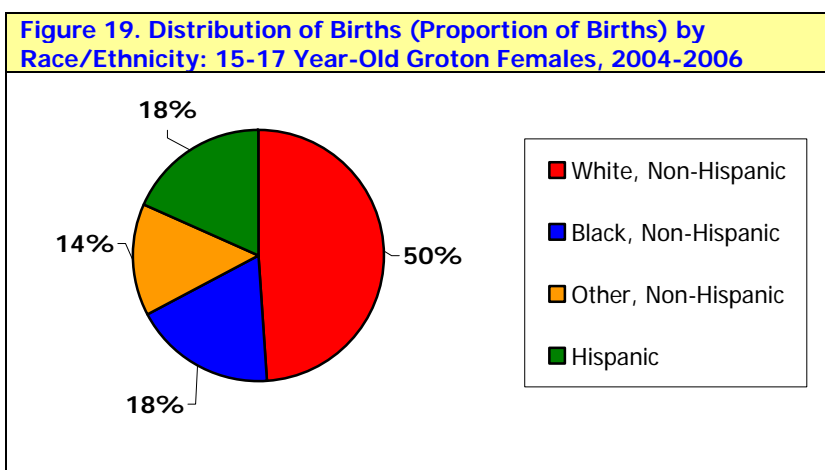
**Table 19. Number of Births by Race/Ethnicity and Age Group: 15-19 Year-Old Groton Females, 1998-2006**

	15-17 Year-Olds						18-19 Year-Olds						Total Teen Births
	White NH	Black NH	Other NH	Hisp	Unknw	Total	White NH	Black NH	Other NH	Hisp	Unknw	Total	
1998	10	3	0	2	2	17	28	6	2	4	0	40	57
1999	5	2	1	2	0	10	37	9	2	9	0	56	66
2000	1	4	0	2	1	8	34	4	3	0	7	58	66
2001	6	0	0	3	1	10	34	6	3	7	2	52	62
2002	9	0	1	3	0	13	23	8	4	4	2	41	54
2003	6	1	0	0	0	7	27	4	2	3	0	36	43
2004	6	3	3	2	0	14	21	1	4	6	0	32	46
2005	5	1	2	4	0	12	38	4	7	11	0	60	72
2006	5	2	0	4	0	11	20	0	3	5	0	28	38
<b>Total</b>	<b>53</b>	<b>16</b>	<b>7</b>	<b>20</b>	<b>4</b>	<b>102</b>	<b>262</b>	<b>42</b>	<b>30</b>	<b>57</b>	<b>11</b>	<b>403</b>	<b>505</b>

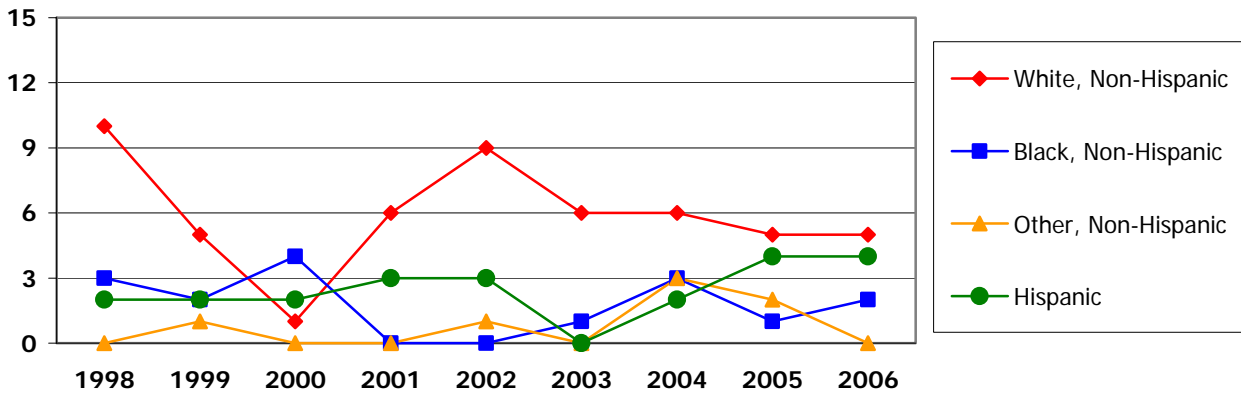
*Note.* NH=Non-Hispanics; Hisp=Hispanic; Unknw=Unknown race/ethnicity.

### Births to 15-17 Year-Olds

From 1998 through 2006, there were fewer than five births a year to 15-17 year-old Blacks, Other, or Hispanics and between one and ten births a year among Whites (Table 19). Most births to 15-17 year-old Groton females are to Whites (Figure 19).



**Figure 20. Number of Births by Race/Ethnicity: 15-17 Year-Old Groton Females, 1998-2006**

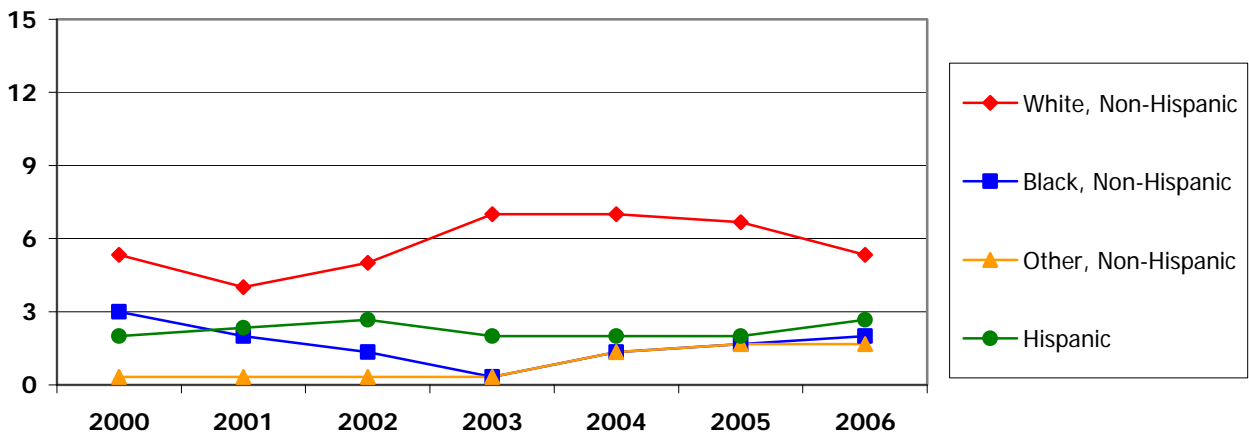


*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

### Rolling Average Number of Births to Groton 15-17 Year-Olds

The three-year rolling average numbers of births to 15-17 year-old females (Figure 21) smoothes out the year to year variations in the number of births and makes trends more apparent. In Groton, births to 15-17 year-olds are infrequent and do not appear to be increasing in any racial/ethnic group except possibly Hispanics.

**Figure 21. Three-Year Rolling Average Number of Births by Race/Ethnicity: 15-17 Year-Old Groton Females, 2000-2006**



*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

## Moving from Birth Numbers to Birth Rates among 15-17 Year-Olds

### Using Rates to Assess Groton Birth Trends among 15-17 Year-Olds

Although Whites account for most births among Groton 15-17 year-olds, births are more common among 15-17 year-old Black and Hispanic teens than among White teens (*i.e.*, rates are higher among Blacks and Hispanics than Whites [Table 20, Figure 22]).

Year	White, Non-Hispanic	Black, Non-Hispanic	Other, Non-Hispanic	Hispanic
1998	22.3	69.8	0.0	44.4
1999	11.2	46.5	14.3	44.4
2000	2.2	93.0	0.0	44.4
2001	13.4	0.0	0.0	66.7
2002	20.1	0.0	14.3	66.7
2003	13.4	23.3	0.0	0.0
2004	13.4	69.8	42.9	44.4
2005	11.2	23.3	28.6	88.9
2006	11.2	46.5	0.0	88.9

*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

**Figure 22. Birth Rates (per 1,000): 15-17 Year-Old Groton Females by Race/Ethnicity, 1998-2006 Compared to Healthy People 2010 Target**

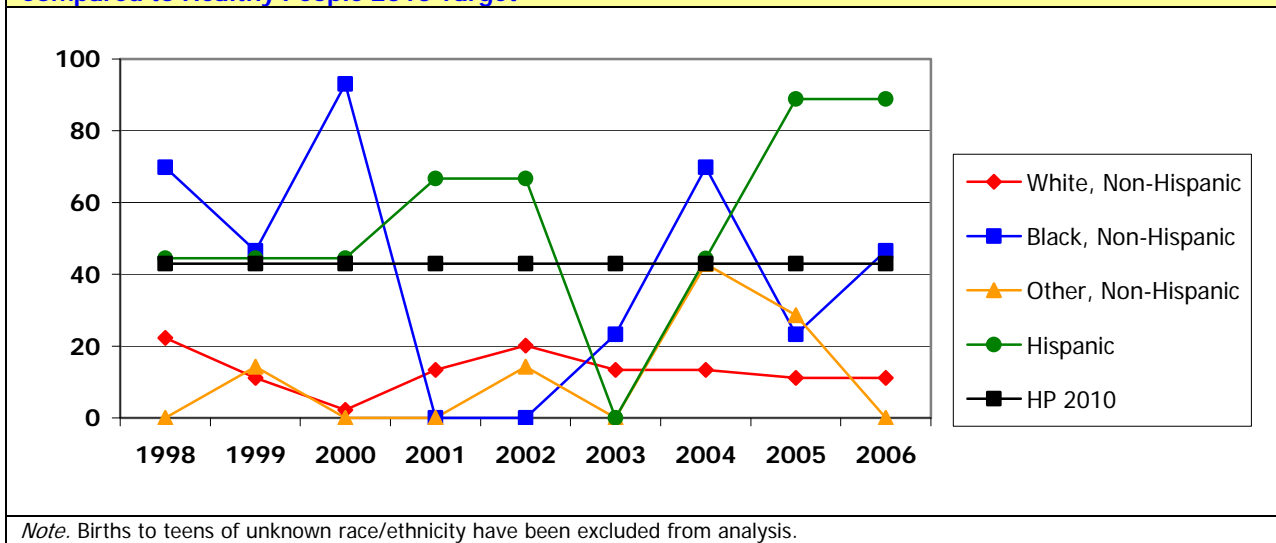
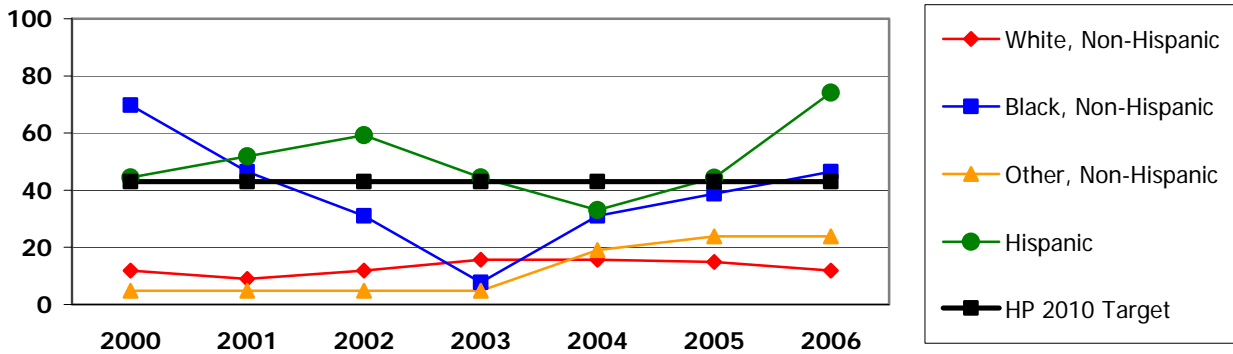


Figure 22 reveals that birth rates vary from year to year making trends difficult to discern. The three-year rolling average birth rates for 15-17 year-old Groton teens (Figure 23) suggests that birth rates are stable among Whites and Others, but increasing among Blacks and Hispanics.

**Figure 23. Three-Year Rolling Average Birth Rates (per 1,000): 15-17 Year-Old Groton Females by Race/Ethnicity, 2000-2006 Compared to Healthy People 2010 Target**



*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

### Introducing the Healthy People 2010 Target Birth Rate for 15-17 Year-Olds

The national target for reduction in teen pregnancy as specified in *Healthy People 2010* is 43 births per 1,000 females aged 15-17 years (DHHS, 2000). As seen in Figure 23, birth rates among 15-17 year-old Groton females were below the target rate for Whites and Others, but have increased among Blacks and Hispanics, and now exceed the target rate.

### Comparison of Groton and U.S. Birth Rates among 15-17 Year-Olds

In 2006, birth rates in Groton (Table 21) were higher than U.S. rates among 15-17 year-old Blacks (29%) and Hispanics (86%), and 5% lower than U.S. rates among 15-17 year-old Whites.

	White, Non-Hispanic	Black, Non-Hispanic	Hispanic
<b>Groton</b>	11.2	46.5	88.9
<b>U.S.</b>	11.8	36.1	47.9

## Using Rates to Assess Racial/Ethnic Disparities in Groton

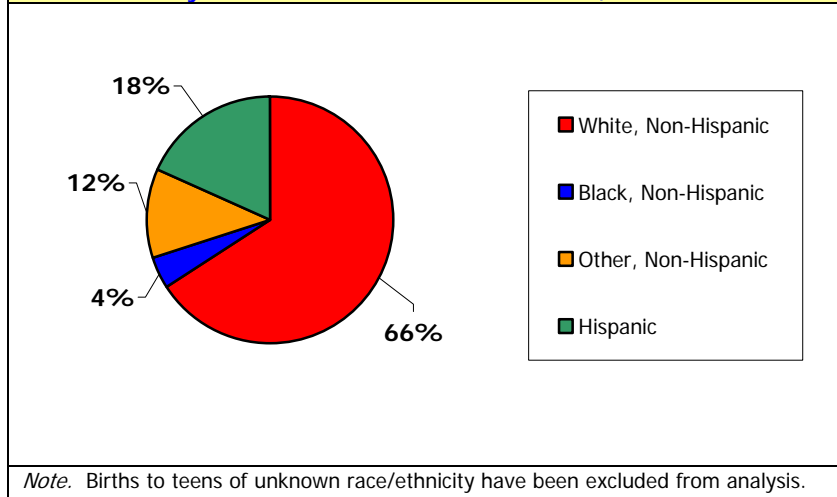
In Groton, the 2006 Groton birth rate (Table 21) among 15-17 year-olds was 315% higher among Blacks, and 694% higher among Hispanics compared to Whites.

## Births to 18-19 Year-Olds

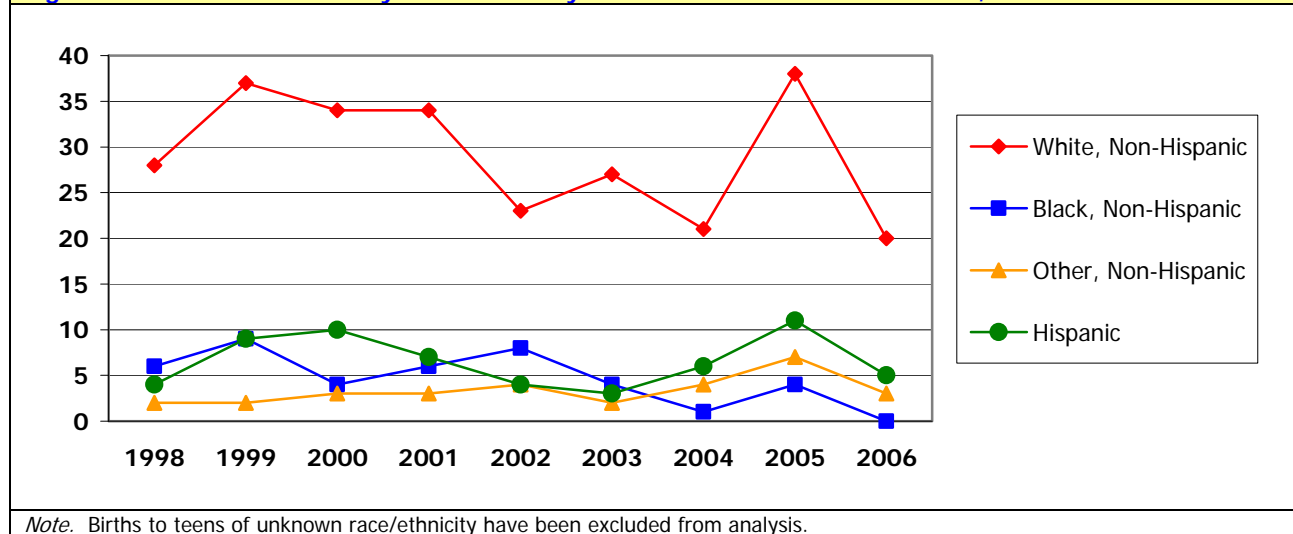
### Number of Births to Groton 18-19 Year-Olds

Most Groton births to 18-19 year-olds are to Whites (Figure 24). Between 1998 and 2006, there were generally less than 10 births a year to Black, Hispanic, and Other 18-19 year-old Groton females, and between 21 and 38 births a year among White 18-19 year-olds (Table 19, Figure 25).

**Figure 24. Distribution of Births (Proportion of Births) by Race/Ethnicity: 18-19 Year-Old Groton Females, 2004-2006**



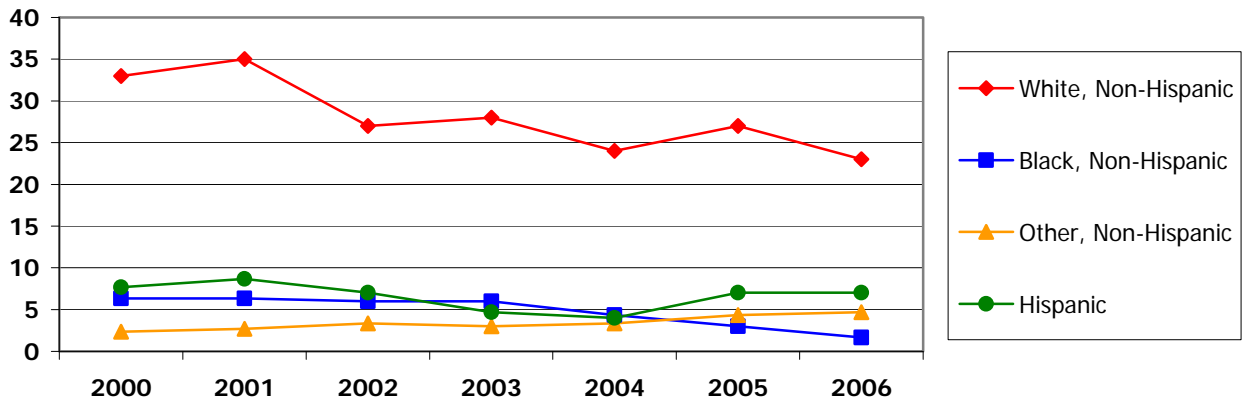
**Figure 25. Number of Births by Race/Ethnicity: 18-19 Year-Old Groton Females, 1998-2006**



## Rolling Average Number of Births to Groton 18-19 Year-Olds

The three-year rolling average numbers of births to 18-19 year-old Groton females depicted in Figure 26 suggests that births may be decreasing among Whites and increasing among Hispanics.

**Figure 26. Three-Year Rolling Average Number of Births by Race/Ethnicity: 18-19 Year-Old Groton Females, 2000-2006**



*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

## Moving from Birth Numbers to Birth Rates among 18-19 Year-Olds

### Using Rates to Assess Groton Birth Trends among 18-19 Year-Olds

Birth rates among 18-19 year-old Groton teens are depicted in Table 22 and Figure 27. Figure 27 reveals that birth rates vary from year to year making trends difficult to discern. The three-year rolling average birth rates for 18-19 year-old

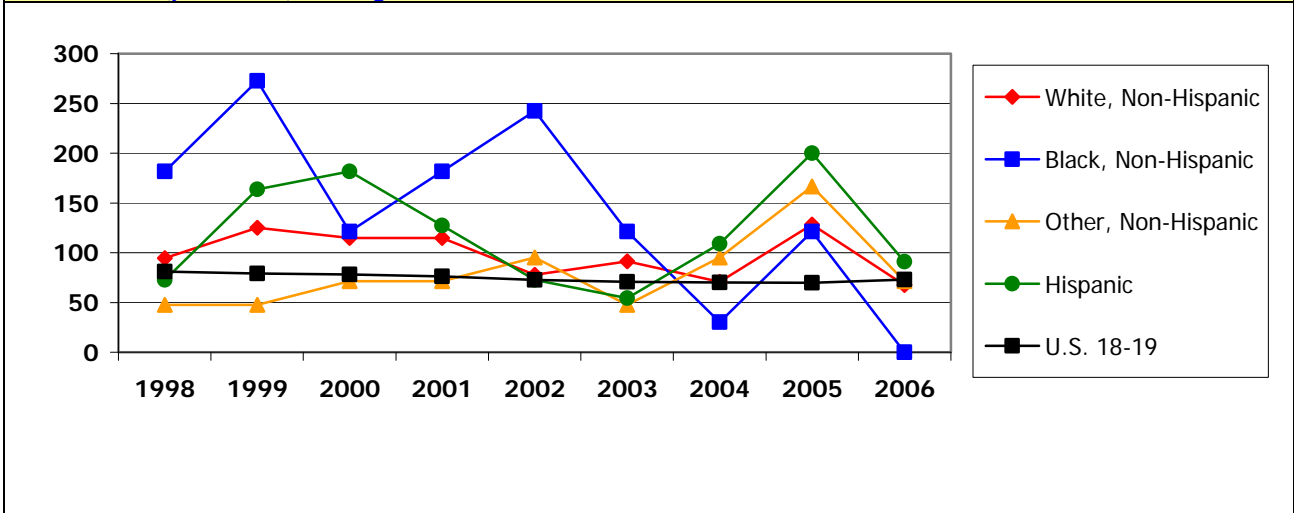
**Table 22. Birth Rates (per 1,000) by Race/Ethnicity: 18-19 Year-Old Groton Females, 1998-2006**

Year	White, Non-Hispanic	Black, Non-Hispanic	Other, Non-Hispanic	Hispanic
1998	94.6	181.8	47.6	72.7
1999	125.0	272.7	47.6	163.6
2000	114.9	121.2	71.4	181.8
2001	114.9	181.8	71.4	127.3
2002	77.7	242.4	95.2	72.7
2003	91.2	121.2	47.6	54.5
2004	70.9	30.3	95.2	109.1
2005	128.4	121.2	166.7	200.0
2006	67.6	0.0	71.4	90.9

*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

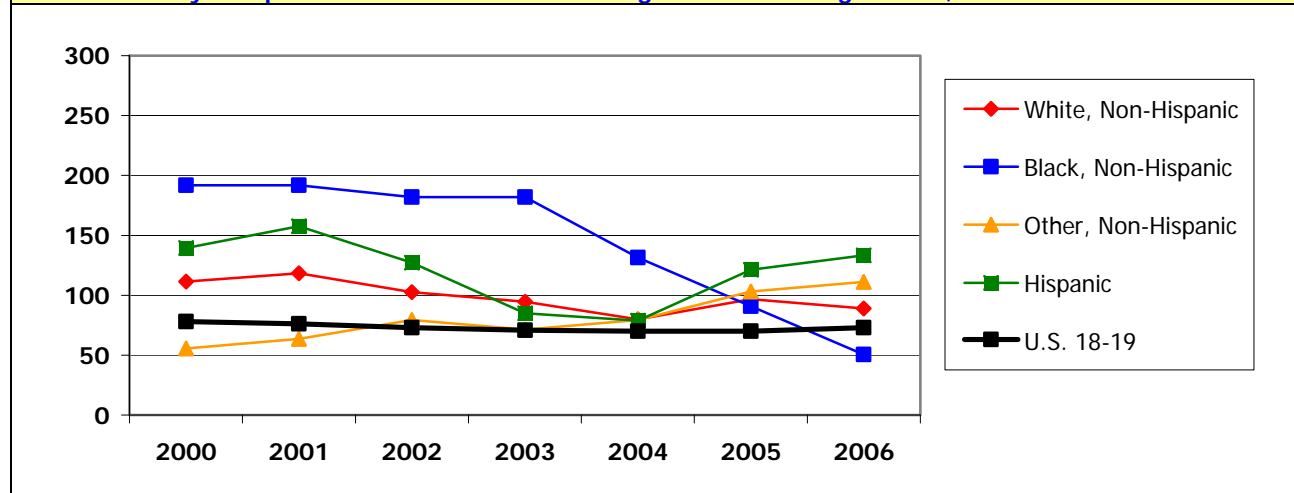
Groton teens (Figure 28) suggests that birth rates are decreasing among 18-19 year-old Blacks, stable among Whites and Others, and increasing among Groton 18-19 year-old Hispanics.

**Figure 27. Birth Rates (per 1,000): 18-19 Year-Old Groton Females by Race/Ethnicity Compared to U.S. Birth Rates (per 1,000) among 18-19 Year-Old Females, 1998-2006.**



*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

**Figure 28. Three-Year Rolling Average Birth Rates (per 1,000): 18-19 Year-Old Groton Females by Race/Ethnicity Compared to U.S. Birth Rates among U.S. Females Age 18-19, 2000-2006**



*Note.* Births to teens of unknown race/ethnicity have been excluded from analysis.

### Comparison of Groton and U.S. Birth Rates among 18-19 Year-Olds

Groton birth rates among 18-19 year-olds are compared to U.S. birth rates in Figures 27-28. (*Healthy People 2010* national target birth rate goals have not been established for 18-19 year-old teens.)

Groton birth rates among 18-19 year-olds are generally higher than U.S. rates, with the

	White, Non-Hispanic	Black, Non-Hispanic	Hispanic
Groton	67.6	0.0	90.9
U.S.	49.3	108.4	139.7

notable exception of lower rates among Groton Blacks in recent years. The 2006 Groton birth rate (Table 23) among 18-19 year-olds was 37% higher than the U.S. rate among Whites and 35% lower than the U.S. rate among Hispanics. There were no births to 18-19 year-old Black females in Groton in 2006.

### Using Rates to Assess Racial/Ethnic Disparities in Groton

Among Groton 18-19 year-olds, the 2006 birth rate among Hispanics was 34% higher than the rate among Whites (Table 23).

### Teen Births Discussion

Groton teen birth rates among 15-17 year-old Blacks and Hispanics, and 18-19 year-old Whites are higher than U.S. rates. Although birth rates among 15-17 year-olds are lower among Whites, there are greater numbers of births to Whites than Blacks or Hispanics. Teen births among Blacks and Hispanics must be decreased to reduce racial disparities, but births to Whites – particularly Whites age 18-19 – must be decreased for teen pregnancy in Groton to be substantially decreased. Groton data suggest the need to start teen pregnancy prevention efforts targeting Whites, Blacks, and Hispanics before they reach age 15 and to continue such programs until after age 19.

## **STD and Teen Births Conclusions**

Gender, age, and race/ethnicity are associated with STD risk. In Groton and the U.S., females are much more likely to be infected with chlamydia than males, but the lower number of reported infections among males is likely because fewer males present for routine testing (DHHS, 2000). Fewer males testing suggest that infected males are not being diagnosed, treated or reported (Steele, 2007). Groton residents age 15-29 are considered to be at high risk for STDs because their infection rates are higher than the rates among other Groton age groups. STD infections among men increase after age 19 (compared to age 15 among females) and do not decrease among males or females until after age 29.

Race/ethnicity is a strong predictor of risk of acquiring an STD; Blacks and Hispanics are more likely to be infected than Whites. Race/ethnicity is a stronger predictor of risk of acquiring a gonorrhea infection than is gender; males and females share a comparable likelihood of acquiring a gonorrhea infection. Teen pregnancy impacts all race/ethnicity groups.

Many factors impact Groton teens' reproductive health and sexuality decisions and behaviors including:

- availability of reproductive health, family planning, and STD testing services;
- recent STD and teen pregnancy prevention programs, in particular the programs that may have contributed to the observed teen pregnancy trends;
- local policies and practices that impact STDs such as condom distribution in schools or community settings, STD testing, counseling, provision of medication for infected individuals and their partners, and re-testing after STD infection.

These findings suggest the need to create:

- STD prevention and control programs starting before age 15 and continuing until beyond age 29;

- culturally relevant STD prevention strategies targeting all audiences – Whites, Blacks, Hispanics, and Others. Prevention can help reduce the total number of infections and decrease racial/ethnic health disparities;
- teen pregnancy prevention programs that effectively target at-risk youth:
  - Teens approaching age 15 are at risk; STD and teen pregnancy prevention programs must start at an early age;
  - Teens age 18-19 are at risk, although they may be considered adults.

# Notes

## Important Terms

### **Sexually Transmitted Disease (STD) and Sexually Transmitted Infection (STI):**

These terms refer to any of over 25 disease-causing organisms that can be transmitted through sexual contact.

**Reportable Diseases:** These are diseases considered to be of great public health importance. Local, state, and national agencies require that such diseases be reported by doctors or laboratories. Reporting allows for the collection of statistics that show where, when, and how often the disease occurs, which in turn helps researchers identify disease trends and track disease outbreaks. This information can help control future outbreaks (Medline Plus, 2007).

**Reportable STDs:** Health care providers and laboratories are required by CT General Statute to report all cases of chlamydia, gonorrhea, syphilis, and chancroid to the CT Department of Public Health (DPH) and the local health department serving the infected individual.

**Confirmed STDs:** STD statistics are based on laboratory confirmed infection. Provider reports of STDs that are not laboratory confirmed are not used to calculate STD statistics.

**Health Disparities:** "...include differences (in the incidence, prevalence, morbidity, mortality, and burden of disease) that occur by gender, race or ethnicity, education, or income, disability, geographic location, or sexual orientation" (DHHS, 2000). The STD and teen birth surveillance systems available to Ledge Light Health District collect data on age gender, race/ethnicity, and geography (address).

## **Understanding Public Health Data: Rates and Numbers**

This report provides information that can be used to measure the extent of the STD and teen pregnancy problem in Groton, CT. The simplest measures of the problem are the count of the number of infections and trends showing whether numbers are increasing or decreasing over time. This report includes several graphics that depict the number of infections each year between 1997 and 2007. Pie charts are used to portray the proportion of infections among population subgroups. Where the annual number of infections is small (statistically unreliable), three years of data are added together to improve statistical reliability and create pie charts that more accurately summarize data. The magnitude of chlamydia disease burden can be evaluated by comparing Groton numbers to national chlamydia numbers. Because there are many more people in the entire U.S. than in Groton and, accordingly, many more infections, rates are calculated in order to compare these two groups of different size.

A rate is a measure of the frequency of an event per population unit. Rates include a numerator and a denominator. The numerator is the number of events in a specified population. The denominator is the number of people in the specified population. Using simple math, the number of people in a denominator can be set to a specified number, usually 100,000 for STDs and 1,000 for teen births.

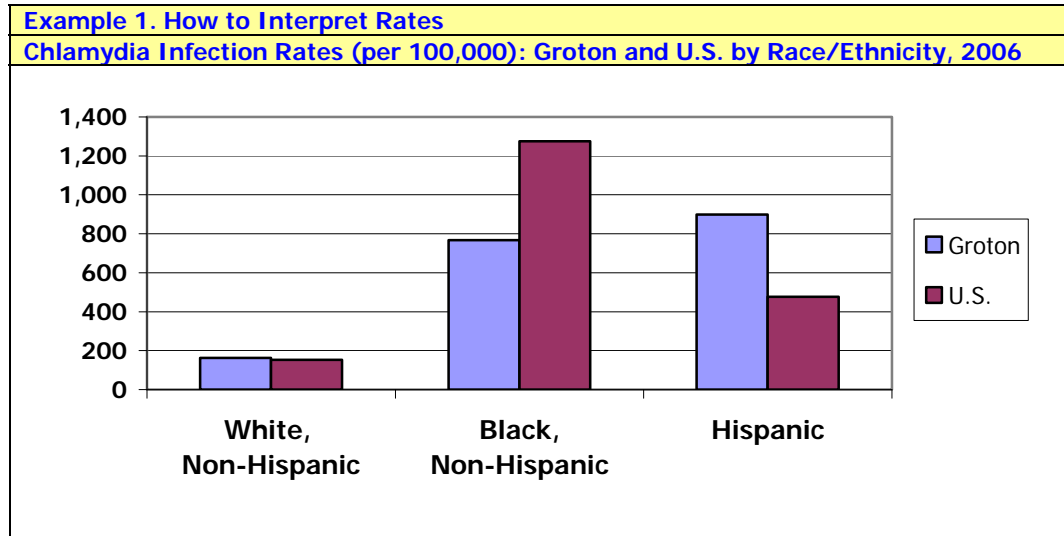
**RATE per 100,000** = (Number of events in a population over a specified period of time ÷ Average number of people in the population over the specified period of time) × 100,000.

Groton rates are based on Census 2000 population estimates (Census, 2000). Groton rates are not as reliable as U.S. rates because the number of infections in Groton is so small and varies widely from year to year. Rates are not statistically reliable when the number of events is small (five or less). Rates are not calculated for populations less than 100 in order to protect confidentiality of the members of that small group (Washington State DPH, 2001).

## Example of How to Interpret Rates

Example 1 depicts the 2006 Groton and U.S. chlamydia infection rates for White, Black, and Hispanic

females;  
rates are  
plotted  
against the  
vertical (Y)  
axis  
and  
population  
sub-groups  
along the



horizontal (X) axis. In this particular graph, the rates are capped at 1,400 because that number is high enough to include rates observed for all population sub-groups. In this report, some graphs have much higher maximum rate values because rates were much higher in the groups being assessed. If all graphs had the same maximum value, the graphs depicting data for groups with low rates would be hard to visualize — all of the columns would be very short and differences between the columns would be hard to distinguish.

It can be seen that, in 2006, rates among Whites from Groton are comparable to U.S. rates, while rates among Groton Blacks are lower and Groton Hispanics are higher than U.S. rates. Keep in mind that, because of the mathematical manipulation, rates do not reflect the actual number of infections that occurred. This graph depicts the number of events that would have occurred in each group if there were 100,000 people in both the U.S. and in Groton.

High STD or teen pregnancy rates suggest a public health problem. When rates differ between groups (for example between races, genders or age groups) there is said to be

a health disparity. When a health disparity is recognized, it is useful to assess the actual number of people who affected. Public health officials assess the actual number of events in order to make decisions about prevention, intervention, and resource allocation.

### **Three-Year Rolling Averages**

Annual variations in the number STDs or teen births may reflect actual changes in the number of infections, random changes, and, in the case of STDs over- and under-counting. Three-year rolling averages smooth variations in data and makes trends more apparent. A three-year rolling average is calculated by adding the number of events (*i.e.*, STDs or teen births) in the specified year to the number of events in the previous two years, then dividing by three and repeating for a series of years (*e.g.*, the 2007 three-year rolling average number of chlamydia infections is equal to the sum of the number of chlamydia infections in 2005, 2006 and 2007 divided by three).

## **Data Sources**

### **STD Data Sources**

In the fall of 2007, the Ledge Light Health District Communicable Disease Prevention Division's Epidemiology Program established a secure electronic database to track reportable infectious disease, vital statistics, and other health data. Data from January 1997-August 2007 were provided to Ledge Light by the CT DPH Sexually Transmitted Disease Division. Since September 2007, Ledge Light has entered data from reportable disease reports into the electronic disease database. Eleven years of STD data were analyzed to create this report. National STD data were abstracted from the Centers for Disease Control and Prevention 2006 STD Surveillance Report (CDC, 2007).

### **Births to Teens Data Sources**

The CT DPH Office of Vital Records maintains a registry of births, marriages, civil unions, deaths and fetal deaths which have occurred in CT or to CT residents. CT Vital

Records databases are analyzed annually to create statistical reports, known as Registration Reports, for births, deaths, fetal deaths, marriages, and divorces. Groton data were abstracted from the 1998-2006 Registration Reports (CT DPH). National data on births and birth outcomes were abstracted from National Vital Statistics Reports (Ventura, 2008 and Hamilton, 2007).

## **Data Validity**

### **STD Data Validity**

The following is a list of threats to STD data validity and the probable impact on STD statistics.

- The greatest limitation to STD statistics is that they severely underestimate the true number of infections. It is estimated that less than 50% of chlamydia and gonorrhea cases are reported (CDC, 2007, Weinstock, 2004). There are two important reasons why:
  1. Individuals may not experience symptoms of infection and so may not seek medical care and be diagnosed. Chlamydia and, to a lesser extent, gonorrhea are often asymptomatic and, as a result, infected individuals do not seek treatment.
  2. Health care providers are required by CT General Statute to report certain STDs (and other diseases) to State and local health departments. Compliance with this law is limited:
    - Not all infections are reported; this results in an underestimation of the true incidence of STDs.
    - Reports are sometimes sent to one but not both (State and local) health departments, resulting in discrepancies between State and local health department statistics. STD statistics on the CT DPH website may not be the same as the statistics in this report.
    - Providers do not always report diseases in a timely fashion; reports may not be received for weeks or months after the diagnosis. The year that an STD report is received by Ledge Light is the year of record (the year that

the STD is counted). Consequently, the year of record may not be the year in which the disease occurred.

- Groton rates are based on Census 2000 population estimates. No other reliable population estimates are available. Rates based on Census 2000 estimates will be in error to the extent that the population of Groton changed since 2000 (*i.e.*, rates will be overestimated if the population increased and underestimated if the population decreased since 2000).
- Data on race and ethnicity are often missing. Reports that do not include data on age, race, or ethnicity lead to an undercount of the true number of infections in those groups. (See *Racial and Ethnic Disparities; Actual and Apportioned Number of Chlamydia Infections* (page 58) for a discussion of this problem.) Information on race or ethnicity was missing from 30% of all STD reports over the past 11 years. The proportion of reports missing data on race or ethnicity varied from year to year. Information on age was available for 99.9% of laboratory STD reports.
- The validity of STD data on race and ethnicity is unknown. It is recognized that the recommended practice of having individuals self-report their races and Hispanic ethnicity is not routinely practiced; therefore the validity of data on race and ethnicity is suspect.
- The validity of STD data may also be impacted by the accuracy of the tests used to diagnose disease, the astuteness of the health care provider in recognizing and diagnosing disease, and the accuracy of both the person completing the reports and the person entering data into the disease registry. These influences are assumed to be negligible and, more importantly, equal for Ledge Light and comparison data. Consequently, Ledge Light data can be compared to national data with one exception: Ledge Light data have been analyzed to assess the extent to which individuals experience multiple episodes of chlamydia or gonorrhea. This enhanced scrutiny of Ledge Light health data led to the identification and elimination of duplicate entries for the same disease. U.S. data might have duplicate entries and overestimate actual numbers.

## **Births to Teens Data Validity**

CT DPH Office of Vital Records has been responsible for maintaining records of all births to CT residents since 1915. CT Vital Records includes data for Connecticut residents that occur in other states and Canada. CT reciprocates with every other state in the U.S. and the provinces of Canada in exchanging copies of complete birth and death records for non-residents. Consequently, records of births to CT residents are essentially 100% complete.

## **Race and Ethnicity Notes**

The forms that most providers and laboratories use to report STDs have check-off boxes to select from among the following races: African American, American Indian or Alaskan Native, Asian, Hawaiian or Pacific Islander, White, Other, or Unknown. In addition, there are check-off boxes to classify Hispanic/Latino ethnicity as either Yes, No, or Unknown.

In this report, race and ethnicity are treated as five mutually exclusive groups: Non-Hispanic White (referred to as “White” in this report), Non-Hispanic Black (referred to as “Black” in this report), Hispanics (who may be of any race), Non-Hispanic of some other race (referred to as “Other” in this report), and Unknown. The number of individuals from Groton who are reported to be American Indian or Alaskan Native, Asian, Hawaiian or Pacific Islander is very small. Reporting cases among such small groups may make it possible for an individual in a community to be identified. To avoid this problem, these groups have been combined with the “Other” group. This classification system results in a comprehensive set; that is, the total of the groups sums to the total population. Comparative data (U.S. STDs and teen births) are likewise classified.

## **Racial and Ethnic Disparities: Actual and Apportioned Number of Infections**

Assessment of racial disparities in STDs is hampered by inadequate reporting by providers and laboratories. Reports that do not include data on age, race, or ethnicity lead to an undercount of the true number of infections in those groups. Between 1997 and 2006, about 30% of reports did not include race or ethnicity data. In 2007, that number rose to 44%. Reports on adolescents were most frequently missing data.

The CDC and CT DPH compensate for this problem of missing data by apportioning reports of disease among individuals of unknown age, race, or ethnicity according to the distribution of infections among the population of known age, race, or ethnicity (CDC, 2007). This method was used to determine Groton rates by gender and race, where possible. This method could not be used to produce Groton STD rates by gender *and* age *and* race/ethnicity because of a combination of the low number of infections and the high number of reports that did not include race or ethnicity—with one exception: there was a sufficiently high number of chlamydia infections among Groton females aged 15-29. Analysis of racial/ethnic disparities among females and males of other ages has been assessed by determining the proportion of disease contributed by the various age/race/ethnicity/gender groups.

## **Timeliness of Data**

### **STD Data**

Reports of STDs among Ledge Light residents may not be received for weeks or even months after they have been documented by a provider or laboratory. There is generally a two-year lag period before U.S. data on STDs are released for publication by the National Center for Health Statistics (NCHS). At the time of data analysis for this report, the latest year for which U.S. STD statistics were available was 2006.

### **Births to Teens Data**

2006 is the latest year for which data on teen births has been made available by the CT DPH Office of Vital Statistics.

### **Disclaimer**

Information in this report was accurate at the time of publication. However, CT DPH and the National Center for Health Statistics (NCHS) may make corrections or update the data in their reports. Ledge Light does not track such changes. Any changes made by CT DPH or NCHS subsequent to April 2008 have not and will not be reflected in this document.

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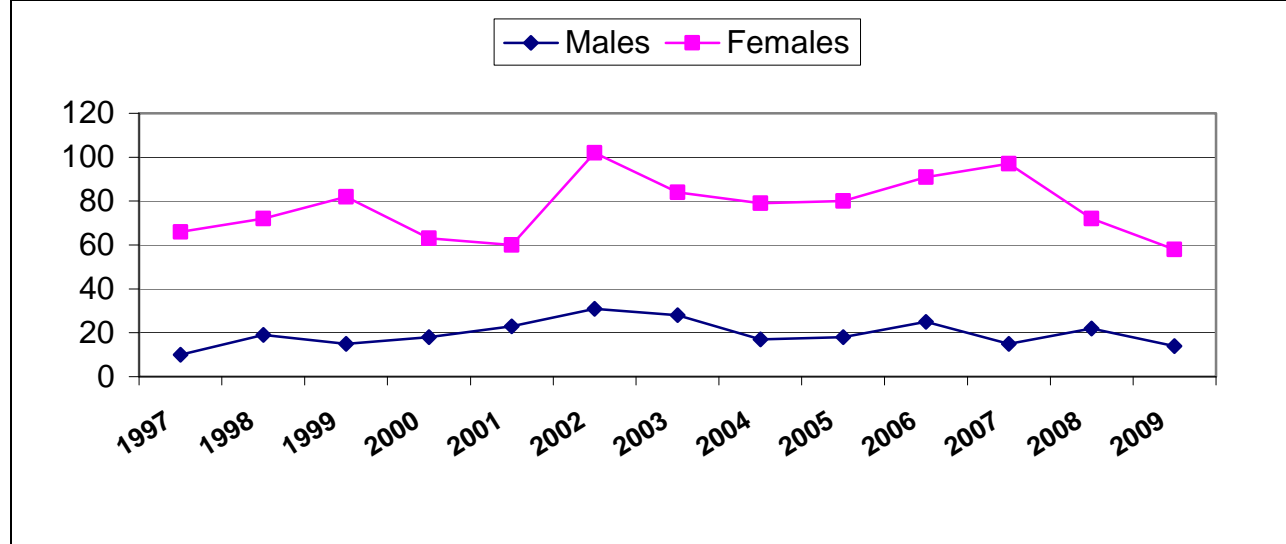
## Appendix A

### SUPPLEMENTAL STD DATA, 2008-2009

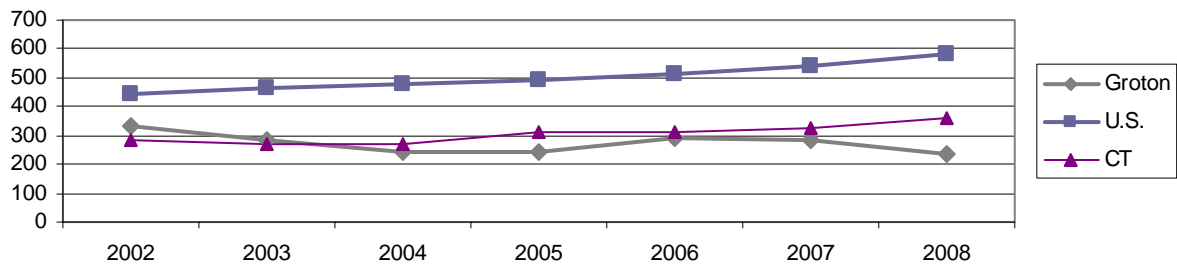
Table A1. Chlamydia Infections (Number and Rate): Groton and U.S.; Females, Males, and Total, 1997-2009									
Year	Groton Females		U.S. Females Rate	Groton Males		U.S. Males Rate	Groton Total		U.S. Total Rate
	Number	Rate		Number	Rate		Number	Rate	
1997	66	338.6		10	49.0		76	190.4	
1998	72	369.4		19	93.1		91	228.0	
1999	82	420.7		15	73.5		97	243.1	
2000	63	323.2		18	88.2		81	203.0	
2001	60	307.8		23	112.7		83	208.0	
2002	102	523.3	445.0	31	151.9	126.8	133	333.3	289.4
2003	84	430.9	463.6	28	137.2	133.0	112	280.7	301.7
2004	79	405.3	480.6	17	83.3	145.6	96	240.6	316.5
2005	80	410.4	492.2	18	88.2	159.4	98	245.6	329.4
2006	91	466.8	510.8	25	122.5	171.3	116	290.7	347.8
2007	97	497.6	539.8	15	73.5	188.6	112	280.7	367.5
2008	72	369.4	583.8	22	107.8	211.1	95*	238.1	401.3
2009	58	297.5		14	68.6		72	180.4	

. \*Gender was unknown for one individual. U.S. rates are only available for 2002-2008

**Figure A1. Number of Chlamydia Infections among Groton Females and Males, 1997-2009**



**Figure A2. Chlamydia Infection Rates (per 100,000): Groton, CT and U.S., 2002-2008**



**Table A2. Number of Chlamydia Infections: Groton Females by Race/Ethnicity, 1997-2009**

Year	White-NH	Black-NH	Other-NH	Hispanic	Unknown	TOTAL
1997	19	28	0	18	21	86
1998	21	32	0	17	39	109
1999	22	35	1	30	23	111
2000	16	22	1	19	34	92
2001	22	32	1	20	32	107
2002	34	37	2	27	20	120
2003	23	26	1	28	27	105
2004	22	36	1	31	20	110
2005	29	45	0	37	30	141
2006	23	40	4	28	35	130
2007	24	27	0	31	41	123
2008	27	15	0	13	61	116
2009	5	14	2	9	88	118

**Table A3. Number of Chlamydia Infections: Groton Males by Race/Ethnicity, 1997-2009**

Year	White-NH	Black-NH	Other-NH	Hispanic	Unknown	TOTAL
1997	5	7	0	2	4	18
1998	4	14	1	4	4	27
1999	5	14	1	2	3	25
2000	3	5	1	4	6	19
2001	5	12	4	3	5	29
2002	7	22	2	8	11	50
2003	4	10	0	4	8	26
2004	9	11	0	7	5	32
2005	5	22	0	4	9	40
2006	6	11	1	5	11	34
2007	4	11	0	4	15	34
2008	2	8	0	1	21	32
2009	0	2	0	2	25	29

<b>Table A4. Distribution (Proportion) of Chlamydia Infections: Groton Females by Race/Ethnicity, 1997-2009</b>					
<b>Year</b>	<b>White-NH</b>	<b>Black-NH</b>	<b>Other-NH</b>	<b>Hispanic</b>	<b>Unknown</b>
1997	22.1	32.6	0.0	20.9	24.4
1998	19.3	29.4	0.0	15.6	35.8
1999	19.8	31.5	0.9	27.0	20.7
2000	17.4	23.9	1.1	20.7	37.0
2001	20.6	29.9	0.9	18.7	29.9
2002	28.3	30.8	1.7	22.5	16.7
2003	21.9	24.8	1.0	26.7	25.7
2004	20.0	32.7	0.9	28.2	18.2
2005	20.6	31.9	0.0	26.2	21.3
2006	17.7	30.8	3.1	21.5	26.9
2007	19.5	22.0	0.0	25.2	33.3
2008	23.3	12.9	0.0	11.2	52.6
2009	4.2	11.9	1.7	7.6	74.6

NH: non-Hispanic

<b>Table A5. Distribution (Proportion) of Chlamydia Infections: Groton Males by Race/Ethnicity, 1997-2009</b>					
<b>Year</b>	<b>White-NH</b>	<b>Black-NH</b>	<b>Other-NH</b>	<b>Hispanic</b>	<b>Unknown</b>
1997	27.8	38.9	0.0	11.1	22.2
1998	14.8	51.9	3.7	14.8	14.8
1999	20.0	56.0	4.0	8.0	12.0
2000	15.8	26.3	5.3	21.1	31.6
2001	17.2	41.4	13.8	10.3	17.2
2002	14.0	44.0	4.0	16.0	22.0
2003	15.4	38.5	0.0	15.4	30.8
2004	28.1	34.4	0.0	21.9	15.6
2005	12.5	55.0	0.0	10.0	22.5
2006	17.6	32.4	2.9	14.7	32.4
2007	11.8	32.4	0.0	11.8	44.1
2008	6.3	25.0	0.0	3.1	65.6
2009	0.0	6.9	0.0	6.9	86.2

NH: non-Hispanic

The number of infections in each race/ethnicity group is not estimated in this supplement because in 2008 and 2009 the high percentage of unknown race/ethnicity precludes using the accepted method of attributing unknown race/ethnicity according to the distribution of known race/ethnicity.

Figure A3. Distribution of Chlamydia Infections among Groton Females of Known Race/Ethnicity, 1997-2009

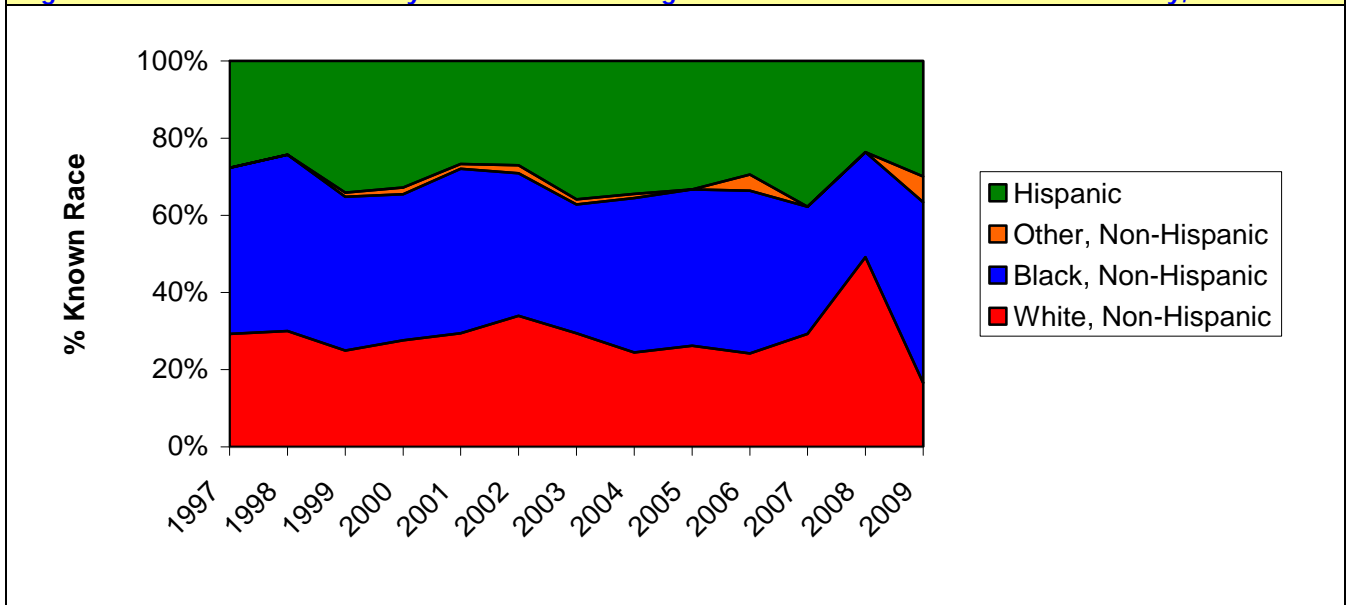
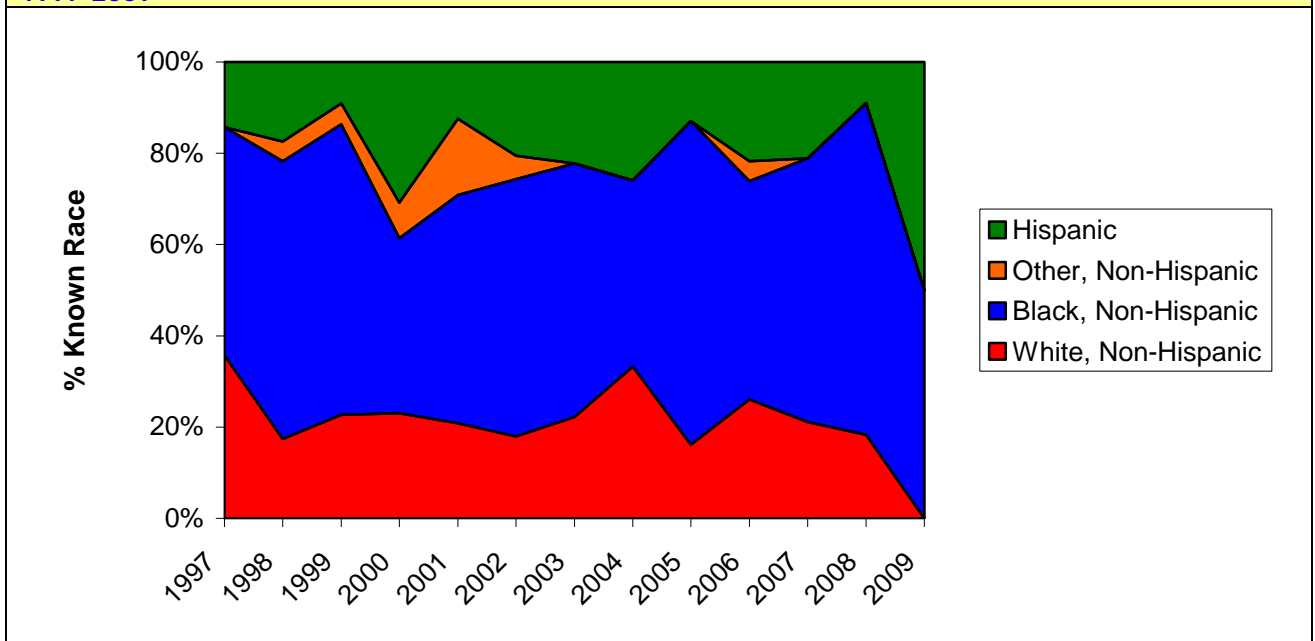


Figure A4. Distribution of Chlamydia Infections among New London Males of Known Race/Ethnicity, 1997-2009



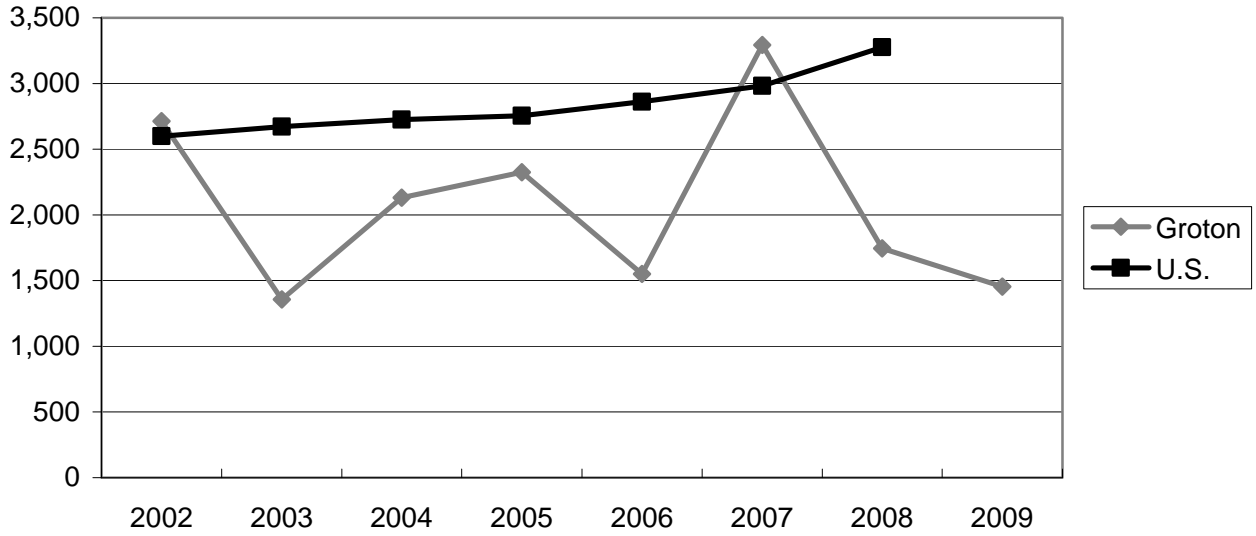
<b>Table A6. Number of Chlamydia Infections by Age Group: Groton Females, 1997-2009</b>											
Year	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-54	55-70	Unknown	Total
1997	0	28	25	5	0	0	1	0	0	1	60
1998	1	24	29	8	1	1	0	0	0	0	64
1999	2	22	34	4	6	0	2	0	0	1	71
2000	2	26	21	7	1	0	0	0	0	2	59
2001	1	23	14	8	2	0	0	1	0	1	50
2002	0	28	26	10	3	0	0	0	0	1	68
2003	0	14	28	15	2	1	1	0	0	0	61
2004	0	22	29	12	3	1	0	0	1	0	68
2005	0	24	36	9	5	0	0	0	0	0	74
2006	1	16	37	17	4	4	0	0	0	3	82
2007	3	34	30	10	2	1	0	0	2	1	83
2008	2	18	25	10	3	1	1	1	1	0	63*
2009	0	15	24	10	6	1	0	1	0	0	57

\*One female below age 10 was infected. One 1998 report missing gender, race and ethnicity data was excluded from analysis.

<b>Table A7. Number of Chlamydia Infections by Age Group: Groton Males, 1997-2009</b>											
Year	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-54	55-70	Unknown	Total
1997	0	2	1	1	1	0	0	0	0	0	5
1998	0	2	6	1	2	0	0	0	0	0	11
1999	0	1	3	5	0	1	0	0	0	0	10
2000	0	1	8	1	4	1	0	0	0	0	15
2001	0	4	7	1	1	0	0	0	0	0	13
2002	0	2	8	3	2	1	0	0	0	0	16
2003	0	4	8	2	2	2	0	0	0	0	18
2004	0	2	7	1	1	2	0	1	0	0	14
2005	0	4	3	4	3	1	0	0	0	0	15
2006	0	2	10	4	1	1	0	0	0	0	18
2007	0	0	3	4	1	0	0	1	0	0	9
2008	0	10	3	2	0	2	0	0	0	0	17
2009	0	0	6	3	0	0	2	1	0	0	12

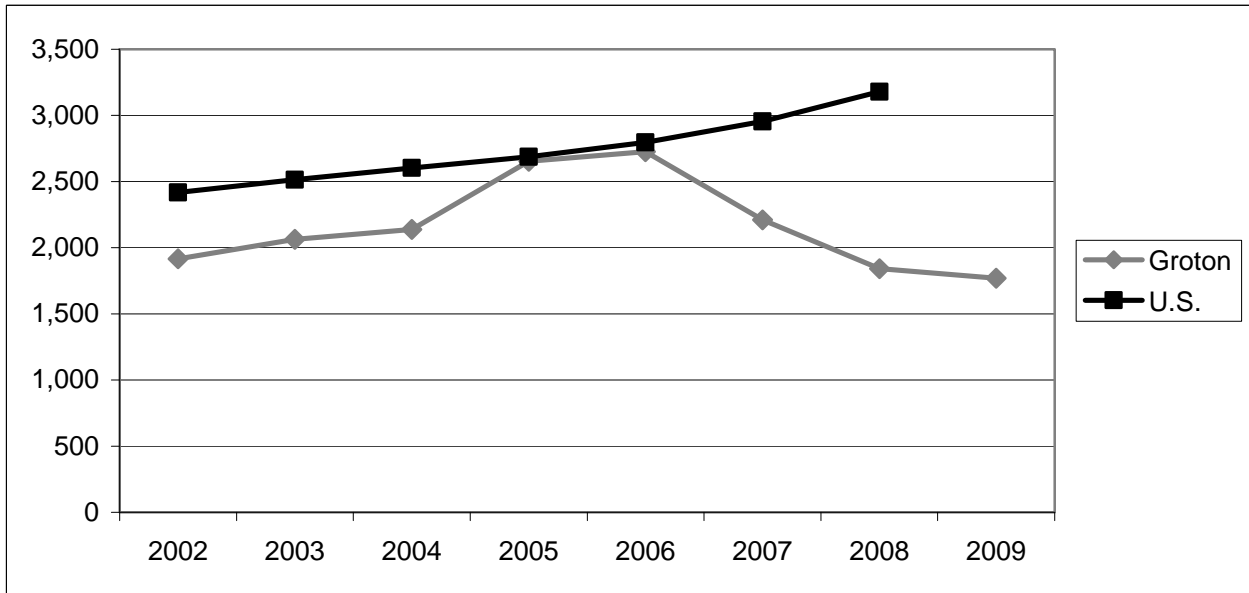
One 1998 report missing gender, race and ethnicity data was excluded from analysis.

**Figure A5. Chlamydia Infection Rates (per 100,000): 15-19 Year-Old Groton and U.S. Females, 2002-2008/2009\***



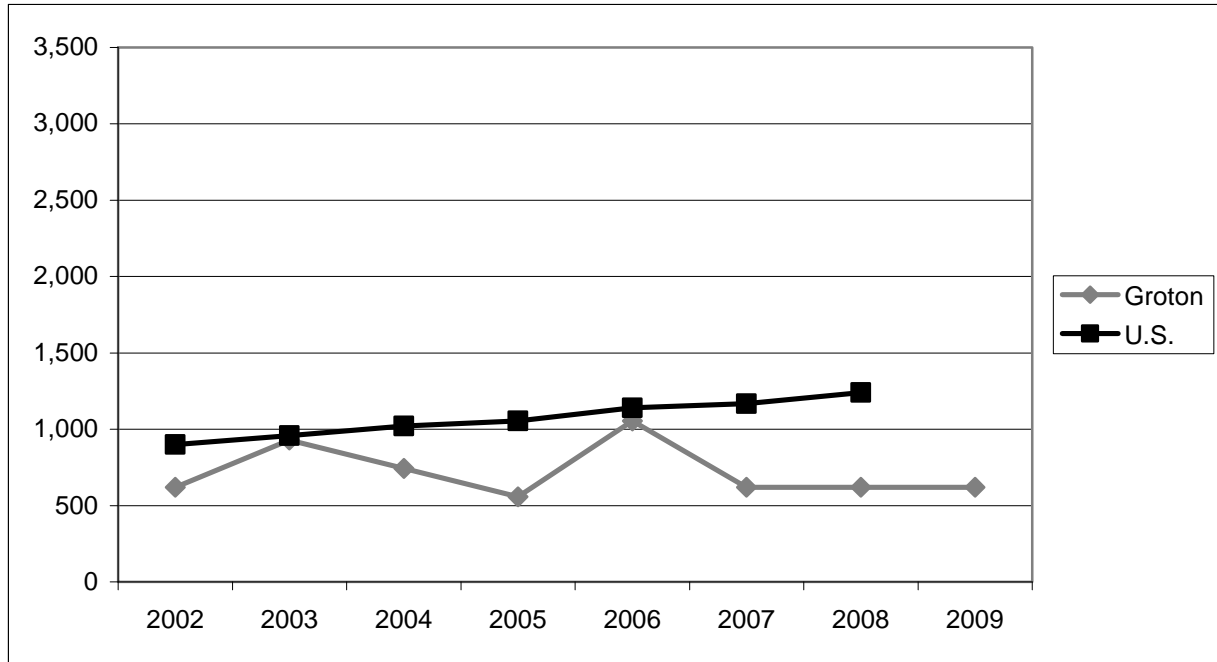
U.S. rates are not available for 2009.

**Figure A6. Chlamydia Infection Rates (per 100,000): 20-24 Year-Old Groton and U.S. Females, 2002-2008/2009\***



U.S. rates are not available for 2009.

**Figure A7. Chlamydia Infection Rates (per 100,000): 25-29 Year-Old Groton and U.S. Females, 2002-2008/2009\***



U.S. rates are not available for 2009.