2012 HIV/STD Surveillance Report: Addendum

Communicable Disease Branch

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EXECUTIVE SUMMARY

HIV Disease

In 2012, 1,409 new individuals were diagnosed and reported with HIV disease (HIV/AIDS) in North Carolina (data as of 07/01/2013). This number represents a decrease from the number of cases diagnosed and reported in 2011. The estimated population of persons in the state living with HIV is about 35,150 people, including those persons unaware of their status. In 2011, of the 50 states in our country and six dependent areas reporting new HIV diagnoses to the CDC, North Carolina ranked 15th, with a rate of 17.3 per 100,000 population (slightly higher than the overall U.S. rate, 15.9 per 100,000). In 2011, North Carolina ranked 18th among states and territories in the rate of adults and adolescents living with HIV disease (N.C. rate = 309.5 per 100,000; U.S. rate = 342.2 per 100,000).

Recognizing North Carolina's diverse racial and ethnic makeup is important to understanding the effect on the state by HIV/AIDS and other STDs because these diseases are disproportionately represented among minorities and the economically disadvantaged. According to census figures, North Carolina ranked as the 10th most populous state in the nation as of 2011 and continues to grow rapidly. In 2012, the racial/ethnic makeup of the state was 21.4 percent black or African American (non-Hispanic), 69.8 percent white (non-Hispanic), and 8.3 percent Hispanic, with the remaining proportion consisting of primarily American Indians (1.2%) and Asians/Pacific Islanders (2.2%). Although American Indians comprise just over 1 percent of the state's population, this group represents the largest population of American Indians in the eastern part of the nation. The state was ranked 38th in the nation for per capita income in 2012, with 29 percent of its child population (0-18 years), 14 percent of the elderly (65+), and 19 percent of the population ages 19-64 years are at or below the federal poverty level (2011-2012).

As seen with many other diseases, HIV is disproportionately distributed among the state's population. Recognizing these differences is important in knowing how to best direct prevention and care efforts. The 2012 adult/adolescent rate of new HIV diagnoses for non-Hispanic blacks (53.2 per 100,000) was nearly nine times the rate for whites (6.0 per 100,000) and the rate of new diagnoses for Hispanics (17.5 per 100,000) was nearly three times the rate for whites. American Indians experienced a rate 2.5 times that of whites (14.9 per 100,000). The highest rate of new HIV diagnoses was found among adult/adolescent black males (86.9 per 100,000). The largest disparity in HIV diagnoses was found in in the comparison of adult/adolescent white and black females; the HIV rate for black females (24.6 per 100,000) was 11 times that for white non-Hispanic females (2.2 per 100,000). The ratio of male-to-female HIV disease cases diagnosed has risen from 2.9 in 2008 to 3.5 in 2012.

Familiarity with gender and racial/ethnic differences is important, but understanding the behavioral risk is also critical. Risk of HIV transmission is very different for males and females; therefore, discussing risk separately by gender is important. In 2012, 80 percent of new adult and adolescent HIV disease cases for males were attributed to men who have sex with men

(MSM), 1 percent to injection drug use (IDU), 2 percent to MSM who also inject drugs (MSM/IDU), and 17 percent were attributed to heterosexual sex. For adult and adolescent females, heterosexual sex accounted for 92 percent of HIV disease cases in 2012, while injection drug use accounted for 8 percent.

The proportion of male HIV case reports with MSM as a risk factor has increased in North Carolina during the past few years for all racial/ethnic groups. In 2012, MSM (including MSM/IDU) accounted for 92 percent of white non-Hispanic male HIV reports, 77 percent of black non-Hispanic male case reports and 85 percent of case reports for other minority males.

Heterosexual sex as a primary risk accounts for 33 percent of all (male and female) 2012 adult/adolescent HIV disease reports and was the principal risk for females (92%). Heterosexual HIV disease cases for 2012 were higher among minority males (20%) than among white males (8%). Indications of heterosexual risk-taking behavior can be found in the high rates of infection for other sexually transmitted diseases.

Injection drug use accounted for about 1 percent of male adult/adolescent HIV disease cases in 2012 and accounted for about 8 percent of female cases. Prevention activities aimed at reducing HIV transmission through injection drug use remains very important to comprehensive HIV prevention strategies. Substantial evidence shows that needle exchange programs are effective in reducing risk behavior, HIV transmission, and Hepatitis C infection among injection drug users. About 7 percent of living HIV cases had IDU as the hierarchical risk.

Preliminary evaluations indicate that four race/gender/transmission risk categories accounted for 79 percent of all new diagnoses in 2012. These categories include black, non-Hispanic MSM (522 cases; 37% of all cases), black, non-Hispanic heterosexual women (216 cases; 15% of all cases), white, non-Hispanic MSM (231 cases; 17% of all cases), and black, non-Hispanic heterosexual men (142 cases; 10% of all cases).

Sexually Transmitted Diseases

In 2012, 598 cases of early syphilis were reported in North Carolina. The overall early syphilis rate in 2012 was 6.2 cases per 100,000. In 2012, the male-to-female ratio was 6.7 for early syphilis cases in the state, with men representing 88 percent of all reported early syphilis cases. The six most populous counties (Mecklenburg, Guilford, Wake, Forsyth, Cumberland, and Durham) accounted for 64 percent of 2012 early syphilis reports in North Carolina. In 2012, black males represented 65 percent of all early syphilis cases with a rate of 39.5 per 100,000. The syphilis rate among black males was more than 12 times the rate for white males (3.2 per 100,000) and the rate of syphilis among Hispanic males (4.7 per 100,000) was 1.5 times the rate for white males.

Chlamydia rates in 2012 were highest among 20 to 24 year olds for both females (4,782.2 per 100,000) and males (1,345.8 per 100,000). Racial disparities in female chlamydia reports have remained fairly stable during the past six years (2007–2012), with a rate among black females six to eight times the rate among white females. The rates for Hispanic females have been two to three times the rates for white females. Chlamydia positivity rates among women <25 years old tested in publicly-funded clinics have not changed during the past six years. In STD clinics, the positivity rate has ranged from 15.4 percent to 16.0 percent. Family Planning and OB/Gyn clinics have similar rates ranging from 7.5 percent to 9.2 percent.

Gonorrhea case reports reflect severe racial disparities. The differences are most dramatic for males, where the 2012 gonorrhea rate among black males (339.5 per 100,000) was 21.4 times, among American Indian males (85.1 per 100,000) was five times, and the rate for Hispanic males (32.4 per 100,000) was two times the rate among white males (15.9 per 100,000). The racial disparities in gonorrhea rates were less severe among females. The 2012 gonorrhea rate for black females (374.4 per 100,000) was 13 times, the rate for American Indian females (184.1 per 100,000) was more than six times, and the rate for Hispanic females (44.0 per 100,000) was almost twice the rate for white females (28.8 per 100,000).

INTRODUCTION

The North Carolina 2012 HIV/STD Surveillance Report: Addendum describes the HIV (human immunodeficiency virus) and STD (sexually transmitted disease) epidemics among various populations in North Carolina. The majority of the data presented are drawn from surveillance systems maintained by the N.C. Department of Health and Human Services' (NCDHHS) Communicable Disease Branch, which is part of the N.C. Division of Public Health (NCDPH). We have also integrated other sources in the analysis and discussion where appropriate.

This document is divided into two parts. The first part describes the HIV epidemic and indicators of HIV transmission risk in North Carolina. The second part describes the epidemics of bacterial STDs in North Carolina including syphilis, chlamydia, and gonorrhea. The document also contains an appendix with a list of references as well as a table and map that may be useful but are not explicitly described in the document text.

Please note that references to race and ethnicity in this document may be different from those found in documents from other agencies. Unless otherwise noted, Hispanics (or Latinos) are counted as a separate group to allow for comparisons with traditional race/ethnicity groups (i.e. "white" refers to white non-Hispanics, "black" refers to black non-Hispanics). All calculated rates in this document are based on U.S. Census Bureau bridged-race population estimates.

The HIV disease and AIDS case totals and rates presented in this document are restricted to adult/adolescent cases for comparability across states and with national data (CDC). Other sexually transmitted disease rates are calculated per 100,000 population. Readers should note that HIV and AIDS data are summarized by 'date of diagnosis' unless otherwise noted. This categorization represents a change in data presentation from previous publications. Readers should note how data are presented when comparing data from other sources or previous publications.

The purpose of this addendum document is to supplement information previously published in the North Carolina 2012 HIV/STD Surveillance Report and the North Carolina Epidemiologic Profile for HIV/STD Prevention & Care Planning, December 2012, both of which are available on the NCDPH website: http://epi.publichealth.nc.gov/cd/stds/figures.html. Many of the counts, percentages, and rates described in this document are presented in tables in the surveillance report. The epidemiologic profile provides additional background and context that may be helpful when interpreting the information presented in this addendum. Of particular interest are the epidemiologic profile's Appendix B (that describes the sources of data), Appendix C (that describes risk categorization and rate calculation), and Appendix E (that includes full references for some sources cited in this addendum).

THE HIV DISEASE EPIDEMIC IN NORTH CAROLINA

HIGHLIGHTS

- As of December 31, 2012, the cumulative number of individuals in North Carolina diagnosed with HIV infection was 41,363 people.

- Approximately 35,150 people were living with HIV/AIDS in North Carolina (including an estimated 6,350 individuals who may have been unaware of their infections) as of December 31, 2012.

- The total number of new HIV diagnoses in 2012 was 1,409 (14.6 per 100,000 population) and the number of new diagnoses of HIV infection among adults/adolescents was 1,399 (17.5 per 100,000 adult/adolescent population).

- In 2012, the rate of new HIV diagnoses for adult/adolescent blacks (53.2 per 100,000) was nearly nine times that for adult/adolescent whites (6.0 per 100,000). The rate of new HIV diagnosis for adult/adolescent Hispanics (17.5 per 100,000) was nearly three times the rate for whites.

- The highest rate of new HIV diagnoses in 2012 was among adult/adolescent, black males (86.9 per 100,000). This rate was more than eight times the rate for adult/adolescent white males (10.1 per 100,000). The rate of new HIV diagnoses for adult/adolescent Hispanic males (27.0 per 100,000) was more than twice the rate among white males.

- The largest disparity in 2012 was for adult/adolescent black females; with a rate of new HIV diagnoses (24.6 per 100,000) that was 11 times that of white females (2.2 per 100,000). The rate among Hispanic adult/adolescent females (6.1 per 100,000) was nearly three times the rate among white females.

- For all 2012 adult/adolescent HIV disease cases, men who have sex with men (MSM) was the risk category in an estimated 64 percent of total cases (including 1 percent among MSM who also indicated injection drug use), heterosexual transmission risk was estimated in 33 percent, and IDU was estimated in 3 percent of total cases.

- In 2012, MSM (including MSM/IDU) accounted for 82 percent of new HIV disease cases among adult/adolescent males.

- In 2012, heterosexual contact accounted for about 92 percent and injection drug use accounted for 8 percent of HIV disease cases for adult/adolescent females.

- Nineteen percent (19%) of all newly diagnosed HIV disease cases in 2012 were among adolescent males ages 13 to 24 years old.

- In 2012, 24.4 percent of newly diagnosed HIV disease cases also represented new AIDS cases (i.e., HIV and AIDS diagnosed at the same time or within six months).

- Mecklenburg County had the most HIV cases diagnosed in 2012 (n=318), followed by Wake County (n=152), and Guilford County (n=102).

- In 2012, Mecklenburg County had the highest three-year average HIV disease rate (34.0 per 100,000), followed by Edgecombe County (31.4 per 100,000), Durham County (28.2 per 100,000), Cumberland County (24.4 per 100,000), Wilson County (24.2 per 100,000), Vance County (23.5 per 100,000), and Guilford County (23.0 per 100,000).

- In 2012, HIV/AIDS was listed as the 10th leading cause of death for North Carolina adults ages 25 to 44 years old. The crude HIV disease death rate for blacks was more than 8 times the rate for whites (8.4 vs. 1.0 per 100,000) in 2012.

- From the beginning of the epidemic in 1983 through December 2012, 21,408 AIDS cases have been reported in North Carolina.

- North Carolina ranked 8th among states and territories in number of HIV disease cases diagnosed in 2011 (the most recent year available for national comparisons) and 10th in the nation for estimated persons living with HIV disease as of the end of 2010.

- Seven hundred ninety-eight (798) AIDS cases were diagnosed in North Carolina in 2012 (8.3 per 100,000 population).

Special notes:

- *HIV disease includes all initial diagnoses of HIV as well as those diagnosed with AIDS as their initial diagnosis. More information about this designation of HIV disease can be found in the North Carolina Epidemiologic Profile for HIV/STD Prevention and Care Planning, December 2012, Appendix C (pg. C-3).*

- *The HIV disease and AIDS case totals and rates discussed in this document are restricted to adults/adolescents only for comparability across states and with national data reported by the Centers for Disease Control and Prevention (CDC). All county totals and references to cumulative cases and persons living with HIV/AIDS do include the 0 to 12 age group.*

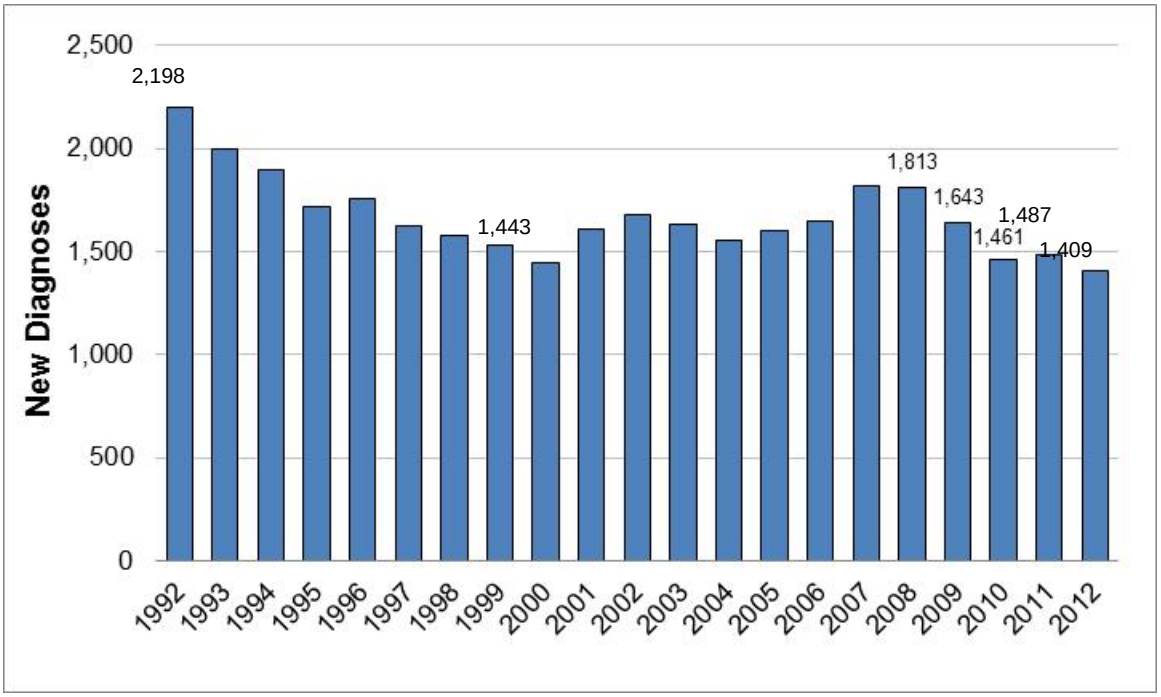
- *Unless otherwise noted, year refers to year of diagnosis for HIV cases, not year of report, as in previous publications.*

- *Unless otherwise noted, references to all racial groups in surveillance data are presented in a race/ethnic designation. Hispanics are considered a separate racial/ethnic group. Thus, "white" refers to white non-Hispanics; "black" refers to black non-Hispanics, etc.*

OVERALL HIV DISEASE TRENDS

Figure 1 displays the number of HIV disease cases diagnosed from 1992 to 2012 by the year of HIV diagnosis for the individual. New diagnoses for 2012 show a slight decrease from the total number of cases seen in 2011. The highest point in the HIV epidemic occurred in 1992 in North Carolina with 2,198 cases diagnosed and then moderated from 1995 to 2012 with an average of 1,611 cases (range: 1,400-1,800) each year. The number of HIV disease cases diagnosed in 1992 represented a time when HIV incidence was likely at its peak. From 1995 to 2012, the epidemic was relatively stable; however, changes in reporting practices contributed to the fluctuations during this period, especially for 2002. The increase in cases in 2007 and 2008 was at least partially a result of N.C. Communicable Disease Branch efforts to increase HIV testing, including the "Get Real. Get Tested." campaign.

Figure 1. HIV disease cases diagnosed in North Carolina, 1992-2012



Please note the numbers in Figure 1 (above) are periodically updated due to completion of case information and deletion of interstate duplicates. Readers are encouraged to use the numbers for earlier years shown in the latest report.

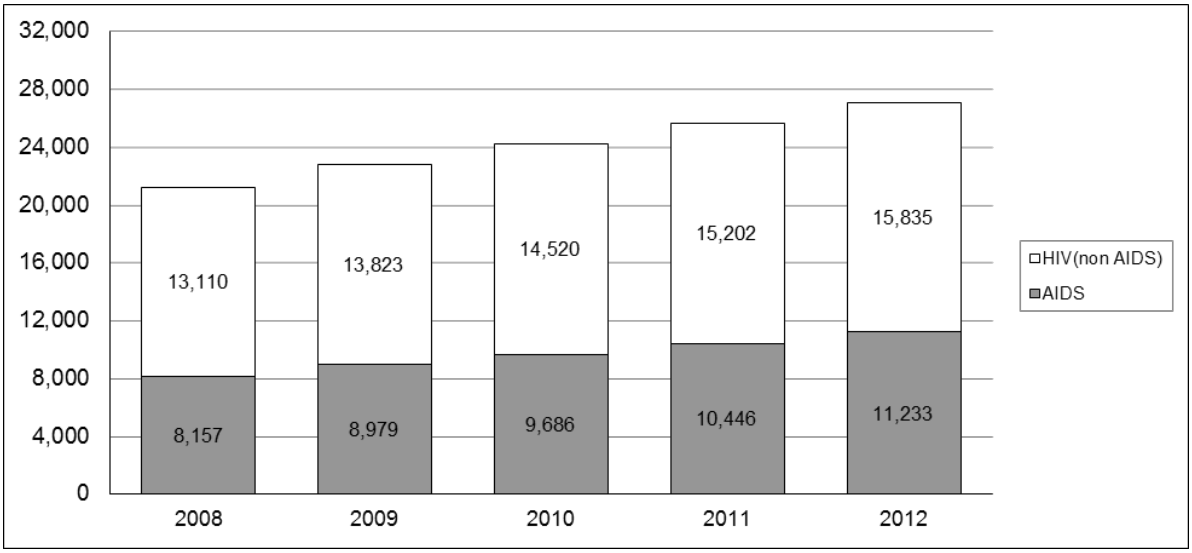
HIV DISEASE PREVALENCE

Prevalent cases represent all individuals living with HIV disease in North Carolina communities. Information about persons living with HIV disease is very critical for activities such as case follow-up, AIDS care provision, and strategic intervention and testing. From the first HIV disease case diagnosed and reported to NCDPH in 1983, through December 31, 2012, the

cumulative number of HIV disease cases diagnosed in North Carolina is 41,363, of whom 27,068 are living and 14,295 have died. This number includes some HIV-positive individuals that died of non AIDS-related causes (see pg. 25 for HIV disease-related deaths). Figure 2 displays the numbers of people living with HIV disease, which represents prevalent cases at the end of each year from 2008 to 2012. The number of people living with HIV disease has been increasing every year, indicating that the number of newly diagnosed HIV disease cases exceeds the number of people who died. Due to the advancement of highly effective antiretroviral treatment (HAART) and opportunistic infection control, people with HIV disease may live longer and healthier lives.

Persons living with HIV represent individuals that have been diagnosed and subsequently reported to the North Carolina public health surveillance system. Case counts are affected by some amount of under-reporting by clinicians as well as people who are infected with HIV but have not been tested and reported. Efforts to identify the unaware positive population will increase new diagnoses in the future. Figure 2 shows the total number of persons living with HIV disease in North Carolina by year. However, these numbers underrepresent true HIV prevalence and must be adjusted to account for those who have been diagnosed but not reported and those who are unaware of their status. One method for estimating people who are unaware they are HIV positive is based on the CDC estimate that 82 percent of people living with HIV have been tested and know their status. Studies indicate that the state HIV surveillance system currently captures 90 percent to 95 percent of HIV diagnoses (North Carolina Epidemiologic Profile for HIV/STD Prevention and Care Planning, December 2012, Appendix B, pg. B-3). Applying these two statistics to our current surveillance total of 27,068 people living in North Carolina with HIV/AIDS increases the estimated HIV disease prevalence in the state to approximately 35,150 people.

Figure 2. Persons (reported) living with HIV disease in North Carolina, 2008-2012*



*represents December 31 of each year

Please note HIV disease reports are periodically updated with vital status data available from the State Center for Health Statistics, thus "living totals" for earlier years, especially for the last two years, have been revised.

Demographics of Persons Living with HIV Disease

Gender, race/ethnicity, and age distribution

Table 1 displays the demographics of people living with HIV disease as of December 31, 2012. Male prevalent cases were 71 percent of the total and more than double the female prevalence. Blacks comprised the majority (66%) of cases, followed by whites (25%) and Hispanics (6%). Older individuals represented a larger percentage of people living with HIV, as people can live for many years on HAART with an HIV diagnosis. The greater percentages of males (71%) and blacks (66%) living with HIV disease indicates that these groups are most affected by the HIV epidemic in North Carolina.

Table 1. North Carolina HIV cases living as of 12/31/2012 by selected demographics

	Males			Females			Total		
	No.	Pct.	Rate**	No.	Pct.	Rate**	No.	Pct.	Rate**
	19,135	71%	386.4	7,933	29%	168.7	27,068	100%	280.3
Race/Ethnicity									
White*	5,559	29%	179.4	1,277	16%	39.2	6,836	25%	107.6
Black*	11,690	61%	1179.9	6,070	77%	539.5	17,760	66%	839.4
AI/AN*	148	1%	262.4	63	1%	104.5	211	1%	180.8
Asian/PI*	96	1%	84.2	42	1%	33.9	138	1%	58.0
Hispanic	1,281	7%	288.4	354	4%	91.2	1,635	6%	196.4
Current Age									
0-12	42	0%	5.0	21	0%	2.6	63	0%	3.8
13-14	4	0%	3.1	10	0%	8.2	14	0%	5.6
15-19	61	0%	18.2	58	1%	18.3	119	0%	18.2
20-24	684	4%	198.4	158	2%	47.4	842	3%	124.1
25-29	1,429	7%	456.2	367	5%	115.5	1,796	7%	284.6
30-34	1,546	8%	497.0	567	7%	176.9	2,113	8%	334.6
35-39	1,616	8%	517.4	866	11%	267.8	2,482	9%	390.4
40-44	2,210	12%	659.0	1,224	15%	354.4	3,434	13%	504.5
45-49	3,048	16%	903.8	1,335	17%	379.7	4,383	16%	636.3
50-54	3,419	18%	1038.4	1,285	16%	365.5	4,704	17%	690.9
55-59	2,393	13%	812.9	979	12%	300.5	3,372	12%	543.7
60-64	1,491	8%	556.2	579	7%	193.5	2,070	8%	364.9
65+	1,178	6%	215.6	483	6%	65.9	1,661	6%	129.9

*non-Hispanic; AI/AN=American Indian/Alaska Native; PI=Pacific Islander **per 100,000 population

Mode of Transmission for HIV Prevalent Cases

Information about modes of transmission of HIV is very useful for disease prevention; without effective behavioral interventions for people living with HIV disease, they may continue to transmit HIV to others. Among living cases, 45 percent were likely infected through MSM activities, 40 percent through heterosexual transmission, 10 percent through injection drug use practices (IDU), and 3 percent through MSM/IDU activities.

NEWLY DIAGNOSED HIV DISEASE CASES IN 2012

In 2012, 1,409 (14.6 per 100,000) individuals were newly diagnosed with HIV infection in North Carolina. Of the newly diagnosed persons, 1,399 of them were over 13 years old, making the rate of HIV infection among adults/adolescents 17.5 per 100,000 (Table 2).

Gender and race/ethnicity

Among individuals diagnosed with HIV disease in 2012, about three times as many cases were male compared to female. Table 2 displays the gender and race/ethnicity distributions of newly diagnosed HIV disease among adults/adolescents for 2012.

Table 2. NC adult/adolescent HIV disease cases by gender and race/ethnicity, 2012

Race/ Ethnicity	Males			Females			Total		
	No.	Pct.	Rate**	No.	Pct.	Rate**	No.	Pct.	Rate**
White*	264	19%	10.1	62	4%	2.2	326	23%	6.0
Black*	681	49%	86.9	227	16%	24.6	908	65%	53.2
AI/AN*	14	1%	31.2	0	0%	0	14	1%	14.9
Asian/PI*	8	1%	8.9	<5	---	---	12	1%	6.3
Hispanic	85	6%	27.0	16	1%	6.1	101	7%	17.5
Other	36	3%	---	<5	---	---	38	3%	---
Total	1,088	78%	28.2	311	22%	7.5	1,399	100%	17.5

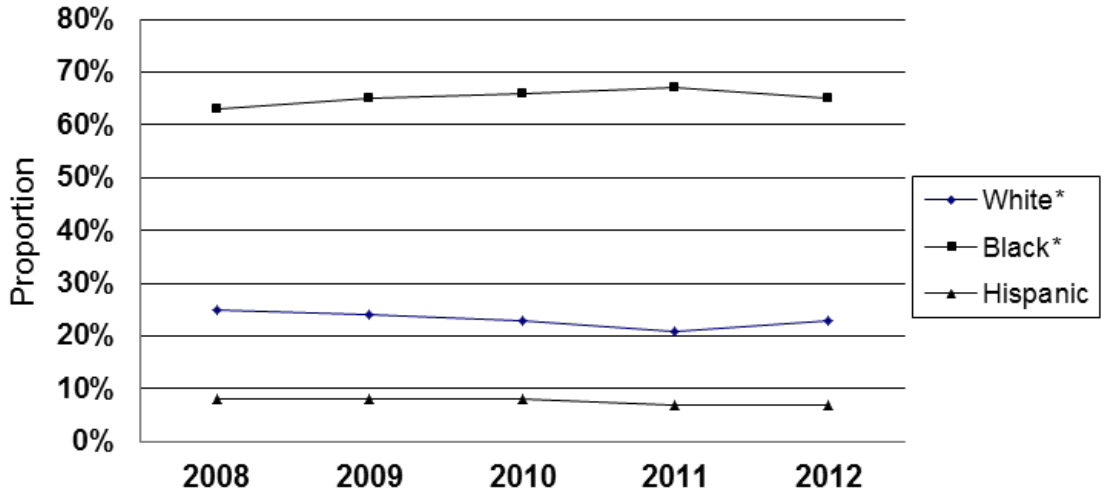
*non-Hispanic; AI/AN=American Indian/Alaska Native; PI=Pacific Islander **per 100,000 adult/adolescent population

Among the adult/adolescent population newly diagnosed with HIV disease in 2012, blacks made up the majority of cases (65%), followed by whites (23%), and Hispanics (7%). During the previous five years (2008–2012), blacks have consisted of 63 percent to 67 percent, whites 21 percent to 25 percent, and Hispanics 7 percent to 8 percent of total cases, as shown in Figure 3. HIV disease rates are different from the proportion of HIV cases because rates take into account the race/ethnicity of the state's population. The highest rate of newly diagnosed HIV disease was among black males (86.9 per 100,000 adult/adolescent population), which was nearly nine times that for white males (10.1 per 100,000 adult/adolescent population; see Table 2). The HIV disease rate among adult/adolescent black females (24.6 per 100,000 adult/adolescent

population) was 11 times the rate for adult/adolescent white females (2.2 per 100,000), representing the largest disparity noted within gender and race/ethnicity categories.

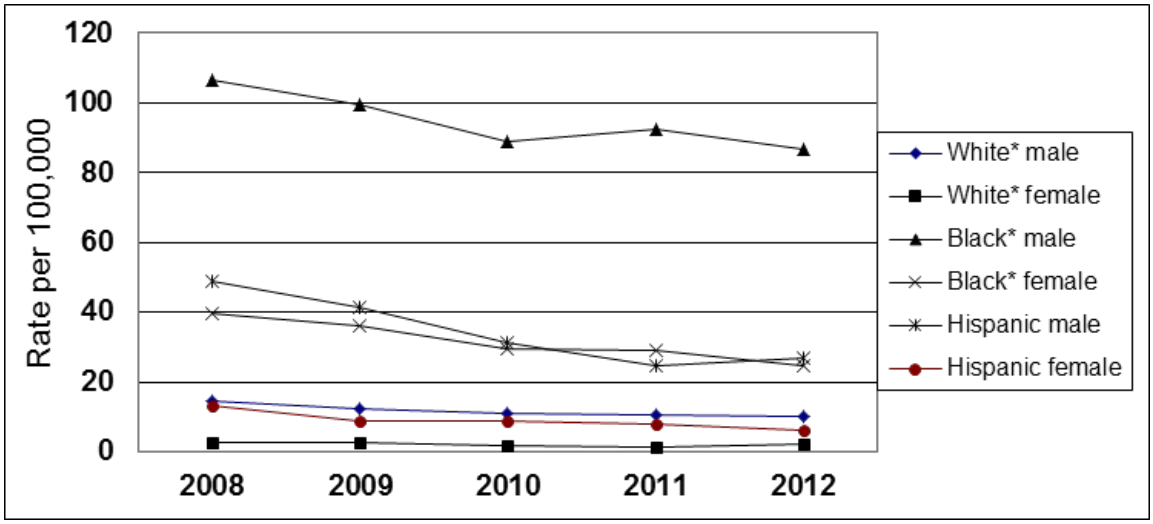
Disparities also existed for Hispanics as compared to whites. The rate for adult/adolescent Hispanic men (27.0 per 100,000) was more than twice the rate for white men, and Hispanic males ranked third highest among the gender and race/ethnicity rates. The rate for adult/adolescent Hispanic women (6.1 per 100,000) was nearly three times that for white women. The HIV disease rate for American Indian males (31.2 per 100,000 was three times the rate for white men, while the rate among Asian/Pacific Islander men was slightly less than that for whites. Figure 3 shows that the HIV disease proportion by race has changed slightly during the past five years, with blacks representing an increasing proportion of cases (from 63% in 2008 to 65% in 2012). Figure 4 shows the gender and race/ethnicity (for whites, blacks, and Hispanics) specific HIV disease rates. In general, HIV disease rates have decreased for all groups. Initial case rates increased slightly for black males in 2011, but they decreased in 2012 to rates lower than in 2010. While initial case rates increased for white females and Hispanic males in 2012, we are still in the process of evaluating all 2012 HIV reports for potential interstate duplicate resolution.

Figure 3. Adult/adolescent HIV disease proportions by race/ethnicity, 2008-2012



*non-Hispanic

Figure 4. Adult/adolescent HIV disease rates by race/ethnicity and gender, 2008-2012



*non-Hispanic

Age distribution

Most HIV disease diagnoses in 2012 were for adults and adolescents, with less than 1 percent (n=10) of newly diagnosed cases representing infants or children younger than 13 years of age. Overall, adults 20 to 29 years old and 40 to 49 years old accounted for the greatest proportion (55.5% together) of individuals diagnosed in 2012 (Table 3).

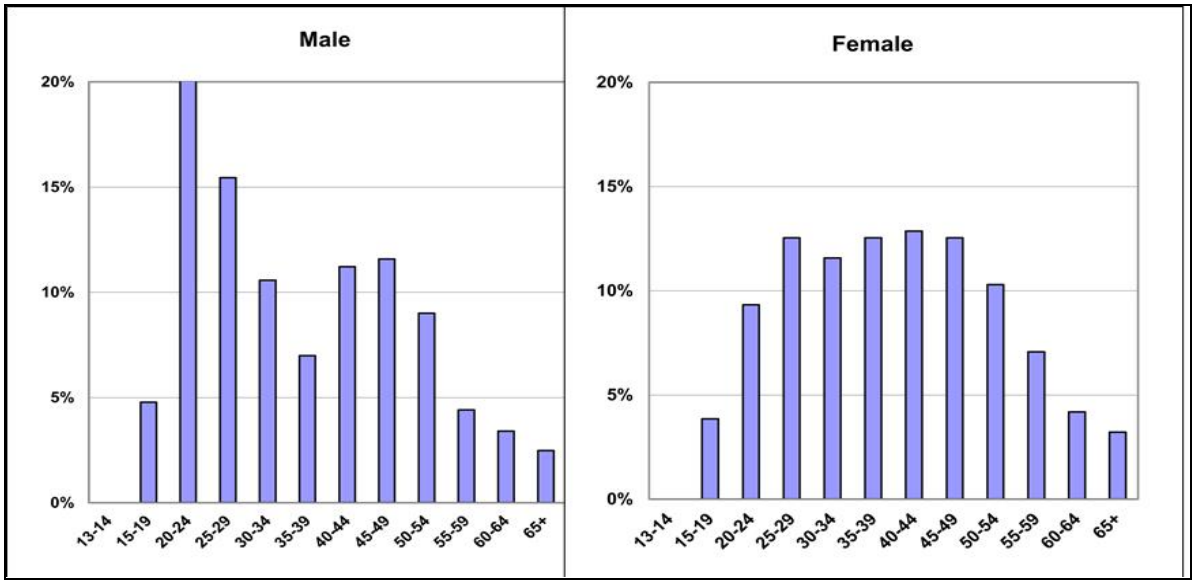
Figure 5 displays the difference of ages between males and females diagnosed with HIV disease in 2012. More males between ages 20 to 29 years (35%) were diagnosed, while the proportion of female diagnoses was remarkably similar for age groups between 20 and 49 years old (about 61% together). The difference of ages at diagnosis reflects the difference in risk for male and females. In recent years, HIV disease has been increasing among young black men in North Carolina, unlike previous years, when the HIV epidemic was increasing primarily among an older population. Diagnoses among older women may represent existing infections previously undiagnosed.

Table 3. North Carolina HIV disease cases by age and gender, 2012

Age	Males			Females			Total		
	No.	Pct.	Rate*	No.	Pct.	Rate*	No.	Pct.	Rate*
0-12	7	0.5%	0.8	3	0.2%	0.4	10	0.7%	0.6
13-14	0	0.0%	0.0	0	0.0%	0.0	0	0.0%	0.0
15-19	52	3.7%	15.5	12	0.9%	3.8	64	4.5%	9.8
20-24	219	15.5%	63.5	29	2.1%	8.7	248	17.6%	36.6
25-29	168	11.9%	53.6	39	2.8%	12.3	207	14.7%	32.8
30-34	115	8.2%	37.0	36	2.6%	11.2	151	10.7%	23.9
35-39	76	5.4%	24.3	39	2.8%	12.1	115	8.2%	18.1
40-44	122	8.7%	36.4	40	2.8%	11.6	162	11.5%	23.8
45-49	126	8.9%	37.4	39	2.8%	11.1	165	11.7%	24.0
50-54	98	7.0%	29.8	32	2.3%	9.1	130	9.2%	19.1
55-59	48	3.4%	16.3	22	1.6%	6.8	70	5.0%	11.3
60-64	37	2.6%	13.8	13	0.9%	4.3	50	3.5%	8.8
65+	27	1.9%	4.9	10	0.7%	1.4	37	2.6%	2.9
Total	1,095	77.7%	23.3	314	22.3%	6.3	1,409	100.0%	14.6

* per 100,000 population

Figure 5. Percentage of adult/adolescent HIV disease cases by age and gender, 2012



Mode of HIV Disease Transmission for Adults/Adolescents

As part of HIV surveillance activities, a great deal of importance is placed on determining the key HIV risk factors associated with each case in order to appropriately target prevention activities. Interviewing the patient, the sex and/or drug-using partners, and the treating physician are all methods used to determine risk factors. Ultimately, each case is assigned to one primary risk category based on a hierarchy of disease transmission developed by the CDC and others.

Table 4 displays the mode of transmission for adult/adolescent HIV disease cases diagnosed in 2012. The principal risk categories were: men who have sex with men (MSM), injection drug use (IDU), and heterosexual sex. The proportion of cases for which there was no identified risk (NIR) reported was substantial (38%; includes presumed heterosexual). A portion of these NIR cases were classified as NIR not due to missing or incomplete information, but rather because the reported risk(s) did not meet one of the CDC-defined risk classifications. The NIR classification was especially common for persons with heterosexual risks. Meeting the CDC-defined risk of heterosexual transmission includes the requirement of knowing a partner's risk (sex with known MSM or IDU, or sex with known HIV-positive person). Consequently, some NIR cases have been reevaluated and reassigned to a "presumed heterosexual" risk category based on additional information gathered from follow-up interviews with newly diagnosed individuals (such as the exchange of sex for drugs or money, previous diagnoses with other STDs, or multiple sexual partners). Even with the reassignment of presumed heterosexual risk for some NIR cases, a substantial proportion (28%) of cases remained assigned as no identified risk.

Table 4. Adult/adolescent HIV disease cases by transmission category, NIR* included, 2012

Exposure category	Males		Females		Total	
	No.	Pct.	No.	Pct.	No.	Pct.
MSM	676	62.1%	---	---	676	48.3%
IDU	12	1.1%	13	4.2%	25	1.8%
MSM/IDU	14	1.3%	---	---	14	1.0%
Heterosexual	56	5.1%	98	31.5%	154	11.0%
Presumed heterosexual	84	7.7%	59	19.0%	143	10.2%
NIR*	246	22.6%	141	45.3%	387	27.7%
Total	1,088	100.0%	311	100.0%	1,399	100.0%

*no identified risk

To better describe the overall changes, the remaining NIR cases have been assigned a risk based on the proportionate representation of the various risk groups within the surveillance data (Table 5). Table 5 shows that in 2012, MSM (including MSM/IDU; men who have sex with men and inject drugs) were estimated to represent about 64 percent of all HIV disease cases. Heterosexual transmission risk represented about 33 percent of all HIV disease cases and IDU represented about 3 percent. More explanation of this general risk reassignment of NIR cases can be found in the North Carolina Epidemiologic Profile for HIV/STD Prevention and Care

Planning, December 2012 (Appendix C, pg. C-4). Please note all further discussions of risk or transmission categories in this document will be based on the fully redistributed risk of all HIV disease cases.

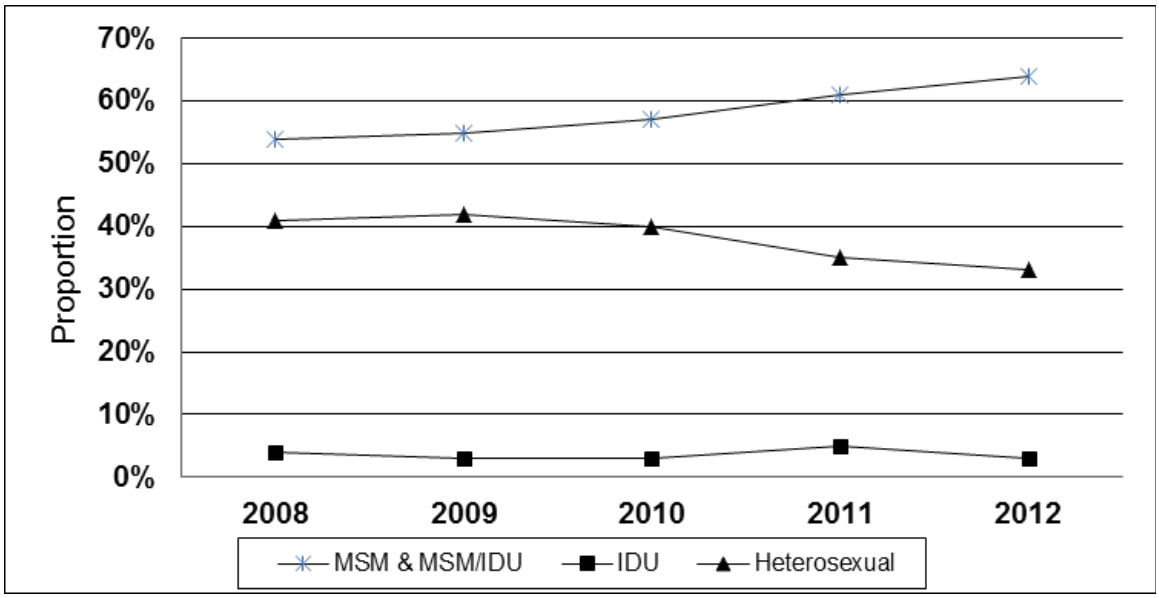
Table 5. Adult/adolescent HIV disease cases by transmission category, NIR* redistributed, 2012

Exposure Category	Males		Females		Total	
	No.	Pct.	No.	Pct.	No.	Pct.
MSM	874	80%	---	---	874	62%
IDU	16	1%	24	8%	39	3%
MSM/IDU	18	2%	---	---	18	1%
Heterosexual	181	17%	287	92%	468	33%
Total	1,088	100%	311	100%	1,399	100%

*no identified risk

Figure 6 shows more than 90 percent of the HIV disease cases were likely transmitted via sex, either homosexual or heterosexual. During the period from 2008 to 2012, MSM have been the leading mode of transmission, increasing from 53 percent in 2008 to 62 percent in 2012 (19% increase). During the same time period, heterosexual transmission decreased 19 percent.

Figure 6. Proportion of HIV disease* cases by mode of transmission, 2008-2012 (NIR's redistributed)



*adult/adolescent

Gender and mode of transmission

HIV risk is very different for males and females; therefore, risk is discussed separately for each gender (Figures 7 and 8 display adult/adolescent risk categories for each gender). For males, MSM (including MSM/IDU) accounted for about 82 percent of HIV disease cases diagnosed in 2012; heterosexual contact cases accounted for about 17 percent of cases; and IDU cases accounted for about 1 percent. For females, heterosexual contact accounted for about 92 percent of cases and IDU about 8 percent.

Figure 7. Adult/adolescent female HIV disease cases, 2012 (N=311)

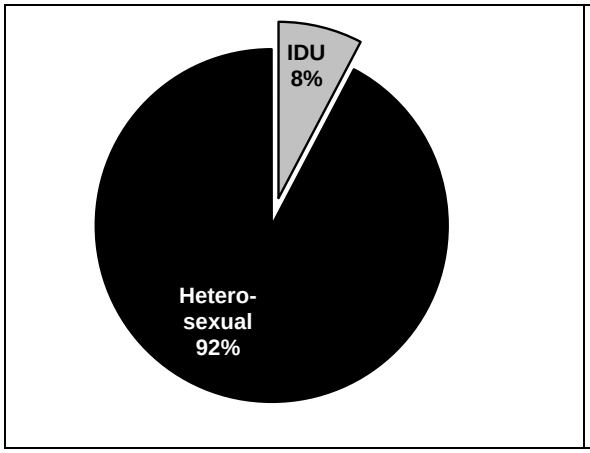
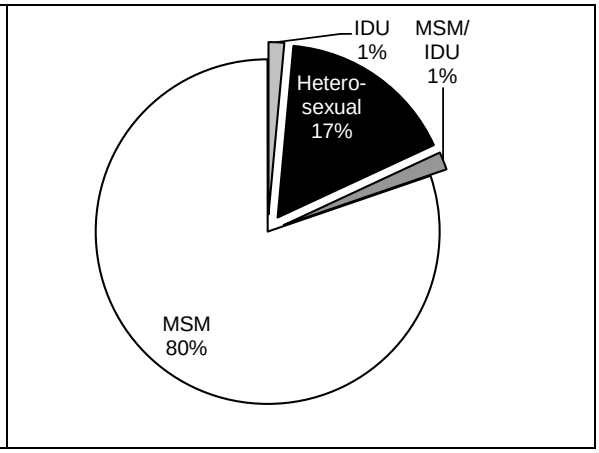


Figure 8. Adult/adolescent male HIV disease cases, 2012 (N=1,088)



For males, the proportion of MSM cases (including MSM/IDU cases) has risen in recent years, from 73 percent in 2008 to 82 percent in 2012. The proportion of IDU cases for males has decreased slightly from 3 percent to 1 percent from 2008 through 2012. For females, the proportion of heterosexual contact reports has fluctuated between 91 percent and 95 percent and proportion of IDU transmission varied between 5 percent and 9 percent during the years 2008 through 2012.

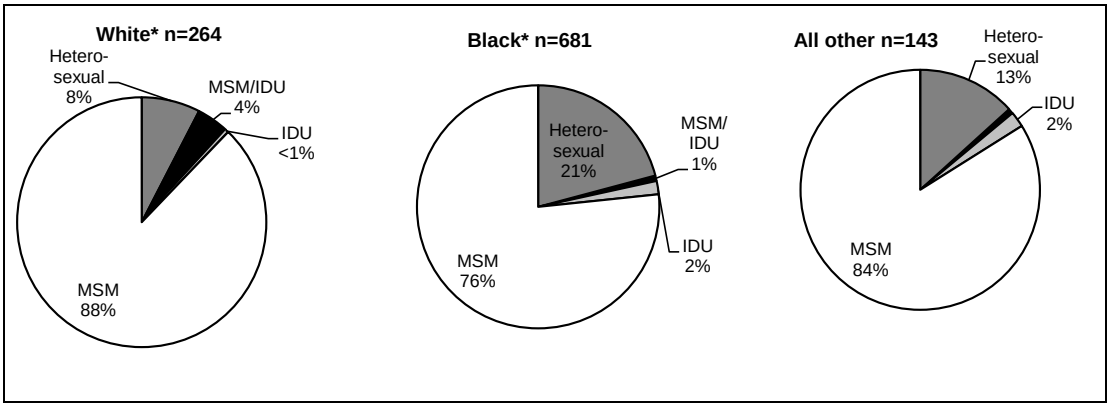
Gender, race/ethnicity, and mode of transmission

Among white males, MSM (including MSM/IDU) represented 92 percent of cases, heterosexual risk represented 8 percent of cases, and IDU risk represented less than 1 percent of cases (Figure 9). For black males, MSM represented about 77 percent of HIV cases, heterosexual risk represented about 21 percent of cases, and IDU risk about 2 percent of cases. The risk breakdown for other races/ethnicities (Hispanics, American Indians, and Asian/Pacific Islanders) are grouped together as "All other" because of low case numbers. Within this aggregated group, MSM risk represented 85 percent of male cases, heterosexual risk 13 percent of cases, and IDU risk 2 percent of cases. The proportion of HIV cases attributed to heterosexual risk among black males and other races are higher than the proportion among white males. Although some of this observed difference may be due to underreporting of MSM activity among minority males, some

is attributed to the difference in disease prevalence for each racial/ethnic group and the subsequent effect on risk.

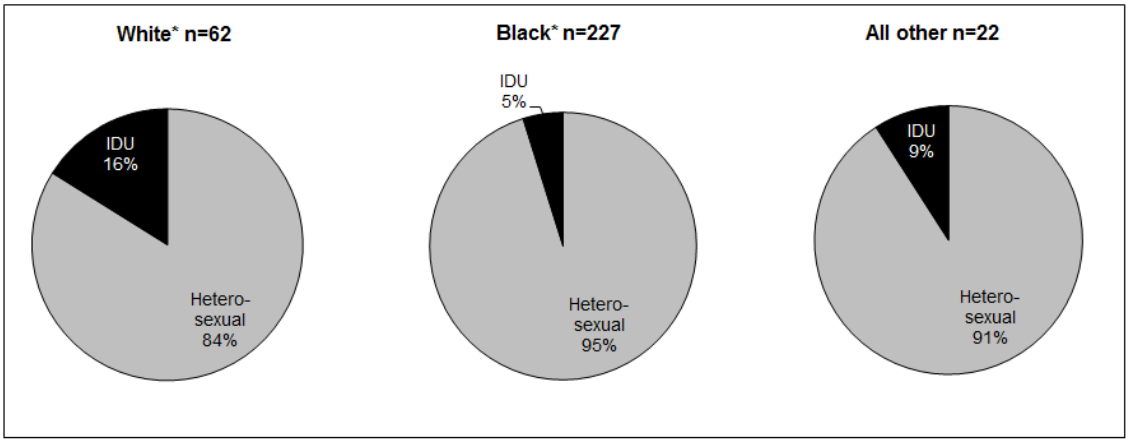
Unlike the differences in risk observed for males among the racial/ethnic groups, the majority of all HIV cases among females, regardless of race/ethnicity, are attributed to heterosexual sex (Figure 10). IDU is attributed to a greater proportion of white female cases (16%) than to minority females (5-10%).

Figure 9. Adult/adolescent male HIV disease cases, 2012



*non-Hispanic

Figure 10. Adult/adolescent female HIV disease cases, 2012



*non-Hispanic

ADOLESCENT HIV/AIDS

Figures 11 through 14 display the percentage of newly diagnosed HIV disease cases by risk and race/ethnicity categories for each gender for individuals ages 13 to 24 years diagnosed with HIV in 2012. Because there can be significant delay between infection and subsequent testing and reporting, using the age group 13 to 24 years old better describes infections that likely occurred during adolescence. In 2012, while just 4.5 percent of total cases diagnosed were found among teenagers from 13 to 19 years, the percentage increased to 22 percent when 20 to 24 year olds were included. From 2008 to 2012, the proportion of adolescents (13 to 24 years old) among HIV disease cases has increased from 17 percent to 22 percent of all reports. The proportion of cases among each racial group for adolescents is similar to that of HIV cases overall: minorities are disproportionally affected. Blacks represented the majority of HIV disease diagnoses for both men and women among 13 to 24 year olds (75% and 81%, respectively). Although adolescent cases do not represent the majority of HIV cases diagnosed in each year, adolescence is the critical age for health education and HIV prevention.

Figure 11. New HIV Diagnoses among adolescent (13-24yrs) males, by race, 2012

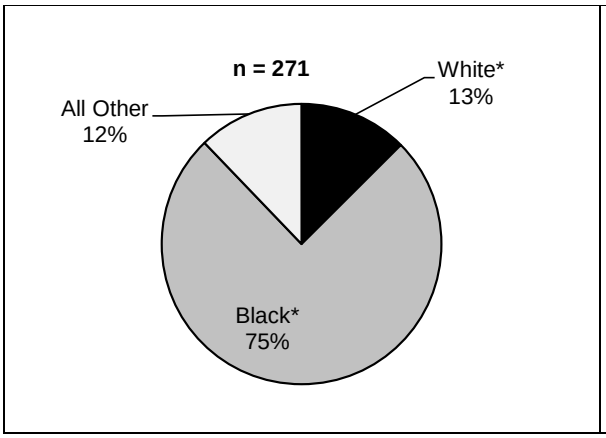
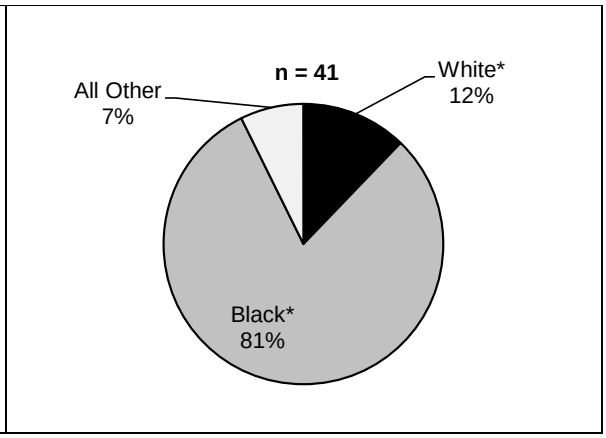


Figure 12. New HIV diagnoses among adolescent (13-24yrs) females, by race, 2012



The exposure or risk categories for male and female adolescents are very different (Figures 13 and 14). In 2012, 93 percent of new HIV disease cases among adolescent females were attributed to heterosexual contact. For adolescent males, the proportion of HIV disease cases attributed to heterosexual contact was only 7 percent and the proportion attributed to MSM risk (including MSM/IDU) accounted for 93 percent, which has increased from 89 percent in 2008. As compared to cases for older persons, adolescent cases are slightly more likely to be associated with sexual activity (99% vs. 97%) and not injection drug use practices.

Figure 13. Adolescent (13-24yrs) male HIV cases, 2012

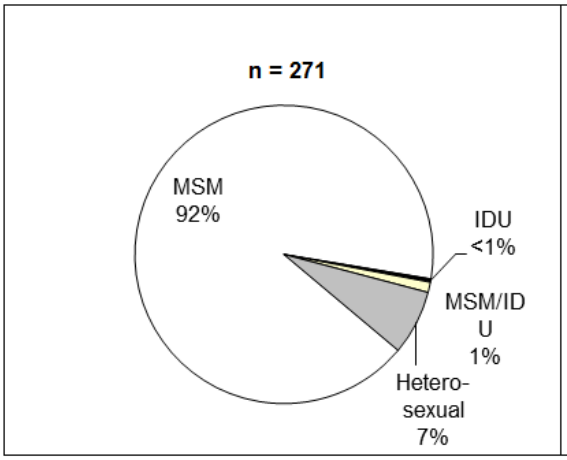
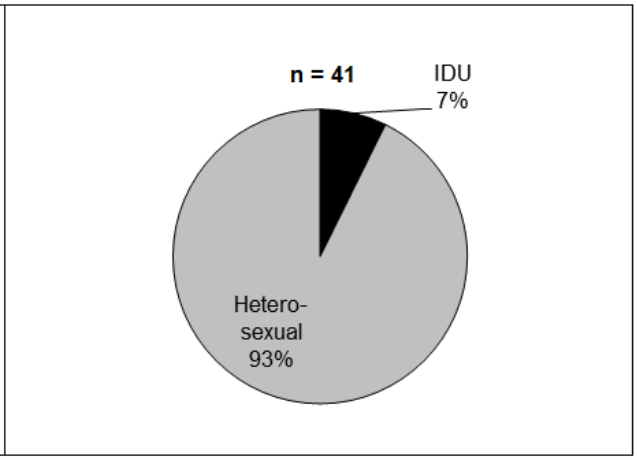


Figure 14. Adolescent (13-24yrs) female HIV cases, 2012



FEMALES OF CHILD-BEARING AGE AND PERINATAL HIV/AIDS

Perinatal transmission of HIV is generally preventable if appropriate drugs are administered to mothers during pregnancy and delivery. For this reason, special emphasis is placed on follow-up for known HIV-infected mothers in North Carolina. Table 6 displays the proportion of HIV-infected women who were of child-bearing age (15–44 years old). During the past five years, an average of 235 women of child-bearing age were diagnosed with HIV each year in North Carolina (approximately 60% of total female HIV cases). Note that the number and proportion of HIV diagnoses among North Carolina females has decreased in recent years. Readers should keep in mind that the delays in testing and diagnosis can significantly affect the assessment of the actual number of females in this category.

Table 6. Female HIV disease cases by special age groups, 2008-2012

Age	2008		2009		2010		2011		2012	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
0-14 yrs	4	0.9%	3	0.7%	4	1.1%	3	0.9%	3	1.0%
15-44 yrs	311	66.7%	259	62.1%	213	58.7%	201	58.3%	195	62.1%
45+ yrs	151	32.4%	155	37.2%	146	40.2%	141	40.9%	116	36.9%
Total	466	100.0%	417	100.0%	363	100.0%	345	100.0%	314	100.0%

Table 7 displays the numbers of likely perinatal HIV transmissions that have occurred from 2003 to 2012 by year of birth. These numbers represent pediatric reports that indicate likely perinatal transmission based on exposure categories in HIV surveillance data. Since 2007, there have been decreases noted in the number of HIV-positive babies born in North Carolina. Confirming

HIV in perinatal cases takes time, so case totals for recent years should be considered preliminary. In November 2007, North Carolina implemented new HIV testing statutes that require every pregnant woman be offered HIV testing by her attending physician at her first prenatal visit and in the third trimester. If there is no HIV result test on record during the current pregnancy, the pregnant woman will be tested at labor and delivery and/or the infant will be tested for HIV.

Table 7. Likely perinatal HIV disease cases by year of birth, 2003-2012

Year of birth	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Cases	6	4	5	9	10	9	5	0	3	0

GEOGRAPHIC DISTRIBUTION OF HIV/AIDS

The North Carolina 2012 HIV/STD Surveillance Report gives county totals of HIV disease and AIDS cases reported, cases living at the end of 2012, and a ranking of case rates (per 100,000 population) based on a three-year average (Tables 1-6, pg. 1-10). Mecklenburg County ranked highest with an HIV disease three-year average rate of 34.0 per 100,000 population in 2012, followed by Edgecombe County (31.4 per 100,000), Durham County (28.2 per 100,000), Cumberland County (24.4 per 100,000), Wilson County (24.2 per 100,000), Vance County (23.5 per 100,000), and Guilford County (23.0 per 100,000). Readers are cautioned to view rates carefully, as rates based on small numbers (generally less than 20) are considered unreliable. Persons diagnosed in long-term institutions, such as prisons, are removed from county totals for a better comparison of HIV impact among communities.

HIV Prevalence Cases in Urban/Rural Areas

Among HIV disease cases living through the end of 2012, approximately 20 percent were diagnosed and reported from rural areas (Table 8) and about 75 percent of living HIV cases were from urban areas. More than 50 percent of living cases diagnosed in North Carolina were from six counties: Mecklenburg (18.4%), Wake (10.4%), Guilford (7.5%), Durham (5.6%), Forsyth (5.0%), and Cumberland (4.6%). Prevalence rates for blacks, whites, Hispanics and American Indians/Alaska Natives were higher in urban than in rural areas; only Asian/Pacific Islanders experienced higher prevalence rates in rural areas (Table 8).

County of residence is based on where an individual was living when diagnosed with HIV disease. People may move to other areas in the years after diagnosis. Assuming no significant difference between the numbers of HIV disease cases moving in and out of the original residence county, the statistics still indicate roughly the number and rate of living HIV disease cases in the corresponding counties.

Table 8. HIV disease prevalence as of 12/31/2012 by rural/urban area, 2012

Race/Ethnicity	Rural			Urban			N.C. Total***		
	Cases	Pct	Rate*	Cases	Pct	Rate*	Cases	Pct	Rate*
White**	1,267	24.1%	64.8	5,347	26.5%	121.6	6,836	25.3%	107.6
Black**	3,446	65.4%	596.0	13,036	64.6%	847.8	17,760	65.6%	839.4
AI/AN**	132	2.5%	161.8	66	0.3%	187.9	211	0.8%	180.8
Asian/PI**	25	0.5%	91.5	110	0.5%	52.2	138	0.5%	58.0
Hispanic	308	5.8%	157.3	1,259	6.2%	197.8	1,635	6.0%	196.4
Other**	89	1.7%	---	370	1.8%	---	488	1.8%	---
Total	5,267	19.5%	185.5	20,188	74.6%	296.1	27,068	100.0%	280.3

* Rate per 100,000 population ** non-Hispanic; AI/AN=American Indian/Alaska Native; PI=Pacific Islander
***N.C. Total includes 1,613 cases unassigned to areas.

Physiographic Regions

Geographic areas can be defined in many ways. In this North Carolina 2012 HIV/STD Surveillance Report: Addendum, data are presented in two categories of geographic areas for the convenience of readers: rural/urban areas and physiographic regions. The distribution of HIV disease is uneven across North Carolina. Cases are assigned to the county of residence at first diagnosis. This disease distribution can be partly explained by the population distribution, as the epidemic tends to be concentrated in urban areas.

The North Carolina state demographer and the GIS lab at the State Center for Health Statistics have produced a Geographic Regional Classification scheme based on "physiographic" qualities. According to this scheme, North Carolina has three regions, Western Region, Piedmont Region and Eastern Region (Table 9). Western Region includes counties west of (and including) Surry, Wilkes, Caldwell, Burke, and Rutherford; Eastern Region includes everything east of (and including) Northampton, Halifax, Nash, Johnston, Harnett, Cumberland, Hoke, and Scotland. Piedmont Region includes the counties in between the Western Region and the Eastern Region.

For whites, blacks, and Hispanics, the majority of HIV disease cases were diagnosed in the Piedmont Region in 2012, followed by the Eastern Region (Table 9). For American Indian/Alaska Natives, most HIV disease cases were diagnosed in the Eastern Region. For Asian/Pacific Islanders, HIV cases were most prominent in the Piedmont Region.

Table 9. Newly diagnosed HIV disease cases by physiographic regions, 2012

Race/Ethnicity	Eastern		Piedmont		Western		N.C. Total***	
	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*
White**	76	4.6	201	5.5	43	4.1	330	5.2
Black**	246	31.4	622	48.7	13	23.3	913	43.2
AI/AN**	9	11.1	3	12.6	2	16.6	14	12.0
Asian/PI**	1	2.7	12	6.4	0	0.0	13	5.5
Hispanic	22	9.9	67	12.4	6	8.8	101	12.1
Other**	6	---	28	---	1	---	38	---
Total	360	13.0	933	16.4	65	5.5	1,409	14.6

* Rate per 100,000 population ** non-Hispanic; AI/AN=American Indian/Alaska Native; PI=Pacific Islander ***N.C. Total includes 51 cases unassigned to areas.

Among HIV disease cases living through the end of 2012, a majority of whites (64%), blacks (62%), and Hispanics (68%) were diagnosed and reported from Piedmont Region, followed by the Eastern Region (Table 10). The Western Region had fewer HIV cases and rates for both new diagnoses and prevalent cases in 2012.

Table 10. HIV disease prevalence as of 12/31/2012 by physiographic regions, 2012

Race/Ethnicity	Eastern		Piedmont		Western		N.C. Total***	
	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*
White**	1,441	87.4	4,387	119.6	786	75.7	6,836	107.6
Black**	5,156	657.8	11,059	866.5	267	478.9	17,760	839.4
AI/AN**	147	181.9	38	159.2	13	108.1	211	180.8
Asian PI**	40	106.7	91	48.4	4	32.4	138	58.0
Hispanic	400	179.1	1,098	202.9	69	101.6	1,635	196.4
Other**	111	---	331	---	17	---	488	---
Total	7,295	263.1	17,004	298.5	1,156	97.5	27,068	280.3

* Rate per 100,000 population **non-Hispanic ***N.C. Total includes 1,613 cases unassigned to areas.

HIV DISEASE CASES DIAGNOSED LATE

Late testers represent a significant proportion of new HIV diagnoses in North Carolina, indicating the need for increased HIV testing and linkage to medical care. People who test late in the course of HIV infection may already have serious HIV-associated complications and are not able to benefit fully from antiretroviral therapy and prophylaxis to prevent opportunistic infections. Late testing also results in missed opportunities for preventing new HIV infections, as knowledge of positive HIV status promotes adoption of safer sex practices (CDC, 2000). The

estimated 20 percent of people in the United States who are not aware they have HIV are estimated to account for 54 percent of new transmissions (Marks, 2006).

Table 11 shows the proportion of individuals diagnosed as AIDS when they were first diagnosed as HIV-infected (late HIV diagnosis or concurrent AIDS cases) in 2012. These persons with concurrent diagnoses are generally referred to as "late testers" and include any person who receives an AIDS diagnosis within six months of the initial HIV positive screening. Overall, 24.4 percent of newly diagnosed individuals had a concurrent AIDS or late HIV diagnosis in 2012, indicating that they probably had HIV for at least five to seven years (CDC, 2006). Hispanic females had the highest proportion (43.8%) of late testers, reflecting possible cultural and language barriers to testing and access to care. As shown in Table 12, roughly 24 percent to 28 percent of individuals newly diagnosed with HIV disease each year also represented AIDS cases (i.e. late testers) during the 2008–2012 period.

The significant proportions of late diagnoses indicate the need for increased HIV testing within North Carolina. These figures support the recommendation to include voluntary HIV testing as part of routine medical examinations for all United States residents ages 13 to 64 years (CDC, 2006). Table 13 displays the gender and race specific proportions of all late testers (concurrent AIDS cases) diagnosed from 2008 to 2012. Blacks comprise 59 percent to 63 percent of total late testers, whites comprise 23 percent to 27 percent, and Hispanics comprise 8 percent to 12 percent during the past five years.

Table 11. Proportion of late testers by race/ethnicity among HIV disease cases, 2012

Race/ ethnicity	Males	Females	Total
White*	24.4%	23.4%	24.2%
Black*	24.1%	21.1%	23.3%
Hispanic	36.5%	43.8%	37.6%
Other*	22.0%	0.0%	20.0%
Total	25.0%	22.3%	24.4%

*non-Hispanic

Table 12. Proportion of HIV and concurrent* AIDS at diagnosis, 2008-2012

	Status at Diagnosis	
Year of Diagnosis	HIV (non-AIDS)	AIDS
2008	73.9%	26.1%
2009	72.1%	27.9%
2010	74.2%	25.8%
2011	73.6%	26.4%
2012	75.4%	24.4%

*HIV and AIDS diagnosed within six months of testing; also referenced as "late testers"

Table 13. Late HIV diagnoses by sex and race/ethnicity, 2008-2012

		Year of Diagnosis				
Sex	Race/Ethnicity	2008	2009	2010	2011	2012
Male	White*	23.7%	20.0%	23.1%	20.7%	18.9%
	Black*	39.5%	46.8%	42.4%	42.9%	48.0%
	Hispanic	11.4%	9.4%	10.9%	6.4%	9.0%
	Other*	1.5%	2.2%	2.1%	4.8%	3.8%
	Total	76.1%	78.4%	78.5%	74.7%	79.7%
Female	White*	3.2%	3.5%	2.4%	2.0%	4.4%
	Black*	19.2%	16.6%	17.5%	20.4%	14.0%
	Hispanic	1.1%	0.9%	1.1%	2.0%	2.0%
	Other*	0.4%	0.7%	0.5%	0.8%	---
	Total	23.9%	21.6%	21.5%	25.3%	20.3%
Total	White*	26.8%	23.5%	25.5%	22.7%	23.3%
	Black*	58.8%	63.4%	59.9%	63.3%	61.9%
	Hispanic	12.5%	10.2%	11.9%	8.4%	11.0%
	Other*	1.9%	2.8%	2.7%	5.6%	3.8%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%

*non-Hispanic

In general, significant proportions of late HIV diagnoses indicate a need for increased HIV testing in North Carolina. The NCDPH is actively pursuing new policies and guidelines aimed at making HIV testing a part of routine medical care settings and continues to work with HIV-infected persons and their partners to reduce transmission. Rapid HIV tests have also created new opportunities to expand HIV testing into nontraditional and high prevalence settings (e.g. emergency rooms, correctional facilities, community settings and mobile testing sites). In addition, specific initiatives such as the statewide "Get Real. Get Tested." campaign have been designed to encourage North Carolinians to learn about and be tested for HIV. As a result of the implementation of the CDC HIV testing recommendations, statewide testing initiatives like the "Get Real. Get Tested." campaign and expanded HIV testing in nontraditional settings, HIV testing has increased substantially. In 2011, the SLPH performed about 233,072 HIV tests, representing a 32 percent increase in testing since 2007 when about 176,487 tests were performed.

NORTH CAROLINA AND THE UNITED STATES

All states have name-based HIV disease case reporting by law and provide data that are acceptable for state–to–state and state–to–national comparisons. Comparing North Carolina to the nation is limited to earlier years because national surveillance data are released later than state data. According to the CDC, the national HIV disease case rate in 2011 was 15.9 per 100,000 population (CDC, HIV Surveillance Report, 2011). During the same time period, North Carolina's HIV disease case rate was 17.3 per 100,000 population. North Carolina ranked 8th

among all states and the District of Columbia in the number of new HIV disease cases reported (Table 14). Please note that comparisons made between other states, North Carolina, and the United States are based on counts and rates calculated by the CDC and have been statistically adjusted for delays in reporting; these numbers may differ slightly from North Carolina's unadjusted case counts and rates.

Table 14. Top 10 states for HIV disease diagnoses

State	HIV Cases Diagnosed in 2011
1. California	5,973
2. Florida	5,408
3. Texas	5,065
4. New York	4,960
5. Georgia	2,522
6. Illinois	2,142
7. Maryland	1,783
8. North Carolina	1,672
9. New Jersey	1,567
10. Pennsylvania	1,545

Source: CDC *HIV Surveillance Report, 2011 ; vol.23.*

The effect of HIV/AIDS in the South is a growing concern. In 2011, the South had 48 percent of new HIV disease cases overall, including five of the top 10 states reporting the most HIV disease cases (Table 14). Among the 50 states and the District of Columbia, the South also had the highest regional rate in 2011 (20.9 per 100,000). In 2011, eight of the top 10 states by HIV disease case rate were in the South (Top 10: DC, MD, LA, FL, GA, NY, MS, TX, MA, and SC); Alabama and North Carolina ranked 12th and 13th, respectively. NOTE: If the United States' dependent areas were included, the U.S. Virgin Islands ranked 2nd and Puerto Rico ranked 8th.

AIDS PREVALENCE IN NORTH CAROLINA

North Carolina is ranked 12th in the nation for estimated number of persons living with an AIDS diagnosis (CDC, HIV Surveillance Report, 2011). Table 15 displays HIV disease prevalence in North Carolina by HIV disease stage (HIV/AIDS), demographic characteristics, and transmission categories. AIDS cases were notably higher (proportionately) than HIV (non AIDS) cases for males, Hispanics, injection drug users (IDU), heterosexuals (CDC defined), and persons ages 45 years and older. Blacks represented nearly two-thirds of both AIDS and HIV (non AIDS) living cases in North Carolina (66% and 65%, respectively). North Carolina ranked 7th in the nation and the District of Columbia for the percentage of all AIDS cases among blacks in 2007 (CDC special request, 2/2010).

Table 15. North Carolina living HIV/AIDS cases of 12/31/2012

Demographics	Disease Status				TOTAL	
	HIV non AIDS		AIDS			
	Cases	Pct	Cases	Pct	Cases	Pct
Gender						
Male	10,940	69.1%	8,195	73.0%	19,135	70.7%
Female	4,895	30.9%	3,038	27.0%	7,933	29.3%
Current Age						
Unknown	15	0.1%	0	0.0%	15	0.1%
<2	2	0.0%	0	0.0%	2	0.0%
2-12	57	0.4%	4	0.0%	61	0.2%
13-24	825	5.2%	150	1.3%	975	3.6%
25-44	6,401	40.4%	3,424	30.5%	9,825	36.3%
45-64	7,649	48.3%	6,880	61.2%	14,529	53.7%
65+	886	5.6%	775	6.9%	1,661	6.1%
Race/ethnicity						
White*	4,076	25.7%	2,760	24.6%	6,836	25.3%
Black*	10,350	65.4%	7,410	66.0%	17,760	65.6%
American Indian/AN*	118	0.7%	93	0.8%	211	0.8%
Asian/PI*	98	0.6%	40	0.4%	138	0.5%
Hispanic	886	5.6%	749	6.7%	1,635	6.0%
Multiple races	307	1.9%	181	1.6%	488	1.8%
Mode of Transmission						
MSM	5,931	37.5%	3,740	33.3%	9,671	35.7%
IDU	961	6.1%	1,060	9.4%	2,021	7.5%
MSM/IDU	305	1.9%	277	2.5%	582	2.2%
Blood Products	32	0.2%	49	0.4%	81	0.3%
Heterosexual-all	2,362	14.9%	1,968	17.5%	4,330	16.0%
Pediatric	203	1.3%	75	0.7%	278	1.0%
NIR/NRR	6,041	38.1%	4,064	36.2%	10,105	37.3%
Total	15,835	100.0%	11,233	100.0%	27,068	100.0%

SURVIVAL

In North Carolina, survival (the estimated proportion of persons surviving a given length of time after diagnosis) was highest for those diagnosed with HIV disease in 2007, although year-to-year differences were small (Table 16). Survival decreased as age increased, particularly among the 65+ age group. Survival was greatest for persons under 13 years of age and ages 13 to 24 and lowest among the ages 65+ group. Survival was lowest among American Indians. Survival was greater among MSM and pediatric cases and lowest among men who were infected through blood products. Vital status may not be determined or reported for all cases; however, the

reporting of deaths for persons reported as having AIDS is estimated to be more than 90 percent complete.

Table 16. Survival for more than 12, 24, and 36 months after initial HIV diagnosis, 2004-2008

	No. of Persons	Proportion Survived (in months)			
		<=12	>12	>24	>36
Age at Diagnosis (yr)					
2-12	46	1.00	1.00	1.00	1.00
13-24	1,356	0.99	0.99	0.99	0.99
25-44	4,569	0.96	0.95	0.94	0.94
45-64	2,322	0.91	0.88	0.86	0.86
65+	138	0.75	0.68	0.60	0.60
Race/ethnicity					
White*	2,159	0.96	0.95	0.93	0.93
Black*	5,369	0.95	0.93	0.91	0.91
Am. Indian/AN*	63	0.87	0.87	0.87	0.87
Asian, PI*	46	0.98	0.93	0.91	0.91
Hispanic	679	0.96	0.95	0.94	0.94
Unknown	117	0.95	0.94	0.92	0.92
Male Mode of Transmission					
MSM	3,173	0.98	0.97	0.96	0.96
IDU	200	0.93	0.90	0.87	0.87
MSM/IDU	99	0.97	0.96	0.93	0.93
Blood Products	5	0.80	0.60	0.60	0.60
Heterosexual-CDC	485	0.94	0.92	0.89	0.89
Pediatric	28	1.00	1.00	1.00	1.00
NIR/NRR	2,107	0.90	0.88	0.87	0.87
Female Mode of Transmission					
IDU	125	0.94	0.91	0.87	0.87
Blood Products	6	1.00	1.00	1.00	1.00
Heterosexual-CDC	675	0.97	0.95	0.93	0.93
Pediatric	18	1.00	1.00	1.00	1.00
NIR/NRR	1,512	0.95	0.93	0.91	0.91
Year of HIV Diagnosis					
2004	1,551	0.95	0.92	0.90	0.90
2005	1,600	0.94	0.92	0.91	0.91
2006	1,649	0.95	0.93	0.92	0.92
2007	1,820	0.96	0.95	0.93	0.93
2008	1,813	0.95	0.94	0.92	0.92
Total	8,433	0.95	0.93	0.92	0.92

*non-Hispanic

HIV/AIDS-related deaths

The North Carolina State Center for Health Statistics reported 255 HIV/AIDS deaths in 2012 (2.6 per 100,000) (Table 17). Unlike chronic diseases with high death rates among older populations (such as cancer or cardiovascular diseases), HIV/AIDS death rates are concentrated among young and middle-aged people. According to the State Center for Health Statistics, the crude death rate for blacks (8.4 per 100,000) is more than eight times that for whites (1.0 per 100,000).

Advances in treatment of HIV with antiretrovirals (ARVs) have been reflected with a major increase in life expectancy for people diagnosed with HIV infection. Between 1996 and 2005, average life expectancy after HIV diagnosis increased from 10.5 to 22.5 years (Harrison, 2010). Despite advances in combating HIV, eventually most HIV-infected individuals develop AIDS. However, individuals diagnosed with AIDS have also seen increases in life expectancy: among individuals diagnosed with HIV having an initial CD4 count of <200 or a CD4 count of <200 within six months of their initial diagnosis, the average survival time had nearly quadrupled from 1996 to 2005 (5.5 years in 1996 to 19.4 years in 2005; Harrison, 2010). Patients with AIDS mostly die from opportunistic infections or malignancies associated with the progressive failure of the immune system.

The age-adjusted death rate for HIV disease in North Carolina for 2010 (the last year of data for national comparisons) was 3.3 per 100,000 (the national death rate was 2.6 per 100,000) (CDC, 2012). HIV Disease is a leading cause of death among younger individuals ages 25 to 44 and varies by race/ethnicity in North Carolina (Table 18). According to the State Center for Health Statistics (SCHS, 2013), in 2012, HIV disease was the 10th leading cause of death among North Carolinians ages 25 to 44 (n=67 deaths).

Table 17. North Carolina HIV/AIDS-related deaths by race/ethnicity and gender, 2012

	Males			Females			Total		
Race/ ethnicity	No.	Pct.	Rate*	No.	Pct.	Rate*	No.	Pct.	Rate*
White**	51	26.8%	1.6	13	20.0%	0.4	64	25.1%	1.0
Black**	130	68.4%	13.1	48	73.8%	4.3	178	69.8%	8.4
Hispanic	6	3.2%	1.4	1	1.5%	0.3	7	2.7%	0.8
Other	3	1.6%	1.8	3	4.6%	1.6	6	2.4%	1.7
Total	190	100.0%	4.0	65	100.0%	1.3	255	100.0%	2.6

**non-Hispanic * per 100,000 population Source: N.C. State Center for Health Statistics

Table 18. HIV disease as the leading cause of death among North Carolina residents, 2012

Age Group	Race/Ethnicity	Number of Deaths	Rank as the leading cause of death
25–44 years	American Indian*	3	8th
	Black*	45	6th
	Hispanic	3	8th
	All Races	67	10th
45–64 years	Black*	105	8th

*non-Hispanic

Source: N.C. State Center for Health Statistics

STDS OTHER THAN HIV/AIDS IN NORTH CAROLINA

HIGHLIGHTS

- In 2012, the North Carolina Division of Public Health (NCDPH) converted syphilis surveillance from the STD*MIS system to the North Carolina Electronic Disease Surveillance System (NC EDSS). Extensive person and event deduplication efforts took place as STD*MIS data was merged into NC EDSS.

- Five hundred and ninety-eight (598) cases of early syphilis were reported in 2012, representing a 36 percent decrease from the number of cases reported in 2009. A significant syphilis outbreak occurred in North Carolina in 2009 with 938 cases reported that year.

- The overall early syphilis rate in 2012 was 6.2 cases per 100,000 population. In 2012, the male-to-female ratio for early syphilis cases in the state was 6.7, with males representing 88 percent of all reported early syphilis cases.

- The six most populous counties (Mecklenburg, Guilford, Wake, Forsyth, Cumberland, and Durham) accounted for 64 percent of 2012 early syphilis reports in NC.

- In 2012, black males represented 65 percent of all early syphilis cases with a rate of 39.5 per 100,000. The syphilis rate among black males was more than 12 times the rate for white males (3.2 per 100,000) and the rate of syphilis among Hispanic males (4.7 per 100,000) was 1.5 times the rate for white males.

- The highest chlamydia rates in 2012 were among 20 to 24 year olds for both females (4,782.2 per 100,000) and males (1,345.8 per 100,000).

- Racial disparities in female chlamydia reports have remained fairly stable from 2007 to 2012, with a rate among black females six to eight times the rate among white females. The rates for Hispanic females have been two to three times the rates among white females.

- Chlamydia positivity rates among women <25 years old tested in publicly-funded clinics have not changed during the past six years. In STD clinics, the positivity rate has ranged from 15.4 percent to 16.0 percent. Family Planning and OB/Gyn clinics have similar rates ranging from 7.5 percent to 9.2 percent.

- Gonorrhea case reports reflect severe racial disparities. The differences are most dramatic for males, where the 2012 gonorrhea rate among black males (339.5 per 100,000) was 21.4 times, among American Indian males (85.1 per 100,000) was five times, and the rate for Hispanic males (32.4 per 100,000) was two times the rate among white males (15.9 per 100,000).

- The racial disparities in gonorrhea rates were less severe among females. The 2012 gonorrhea rate for black females (374.4 per 100,000) was 13 times, the rate for American Indian females (184.1 per 100,000) was more than six times, and the rate for Hispanic females (44.0 per 100,000) was almost twice the rate for white females (28.8 per 100,000).

REPORTABLE STDS IN NORTH CAROLINA

In addition to HIV disease, there are 16 other sexually transmitted conditions reportable by law to the North Carolina Department of Health and Human Services (NCDHHS). Cases of syphilis (eight possible stages), gonorrhea (genito-urinary/non-PID or opthalmia neonatorum), chancroid, and granuloma inguinale are required to be reported to the local health department within 24 hours of diagnosis. Lab-confirmed chlamydia, lymphogranuloma venereum (LGV), nongonococcal urethritis (NGU), and pelvic inflammatory disease (PID) all must be reported within seven days to the local health department. Hepatitis A and B can also be transmitted through sexual contact; acute cases are reportable within 24 hours to the local health department. Statewide surveillance is directed by the Communicable Disease Surveillance Unit (CDSU) at NCDPH.

Table 19. North Carolina reportable sexually transmitted disease, 2012

	Gender		
	Male	Female	Total*
Chlamydia (lab-confirmed)	11,341	39,151	50,606
Gonorrhea	6,172	8,101	14,322
Syphilis			
Primary Syphilis	65	5	70
Secondary Syphilis	247	32	279
Early Latent Syphilis	217	32	249
Late Syphilis	1	0	1
Late Latent Syphilis	225	116	342
Late Syphilis w. symptoms	2	0	2
Congenital Syphilis	3	0	3
Syndromic Diagnoses			
Nongonococcal Urethritis (NGU)	5,663	n/a	5,663
Pelvic Inflammatory Disease (PID)	n/a	626	626
Other STDs			
Chancroid	1	0	1
Granuloma Inguinale	0	0	0
Lymphogranuloma Venereum (LGV)	0	0	0
Opthalmia Neonatorum (gonorrhea)	0	1	1

Table 19 describes STD cases reported to the CDSU in 2012. The remainder of this report will focus on the three most commonly reported conditions: lab-confirmed chlamydial infection, gonorrhea, and syphilis. Although NGU is reported in relatively high numbers, this condition will not be discussed in detail because the data is difficult to interpret. NGU is a diagnosis of exclusion that requires specific physical characteristics and the documented absence of Neisseria gonorrhoeae. Although NGU can be caused by several different organisms, most cases are assumed to be Chlamydia trachomatis. However, since these cases are not laboratory confirmed,

grouping these diagnoses with the chlamydia cases would not be accurate. Similarly, PID is a syndromic diagnosis with multiple possible causes, the most common being gonorrhea and chlamydial infection (CDC, PID Fact Sheet, 2011). In 2012, there were 626 cases of PID reported to NCDHHS. Since an estimated 10 percent to 15 percent of untreated female chlamydia infections will eventually lead to PID (CDC, Chlamydia Fact Sheet, 2011), this number represents a drastic underreporting of PID cases. Other reportable STDs are almost non-existent in the state of North Carolina. In 2012, there was one case of chancroid and one case of opthalmia neonatorum (opthalmic infection with N. gonorrhoeae in infants) reported and zero cases of lymphogranuloma venereum.

CHLAMYDIA

Chlamydia disease

Nationally, as well as in North Carolina, chlamydia is the most frequently reported bacterial STD, and is easily treated with antibiotics. When symptoms occur, they usually include discharge and painful urination. Approximately three-quarters of infected females and one-half of infected males have no symptoms at all (CDC, Chlamydia Fact Sheet, 2011). STDs appear to increase susceptibility to HIV infection by two mechanisms. Inflammation resulting from genital ulcers or non-ulcerative STDs (e.g., chlamydia increase the concentration of cells in genital secretions that can serve as targets for HIV (e.g., CD4+ cells) (CDC, STD Detection and Treatment in HIV Prevention Fact Sheet, 2010). The infection can cause severe damage to the female reproductive tract, including infertility and pelvic inflammatory disease (PID). For this reason, the CDC and the NCDPH recommend that all sexually active females age 25 years and under, as well as all pregnant women and older women with risk factors, such as new or multiple sex partners, be screened for chlamydia. No comparable screening programs exist for young men. For this reason, chlamydia cases are always highly biased with respect to gender.

Chlamydia reporting

North Carolina law states that all cases of chlamydial infection must be reported to the local health department within seven days. Laboratory confirmation of chlamydia takes place at a number of private labs; however, most public clinics send their samples to the North Carolina State Laboratory of Public Health (SLPH). Laboratory confirmed chlamydia results are returned to the provider, who reports them to the local health department. Infected patients are treated and encouraged to bring their partners in for treatment, but there is no formal partner notification procedure. Chlamydia cases for males are severely underreported due to the lack of screening in men. The data for females is more complete, although cases are still underreported and may be biased toward public clinics, which are more likely to screen and report cases.

From 2011 to 2012, there was a 6 percent increase in the number of chlamydia cases reported in North Carolina.

Chlamydia trend analysis

Gender

Due to screening bias, the vast majority (consistently between 70 percent - 80 percent) of reported chlamydia cases are among females. Male cases are often detected when a female partner tests positive through screening and refers the male for testing and treatment. The number of male cases reported increases as the number of female cases increases but the proportions of each remain relatively consistent. In 2010, only 19 percent of the 42,167 cases reported were among males. This proportion increased to 22 percent of cases for 2012 (out of 50,606 cases). Again, this increase is likely a factor of screening practices and surveillance reporting, not an alteration in morbidity.

Comparing 2011 and 2012, the rate of male cases remained stable and the rate of female cases increased 7 percent, respectively (NC 2012 HIV/STD Surveillance Report, Table 32, pg. 28-29). This increase is likely a combination of additional screening targeted to this population as well a result of more accurate reporting through NC EDSS.

Age

Chlamydia is predominantly found in younger age groups. From 2007 to 2012, reported cases and rates have generally been on the rise for all age groups, most likely reflecting increased screening. For males, the highest rates are consistently found in the 20 to 24 year old age group, followed by 15 to 19 year olds. For females, the rates for 15 to 19 year olds and 20 to 24 year olds are much closer. In 2012, the rate for females 20 to 24 years of age was the highest rate across all demographic groups (4,782.2 per 100,000) (NC 2012 HIV/STD Surveillance Report, Table 18, pg. 28-29). During 2012, 20 to 24 year olds represented 41 percent of female cases and 41 percent of male cases reported in North Carolina.

Race/Ethnicity

Chlamydia case reports reflect severe racial disparities that have remained relatively consistent during the past six years. Historically, the rates among non-Hispanic black males have been 11-12 times the rates for non-Hispanic whites, and the rates for Hispanics have been 3-4 times the rates for non-Hispanic whites. In 2012, the rate among non-Hispanic black males (436.7/100,000) increased to 11 times the rate for non-Hispanic whites (40.2/100,000), and the rate for Hispanic males (136.4/100,000) was 3.4 times the rate for non-Hispanic whites (NC 2012 HIV/STD Surveillance Report, Table 17, pg. 27-28). The disparity for females is nearly as severe, with the non-Hispanic black female rate (1,382.8/100,000) 5.7 times the non-Hispanic white female rate (241.1/100,000). The rate for American Indian/Alaskan Native females (AI/AN) (991.8/100,000) was about four times and the Hispanic rate (570.3/100,000) about 2.4 times the rate for non-Hispanic white females. These disparities are likely due, at least in part, to screening and reporting bias. About 37 percent of chlamydia reports for 2012 were missing race/ethnicity information.

Geography

As has been historically demonstrated with infectious diseases, chlamydia case reports are generally localized to urban communities. In 2012, 46 percent of chlamydia cases were reported from the six most populous counties (large metropolitan communities) in North Carolina (Mecklenburg, Wake, Forsyth, Guilford, Cumberland and Durham counties) (NC 2012 HIV/STD Surveillance Report, Table 7, pg. 11-12). The highest rates of chlamydia cases for 2012 were found in Edgecombe (1,150.9/100,000) and Cumberland counties (1,104.1/100,000). Ten counties reported a 20 percent or greater increase in chlamydia rates in from 2011 to 2012: Beaufort, Chowan, Clay, Durham, Franklin, Graham, Granville, McDowell, Onslow and Perquimans.

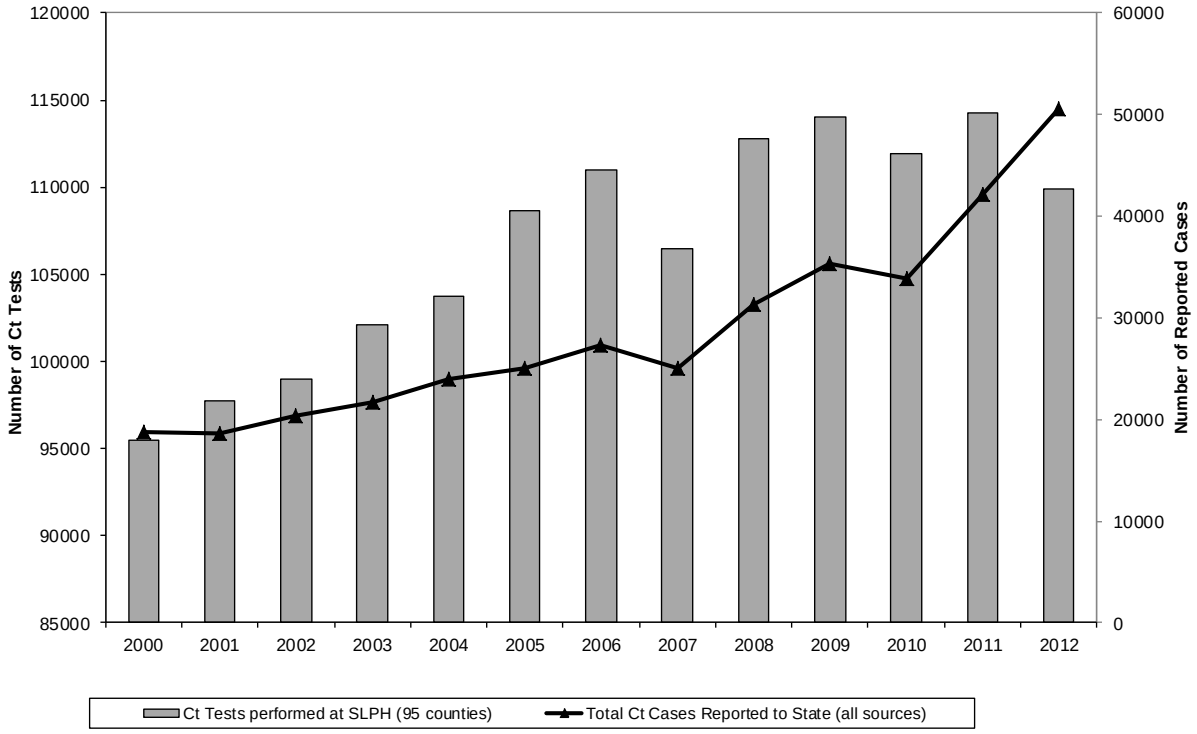
Chlamydia Prevalence Data

Since most county health departments in North Carolina do not have adequate laboratory facilities to process chlamydia samples, samples are sent to the SLPH for testing. Information is collected on both positive and negative tests from 95 counties and is used for estimating prevalence as well as for program evaluation. County Health Clinics (STD, family planning, and OB/Gyn) in the 95 counties screen all sexually active women ages 24 and under, all pregnant women, and women ages 25 and older with certain risk factors such as having multiple sexual partners. These data do not include tests from the five counties with the largest health departments (Durham, Forsyth, Guilford, Mecklenburg, and Wake) which conduct in-house testing.

In 2004, the SLPH switched from Enzyme Immuno Assay (EIA) testing to the more sensitive Nucleic Acid Amplification Test (NAAT). This change in testing caused an immediate increase in positivity (from 5.4% to 8.8% among women within a single year). Keeping comparisons within a single test type (NAAT), positivity rates have remained fairly stable since 2004, ranging from 7.4 percent to 8.8 percent each year among women screened.

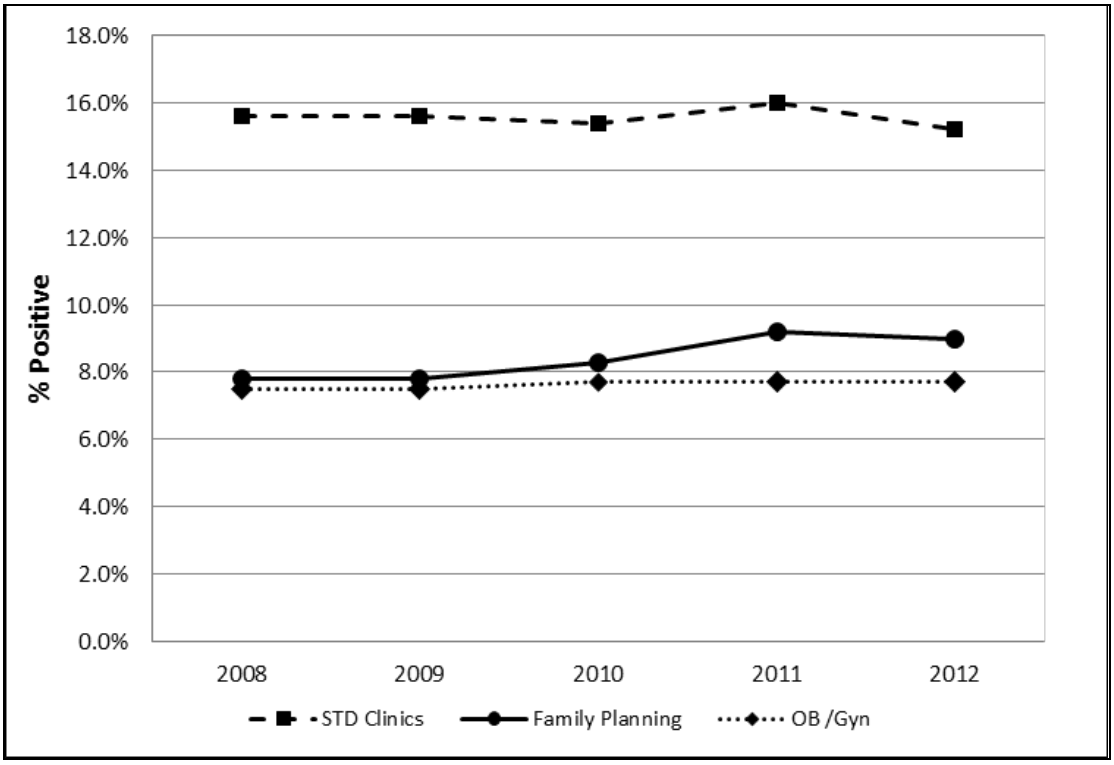
Chlamydia screening is almost exclusively done for women and the data only reflects testing that occurred in publicly-funded clinics, resulting in some bias in the data. Still, this data is the best source of information on chlamydia prevalence that is currently available. The number of reported chlamydia cases (and therefore the chlamydia rates) is highly dependent on screening practices. Figure 15 illustrates this phenomenon by comparing the number of chlamydia tests performed at the SLPH (for 95 counties) with the number of chlamydia cases reported for the whole state (100 counties). The cases detected by the SLPH represent a quarter to a third of the overall reported cases each year. The county health departments in the five largest counties follow the same screening practices as those in the other 95 but send their tests to other labs.

Figure 15. Chlamydia tests performed at NC SLPH and new cases reported, 2000-2012



Determining whether the prevalence of chlamydial infection is changing is difficult because chlamydia reporting is dependent on screening practices. The SLPH screening data provides an opportunity to examine this question by plotting the positivity rates over time among stable, screened populations. Figure 16 shows women screened in STD, family planning, and OB/Gyn clinics in the 95 county health departments. All sexually active women in this age group are offered testing. Positivity rates are highest among STD clinic patients and lowest among OB/Gyn patients, but overall positivity has not changed in the past four years.

Figure 16. Chlamydia testing among women under age 25, positivity rates by clinic type



GONORRHEA

Gonorrhea disease

Nationally and in North Carolina, gonorrhea is a commonly reported STD (CDC, Gonorrhea Fact Sheet, 2011). Nearly all infected males experience symptoms, including discharge and burning on urination (Hook 1999). Many women also experience symptoms, although they may be mild. Like chlamydia, untreated gonorrhea can cause severe damage to the female reproductive tract, including PID and infertility.

Gonorrhea reporting

North Carolina law states that all cases of gonorrhea must be reported to the local health department within 24 hours. Laboratory confirmation of gonorrhea cases takes place at a number of private labs with most public clinics sending their samples to the SLPH. Results are returned to the provider, who reports them to the local health department. Infected patients are treated and encouraged to bring their partners in for treatment, but there is no formal partner notification procedure. Morbidity reports of gonorrhea are then forwarded to the CDSU at the NCDPH via NC EDSS. The move to NC EDSS may have affected the gonorrhea data the same way as chlamydia case reporting. In 2012, gonorrhea rates decreased by 29 percent from 177.7 to 148.3 per 100,000 population.

The majority of males do experience symptoms associated with gonorrhea; therefore, they are relatively likely to seek care and be reported as cases. Public clinics and local health departments that screen young women for chlamydia also screen for gonorrhea, since a single laboratory test is used for both infections. This combination testing contributes greatly to the detection of asymptomatic cases. For these reasons, gonorrhea surveillance data is far more reliable and useful than data for chlamydial infection (Sampson, 2006).

Gonorrhea trend analysis

From 2007 to 2012, rates for gonorrhea ranged from 148.4 to 183.9 per 100,000 population. The highest rate (183.9/100,000) was observed in 2007 (NC 2011 HIV/STD Surveillance Report, Table 8; pg. 13-14). The slight fluctuations between years are likely the result of reporting issues and do not represent a discernable trend in changes to disease morbidity. Nationally, gonorrhea rates have remained fairly stable. In North Carolina, from 2007-2012, the proportion of female cases has ranged between 54 percent to 58 percent. True increases (or decreases) may be masked by changes in screening practices, use of diagnostic tests with differing test performance, population shifts resulting from natural disasters, and changes in reporting practices.

Gender

Gonorrhea is often symptomatic in males and slightly less so in females. Females entering publicly-funded prenatal care, family planning, and STD clinics are screened for asymptomatic gonorrhea. Males are screened at STD clinics only. Since males are more likely to have symptoms that would bring them to the STD clinic, the gender bias in gonorrhea reporting is not as severe as that for chlamydia reporting. From 2004 to 2006, rates for males were consistently a bit higher than the rates for females with the male-to-female case ratio stable around 1.0. Since 2007, the rate has gradually increased for females and thus, the male-to-female ratio decreased slightly to 0.8 in 2012 (NC 2012 HIV/STD Surveillance Report, Table 19, pg. 30). In general, the increased rates for females would indicate a lack of substantial transmission among men who have sex with men (MSM). Detailed surveillance of rectal gonorrhea would assist in understanding this type of trend; however, the current diagnostic test of choice for gonorrheal infection (NAAT) has not been approved by the FDA for the diagnosis of extragenital gonorrhea (CDC, Clinic-Based Testing for Rectal and Pharyngeal Neisseria gonorrhoeae and Chlamydia trachomatis Infections by Community-Based Organizations, 2009).

Age

Gonorrhea is predominantly found in younger age groups, and relative rates mirror those for chlamydia with respect to age. For males, the highest rates are consistently found in the 20 to 24 year old age group, followed by 25 to 29 and 15 to 19 year olds. In 2012, the rates for males in the 20 to 24 year old age group were highest (664.5/100,000) and the rates for 25 to 29 year olds (374.5/100,000) were higher than the rates for 15 to 19 year olds (300.8/100,000) (NC 2012 HIV/STD Surveillance Report, Table 20, pg. 31-32). Female gonorrhea rates in 2012 were also highest for 20 to 24 year olds (941.8/100,000), closely followed by the rates for 15-19 year olds

(771.8/100,000). The rates for 25 to 29 year old females were considerably less (410.5/100,000). For the past six years (2007-2012), individuals ages 15 to 24 represented more than 60 percent of all gonorrhea cases reported. Targeted screening campaigns focused on this population may be responsible for the high percentage of cases in this age group.

Race/Ethnicity

Trends over time for various racial/ethnic groups are difficult to determine because in recent years, more reports are missing racial/ethnic information. Nonetheless, gonorrhea case reports reflect severe racial disparities. Historically, the differences are most dramatic among males, where 2012 gonorrhea rates among non-Hispanic blacks (339.5/100,000) were more than 21 times, among American Indian/Alaska Natives (AI/AN) were six times (96.4/100,000), and among Hispanics were two times (32.4/100,000) the rates for non-Hispanic whites (15.9/100,000) (NC 2012 HIV/STD Surveillance Report, Table 19, pg. 30-31). Among women, the trends are similar but less pronounced: in 2012 the non-Hispanic black rate (374.4/100,000) was 13 times the rate for non-Hispanic whites (28.8/100,000) and was the highest rate across all racial/ethnic groups. The rate for AI/AN females (184.1/100,000) was more than six times the rate for non-Hispanic whites and the rate for Hispanic females (44.0/100,000) was 1.5 times the non-Hispanic white rate. The number of case reports with unknown race/ethnicity has increased from 24 percent in 2010 to 34 percent in 2011, so conclusions based on race/ethnicity continue to be in question as health department users continue to adjust to reporting through NC EDSS (NC 2012 HIV/STD Surveillance Report, Table 19, pg. 30-31). In 2012, case reports with unknown race/ethnicity maintained at 33 percent.

Geography

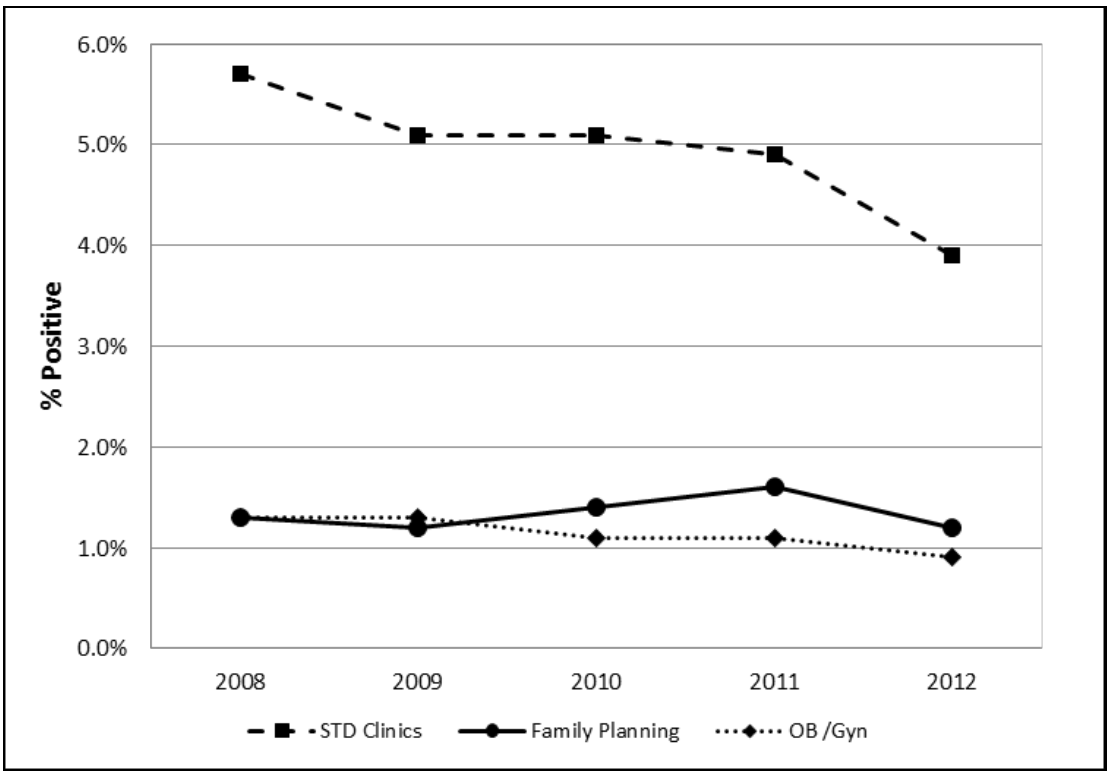
As with chlamydia cases, gonorrhea cases are generally localized within urban communities. In 2012, 51 percent of 14,322 gonorrhea cases were reported from the six most populous counties (large metro communities) in North Carolina (Mecklenburg, Wake, Forsyth, Guilford, Cumberland, and Durham counties) (NC 2012 HIV/STD Surveillance Report, Table 8, pg. 13-14). In addition, the highest rate of reported gonorrhea in 2012 was in Vance County (456.9/100,000), and the second highest rate was in Cumberland County (360.1/100,000). Many counties reported a decrease in gonorrhea rates in 2012.

Gonorrhea Prevalence Data

When the SLPH switched chlamydia testing from EIA to NAAT in 2004, North Carolina gained a comprehensive gonorrhea screening program. Up to that point, gonorrhea screening had been taking place in county health departments but the culture tests were performed locally and with varying levels of expertise. The NAAT test is a combined chlamydia and gonorrhea test so all women screened for chlamydia as previously described are also tested for gonorrhea. Reported gonorrhea cases are less dependent upon screening practices than chlamydia, but examining the screened populations over time can still be useful. Positivity rates by clinic type are shown in Figure 17 and reflect sexually active women under age 25 screened in 95 county health

departments. As with chlamydia, rates are highest among STD clinic patients and lowest among OB/Gyn patients and have not changed in the past four years.

Figure 17. Gonorrhea testing among women under age 25, positivity rates by clinic type, 2008-2012



Gonococcal Isolate Surveillance Project – GISP

GISP is a collaborative project between selected STD clinics, five regional laboratories, and the CDC. The project was established in 1986 to monitor trends in antimicrobial susceptibilities of strains of N. gonorrhoeae in the United States to establish a rational basis for the selection of gonococcal therapies. N. gonorrhoeae isolates are collected from the first 25 men with urethral gonorrhea attending STD clinics each month in 30 cities in the United States. The men are asked a number of behavioral questions, and the samples are tested for resistance to a variety of antibiotics. The project includes one site in North Carolina, located at Fort Bragg from 1998 to 2001. In mid-2002, the participating clinic was changed to a location in Greensboro, North Carolina. Samples are collected from men who would have been tested for gonorrhea anyway, so the project does not artificially inflate gonorrhea reports from the site.

During 2011, 214 men were tested at the Greensboro site. Ninety-seven percent were non-Hispanic blacks; about 37 percent were age 20 to 24 years with another 20 percent age 25 to 29 years. More than 11 percent of participants reported identifying as men who had sex with men.

Resistance to penicillin, ciprofloxacin, and/or tetracycline was detected in slightly more than 21 percent of the samples (CDC, GISP Report, 2011).

SYPHILIS

Syphilis disease

Syphilis is a complex disease with a natural history encompassing a number of different stages (CDC, Syphilis Fact Sheet, 2011). When a syphilis case is identified, the stage must be determined and reported because different stages have different implications for continued spread of the disease. Patients in the primary or secondary stages are most likely to have noticeable symptoms and may present for treatment. These stages are also of the greatest concern for sexual transmission because they are the most infectious. Patients in the asymptomatic early latent stage may also be infectious to their sexual partners, although less so than in the primary or secondary stages of disease. Such cases are generally found through screening or partner notification since the patient does not have symptoms. Primary, secondary, and early latent stages all occur within the first year of infection and can lead to transmission of syphilis to sexual partners. Therefore, these stages are often grouped together when discussing infectious syphilis and are called "early syphilis" or PSEL. If a case progresses past the early latent stage, the infection will move into a stage known as late syphilis. Late syphilis cases are reported in several different ways. Some patients with late syphilis will develop symptoms, while others will be detected through screening or partner notification. Patients of either sex are not likely to be infectious to their sexual partners beyond the early latent stage, but finding these cases is still important in terms of morbidity and care. In addition, pregnant women can pass congenital syphilis to their infants well past the early latent stage.

Syphilis reporting

North Carolina law states that all cases of syphilis must be reported to the local health department within 24 hours. However, syphilis testing and case investigation can take several weeks. Each individual with a reactive syphilis test must be investigated thoroughly to determine (a) if the person is genuinely infected and if so, (b) if the infection is new or failed treatment of an old infection, and if new, (c) the stage of the disease. The investigation, conducted by local or regional health department personnel, can take days or weeks, and in most cases the patient is treated for a probable infection before the investigation is complete. Contact tracing and partner notification are also initiated for probable syphilis cases and often partner information helps with diagnosing the stage of the infection. In addition to mandatory provider reports of syphilis, laboratories are required to report certain positive test results to the state within 24 hours, speeding up the reporting process by initiating investigations earlier. When a new case is diagnosed, a morbidity report is forwarded to the CDSU at the NCDPH, where information on patient names, demographics, and disease diagnoses are compiled for analysis and reported to CDC.

Due to the severity and rarity of syphilis compared to other sexually transmitted diseases, syphilis reporting, even from private providers, is believed to be quite good. Data on primary and secondary syphilis cases is particularly good because diagnosis of these stages of syphilis requires documentation of specific physical symptoms (such as chancre and/or a rash on palms of hands and soles of feet for primary and secondary stages respectively). Many latent cases of syphilis are asymptomatic and are only found through screening. Latent syphilis case reporting may be biased towards groups that receive syphilis screening (pregnant women, jail inmates, others). Distinguishing between the various latent stages of syphilis (early latent, late latent, latent of unknown duration) is also slightly more difficult than distinguishing between primary and secondary stages, so the stage of the infection may be misdiagnosed in some cases. Thorough contact tracing and partner notification activities greatly reduce bias in reporting by locating and reporting partners with asymptomatic infections that may not have otherwise been found.

Syphilis morbidity data management reporting changed in late 2012 from a central STD*MIS database and an additional partner service investigation data in stand-alone regional databases to one surveillance system, NC EDSS. Extensive person and event deduplication efforts took place as STD*MIS data was merged into NC EDSS. The change to NC EDSS introduced new procedures to learn and data from 2012 should be viewed with caution. Additionally, 2012 syphilis data may be under reported due to the reporting delay that occurred with NC EDSS conversion.

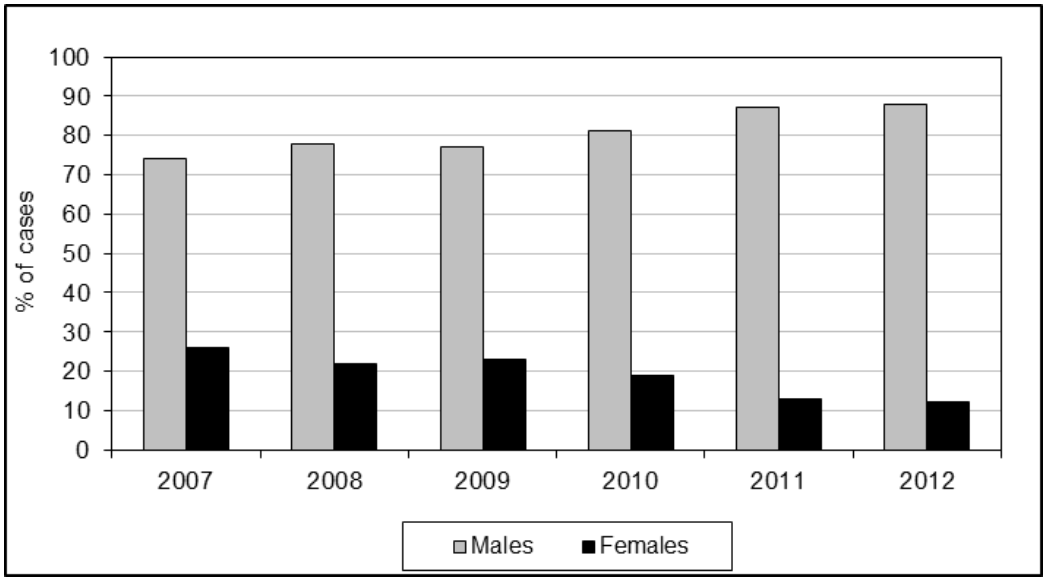
Syphilis trend analysis

In 2009, North Carolina experienced a significant outbreak of new syphilis cases. Nine hundred thirty eight (938) new cases of early syphilis (primary, secondary and early latent) were reported. These new cases represented an 82 percent increase in cases over the 516 cases reported in 2008. Increases in morbidity were noted for almost all demographic groups as well as among persons already infected with HIV. During 2010, 724 cases of early syphilis were reported in North Carolina and in 2011 there were 768 reports. In 2012, 598 cases of early syphilis were reported in North Carolina. While this is a 21 percent decrease from 2011, it is estimated that the 2012 case count is an underestimation due to the NC EDSS conversion and could represent a 10-15 percent underestimation with those cases reported in early 2013.

Gender

Early syphilis rates among males began to rise substantially in 2004 and continue to rise indicative of increasing transmission among men who have sex with men (MSM). In 2012, male cases represented 88 percent of all 598 early syphilis reports and the male-to-female ratio (based on rate) was 8.0 (NC 2012 HIV/STD Surveillance Report, Table 23, pg. 36-37). The rate of male early syphilis cases in 2012 was 11.2 per 100,000 males, a 21 percent rate decrease from 2011 (14.1/100,000 males). The rate of female early syphilis cases decreased from 1.9/100,000 in 2011 to 1.4 cases per 100,000 in 2012, supporting the assessment that men who have sex with men are a key population of concern in the current outbreak (see Figure 18).

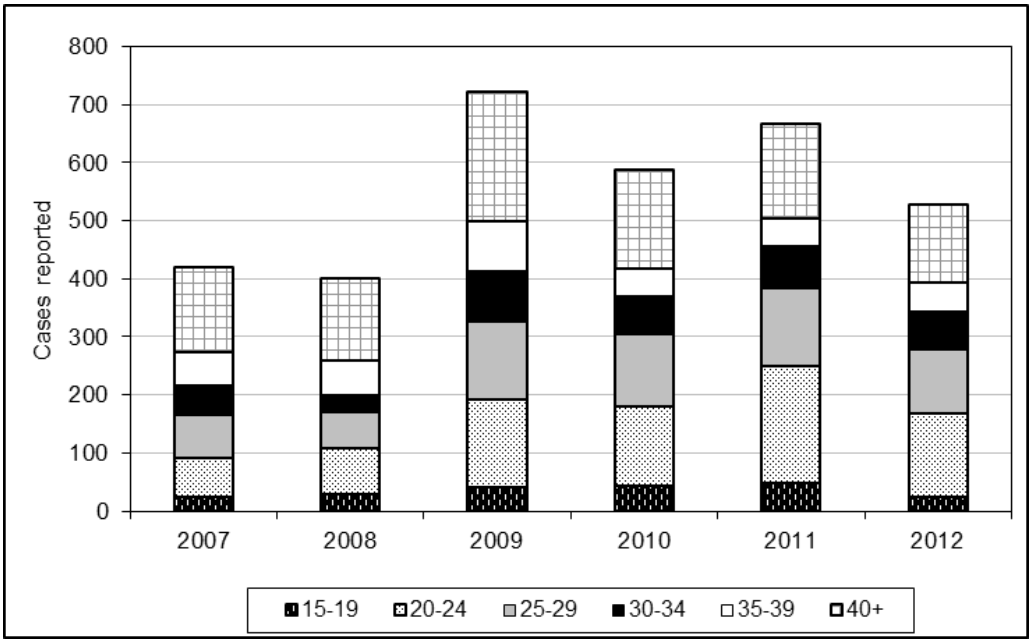
Figure 18. PSEL syphilis cases by gender, 2007-2012



Age

Previously in North Carolina, syphilis cases were found among an older population than those affected by gonorrhea and chlamydia, especially among men. In 2004, the age groups with the highest early syphilis rate were 35 to 39 year olds for both men and women. Since that time, there has been a general shift to higher early syphilis rates among younger age groups for both men and women. In 2012, 20 to 24 year old males (41.5/100,000) had the highest rate across all age and gender groups followed closely by 25 to 29 year old males (35.4/100,000) (see Figure 19). The highest rate for females was among those age 20-24 (7.2/100,000), an increase from the 6.6/100,000 in 2011. The highest rate for males was among 20-24 year olds, decreasing from 57.4/100,00 in 2011 to 41.5/100,000 in 2012.

Figure 19. PSEL syphilis cases in males by age, 2007-2012



Race/Ethnicity

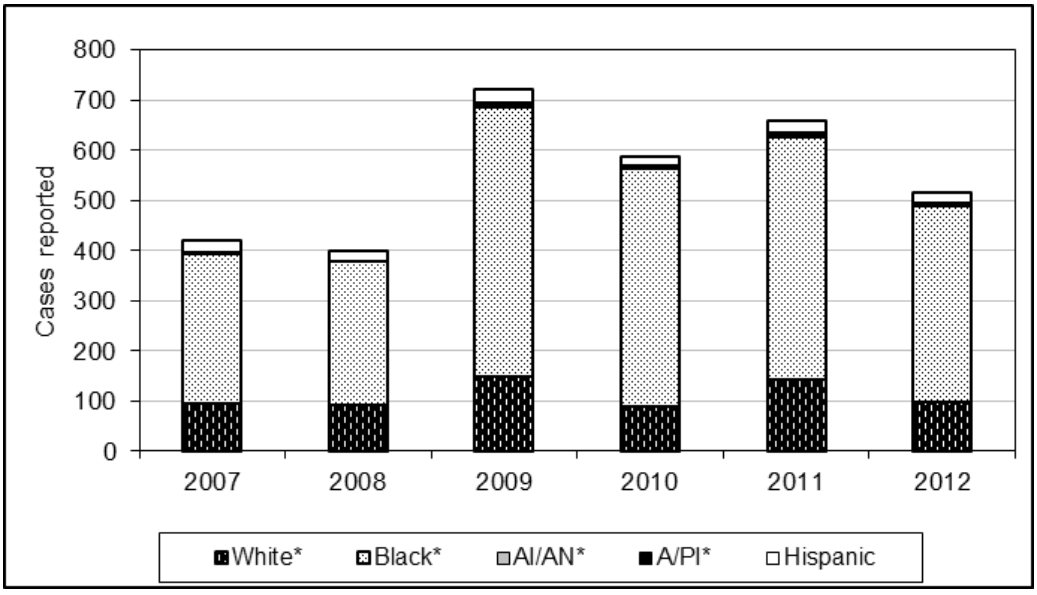
Syphilis disproportionately affects minority communities, but increases in early syphilis rates were observed for almost all racial/ethnic groups in 2009. Syphilis rates for non-Hispanic blacks and Hispanics are many times higher than for non-Hispanic whites. Syphilis reporting is generally very good in North Carolina, so this disparity is most likely not due to reporting or testing bias. Racial and ethnic disparities in syphilis rates are likely the result of a complex combination of poor access to health care, poverty, and the dynamics of sexual networks.

For males, the 2012 early syphilis rate for non-Hispanic whites was 3.2 per 100,000, for non-Hispanic blacks the rate was 39.5 per 100,000 or 12.3 times the non-Hispanic white rate, and for Hispanic males the rate was 4.7 per 100,000. For females, the 2012 early syphilis rate for non-Hispanic whites was 0.3 per 100,000 and for non-Hispanic blacks the rate was 3.9 per 100,000 or nearly 13 times that for whites.

In 2005, non-Hispanic whites represented about 28 percent of syphilis reports for males, non-Hispanic blacks about 36 percent, and Hispanics about 6 percent. Since that time, the proportion of non-Hispanic blacks among male reports has increased each year. In 2012, non-Hispanic black males represented 65 percent of reports for males, while reports for non-Hispanic white males decreased to 17 percent and reports for Hispanic males decreased to 4 percent (see Figure 20). For females, trends have also changed over time. Among 2005 female syphilis cases, the proportion of non-Hispanic whites was about 7 percent, the proportion of non-Hispanic blacks was about 20 percent and the proportion of Hispanics was about 1 percent. In 2012, non-

Hispanic white female cases represented 2 percent of reported cases, non-Hispanic blacks 7 percent, and Hispanics 1 percent (NC 2012 HIV/STD Surveillance Report, Table 23, pg. 36).

Figure 20. PSEL syphilis cases in males by race/ethnicity, 2007-2012



*non-Hispanic; AI/AN=American Indian/Alaska Native; A/PI=Asian/Pacific Islander

Geography

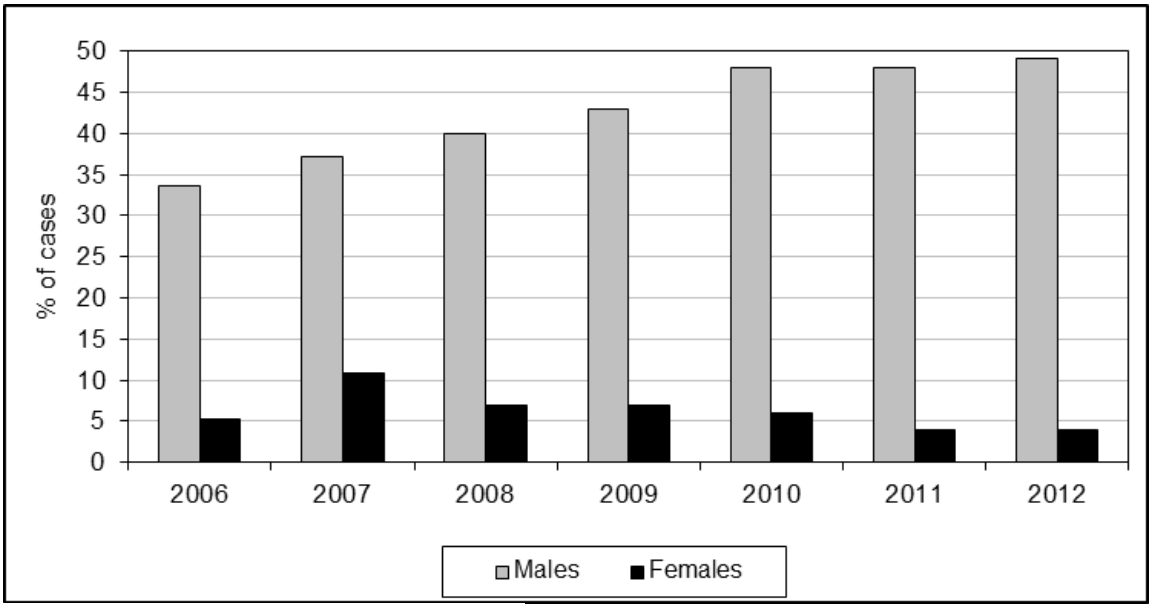
The increase in syphilis cases in 2009 occurred throughout the state and included many counties that follow Interstate Highways 40 and 85 and several eastern counties. In 2009, Forsyth, Mecklenburg, Wake, Guilford, Wayne and Durham counties each contributed at least 40 or more new early syphilis cases to the overall morbidity of the state. Most counties reported fewer early syphilis cases in 2010 compared to 2009 with further declines in 2011. Notable exceptions include Guilford County (68 cases in 2009, 115 in 2011, and 66 in 2012), Mecklenburg (174 cases in 2009, 190 in 2011, and 134 in 2012) and Wake (116 cases in 2009, 76 cases in 2011 and 84 cases in 2012). In 2012, the majority of syphilis cases were detected in the Piedmont region where the population is the most concentrated and also in the Eastern region. The highest rates were seen in the 20-24 and 25-29 age groups with rates between 18.9 and 29.3 per 100,000 population.

Comorbidity of Syphilis and HIV

A special investigation using the currently available data systems was initiated to compare the HIV morbidity data to syphilis morbidity data to identify co-infection. Syphilis cases that are also infected with HIV (co-morbid) have increased as a proportion of syphilis cases in recent years. For a syphilis case to be considered co-morbid, the HIV diagnosis must have occurred before the syphilis diagnosis or determined within six months after the syphilis diagnosis. In 1999, the proportion of all early syphilis cases with HIV was about 4.3 percent. In 2009, 36

percent of early syphilis cases also had an HIV diagnosis and this level of co-morbidity was maintained in 2010. The increase in co-morbidity among male syphilis cases has been especially dramatic. In 2003, the proportion of male early syphilis cases with HIV was about 18.2 percent and about 7.0 percent for female cases. By 2009, the proportion of male syphilis cases with HIV had increased steadily to 44.5 percent and in 2012 had increased to 49 percent. For females the trend since 2003 is less clear and the proportion of female cases with HIV fluctuated from a low of 4.1 percent to a high of 11 percent in 2007 (see Figure 21).

Figure 21. Percent of PSEL syphilis cases with HIV by gender, 2006-2012*



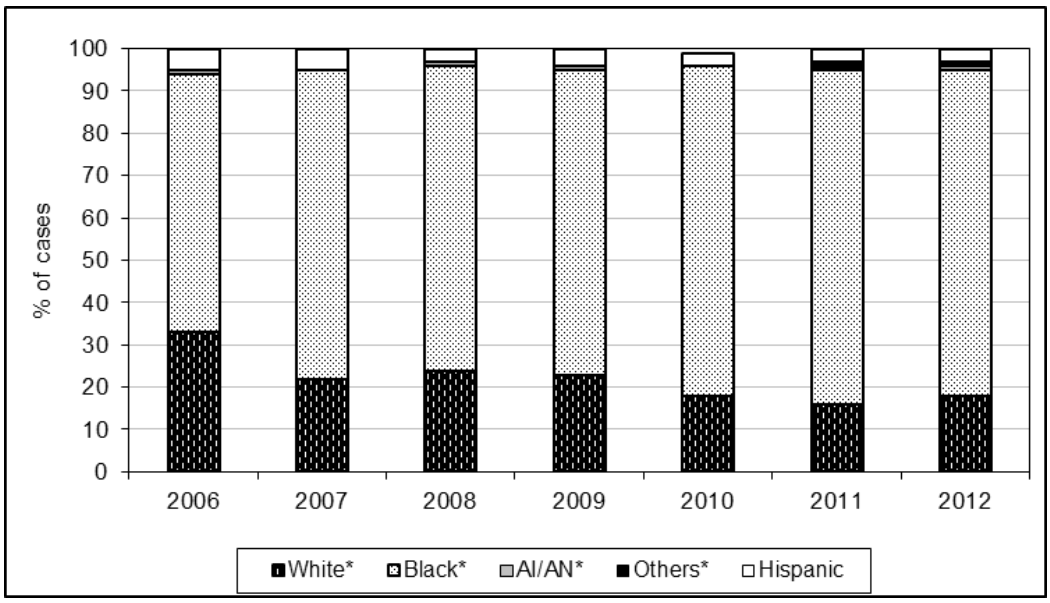
*HIV diagnosis data current as of July 2013

The race/ethnicity of male syphilis cases with HIV has been consistent over the past decade with one exception. In 2003, non-Hispanic blacks represented 77 percent of co-morbid male cases and non-Hispanic whites represented 19 percent. The race/ethnicity of male syphilis cases changed dramatically in 2005 when the percentage of non-Hispanic white cases among co-morbid males increased to 54 percent. Since that time the percentage of co-morbid cases represented by non-Hispanic black males has returned to levels observed earlier. In 2012, 77 percent of co-morbid male cases were black, non-Hispanic and 18 percent were white, non-Hispanic (see Figure 22). The male cases with both syphilis and HIV are overwhelmingly associated with MSM risk. This trend is being seen both in North Carolina and across the United States (CDC, Syphilis and MSM Fact Sheet, 2007).

In response to the syphilis outbreak among MSM seen in 2009, the CDSU created the North Carolina MSM Taskforce as a joint collaboration of community leaders and public health professionals to help target prevention efforts toward this population. The MSM Taskforce is especially focused on developing “safe spaces” for the MSM community to be able express and

address their concerns and questions that may be causing hesitancy to access care or affect risk behaviors (see: HIV Testing for more information (North Carolina Epidemiologic Profile for HIV/STD Prevention and Care Planning, December 2012)).

Figure 22. Percent of PSEL syphilis cases in males with HIV by race/ethnicity, 2006-2012



*non-Hispanic

Congenital Syphilis

Untreated syphilis in pregnant women results in infant death in up to 40 percent of cases. An infected baby born alive may not have any signs or symptoms of disease. However, if not treated immediately, the baby may develop serious problems within a few weeks. Untreated babies may become developmentally delayed, have seizures, or die (CDC, Syphilis Fact Sheet, 2014). Women with early syphilis are the most likely to infect their fetuses in uteri or during delivery, but women with late latent syphilis can also have congenitally infected infants (Radolf, 1999). Under current CDC case definitions, infants whose mothers receive treatment for syphilis less than 30 days prior to delivery are still classified as congenital syphilis cases, regardless of whether the child displays symptoms.

North Carolina continues to suffer from cases of congenital syphilis. In 2012, three infants were born to mothers who had active or inadequately treated cases of syphilis. Because of the delay in reporting and confirming congenital syphilis diagnoses, this number should be considered preliminary. Ten cases of congenital syphilis were reported in 2010 and five cases in 2011. While the trend is decreasing, the number of congenital syphilis cases reported must be watched closely to ensure pregnant women are receiving appropriate prenatal care and no congenital syphilis case is left undetected.

North Carolina law states that medical providers are supposed to test all pregnant women for syphilis between 28-30 weeks gestation and again at delivery for women at high risk for syphilis. Women who do not receive adequate prenatal care services often miss these opportunities for screening. The Communicable Disease Branch is currently partnering with the Women & Children's Health Section to refer at-risk women into prenatal care services.

The number of congenital syphilis cases continues to represent a problem. Mothers of infants with congenital syphilis in North Carolina either lack access to treatment that can prevent the transmission of syphilis or they are not seeking prenatal care and are thus outside the realm of the public health surveillance. These women pose a special challenge to public health and continue to need our attention if we are to eliminate congenital syphilis in North Carolina.

APPENDIX

Table A. Persons living in North Carolina with HIV Disease* as of 12/31/2012, County of Residence and Patient Management Model Regions

		Report Category		TOTAL
		HIV (NON AIDS)	AIDS	
HIV CARE	COUNTY			
CHARLOTTE TRANSITIONAL	ANSON	28	32	60
	CABARRUS	162	81	243
	GASTON	300	210	510
	MECKLENBURG	3,189	1,803	4,992
	UNION	104	83	187
	TOTAL	3,783	2,209	5,992
REGION 1	COUNTY			
	AVERY	4	5	9
	BUNCOMBE	274	216	490
	CHEROKEE	8	5	13
	CLAY	6	3	9
	CLEVELAND	110	80	190
	GRAHAM	.	2	2
	HAYWOOD	22	34	56
	HENDERSON	29	54	83
	JACKSON	15	18	33
	MACON	13	15	28
	MADISON	7	8	15
	MCDOWELL	13	14	27
	MITCHELL	4	7	11
	POLK	7	12	19
	RUTHERFORD	24	27	51
	SWAIN	7	8	15
	TRANSYLVANIA	20	7	27
	YANCEY	5	7	12
	TOTAL	568	522	1,090
REGION 2	COUNTY			
	ALEXANDER	16	18	34
	ALLEGHANY	2	0	2
	ASHE	9	0	9
	BURKE	39	34	73
	CALDWELL	21	27	48
	CATAWBA	96	116	212
	LINCOLN	32	25	57
	WATAUGA	14	10	24
	WILKES	26	17	43
	TOTAL	255	247	502
REGION 3	COUNTY			
	DAVIDSON	147	85	232
	DAVIE	15	16	31
	FORSYTH	874	479	1,353
	IREDELL	73	53	126
	ROWAN	142	89	231
	STOKES	21	13	34
	SURRY	36	21	57
	YADKIN	10	15	25
	TOTAL	1,318	771	2,089

*HIV disease includes all newly reported HIV infected individuals by the date of first diagnosis (HIV or AIDS)

Table A: continued

		Report Category		TOTAL
		HIV (NON AIDS)	AIDS	
REGION 4	**COUNTY**			
	ALAMANCE	223	120	343
	CASWELL	27	13	40
	GUILFORD	1,342	678	2,020
	MONTGOMERY	16	20	36
	RANDOLPH	89	62	151
	ROCKINGHAM	85	43	128
	STANLY	54	23	77
	TOTAL	1,836	959	2,795
REGION 5	**COUNTY**			
	BLADEN	41	48	89
	CUMBERLAND	816	441	1,257
	HARNETT	106	101	207
	HOKE	71	60	131
	MOORE	73	65	138
	RICHMOND	72	48	120
	ROBESON	214	210	424
	SAMPSON	77	73	150
	SCOTLAND	71	49	120
	TOTAL	1,541	1,095	2,636
REGION 6	**COUNTY**			
	CHATHAM	59	35	94
	DURHAM	998	517	1,515
	FRANKLIN	50	53	103
	GRANVILLE	99	57	156
	JOHNSTON	146	153	299
	LEE	111	43	154
	ORANGE	206	85	291
	PERSON	50	22	72
	VANCE	106	77	183
	WAKE	1,530	1,295	2,825
	WARREN	30	11	41
	TOTAL	3,385	2,348	5,733
REGION 7	**COUNTY**			
	BRUNSWICK	77	81	158
	COLUMBUS	88	78	166
	DUPLIN	82	88	170
	NEW HANOVER	351	237	588
	ONSLOW	133	97	230
	PENDER	26	30	56
	TOTAL	757	611	1,368
REGION 8	**COUNTY**			
	EDGECOMBE	148	155	303
	HALIFAX	77	80	157
	NASH	159	119	278
	NORTHAMPTON	29	37	66
	WILSON	184	168	352
	TOTAL	597	559	1,156

Table A: continued

		Report Category		TOTAL
		HIV (NON AIDS)	AIDS	
REGION 9	**COUNTY**			
	BERTIE	32	44	76
	CAMDEN	6	9	15
	CHOWAN	14	15	29
	CURRITUCK	5	9	14
	DARE	16	20	36
	GATES	7	1	8
	HERTFORD	24	59	83
	HYDE	3	7	10
	PASQUOTANK	46	42	88
	PERQUIMANS	16	14	30
	TYRRELL	3	2	5
	TOTAL	172	222	394
REGION 10	**COUNTY**			
	BEAUFORT	58	52	110
	CARTERET	28	30	58
	CRAVEN	126	112	238
	GREENE	22	30	52
	JONES	11	11	22
	LENOIR	121	122	243
	MARTIN	38	37	75
	PAMLICO	13	6	19
	PITT	257	289	546
	WASHINGTON	19	30	49
	WAYNE	145	143	288
	TOTAL	838	862	1,700
UNASSIGNED**		785	828	1,613
TOTAL		15,835	11,233	27,068

*HIV disease includes all newly reported HIV infected individuals by the date of first diagnosis (HIV or AIDS)

**Unassigned includes cases with unknown county of residence at diagnosis or cases that were diagnosed at a long term care facility such as prisons

APPENDIX: REFERENCES

Most references cited in this document are listed in the North Carolina Epidemiologic Profile for HIV/STD Prevention and Care Planning, December 2012, *Appendix E. The references listed below are in addition to those in the epidemiologic profile.*

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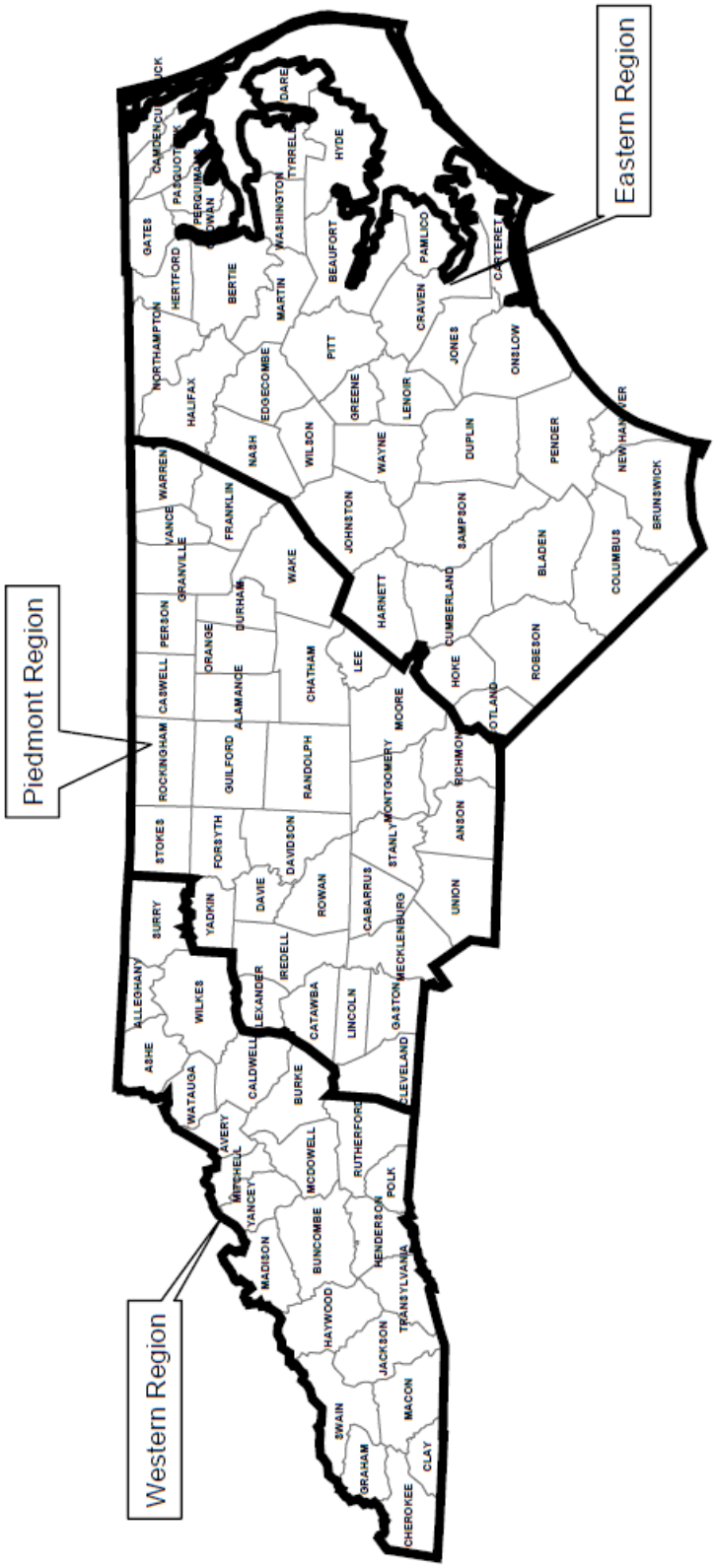
North Carolina Geographic Regions



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