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Epidemiologic Overview

North Carolina's Integrated HIV Prevention and Care Plan including the Statewide Coordinated Statement of Need, CY 2017-2021

REGION	South
PLAN TYPE	Integrated state/city/county prevention and care plan
JURISDICTIONS	State of North Carolina and Mecklenburg County TGA
HIV PREVALENCE	High

North Carolina's epidemiologic profile provides comprehensive demographic data and a good breakdown of HIV burden by geographic area, including county specific data. The section details infection disparities between race/ethnicities and gender, as well as detailed socioeconomic data for people in care during a five-year period of time (2009-2013) collected by the CDC supported Medical Monitoring Project (MMP). Data includes variables on education, homelessness, incarceration status, income/poverty, and health insurance status. Data on met and unmet needs for care services and testing data from the North Carolina Department of Health and Human Services are included.

SELECTION CRITERIA: EPIDEMIOLOGIC OVERVIEW

Exemplary Epidemiologic Overview sections met the following criteria (based on the Integrated HIV Prevention and Care Plan Guidance):

☑ 5 year data trends used with most recent year between 2014 through 2016

☑ Use of clear and effective graphics

☑ Robust description of demographic data (race, age, sex, transmission category, gender identify) of persons newly diagnosed, PLWH, and persons at high risk for infection

☑ Description of SES (FPL, income, education, insurance status) of persons newly diagnosed, PLWH, and persons at high risk for infection

☑ Clear description of burden of HIV in service area

☑ Clear description of indicators of risk for HIV infection

Additional exemplary plan sections are available online:
www.targetHIV.org/exemplary-integrated-plans

taken to begin this work and contract with a vendor for services, hire staff and assess the start of this new service.

This Integrated HIV Care and Prevention Plan covers the entire state of North Carolina, the TGA and all 100 counties, delivering integrated HIV and STD prevention and care services.

SECTION I: Statewide Coordinated Statement of Need/Needs Assessment

A. Epidemiologic Overview

Sociodemographic Characteristics of North Carolina

Knowledge of sociodemographic characteristics is paramount to fully understanding the health of a risk population. Sociodemographics can be used to identify certain populations that may be at greater risk for morbidity and mortality. This knowledge can also assist in identifying underlying factors that may contribute to a health condition. Population characteristics will be explored in this section, including basic demographics, geography, income, and poverty.

Population Demographics

According to the 2014 U.S. Census, North Carolina was the 9th most populous state and one of the most rapidly expanding states during the previous decade. [1] Between 2010 and 2014, North Carolina gained more than 400,000 residents, the 5th largest numeric gain among the states, and grew by 4.3%, the 13th highest growth rate.[2] The 2014 North Carolina *provisional* population estimate was 9,943,964, with county populations ranging from 4,115 (Tyrrell County) to 1,012,539 (Mecklenburg County).[3] More than one-half of North Carolina's population lived in only 16 counties (Mecklenburg, Wake, Guilford, Forsyth, Cumberland, Durham, Buncombe, Gaston, New Hanover, Union, Onslow, Cabarrus, Johnston, Pitt,

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[1]United States Census Bureau. (2016). *Annual estimates of the resident population for the United States, regions, states, and Puerto Rico: April 1, 2010 to July 1, 2014.* [Data file]. Revised May 19, 2016. Accessed June 13, 2016. Retrieved from http://www.census.gov/popest/data/historical/2010s/vintage_2014/index.html.

[2]Tippett, R. (2016). *Population growth in the Carolinas: projected vs observed trends*. Carolina Demography. December 8, 2015. Accessed June 13, 2016. Retrieved from http://demography.cpc.unc.edu/2015/12/08/population-growth-in-the-carolinas-projected-vs-observed-trends/

[3]National Center for Health Statistics. *Vintage 2014 postcensal estimates of the resident population of the United States (April 1, 2010, July 1, 2010-July 1, 2014), by year, county, single-year of age (0, 1, 2, .., 85 years and over), bridged-race, Hispanic origin, and sex.* [Data file]. Updated March 7, 2016. Accessed July 2015. Retrieved from http://www.cdc.gov/nchs/nvss/bridged_race.htm.

Davidson and Iredell).[1] In 2014, there were 120,948 births and 85,212 deaths in the state, and the average life expectancy for North Carolinians was 78.3 years.[4]

Age and gender play an important role in public health planning and in understanding the health of a community. These characteristics are significant indicators in the prevalence of certain diseases, especially human immunodeficiency virus (HIV) and other sexually transmitted diseases (STDs). In 2014, the median age for people living in North Carolina was 38 years old[1], with 25.7% under the age of 20 years old, and 14.7% were 65 years and older. Approximately 49.0% of the population were men and 51.0% were women, and the majority of people in North Carolina are White/Caucasian, followed by Black/African Americans, and Hispanic/Latinos (Table 1).

Table 1. North Carolina Bridged-Race Population Estimates by Gender, Age, and Race/Ethnicity, 2014

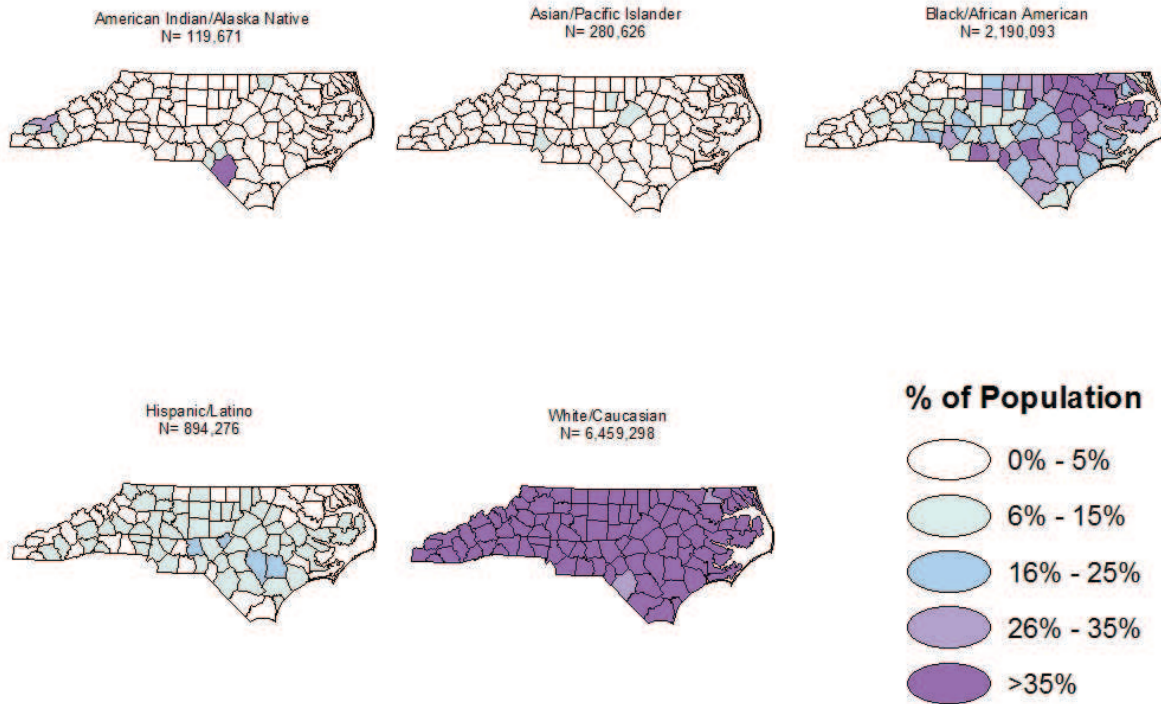| Demographics	Men		Women		Total	
	Cases	%	Cases	%	Cases	%
Age (Year)						
Less than 13	836,089	17.3	802,319	15.7	1,638,408	16.5
13-14	135,352	2.8	130,475	2.6	265,827	2.7
15-19	333,645	6.9	319,296	6.3	652,941	6.6
20-24	376,049	7.8	342,212	6.7	718,261	7.2
25-29	324,122	6.7	330,353	6.5	654,475	6.6
30-34	312,509	6.5	325,266	6.4	637,775	6.4
35-39	305,953	6.3	319,560	6.3	625,513	6.3
40-44	331,038	6.8	346,207	6.8	677,245	6.8
45-49	327,819	6.8	340,552	6.7	668,371	6.7
50-54	338,657	7.0	360,537	7.1	699,194	7.0
55-59	314,339	6.5	344,034	6.7	658,373	6.6
60-64	273,695	5.6	310,524	6.1	584,219	5.9
65 and older	635,326	13.1	828,036	16.2	1,463,362	14.7
Race/Ethnicity						
American Indian/Alaska Native*	57,573	1.2	62,098	1.2	119,671	1.2
Asian/Pacific Islander*	135,181	2.8	145,445	2.9	280,626	2.8
Black/African American*	1,026,016	21.2	1,164,077	22.8	2,190,093	22.0
Hispanic/Latino	469,971	9.7	424,305	8.3	894,276	9.0
White/Caucasian*	3,155,852	65.1	3,303,446	64.8	6,459,298	65.0
Total	**4,844,593**	**100.0**	**5,099,371**	**100.0**	**9,943,964**	**100.0**

*Non-Hispanic/Latino.
Data Source: National Center for Health Statistics, Bridged-Race Population Estimates (Accessed July 2015).

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[4] North Carolina State Center for Health Statistics. (2014). *North Carolina vital statistics, volume 1: population, births, deaths, marriages, and divorces & life expectancy.* [Data file]. Updated October 8, 2014. Accessed June 13, 2016. http://www.schs.state.nc.us/data/vital.cfm

The racial and ethnic differences within the state's population play an important role in interpreting gaps in access to health care among groups. These health and health care differences are documented using public health surveillance and are shown to be especially large in terms of HIV infection morbidity and intervention. Previous HIV infection surveillance has shown that HIV disproportionately affects ethnic minorities in North Carolina. Figure 1 shows the race/ethnic distribution across the state, based on the overall proportion of the race/ethnic group. While the White/Caucasian population is widely distributed throughout the state, other race/ethnic groups are concentrated in certain areas. The American Indian/Alaska Native population is one of the largest in the United States, and the Hispanic/Latino population in North Carolina has increased by 75.6% since 2004 (from 508,851 to 894,276).[3]

Figure 1. North Carolina Population Demographics by Race/Ethnicity, 2014

American Indian/Alaska Native
N= 119,671

Asian/Pacific Islander
N= 280,626

Black/African American
N= 2,190,093

Hispanic/Latino
N= 894,276

White/Caucasian
N= 6,459,298

% of Population

0% - 5%
6% - 15%
16% - 25%
26% - 35%
>35%

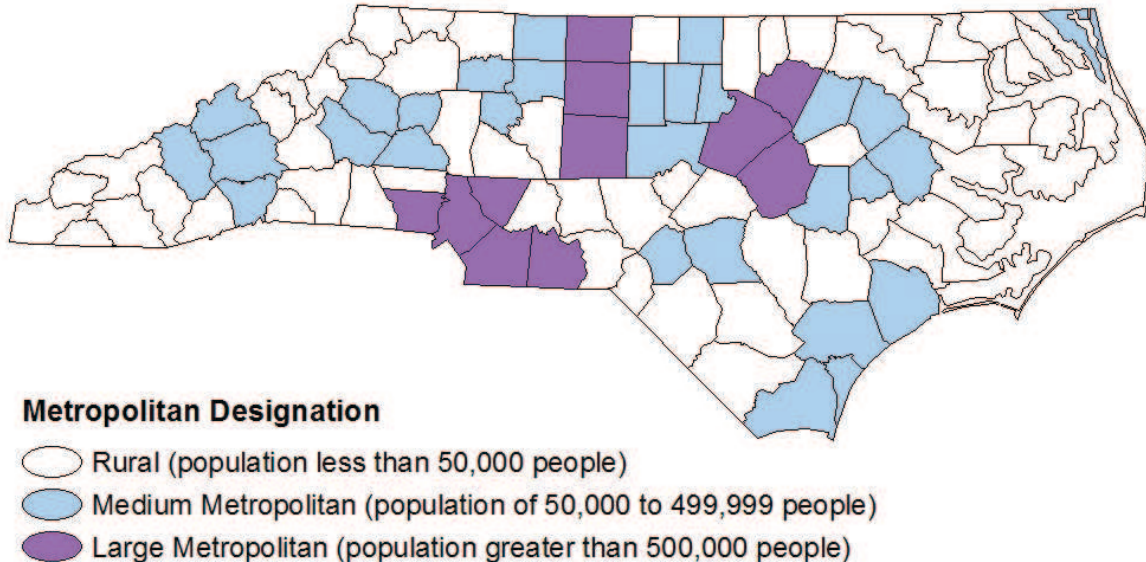Data Source: National Center for Health Statistics, Bridged-Race Population Estimates (Accessed July 2015).

Geographic Regions

Metropolitan statistical areas are population areas that represent the social and economic linkages and commuting patterns between urban cores and outlying integrated areas. These geographic designations are managed by the Office of Management and Budget (OMB) in order to have nationally consistent areas for developing federal statistics. These areas are collectively referred to as core based statistical areas with a metropolitan area containing a core urban area population of 50,000 or more. In the *HIV/AIDS Surveillance Supplemental Report, Volume 13 Number 2*, the Centers for Disease Control and Prevention (CDC) divided urban/metropolitan areas into large- (population greater than or equal to 500,000) and medium-sized urban/metropolitan areas (population 50,000 to 499,999), which are all defined as urban areas. Areas other than metropolitan areas are defined as rural areas.[5] Eleven North Carolina counties (Anson, Cabarrus, Franklin, Gaston, Guilford, Johnston, Mecklenburg, Randolph, Rockingham, Union and Wake) are classified as large urban/metropolitan areas. Twenty-nine North Carolina counties (Alamance, Alexander, Brunswick, Buncombe, Burke, Caldwell, Catawba, Chatham, Cumberland, Currituck, Davie, Durham, Edgecombe, Forsyth, Greene, Haywood, Henderson, Hoke, Madison, Nash, New Hanover, Onslow, Orange, Pender, Person, Pitt, Stokes, Wayne, and Yadkin) are classified as medium urban/metropolitan areas. The remaining 60 counties are classified as rural.

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[5]Centers for Disease Control and Prevention. (2006). Cases of HIV infection and AIDS in urban and rural areas of the United States, 2006. *HIV Surveillance Supplement Report. 13*(2), 4.

Data from the U.S. Census showed that in 2010, 80.7 percent of the general population of the United States was living in urban areas and 19.3 percent in rural areas.[6] Using the most current estimate for 2014, North Carolina remains more rural than the United States (U.S.) as a whole, with 70.0% living in urban areas, and 30.0% percent in rural areas.[3] Figure 2 displays the metropolitan designations for North Carolina, which is separated by rural, medium metropolitan, and large metropolitan areas.

Figure 2. North Carolina Metropolitan Designations

Metropolitan Designation

◯ Rural (population less than 50,000 people)
🔵 Medium Metropolitan (population of 50,000 to 499,999 people)
🟣 Large Metropolitan (population greater than 500,000 people)

Data Source: National Center for Health Statistics, Bridged-Race Population Estimates (Accessed July 2015).

Household Income and Poverty

Contextual factors such as poverty and income, as well as racial segregation, discrimination, and incarceration rates, influence sexual behavior and sexual networks. These factors contribute substantially to the persistence of marked racial disparities in STD rates.[7]

According to the U.S. Department of Commerce's Bureau of Economic Analysis, the 2014 per capita income for North Carolina was $43,332, or 88.3% of the national average ($49,091).[8] The 2014 annual unemployment rate in North Carolina was 5.5, down from a rate of 6.9 in 2013.[9] In 2013, the median

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[6]United States Census Bureau. (2010). 2010 Census Urban and Rural Classification and Urban Area Criteria. Revised February 9, 2015. Accessed November 6, 2014. Retrieved from https://www.census.gov/geo/reference/ua/urban-rural-2010.html.

[7]Adimora, A. & Schoenbach V. (2005). Social context, sexual networks, and racial disparities in rates of sexually transmitted infections. *Journal of Infection Diseases, 191 Suppl 1,* S115-122.

[8]United States Department of Commerce: Bureau of Economic Analysis. (2014). *Regional data: GDP and personal income.* [Data file]. Updated June 14, 2016. Accessed June 14, 2016. Retrieved from http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1#reqid=70&step=1&isuri=1

[9]United States Department of Labor: Bureau of Labor Statistics. (2016). *Regional and State Employment and Unemployment, December 2014.* Accessed June 14, 2016. Retrieved from http://www.bls.gov/news.release/archives/laus_01272015.pdf

household income in North Carolina was $46,693, lower than the national median of $53,482.[10] The median household income distribution by county can be seen in Figure 3. The higher median household incomes ($55,000) are located in the Charlotte area, Raleigh/Durham area, and the northeastern part of the state, including the Outer Banks (Figure 3).

Figure 3. North Carolina Median Household Income by County, 2014
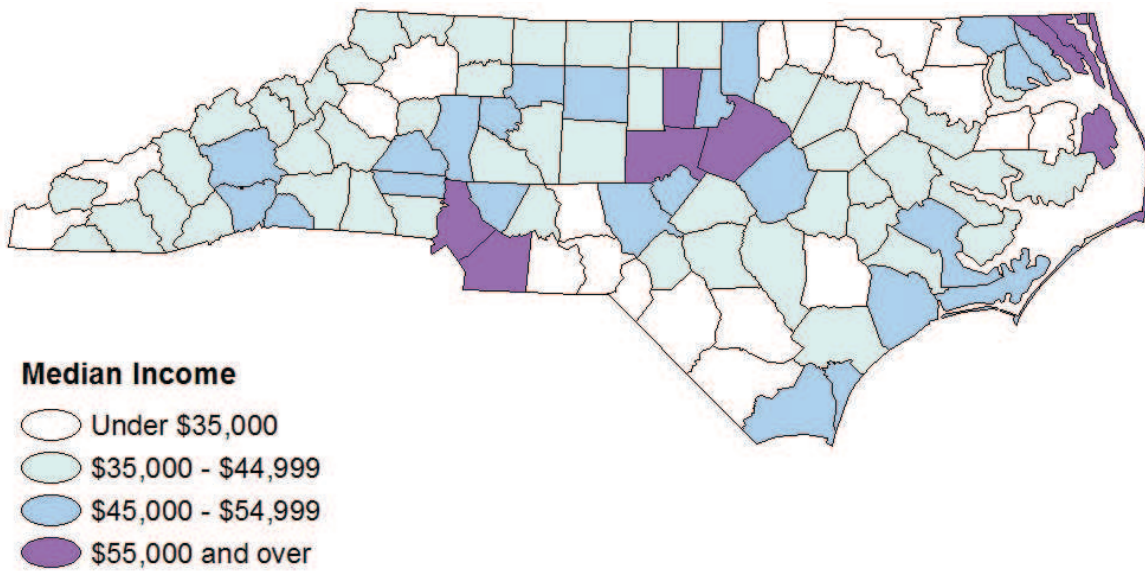
Data Source: American FactFinder, Compare Counties for Median Household Income, 2014 (Accessed June 14, 2016).

In 2014, 17.6% of North Carolina households were below the federal poverty level (FPL), which is slightly higher than the national percent below the FPL, 15.6%.[10] Women, children (less than 18 years of age), and Hispanic/Latinos had a higher percentage living below the FPL through 2014 (Table 2). In total, 36.0% of the population are considered low income (199% FPL or below).[11]

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[10]American FactFinder. (2016). *Community facts for North Carolina and United States, 2014.* [Data file]. Accessed June 14, 2016. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

[11]The Henry J. Kaiser Family Foundation. (2016). Distribution of the Total Population by Federal Poverty Level (above and below 200% FPL). [Data file]. Updated 2016. Accessed June 14, 2016. Retrieved from http://kff.org/other/state-indicator/distribution-by-fpl/.

Table 2. North Carolina and United States Individual Poverty Rate by Gender, Age, and Race/Ethnicity, 2014

| Demographics	North Carolina	United States
	%	%
Gender		
Men	16.1	14.3
Women	18.9	16.8
Age (Year)		
Children (0-18 years)	25.0	21.9
Adults (19-64 years)	16.5	14.6
Elderly (65 years and older)	9.9	9.4
Race/Ethnicity		
American Indian/Alaska Native*	30.1	28.8
Asian/Pacific Islander*	13.4	12.7
Black/African American*	27.6	27.3
Hispanic/Latino	33.4	24.8
White/Caucasian*	11.9	10.8
Multiple Race	26.7	20.3
Total	**17.6**	**15.6**

*Non-Hispanic/Latino.
Data Source: American FactFinder (2016). Poverty status in the past 12 months: 2010-2014 American Community Survey 5-year estimates. Accessed June 14, 2016. Retrieved from
http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

Overall HIV Trends in North Carolina

The overall rates for both prevalence and newly diagnosed HIV infections from 2000 to 2014 in North Carolina, by the year of HIV diagnosis for the individual, is presented in Figure 1. While the rate of people living with HIV infection has steadily increased as new diagnoses continue and people survive longer, the rate of newly diagnosed HIV infections has been decreasing since 2008. Newly diagnosed HIV infection peaks occurring in 2007 and 2008 may be attributed to the Communicable Disease Branch's effort to increase HIV testing, including the *Get Real. Get Tested. Get Treatment.* campaign and may not necessarily represent an increase in cases. Since 2012, the rate of newly diagnosed HIV infections has remained relatively stable (Figure 4).

Figure 4. HIV Infection* Rates for People Diagnosed in North Carolina, 2000–2014
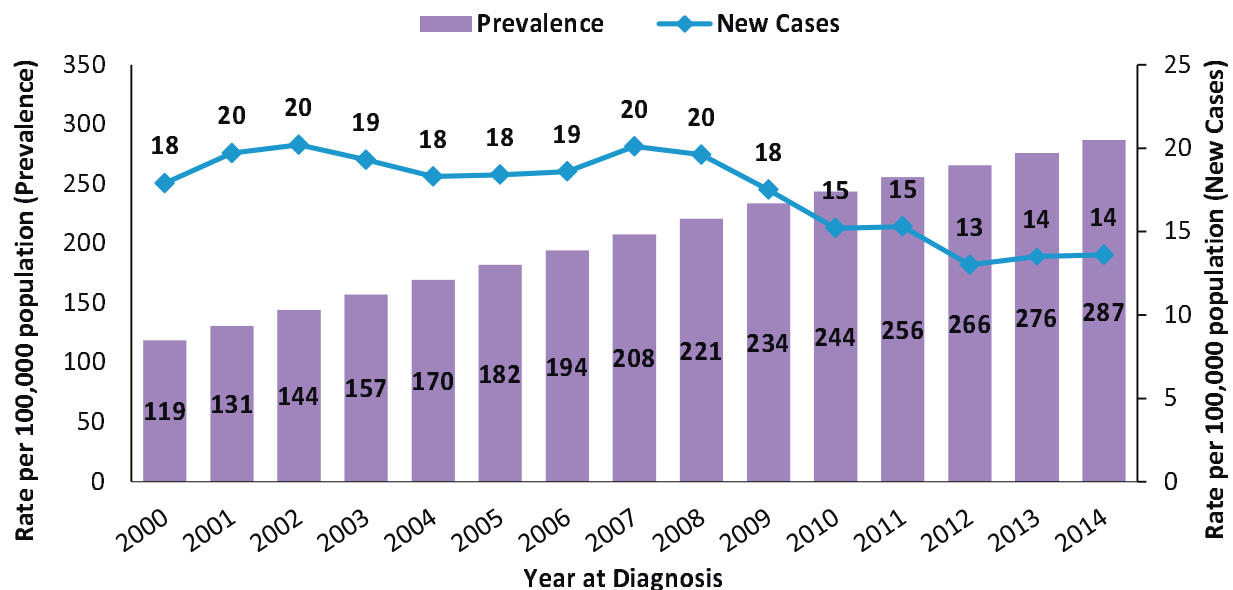
*HIV infection includes all newly reported HIV infected individuals by the year of first diagnosis, regardless of the stage of infection (HIV or AIDS).

Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

HIV Prevalence in North Carolina

Demographics

Using an analysis program created by the Centers for Disease Control and Prevention (CDC) to calculate jurisdiction-based undiagnosed population, it is estimated that 36,700 people were living in North Carolina with HIV at the end of 2014. Of those, an estimated 4,900 people (13.4%) were unaware of their infection.[12] (CDC creates mathematical estimates of the proportion undiagnosed in each state, based on testing history and state prevalence; as a result we can observe the estimated proportion over time. By testing those people at highest risk and providing frequent testing we will be able to see a decrease in the undiagnosed; since NC's proportion is already low, indications are that we are diagnosing most people.)

At the end of 2014, there were 28,526 people diagnosed with HIV and still living in North Carolina. More men, 71.5%, were diagnosed with HIV and living in North Carolina than women (28.5%). Black/African Americans comprised the majority (64.8%) of cases, followed by White/Caucasians (25.2%) and Hispanic/Latinos (6.5%). Individuals older than 50 years of age represented the majority (41.0%) of people living with HIV, as people can live for many years on ART after an HIV diagnosis. The large percentages of men and Black/African Americans living with HIV infection indicates that these groups are most affected by the HIV epidemic in North Carolina (Table 3).

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[12]HIV infection fact sheet 2014 (http://epi.publichealth.nc.gov/cd/stds/factsheets.html)

Table 3. People Diagnosed and Living in North Carolina with HIV Infection[a] as of 12/31/2014 by Gender, Current Age, Race/Ethnicity, and Hierarchical Risk of Exposure (Unknown Risk[b] Redistributed)

Demographics	Men			Women			Total		
	Cases	%	Rate[b]	Cases	%	Rate[b]	Cases	%	Rate[b]
Current Age (Year)									
Less than 13	45	0.2	5.4	34	0.4	4.2	79	0.3	4.8
13-14	9	0.0	6.6	8	0.1	6.1	17	0.1	6.4
15-19	89	0.4	26.7	65	0.8	20.4	154	0.5	23.6
20-24	988	4.8	262.7	179	2.2	52.3	1,167	4.1	162.5
25-29	1,746	8.6	538.7	414	5.1	125.3	2,160	7.6	330.0
30-34	1,818	8.9	581.7	576	7.1	177.1	2,394	8.4	375.4
35-39	1,810	8.9	591.6	879	10.8	275.1	2,689	9.4	429.9
40-44	2,339	11.5	706.6	1,266	15.5	365.7	3,605	12.6	532.3
45-49	3,196	15.7	974.9	1,354	16.6	397.6	4,550	16.0	680.8
50-54	3,454	16.9	1,019.9	1,354	16.6	375.6	4,808	16.9	687.6
55-59	2,409	11.8	766.4	1,003	12.3	291.5	3,412	12.0	518.2
60-64	1,438	7.1	525.4	581	7.1	187.1	2,019	7.1	345.6
65 and older	1,041	5.1	163.9	431	5.3	52.1	1,472	5.2	100.6
Race/Ethnicity									
American Indian/Alaska Native[c]	147	0.7	255.3	64	0.8	103.1	211	0.7	176.3
Asian/Pacific Islander[c]	118	0.6	87.3	49	0.6	33.7	167	0.6	59.5
Black/African American[c]	12,307	60.4	1,199.5	6,187	76	531.5	18,494	64.8	844.4
Hispanic/Latino	1,465	7.2	311.7	396	4.9	93.3	1,861	6.5	208.1
White/Caucasian[c]	5,905	29.0	187.1	1,291	15.9	39.1	7,196	25.2	111.4
Multiple Races[d]	407	2.0	--	152	1.9	--	559	2.0	--
Unknown[d]	33	0.2	--	5	0.1	--	38	0.1	--
Exposure Category[e]									
Heterosexual-All[f]	4,277	21.0	--	6,757	83.0	--	11,034	38.7	--
IDU[g]	1,537	7.5	--	1,094	13.4	--	2,630	9.2	--
MSM[g]	13,541	66.4	--	N/A	N/A	--	13,541	47.5	--
MSM/IDU[g]	777	3.8	--	N/A	N/A	--	777	2.7	--
Other Risks[h]	250	1.2	--	293	3.6	--	544	1.9	--
Total	20,382	100.0	420.7	8,144	100.0	159.7	28,526	100.0	286.9

[a]All people living with HIV infection, regardless of the stage of infection (HIV or AIDS).
[b]Rate is expressed per 100,000 population.
[c]Non-Hispanic/Latino.
[d]Rates are not available due to the lack of overall population data for the multiple race/ethnic group or the unknown race/ethnic group.
[e]Rates could not be calculated for "Exposure" category due to the lack of population data for specific exposure groups.
[f]Heterosexual-all includes those individuals reporting heterosexual contact with a known HIV-positive or high risk individual and cases redistributed into the heterosexual classification from the "Unknown" risk group.
[g]IDU = injection drug use; MSM=men who report sex with men; MSM/IDU=men who report sex with men and injection drug use.
[h]Other risks include exposure to blood products (including adult hemophilia) and pediatric risk.
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Information about risk or exposure categories of HIV is very useful for disease prevention efforts focusing on behavior change. Successful behavior change reduces HIV transmission. Exposure categories (referred to by the CDC as modes of transmission) are determined using a presumed hierarchical order

of probability of potential risk factors as defined by the CDC.[13] If a person's exposure category was unknown (not identified or not reported), we redistributed those cases according to the distribution of reported risk in order to estimate exposure category and reclassify these cases. Reassigning these cases to an exposure category allows for a more complete picture of trends over time.

After reassigning the "unknown" risk of exposure group among persons living with HIV infection in North Carolina as of December 31, 2014, 47.5% were exposed through men who report having sex with men (MSM) activities, 38.7% through heterosexual contact, 9.2% through injection drug use practices (IDU), and 2.8% reported both MSM and IDU; these risks are considered to be equal and this category is referred to as MSM/IDU (Table 3).

Geographic Distribution of HIV Prevalence in North Carolina

Cases are assigned to the county of residence at first diagnosis. People may move to other areas in the years after diagnosis. Assuming no significant difference between the numbers of HIV infection 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. The HIV prevalence in North Carolina is presented by rural/urban areas, county rates, and regional networks of care and prevention (RNCPs).

The distribution of HIV infection is uneven across North Carolina. This uneven distribution can be partly explained by the population distribution, as the epidemic tends to be concentrated in urban areas. It is estimated that about 20.0 percent of people diagnosed with HIV infection in North Carolina were diagnosed in rural areas.

At the end of 2014, HIV prevalence in North Carolina was 286.9 per 100,000 population. The top 10 counties with the highest rate of HIV prevalence in 2014 were Edgecombe County (597.1 per 100,000 population), Durham County (542.7 per 100,000 population), Mecklenburg County (526.8 per 100,000 population), Lenoir County (448.0 per 100,000 population), Cumberland County (426.3 per 100,000 population), Guilford County (424.3 per 100,000 population), Washington County (421.6 per 100,000 population), Wilson County (418.9 per 100,000 population), Vance County (407.9 per 100,000 population), and Forsyth County (387.0 per 100,000 population). The highest rates of HIV prevalence in North Carolina at the end of 2014 were mainly in the eastern part of the state. In Figure 5, the darker purple color denotes rates greater than 300 per 100,000 population.

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[13]Centers for Disease Control and Prevention. *HIV Surveillance Report, 2014*; vol. 26. http://www.cdc.gov/hiv/library/reports/surveillance/. Published November 2015. Accessed March 4, 2016.

Figure 5. People Diagnosed and Living in North Carolina with HIV Infection* Rates by County of Diagnosis, as of 12/31/2014
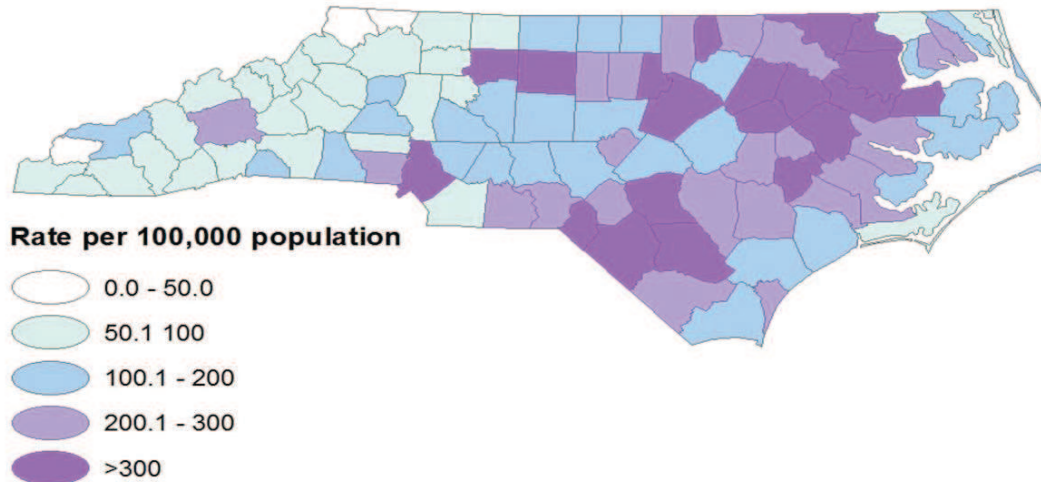
Rate per 100,000 population

- 0.0 – 50.0
- 50.1 100
- 100.1 – 200
- 200.1 – 300
- >300

*HIV infection includes all newly reported HIV infected individuals by the year of first diagnosis, regardless of the stage of infection (HIV or AIDS). Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Ninety-five counties in North Carolina are divided into 10 RNCPs, with the remaining five counties making up the Charlotte Transitional Grant Area (TGA). These areas ensure that HIV care, support, and prevention services are available in an integrated fashion to all individuals who qualify for the Ryan White Part B program, as well as to anyone at-risk for HIV/STD seeking screening services. Table 4 represents the overall HIV prevalence in North Carolina broken up HIV infection classification by these RNCPs, including the Charlotte TGA.

Table 4. People Diagnosed and Living in North Carolina with HIV Infection[a] as of 12/31/2014 by Regional Network of Care and Prevention

Regional Networks of Care and Prevention *(Counties)*	TOTAL
Charlotte-Transitional Grant Area (TGA) (*Anson, Cabarrus, Gaston, Mecklenburg, and Union*)	6,394
Region 1 (*Avery, Buncombe, Cherokee, Cleveland, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania, and Yancey*)	1,134
Region 2 (*Alexander, Alleghany, Ashe, Burke, Caldwell, Catawba, Lincoln, Watauga, and Wilkes*)	541
Region 3 (*Davidson, Davie, Forsyth, Iredell, Rowan, Stokes, Surry, and Yadkin*)	2,179
Region 4 (*Alamance, Caswell, Guilford, Montgomery, Randolph, Rockingham, and Stanly*)	3,008
Region 5 (*Bladen, Cumberland, Harnett, Hoke, Moore, Richmond, Robeson, Sampson, and Scotland*)	2,833
Region 6 (*Chatham, Durham, Franklin, Granville, Johnston, Lee, Orange, Person, Vance, Wake, and Warren*)	6,103
Region 7 (*Brunswick, Columbus, Duplin, New Hanover, Onslow, and Pender*)	1,411
Region 8 (*Edgecombe, Halifax, Nash, Northampton, and Wilson*)	1,182
Region 9 (*Bertie, Camden, Chowan, Currituck, Dare, Gates, Hertford, Hyde, Pasquotank, Perquimans, and Tyrrell*)	382
Region 10 (*Beaufort, Carteret, Craven, Greene, Jones, Lenoir, Martin, Pamlico, Pitt, Washington, and Wayne*)	1,802
Unassigned[b]	1,557
North Carolina	**28,526**

[a]All people living with HIV infection, regardless of the stage of infection (HIV or AIDS).
[b]Unassigned includes cases with unknown county of residence at diagnosis or cases that were diagnosed in long-term residence facilities, including prisons.
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Newly Diagnosed HIV in North Carolina

Note: The HIV infection case totals and rates discussed in this section (except for geographic distribution) are restricted to adults and adolescents only, for comparability across states and with national data reported by the CDC.

<u>Demographics</u>

Newly diagnosed HIV infections include all newly diagnosed HIV infections, regardless of the stage of infection (HIV or AIDS) reported to North Carolina in 2014. In 2014, 1,351 (13.6 per 100,000 population) individuals were newly diagnosed with HIV infection in North Carolina. Of the newly diagnosed people, 1,341 of them were over 13 years old, which makes the rate of newly diagnosed HIV infection among adults and adolescents 16.3 per 100,000 adult and adolescent population. The overall rate for newly diagnosed HIV infections among males in 2014 was 26.5 per 100,000 population, while the rate for females was 1.7 per 100,000 population.

Age Distribution

Diagnoses in adults and adolescents made up most 2014 HIV diagnoses, with 10 newly diagnosed infections in people younger than 13 years old. Overall, the majority of newly diagnosed HIV infections in 2014 were among the 20 to 24 years old (N=319; 44.9 per 100,000 population), 25 to 29 years old (N=228; 35.6 per 100,000 population), and 30 to 34 years old (N=162; 25.5 per 100,000 population) age groups. These three age groups account for over 50 percent of the newly diagnosed HIV infections in North Carolina in 2014.

Figure 6 displays the age differences between men and women newly diagnosed with HIV infection in 2014. The proportion of new diagnoses among men was highest between 20 through 29 years old (44.8%), while the proportion of new diagnoses among women was highest for 25 to 29 years old (13.7%) and 45 to 49 years old (13.0%). For the last few years, the largest proportion of newly diagnosed HIV infections among women occurred in the 40 to 49 year old age group, therefore we may be seeing an age shift in the epidemic among women. In recent years, new diagnoses of HIV infections have been increasing among younger men in North Carolina, unlike previous years when the HIV epidemic was primarily increasing among an older population. Young Black/African American men (13-24 years old) represented 19.8% of new cases in 2014 compared to 8.0% in 2004 and 13.0% in 2009 (Figure 6).

Figure 6. North Carolina Newly Diagnosed Adult and Adolescent HIV Infections* by Gender and Age, 2014
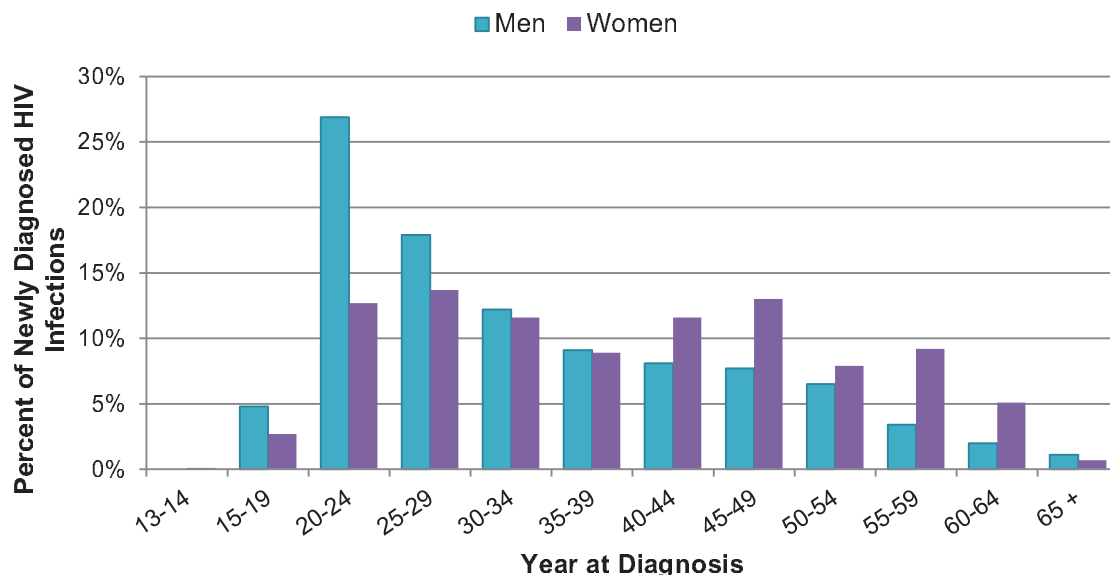
*HIV infection includes all newly reported HIV infected individuals diagnosed in 2014, regardless of stage of infection (HIV or AIDS).
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Race/Ethnicity

Among individuals newly diagnosed with HIV infection in 2014, the majority of cases were reported among men, specifically Black/African American men. Among the adult and adolescent newly diagnosed population in 2014, Black/African Americans made up the majority of cases (64.1%), followed by White/Caucasian (22.2%), Hispanic/Latinos (9.5%), multiple race (1.9%), Asian/Pacific Islander (1.4%), and American Indian/Alaska Native (0.9%).

HIV infection rates are related to poverty, as well as race/ethnicity. HIV rates are higher in low-income areas[14], and Black/African Americans and Hispanic/Latinos are more likely to live in these areas. The highest rate of newly diagnosed HIV cases was among Black/African American men (80.4 per 100,000 adult/adolescent population), over eight times that for White/Caucasian men (9.3 per 100,000 adult/adolescent population; see Figure 4). The newly diagnosed HIV infection rate among adult/adolescent Black/African American women (21.8 per 100,000 adult/adolescent population) was nearly 13 times the rate for adult/adolescent White/Caucasian women (1.7 per 100,000 adult/adolescent population), which represented the largest disparity noted between gender and race/ethnicity categories (Figure 4).

Disparities also existed for Hispanic/Latinos as compared to White/Caucasians. The rate for adult/adolescent Hispanic/Latino men (31.4 per 100,000 adult/adolescent population) was three times that for White/Caucasian men, and Hispanic/Latino males ranked third highest among the gender and race/ethnicity rates. The rate for adult/adolescent Hispanic/Latina women (8.1 per 100,000

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[14]Centers for Disease Control and Prevention. (2015). *Communities in Crisis: Is There a Generalized HIV Epidemic in Impoverished Urban Areas of the United States?* Accessed March 7, 2016. http://www.cdc.gov/hiv/group/poverty.html.

adult/adolescent population) was more than triple that for White/Caucasian women. Finally, the newly diagnosed HIV infection rate for American Indian/Alaska Native men (22.0 per 100,000 adult/adolescent population) and the rate among Asian/Pacific Islander men (16.0 per 100,000 adult/adolescent population) were higher than that for White/Caucasian men in 2014 (Figure 7).

Figure 7. North Carolina Newly Diagnosed Adult and Adolescent HIV Infection[a] Rates by Gender and Race/Ethnicity, 2010-2014
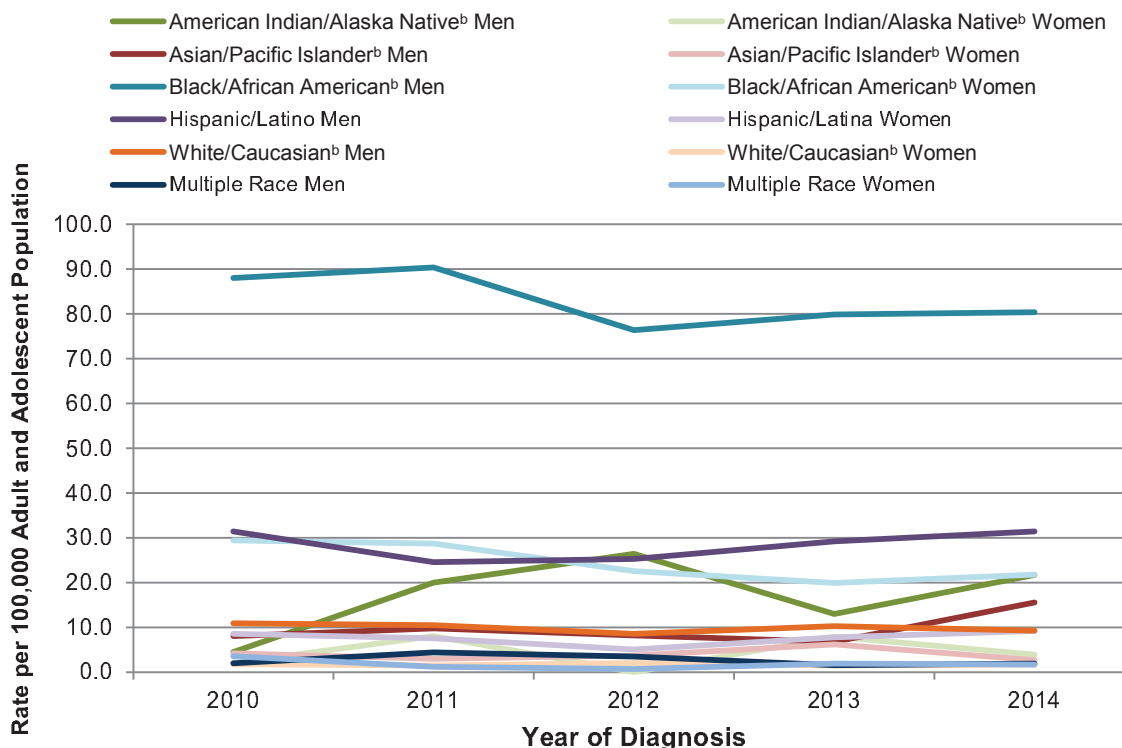
Note: Rates for unknown and other race/ethnicity categories are not calculated due to lack of population data.
[a]HIV infection includes all newly reported HIV infected individuals by the year of first diagnosis, regardless of the stage of infection (HIV or AIDS).
[b]Non-Hispanic/Latino.
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

## Women of Child-Bearing Age and Perinatal HIV Transmission

Perinatal transmission of HIV is generally preventable if mothers receive appropriate treatment during pregnancy and delivery. For this reason, special emphasis is placed on follow-up with HIV-infected pregnant women in North Carolina. In 2014, 179 women of child-bearing age (15 to 44 years old) were newly diagnosed with HIV in North Carolina (approximately 60% of total HIV cases among women).

Note that the number and proportion of HIV diagnoses among North Carolina infants has decreased in recent years, since the new HIV testing statutes were implemented in 2007, requiring every pregnant woman be offered at HIV test by her attending physician both at her first prenatal visit and in the third trimester (if no HIV result on record at delivery, the woman and infant should be tested at delivery).

Since 2008, there has been a very large decrease in perinatal HIV transmission reported to North Carolina. In 2014, there were no reported perinatal transmissions (Figur8=e 8).

Figure 8. Perinatal HIV Infections* Reported to North Carolina by Year of Birth, 2005-2014
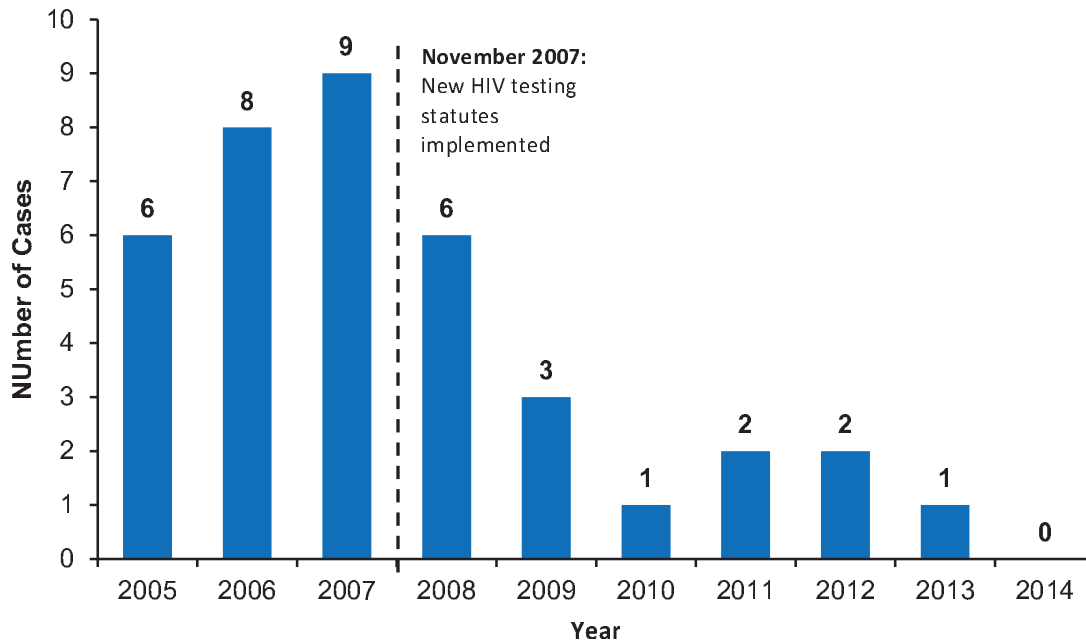
*HIV infection includes all newly reported HIV infections by year of first diagnosis.
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

_Hierarchical Risk of Exposure for HIV Infection_

As part of HIV surveillance activities, a great deal of importance is placed on determining the key HIV risk factors associated with each case. Interviewing the patient, their partners and the treating physician are all methods used to determine risk/exposure factors. Ultimately, each case is assigned to one primary risk category based on a hierarchy of disease exposure developed by the CDC and others. In this section like in the _HIV Prevalence_ section, all "unknown" risks have been redistributed to the overall newly diagnosed group. Therefore, all risks described include a proportion of the "unknown" risk group.

The majority of newly diagnosed HIV infections among adults and adolescents were likely exposed to HIV via sex, either homosexual or heterosexual. Over the period from 2010 to 2014, people classified as MSM and MSM/IDU exposures made up the largest proportion of newly diagnosed North Carolina HIV infections, increasing from 60.0% in 2010 to 68.1% in 2014. During this same time period, the proportion of people reporting heterosexual exposure decreased from 39.6% in 2010 to 27.8% in 2014. IDU exposure was reported by the smallest group (4.1% in 2014) and has not fluctuated drastically in the past five years. However, IDU remains an important mode of exposure for new HIV infection cases (Figure 9), and is of significant concern when considering new HCV transmission.

Differences exist in the reported exposures for men and women. For men, sex with men (MSM) was reported by for 83.8% of newly diagnosed with HIV among men in 2014; sex with women only was reported by 10.8% of the newly diagnosed; and IDU was reported by 2.3% (Figure 9). The proportion of diagnoses among men reporting sex with men has risen in recent years, from 75.6% in 2010 to 83.8% in 2014. The proportion of males reporting IDU has remained the same (around 3.0%) over the five-year time period.

Heterosexual contact was reported for 89.1 percent of newly diagnosed HIV women, while IDU was reported for 10.9 percent of women in North Carolina for 2014 (Figure 9). For women, the proportion of heterosexual contact reports has fluctuated between 89.1 and 94.8%, and proportion of IDU exposure varied randomly between 5.2 and 10.9% during the last five years.

Figure 9. North Carolina Newly Diagnosed HIV Infections[a] among Adults and Adolescents by Gender and Hierarchical Risk (Unknown[b] Risk Redistributed), 2014
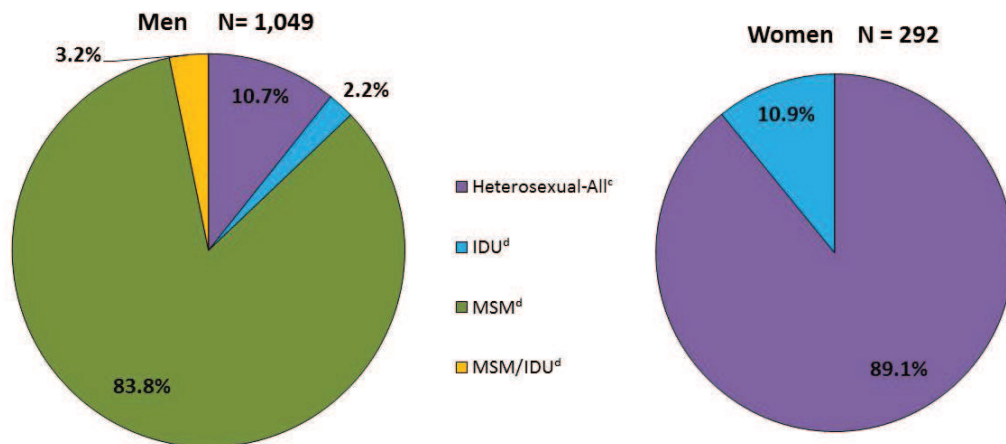
[a]HIV infection includes all newly reported HIV infected individuals by the date of first diagnosis, regardless of the stage of infection (HIV or AIDS).
[b]NIR = no identified risk; NRR = no reported risk. For distribution calculations, see "Appendix C: Technical Notes, HIV Risk of Exposure Categories and Distribution" for more information .
[c]Heterosexual-All includes those individuals reporting heterosexual contact with a known HIV-positive or high risk individual and cases redistributed into the heterosexual classification from the "Unknown" risk group.
[d]IDU = injection drug use; MSM = men who report sex with men.
Data Source: enhancedHIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Newly Diagnosed HIV Infections Diagnosed Late in North Carolina

Persons who are diagnosed with AIDS (Stage 3) within six months of the initial HIV-positive screening (concurrent diagnosis) are generally referred to as receiving a late diagnosis. Late diagnoses represent a significant proportion of new HIV diagnoses in North Carolina, indicating the continued 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 (ART) to remain healthy and to prevent opportunistic infections. Late testing also

results in missed opportunities for preventing new HIV infections, as research has shown that knowledge of positive HIV status promotes adoption of safer sex practices and ART adherence.[15]

In North Carolina, late diagnoses account for about one-quarter of all newly diagnosed HIV infections annually in the last five years. In 2014, 22.1% of all newly diagnosed HIV infections were diagnosed late, indicating that they had probably had HIV for at least five to seven years.[16] This is a decrease from 2010, where late diagnoses made up 26.0% of all newly diagnosed HIV infections. While the majority of late diagnoses occur among males, the rate of late diagnoses has been decreasing since 2005. The rate among females has steadily decreased from 2005 to 2010, but has remained stable over the past few years (Figure 10).

Figure 10. North Carolina Newly Diagnosed HIV and AIDS within Six Months (Late Diagnoses) Rates among Adult and Adolescents by Year of Diagnosis, 2005-2014
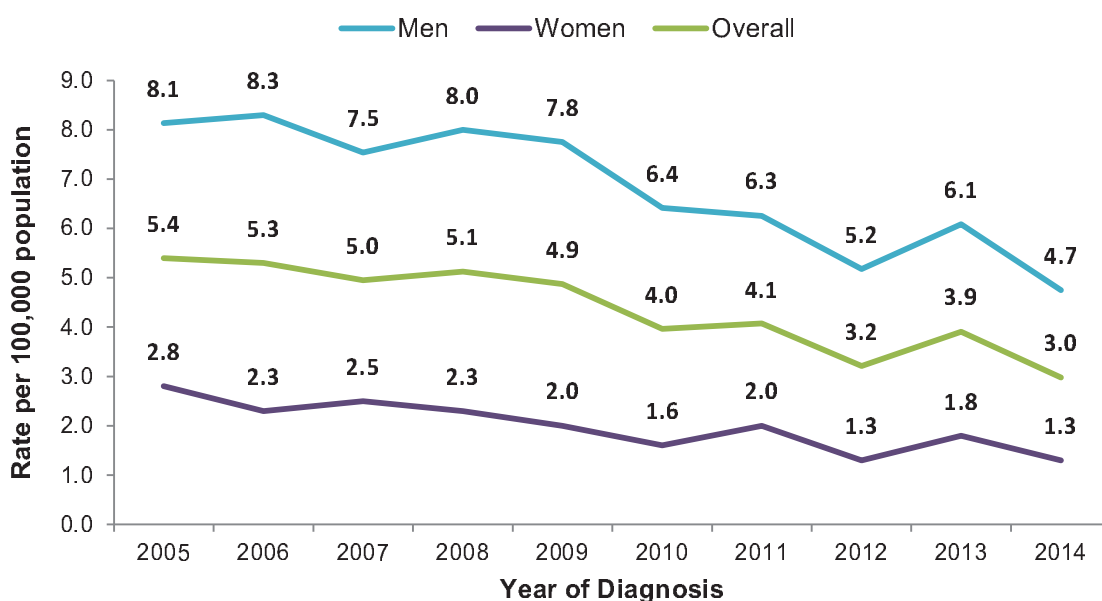
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Table 5 shows the demographics of individuals who were diagnosed late in their HIV infection from 2010 to 2014. The majority of late diagnoses were among men, people ages 45 to 49 years, Black/African Americans, and MSM. From 2011 to 2014, there was an increase of late diagnoses among Hispanic/Latinos, reflecting an increase in the Hispanic/Latino population across the state.

[15]Centers for Disease Control and Prevention. (2015). The role of STD detection and treatment in HIV prevention: CDC fact sheet. Accessed March 8, 2016. http://www.cdc.gov/std/hiv/stdfact-std-hiv-detailed.htm.

[16]Centers for Disease Control and Prevention. (2006). Revised recommendations for HIV testing of adults, adolescents, and pregnant female in health-care settings. *Morbidity and Mortality Weekly Report Recommendations and Reports. 55*(RR14), 1-17.

Table 5. North Carolina Newly Diagnosed HIV and AIDS within Six Months (Late Diagnoses) Rates among Adult and Adolescents by Selected Demographics and Year of Diagnosis, 2010-2014

Demographics	Year of Diagnosis														
	2010			2011			2012			2013			2014		
	Cases	%	Rate[a]	Cases	%	Rate[a]	Cases	%	Rate[a]	Cases	%	Rate[a]	Cases	%	Rate[a]
Gender															
Men	299	78.9	6.4	294	74.8	6.3	246	78.6	5.2	292	75.8	6.1	230	77.7	4.7
Women	80	21.1	1.6	99	25.2	2.0	67	21.4	1.3	93	24.2	1.8	66	22.3	1.3
Age at Diagnosis (Year)															
13-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-19	8	2.1	1.2	11	2.8	1.7	4	1.3	0.6	5	1.3	0.8	4	1.4	0.6
20-24	24	6.3	3.6	38	9.7	5.6	23	7.4	3.3	29	7.5	4.1	21	7.1	2.9
25-29	35	9.2	5.6	43	10.9	6.8	32	10.2	5.1	43	11.2	6.7	38	12.8	5.8
30-34	47	12.4	7.5	40	10.2	6.4	38	12.1	6.0	36	9.4	5.7	39	13.2	6.1
35-39	41	10.8	6.2	42	10.7	6.6	24	7.7	3.8	43	11.2	6.9	39	13.2	6.2
40-44	46	12.1	6.9	51	13.0	7.5	46	14.7	6.7	54	14.0	7.9	39	13.2	5.8
45-49	63	16.6	9.0	58	14.8	8.4	49	15.7	7.2	59	15.3	8.8	47	15.9	7.0
50-54	41	10.8	6.1	45	11.5	6.6	48	15.3	7.0	47	12.2	6.8	30	10.1	4.3
55-59	35	9.2	5.8	32	8.1	5.2	18	5.8	2.8	30	7.8	4.6	19	6.4	2.9
60-64	21	5.5	3.9	17	4.3	3.0	14	4.5	2.5	20	5.2	3.5	9	3.0	1.5
65 +	18	4.8	1.4	16	4.1	1.3	17	5.4	1.3	19	4.9	1.4	11	3.7	0.8
Race/Ethnicity															
American Indian/Alaska Native[b]	1	0.3	0.9	5	1.3	4.2	2	0.6	1.7	2	0.5	1.7	1	0.3	0.8
Asian/Pacific Islander[b]	3	0.8	1.3	1	0.3	0.4	1	0.3	0.4	4	1.0	1.5	3	1.1	1.1
Black/African American[b]	227	59.9	10.9	245	62.3	11.3	195	62.3	9.1	236	61.3	10.9	165	55.8	7.5
Hispanic/Latino	46	12.1	5.7	33	8.4	3.8	32	10.2	3.8	38	9.9	4.4	45	15.2	5.0
White/Caucasian[b]	95	25.1	1.5	91	23.2	1.4	74	23.6	1.2	97	25.2	1.5	76	25.7	1.2
Multiple Race[c]	7	1.9	--	18	4.6	--	9	2.9	--	8	2.1	--	6	2.0	--
Mode of Exposure[d]															
Heterosexual-high[e]	41	10.8	--	44	11.2	--	37	11.8	--	35	9.1	--	29	9.8	--
Heterosexual-other[f]	51	13.5	--	62	15.8	--	20	6.4	--	0	0.0	--	0	0.0	--
IDU[g]	13	3.4	--	13	3.3	--	8	2.6	--	11	2.9	--	10	3.4	--
MSM[g]	143	37.7	--	163	41.5	--	131	41.9	--	131	34.0	--	104	35.1	--
MSM/IDU[g]	5	1.3	--	0	0.0	--	2	0.7	--	4	1.0	--	2	0.7	--
Unknown[h]	126	33.3	--	111	28.2	--	115	36.7	--	204	53.0	--	151	51.1	--
Total	379	100.0	4.0	393	100.0	4.1	313	100.0	3.2	385	100.0	3.9	296	100.0	3.0

[a]Rates are presented per 100,000 population.
[b]Non-Hispanic/Latino.
[c]Rates are not available due to the lack of overall population data for the multiple race/ethnic group or the unknown race/ethnic group.
[d]Rates could not be calculated for the "Exposure" category due to the lack of population data for the specific exposure groups.
[e]Heterosexual-high risk is defined as a person who does not report IDU or MSM, but does report sexual contact with a partner of opposite sex, who is IDU, MSM, or known HIV-positive status. Also, if a person is a victim of sexual assault, exchanges sex for drugs/money, has had a recent STD or has sexual contact while using drugs, they are classified as high risk.
[f]Heterosexual-other is defined as individuals classified as people who reports sex with an opposite sex partner and does not report IDU, MSM, or any other potential "high risk" behaviors.
[g]IDU = injection drug use; MSM = men who report sex with men; MSM/IDU = men who report sex with men and injection drug use.
[h]Unknown risk is defined as individuals classified as no identified risk (NIR) and no reported risk (NRR) individuals.
Data Source: enhanced HIV/AIDS Reporting System (eHARS)(data as of June 25, 2015).
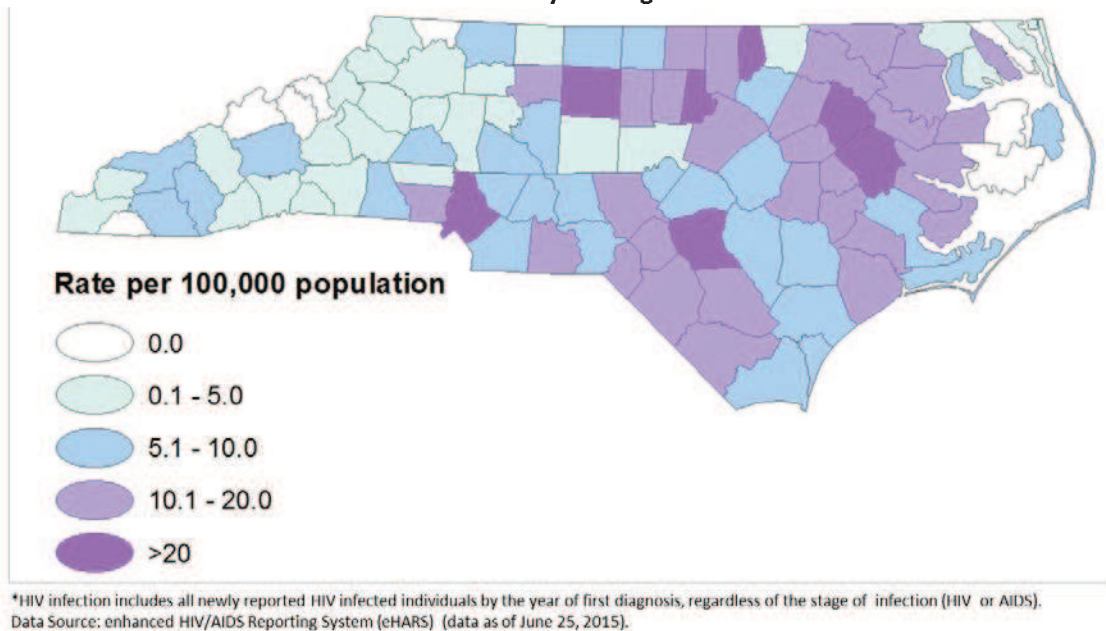
Late Diagnoses among Women

Since the rate of women who tested late for HIV has been stable over the last five years (compared to the rate among men, which is decreasing), further analysis was done to explore this population. The goal of this analysis was to identify populations of females that would benefit from targeted early diagnosis and linkage to care strategies. From 2010 to 2014, women diagnosed late were older (the mean age of female diagnosed late was 45 years old) and of minority race/ethnicity. Women reporting IDU and no known risk made up a higher proportion of women diagnosed late than those diagnosed earlier in infection from 2010 to 2014. The largest proportion of women diagnosed late were tested in an emergency department, hospital, or physician's office, and the majority of women diagnosed late were also diagnosed in urban areas. Nearly 60.0 percent of women diagnosed late were tested due to clinical symptoms consistent with AIDS-associated illnesses, and 4.0 percent were diagnosed during prenatal screening.

Because late diagnoses of HIV infection account for between 19.0 and 28.0 percent of all newly diagnosed HIV infections among females, there is a need for improved access to medical health care and public health efforts to identify infections earlier. Testing in both inpatient and outpatient settings should be emphasized, particularly among emergency departments. Efforts also need to be made to either revise or explore new prevention strategies that target women, particularly minorities, for earlier diagnosis and linkage to care efforts.

Geographic Distribution of Newly Diagnosed HIV Infections in North Carolina

Newly diagnosed HIV infections occurred in 91 of the 100 counties in North Carolina in 2014. The top five counties that had the highest three-year average rate of newly diagnosed HIV infections (2012 -2014) were Edgecombe (28.9 per 100,000 population), Mecklenburg (27.3 per 100,000 population), Durham (23.5 per 100,000 population), Vance (23.1 per 100,000 population), and Cumberland (21.9 per 100,000 population) (Figure 8). Rankings are not based on one-year rates because most counties have small numbers (generally less than 20 cases), making a single-year rate unreliable (Figure 11).

Figure 11. North Carolina Newly Diagnosed HIV Infection* Three-Year Average Rate (2012 to 2014) by County of Diagnosis

Rate per 100,000 population

- 0.0
- 0.1 - 5.0
- 5.1 - 10.0
- 10.1 - 20.0
- >20

*HIV infection includes all newly reported HIV infected individuals by the year of first diagnosis, regardless of the stage of infection (HIV or AIDS).
Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Like the HIV prevalence data, newly diagnosed HIV infection data is also presented by North Carolina's RNCPs, including Charlotte TGA. In 2014, the highest rates of newly diagnosed HIV infections were in Charlotte TGA, Regions 4, 5, 6, 8 and 10. Over the last five years, these same regions have had the highest newly diagnosed HIV infection rates in North Carolina (Table 6).

Table 6. North Carolina Newly Diagnosed HIV Infection* Rates by Regional Networks of Care and Prevention (RNCP) (County of Residence at Diagnosis) by Year of Diagnosis, 2010-2014

Regional Networks of Care and Prevention (Counties)	2010		2011		2012		2013		2014	
	Cases	Rate[b]	Cases	Rate[b]	Cases	Rate[b]	Cases	Rate[b]	Cases	Rate[b]
Charlotte-Transitional Grant Area (TGA) (*Anson, Cabarrus, Gaston, Mecklenburg, and Union*)	364	23.7	383	24.5	306	19.2	300	18.4	374	22.5
Region 1 (*Avery, Buncombe, Cherokee, Cleveland, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania, and Yancey*)	46	5.3	55	6.3	48	5.5	47	5.3	47	5.3
Region 2 (*Alexander, Alleghany, Ashe, Burke, Caldwell, Catawba, Lincoln, Watauga, and Wilkes*)	27	4.5	23	3.8	35	5.8	27	4.5	22	3.7
Region 3 (*Davidson, Davie, Forsyth, Iredell, Rowan, Stokes, Surry, and Yadkin*)	103	10.2	107	10.5	86	8.4	100	9.7	80	7.7
Region 4 (*Alamance, Caswell, Guilford, Montgomery, Randolph, Rockingham, and Stanly*)	151	15.3	173	17.4	132	13.2	153	15.2	144	14.2
Region 5 (*Bladen, Cumberland, Harnett, Hoke, Moore, Richmond, Robeson, Sampson, and Scotland*)	151	17.0	180	20	127	14.1	134	14.7	151	16.5
Region 6 (*Chatham, Durham, Franklin, Granville, Johnston, Lee, Orange, Person, Vance, Wake, and Warren*)	324	17.7	263	14.1	273	14.4	306	15.8	270	13.7
Region 7 (*Brunswick, Columbus, Duplin, New Hanover, Onslow, and Pender*)	63	9.5	58	8.7	66	9.8	53	7.7	65	9.3
Region 8 (*Edgecombe, Halifax, Nash, Northampton, and Wilson*)	63	20.3	70	22.6	64	20.8	46	15	62	20.4
Region 9 (*Bertie, Camden, Chowan, Currituck, Dare, Gates, Hertford, Hyde, Pasquotank, Perquimans, and Tyrrell*)	27	13.2	16	7.8	9	4.4	22	10.8	17	8.3
Region 10 (*Beaufort, Carteret, Craven, Greene, Jones, Lenoir, Martin, Pamlico, Pitt, Washington, and Wayne*)	76	11.7	85	12.9	83	12.6	100	15.2	92	14.0
Unassigned[c]	60	---	61	---	40	---	42	---	27	---
North Carolina	**1,455**	**15.2**	**1,474**	**15.3**	**1,269**	**13.0**	**1,330**	**13.5**	**1,351**	**13.6**

[a]HIV infection includes all newly diagnosed HIV infected individuals by the year of first diagnosis, regardless of stage of infection (HIV or AIDS).

[b]Rate is expressed per 100,000 population.

[c]Unassigned includes cases with unknown county of residence at diagnosis or cases that were diagnosed in long-term residence facilities, including prisons.

Data Source: enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Sexually Transmitted Diseases (STD) and Tuberculosis Co-infections with HIV in North Carolina

The North Carolina Division of Public Health has a fully integrated electronic disease surveillance system, North Carolina Electronic Disease Surveillance System (NC EDSS), which allows for the rapid identification of HIV-positive individuals experiencing or at risk for overlapping epidemics. Due to behaviors and environmental conditions that increase risk for multiple diseases, HIV-positive individuals are at increased risk for comorbid infections such as syphilis, gonorrhea, and tuberculosis (TB). Our measurement of co-infection is subject to imperfect reporting, and we measure co-infection differently for each disease, as detailed in the sections below.

Sexually Transmitted Diseases (STD) and HIV Infection

The North Carolina Communicable Disease Branch supports free and confidential testing for HIV and other sexually transmitted diseases (STD). Because of shared risk behaviors and modes of transmission, the Communicable Disease Branch mandates that all local health departments provide comprehensive on-site STD diagnostic and treatment services to all clients seeking STD services. This includes ensuring that clients are evaluated and screened for all possible STDs at the time of their clinic visit. For example, clients who present to the clinic requesting HIV testing will also be evaluated and offered testing for other related STDs such as syphilis, gonorrhea, and chlamydia.

Syphilis and HIV

In mid-2014, the Communicable Disease Branch noticed a jump in early syphilis (primary, secondary, and early latent syphilis) infections diagnosed in North Carolina. At the end of 2014, there were a total of 1,113 newly diagnosed early syphilis infections (rate: 11.2 per 100,000 population) in North Carolina, a 61.8 percent increase from 2013 (N=688; rate: 7.0 per 100,000 population). We define early syphilis co-infection with HIV as having an HIV diagnosis prior to or within 30 days of the syphilis diagnosis. Of the 1,113 diagnosed early syphilis infections, 483 (43.4%) were co-infected with HIV, compared to the 272 (39.5%) co-infections in 2013. Of the 483 people with co-infected with early syphilis and HIV, 424 were diagnosed with HIV before their syphilis diagnosis, while 59 were diagnosed with HIV at the same time or within 30 days of their syphilis diagnosis.

The proportion of people co-infected with early syphilis and HIV has been increasing since 2003, with the largest increase occurring among men. Early syphilis co-infections with HIV among men increased from 25.2% in 2004 to 48.3% in 2014. While the proportion of women co-infected with HIV has remained low, it has increased from 2.4% in 2010 to 4.6% in 2014 (Figure 12).

Figure 12. Newly Diagnosed Early Syphilis (Primary, Secondary, and Early Latent Syphilis) Co-Infections with HIV* by Gender, 1999-2014
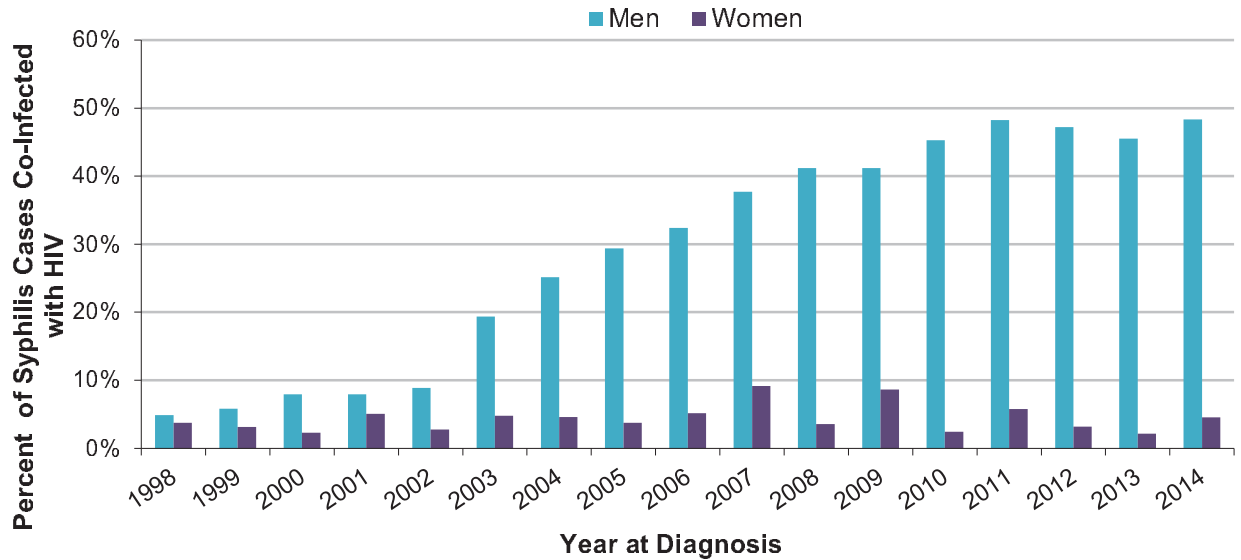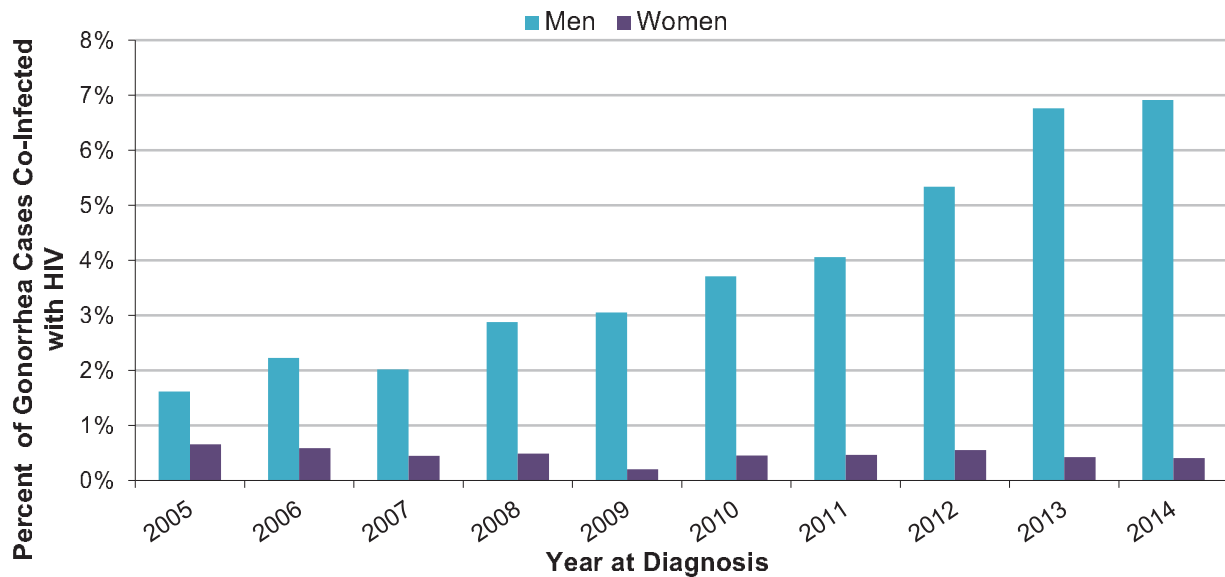

*HIV diagnosed prior to OR within 30 days of syphilis diagnosis.
Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of July 6, 2015) and enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Gonorrhea and HIV

While gonorrhea cases have not seen as dramatic an increase as syphilis, the number of newly diagnosed gonorrhea infections did increase from 14,114 (rate: 140.9 per 100,000 population) in 2013 to 14,952 (rate: 150.4 per 100,000 population) in 2014. In 2010, the overall proportion of newly diagnosed gonorrhea co-infections with HIV (HIV diagnosis prior to or within 30 days of the gonorrhea diagnosis) was less than 2.0%. In 2014, the proportion was 3.4%. The majority of newly diagnosed gonorrhea co-infections occur among males. In 2014, 6.9% of all men newly diagnosed gonorrhea were co-infected with HIV, while 0.4% of women had gonorrhea and HIV co-infection (Figure 13).

Figure 13. Newly Diagnosed Gonorrhea Co-Infections with HIV* by Gender, 2005-2014

*HIV diagnosed prior to OR within 30 days of gonorrhea diagnosis.
Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of July 6, 2015) and enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Tuberculosis (TB) and HIV Infection

While tuberculosis (TB) disease is preventable and in most cases curable, it maintains a grim historical notoriety as one of the leading infectious causes of death in North Carolina. In 1980, North Carolina was ranked third in the nation for TB case rates. Since that time the number of new TB cases has declined. The number of newly diagnosed TB cases in North Carolina decreased 49 percent between 2004 and 2014, dropping from 380 cases to 195 cases. While the number of TB cases reported annually in the US steadily decreased for 20 years, TB rates have decreased more quickly in North Carolina than in the nation as a whole. As of 2014, North Carolina ranks 27th in the nation for TB case rates.[17]

An individual with TB is considered to have co-infection with HIV if they have an HIV diagnosis prior to, or have an HIV-positive test at time of, the TB diagnosis. Figure 14 shows the number and percentage of North Carolina TB cases reported between 2004 and 2014 that were known to have TB/HIV comorbidity. In 2014, a total of eight (4%) TB cases were co-infected with HIV (Figure 14). Of the eight 2014 TB cases with HIV co-infection, exactly half were male, seven were Black/African American, six were US-born, and the average age was 47 years old (range: 39 – 57 years).

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[17]Centers for Disease Control and Prevention. (2015). Reported Tuberculosis in the United States, 2014. Atlanta, GA: US Department of Health and Human Services. http://www.cdc.gov/tb/statistics/reports/2014/pdfs/tb-surveillance-2014-report.pdf.

Figure 14. Reported Cases of Tuberculosis Disease in North Carolina with HIV Co-Infection*, by Year, 2004-2014
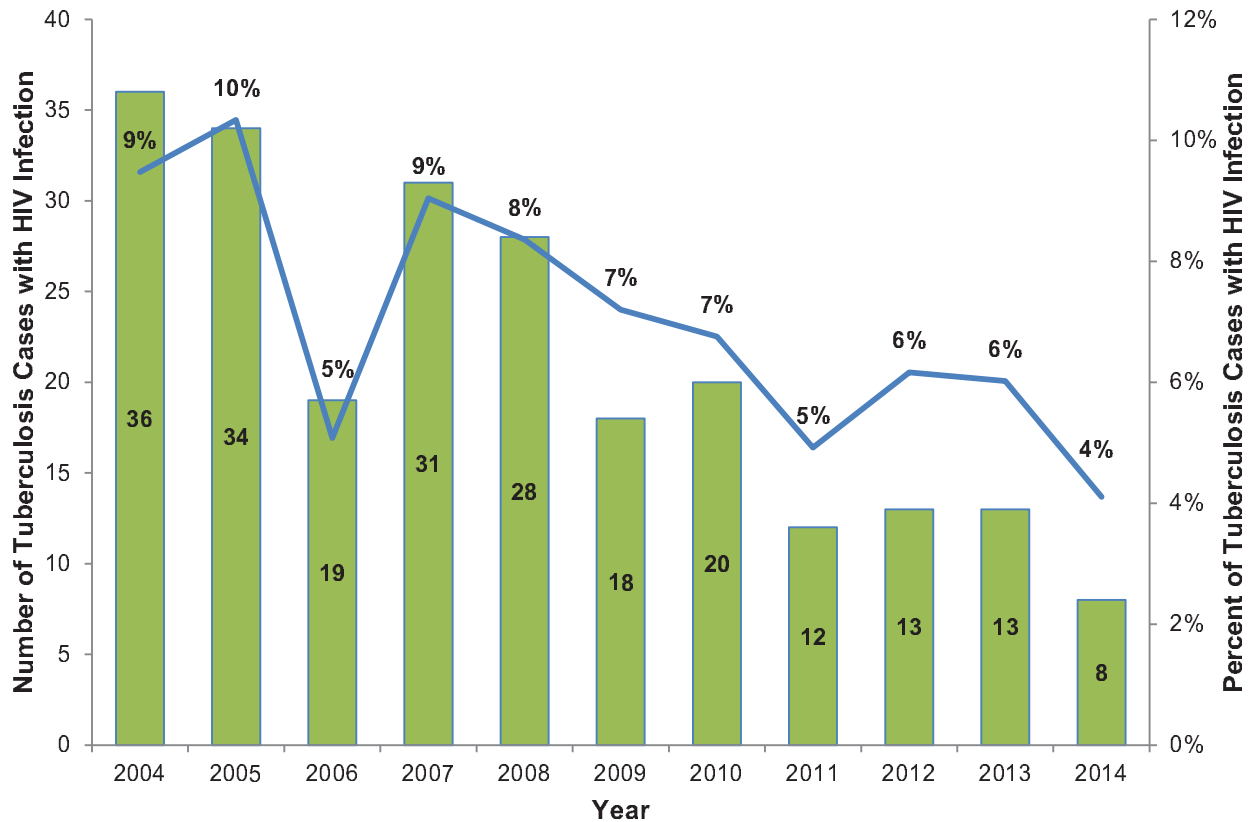
*Co-infection is defined as having an HIV diagnosis prior to or having an HIV-positive test at time of the TB diagnosis. Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS), updated June 2016.

Medical Monitoring Project: People with HIV in Care in North Carolina

The Medical Monitoring Project (MMP) is an ongoing locally and nationally representative supplemental surveillance system, supported by the CDC. MMP collects data on a representative sample of HIV-diagnosed adults who are in care in the United States. MMP also monitors sociodemographics, behavioral and clinical characteristics, supportive service needs, use of healthcare and prevention services, and adherence to clinical care guidelines among HIV-diagnosed persons. The project describes "met and unmet needs" for HIV care and prevention services. For more MMP program information, visit: http://www.cdc.gov/hiv/statistics/systems/mmp/.

Locally, North Carolina MMP also functions as a secondary evaluation tool to ensure that physicians, medical facilities, and applicable laboratories continue to report HIV-positive cases and HIV-related lab results. North Carolina MMP ensures that the randomly selected patients are documented in our HIV surveillance systems. MMP data are a valuable addition to eHARS, providing information on those in

care on socioeconomic factors, such as income, health insurance, education, and housing status that are not captured in standard surveillance data. While these data are representative of North Carolina HIV-infected people in care, there are some differences between the MMP participants and our general HIV population from surveillance data. The largest difference is that less than 37.4% of MMP participants were MSM, while our surveillance data shows that 52.0% of our population (crude numbers, not redistributed risk estimates) of people living and diagnosed with HIV were classified as MSM. In this section, we make the assumption that our MMP sample represents people receiving care for HIV in North Carolina.

Socioeconomic Data, 2009-2013

These data are presented as weighted percentage estimates for the state. From 2009 to 2013, the majority of people in care had more than high school education (54.6%) and had not been homeless in the past 12 months (92.4%). The majority of people in care had not been in jail in the past 12 months. People in care in North Carolina had an annual household income of less than $20,000 (62.5%), and 45.5% of participants were at or below the poverty level (Table 7). None of these socioeconomic variables had changed significantly from year to year during the five years.

Table 7. Socioeconomic Information for People in Care in North Carolina, 2009-2013

Variable	%*	95% Confidence Interval	
Education			
Less than High School	18.7	15.4	22.0
High School diploma or equivalent	26.7	21.5	31.9
More than High School	54.6	48.6	60.6
Homeless[a] at any time in the past 12 months			
Yes	7.6	5.6	9.7
No	90.3	90.3	94.4
Incarcerated for longer than 24 hours in the past 12 months			
Yes	5.6	4.3	6.9
No	94.4	93.1	95.7
Combined yearly household income from all sources before taxes last calendar year (dollars)			
$0 - $19,000	62.6	57.7	67.4
$20,000 - $39,000	21.3	18.6	24.1
$40,000 - $74,999	11.1	8.3	14.0
$75,000 or more	5.0	3.2	6.8
Poverty guidelines[b]			
Above poverty level	54.5	50.0	58.9
At or below the poverty level	45.5	41.1	49.8

*Weighted percentages for 2009-2013 data.
[a]Living on the street, in a shelter, in a single-room-occupancy hotel, or in a car.

Almost everyone in HIV care had some sort of health insurance coverage (including Ryan White and AIDS Drug Assistance Program (ADAP) assistance). When looking at primary insurance (some noted having more than one source of insurance), 26.5% had Medicare, 24.4% had private insurance, 21.5% had Medicaid, 22.5% were Ryan White participants, 4.3% had no insurance, 0.3 % had other insurance, 0.3% had TRICARE, 0.1% were ADAP participants, and 0.1% had other public funds for insurance coverage. A trend analysis was conducted to determine if any changes from year to year had occurred with health insurance coverage. There was only one significant change. People in care who were also part of the Ryan White program had a significant increase from year to year, meaning with each year, more people in HIV care were also participants with Ryan White (from 15% in 2009 to 20% in 2013).

Met and Unmet Need for People in Care in North Carolina, 2009 -2013

During the interview, MMP participants are asked about care services. There are three categories: received the service, needed but did not receive the service, and did not use or did not need the service. Figure 15 shows the proportion of people receiving and needing select care services, which include dental services, HIV case management, ADAP, HIV prevention education, transportation assistance, drug and alcohol counseling or treatment, and home health services. The services with the smallest "needed but did not receive" (small orange section) were HIV case management, HIV prevention education, ADAP, adherence services, and drug and alcohol counseling or treatment (Figure 15). The five largest "needed but did not receive" (large orange section) are highlighted in the grey box in Figure 15. Dental services is the largest unmet need care service among people in care in North Carolina.

Figure 15. Met and Unmet Needs for Care Services for People in Care in North Carolina, 2009-2013
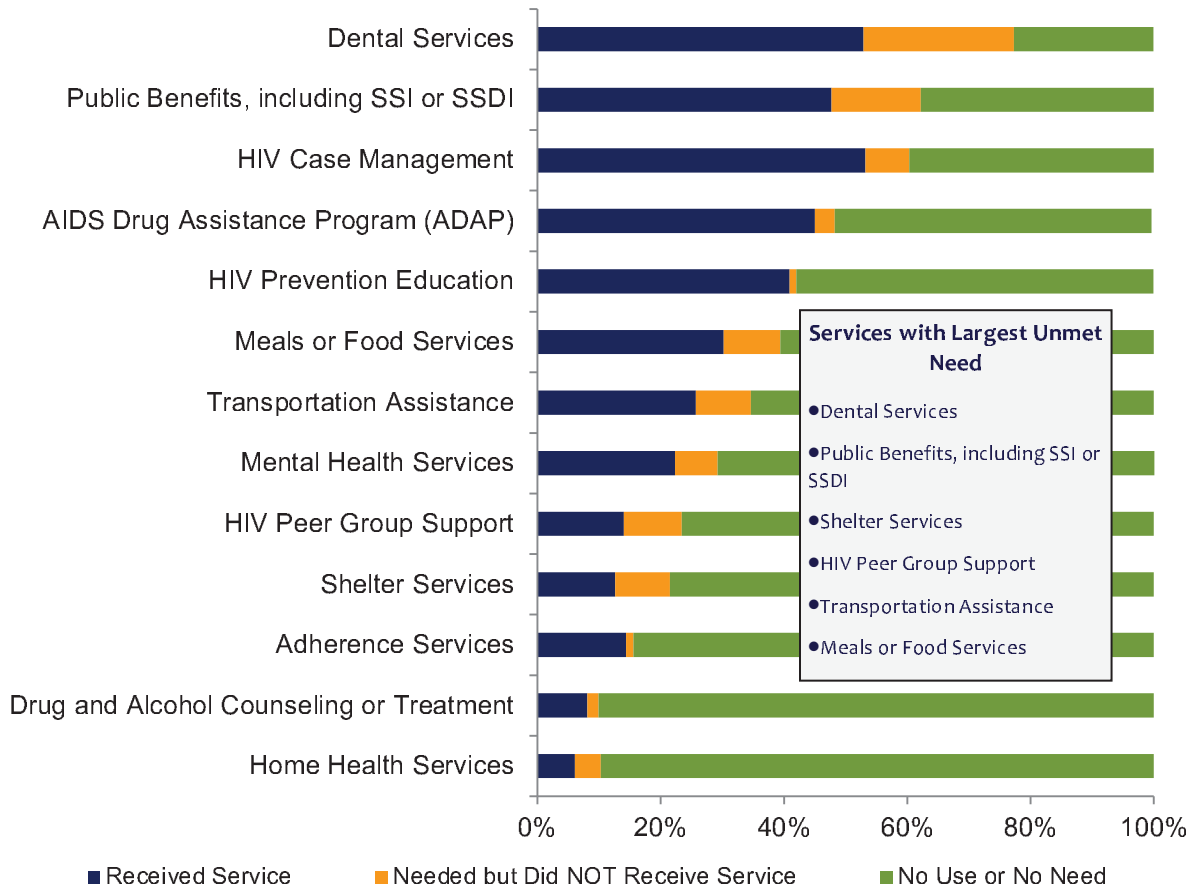
Data Source: 2009-2013 Weighted North Carolina MMMP data (data as of September 25, 2015).

Survival and HIV-Related Deaths in North Carolina

Survival

Advances in treatment of HIV with ARTs have been associated with a major increase in life expectancy for people diagnosed with HIV infection. From a recent study following a United States cohort from 1996 to 2011, the average life expectancy after HIV diagnosis increased from 19 to 53 years post-infection.[18] Individuals diagnosed with AIDS (Stage 3) have also experienced increases in life expectancy; among

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[18] Marcus J., Chao, C. Leyden, W., Xu, L., Quesenberry, C.P., Klein, D.B., Towner, W.J., Horberg, M.A., &Silverberg, M.J. (2016). *Narrowing the gap in life expectancy for HIV+ compared with HIV- individuals.* CROI 2016, February 22-25, 2016. Boston, MA . Abstract#54.

individuals diagnosed with AIDS (Stage 3) within six months of their initial HIV diagnosis, the average survival time nearly quadrupled from 1996 to 2005 (5.5 years in 1996 to 19.4 years in 2005).[19]

In North Carolina, survival (the estimated proportion of persons surviving a given length of time after diagnosis) was highest for those diagnosed with HIV infection in 2011 (determined by those living greater than 36 months after diagnosis), although year-to-year differences were small (Table 6). Survival was longest for people under 13 years old and 13 to 24 years old. Survival was lowest among American Indian/Alaska Natives. Among men, survival was greater among MSM and lowest among people with unknown risk. For women, survival was greatest among those exposed through heterosexual contact and lowest through IDU exposure (Table 8).

Table 8. Survival for More than 12, 24, and 36 Months after Initial HIV Diagnosis, 2007-2011

Demographics	Number of People	Percent Survived			
		<=12 months	>12 months	>24 months	>36 months
Year of HIV Diagnosis					
2007	1,823	96.3	94.7	93.3	93.1
2008	1,826	95.0	93.6	92.2	92.2
2009	1,633	95.7	94.7	93.7	93.7
2010	1,465	96.2	94.9	93.7	93.7
2011	1,473	96.1	95.0	94.4	94.4
Age at Diagnosis (Year)					
less than 13	44	100.0	100.0	100.0	100.0
13-24	1,656	99.6	99.4	99.3	99.3
25-44	3,948	97.5	96.5	95.6	95.6
45-64	2,421	92.0	89.5	87.6	87.7
65 and older	151	73.5	68.2	61.6	61.6
Race/Ethnicity					
American Indian/Alaska Native[a]	42	95.2	90.5	90.5	90.5
Asian/Pacific Islander[a]	50	100.0	96.0	94.0	94.0
Black/African American[a]	5,270	95.7	94.3	93.2	93.2
Hispanic/Latino	652	96.3	95.4	94.8	94.8
White/Caucasian[a]	2,000	96.0	94.7	93.3	93.3
Multiple Race	206	97.6	97.1	95.6	95.6
Men Hierarchical Risk of Exposure					
Heterosexual-high risk[b]	426	95.5	93.7	91.1	91.1
Heterosexual-other[c]	603	97.3	96.2	94.7	94.7
IDU[d]	150	92.0	90.0	88.0	88.0
MSM[d]	3,514	98.4	97.7	97.0	97.0
MSM/IDU[d]	150	98.7	97.3	97.3	95.0
Unknown[e]	1,302	89.6	87.3	86.0	86.0
Other Risks[f]	28	100.0	100.0	100.0	100.0
Women Hierarchical Risk of Exposure					
Heterosexual-high risk[b]	623	97.4	96.1	94.5	94.5
Heterosexual-other[c]	543	99.1	97.8	97.4	97.4
IDU[c]	88	96.6	92.0	87.5	87.5
Unknown[e]	842	90.9	89.2	87.9	87.9
Other Risks[f]	21	100.0	100.0	100.0	100.0
Total	**8,220**	**95.9**	**94.5**	**93.4**	**93.4**

[a]Non-Hispanic/Latino.

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[19]Centers for Disease Control and Prevention. (2006). Missed opportunities for earlier diagnosis of HIV infection-South Carolina, 1997-2005. *Morbidity and Mortality Weekly Report*. *55*(47), 1269-1272.

- o 12.7% (9.7% of women and 15.7% of men) ever used marijuana;
- o 2.4% (1.7% of women and 3.1% of men) ever used any form of cocaine;
- o 5.1% (3.3% of women and 6.8% of men) ever took prescription drugs without a prescription;
- o 6.1% (4.7% of women and 7.6% of men) currently smoked cigarettes;
- o 11.4% (6.8% of women and 16.0% of men) have ever had sexual intercourse; and
- o 32.9% (36.3% of women and 29.6% of men) were never taught in school about HIV or AIDS.

- For High School students:
  - o 32.2% (32.4% of women and 31.8% of men) currently drank alcohol;
  - o 14.6% (12.2% of women and 17.1% of men) were binge drinkers;
  - o 23.2% (19.5% of women and 26.5% of men) currently use marijuana;
  - o 4.9% (2.5% of women and 7.4% of men) ever used cocaine;
  - o 17.2% (16.4% of women and 17.8% of men) ever took prescription drugs without a prescription;
  - o 15.0% (11.8% of women and 18.0% of men) currently smoked cigarettes;
  - o 47.3% (45.4% of women and 49.2% of men) ever had sexual intercourse;
  - o 39.2% (47.4% of women and 30.6% of men) did not use a condom at last sexual intercourse; and
  - o 21.2% (18.2% of women and 24.1% of men) drank alcohol or used drugs before last sexual intercourse.

Indicators of Risk among HIV-Positive Population

Medical Monitoring Project (MMP)

In a previous section, sociodemographic and care service information collected through MMP were presented. Additional information about the North Carolina MMP participants can be useful in understanding the overall population in North Carolina infected with HIV, specifically information about sexual behavior, STD screening, dose adherence, and other behavioral outcomes.

The 2009 to 2013 weighted data shows that people in care in North Carolina were the following:

- 59.3% were heterosexual;
- 37.4% were men who reported sex with other men;
- 13.1% reported unprotected sex;
- 48.4% of those sexually active were screened for syphilis;
- 16.2% of those sexually active were screened for gonorrhea;
- 16.2% of those sexually active were screened for chlamydia;
- 39.5% of those sexually active received HIV prevention education from a health care professional;

(North Carolina SLPH), rapid HIV tests conducted by health departments and CBOs, and tests conducted through the expanded testing program in emergency departments and community health centers. Some duplication of the number of persons tested is inevitable because an individual may be tested multiple times throughout the year, and therefore counted more than one time.

Of the 969 positive tests, 488 newly identified cases of HIV (not previously reported to the North Carolina HIV surveillance program). During this same time period, there were 1,351 new HIV cases reported to the North Carolina Department of Health and Human Services. That is, 36.1% of all new cases reported to surveillance in 2014 were identified through conventional HIV tests performed at the North Carolina SLPH.

Of the 208,373 conventional HIV tests performed at the North Carolina SLPH, 136,131 (65.3%) people tested were women, 71,211 (34.2%) were men, and 64 were transgender (0.03%). The remaining 967 (0.5%) had no information on gender. The positivity rate of new HIV cases was higher for men compared to women (1.1% versus 0.1%). Since a majority of the women were tested in family planning/OB clinics (45.1%) as part of their routine or prenatal healthcare, they represented a lower risk group than the men who were tested. Most of the men were tested in an STD clinic (49.5%) or in jail/prison (22.4%) and represented a population at higher risk for HIV (Table 7).

The highest positivity rate for those newly positive was among men younger than 25 years of age, Black/African American males, and men who report MSM. The highest positivity rate of new HIV cases (6.1%) was observed among the tests conducted through Disease Intervention Specialist (DIS) field visits. These tests were done by state or county DIS as part of partner notification, counseling, and referral services. This high positivity rate is expected because DIS test partners and other contacts of people with HIV or syphilis. HIV positivity rates were also elevated for those tested in HIV counseling and testing sites (57 new positives, 1.4% positivity). Most of the new cases identified were tested in STD clinics (278 new positives), in outreach testing (11 new positives), in HIV counseling and testing sites (57 new positives), and in jails/prisons (32 new positives) (Table 9).

Table 9. North Carolina HIV Testing Positivity Rates by Selected Demographics and Testing Site, 2014

Variable	Men			Women			Total[a]		
	Tested	Positive (%)	New Positive (%)	Tested	Positive (%)	New Positive (%)	Tested	Positive (%)	New Positive (%)
Age (Year)									
Less than 25	25,442	270 (1.1)	178 (0.7)	57,165	25 (0.05)	17 (0.03)	83,069	301 (0.4)	196 (0.2)
25 and older	45,741	501 (1.1)	230 (0.5)	78,894	154 (0.2)	52 (0.07)	125,200	668 (0.5)	292 (0.2)
Missing Age	28	0	0	72	3 (0.2)	0	104	0	0
Total	**71,211**	**771 (1.1)**	**408 (0.6)**	**136,131**	**182 (0.1)**	**69 (0.05)**	**208,373**	**969 (0.5)**	**488 (0.2)**
Race/Ethnicity									
Black/African American[b]	39,347	535 (1.4)	275 (0.7)	59,990	123 (0.2)	46 (0.08)	99,713	668 (0.7)	327 (0.3)
Hispanic/Latino	6,657	56 (0.8)	38 (0.6)	28,626	8 (0.03)	4 (0.01)	35,344	65 (0.2)	42 (0.1)
White/Caucasian[b]	18,871	116 (0.6)	65 (0.3)	37,448	27 (0.07)	12 (0.03)	56,420	143 (0.3)	77 (0.1)
Other Races	2,371	15 (0.6)	7 (0.3)	3,160	6 (0.2)	2 (0.06)	5,549	21 (0.4)	9 (0.2)
Missing Race	3,965	49 (1.2)	23 (0.6)	6,907	18 (0.3)	5 (0.07)	1,1347	72 (0.6)	33 (0.2)
Total	**71,211**	**771 (1.1)**	**408 (0.6)**	**136,131**	**182 (0.1)**	**69 (0.05)**	**208,373**	**969 (0.5)**	**488 (0.2)**
Risk of Exposure									
Heterosexual[c]	43,934	189 (0.4)	82 (0.2)	100,821	121 (0.1)	45 (0.04)	144,765	310 (0.2)	127 (0.1)
IDU[d]	1,639	6 (0.4)	2 (0.1)	1,201	6 (0.5)	2 (0.2)	2,841	12 (0.4)	4 (0.1)
MSM[d]	6,129	384 (6.3)	234 (3.8)	--	--	--	6,158	389 (6.3)	237 (3.9)
MSM/IDU[d]	107	8 (7.5)	4 (3.7)	--	--	--	108	8 (7.4)	4 (3.7)
Other Risk	2,442	33 (1.4)	9 (0.4)	3,345	16 (0.5)	5 (0.2)	6,359	57 (0.9)	20 (0.3)
Missing Risk	16,960	151 (0.9)	77 (0.5)	30,764	39 (0.1)	17 (0.06)	48,142	193 (0.4)	96 (0.2)
Total	**71,211**	**771 (1.1)**	**408 (0.6)**	**136,131**	**182 (0.1)**	**69 (0.05)**	**208,373**	**969 (0.5)**	**488 (0.2)**
Testing Site									
HIV CTS[e]	2,277	88 (3.9)	55 (2.4)	1,606	11 (0.7)	1 (0.06)	3,957	101 (2.6)	57 (1.4)
STD[e] Clinic	35,268	381 (1.1)	241 (0.7)	48,276	69 (0.1)	33 (0.07)	83,927	455 (0.5)	278 (0.3)
Family Planning/OB[e]	271	0	0	61,396	18 (0.03)	9 (0.01)	61,671	18 (0.03)	9 (0.01)
TB[e] Clinic	893	3 (0.3)	2 (0.2)	981	2 (0.2)	2 (0.2)	1,881	5 (0.3)	4 (0.21)
Jail Screening	16,004	105 (0.7)	28 (0.2)	3,386	19 (0.6)	4 (0.1)	19,559	125 (0.6)	32 (0.2)
Drug Treatment	2,499	20 (0.8)	6 (0.2)	1,431	11 (0.8)	1 (0.07)	3,955	32 (0.8)	7 (0.2)
CHCs[e]	2,491	9 (0.4)	6 (0.2)	3,418	2 (0.06)	2 (0.06)	5,945	11 (0.2)	8 (0.1)
Outreach	1,959	12 (0.6)	8 (0.4)	3,084	18 (0.3)	2 (0.06)	5,197	20 (0.9)	11 (0.2)
DIS Field Visit	186	37 (19.9)	14 (7.5)	71	6 (8.5)	1 (1.4)	261	44 (16.9)	16 (6.1)
Other	7,134	97 (1.4)	40 (0.6)	6,739	26 (0.4)	6 (0.09)	13,988	128 (0.9)	50 (0.4)
Missing Site	2,229	19 (0.9)	8 (0.4)	5,743	11 (0.2)	45 (0.04)	8,032	30 (0.4)	16 (0.2)
Total	**71,211**	**771 (1.1)**	**408 (0.6)**	**136,131**	**182 (0.1)**	**69 (0.05)**	**208,373**	**969 (0.5)**	**488 (0.2)**

[a]Total includes 64 tests from individuals who identify as transgender, and 967 tests that had missing gender information.
[b]Non-Hispanic/Latino.
[c]Heterosexual is defined as a person who does not report IDU or MSM, but does report sexual contact with a partner of opposite sex, who is IDU, MSM, or known HIV-positive status. Also, if a person is a victim of sexual assault, exchanges sex for drugs/money, has had a recent STD or has sexual contact while using drugs, they are classified as heterosexual. Heterosexual is also defined as a person who reports sex with an opposite sex partner and does not report IDU, MSM, or any other potential high risk behaviors.
[d]IDU = injection drug use; MSM = men who report sex with men; MSM/IDU = men who report sex with men and injection drug use.
[e]Abbreviations: CTS = counseling and testing services; STD = sexually transmitted diseases; OB = obstetrics; TB = tuberculosis; CHC = community health center.
Data Source: North Carolina Division of Public Health supported HIV testing data (conventional tests performed by North Carolina State Laboratory of Public Health) (data as of February 27, 2015).

Table 10 compares demographic distributions for the Ryan White Part A (Charlotte TGA-five counties in North Carolina and one county in South Carolina), Ryan White Part B base program (95 counties in North Carolina), and the AIDS Drug Assistance Program (ADAP) program enrollees, to the people living with HIV in North Carolina as of December 31, 2014. Looking at the demographic breakdown of people enrolled in each program, the proportion of people enrolled does match the overall proportion of people living and diagnosed with HIV living in North Carolina. Therefore, the populations with more people living with HIV are enrolling in programs aimed to help people with HIV services, including care and treatment.

Table 10. Proportion of North Carolina Ryan White Part A and Part B Clients, ADAP clients, and People Diagnosed with HIV and Living in North Carolina, 2014

Demographics	Ryan White Part A Clients N=2,464	Ryan White Part B Clients N=8,682	ADAP Enrollees[c] N=7,341	People Living with HIV Infection N=28,526
Gender				
Men	72.9%	69.1%	72.4%	71.5%
Women	26.1%	30.1%	27.0%	28.5%
Transgender[a]	1.0%	0.8%	0.6%	--
Race/Ethnicity				
American Indian/Alaska Native[b]	0.5%	0.8%	0.8%	0.7%
Asian/Pacific Islander[b]	0.9%	0.4%	0.2%	0.6%
Black/African American[b]	71.5%	64.0%	63.7%	64.8%
Hispanic/Latino	8.0%	6.5%	7.7%	6.5%
White/Caucasian[b]	18.1%	25.9%	25.9%	25.2%
Multiple Race	1.0%	1.0%	0.3%	2.0%
Unknown	0.0%	1.2%	1.7%	0.1%
Age Group (Year)				
Less than 13	0.0%	0.8%	0.0%	0.3%
13-24	8.2%	5.7%	4.9%	4.7%
25-44	46.2%	38.3%	43.4%	38.0%
45-64	43.3%	51.2%	47.4%	51.8%
65 and older	2.3%	4.0%	4.3%	5.2%

[a]Transgender available for Ryan White Part B and ADAP data only; not recorded for persons living with HIV infection.
[b]Non-Hispanic/Latino.
[c]Includes clients in the ADAP Pharmacy Program (APP) and State Pharmaceutical Assistance Program (SPAP)

Data Sources: CAREWare (Ryan White Part A, Part B clients) (data from January 1, 2014 to December 31, 2015), ADAP (Cross Section from September 30, 2014), and enhanced HIV/AIDS Reporting System (eHARS) (data as of June 25, 2015).

Risk Factors Based on Surveillance Data from Other Diseases

STD, Tuberculosis, and Hepatitis C Surveillance Data

Due to behaviors and environmental conditions that increase risk for multiple diseases, HIV-positive individuals are at increased risk for comorbid infections such as syphilis, TB, and hepatitis C (HCV). The presence of comorbid infections can detrimentally impact both the health and life expectancy of HIV-positive individuals. HIV-positive persons with comorbidities may need special care and treatment. Therefore, surveillance of potential HIV comorbidities is very important.[26]

More than half of all newly diagnosed syphilis infections were among men under the age of 30, almost two-thirds were Black/African American, and almost half were also co-infected with HIV (had HIV prior to or within 30 days of syphilis diagnosis). Syphilis rates have also been increasing among women. From 2012 to 2014, the rate of newly diagnosed syphilis infections among women increased from 1.3 per 100,000 population to 2.6 per 100,000 population.

The majority of TB disease cases in North Carolina in 2014 were among men (56%), over 40 years of age (64%), and were Black/African American (43%). Almost half of the TB disease cases in 2014 were among people born outside of the US, and 4.1% of people with TB disease had been homeless within the past year (Table 11).

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[26]Samji, H., & Hogg, R. (2014). Life expectancy trends in HIV. *Physician's Weekly*. Retrieved from http://www.physiciansweekly.com/hiv-life-expectency-trends/

Table 11. Tuberculosis Disease Cases in North Carolina by Selected Demographics, 2014

Demographics	Number	Percent
Gender		
Women	85	43.6%
Men	110	56.4%
10 Year Age Group (Calculated)		
0-9	7	3.6%
10-19	8	4.1%
20-29	29	14.9%
30-39	27	13.9%
40-49	43	22.1%
50-59	29	14.9%
60-69	22	11.3%
70-79	12	6.2%
80 and Older	18	9.2%
Race/Ethnicity		
American Indian/Alaskan Native	5	2.6%
Asian/Pacific Islander	26	13.3%
Black/African American	84	43.1%
Hispanic/Latino	38	19.5%
White/Caucasian	38	19.5%
Multiple Race	4	2.1%
Country of Origin		
U.S.	110	56.4%
Non-U.S.	85	43.6%
Homeless Within Past Year		
Yes	8	4.1%
No	187	95.9%
Total	195	100.0%

Data Source: North Carolina Electronic Disease Surveillance System (data as of June 2016).

Acute, but not chronic, HCV is reportable in North Carolina. Most cases of HCV are not identified in the acute stage or the first six months of infection, and therefore are never reported. In 2014, the majority of people with acute Hepatitis C infections were men (53%), under 30 years of age (48%), White/Caucasian (85%), and were missing risk factor information (56%). Over one-third reported injection drug use as a risk factor. At this time, North Carolina surveillance data cannot provide a representative picture of acute or chronic HCV co-infection with HIV.

Chronic Hepatitis C will be reportable via electronic lab report at the beginning of 2017. Recent analysis based on acute reporting and vulnerability data has indicated that there are at least 110,000 people living with chronic Hepatitis C in the state. Therefore, NC has inaugurated the NC HCV: TLC program (Test, Link, Cure) focused on western and southeastern counties believed to be at greatest risk for HCV

transmission, primarily as a result of the opioid and injecting drug epidemic both nationally and in the state. Clean syringe programs have recently been legalized in North Carolina; standing orders for opioid reversals are now available at all pharmacies; increased efforts to educate the medical work force in preparation for a growing population in need of treatment and cure are underway.

B. HIV Care Continuum in North Carolina

The HIV care continuum is a concept developed within the past few years that describes the various stages of engagement for a person receiving HIV medical care.[27,28] The HIV care continuum addresses the question, "What proportion of the population diagnosed and reported with HIV infection in my state are believed to be in care during a given year?" Variations on the continuum include different stages, but major stages often include: undiagnosed HIV infection, diagnosed HIV infection, linked to HIV care, in care (measured various ways), prescribed ART, and virally suppressed. The HIV continuum serves as a useful framework for conceptualizing progress made toward achieving the National HIV/AIDS Strategy (NHAS) goal of increasing access to care and optimizing health outcomes, such as ensuring that people with HIV infection are virally suppressed.[29] In 2013, President Barack Obama issued an executive order establishing the HIV Care Continuum Initiative, which highlights the important role the HIV care continuum plays in national HIV/AIDS policy.[30,31]

There are several key points that should be considered when interpreting the North Carolina HIV care continuum (both prevalence- and diagnosed-based, Figures 16-21):

- The North Carolina HIV care continuum is based on both surveillance and Medical Monitoring Project (MMP) data, in accordance with CDC protocols. CDC protocols:
  - Use reported laboratory tests for CD4+ T-lymphocyte cell counts and viral loads as surrogate markers for evidence of HIV care;

[27]Gardner, E., McLees, M., Steiner, J., Del Rio, C., & Burman, W. (2011). The Spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. *Clinical Infectious* Diseases. *52*(6), 793-800. doi: 10.1093/cid/ciq243.

[28]AIDS.gov. (2013). *HIV/AIDS care continuum*. Revised December 18, 2013. Accessed November 8, 2014. Retrieved from http://www.aids.gov/federal-resources/policies/care-continuum/

[29]President Barack Obama. (2010). *National HIV/AIDS strategy for the United States.* (July 2010). Accessed November 8, 2014. Retrieved from http://aids.gov/federal-resources/national-hiv-aids-strategy/nhas.pdf

[30]President Barack Obama. (2013). *Executive Order -- HIV care continuum initiative. The White House, Office of the Press Secretary*. Created July 15, 2013. Accessed November 8, 2014. Retrieved from http://www.whitehouse.gov/the-press-office/2013/07/15/executive-order-hiv-care-continuum-initiative

[31]Office of National AIDS Policy. (2013). *National HIV/AIDS strategy improving outcomes: accelerating progress along the HIV care continuum*. Created December 2013. Accessed November 8, 2014. Retrieved from http://www.whitehouse.gov/sites/default/files/onap_nhas_improving_outcomes_dec_2013.pdf